Perceptions of Bicycle Safety in Lawrence, KS

"One of the most important days of my life was when I learned to ride a bicycle"

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Independent Study
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Introduction

It has been noted around the United States that simply building bicycle infrastructure (bike routes, lanes, and shared use paths) is not enough to substantially change the behaviors of travelers and not nearly enough to get more of them riding instead of driving. Building bike facilities is important, but so is teaching people how to ride safely and encouraging them to do so for their utilitarian trips to work or shopping. It is also important for law enforcement to understand the importance of making sure that all cyclists and motorists follow the laws and share the roads safely. These concepts are known as the 5 E's of bicycle planning. They include Education, Encouragement, Engineering, Enforcement and Evaluation.

Figure 1: Intersection Downtown Lawrence- 7th & New Hampshire

"Bikeability" – a term defined as the cities suitability for bicycling.

There are plenty of operational and educational factors that need to be considered in the creation of a successful bikeway network and a safe comfortable cycling environment. States and cities that take a comprehensive approach to bicycle planning and implementation are really making a difference in the quality of life for cyclists. Unfortunately, it appears that Kansas may be falling behind in its bicycling programs. According to the historical ranking of bicycle friendly states, Kansas ranked 46th on the list in 2014, whereas back in 2010 it ranked 13th on that same list. The recent changes made by other states to improve bicycling are noticeable and commendable. It is now time for Kansas and the City of Lawrence to follow that lead and push ahead for better cycling.

A prominent issue discouraging bike ridership is that people do not feel safe riding on our streets. This study will start to explore that issue by analyzing the bicycle crash data, and investigate the perceptions people have about cycling safety based on responses to an online survey put out by the Lawrence - Douglas County Bicycle Advisory Committee.

The study explores what makes the perception of bicycling safer. It evaluates the improvements and programs implemented in Columbia, Missouri as part of The Non-motorized Transportation Pilot Program.

Lawrence - Douglas County BAC Bicycle Advisory Committee

Figure 2: BAC Logo

This study will explore “bikeability” as an assessment of the entire bikeway-network in terms of the perceived safety, ability and convenience to access important destinations. The Sunflower State is not going to be thought of as a bike-friendly place if more is not done to address the problems of cycling in Kansas, and that starts with an objective identification of the issues keeping people off their bikes and in their cars.

Social, cultural and ethnographic factors are also important for this study, to be able to address which changes can be performed to change the common misunderstanding that bicycles and motor vehicles cannot share the road. Likewise, considerable evaluation of these factors and examining solutions to the problem on how to get the professor, the student, the businessman in a suit, and the parent toting children to discover the benefits and joy of cycling. Getting those who currently drive their personal automobile to get on the bicycle to go to work, to the bank, to visit the library and go to the grocery store will be important to the success of developing the bicycle network. This is performed by identifying the individual’s perception about the barriers regarding the use of bicycles as a mode of transport. The literature presents a large set of factors that individuals may consider possible barriers to cycling, including: travel time, stress, too much traffic, perception of insecurity, lack of physical fitness, personal factors (e.g., lack of time), necessity of traveling at night, inconvenience, lack of adequate infrastructure for cyclists, climate factors and topography. There are a plethora of approaches and programs to address these factors at a city level.

Government support at the Federal, State, and local level is critical to guarantee that the transportation system accommodates bicycling and walking. Whereas individuals and private organizations can accomplish much in increasing public awareness, identifying needs, etc., the creation of a bike infrastructure is primarily a responsibility of government. The responsibility for the development of a bicycle friendly community lies with the community; no one organization can do it alone. Policy changes that advocate for cycling promotion are regarded as very important for healthier transport and a more sustainable mobility is based on the connection of factors affecting bicycle use (Pucher et al., 2010).

The perception of not feeling safe riding on the streets with automobile traffic is mentioned as a barrier to cycling in the Countywide Bikeway System Plan produced by the Lawrence - Douglas Metropolitan Planning Organization (L-DC MPO) in 2013. This safety focused bicycle study will complement that Countywide Bikeway Plan and other MPO planning products (Transportation 2040 Plan, etc.). These studies depict the community desire for more multimodal transport throughout Douglas County. This bike safety study will also be timely since the USDOT is scheduled to create performance measures, under the Moving Ahead for Progress in the 21st Century Act. These performance measures will include traffic safety measures, which will need to be incorporated into the transportation planning process.

Background

Cycling is increasingly recognized as a clean, sustainable mode of transport and an essential part of an inter-modal plan for sustainable travel (OECD, 2004). In the United States, however, the bicycle has traditionally been marginalized as a form of transportation as cities develop and sprawl outward. These impacts have caused bicycling to disappear as a method of transport, and instead left it primarily as instrument to exercise/recreation. The decrease of bike use has led to motorist's perception that they are not required to safely share the road with cyclists, not to mention the cyclist's knowledge of proper bike etiquette and safety.

As concerns arise about climate change and congestion in major cities of the US, many American cities are looking at the bicycle as part of a solution to transportation issues. It is time for city planners, engineers and the public to push towards this purpose. Cities around the United States have already started developing comprehensive bike plans in efforts to increase bike usage. Certainly, cycling is not the solution for urban-related problems moreover global warming, but it has healthy effects through higher physical activity and positive environmental impacts (Akar and Clifton, 2009).

The success of these programs has one common denominator, the perception of how safe it is to bicycle, the most common factor impeding potential cyclists (FHWA 1995: 13). It is also reliant to the bikeability of a city, in other words the connectivity of the bikeways and where they lead. A good way cities have to measure the bikeability of their system is by the amount of trips done by women and children. Several studies show that women are more sensitive to cycling dangers than men (Baker, 2009; Geddes, 2009; Pucher et al., 2010a). From 2001 to 2009, the percent of all bike trips in the USA made by women fell from 33 percent to 24 percent. In fact bicycling has declined in persons younger than 16, from 56 percent in 2001 to 39 percent in 2009.This is an alarming fact for cities across the United States, for this reason change has to come now.

Figure 3: Emily Finch powers her seven-person family vehicle down SE Clay Street. (Photos©J.Maus/BikePortland)

In an effort to promote active transportation, Congress funded the Nonmotorized Transportation Pilot Program under the 2005 federal transportation bill (SAFETEA-LU). The sole purpose of the pilot program was to fund communities so they could develop active transportation infrastructure with supporting educational programs. More infrastructure dedicated to commuters in non-motorized vehicles, makes more people use the bicycle as a form of transportation. Not only making improvements in infrastructure but also better combining land use and transportation initiatives allowing residents to live closer to a variety of destinations, making cycling an effective choice of transportation.

Four pilot communities were awarded $25 million each through this pilot program. This thesis will evaluate the efforts performed by Columbia, Missouri. Out of the four pilot communities Columbia is topographically and demographically similar to Lawrence, Kansas. This study will explore how the improvements in bicycle parking, on-street and off-street infrastructure projects, and the implementation of outreach, education, and marketing impacted the community. In doing so, this study hopes to identify which programs should be used as models to apply in Lawrence.

Figure 4: Intersection on 6th & Rockledge- Lawrence, KS

Figure 5: NTPP Report May 2014

The Nonmotorized Transportation Pilot Program (NTPP)

The Nonmotorized Transportation Pilot Program, established in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for users (SAFETEA-LU) provided approximately $25 million each to four pilot communities (Columbia, Missouri; Marin County, California; Minneapolis area, Minnesota; and Sheboygan, Wisconsin) for pedestrian and bicycle infrastructure and nonmotorized programs. A fifth community was chosen as a control community to serve to identify external factors that contribute to nonmotorized transit use, like gas prices. This program sought to "demonstrate the extent to which bicycling and walking can carry a significant part of the transportation load, and represent a major portion of the transportation solution, within selected communities" (NTPP report 2014,1). Each community developed its own set of program priorities and approach to implementation due to their unique geographic and demographic contexts.

The pilot communities and the Federal Highway Administration (FHWA) created working groups to coordinate the implementation of the program and develop a common methodology for data collection and analysis. These working groups are:

- GetAbout Columbia, by Pednet (Non-profit)
- WalkBikeMarin, by Marin County Department of Public Works (Government)
- Bike/Walk Twin Cities, by Transit for Livable Communities (Non-profit)
- NOMO, by The Sheboygan County Planning and Conservation Department (Government)

This research concentrates in the efforts performed by GetAbout Columbia; these are summarized in detail in Chapter 3.

Bicycle Facilities & Infrastructure

Bikeways are one element of an effort to improve bicycling safety and convenience – either to help accommodate motor vehicle and bicycle traffic on shared roadways, or to complement the road system to meet needs not adequately met by roads. Facilities and programs can reassure safety and usage, the proper implementation of this can increase the number of trips a community has.

Facilities that encourage bicycle usage

- Water resistant or covered bicycle storage
- Wayfinding – traffic signals for bicycles they can include closest landmarks, time to destination
- On-street bike parking
- Crossing islands
- Lane reduction/reconfiguration or narrowing
- Reducing Speed limits for shared lanes
- Accessible showers and changing rooms in office buildings
- Cyclovia: An event that started in Colombia, were once a month major streets are closed for motor vehicle traffic from 8 A.M. to 3 P.M, to encourage bicyclist, runners, and skaters. This provides the community with awareness about active transportation.
- Neighborhood Greenways

Figure 6: Cyclists wait at 6th Street and 4th Ave. during the Cyclovia Tucson event on April 18,

There are also, different types of classification of bicycle infrastructure throughout the world; this project will concentrate in the ones applied by the pilot communities. The classifications of these are based on the interaction with motor vehicles.

Class I

Bikeways that provide a completely separated right of way for the exclusive use of bicycles and pedestrians with minimized motor vehicle cross flow.

- Greenway Trails: Paths incorporated into natural areas such as parks or conservation areas, along stream or river corridors, along waterfronts including beaches and shorelines, or along flood control levees.

- Side Paths: A side path is a shared use path located adjacent to a street. It is designed for two-way use by bicyclists and pedestrians. Side paths may not be appropriate in areas of high pedestrian activity unless there is space to separate pedestrians and cyclists and to successfully manage conflicts. Side paths may also not be appropriate along streets with numerous driveways or intersections, particularly in commercial areas with high traffic volumes.

Figure 7: Example of Side Path

- Cycle Tracks: A cycletrack, sometimes called a protected bike lane, is a bicycle facility that is physically separated from both the street and the sidewalk. A cycletrack may be constructed at street level using street space, or at the sidewalk level using space adjacent to the street. Cycletracks provide cyclists with a higher level of comfort compared to bike lanes, and are typically used on large multi-lane arterials where higher vehicle speeds exist. They may also be appropriate on high-volume but lower-speed streets.

Figure 8: Example of Cycletrack (Protected Bike

Class II

Bikeways that provide shared use with motor vehicle traffic.

Figure 9: Example of Bike Lane

Bike Lanes: is a pavement marking that designates a portion of a street for the preferential or exclusive use of bicycles. Bike lane markings are typically dashed where vehicles are allowed to cross the bike lane, such as for right turns or at bus stops. Bike lanes are recommended on two-way arterials and collector streets where there is enough width to accommodate a bike lane in both directions, and on one-way streets where there is enough width for a single bike lane.

Figure 10: Example of a Bike Route with Paved

Bike Route with Paved Shoulders: Signed bike routes on busier roads should provide a paved shoulder for bicyclists to use. In addition to benefiting bicyclists, paved shoulders increase the longevity of the roadway, reduce pavement maintenance, provide safety benefits to motorists, provide additional space for agricultural equipment and other slow moving vehicles, and provide a number of other benefits to all users of the roadway.

Figure 11: Example of a Sharrow in Lawrence (Naismith Drive South of

Sharrows: Shared lane markings (sharrows) are used on streets where bicyclists and vehicles share travel lanes. The sharrow helps position bicyclists and also provides a visual cue to motorists. On a four-lane street, sharrows should be placed in the outside lane. Sharrows are not appropriate on streets with speed limits greater than 35 mph.

Figure 12: Example of a Neighborhood Greenway / Bike Boulevard

Neighborhood Greenway/Bike Boulevards: A neighborhood greenway, sometimes also called a bicycle boulevard, is a street with low motorized traffic volumes and speeds designated to provide priority to bicyclists and neighborhood motor vehicle traffic. Neighborhood greenways may simply have signs and shared lane markings, or may include traffic calming elements including speed humps, traffic circles, chicanes, or traffic diverters. Neighborhood greenways benefit neighborhoods by reducing cut-through traffic and speeding without limiting access by residents.

Bicycle Safety and Understanding the Perceptions of Safety

With an increased public policy focus on bicycling, researchers and planners are trying to better comprehend what motivates people to use a bicycle instead of a motorized vehicle. Many scientific literatures assess the factors affecting bicycle usage these analyze cyclist behavior depending on externalities. According to (Fernández-Heredia et al., 2014) there is an evident need to assess not only factors that can be observed but also factors related to cyclists' emotions, feelings, and personal perceptions. The typical factors used to determine transport users behavior (cost and time) are not as significant concerning bicycle usage. To be able to understand cyclist behavior, an explicit approach to identifying psychosocial factors affecting their perceptions has to be performed.

This information will help us understand and determine the appropriate actions that have to be taken to encourage bicycle use. The current problem bicycle advocates have is to overcome the perception that riding a bicycle is unsafe. According to the pedestrian and bicycle information center (PBIC) "bicyclists seem to be over-represented in the crash data, but, there is no reliable source of exposure data as we don't know how many miles bicyclists travel each year, and we don't know how long it takes them to cover those miles." This means that we won't be able to understand the actual risk of riding a bicycle compared to other transportation modes until we have reliable data to analyze.

This study will combine available literature that addresses this issue by analyzing socio-demographic characteristics, latent variables, and cyclist choice factor with a more descriptive perspective. With this purpose an Internet based survey was designed, and distributed in the City of Lawrence, investigating which improvements can be planned to meet the Moving Ahead for Progress in the 21st Century Act.

Factors that lie under the socio-demographic characteristics are age, ethnicity, sex, socio-economical status, and family size. In the available literature this yield different results (Dill and Voros, 2007; Pucher and Buehler, 2008; Pinjari et al., 2008). Latent variables are aimed to understand the perceptions of the users by creating a hypothesis from observed factors. Six latent variables relate to the perception towards bicycling according to (Li et al., 2013) these are: environmental awareness, need for flexibility, desire for economy, desire for comfort, sensitivity to time, and need for a fixed schedule. Choice factors are measured directly by retrieving information from users. These factors can be divided into those who affect a group of people, an individual, structural factors, and subjective factors.

- Collective factors are related to environmental factors, which include weather conditions, topography, and urban form. Urban form refers to the usage of space in the city and the density of the population.
- Individual factors are related to the individual trip factors, which include the purpose, duration or distance, and flexibility of the ride all this affect the decision the individual makes between using a motorized or nonmotorized vehicle. It is important to separate mandatory travel from leisure or recreational activities.
- Structural factors are conveyed with the cities bikeability or the connectivity

of the city's bicycle network.

- Subjective factors are the perception of risk and exercise opportunity of each individual. The actual risk of each facility is not correlated to the perceived risk of the cyclist therefore it is a determinant in the choice of alternative modes of transportation.

City planners and engineers have to take account of all of these factors if they want to overcome the first and last mile challenge. Planning a system with Class I bikeways that connect residential areas to schools and business districts. This have to be planned and engineered to overcome the fear of being close to traffic, but at the same time be placed close enough to traffic that motor vehicles become aware of them (Jacobsen 2003, 205). Peter Jacobsen's theory suggests that by having more cyclists on the road, motorists will become more alert and safer drivers. The U.S. Department of Transportation reports that Portland, Oregon, has bike-related accidents inversely proportional to the number of cyclist on the road. This theory is inclined to having Class II bikeways, thus designing a system that has Class I bikeways visible to traffic is one of the challenges.

First-Last mile challenge is used to describe the difficulty of getting users from their starting location to a transportation network or their final destination. The connectivity of a bikeway network plays a key factor to address this problem, as well as, the necessary infrastructure and facilities at the end destination.

Another challenge that city planners and engineers have to address is the connectivity issue that is created by only having one type of bikeways. This includes the time and distance related problems that are generated by not having bikeways parallel to main streets crossing the city. For this reason no healthy bike network can only have one type of bikeway system implemented, it needs to integrate both Class I & II bikeways in such a way that bikers with all comfort levels can ride on them. By creating joints (meeting points) in the system between both types of infrastructure, the individual's comfort levels will strengthen, facilitating the first-last mile problem.

Government and advocates have to push for additional policies to address these difficulties. It is suggested that the perceptions of risk can decrease by implementing new law that prioritizes bicyclists over motor vehicles. This can be performed in many different ways such as, reducing speed limits, creating and enforcing law that punishes reckless driving in shared lanes, between many more. Law enforcement contribution is essential to this cause by enforcing the laws and penalizing those motor vehicles that put bicyclist at risk. Employers can assume other policies that affect positively to ridership by offering financial or other incentives that include showers, lockers, and secure bicycle storage. With all this implementations in place education and outreach is essential to realize all the benefits bicycling will bring to their life and the environment.

To address the problem of what is keeping people in their cars and off their bicycles, a collective effort has to be shown by not one entity but by the whole community. In the next chapters, the study will identify projects that worked in Columbia, MO and can be considered by the Lawrence community to improve its bikeability.

Columbia, MO

Similarities to Lawrence, KS

Columbia, Missouri was chosen out of the four cities that are part of the Nonmotorized Transportation Pilot Program (NTPP) because it's the closest representation of demographics and built environment to Lawrence. It is a typical university city not densely populated in the United States with a median age of 27 years old. A comparison of both cities in a set of specific characteristics is shown in Table 1. Furthermore the topography and weather is also similar, both have hills and weather extremes. These make Columbia a perfect city to model after, and it is reasonable to believe that their results could be also achieved in Lawrence. An updated map of Columbia's bike map is shown in Figure 13, this map shows access points, difficult connections (intersections), and the type of infrastructure.

> *"Established by federal transportation legislation, the Nonmotorized Transportation Pilot Program provided over $25 million each to four communities (Columbia, MO; Marin County, CA; Minneapolis Area, MN; Sheboygan County, WI) to demonstrate how walking and bicycling infrastructure and programs can increase rates of walking and bicycling.* (Nonmotorized Transportation Pilot Program, 2015)"

	Columbia, MO	Lawrence, KS
Population	108,500 (2010)	87643 (2010)
Housing Units	46,739 (2010)	37, 502 (2010)
Jobs	72,070 (2010)	57, 974 (2010)
Geographic Area	53 square miles (2010)	33.56 square miles (2010)
Population Density	2,047 persons per square mile (2010)	2,611 persons per square mile (2010)
Sidewalks	350 miles (2005)	405 miles* (2014)
Bicycle Lanes	28 miles (2005)	7.1 (2012)
Shared-Use Paths	25 miles (2005)	28.3 (2012)
Previous Bicycle / Pedestrian Planning and project Experience	Moderate	Moderate
Key Community Characteristics	College town; large institutional employers	College town; large institutional employers

*Excludes university sidewalks

Table 1: Comparison of city characteristics, and Demographics

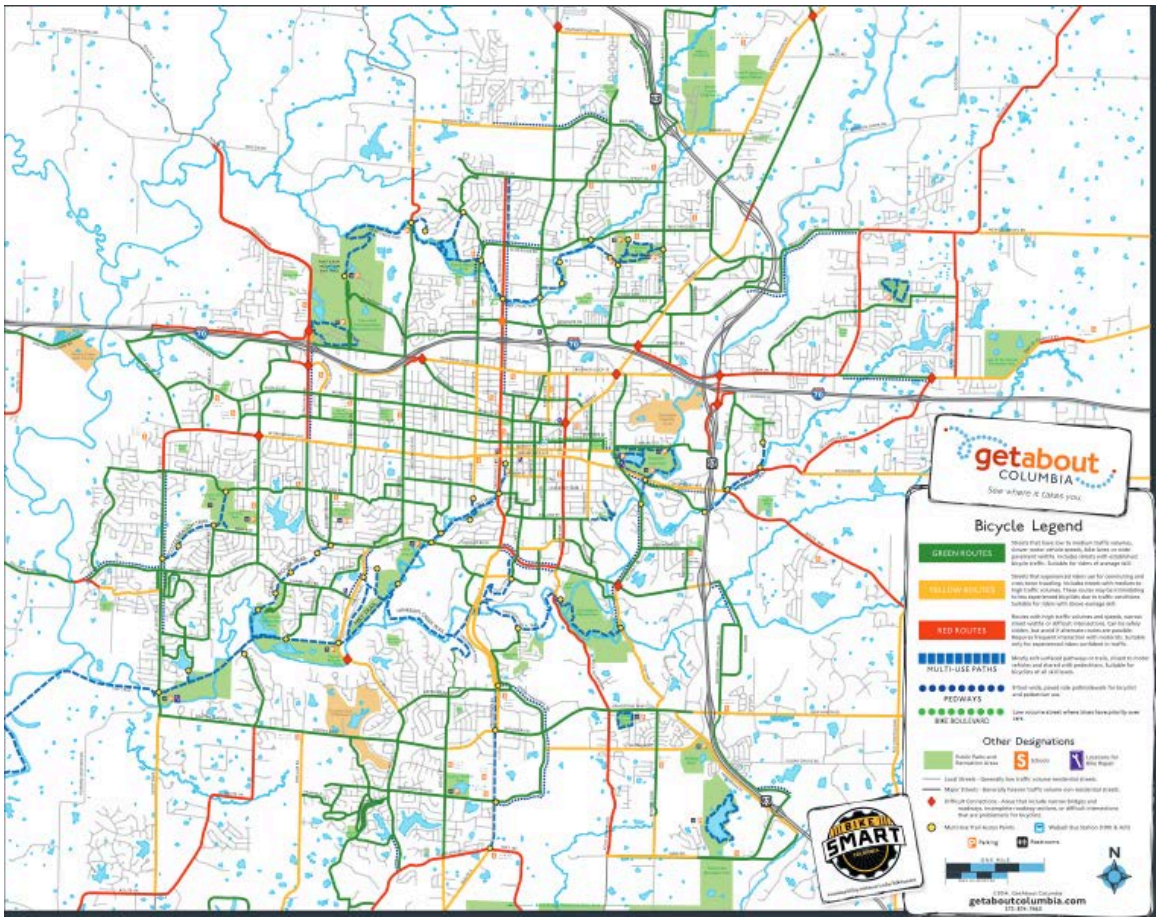


Figure 13: Columbia Bike Map 2014

Implementation of funds

To implement the NTPP program, Columbia named its pilot program GetAbout Columbia, which is facilitated by PedNet, an existing bicycling and pedestrian advocacy group. PedNet represent the opportunity for everyone in the community to think differently about how to get about town, and experience the benefits and enjoyment of walking and biking.

