BIKENOMICS

Measuring the Economic Impact of Bicycle Facilities on Neighborhood Business Districts

Kyle Rowe

University of Washington

College of Built Environments

July 19, 2013

This project was the culmination of my work in the Community, Environment, and Planning program at the University of Washington. I am excited to share my work with the planning community, and hope that it will benefit future analyses of how bicycle facilities impact the economics of neighborhood business districts; and ultimately inform the implementation of Seattle's Bicycle Master Plan. There were many people who provided invaluable help to this project; I would like to thank them, for this project would never have been possible without their support: Daniel Rowe, David Amiton, Chad Lynch, Sara Zora, Rachel McCaffrey, Caitlin Dean, Chris Campbell, and Eliot Mueting - thank you for you help!

Feel free to contact me with questions or comments:

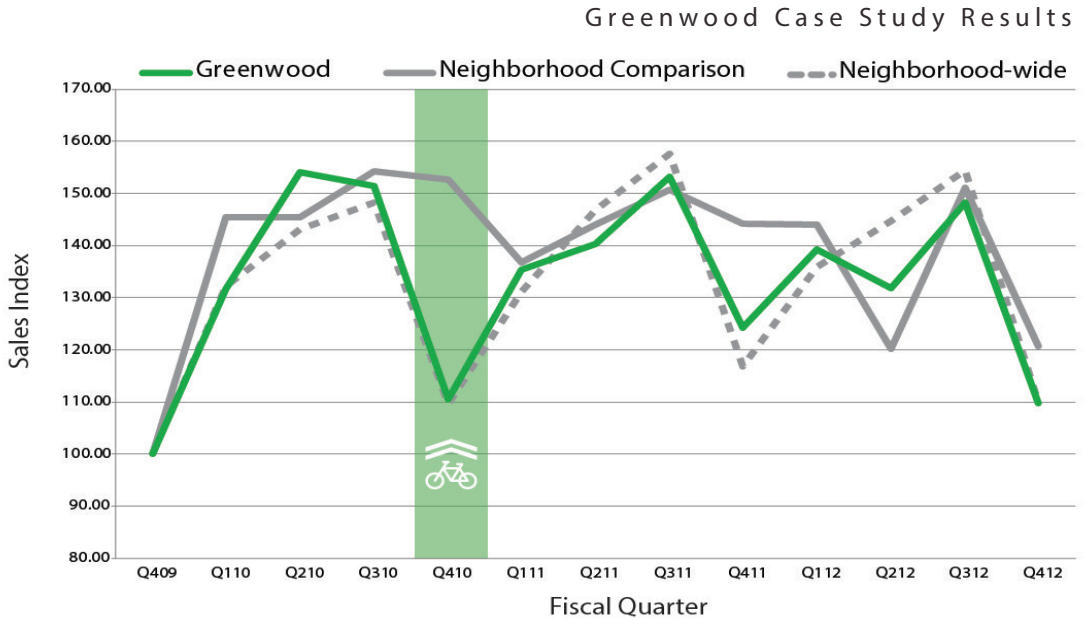
kylerowe4@gmail.com

Table of Contents

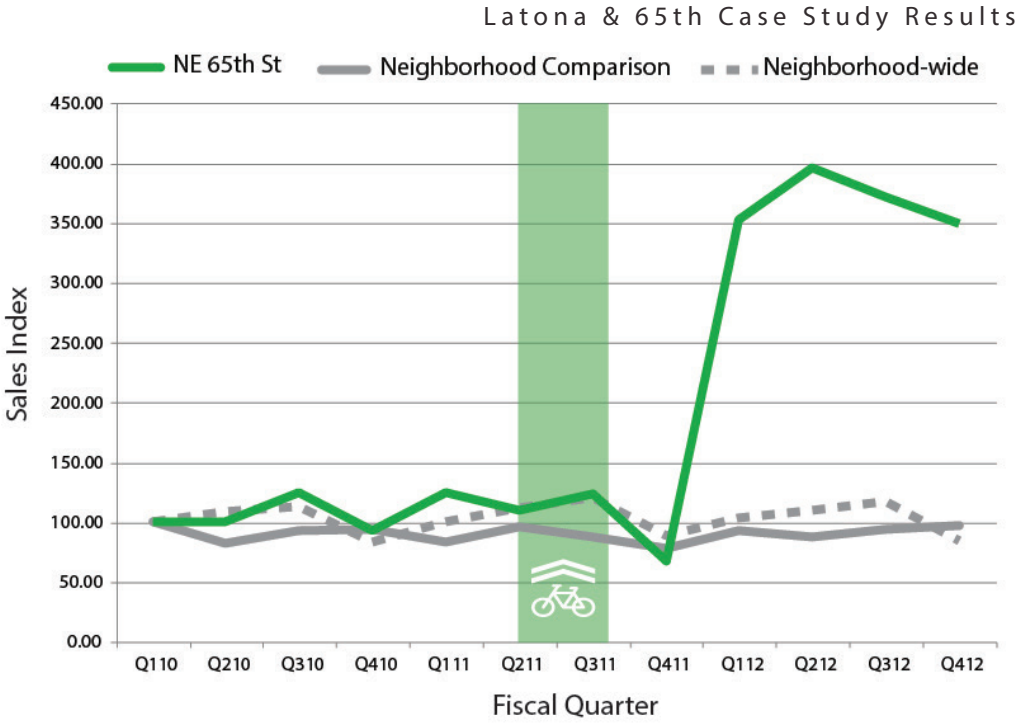
Executive Summary

Although we may be one of the top cities for bicycling in the nation, planning for bicycles is no simple task in Seattle; political barriers, physical limitations, and competing modes make squeezing a cycle track on to an arterial seem like we are tearing down a bridge. One of the barriers that bicycle planners face in this city is the business community, who has repeatedly made their voice heard that they oppose bicycle facilities on their retail streets (cough, NE 65th St, cough) for the update to our Bicycle Master Plan. A lack of data and understanding about the impacts that bicycle facilities have on retail streets has allowed this political barrier and general misunderstanding to persist much longer than necessary. During the public comment period for the Bicycle Master Plan, numerous businesses wrote to the city in opposition to the new facilities planned on their streets. Rightfully so, these businesses are concerned about customers' access to their storefront; and with little data to show, planners are at a loss when trying to rationalize that the proposed changes to the right-of-way will be prosperous for the business community. I have attempted to shorten that knowledge and data gap by utilizing taxable retail sales data (provided by the Washington State Department of Revenue) to study the impacts that two bicycle projects in Seattle had on the neighborhood business districts they occurred in.

In late 2010, the Seattle Department of Transportation completed a road diet on Greenwood Ave N, which included installing bicycle lanes from N 85th St. to N 105th St. The business district in Greenwood is centered around the intersection of Greenwood and 85th, and extends both north and south a few blocks. Data was gathered from the Greenwood business district, starting in the fourth quarter of 2009 and extending to the fourth quarter of 2012 - the most recent dataset available. To account for variables beyond the street improvements, two more datasets were gathered in the same timeframe to act as constants. The neighborhood comparison was the business district centered at NW 85th St. and 15th Ave NW, and the neighborhood-wide data included all businesses in NW Seattle. The results of this analysis are in the graph below, with the bicycle lane signifying the construction of the road diet.



The second bicycle project studied was the climbing lane installed on NE 65th St, from NE Ravenna Blvd to 1st Ave NE. Although this project only installed a climbing lane for the hilly portion and shared lane markings elsewhere, the real impact in question is the twelve parking spots removed adjacent to the business district at NE 65th and Latona Ave NE. Similarly, two more datasets were gathered to provide constants; the neighborhood comparison was the business district referred to as Tangletown - at Keystone Pl. N and N 56th St., and the neighborhood-wide data included all businesses in NW Seattle. The results of this analysis are in the graph below, again with the bicycle lane signifying the construction of the project and the removal of the parking.



Looking at the data, conclusions can only be made to reject the hypothesis that the bicycle projects had a negative impact on the business districts for both case studies. Even though the business district at 65th & Latona experienced a 400% increase in sales index after the parking was removed and the climbing lane was installed, we cannot assume that this economic success was the result of increased bicycle access. One could argue that the economic success certainly wasn't the product of customers accessing the businesses by car, but without mode-split data before and after the project no conclusions can be made to assume which mode was most responsible for the economic change, or if it even had a correlation to a transportation mode.

Taxable retail sales provide us with true economic data, making it highly valuable compared to the traditional method - intercept surveys. Utilizing a survey-based methodology, like the recent East Village Shoppers Study in New York and the Polk Street Study in San Francisco, gives the researchers a better understanding of how people are accessing the business district, but relies on highly subjective economic data. Future studies should utilize both methods in conjunction to gain an understanding of how mode-splits change during the same timeframe that taxable retail sales data is collected. Doing this will allow for more accurate conclusions to be made and facilitate understanding and better communication between the bicycle planning and business communities.