The funds were committed to nonmotorized transportation projects or programs in the following four categories:

- Bicycle parking
- On-street infrastructure projects
- Off-street infrastructure projects
- Outreach, education, and marketing to promote walking and bicycling

In addition to these investments, the pilot communities leveraged other federal, State, local, and private sources to increase the program's impact. Part of the funds allocated on planning, program administration, and evaluation.

The program's aim is less focused on creating an entirely new network but more improving the existing bikeway network and on getting a larger share of the population to use the system. The funds were distributed in the previously mentioned categories as shown in Figure 14. One key factor of the approach of this project is the pairing of educational and promotional programs along with the improvement of the existing infrastructure. This approach provides stimulus toward behavioral change amongst individuals that tend to use their automobile instead of bicycling and walking. Ultimately motivate them to do their utilitarian travel by bicycling or walking.

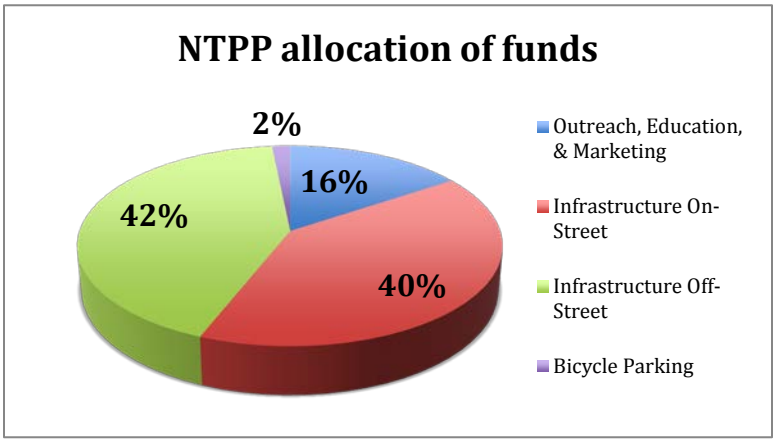


Figure 14:Columbia's NTPP Pilot Community Investment Percentages by type.

Data Collection and Analysis

The ability to measure the impact of the project funding was one of the first challenges encountered by the work groups. The analysis and data collection for cycling usage has been especially marginalized because of its relatively low use. Given these limitations, the work groups developed a collaborative approach to data collection relying on directly collected data and supplementary existing State, national, and local data sources.

The work groups used averages of the total two-hour weekday afternoon and weekend counts where available for up to three years prior to the project implementation for the pre-project data. Additionally the most recent data was averaged every three-years after project completion to provide the most recent post-project data. The work groups did not have enough years of pre-program data to apply a moving average for the baseline year. The evaluation areas for the counts fell under the following categories: Mode Share Shift, Access and Mobility, Environment and Energy, and Safety and Public Health. These were performed following the National Pedestrian and Bicycle demonstration Project methodology, developed by Alta Planning and Design and the Institute of Transportation Engineers.

Due to challenges collecting data many of the results are based on estimates, particularly the mode share shift results, which are based on counts described above. Each community had different amount of preexisting infrastructure, the contribution to the overall network is relative depending on it. Additionally external factors contribute to the usage of nonmotorized vehicles such as weather, changing economic conditions, gas prices, and demographic factors.

For this reason, the NTPP final report represents the improvements in the implementations of infrastructure and education. This report, as the work groups involved in this project recognized that the outcomes of these implementations are not fully attributable to the NTPP investment. Furthermore, despite all these uncertainties all the work groups' analyses conclude, "over the seven-year measurement period, concurrent increases in active transportation and accessibility improvements helped reduce emissions and energy usage and improve health and safety" (NTPP report 2014, 16).

Methodology

Mode Share Shift

Each pilot community conducted counts of bicyclists and pedestrians on day of the fall at predetermined locations every year between 2007 and 2013. According to Alta Planning and Design, "Studies have shown that activity levels of bicyclists and pedestrians may vary as much as 30 percent or more on a daily basis at the same location (even on sequential days)." By averaging the activity as a three-year moving average, the variability of the results was addressed. The American Community Survey uses this method for many of its data and tables. A description of the model used to count mode share shift is part of The Final Report to Congress, The Volpe Center reviewed this model.

According to the model estimations, bicycling as a mode share increased every year and driving decreased each year at estimated 12.8 percent. Bicycling in the pilot communities increased an estimated 44% in the 6-year period. This dramatic change can be partly attributed to the high density of the pilot communities compared to the country as a whole. An estimated 4.14 million vehicle trips were avoided in 2013 compared to the base line year 2007, for bicycle trips alone. "In sum, an estimated 85.1 million vehicle miles traveled were averted by nonmotorized trips between 2009 and 2013." About 80% of those miles were recognized to be walking trips, because of its high frequency.

Access and Mobility

"Transportation demand refers to the amount of mobility and accessibility people would consume under various conditions" (Todd. 2012,6). To be able to move physically from one place to another gives you mobility, for example the ability to travel between home and school, among other destinations. Accessibility is referred as people's ease of mobilization to reach goods, services, activities, and destinations.

A beautiful designed off-road facility will be useless to the bicyclist if he/she cannot

access it because he/she has to cross a highway to get to it. Similarly, bikeways that do not connect neighborhoods with schools, downtown businesses or shopping areas will never achieve their intended purpose of nonmotorized travel. Bicycle accessibility in other words "Bikeability" is the assessment of the entire bikeway-network in terms of the perceived safety, ability and convenience to access important destinations. The pilot communities prioritized increasing their bikeability by analyzing various key community destinations and planning routes that interconnect destinations. More than 70 percent of the projects connect to activity nodes, including employment centers, schools, and park and recreation areas.

The NTPP investment increased the ¼-Mile access to the bicycle network to approximately 250,000 people, 100,000 housing units, and 100,000 jobs. In Columbia alone the ability of having ¼-Mile access to the network bumped from 16 to 78 percent of people, 12 to 78 percent of housing units, and from 28 to 77% of jobs. There was such an increase in percentage of people reached because the community had a relatively small preexisting network. Ted Curtis, Ped/Bike coordinator for GetAbout commented that they have constructed more than 60 miles of bike lanes.

Environment and Energy

Environmental benefits are associated with Mode Share Shift, by reducing air pollutants and greenhouse gas emissions. The work groups identified the pollutants under the Federal Clean Air Act Amendment as well as carbon dioxide. According to the FHWA's National Household Travel Survey, about 50 percent of daily trips are less than 3 miles, but 72 percent of these are driven. According to the Environmental Protection Agency (EPA), automobiles are responsible for about 20 percent of CO_2 emissions in the U.S. It is estimated that during the trial period the pilot communities averted 34,639 tons of CO_2 collectively, that is equivalent to 3.6 million gallons of gasoline.

The impacts of energy savings were calculated from shifts from driving to walking and bicycling. The program prevented 146,877 BTUs (standard measure of energy) per capita this translates to 406 billion BTUs between 2009-2013. These calculations are based on the average passenger car fuel efficiency in 2005, at the beginning of the NTPP.

Safety and Public Health

Essentially all NTPP infrastructure and education programs positively impacted pedestrian and bicycle safety while increasing the physical activity performed in the pilot communities. As nonmotorized trips increase, the existing concern about the safety of each rises. Research shows that cities that have bike share programs have the safest cycling; on the other hand cities with the lowest bicycles in the roads have the most dangerous cycling. "Safer cycling encourages more cycling, and more cycling encourages greater safety" (Pucher et al., 2011, 462-463).

The communities observed:

- *A 20 percent and 28.6 percent respective decline in pedestrian and bicycle fatalities on roadways.*
- *The added bicycling trips observed in 2013 alone reduced the economic cost of mortality in the pilot communities by an average of $46.3 million*

The improvement of safety was the primary concern of the NTPP, to evaluate the success of the project an analysis was performed between 2002 and 2012. This evaluated motorist-involved pedestrian and bicycle crash fatalities and reported injuries. It is important to have present that a great amount of minor accidents are generally not reported to the police, for this reason the analysis concentrates on motor vehicle-involved crashes. The analysis performed by the work groups of the four pilot communities suggested that a decline of number of pedestrian and bicycle fatalities and injuries per number of trips. According to the NTPP report presented on May 2014, the reasons for the observed safety improvements are:

- Many of the NTPP projects, reduce traffic hazards for pedestrians and bicyclists
- NTPP outreach programs focused on education and marketing promoting safety on the road; and
- Greater density of pedestrians and bicyclist could have created “safety in numbers,” creating awareness among the community.

Extensive medical research indicates that cardiovascular activity is necessary for healthy living. A study published in the September 2003 issue of the *American Journal of Health Promotion* found that people living in sprawling counties “were likely to walk less, weigh more, and have greater prevalence of hypertension than those living in compact counties” (Ewing et al. 2003, 567). Some of the benefits seen by having as short as 10 minutes of cardiovascular activity are:

- Builds strength and muscle tone
- Mood improvements
- Prevention of certain types of cancer
- Weight control
- Reduced risk of cardiovascular disease
- Reduced risk of diabetes

According to the British Medical Association, cycling just 20 miles a week can reduce the risk of coronary heart disease by 50% that is less than 3 miles a day. Moreover, pedestrian and bicycle transportation offers more occasions for people to socialize than driving in automobiles, creating a happier and safer community.

Infrastructure

In the efforts of increasing safety for cyclist GetAbout, took a non-traditional way to use their funds, they invested in the design of experimental infrastructure. This experimental infrastructure was in the efforts of getting the word out. This projects are both efficient and self-promoting, this can be noticed in Figure # which shows a non-traditional Bike lane. This Green Bike Lane is efficient not only by making the bicyclist fell he has his own space, but it makes the motorized vehicles aware of

merging areas and intersections. Ted Curtis Bike/Ped coordinator of the program commented that there was no confusion amongst drivers when this was implemented, there weren't any comments or concerns filed. The design of the experiment Green Merge Area (GMA) is shown in Figure 15 & 16, where bikes yield/merge with the car lane. The plans for a second GMA design was passed in 2012, the detail is shown in Figure 17.

Figure 15: First GMA implemented in 2009

Figure 16: First GMA implemented in 2009, (Aerial photograph)

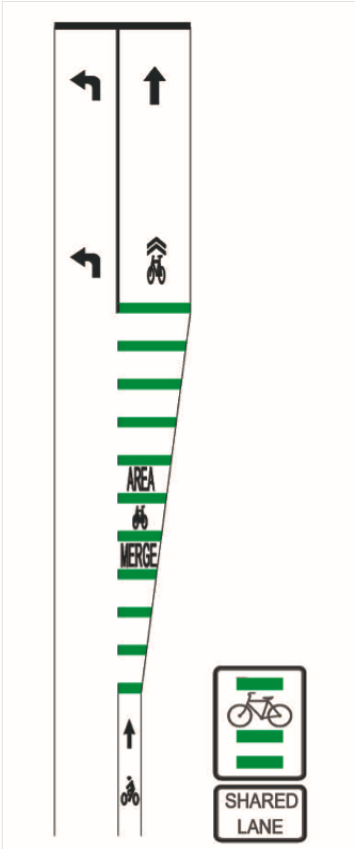


Figure 17: Second GMA design

According to GetAbout Columbia other projects have had a lot of positive reception are the bike boulevards, currently one is finished and another is underway. Wayfinding and signaling have been necessary for the projects realization, this show that the users feel conformable by knowing where in the trail they are and where to go. Figure 18 shows the signage plan for trials, this help users know where they are, assistance information (911), and lets them know how far destinations are by time and distance. GetAbout also experimented with on-street wayfinding, Figure 19, shows their first experiment which was classified as “too small.” Another experimental marking is shown in Figure 20, this is an 18-inch in diameter thermoplastic on asphalt marking. Figure 21, shows the markings, which are helpful to connect Class I, and Class II bike trails, to create a proficient system.

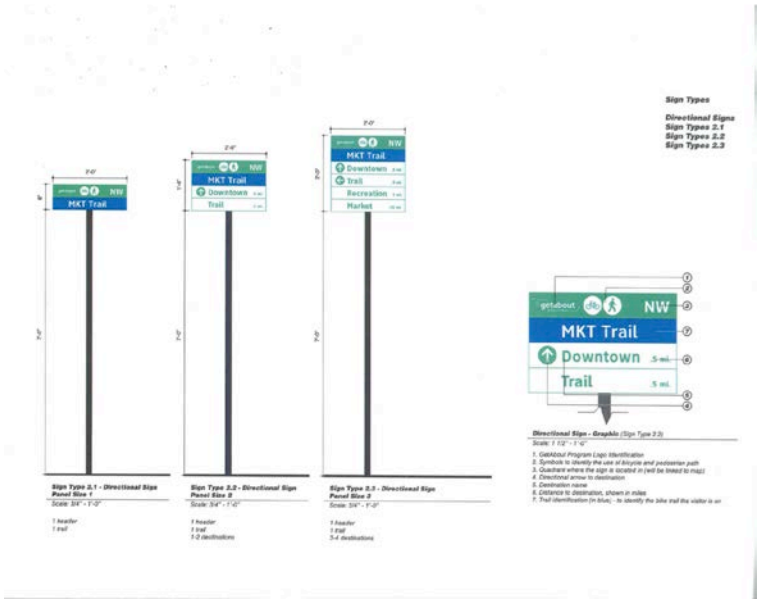


Figure 18: Wayfinding plan for trials

Figure 19: First experiment 6-inch diameter symbols of bike routes through campus

Figure 20: Example of 18-inch diameter thermoplastic marking on asphalt

Figure 21: Example of On-Street

Education

Educational programs have been designed to "enhance skills and competency," and improvements to infrastructure have been designed to provide safe facilities on and off the road (NMTPP Interim Report to Congress 2007: 17). GetAbout spent $3.5 million in outreach and education, dedicating this money in seven educational programs which range from classes geared toward children and classes geared toward adults. These courses are taught by certified by the League of American Bicyclist instructors. Ted Curtis commented:

"It is hard to tell what general marketing was the most effective - it was a multi-faceted approach. As far as direct results, the effective cycling courses showed the highest direct change in behavior. However, that being said, it is difficult to get a significant amount of individuals into the classes, fee or free. We have had up to 100 people a year take the class out of a population of 100,000. Barely a dent in the population."

One of the most noteworthy educational programs is the Safe Routes To School program (SRTS). SRTS programs are sustained efforts by parents, schools, community leaders and local, state, and federal governments to improve the health and well-being of children by enabling and encouraging them to walk and bicycle to school. The program is built up to

- Build sidewalks, bicycle paths and pedestrian friendly infrastructure.
- Reduce speeds in school zones and neighborhoods
- Address distracted driving among drivers of all ages
- Educate generations on pedestrian and bicycle safety

All of these programs build upon each other to make it easier for cyclists to navigate city traffic.

Results and Comments

Cycling has become safer in the USA over all, over a 20-year period from 1988 to 2008; the total number of cyclist's fatalities fell by 21%. Fatalities per 10 million bike trips (all purposes) fell by 65 percent between 1977 and 2009, from 5.1 to 1.8 fatalities per 10 million trips. Columbia reported only 2 fatalities in bicycle trips between the years 2002 to 2009 according to the Missouri Bicycle and Pedestrian Federation. This Statistics make bicycling one of the safest modes of transportation.

Columbia has noted a positive response to all the implementations that their several programs have established. In its 2009 Progress Report, GetAbout Columbia reported that a follow-up survey of the 125 adults taking the 9-hour "Confident City Cycling" course showed 75 percent riding their bikes more and reporting that they have replaced on the average 24 percent of automobile trips with bicycle trips.

Increments in number of participants of these programs are notable; Bike, Walk and Wheel week went from 1,750 participants in 2005 to 6,500 in 2010. For pedestrians, the Walking School Bus program greatly expanded to a ten-week program with 400 students now walking to 15 schools.

Additionally, counts performed by Philips and Associates Inc. of St. Louis, MO show that the system users feel more comfortable by bicycling in town. In between the years of 2007 -2008 there was 5 percent increase in people who occasionally bike to work or school in a typical week. 66 percent of the residents were aware of the program in 2007; in 2015 the count is up to 83 percent. A great representation of the impact of the programs funded by NTPP program is the dropped experienced in people who drive alone to work or school from 77.5 percent to 62 percent (GetAbout Columbia Executive Summary 2009: 4). Furthermore, the average weekday peak hour bicycling volumes increased 71 percent at seven measured locations. Per spot surveys, show that the frequency of utilitarian trips bicycling doubled to 16 trips a month (GetAbout Columbia Executive Summary 2009: 5).

Behavior change is the overall goal of the GetAbout Columbia project, though safety is often a consideration. GetAbout reports increase in usage in all areas since the program was initiated. Ted Curtis comments on how the perception of safety has shifted in the past 10 years since the implementation of the SAFETEA-LU funds

"There are a lot more bicycles on streets, especially in the downtown area. Drivers seem to be more aware and tolerant of the cyclists - in the last few years there have been very few "rants" in the local media compared to when the program started. Without and direct surveys, the increase in numbers makes for a safer environment and perception of safety. This is somewhat based on Portland OR data also."

Overall, Columbia has absolutely seen a positive response to the implementations of the funds. This is greatly attributed to the promotion and education programs, which reach people and teach them to being a safe driver and rider. GetAbout Columbia hasn't released any specific reports regarding ridership in areas where infrastructure improvements have been made. Despite this, bicycling increased an estimated 44 percent between 2007 and 2013(NTPP – May 2014 Report, 19). GetAbout also reports that 80% of the citizens consider Columbia a bicycle friendly town.

The following chapter will address the information and analysis gathered from the survey process performed in Lawrence, KS. This section will help identify changes that the City of Lawrence can perform to promote bicycle usage. Moreover, it will analyze the perceptions of safety of people that own a bicycle and compare them to the perceptions people that don't own one. Therefore giving me a base line to identify what can be performed in the system to change individual perceptions.

Existing Conditions in Lawrence, KS

Perceptions of Safety

The previous chapter describes the similarities that Lawrence has with Columbia, MO, focusing mostly on the structural factors. The purpose is to emulate the positive changes that the community encountered through the implementation of infrastructure and education. This chapter will take account of the collective, individual and subjective factors described under the Bicycle Safety and Understanding the Perceptions of Safety section.

In a partnership with the City of Lawrence and the Lawrence - Douglas County Bicycle Advisory Committee a survey was distributed among the community to learn about the parameters of comfort local bicyclist have in the current system. Additionally, comment sections were included for suggestions about how the system can improve and opinions about bicycling in town. The survey was distributed during an Earth Day event and online, where a total 350 surveys were filled out. Each question has been calculated to have a confidence interval of 5.24 percent with a confidence level of 95 percent. This numbers were calculated using the population size of Lawrence 90,811 according to the U.S. Census Bureau, and the amount of surveys completed.

The survey was designed so people with and without bicycles would be able to complete it. Page logic was utilized so people without bicycles skipped bicycling in town related questions. Therefore answers varied due to many different factors. This section will separately analyze people that own a bicycle and people that don't own a bicycle. Furthermore, it will also look for trends of attitudes between age groups, and experience of the bicyclist.

The determination of these trends will be an important factor for the local government and advocacy groups so they can plan for the future of bicyclists in the city. An example of the sample survey distributed can be found in Annex A, and its results in the results section.

Trends found with people who do not own a bicycle

Out of the 350 respondents only 38 of them did not own a bicycle, which is 11 percent of all the surveys taken. The survey was designed so that the people who didn't own a bicycle would skip the following questions:

- How often do you bicycle in the months of March to September?
- How often do you bicycle with your children?
- When bicycling does you use any of the following? (Referring to protective gear)
- If you do not use a helmet… Why not?

When asked about the personal experience with bicycling, 38.84 percent of respondents answered that they were interested in bicycling. If one assumes that these people do not know how to bicycle and then add them to the 29.73 percent who see themselves as beginners, there are a 68.57 percent of people that don't own a bike because they lack the skillset or feel bicycling is unsafe. This correlates with their answers retrieved from question 14 that asked about what prevented each one to ride more. Figure 22, shows the reasons these respondents gave when asked this question. It is important to note that out of the 25 who answered the experience related question, only 68 percent of them answered the previously mentioned question.

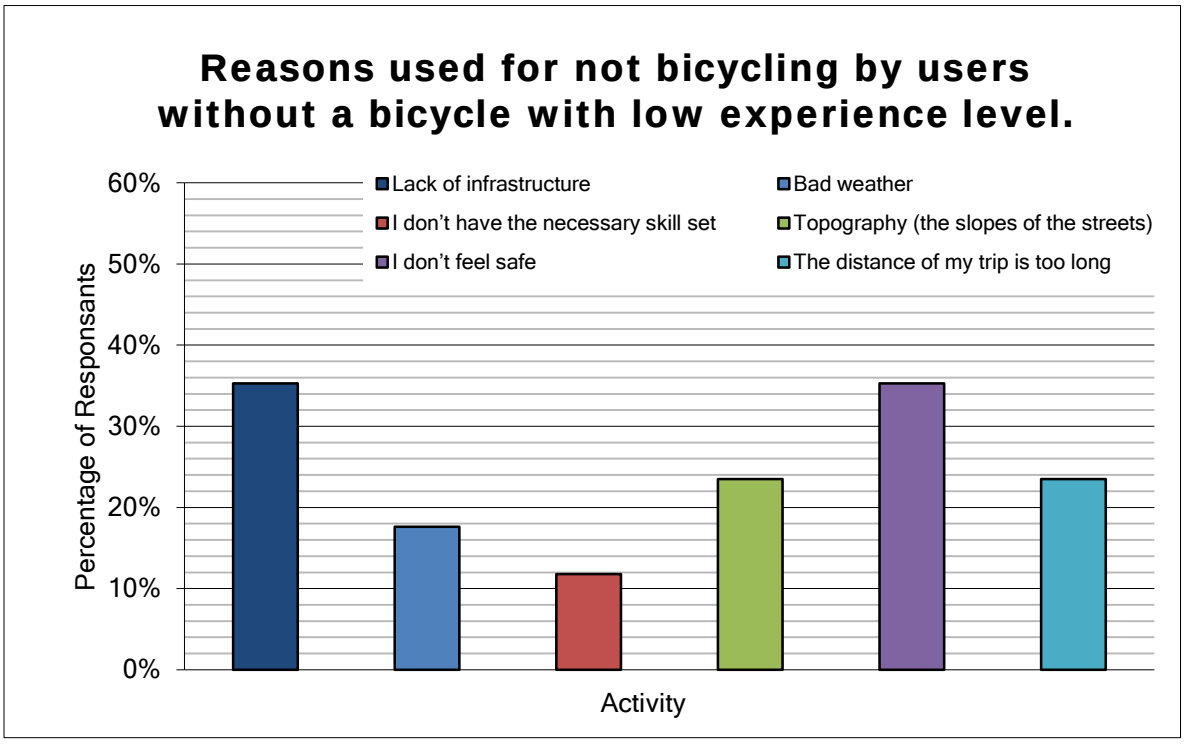


Figure 22: Reasons affecting the choice of a motor vehicle over a bicycle

When asked about the maximum travel time To/From different locations, there was extreme difference between these locations and when bicycling for exercise or recreational purposes. The question was formatted to be an open-ended question, which seemed to bring confusion, people answered in time, ranges of time, and distance. To make the analysis feasible the ranges of time were averaged to a single unit, and the distances converted by assuming that a normally passed rider takes 5 minutes per mile. Additionally to this, answers that were partially complete or left blank were assumed to be 0 minutes. On Table 2, one can see the maximum travel time people without a bicycle would be willing to bike depending on an activity.

Activity	To/From Work (Min.)	To/From School (Min.)	To/From shopping (Min.)	To/From the park or library (Min.)	Visiting Family or Friend (Min.)	Trips for Exercise/ Recreation (Min.)
Average	13.62	13.19	13.59	16.55	18.53	41.55
Median	15	15	15	15	15	45
Mode	15	10	15	15	15	60

Table 2: Maximum perceived trip length in minutes, per

> *Public Comment:*
>
> *"With campus being on a hill there will be at least one direction that is an uphill struggle."*

This data can help us make several assumptions about the maximum time people that don't own a bike are willing to ride if they did. For example the lowest mode is To/from School, thus most of the people are not willing to ride more than 10 minutes, this is most likely because of the hill. It can also be inferred that travelling to work, school, and schopping are more social activities thus people not wanting to have a long trip that could make them sweat. Also, if the trip is to a grocery store or to shop it will be hard to transport most of the bags. The lack of parking could be a contributing factor to the difference between the time willing to bicycle to visit friends and family or the library. The library provides bike racks and a family or friends house is safe as well. The median for all this activities is 15 minutes which tells us that people are willing to go on bicycle trips for a distance of 3 miles considering a 5 minute mile. According to the FHWA's National Household Travel Survey, about 50 percent of daily trips are less than 3 miles, but 72 percent of these are driven.

When asked about what facilities each saw as the safest a vast 81.82 percent of respondents thought that major roadways without bicycle infrastructure were very unsafe. More than half the respondents feel it is not safe to ride on local roadways without bicycle infrastructure. On the other hand, the safest facilities were off-street trails or shared use paths, sidewalks, and roadways designated as a bike route. The data also shows that roadways with bike lanes are seen as moderately safe. All this data correlates with mentioned in the Bicycle Safety and Understanding the Perceptions of Safety section presented previously.

Only 60 percent of the respondents answered the question that had to do with what could encourage them to bicycle more. All the possible answers for this question had something to do with infrastructure. The 4 infrastructure upgrades that stood out where:

- Dedicated bicycle lanes
- Protected bicycle lane or cycle track
- Off-street bicycle trails or Shared use paths
- Better street lighting

All this relate with Class I bikeways, which has been proven to be the choice for cyclists that relay in their emotions, feelings, and personal perceptions. The factors that affect them the most are dependant of externalities. On Figure 23, find the actual distribution between what would encourage each person to bicycle more. Two of the respondents answered other, and specified that it was for lack of a bicycle and for their age, these responses were not included.

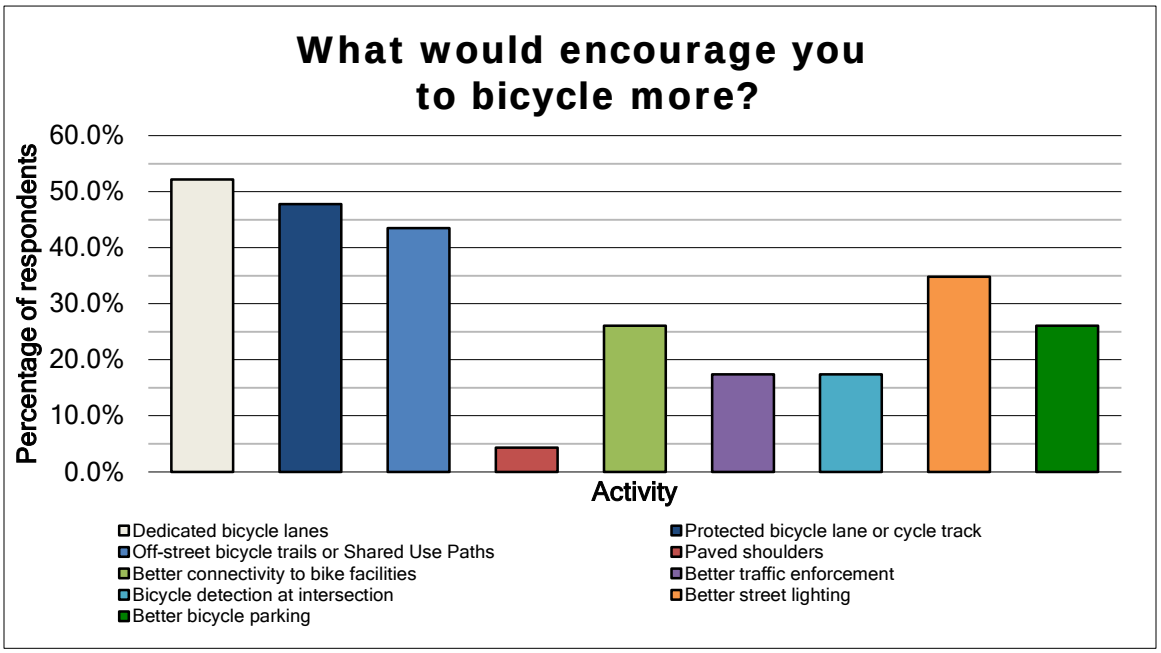


Figure 23: Ways to encourage non-bicycle owners

Trends found in people who own bicycles

The vast majority of the surveyed people owned a bicycle, and had strong opinions about bicycling in Lawrence. Trends look different from the beginning of the survey analysis where 83 percent of the respondents answered that their experience level was either intermediate or advanced. Figure 24 shows the distribution between the different levels of experience of people who own a bicycle. This also gives us the possibility to infer that if an individual, who owns a bicycle, will use it.

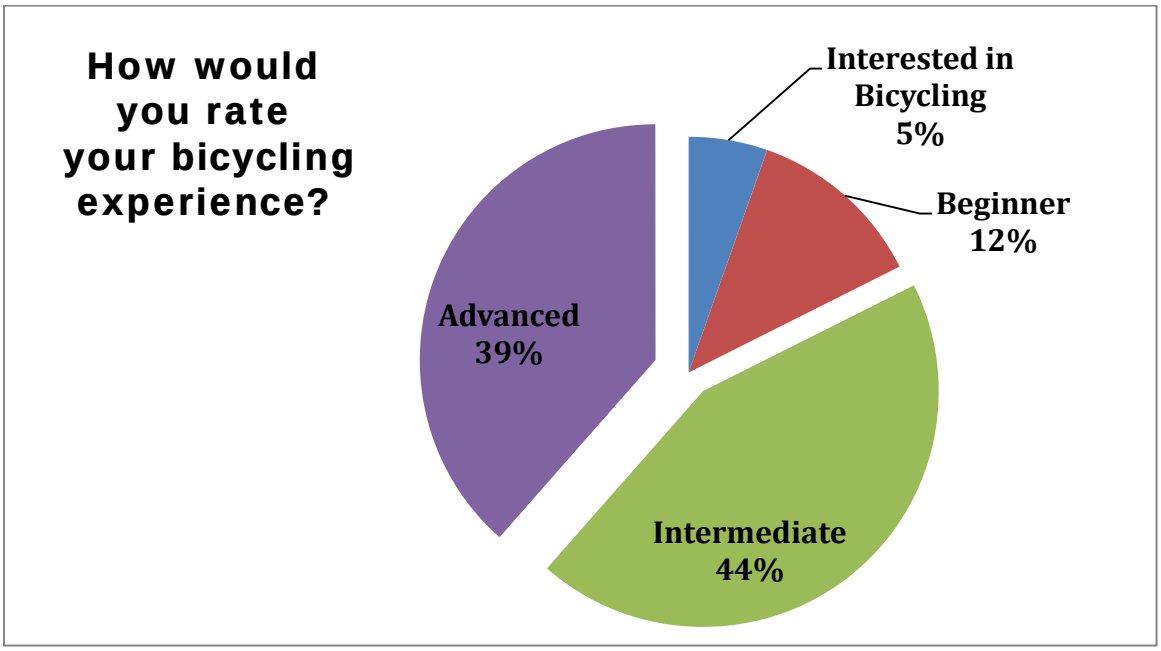


Figure 24: Pie graph showing the perceived experience level of individuals who own a bicycle.

This proposition is proved in this survey as 75 percent of the respondents answered that they use their bike at least once in between the months of March and September. These months are specified in this question due to the strong winter, which tends to start early October and finish mid-March. Out of this group 23 percent of them mentioned that their bicycle usage was daily. An interesting fact that is noticeable is that only 5 percent of the people who own bicycles never use them.

When asked about the frequency of rides with children, 53 percent of respondents specified that they did not have children. Only 16 percent of who had children responded that they ride with them at least once a week. As a matter of fact, only 2.7 percent of respondents said they ride with their children in a daily basis. In Lawrence, the SRTS program reported that in 2014, 14.2% of kids walk and bike to school. According to a report published by Safe Routes to School in 2009, less than 15 percent of American children walk or bike to school in comparison to nearly 100 percent of children in 1969. This can be due to sprawling and a new century way of thinking related to lack of security for children to be alone. If we can go back to riding the bicycle with our kids in the mornings to school a positive health, environment, and traffic impact would be seen immediately. Let alone the fact that children's perceptions of safety will increase due to the exposure at an early age to different infrastructure, and traffic events.

FACT: 20-25 percent of morning rush hour traffic is attributable to parents driving their children to school.

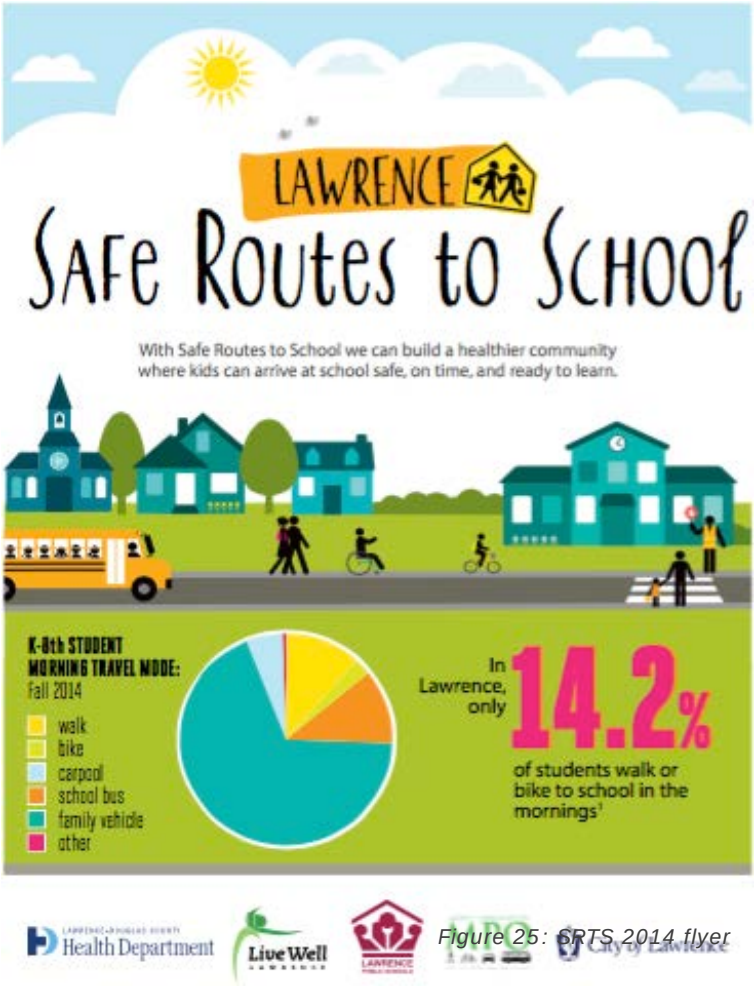


Figure 25: SRTS 2014 flyer

Uplifting facts were found when retrieving the data that asked about the protective gear used by riders. This question was answered by 86.6 percent of the total respondents. Helmet, head lights or taillights, reflectors and bicycle locks were used by more the 60 percent of the riders. An inspiring 86 percent of respondents stated that they used helmets when biking. When asked about the reasons for not using a helmet 41 percent of respondents mentioned that the trip distance was short, and that nothing would happen in such a short distance. By choosing the option of “other, please specify” 55 percent of riders that don’t wear helmets attributed their lack of use to:

“On a tight budget”

“Research has shown it is not necessary.”

“Don't have one. But kiddo wears his.”

“I ride to work. I work in a professional environment that does not have a changing room or area where I can fix "helmet hair." The sweat covered, matted down hair-look isn't really acceptable in the workplace.”

“Cost and not sure how to get the right fit. - I'm not a kid, so I can't get fitted at the Fire station”

“No excuse. I should wear a helmet.”

“Helmets are only protective in a very rare and specific type of crash where your cranium hits concrete. The chances of that happening are too rare to justify lugging the thing around 24/7.”

“I grew up not wearing one, it seems odd”

“Should only be required for children 15 and under”

“Drivers have been shown to give more space to helmet less riders. I wear a helmet on longer rides, just not on campus where speed limits are low and drivers are hyper aware.”

“Just beginning and thus far, have not bicycled on the street. Plan to get one.”

“Good helmets are too expensive. Do the others even work?”

Many of these reasons could be changed or argued with the proper education, and outreach. Disregarding these comments the numbers don't lie Lawrence is doing extremely well in the usage of protective gear. Lawrence Bicycle and Pedestrian Counts record the number of bicyclists spotted with helmets from 2009-2014 between 35-51%.

In a study that researched the discrepancy of helmet use among college students between two bicycle use purposes (Kakefuda et al, 2008) found out that out of 192 surveyed people only 9.2 percent of bicycle riders wore helmets every time for commuting, while 36.5 percent did so for recreation. It is important to note that the collected data for this study was not focused on college students only. But it is gratifying that the community is wearing protective gear when riding. This question is presented in Figure 26, this had the option to specify what else people ride with, and their answers were:

- Grocery basket
- Repair Kit
- GPS
- Air horn, lots of vocal signals
- Rear view mirror
- Flags
- Bell

All these seen to address the problems mentioned by the people who did not own a bicycle. Basket to hold big amounts of stuff when shopping; Bells, GPS, flags, mirrors, horns, vocal signals to be able to signalize direction of trip and be acknowledged; and repair kits to be safe in case the bicycle gets damaged.

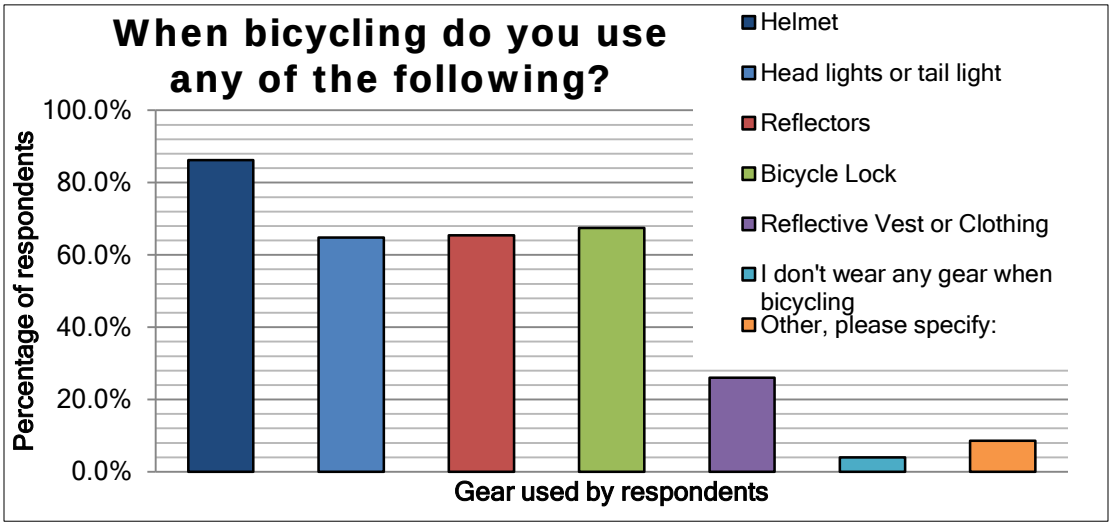


Figure 26: Protective gear use

Similarly to the analysis performed for people that do not own a bicycle, a maximum travel time summary Table 3 is shown below. The same actions were performed for data reduction. Surprisingly, only 37 percent of respondents answered this question, the rest skipped it.

Activity	To/From Work (Min.)	To/From School (Min.)	To/From shopping (Min.)	To/From the park or library (Min.)	Visiting Family or Friend (Min.)	Trips for Exercise /Recreation (Min.)
Average	23.57	19.91	18.36	20.34	27.90	102.55
Median	20	20	15	20	20	60
Mode	30	30	15	30	30	60

Table 3: Maximum trip length per activity (not perceived)

It is clear that every maximum average trip length of bicycle owners is higher than for individuals that don't own a bicycle. This can be thought to be due to the knowledge of how long it actually takes to ride a mile. It is inferred that people that do not own a bicycle have a perception that the time it take to travel a mile is longer than it actually is. This correlates with the data that shows the total trip length for exercise/recreation that is 247 percent longer than the estimated time people without a bicycle thought of taking. Similarly to this the trip lengths To/from School, work and visiting family or friend are 173.05, 150.94, and 150.56 percent longer respectively. A strong similarity between both types of riders are that going To/from shopping had a low time average and both had the same median and mode. This can be attributed to the lack of space for shopping bags. On Figure 27 to the left find a comparison between the maximum trip length average for people who own a bicycle and people who don't.

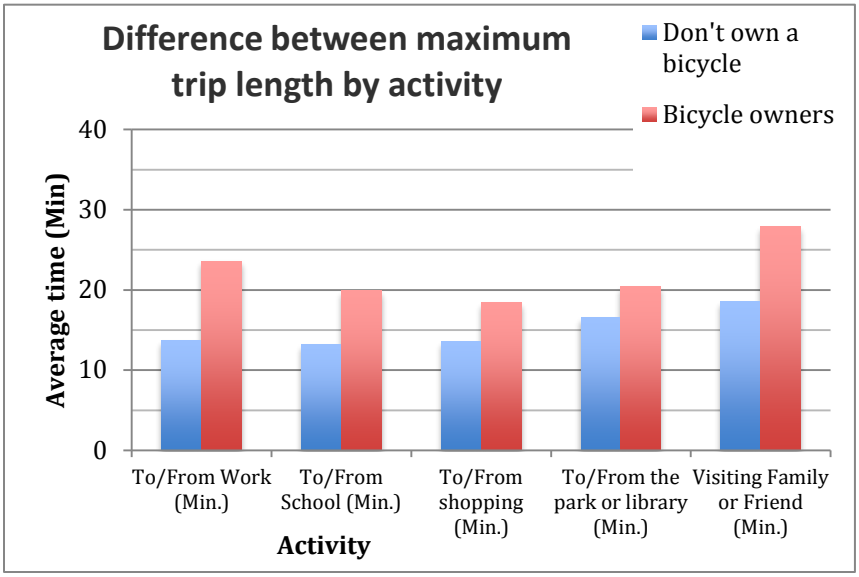


Figure 27: Comparison of maximum trip time for riders and non-riders, exception Exercise

Contrary to the results retrieved from in the first section of this chapter, bicycle owners tend to ride their bicycle in Class II bikeways. For both local and major roadways without bicycle infrastructure, 64 and 19 percent respectively of riders answered as the primary type of infrastructure they ride on. A big difference is also seen on the both roadways with bike lanes and sharrows. These trends show that bicycle owners do expose themselves to the existing infrastructure in town. Following to these facts, only 17 percent of all the riders mentioned that they have experienced at least one injury or crash in the past year. Not to mention only 10% of all the riders who experienced an injury or crash reported it to the police. As mentioned early in the text, this is a contributing factor for the lack of information there is with respect to bicycle crash data. This data may not be a strong representation of all the community because more than half of the respondents decided to skip this question. After further analysis no trends were found to explain the reason why this question was skipped.