Importance

Analyzing the relationship between bicycle facilities and neighborhood business districts is advantageous for several stakeholders and professional fields. Bicyclists, planners, business district organizations, business owners, and property owners benefit from the knowledge gained. There are two primary reasons that shrinking this knowledge gap is important to the existing bicycling and planning environments in Seattle. First, SDOT is preparing to complete the 2013 update to the Bicycle Master Plan, which plans for over one hundred miles of bicycle facilities that will be adjacent to retail. Not only will this study help SDOT, but the planning field in general will benefit greatly from an understanding the relatedness of economics and street improvements. Second, businesses are not provided sufficient information to understand how people access their storefront; partly because of the lack of data, business owners in Seattle believe that automobile parking means more customers.

Planning

Bicycling in Seattle is growing faster than ever. Commute Seattle's *Center City Commuter Mode Split Survey* from 2012 found that bicycling is the second fastest growing commute mode, falling only to rail, which continues to grow due to the Sound Transit Link Light Rail expansion. If the bicycling trend continues, the city will have to build facilities to protect cyclists from other road users, particularly cars, trucks, and buses. Logically, the next question that arises from this growth, is the location of the bicycle facilities – where should we build them? Bicycle facilities effectively aid the user in reaching his/her destination. Potentially the most common destination for cyclists falls in a NBD, because it is in a NBD

Commute Seattle's** Center City Commuter Mode Split Survey **from 2012 found that bicycling is the second fastest growing commute mode...

that you go to the coffee shop, meet a friend at the bar, go to the bank, or get groceries. These shorter neighborhood trips are very popular for cyclists because it is often faster and easier to complete by bike than by foot, car, or bus. SDOT saw the need for bicycle access to NBD, and reflected it in the update to the Bicycle Master Plan.

In the spring of 2013, SDOT released the 2013 draft update to the Bicycle Master Plan. The biggest aspect of this plan is the draft bicycle network, which includes 582 miles of bicycle facilities, existing and planned. Of those 582 miles, 450 do not exist or would require an upgrade of some sort. Of these 450 miles needing to be built, 161 are adjacent to retail. This significantly impacts the right-of-way space on which these businesses rely for customer access.

Bicycle Master Plan... 161 miles of bicycle facilities adjacent to retail

Business

Typically, businesses do not support the removal of parking spaces for alternative transportation modes, and this was very prevalent during the public comment period for the draft network. In particular, the businesses on NE 65th Street made their voice heard. The comments below are examples of the responses that SDOT received from NE 65th Street businesses.

This issue is not unique to bicycles either; retail seems to support car parking over all other uses for securing customer access. More data on NBD access and commute mode could factually inform business organizations and owners, potentially alleviating the disagreement between planners and shop owners.

"Please do not take away the 65th St. traffic lanes for bicycle lanes. Traffic is congested already and eliminating street parking for cars will [be] detrimental for all small businesses located on 65th."

"As my dear wife said after reading about the proposal to add a bike lane, etc., what have you been smoking? 65thst. [is already] often congested and slow. This proposal would not only make it worse for drivers, but it would seriously and negatively impact businesses along 65th..."

Literature Review

Despite a plethora of information regarding the relationship between mode-choice and economic trends, very few studies have focused specifically on bicycle infrastructure and economic activity. Much of the existing literature considers citywide economic trends, or use consumer and retailer surveys as the basis for their findings. The question I chose to analyze in Seattle—how has bicycle infrastructure impacted the economic activity of a neighborhood business district?—had not been truly investigated until quite recently, when New York City hired consultants Bennett Midland LLC to pioneer this type of analysis.

Although research exists for analyzing the economic impact of bicycles at the national, state, regional, and city-wide scales, I will only analyze the studies that looked at the scale of the business district. In addition, I have included some studies from Seattle that do not analyze bikes and NBDs directly, but were certainly informative for this project.

Business District Scale

The neighborhood business district is the scale at which we can start attributing calculated economic trends to pedestrian or bicycle street improvements. When a street becomes pedestrianized (cut-off to all modes but walking), the impact of that decision can be seen at the business district scale; looking at the whole city will allow factors other than the street improvement in question to impact the data. Similarly, looking at one or two businesses will be easily skewed by other factors affecting those businesses' success or loss; however, we can examine the business district to see what good, or detriment, a street improvement project has done. The neighborhood business district is the scale at which we are likely to find some sort of correlation between economic trends and bicycle infrastructure improvements.

Most studies to date that aimed to analyze the impact of street improvements, specifically bicycle facilities, used surveys for their

methodology. A study conducted in 2003, by Emily Drennen, examined the new bike lane on Valencia Street in San Francisco's Mission District. To gather an idea of how the bike lane affected the businesses, the study interviewed twenty-seven businesses four years after the facility was built. 65% of the storefronts interviewed responded that the bike lane had a positive impact on their business, and 65% also said that they would support more traffic calming on Valencia Street. Two gaps become apparent in Drennen's methods: she did not use an independent variable against which to compare results and she did not collect data before the facility was built to track individual's perceptions before and after. Drennen did, however, recognize the need for more empirical econometric analyses; in the *Conclusions and Next Steps* section, Drennen says, "Econometric studies (especially based on annual tax receipts, assessed property values, and rents for multiple jurisdictions) could perhaps more definitively determine what benefits traffic calming brings to urban small businesses" (Drennen 2003). The econometric analysis that Drennen mentions above is exactly what I hope to use in Seattle.