PUBLIC COMMENT:

"Shared use paths a very mixed development - I often feel safer on the street, because cars don't look for cyclists at intersections. And they only work if there are very few pedestrians."

It is very interesting that the perception of safety of the riders depending the facility type had the same trends as found with what individuals who did not own a bicycle have. It was found here that sidewalks are seen as more dangerous by individuals that ride in a common basis than those who do not. Local and major roadways without bicycle infrastructure again were chosen to be the most dangerous facilities type. Off-street trails or shared use paths were chosen to be the safest among the facilities types, with a margin of 170 percent over sidewalks. Roadways designated as a bike route also scored higher than what people who don't own a bicycle did. This means that individuals who do not use the infrastructure have different perceptions of how dangerous it actually is to ride on sidewalks and roadways designated as bike routes. As well as, the fact that even if a certain infrastructure is seen as moderately safe it will be used if the connectivity of the system is good. This is shown by the 64 percent of bicyclist who mention local roadways without bicycle infrastructure as their way of commuting even if it's ranked as the perceived second most dangerous type of facility.

To be able to create a model that represented the modes of transportation for different activities, the respondents were asked to choose their primary mode of transportation depending on an activity. The respondents were free to choose more than one mode of transportation per activity, and the patterns of how individuals commute are shown on Figure 28. It is not surprising that the primarily mode of transportation of every individual is a private vehicle. It ranked the highest in usage for destinations including work, school, shopping, park or library, visiting family or friend. The only category that this trend did seem to follow was on trips for exercise and recreation. Even so 27 percent of the respondents mobilize in a private vehicle

to places where they can exercise like the gym, or private lessons. A discouraging 30 percent of the respondents who go to school responded that they use their bicycles for this trip. This can be again attributed to the hill.

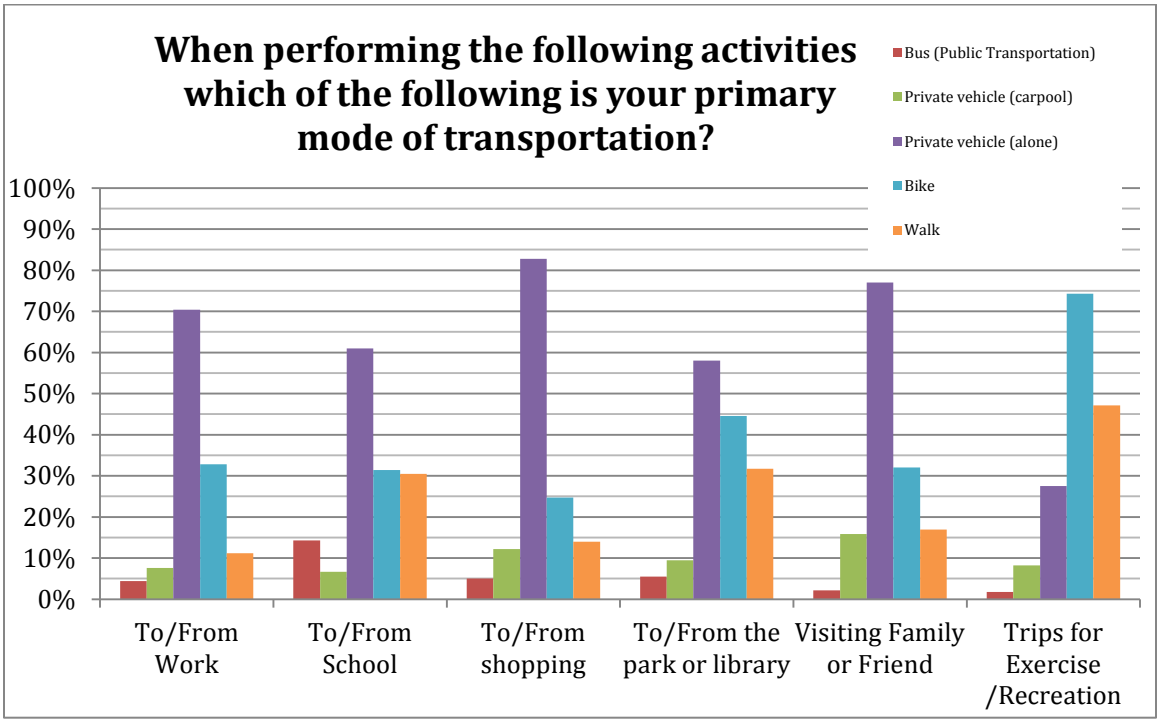


Figure 28: Primary type of transportation used dependent on activity type.

> *PUBLIC COMMENT:*
>
> *"Sidewalk intersections crossing roads, cars aren't looking for bicycles."*

Safety and Lack of infrastructure seemed to be the primary reasons individuals felt averted from bicycling more. The necessary skill set seemed to be the least of the worries of people who ride their bicycles a small 5% of them stated it as a contributing factor to what prevented them from bicycling more. Collective factors as bad weather and distance of trip are shown to be very influential when the decision of bicycling is chosen. As a general trend seven of the proposed nine infrastructure changes were thought to encourage at least 40 percent of bicyclist. In congruency with individuals who don't own a bicycle, the three facility types, which are seen as most encouraging to bicyclists are dedicated bicycle lanes, protected bicycle lanes or cycle tracks and off-street bicycle trails or shared use paths. Better street lighting did not seem to be as important as other upgrades the city could perform concerning on-street infrastructure.

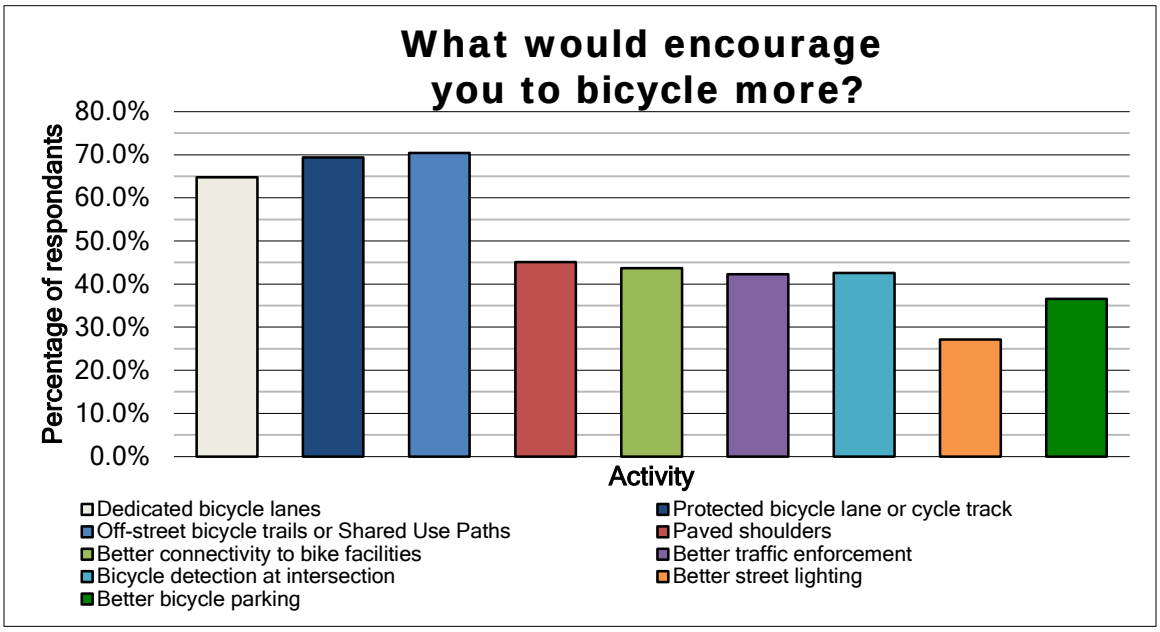


Figure 29: Infrastructure that encourages bicycle use.

Find comments provided in this section of the survey below.

"Parking is important many cities have designated bike lots"

"Dedicated bike storage at work, and easy access to a shower."

"Better education of both drivers and cyclists to break down the Us Vs. Them frustration on the road. I would also ride my road bike if I thought that I would be protected under laws that were actually enforced..."

"In Austin, they have repair stations in front of several different stores. They're a bike stand with a pump and various basic tools attached by steel cables. If there was something like that here it'd be amazing."

"Enforcement for bicyclists, too. Vehicle drivers get angry when bicyclists break the rules, understandably."

What else does the data tell us

The survey was equally distributed between male and female respondents. It is clear when the data is filtered by sex that the vast majority, 49 percent of female riders see their abilities as intermediate, as for male population a 51 percent view themselves as advanced. The riding frequency is also skewed towards the male as 85 percent mention to use their bicycle at least once a week, 32 percent of them daily. In other hand female rider frequency is 66 percent least once a week and only 14.5 percent daily. Both sexes lack the tendency to go out and bicycle with their children. The same pattern is found in the percentage of riders who use protective gear, similar trends are found for each type of gear mentioned. As well as the reason for not using a helmet for those who did not, the length of the trip seemed to be the strongest contributing factor for the lack of its use.

When asked about their personal perception of safety regarding each infrastructure type, both sexes had the same responses. The same trends are seen throughout all respondents, were the most dangerous infrastructure was local and major roadways without bicycle infrastructure. Off-street trials or shared use paths are once again ranked the safest among both sexes. 11 percent more female respondents than male respondents felt that feeling unsafe was a reason that prevented them from bicycling more. The same patterns were observed about the lack of infrastructure and weather regarding reasons preventing the use of bicycles. Additionally find in Figure 30 infrastructure advancements that would encourage more bicycle use, the trends are similar for both sexes as well.

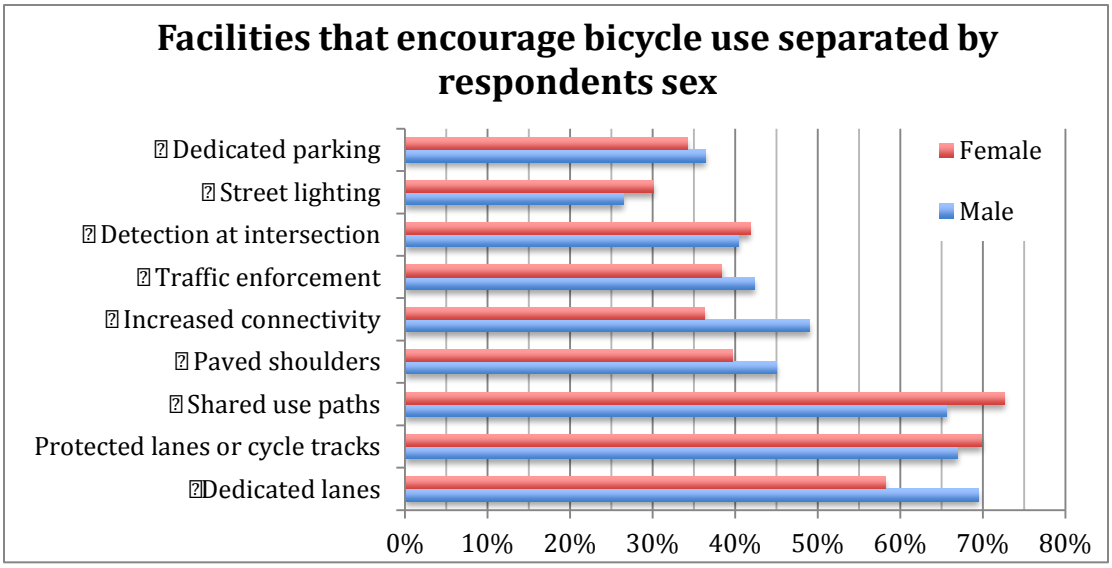


Figure 30: Comparison of how infrastructure encourages males and females.

Similar trends were found when the respondents were separated in groups by experience level or age. It is safe to conclude that the perceptions of bicycle safety in Lawrence are distributed equally among sex, age group, and experience level. All the respondents seemed to be interested in the upgrades that can be performed in

infrastructure as well as, education for both bicyclist and motor vehicle drivers. The analysis of the results of the survey shows that people will ride both Class I and II bikeways if the bikeability of the city is high.

Crash Data

State crash reports are only filed if the crash includes a motor vehicle. These likely results in an underreporting of crash information. There is a local Lawrence ordinance that requires any injury accident over $50 to be reported to the Lawrence Police Department. However, the ordinance does not have a standard for how that is documented. Some officers take the verbal report and thank the caller; others at their discretion file an information report. Information reports are unable to be easily queried for bicycle/pedestrian related information.

KU collects crash data when reported to KU Public Safety using the state crash reporting form. Some of the data years are missing and currently the data is not believed to be geocoded or mapped although there are research efforts ongoing that might be working on this. Douglas County Public Works receives copies of accident reports worked by the Douglas County Sheriff's Office for roads outside incorporated areas except state highways. They map the data and could query it from their database. Their data is missing accidents on roads worked by the Kansas Highway Patrol. The County submits all their reports to the State. Additional data collection will be necessary to address the underreporting of crash information.

"Crash vs. Accident— The word "crash" may be a new way to describe the event in which a bicyclist collides with, a motor vehicle, in a way that can result in bodily harm and/or property damage. Historically, these events were called accidents. The term accident implies heavy doses of chance, unknown causes, and the connotation that nothing can be done to prevent them. Crashes are preventable. Bicyclist crashes are not random events. They fall into a pattern of recurring crash types and occur because the parties involved make mistakes. The mistakes can be identified and counteracted through a combination of education, skill development, engineering, and enforcement measures that can substantially reduce crash occurrences. There is a continuing need to establish the mindset that bicyclists and pedestrians are worthy and viable users of our transportation system."

-Federal Highway Administration University Course on Bicycle and Pedestrian Transportation. Ch. 3

The total number of bicycle crashes that were reported in Douglas County is shown in Table 4. These are separated between the three major cities and the unincorporated area. The standard deviation of total crashes per year in Douglas County is 3.27, with a low in 2011 and maximum amount of total crashes in 2012 and 2013. The survey shows that only 10 percent of people reported their incident this means that only 5 percent of incidents are reported. Out of the 21 individuals that experienced at least one crash, 12 experienced more than one.

Douglas County Bicycle Incidents by City 2009-2013						
	2009	2010	2011	2012	2013	Total
Lawrence	30	32	29	35	37	163
Eudora	0	1	0	2	0	3
Baldwin City	1	0	1	0	0	2
Unincorporated Area	0	0	2	3	4	9
Total	31	33	30	37	37	168

Table 4: Total number of reported incidents

Concurring to the assumption that only 5 percent of incidents are reported, then more than 700 incidents are not reported per year. This is a troubling number that can be addressed and changed by changing the process of incident reports with police. As this total number of unreported incidents decreases the city will be able to address in a more proficient way the problem areas of the bikeway network.

Douglas County Bicycle Crash Severity 2009-2013						
	2009	2010	2011	2012	2013	Total
Injury	33	35	38	44	41	191
Property Damage Only	8	1	1	3	5	18
Fatality	3	0	0	0	1	4
	44	36	39	47	47	213

Table 5: Severity of total reported crashes

It is safe to assume that most the unreported incidents had total damages less than $50, and didn't have a motor vehicle involved in it. Positive trends are noted in Table 5 where the number of fatalities decreased after 2009, the injuries increased accordingly.

Surface, Weather & Light Conditions

This study concentrated in the amount of ridership happening in the months of March through September because of the favorable weather. The surface conditions of the reported incidents are shown in Table 6, which demonstrates that most of the incidents happen in this time frame. The weather conditions for these incidents are

shown in Table 7. The vast majority of incidents happened on visible conditions of either daylight or dark with lights on, this is shown in Figure 31.

Douglas County Bicycle Incident Surface Conditions 2009-2013						
	2009	2010	2011	2012	2013	Total
Dry	27	27	29	39	36	158
Ice or Snow packed	0	0	0	0	0	0
Mud, Dirt, or Sand	0	0	0	0	1	1
Snow	0	0	0	0	0	0
Standing Moving Water	0	0	1	0	0	1
Unknown	1	1	0	0	0	2
Wet	3	5	2	1	4	15
	31	33	32	40	41	177

Table 6: Surface Conditions of reported incidents

Douglas County Bicycle Incident Weather Conditions 2009-2013						
	2009	2010	2011	2012	2013	Total
Clear Weather	28	28	30	38	38	162
Rain, Mist, Drizzle	3	4	2	1	3	13
Snow	0	0	0	0	0	0
Strong Winds	0	0	0	1	0	1
Unknown	0	1	0	0	0	1
	31	33	32	40	41	177

Table 7: Weather Conditions of reported incidents

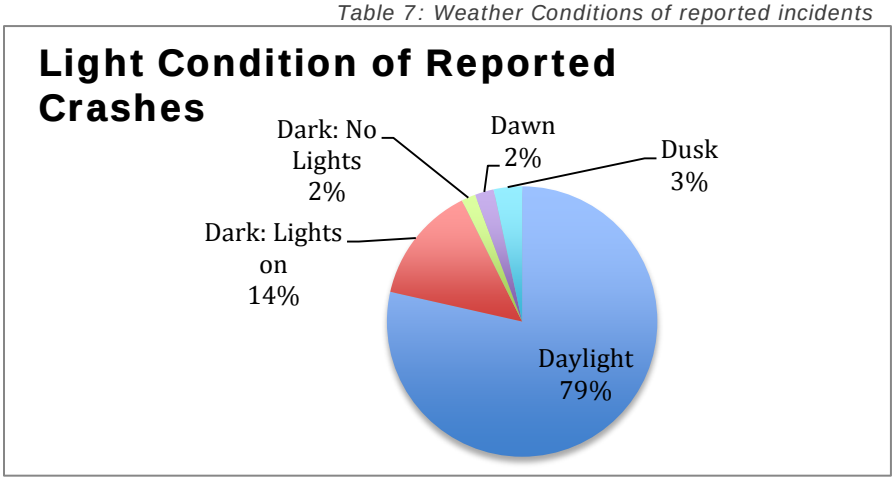


Figure 31: Light conditions of reported crashes

Crash Frequency

Moreover, Figure 32 shows the amount of incidents reported each month in the 5-year period of available data. During the months of between October and February only 31 percent of the reported incidents happened. This low amount of ridership is attributed to the bad weather conditions and to lack of convenience of a bicycle trip against a motor vehicle trip.

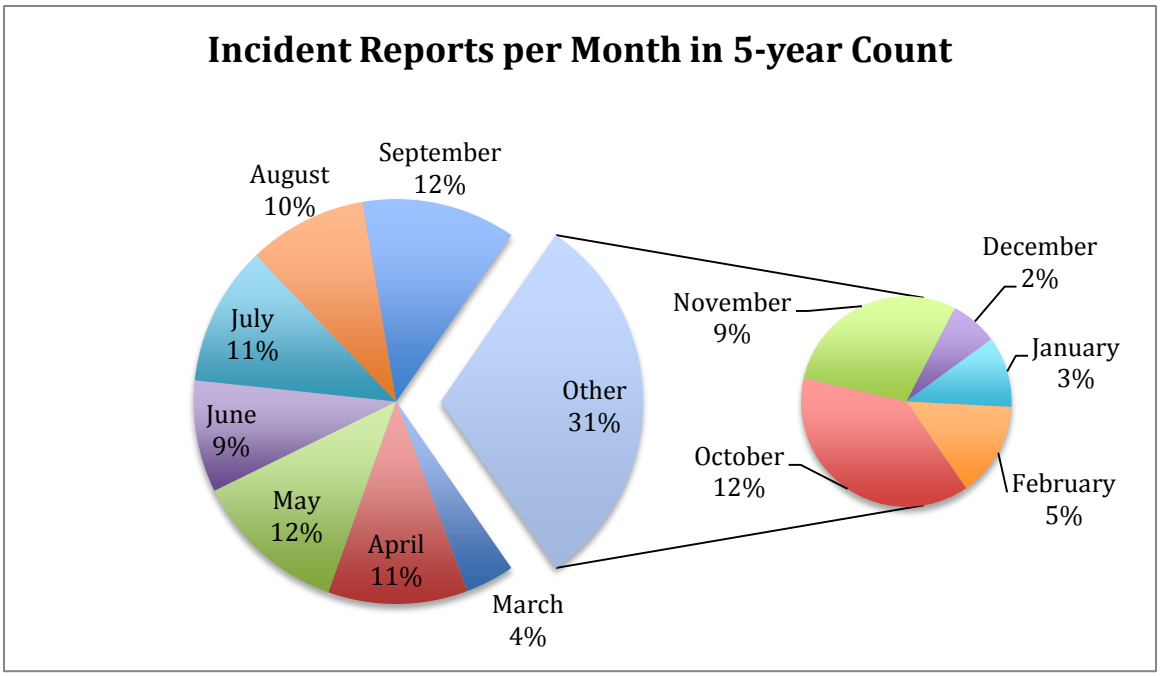


Figure 32: Incidents reported by Month

Location of Incidents

It is very important for city planners to know the location of incidents to be able to plan accordingly. The majority of incidents in the 5-year count period happened in crosswalks or bikeways, this correlates with the fact that most of the inexperienced riders feel safer in Class I bikeways. It is important to note that 19 percent of the crashes happened in intersections, special attention should be paid to planning intersections. The reported locations of the incidents are shown in Table 8.

Douglas County Bicycle Location During Crashes 2009-2013						
	2009	2010	2011	2012	2013	Total
In Crosswalk or Bikeway	11	12	8	11	14	56
In Intersection	5	7	7	8	6	33
Not in Crosswalk or Bikeway	3	4	2	3	1	13
Not in Intersection	4	8	15	12	13	52
Not in Roadway	3	0	0	6	6	15
Other	0	1	0	0	0	1
Unknown	5	1	0	0	1	7
	31	33	32	40	41	177

Table 8: Location of Reported Crashes

Age Cohorts

The number of reported incidents show a trend that the age group that is more prone to getting in an accident is between 20 and 29 years of age, shown in Table 9. Additionally, Table 10 shows that it's the only age group that suffered fatalities during the 5-year count period. It is difficult to compare this data with the data collected by the survey due to different age cohorts. What can be retrieved from both sets of data is that individuals older than 30 tend to be more careful and alert when riding a bicycle. Over 50 percent of the total survey respondents were identified to be older than 30 years of age.

Bicycle Age Cohorts	2009	2010	2011	2012	2013	Total	5-Year Avg.
0-9	4	0	5	1	5	15	3
10-19	11	9	11	15	6	52	10
20-29	14	13	15	10	24	76	15
30-39	3	2	2	7	5	19	4
40-49	0	6	4	5	1	16	3
50-59	0	3	2	6	2	13	3
60-69	0	2	0	2	2	6	1
70-79	0	1	0	1	1	3	0.6
80-89	0	0	0	0	1	1	0.2

Table 9:Number of reported incidents per age cohort

Bicycle Age Cohorts	Injury	PDO	Fatality	Total
0-9	13	2	0	15
10-19	45	7	0	52
20-29	79	5	4	88
30-39	18	1	0	19
40-49	15	1	0	16
50-59	12	1	0	13
60-69	6	0	0	6
70-79	2	1	0	3
80-89	1	0	0	1

Table 10: Injury type of reported accidents per age cohort

Bicycle Counts

The City of Lawrence and Douglas County started bicycle counts to strengthen the bottom line for future investment. The following 2009-2014 counts are part of Lawrence's participation in the National Bicycle & Pedestrian Documentation Project (NBPDP). The project aims to establish a consistent methodology for counting and surveying bicyclists and pedestrians and develop a national database of bicycle and pedestrian activity. The Institute of Transportation Engineers (ITE) and transportation professionals nationwide have helped to develop the methodology, which requires the following features:

- Consistent days and times
- Consistent methods and materials, including training of volunteers
- Centralized data collection and analysis practices

A screen line was established for all locations; when a bicyclist or pedestrian passed the screen line, they were counted. Counts were conducted during three two-hour time slots. Dates for conducting counts were chosen based on the National Bicycle and Pedestrian Documentation Project's recommended September count weeks. Counts performed for 2014 are shown in Table 11, the highlights street locations were based of weekday user rates only or include counts on days with rain or have missing count.

2014: Daily, Monthly, and Annual Projections												
	Daily	Monthly	Annual					Annual Average Daily Traffic				
Lawrence	Average Bicyclists and Pedestrians	Average Bicyclists and Pedestrians	Total Bicyclists and Pedestrians	Bicycling Percentage	Bicycling Totals	Walking Percentage	Walking Totals	Vehicles (KDOT AADT and local counts)	Bicyclists and Pedestrians	Percentage of Bicyclists and Pedestrians	Percentage of Bicyclists	Percentage of Pedestrians
Naismith Drive	971	28,351	354,383	13%	47,495	87%	306,889	8,843	971	9.89%	1.33%	8.57%
E. 19th Street	150	4,384	54,802	40%	22,063	60%	32,739	9,851	150	1.50%	0.60%	0.90%
Iowa north of 15th Street	80	2,338	29,228	42%	12,178	58%	17,049	30,700	80	0.26%	0.11%	0.15%
12th Street/ Tenn	412	12,037	150,461	11%	15,971	89%	134,490	1,107	412	27.13%	2.86%	24.25%
Constant Park	265	8,328	104,096	48%	49,529	52%	54,566	0	265	100.00%	47.58%	52.42%
21st St	67	1,949	24,356	59%	14,392	41%	9,964	1,925	67	3.35%	1.98%	1.37%
Iowa	117	3,427	42,834	20%	8,399	80%	34,435	34,100	117	0.34%	0.07%	0.28%
Mississippi	904	26,404	330,047	8%	27,856	92%	302,191	3,048	904	22.88%	1.93%	20.95%
Bob Billings @ DeVictor	76	2,218	27,730	21%	5,882	79%	21,848	4,039	76	1.85%	0.39%	1.45%
DeVictor Park	37	1,075	13,442	6%	840	94%	12,602	0	37	100.00%	6.25%	93.75%
9th St Conn	230	6,722	84,021	32%	26,887	68%	57,135	3,190	230	6.73%	2.15%	4.58%
Connecticut St	199	5,813	72,656	31%	22,549	69%	50,108	9,240	199	2.11%	0.65%	1.45%
5th Street	136	3,961	49,511	53%	26,014	47%	23,497	6,355	136	2.09%	1.10%	0.99%
Maine Street	124	3,626	45,327	30%	13,430	70%	31,897	6,890	124	1.77%	0.52%	1.25%
2nd Street	50	1,473	18,413	82%	15,065	18%	3,348	4,875	50	1.02%	0.84%	0.19%
E 25th Street	81	2,354	29,422	20%	5,884	80%	23,537	1,209	81	6.25%	1.25%	5.00%
Franklin Road	5	134	1,677	0%	0	100%	1,677					
McDonald	25	737	9,214	82%	7,538	18%	1,675	17,875	25	0.14%	0.12%	0.03%
South Iowa Trail	16	468	5,846	78%	4,547	22%	1,299	0	16	100.00%	77.78%	22.22%
Cresent Rd	1,006	29,372	367,154	20%	75,119	80%	292,035	1,220	1,006	45.19%	9.25%	35.94%

Table 11: 2014 Counts for 20 selected points in the City

Bicyclist and pedestrian counts are more variable due to weather and events than motor vehicle volumes. The weather during 2014 was relatively unpredictable, as the higher chances of rain during the count weeks are anecdotally observed as the reason for the lower bicycle and pedestrian trips documented during the 2014 count program. The location and density of pedestrian counts are shown in Figure 33, and the mode share map of annual average daily traffic for these locations is shown in Figure 34.

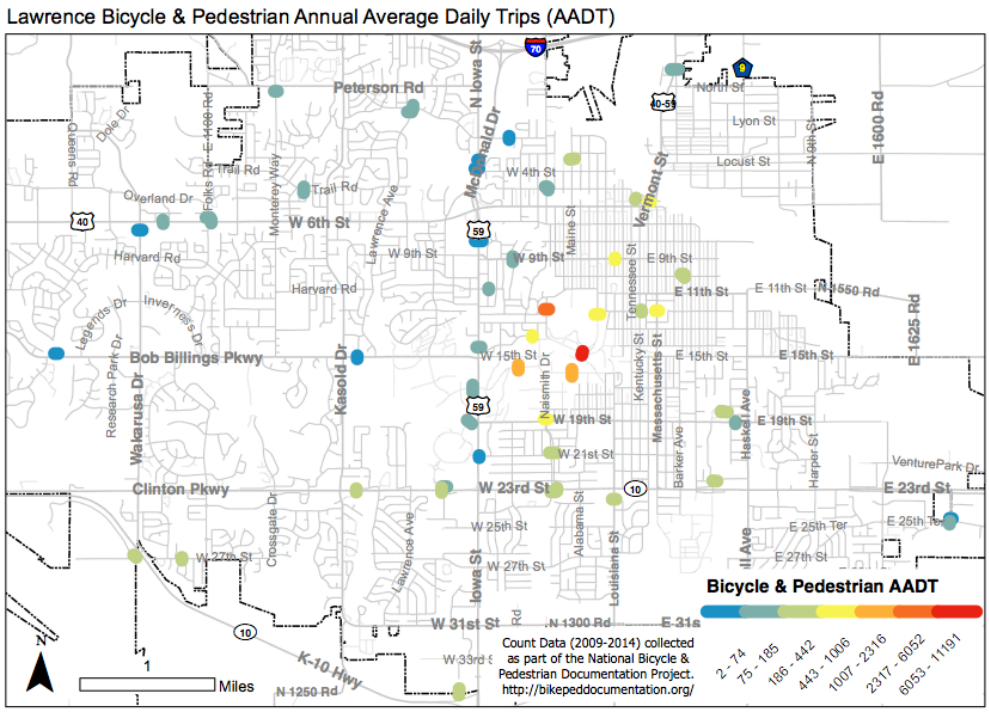


Figure 33:Annual Average daily trips for bicycle and pedestrian trips; 2009-2014 counts

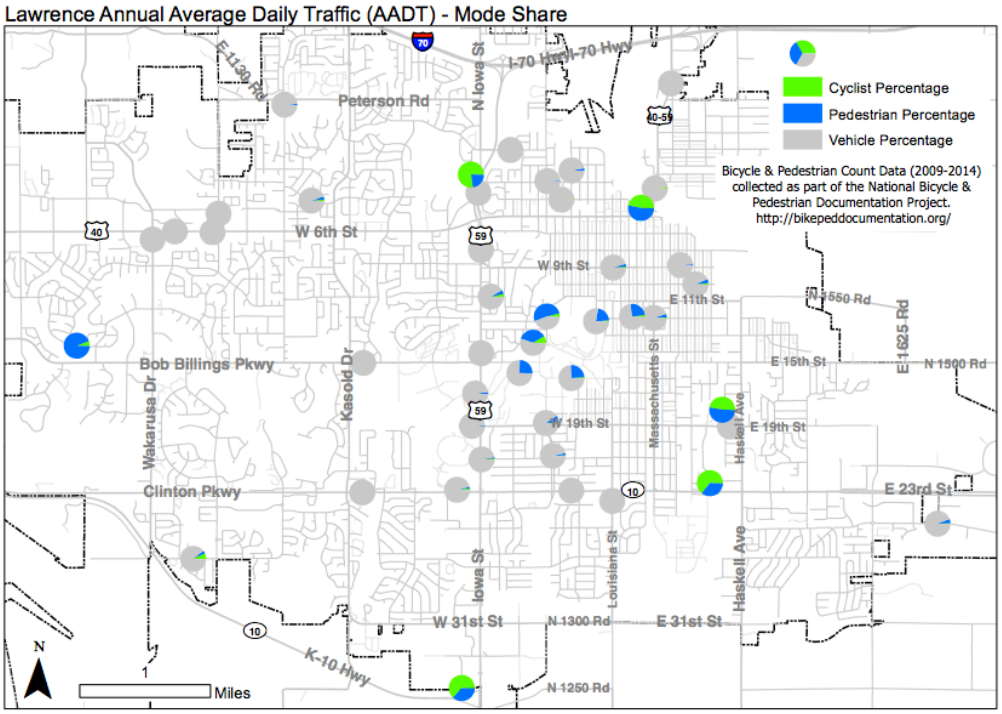


Figure 34:Annual Average daily mode share trips; 2009-2014 counts

Other Resources

Lawrence has had a Bicycle Rideability Map since 2010. Pictured below is the 2nd version. It can be found online at: www.lawrenceks.org/assets/mpo/bicycle/BikeMap.pdf

Bicycle Rideability Map

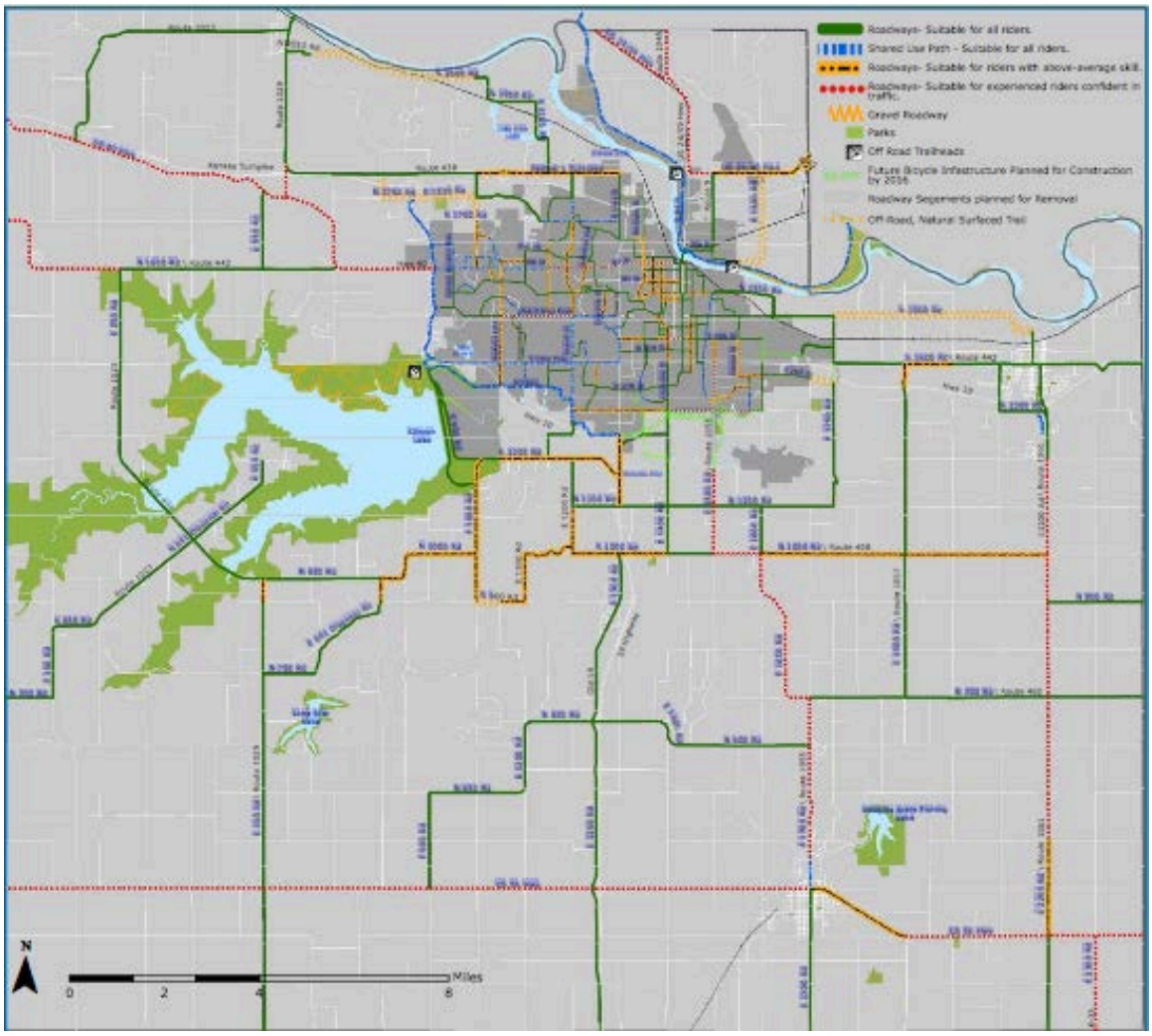


Figure 35: Lawrence Bicycle Rideability Map

The following section will summarize results and state recommendations that the City of Lawrence can take to be more bicycle friendly.

Conclusion & Recommendations

The purpose of this project is to explore “bikeability” as the assessment of the entire bikeway-network in terms of perceived safety, ability and convenience to access important destinations. This was performed by analyzing the bicycle crash data, and through an investigation on the perceptions of safety of people in Lawrence, KS. As well as, determining the improvements and programs implemented in Columbia, MO as part of The Nonmotorized Transportation Pilot Program to make recommendations about future projects and programs that have succeeded in similar towns. The following sections will detail the conclusions from this analysis and next steps recommended for the City of Lawrence.

Conclusions

Evaluation of Safety Perceptions

This project assessed safety perceptions by analyzing the results of an online survey that asked the respondents to classify their experience while bicycling in the city’s bikeway network. This analysis showed that the people using the current bikeway network feel comfortable with using the existing infrastructure. Bicycle usage can be improved and encouraged by adding new types of infrastructure to the existing network. This study lacked a way to give a numerical evaluation to the network’s bikeability by assessing bicycle level of service, accessibility. To be able to quantify the priority of future investment a new way of calculating the bikeability will be needed.

Factors affecting the usage of bicycles

By studying the psychosocial factors that make bicycle eligible as a modal alternative to motorized vehicles, 6 factors were found as influential when choosing mode of travel. This study found the experience (frequency and type use) of the rider and accessibility to a bicycle make the difference. Experienced riders used every facility that is at their disposal, and tend to use them no matter the perceived risk. In the other hand riders with low to no experience did not feel comfortable using facilities or infrastructure that had high-perceived risk. Among the latent variables that affect the choices of individuals are convenience and exogenous restrictions are the most important elements to understand the attitudes towards the bicycle.

Convenience relates the idea of an efficient mode of transportation from many viewpoints: Environmentally friendly, healthy, cheap, fast, and fun. Convenience becomes more important for an individual cyclist that perceives more of these characteristics with its use. Physical determinants seem to be highly subjective and are not perceived as very important by bicycle users. A common characteristic found is that these factors are under cyclists’ control so it can be influenced by training and exposure.

Safe Routes to School (SRTS) Program

It was also noticed during the analysis of the survey that only 16 percent of respondents with children rode with them at least once a week. A study that evaluated a New Jersey Bike School program concluded "Child's age and experience riding a bicycle with parents were all associated with higher scores on the pre-training test" (U. Lachapelle et al., 2013, 247). Parent's involvement with children's bicycling is fundamental to improve the perceptions of safety from childhood. This report applauds the efforts and work performed by the Safe Routes to School program has in Lawrence and emphasizes the importance of this program. A study of 801 schools showed that education and encouragement programs increased biking and walking rates 5 percent each year, for a 25 percent increase over 5 years (N.C.McDonald et al., 2014). The involvement of the general public and schools is fundamental for the success of the SRTS program in Lawrence.

Unreported or missing data

Additional data collection will be necessary to address the underreporting of crash information and to track changes in crashes.

Highlights of Columbia, MO pilot program

The experimentation of new and innovative infrastructure design is important to engineer solutions to the current bikeway network. GetAbout highlighted that projects like the green marge areas, intersection improvements and wayfinding helped the public feel comfortable in the bikeway network. The creation of an integrated bike/walk grid system is very important to accommodate individuals with different experience levels. A sustainable system needs both types of infrastructure if it is to be successful in accommodating a variety of riders with varying skillset and perceptions of risk. Partnerships with law enforcement are also a very important highlight from the implementation of this project. Law enforcement is important in accommodating higher numbers of cyclists in communities that are unaccustomed to high bike use. The application of courses dedicated to training law enforcement officers that haven't had the proper training or are unaware of bicycle laws. Columbia created a city ordinance to discourage harassment of cyclists, further promoting cyclists' right to use the road.

Education and outreach were mentioned as the most important factors that encourage more bicycle usage. According to Ted Curtis, GetAbout noticed that something similar to a learning curve happened with the amount of new people drawn to use the bicycle system. He stated that the implementation of new infrastructure generated new trips but after a certain amount of time the amount of new trips made hit a ceiling. For this reason he recommends that cities create educational programs targeted to any age, sex and skill set. The implementation of these programs can concentrate in bike safety and etiquette, and these can build upon each other to encourage students to take each successive level.

Recommendations

These recommendations were developed after reviewing the existing bicycle planning documents. Some of these recommendations can also be found in existing MPO studies. These recommendations that are also applicable to this paper and are stated below.

Continue to Build and Implement the Countywide Bikeway Plan

The City of Lawrence should continue to work with the Bicycle Advisory Committee (BAC) and other groups to identify changing conditions for the region's bikeway network and to identify needed changes to the Bikeway System Map as they build additional bicycle infrastructure. This study exemplified how important the presence of Class I and Class II bikeways and their connectivity are to perceptions of safe bicycling is in the community. The City of Lawrence should continue to build out the network of bicycle infrastructure.

Implement the recommendations from the League of American Bicyclists

The Bicycle Friendly Communities Campaign is an awards program administered by the League of American Bicyclists that recognizes municipalities that actively support bicycling. A Bicycle-Friendly Community provides safe accommodation for cycling and encourages its residents to bike for transportation and recreation. The City of Lawrence has been recognized as a Bicycle Friendly Community at the Bronze level since 2004. The League of American Bicyclists provides feedback to the cities who apply to be a bicycle friendly community. The City of Lawrence should implement to recommendations from the league feedback. The feedback can be found online at: www.lawrenceks.org/assets/pds/planning/documents/BikeFeedback.pdf

Develop a Bicycle Level of Service

There are better ways to assess bikeability of a bikeway network than the one performed by this study. City planners and engineers should adopt a new way of calculating bikeability, by following the method proposed by (Lowry, Callister, Gresham, and Moore, 2012). This paper demonstrates a way to calculate bikeability by including the Highway Capacity Manuals' bicycle level of service across an entire community and the access to important destinations by GIS mapping of the existing network. Engineers and planners can follow a similar procedure to help prioritize improvement projects or communicate the benefit of new projects.

Implement a Bicycle Share Program or Bike Mentor Program

In this study a clear difference is made between the perceptions of users that have cycling experience and those that do not have experience. The City of Lawrence should explore the implementation of a bicycle share and ride mentor program. These programs allow people to experience cycling in real situations (Broach et al., 2012). This contributes to the factors, which encourage bicycle use as convenience and accessibility. In fact, it also contributes to increase the perceptions of safety of the bike network by restricting external factors as danger and auxiliary facilities.

Furthermore, the creation of sustainable policies to highlight the previously mentioned aspects of the relationship of convenience and cycling mobility, by showing the bicycle as a competitive transportation mode for many types of trips.

Education & Encouragement

Cycling should be promoted as a sustainable and healthy mode of transport through various media accessible by the City of Lawrence. A partnership with KU is recommended so that together policies can be formed that give priority to bicyclists and pedestrians on campus and adjacent areas. The influence that the university has over a vast population of Lawrence is a vital tool that can be used for outreach. Freshman orientation packs and pamphlets can state that the recommended access mode to reach the University is bicycling. This could also include pocket maps that highlight the main bikeways in Lawrence; this should include main or important destinations in town and travel time in a bicycle between them. The travel times between point A and B should aim for a maximum trip length of 15 minutes. If destinations are further away, it is recommended that the trip be showed as two separate trips, finding a midpoint location.

It is also recommended to the City of Lawrence and BAC members to consider the schools of Engineering, Architecture and Urban Planning in future projects. Search for involvement of KU students in the design process of new infrastructure. Giving annual scholarships or grants to students that can plan and design innovative infrastructure for problem areas.

Review and develop policies to strengthen Crash reporting and Data Analysis

There is a need to strengthen the Data Analysis Capabilities in Douglas County in the future. The Federal Highway Administration in cooperation with NHTSA developed a Pedestrian and Bicycle Crash Analysis Tool (PBCAT) through the University of North Carolina HSRC. PBCAT is a user-friendly analysis tool that determines the crash type through a series of onscreen questions about the crash. It provides tabular and graphing functions of various factors (such as age, sex, light conditions, etc.) associated with the crash. The system also recommends countermeasures and related resources and reference information. PBCAT or similar database software should be considered for future analysis and monitoring of pedestrian and bicycle crash data.

To be able to plan according to the needs of the public, it is also recommended to review the policies of crash reporting. Taking advantage of the available technology a new reporting system should be implemented. This is to be able to aid city planners with more accurate data regarding crashes concerning bicyclists and pedestrians. It can be as simple as an online questionnaire powered by Google docs, which will directly put all the information to a spreadsheet. If greater funds are available the possibility of the creation of an APP, that makes it simple and quick to show the location of the incident, and a brief description of it. If such program is implemented outreach and marketing are fundamental for people to create a habit of reporting

incidents. The educational programs to be implemented to schools, and Parks & Rec. should also include a section that describes the importance of reporting incidents.

All E's together

Bicycle Planning follows a 5 E's approach that includes: Engineering, Education, Encouragement, Enforcement and Evaluation. The local conclusion is no different than the international conclusion from the Public Policies for Pedestrian and Bicyclist Safety and Mobility report "No single policy or action exists to make streets and roads safer and more conducive to pedestrians and bicyclists." Instead safer active transportation networks will only be achieved through a change in priorities for addressing transportation demand and land use. The national review also found "there is also a need to change typical road user behavior, such as distracted and aggressive driving as well as bicyclists and pedestrians not obeying traffic control devices." Often this cultural behavior is changed through education and enforcement. Planning around all E's is critical to the success in achieving a better bicycle friendly community status.

Thoughts about cycling in Lawrence and Douglas County

"- Should be encouraged especially among students who live within the 15 minute trip mark. - Needs a start somewhere. - Should look at promoting biking within the entire campus to help keep the campus clean and also make it safer for pedestrians."

"More bike racks on public buses"

"I sincerely appreciate the person(s) who took the time to put this together. I hope it results in more a adequate environment for Lawrence cyclists."

"Thank you!"

"Let's make it more part of the culture"

"I've been on a few of the smaller Lawrence trails. It would be nice to have signs that show the connectivity of the city more broadly, and how we can get from one to the next"

"Start ticketing the bicyclist!!!!!! and quit blaming the car drivers all the time."

"I think we are making good strides in improving bicycle infrastructure we just need to keep plugging along."

"Cyclists and drivers alike need to be educated about traffic laws and how they pertain to bicycles. In my experience many cyclists want to ride in the street, but act as if rules do not apply to them and all traffic should yield to bicycles."

"Intersections are very scary. I've had cars turning right not notice me. I'm very aware that bicyclists have been killed in Lawrence. Also, how can we teach bicyclists, when they are on a common use, to let walkers know they are coming from behind?"

"City hall just installed a bike maintenance which is Great!! It would great if a few more stations could be put up around town."

"I don't think people realize that they can ride their bike and bus both in the same trip."

"I think Lawrence is dong a pretty good job of addressing/including bicycles and pedestrian traffic issues in the city agenda. I would like to see more things, signage especially, done out in the county."

"Lawrence has great facilities for exercise but not traveling by bike."

"I would love to see more designated bicycle paths for utilitarian biking, and a pedestrian/bicycle bridge over Iowa at 21st street."

Appendix

Paper Survey

Whether you drive a car, ride a bike, use public transit or walk, *your feedback and safety matter!* Please share your experiences and perception of bicycling in Lawrence and Douglas County.

The information you provide will help Lawrence - Douglas County Bicycle Advisory Committee and staff to better understand the community's perception of bicycle safety.

Completing the survey will take just 5-10 minutes! Thank you for taking the time to give us your feedback!

1. Do you own a bicycle? (Circle one.) YES NO

2. How would you rate your bicycling experience? (Check one.)

☐ Interested in Bicycling ☐ Intermediate ☐ Expert

☐ Beginner ☐ Advanced

3. How often do you bicycle in the months of March to September? (Check one.)

☐ Daily ☐ Weekly ☐ Once a month or less

☐ A few times a week ☐ A few times a month ☐ Never

4. How often do you bike with your children? (Check the most suitable answer)

☐ Daily ☐ A few times a month ☐ I don't have children

☐ A few times a week ☐ Once a month or less

☐ Weekly ☐ Never

5. When performing the following activities which of the following is your primary mode of transportation? (Check all that apply)

Activity	Walk	Bike	Private vehicle (alone)	Private vehicle (carpool)	Bus (Public Transportation)	Not Applicable
To/From Work						
To/From School						
To/From shopping						
To/From the park or library						
Visiting Family or Friend						
Trips for Exercise /Recreation						

6. When bicycling do you use any of the following? (Check all that apply.)

☐ Helmet ☐ Bicycle Lock

☐ Head lights or tail light ☐ Reflective Vest or Clothing

☐ Reflectors ☐ Other

If other, please specify:_____

Over ->

7. If you do not use a helmet, lights or reflectors... why not? (Please check all that apply.)

- ☐ I don't think it's useful
- ☐ I think it's funny looking
- ☐ I don't want to ruin my hairstyle
- ☐ I'm a good rider, I don't need it
- ☐ My trip is short, nothing will happen in such a short distance
- ☐ Other

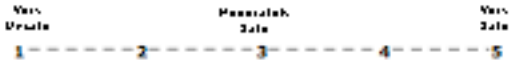
If other, please specify:_____

8. Where do you primarily bicycle? (check all that apply)

- ☐ Sidewalks
- ☐ Local Roadway without bicycle infrastructure
- ☐ Major Roadway without bicycle infrastructure
- ☐ Off-street trails or Shared Use Path (10 ft wide paved surface shared with pedestrians)
- ☐ Roadway with Bike Lanes
- ☐ Roadway with Sharrows (A shared-lane arrow marking)
- ☐ On a Roadway designated as a Bike Route
- ☐ Mountain Bicycle Trail
- ☐ Other

If other, please specify:_____

9. How safe do you feel on each of the following facility types (Mark the boxes that apply):



Sidewalks					
Local Roadway without bicycle infrastructure					
Major Roadway without bicycle infrastructure					
Roadway with Bike Lanes					
Off-street trails or Shared Use Path (10 ft wide paved surface shared with pedestrians)					
Roadway with Sharrows (A shared-lane arrow marking)					
On a Roadway designated as a Bike Route					
Mountain Bicycle Trail					

Next Page ->

10. How many injuries and/or crashes did you have in the past year while bicycling2(Check one.)

- ☐ One
- ☐ Two
- ☐ None
- ☐ More than two

b. If you had an injury or crash was the crash reported to the police department? (Check one.)

- ☐ Yes
- ☐ Don't know
- ☐ No
- ☐ Other (specify)

If other, please specify: _____

11. What prevents you from bicycling more? (Check all that apply)

- ☐ Lack of infrastructure
- ☐ I don't feel safe
- ☐ Bad weather
- ☐ The distance of my trip is too long
- ☐ I don't have the necessary skill set
- ☐ Other
- ☐ Topography (the slopes of the streets)

If other, please specify: _____

12. What would encourage you to bicycle more? (Check all that apply)

- ☐ Dedicated bicycle lanes
- ☐ Better traffic enforcement
- ☐ Protected bicycle lane or cycle track
- ☐ Bicycle detection at intersection
- ☐ Off-street bicycle trails or Shared Use Paths
- ☐ Better street lighting
- ☐ Better bicycle parking
- ☐ Paved shoulders
- ☐ Other
- ☐ Better connectivity to bike facilities

If other, please specify: _____

13. What is the maximum trip (one way) distance you would do when bicycling in the following activities? (Mark the boxes that apply)

Activity	Up to 15 minutes	15-30 minutes	30-45 minutes	45+ minutes
To/From Work				
To/From School				
To/From shopping				
To/From the park or library				
Visiting Family or Friend				
Trips for Exercise /Recreational				

Over ->

14. Are there any specific areas where you think safety concerns needs to be addressed?

_____

_____

_____

15. I identify my sex as... (Check one.)

- ☐ Male
- ☐ Female
- ☐ Other
- ☐ Prefer not to answer

16. How old are you? (Check one.)

- ☐ Under 15
- ☐ 15-29
- ☐ 30-49
- ☐ 50-69
- ☐ Over 70

17. Where did you hear about this questionnaire? (Check all that apply)

- ☐ Email/Website
- ☐ Baldwin City Community Wellness Festival
- ☐ 2015 Lawrence Earth Day
- ☐ Social media (ex: Facebook, Twitter, etc.)
- ☐ Board/Commission
- ☐ Newspaper
- ☐ Friend/Family

If other, please specify: _____

Do you have anything else you want to tell us about bicycling in Lawrence and Douglas County.

_____

_____

_____

_____

_____

_____

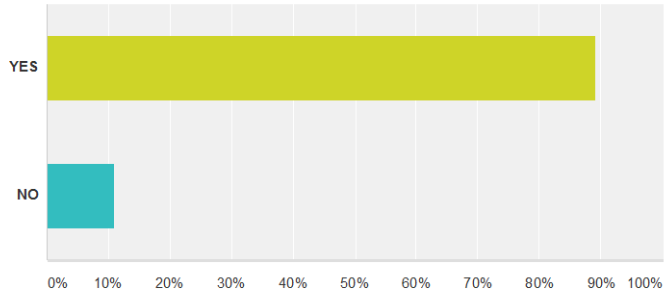
Thank you!

Survey Results

Perceptions of Bicycle Safety

Q1 Do you own a bicycle? (Check one.)

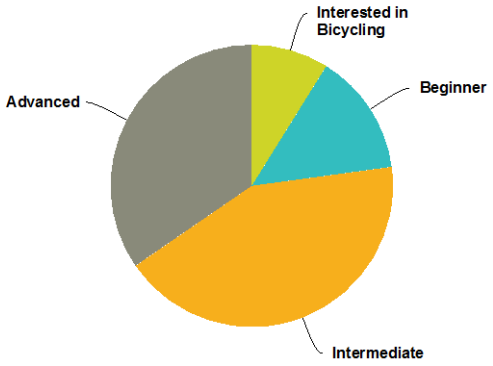
Answered: 350 Skipped: 1



Answer Choices	Responses	
YES	89.14%	312
NO	10.86%	38
Total		350

Q2 How would you rate your bicycling experience? (Check one.)

Answered: 350 Skipped: 1



Answer Choices	Responses	
Interested in Bicycling	8.86%	31
Beginner	14.00%	49

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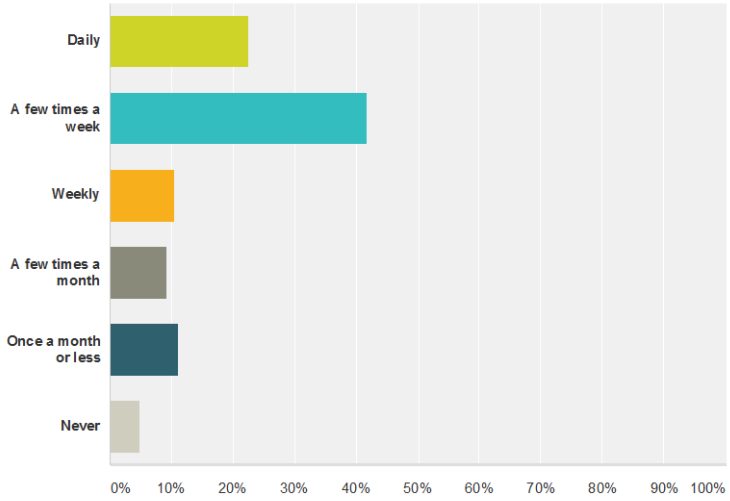
Intermediate	**42.57%**	149
Advanced	**34.57%**	121
Total		**350**

Q3 How often do you bicycle in the months of March to September? (Check one.)

Answered: 306 Skipped: 45

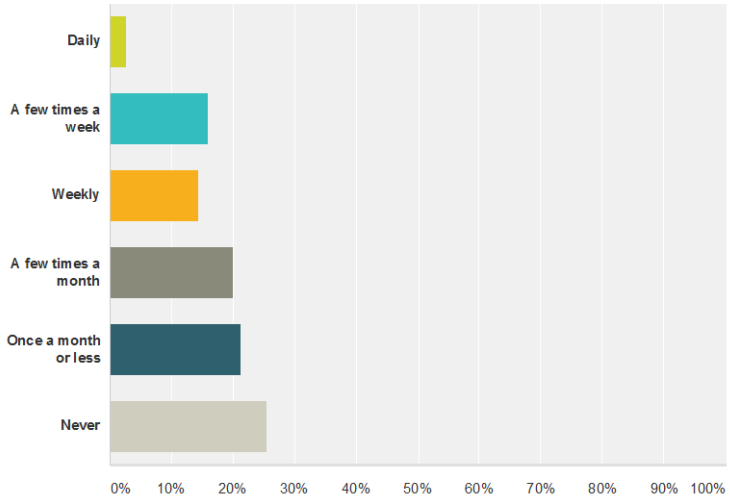


Answer Choices	Responses	
Daily	**22.55%**	69
A few times a week	**41.83%**	128
Weekly	**10.46%**	32
A few times a month	**9.15%**	28
Once a month or less	**11.11%**	34
Never	**4.90%**	15
Total		**306**

Q4 How often do you bicycle with your children? (Check one.)

Answered: 307 Skipped: 44

Perceptions of Bicycle Safety

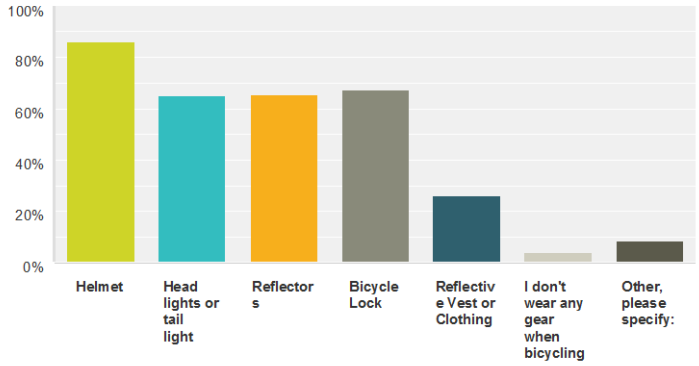


Answer Choices	Responses	
Daily	2.76%	4
A few times a week	15.86%	23
Weekly	14.48%	21
A few times a month	20.00%	29
Once a month or less	21.38%	31
Never	25.52%	37
Total		145

Q5 When bicycling do you use any of the following? (Check all that apply.)

Answered: 304 Skipped: 47

Perceptions of Bicycle Safety

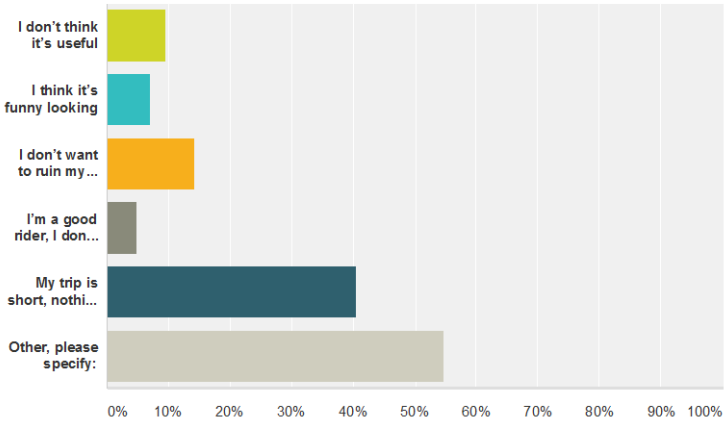


Answer Choices	Responses	
Helmet	86.18%	262
Head lights or tail light	64.80%	197
Reflectors	65.46%	199
Bicycle Lock	67.43%	205
Reflective Vest or Clothing	25.99%	79
I don't wear any gear when bicycling	3.95%	12
Other, please specify:	8.55%	26
Total Respondents: 304		

Q6 If you do not use a helmet... why not? (Check all that apply)

Answered: 42 Skipped: 309

Perceptions of Bicycle Safety



Answer Choices	Responses	
I don't think it's useful	9.52%	4
I think it's funny looking	7.14%	3
I don't want to ruin my hairstyle	14.29%	6
I'm a good rider, I don't need it	4.76%	2
My trip is short, nothing will happen in such a short distance	40.48%	17
Other, please specify:	54.76%	23
Total Respondents: 42		

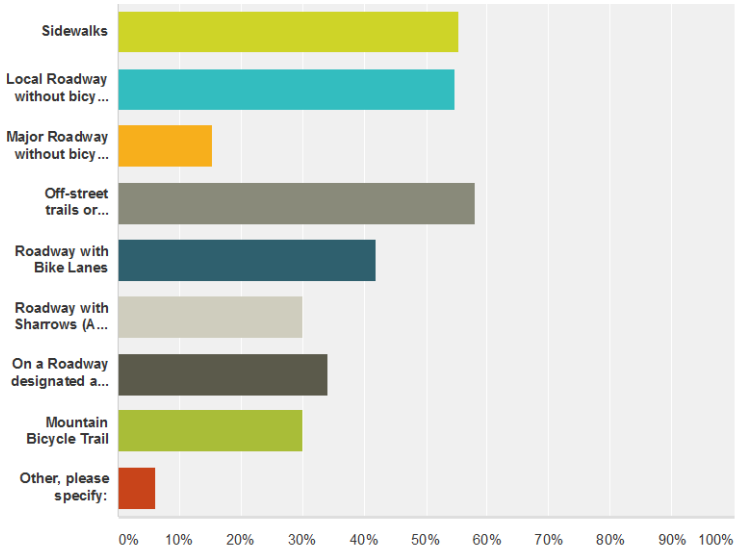
Q7 List the maximum trip (one way) travel time you would be comfortable bicycling for the following activities? (List time in Minutes)

Answered: 143 Skipped: 208

Answer Choices	Responses	
To/From Work	87.41%	125
To/From School	76.92%	110
To/From shopping	86.01%	123
To/From the park or library	88.81%	127
Visiting Family or Friend	90.21%	129
Trips for Exercise /Recreation	97.20%	139

Q8 Where do you primarily bicycle? (Check all that apply)

Answered: 150 Skipped: 201



Answer Choices	Responses	
Sidewalks	55.33%	83
Local Roadway without bicycle infrastructure	54.67%	82
Major Roadway without bicycle infrastructure	15.33%	23
Off-street trails or Shared Use Path (10 ft wide paved surface shared with pedestrians)	58.00%	87
Roadway with Bike Lanes	42.00%	63
Roadway with Sharrows (A shared-lane arrow marking)	30.00%	45
On a Roadway designated as a Bike Route	34.00%	51
Mountain Bicycle Trail	30.00%	45
Other, please specify:	6.00%	9
Total Respondents: 150		

Q9 How many injuries and/or crashes did you have in the past year while bicycling? (Check one.)

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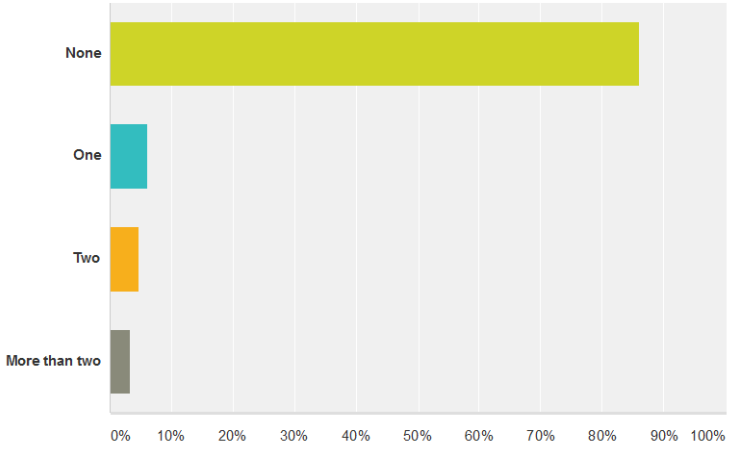
Perceptions of Bicycle Safety

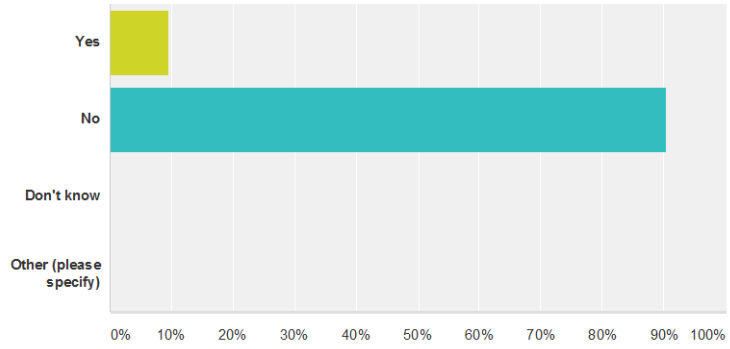
Answered: 150 Skipped: 201



Answer Choices	Responses	
None	86.00%	129
One	6.00%	9
Two	4.67%	7
More than two	3.33%	5
Total		150

Q10 If you had an injury or crash was the crash reported to the police department? (Check one.)

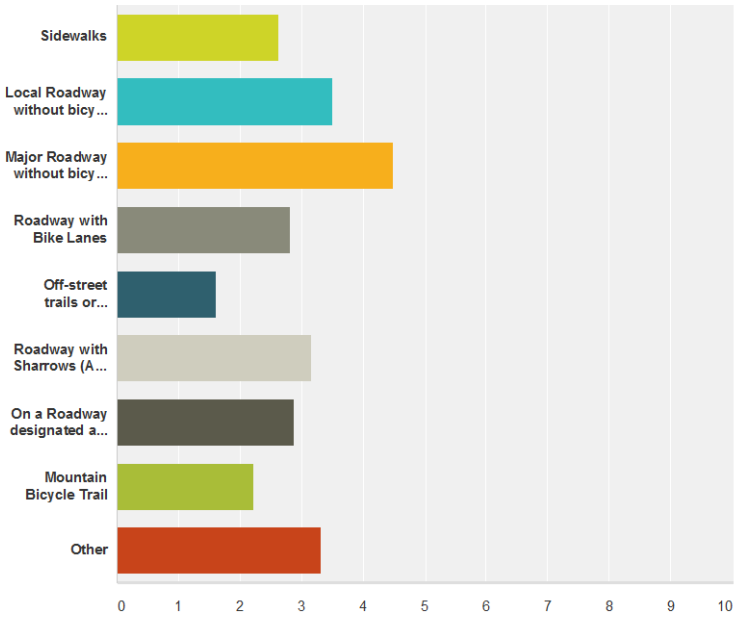
Answered: 21 Skipped: 330



Answer Choices	Responses	
Yes	9.52%	2
No	90.48%	19
Don't know	0.00%	0
Other (please specify)	0.00%	0
Total		21

Q11 How safe do you feel bicycling on each of the following facility types?

Answered: 316 Skipped: 35



	Very Safe	(no label)	Moderately Safe	(no label)	Very Unsafe	Total	Weighted Average
Sidewalks	26.01% 77	21.28% 63	27.36% 81	13.51% 40	11.82% 35	296	2.64
Local Roadway without bicycle infrastructure	3.19% 10	12.78% 40	32.91% 103	33.23% 104	17.89% 56	313	3.50
Major Roadway without bicycle infrastructure	1.60% 5	3.51% 11	5.43% 17	23.64% 74	65.81% 206	313	4.49

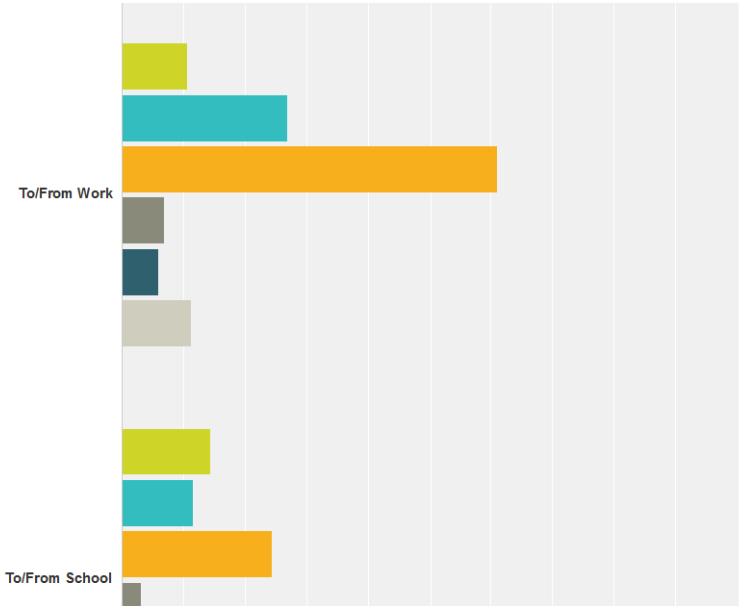
Roadway with Bike Lanes	**5.77%** 18	**31.09%** 97	**44.55%** 139	**12.18%** 38	**6.41%** 20	312	2.82
Off-street trails or Shared Use Path (10 ft wide paved surface shared with pedestrians)	**60.51%** 190	**24.84%** 78	**10.83%** 34	**2.23%** 7	**1.59%** 5	314	1.60
Roadway with Sharrows (A shared-lane arrow marking)	**3.22%** 10	**21.86%** 68	**41.48%** 129	**23.79%** 74	**9.65%** 30	311	3.15
On a Roadway designated as a Bike Route	**10.93%** 34	**24.44%** 76	**36.98%** 115	**20.90%** 65	**6.75%** 21	311	2.88
Mountain Bicycle Trail	**31.72%** 92	**32.76%** 95	**21.72%** 63	**10.34%** 30	**3.45%** 10	290	2.21
Other	**16.67%** 6	**13.89%** 5	**25.00%** 9	**11.11%** 4	**33.33%** 12	36	3.31

Q12 Are there any specific areas where you think safety concerns needs to be addressed?

Answered: 174 Skipped: 177

Q13 When performing the following activities which of the following is your primary mode of transportation? (Check all that apply)

Answered: 310 Skipped: 41



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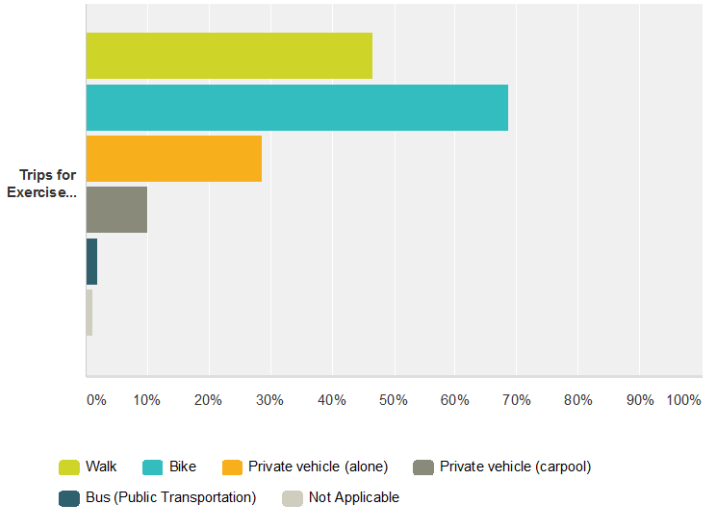
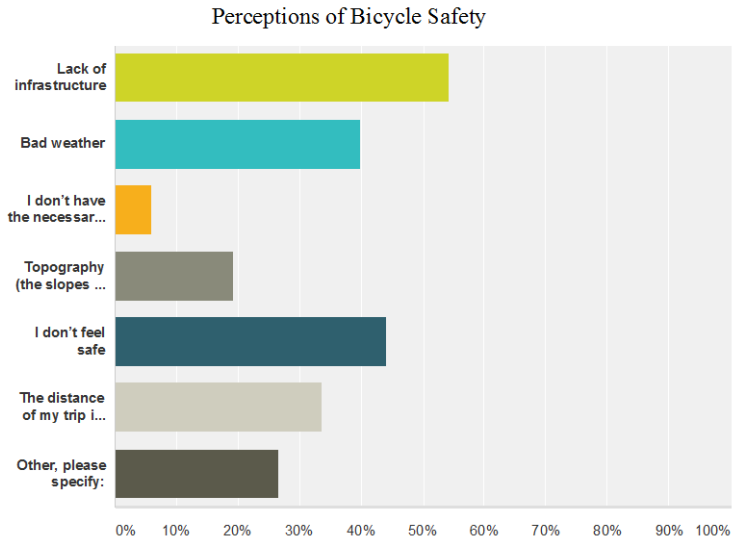
Perceptions of Bicycle Safety



	Walk	Bike	Private vehicle (alone)	Private vehicle (carpool)	Bus (Public Transportation)	Not Applicable	Total Respondents
To/From Work	**10.71%** 33	**26.95%** 83	**61.04%** 188	**6.82%** 21	**5.84%** 18	**11.36%** 35	308
To/From School	**14.48%** 42	**11.38%** 33	**24.48%** 71	**3.10%** 9	**8.28%** 24	**56.21%** 163	290
To/From shopping	**13.40%** 41	**22.88%** 70	**81.05%** 248	**12.75%** 39	**5.23%** 16	**0.98%** 3	306
To/From the park or library	**32.14%** 99	**39.61%** 122	**55.19%** 170	**9.42%** 29	**6.17%** 19	**3.25%** 10	308
Visiting Family or Friend	**16.94%** 52	**28.99%** 89	**75.24%** 231	**17.59%** 54	**2.28%** 7	**1.63%** 5	307
Trips for Exercise /Recreation	**46.58%** 143	**68.73%** 211	**28.66%** 88	**10.10%** 31	**1.95%** 6	**0.98%** 3	307

Q14 What prevents you from bicycling more? (Check all that apply)

Answered: 306 Skipped: 45

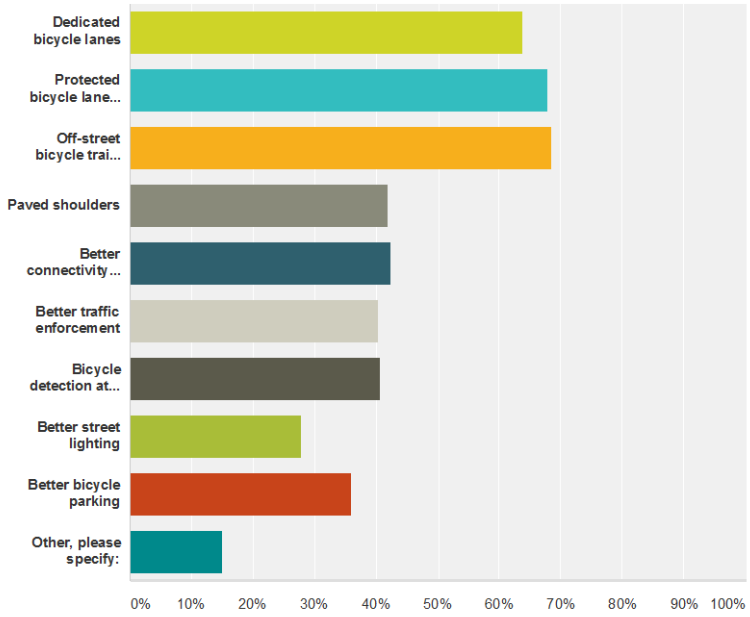


Answer Choices	Responses	
Lack of infrastructure	**54.25%**	166
Bad weather	**39.87%**	122
I don't have the necessary skill set	**5.88%**	18
Topography (the slopes of the streets)	**19.28%**	59
I don't feel safe	**44.12%**	135
The distance of my trip is too long	**33.66%**	103
Other, please specify:	**26.47%**	81
Total Respondents: 306		

Q15 What would encourage you to bicycle more? (Check all that apply)

Answered: 307 Skipped: 44

Perceptions of Bicycle Safety

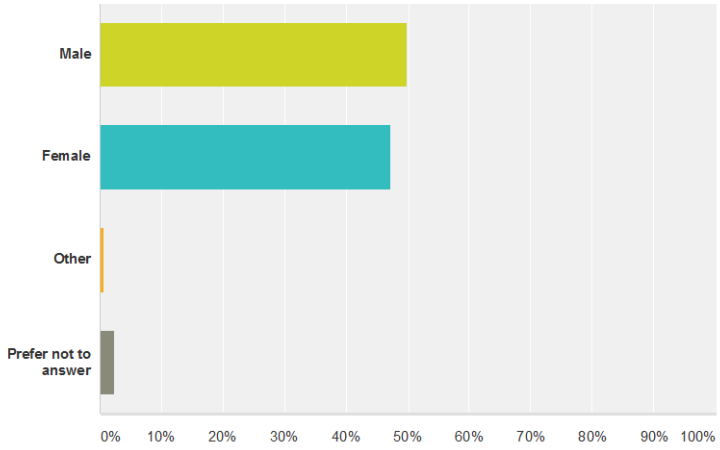


Answer Choices	Responses	
Dedicated bicycle lanes	63.84%	196
Protected bicycle lane or cycle track	67.75%	208
Off-street bicycle trails or Shared Use Paths	68.40%	210
Paved shoulders	42.02%	129
Better connectivity to bike facilities	42.35%	130
Better traffic enforcement	40.39%	124
Bicycle detection at intersection	40.72%	125
Better street lighting	27.69%	85
Better bicycle parking	35.83%	110
Other, please specify:	14.98%	46
Total Respondents: 307		

Q16 I identify my sex as..... (Check one)

Answered: 311 Skipped: 40

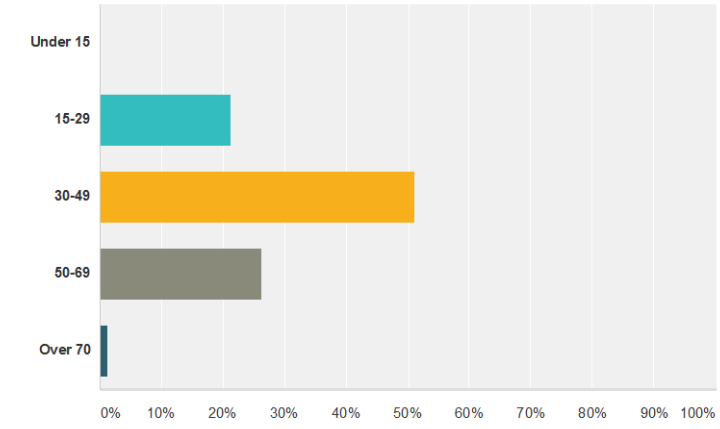
Perceptions of Bicycle Safety



Answer Choices	Responses	
Male	49.84%	155
Female	47.27%	147
Other	0.64%	2
Prefer not to answer	2.25%	7
Total		311

Q17 How old are you? (Check one.)

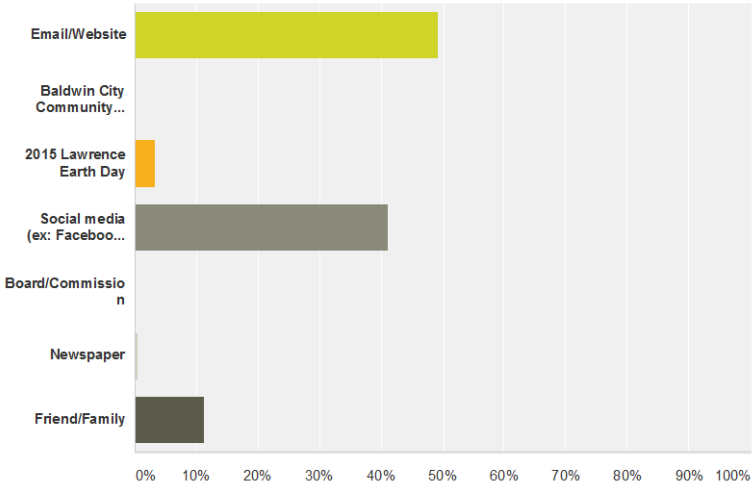
Answered: 309 Skipped: 42



Answer Choices	Responses	
Under 15	0.00%	0
15-29	21.36%	66
30-49	51.13%	158
50-69	26.21%	81
Over 70	1.29%	4
Total		309

Q18 Where did you hear about this questionnaire? (Check all that apply)

Answered: 301 Skipped: 50



Answer Choices	Responses	
Email/Website	49.17%	148
Baldwin City Community Wellness Festival	0.00%	0
2015 Lawrence Earth Day	3.32%	10
Social media (ex: Facebook, Twitter, etc.)	41.20%	124
Board/Commission	0.00%	0
Newspaper	0.33%	1
Friend/Family	11.30%	34
Total Respondents: 301		

Q19 Do you have anything else you want to tell us about bicycling in Lawrence and Douglas County.

Answered: 139 Skipped: 212

#	Responses	Date
1	- Should be encouraged especially among students who live within the 15 minute trip mark. - Needs a start somewhere. - Should look at promoting biking within the entire campus to help keep the campus clean and also make it safer for pedestrians.	4/23/2015 10:28 AM
2	More bike racks on public buses	4/22/2015 9:42 AM
3	Make all shared use paths concrete and connect to one another. Must be able to fit a wheelchair	4/21/2015 7:22 PM
4	I sincerely appreciate the person(s) who took the time to put this together. I hope it results in more a adequate environment for Lawrence cyclists.	4/21/2015 7:20 PM
5	I appreciate that you are gathering input! I would like to see a requirement that new major roads include a bike path.	4/21/2015 5:12 PM
6	I've been on a few of the smaller Lawrence trails. It would be nice to have signs that show the connectivity of the city more broadly, and how we can get from one to the next	4/21/2015 11:12 AM
7	I applaud the efforts to continue adding more trails	4/21/2015 9:26 AM
8	Cyclists and drivers alike need to be educated about traffic laws and how they pertain to bicycles. In my experience many cyclists want to ride in the street, but act as if rules do not apply to them and all traffic should yield to bicycles.	4/21/2015 9:23 AM
9	Please create and connect more bike paths in and around the city!	4/21/2015 8:58 AM
10	We need more of it and driving cars should be discouraged monetarily to fund bicycle improvements	4/21/2015 8:57 AM
11	Build pathways and keep cyclist off the rural roads. They hinder the traffic, especially when they cycle in groups and prohibit the passage of vehicles. If they want to share the roads they, too need to abide by the rules of the road.	4/21/2015 8:52 AM
12	Thank you!	4/21/2015 8:52 AM
13	I think we are making good strides in imporving bicycle infrastucture we just need to keep plugging along.	4/20/2015 11:32 AM
14	Intersections are very scary. I've had cars turning right not notice me. I'm very aware that bicyclists have been killed in Lawrence. Also, how can we teach bicyclists, when they are on a common use, to let walkers know they are coming from behind?	4/18/2015 4:23 PM
15	I support bike lanes and believe all new streets should include them	4/18/2015 1:45 PM
16	What about mentioning bikes on buses (bike racks on all buses). I don't think people realize that they can ride their bike and bus both in the same trip.	4/18/2015 11:48 AM
17	Keep improving bicycle infrastructure!	4/18/2015 9:54 AM
18	Prefer off street trails because they are more relaxing (quiet and away from pollution) and easy to ride with kids. If there are under or overpasses, then they are definitely safer too.	4/17/2015 10:31 PM
19	Use bicycle is nice for Lawrence	4/17/2015 10:05 AM
20	I love that there are so many people who want to bike and would love to see more people feel safe doing so. Thanks.	4/17/2015 6:03 AM
21	I know many who would cycle more if they felt safer. More safety will lead to more cyclists, which will lead to a healthier and more environmental city.	4/16/2015 11:19 PM

22	Freeride trail features and a freeride jump park could go a long way to help attract tourism from a larger radius than what Clinton/Perry/LRT currently attract and such features or park would also highly benefit the entire biking community in the county. More people traveling with bikes and riding their bikes would lead to an increased awareness of bikers. Also, anything that gets more people outside and on their bikes creates a stronger foothold for the entire biking community with every style of riding.	4/16/2015 3:09 PM
23	Start ticketing the bicyclist!!!!!! and quit blaming the car drivers all the time.	4/16/2015 12:02 PM
24	The rules are confusing, as a biker and a driver. Where you can/can't ride. There was a map, but it's not very public. I think a few bad drivers ruin it for the bikers and a few bad bikers ruin it for the drivers. Not sure how you solve that.	4/16/2015 11:24 AM
25	City hall just installed a bike maintenance which is Great!! It would great if a few more stations could be put up around town.	4/15/2015 4:19 PM
26	Love the commitment to encourage bicycling. It's frustrating to want to bike to a destination but don't feel safe getting there.	4/15/2015 12:29 PM
27	I find the only usable path on a flat surface is the levy/Riverfront park. Since I live on the West Side, there is virtually no way for me to ride across the river without going all the way downtown. One or two floating bridges on the river for use in the summer would make this better.	4/15/2015 11:12 AM
28	We do pretty good. Some relatively small additions could really strengthen the network. US-40 from just west of the SLT to the Stull Road turn is a sore point for cars and bikes. If we're going to start putting crap in on Iowa south of the SLT, pedestrian access needs to be considered.	4/15/2015 10:19 AM
29	I think Lawrence is dong a pretty good job of addressing/including bicycles and pedestrian traffic issues in the city agenda. I would like to see more things, signage especially, done out in the county.	4/15/2015 10:14 AM
30	Can we make it family friendly and safer for kids?	4/15/2015 10:11 AM
31	What a great community and what a wonderful opportunity to improve bicycling ease, accessibility, and safety. Check out the Green Circle Trail in Stevens Point, WI. It's a great asset to the town as it offers a safe path for cyclists, and attracts people from all over for recreational purposes. We need more dedicated bikes lanes and bike trails that connect us to the city of Lawrence, Ottawa, Baldwin City.	4/15/2015 10:09 AM
32	Lawrence has a huge student population (which consists of primarily lower income individuals) that means many individuals don't have cars/don't want to spend tons of money on gas. So bettering biking conditions would be an eco friendly and cost effective alternative to students as well as local Lawrence residents.	4/14/2015 12:31 PM
33	More courtesy between both bikers and drivers. Make bikers use hand signals. Make drivers slow down and not use horns.	4/14/2015 11:02 AM
34	Let's make it more part of the culture	4/14/2015 10:58 AM
35	LMBC is the best!	4/14/2015 10:56 AM
36	Roads leading to downtown Lawrence need to have better bike access	4/14/2015 10:53 AM
37	Improved safety in last years	4/14/2015 10:46 AM
38	its good but could be a lot better. More awareness on the part of drivers and a change in attitude .. More bikes on the street will help to change things	4/13/2015 1:52 PM
39	Some motorist need to be educated about cyclists. For example many drivers will STOP in a roundabout when I approach on my bike. I will yield, and they should not do this.	4/12/2015 10:23 AM
40	I wish that more residents felt comfortable/safe on a bike. My neighbors with 2 school-age children no longer bike to school b/c of safety concerns.	4/12/2015 9:05 AM
41	With campus being on a hill there will be at least one direction that is an uphill struggle.	4/11/2015 3:40 PM
42	To much to fit here. I want to make sure that all new lighting is very directed and avoids light pollution! Making Lawrence great for bikes will make it great for people and great for business.	4/11/2015 11:36 AM
43	I'd live more trails like the Burroughs Trail connecting together to commute all over city.	4/11/2015 10:03 AM
44	No.	4/10/2015 6:48 PM
45	Wider lanes	4/10/2015 12:34 PM

46	I am really excited for this time in Lawrence, where the city is looking at more pedestrian and cyclist routes and safety! With the city growing so quickly, this is so very important.	4/10/2015 12:28 PM
47	It would be great if the new Burcham Park trail and Sandra J Shaw trails connected with the new bike lanes on Princeton, or at least to 2nd st. Currently, cyclists must ride through the LMH parking lot.	4/10/2015 8:44 AM
48	Keep advocating for cyclists, please!	4/9/2015 10:48 PM
49	Thank you for your hard work & dedication!	4/9/2015 9:50 PM
50	Lawrence has great facilities for exercise but not traveling by bike.	4/9/2015 9:35 PM
51	Thanks for doing this survey. Bicycles should be a major mode of transportation within the city, but I don't think a lot of people feel safe riding on the major streets like 6th, 9th, 15th, 23rd, or Iowa. The shared bike/pedestrian paths (like the one that goes along K10 and near the Clinton Lake sports complex) are great. But those should come after safety within the city.	4/9/2015 9:20 PM
52	biking is improving in lawrence. keep adding more bike lanes, keep pushing people who drive cars to be aware and keep teaching riders how to follow the rules of the road.	4/9/2015 6:56 PM
53	No	4/9/2015 2:47 PM
54	the level of understanding of cyclist rights and responsibilities is very low. Motorists do not seem to understand what their responsibilities are toward cyclists.	4/9/2015 2:01 PM
55	East/West travel is not easy by bike. Too limited infrastructure and lack of connectivity. On again/off again lanes on 9th are good start but needs to be continuous. Places like shopping, downtown need much more & better parking, preferably protected (like in a parking garage) to keep bikes out of elements. There need to be at least some streets that are built with the PRIORITY of walking and biking, and not automobile use. Connectivity among shared use paths should also be high priority to encourage bike transportation among those not comfortable riding on roadways.	4/9/2015 1:11 PM
56	The City needs better enforcement of traffic ordinances on bicyclists and should require helmets be worn by all cyclists whenever they're riding on public streets and sidewalks.	4/9/2015 12:43 PM
57	There should be more formal bike routes downtown, aside from Vermont St. Also, bring more rail trails (if possible) to the area!	4/9/2015 12:33 PM
58	Absolutely vital to vigorously enforce traffic laws as well as educate about giving three feet, etc. on cars. Many/most drivers don't seem to know the laws about three foot margin, or that bikes have the right to take the lane when necessary for safety, can ride two abreast, etc. Instead they behave as if bikes are intruders/stow-aways on roads that are exclusively for cars. Have encountered many nice drivers, and some people who seem to become psychopathic behind the wheel - I've been yelled at, brushed, cut off, gassed (google "rolling coal"). Literally murderous behavior that somehow is okay because I'm on a bike and have no right to be there. They may be in the minority, but it only takes one. (And, seriously and no kidding, I'm a law-abiding, skilled, and polite cyclist.)	4/9/2015 11:30 AM
59	Thank you for promoting cycling in Lawrence and Douglas County!	4/9/2015 10:27 AM
60	Stop focusing on accomidating drivers, traffic with cars going at higher speeds kills neighborhoods and businesses, lower the speed limits with in the city!! Divert traffic away from schools, elderly living, and parks, force people to drive slow or go a different way. Create protected neighborhood zones around schools and parks that are in effect 24/7	4/8/2015 11:22 PM
61	Infrastructure is one thing, education is another. Infrastructure is great but it's filtered through politics, improving the cycling experience starts with education. The public (cyclists and non-cyclists) needs education on bicycle safety and responsibility from both the driver and the riders perspective. Until we cyclists start behaving responsibly on the the road in a overwhelmingly noticeable and wide-sweeping way we will never be taken seriously. Check out Tim Johnson's "Changing Group Road Ride Behavior" for a good example of what the Muffin, Pasta, Comet, and other rides could be. http://www.peopleforbikes.org/blog/entry/changing-road-group-ride-behavior	4/8/2015 9:14 PM
62	I had a bicycle accident in 2010 and lost vision in one eye due to impact. I was wearing a helmet. I was on the south lawrence trafficway on the sidewalk and at a T intersection of the walk (6th street and Lawrence trafficway) I fell off my bike due to poor maintenance of the sidewalk` there was much gravel debris and I lost control of the bicycle. Warning signs or maintenance of this area may have helped.	4/8/2015 8:44 PM
63	would like bike baths throughout city much like Topeka has	4/8/2015 7:17 PM

64	make bike paths continuous not segmented	4/8/2015 6:11 PM
65	Cycling in Lawrence and Douglas County is definitely still an "assumed risk activity." Lawrence has a long way to go before I would consider it a "bicycle -friendly community."	4/8/2015 5:58 PM
66	Baldwin City could really use some bicycling infrastructure.	4/8/2015 5:39 PM
67	The patchwork system of bike lanes and multi-use paths means that I end up using local roads and sidewalks for most of my rides to and from planned destinations. Recreational riding doesn't have the same constraints but the areas in which to ride safely are likewise limited by the patchy network currently in place. And county roads are the worst. Absent a paved shoulder, the risk of riding on such a road almost always outweighs the desire to ride paved county roads.	4/8/2015 4:34 PM
68	Enforce helmet laws for kids!	4/8/2015 4:32 PM
69	I know that city planners love to solve problems through infrastructure, but that is not the most effective way to increase participation in cycling. Instead, study how bike friendly communities like Davis California did things in the 1970s, not today. Comparing Lawrence to Davis, Portland, or Copenhagen today is comparing apples and oranges. Think about how to get butts on bikes in the first place...how does that culture develop, and why? You can't paint all the stripes on the pavement you want, but that's not really going to convince people to take to bikes if they don't know how to lube a chain or fix a flat...or if they know that there is a free parking spot waiting for them if they take their car. Again, think about bike CULTURE...bike culture started in this country as a counter culture, a heavily immigrant activity taken up by the children of Europeans in select areas of the United States, then grown in particular locales that embraced it as an expression of cultural values. In truth, biking is a counter-culture. So study the biking hotspots, but don't compare them today to Lawrence today...look at them in the 1970s and figure out how and why bike culture developed. Finally, figure out how to work with KU. Thousands of KU students ride the free bus a quarter mile every day. If you could get some of them onto bicycles the spillover effect would get hundreds more bicyclists onto city streets.	4/8/2015 4:03 PM
70	I would like to see an education campaign for drivers and cyclists informing them of cycling rules of the road, what drivers should do when coming upon a cyclist on the road, and etiquette--how drivers and cyclists can help each other and be respectful to keep everyone safe.	4/8/2015 3:20 PM
71	Overall, Lawrence is the safest city Ive lived in for cycling with good infrastructure. However, poorly planned construction on roads leads cyclists on difficult/unfriendly routes, lack of education and enforcement for drivers not sharing roadways, prevalence of alcohol use/DUIs, difficult intersections, unpaved shoulders, contribut to fear and unsafe conditions for biking. The air pump and tools at city hall is a novelty, but does little to help or protect cyclists from the main barrier to biking more, that is uneducated and unsafe drivers.	4/8/2015 2:44 PM
72	Lawrence needs bike lanes. Period. Sharrows are just re-stating the obvious and that really isn't working. --And there are some places it just isn't safe to bike--thoroughfares like Iowa St. and 23rd street force bikes to take the sidewalk, which gets dicey when there are pedestrians present or people in SUVs turning at intersections without checking the crosswalks, which honestly is more of a rule than an exception. It would be very nice if there were more access roads for bikes, or even wider sidewalks, along these streets.	4/8/2015 2:33 PM
73	Haven't been hit by a car yet. but am always disturbed when reading about a fellow bicyclist who has.	4/8/2015 2:27 PM
74	Paved shoulders are most important for serious bicycle riders.	4/8/2015 2:25 PM
75	Love all of the paved shared use paths and looking forward to more. Connecting current ones to Mary's Lake and Rock chalk park/north lawrence would be great	4/8/2015 2:12 PM
76	It's pretty good.	4/8/2015 1:46 PM
77	Overall, i feel Lawrence is much better for biking than a lot of places	4/8/2015 1:44 PM
78	We need to change the mindset of drivers and taxpayers that cycling is an equal transportation form to autos.	4/8/2015 11:35 AM
79	Lawrence needs to look at cities that have been successful in creating safe and pleasant biking and walking situations. Madison? Boulder? Maybe we should stop giving incentives to developers for apartments and Comptonville and use some of those funds to make Lawrence a great place to live.	4/8/2015 11:22 AM
80	1. The use of drivers, particularly young people, of their cell phones while driving is very dangerous for cyclists. there is not enough enforcement and it could end very badly. 2. I want to suggest to set a route around Lawrence and to set it with special signs. Adult can finish it in less than two hours. Once a year it can be a family event to ride around Lawrence.	4/8/2015 9:40 AM

81	Just about everywhere in Lawrence east of Iowa St. should be very easy to bike because of the land use patterns. The city needs to commit to making bike/ped infrastructure its top priority every time there is any road construction in those areas. West of Iowa St. will be harder to create a great biking environment because of the sprawling land use patterns. Nonetheless, the same principles should be used. Additionally, plans to continue sprawling the city south and west of K-10 are ill-conceived and should be abandoned in favor of more infill development that increases density and prioritize accessibility for people over mobility for cars.	4/8/2015 9:19 AM
82	If we make it easier to bike, our roadways will be less congested with car traffic, and limited downtown parking will be less of an issue.	4/8/2015 8:59 AM
83	Bicycling should be a viable commuting method, but it's important to realize that people do live west of Kasold too. I want to ride too, but I can't afford to live in OWL. Don't just focus on the County or Downtown Lawrence.	4/8/2015 8:26 AM
84	We do not need cameras at every traffic light in lawrence! What is that about? They also tape cyclists – the surveillance here is simply far too much.	4/8/2015 7:37 AM
85	I hope we're partnering with K.U. - many of the negative perceptions of motorists about bicyclists come from encounters with students who frankly don't know how to bicycle properly, let alone safely. It needs to be a part of freshman orientation.	4/8/2015 5:05 AM
86	With no mountains or beaches, bike paths are one of the few ways to make this area a more attractive place to live. Before moving to Lawrence over a decade ago, I had always lived in places that did not force me to own a car, and that too is a major attraction, especially for healthy young people. It makes a city feel more pleasant, more friendly, more livable. Especially with good public transportation, and the investment so far for pedestrians and cyclists, it is worthwhile to keep investing in making cycling even safer, because it is very possible even now to get by without a car. It is a way to reduce our carbon footprint and stay healthy in a pleasant, friendly and safe community.	4/7/2015 11:18 PM
87	Hold bicyclist accountable. More cops on bikes to monitor bicyclists in town.	4/7/2015 11:11 PM
88	The city of Lawrence is a perfect scale for bicycling . In addition to infrastructure, educating the public, especially drivers, could be a very effective way to ensure saftery of the bicyclists.	4/7/2015 11:10 PM
89	A bike registry with local PD would be sensible to assist in the recovery of stolen bikes in Lawrence.	4/7/2015 10:40 PM
90	Lawrence is auto based-would like to see that shift some	4/7/2015 9:12 PM
91	I would love to see biking trails made of asphalt - not concrete. Concrete buckles & the expansion cuts are irritating to ride on. Have ridden on many great smooth asphalt trails in MN, WI, IA and FL. Lawrence city leaders are way too in love with concrete.	4/7/2015 9:08 PM
92	I think the cycling community is growing here. I feel that Lawrence would benefit by enhancing and promoting Lawrence as a bike friendly community and expand to surrounding communities. Bicycle tourism has shown to be a growing commerce. Why not venture into that market?	4/7/2015 8:57 PM
93	I see lots of improvements with bike lanes. Good job - let's keep working at it.	4/7/2015 8:21 PM
94	Please enforce "no bikes on Mass St". I have been sideswiped while walking. In NYC I saw stencils painted on the sidewalks - "No Bikes Allowed", which seemed like a great way to raise awareness.	4/7/2015 7:42 PM
95	Terrain and safety are the to reasons I do not bike here. I have biked to work in other communities with more forgiving terrain and where I felt safer.	4/7/2015 5:11 PM
96	We need to do better in making bicycling safer to KU, schools, parks and downtown.	4/7/2015 3:17 PM
97	I would love to see more designated bicycle paths for utilitarian biking, and a pedestrian/bicycle bridge over Iowa at 21st street.	4/7/2015 3:08 PM
98	Invest in infastructure and Engineering @staff level. Adopt the Safe Routes policies and proceedures.	4/7/2015 3:00 PM
99	I was hit by a car, the driver simply did not see me and pulled through an intersection from a side street directly into me, I had the right of way. The hit and run driver left me and my crumpled bike laying in the middle of the busy intersection where I could have been hit again. I am now terrified to ride in traffic of any kind, which is why I tend to walk rathe than ride a bike. I only ride my bike on surfaces not shared with automobiles since that accident some 40 years ago.	4/7/2015 2:57 PM
100	many who bike do not know the rules and cause other modes of transportation -cars and buses - to become frustrated leading to negative views of cyclist.	4/7/2015 2:36 PM

101	Look at DAVIS CA and their biking ideas. Tons of lanes, crossing signals, paths, tools, parking, rightofway, respect.	4/7/2015 2:12 PM
102	If the infrastructure is vastly improved there will be a dramatic increase in economic benefits to the whole community	4/7/2015 2:12 PM
103	There is a lot of loose gravel and scree on roads that aren't right in town! Even bi-annual street sweeping of paved roads would be helpful.	4/7/2015 1:51 PM
104	RIDE LIKE YOU ARE INVISIBLE!	4/7/2015 1:36 PM
105	lots of roundabouts	4/7/2015 1:32 PM
106	I have lived in larger cities where I felt MUCH safer biking, and biked almost daily to work and school. Currently Lawrence feels too unsafe for me to attempt that here.	4/7/2015 1:32 PM
107	Infrastructure for biking needs to be improved, however a problem i have noticed is that many drivers don't respect bicyclists. Some honk and yell, others do not give you much space or slow down. I don't know how to do this, but drivers need to be educated about the rights of cyclists on the road.	4/7/2015 1:27 PM
108	I think connectedness is key for the trails, paths, bike lanes, shared use paths, parks, etc. If everything connects it makes it much easier to bike. And enforcement. People driving need to understand the rules that govern bicycle use and their part in it, likewise cyclists need to be informed if they are breaking the rules.	4/7/2015 1:14 PM
109	I have lived in communities where biking is very safe and the infrastructure supports healthy forms of commuting. In comparison, Lawrence is NOT a biking friendly community. I have a hard time even finding a place to lock-up my bike when I am downtown or around Lawrence. Definitely, lots of work to do to make the town more accessible for bikers.	4/7/2015 1:07 PM
110	Lawrence is generally a great place to be a cyclist from the year round weather, to miles of country roads and mtn bike trails just outside my door, to the events hosted by and around the city. I think getting kids started and raising a generation that is comfortable with alternate transportation is key factor in bring this mainstream.	4/7/2015 1:06 PM
111	I'm no longer a current resident in Lawrence and I miss all the biking trails.	4/7/2015 1:00 PM
112	Lawrence has the worst drivers I have ever encountered!	4/7/2015 12:45 PM
113	I live in SE Lawrence and work in Baldwin City. I'd ride down to work regularly if there was a marked off lane for bikes on 1055.	4/7/2015 12:35 PM
114	Lawrence/Douglas County is a great place for biking whether it be road, cycocross or mountain biking. It's great for families and people in general as it's good exercise and brings people together. It's also great for the environment and see it getting bigger in the future are people turn to alternative means of transportation. We need to start relying on human power vs fossil fuels.	4/7/2015 12:27 PM
115	I like the fact that the city had a forum/meeting last week. More discussion is needed on this topic. Lawrence calls itself a "Bicycle friendly City". I do think it has a long way to go to become that. Especially since the bike path is currently closed in the middle because of construction.	4/7/2015 12:23 PM
116	I've been cycling in Lawrence for 25+ years; I consider myself a safe, advanced cyclist who follows the rules of the road. I'm generally comfortable riding anywhere in town on any road, but I know many hobbyist cyclists feel uncomfortable riding on the street.	4/7/2015 12:16 PM
117	To build more trails in Lawrence in the North side not the West	4/7/2015 12:12 PM
118	Don't make the same horrid mistakes that Long Beach CA made. Cyclists do not need separate lanes. They need discipline and respect.	4/7/2015 12:10 PM
119	Lawrence has so much potential to be a truly bike-friendly town. Look at Eugene, OR for a town not that much larger than lawrence that has done a fantastic job of integrating the cycling culture into the city.	4/7/2015 12:09 PM
120	I love cycling here! It's much better than many places in Kansas, but there's still a lot to improve. I would very much like to see better ways to cross and ride on 23rd St. and Iowa St., both of which are major barriers between neighborhoods for cyclists and walkers alike. Better connectivity will lead to a thriving, greener, more social community. Thanks for sponsoring this survey!	4/7/2015 12:05 PM
121	Bike trails (on-road) are not connected well. I know the city has big plans for this, but it is taking a long time and is not helped by the 15th St/K10 construction taking out a major part of the bike trail for over a year with no good/safe alternate route.	4/7/2015 12:05 PM

122	Keep on trucking	4/7/2015 12:02 PM
123	Lawrence is a good place to ride but could be the best.	4/7/2015 11:57 AM
124	Lawrence is headed in the right direction! Keep it up!	4/7/2015 11:57 AM
125	Let me know how I can help. As a 20 year veteran of cycling and a former professional rider, I'd love to see what is a decent place to ride, become even better. Thanks Todd	4/7/2015 11:55 AM
126	Keep it going! We need more cycling infrastructure. If you build it, they will come. It is good for the environment, city budgets and our health. Also, please make sure there are protected bike lanes on the 9th Street Corridor.	4/7/2015 11:48 AM
127	Need a safe bikeway to get up and down Mt. Oread and hill near 9th and Emery. Slower/less fit riders can wobble or need to stop going up hills.	4/7/2015 11:47 AM
128	I am a long time Lawrence biker (for 40 years) and have never felt so unsafe as I do now when biking around town. I love to bike and hate to do so here so am seriously considering moving away from Lawrence to a more bike-friendly community when I retire from work in the next few years.	4/7/2015 11:45 AM
129	I feel safest on sidewalks, but they need to be wide enough so I can pass pedestrians and be well maintained to avoid crashing.	4/7/2015 11:44 AM
130	if lawrence were more bicycle friendly, that would be a factor in my choice of staying or moving to a more ped/bike friendly community....thanks for sending out this survey.	4/7/2015 11:41 AM
131	I love the bike trail from the movie theater to Clinton Lake. I really appreciate having this available for recreation and exercise.	4/7/2015 11:41 AM
132	Roads like 458 are too narrow without shoulders to be major bike trails. Need to complete shoulders and keep them clean for bikes to be safe.	4/7/2015 11:36 AM
133	Let's hear it for the street cleaners who make bicycling a lot safer in Lawrence! That said, I wish there was more of a priority to get the sand off the going-down sides of hill streets where gravity and sand which is almost as slick as ice can lead to bad spills.	4/7/2015 11:24 AM
134	I would like to see bicycling safer for children.	4/7/2015 11:24 AM
135	Openning up the bike road near the 10 sooner will be a big help.	4/7/2015 11:21 AM
136	Generally, I think we have a REALLY good start. The single most frustrating part is a lack of connections from one paved multi-use path to another, and connections from them to county bike routes. A good example is that there's no reasonable way to get from the termination of the SLT path (north end) with farmer's turnpike, which, connecting to Lecompton road to the north constitutes a major amount of bike traffic.	4/7/2015 11:17 AM
137	It needs dedicated funding. Please avoid sharrows & sidepaths when possible. Lanes (protected or unprotected) are considerably more attractive for those concerned about safety.	4/7/2015 11:14 AM
138	Thanks Jessica/BAC Members!	4/7/2015 11:12 AM
139	Bicycling and pedestrian issues should be viewed as economic development infrastructure too.	4/7/2015 11:10 AM

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