A study of a similar structure, examined a potential bike lane on Bloor Street in Toronto's Annex neighborhood; however this study was much more thorough. Fred Sztabinski, from the Clean Air Partnership, analyzed Bloor Street by surveying 61 storefronts and 538 customers, and completed an analysis of the parking usage in the Annex neighborhood business district. Both studies, Bloor Street and Valencia Street, identified the battle for right-of-way space with parking spots and automobile lanes as one of the main drivers for their studies. However, the Bloor Street study included subjective commentary regarding why they expected the potential bicycle facility to have a positive impact on the businesses: "Cyclists can stop on a whim more easily than motorists, park at the nearest post-and-ring, and support local businesses" (Sztabinski 2009).

Sztabinki's results showed that 44% of merchants believe that adding a bike lane and removing half of the on-street parking would have no effect on the number of customers coming to their shop, 30% said it would bring more customers, and 26% believed it would bring fewer customers. The survey of customers in the business district showed that 46% walk, 32% take transit, 12% bike, and 10% came by car. Not surprisingly, those who live or work in the Annex neighborhood visit the most; but looking at mode share, Stzabinski found that 84% of walkers visit more than five times a month, followed by cyclists at 72%. Automobile users visit the least, with only 42% visiting over five times per month. A similar hierarchy was found when comparing mode of travel and amount spent. Walkers spent the most, followed by bicyclists, whereas motorists and transit riders were tied for the least spending. Furthermore, 62% of survey respondents supported the bike lane proposal (Sztabinski 2009).

What made the Bloor Street study unique was its inclusion of parking utilization in the analysis. The Toronto Parking Authority provided data for on- and off-street parking. The on-street data found that at the busiest times (Saturday evenings and afternoons), the parking was only being 62% utilized. The off-street parking was busiest on Saturdays at 82% utilization, and during the weekdays at 66% utilization (Sztabinski 2009). This study did an excellent job of capturing survey-based economic data of the Bloor

Street business district, and understanding both merchants' and customers' opinions of a bicycle facility before anything was built. The primary finding was that drivers visit the least and reported spending the least amount of money, while pedestrians, cyclists, and public transit riders make up 90% of the customers, and they do not need on or off-street parking (Sztabinski 2009). However, the findings were still based off of surveys, which do not offer evidence of economic impact as strong as that provided by sales tax or property value. The main takeaway from the Bloor Street study is the inclusion of a parking utilization analysis. This could benefit an analysis on Seattle's street improvements, primarily for tracking the changes in the mode split and the lack, or excess, of parking availability. Luckily, extensive off-street parking utilization data in King County already exists with King County Metro's recent *Right Size Parking Project*.

A similar survey-based study was conducted just last year in New York City's East Village business district. This study was implemented after New York built protected bike lanes and offered a new Select Bus Service on First and Second Avenues. By interviewing 420 visitors to the business district, the study assessed the inclinations customers had to use the new facilities, and what they thought it meant for the neighborhood. Similar results to the Bloor Street study became clear in the East Village. Alternative commuters (all modes except driving) made up 95% of the retail dollars spent in the area (see figure 1). Furthermore, customers on bike spent the most per capita per week, $163 at local businesses. Not surprisingly, 61% of walkers and 58% of cyclists visit the business district more than five times per week, being the highest among the various modes. Lastly, the study found that 73% of respondents reported that the new bikes lanes had a "positive" or "very positive" impact on the neighborhood (Bernier-Heroux and Ryan 2012).

Alternative commuters made up 95% of the retail dollars spent in the area.

Kelly Clifton, Associate Professor of Civil and Environmental Engineering at Portland State University, wrote two articles (*Business Cycles: Catering to the Bicycling Market,* and *Exploring the Relationship Between Consumer Behavior and Mode Choice),* with graduate students Sara Morrissey and Chloe Ritter, that share best practices for studying the econometrics of bicycling. Not surprisingly, a lot of the research Clifton shares is based on surveys, and measures economic impact based on frequency of visits and amount spent per visit. Clifton, *et al.* even included a survey-based study that Portland State is conducting throughout Portland, OR. The findings show that contrary to what businesses believe, motorists are not the biggest spenders in their city. Customers who came by car spend, on average, the most per visit; but since cyclists visit more frequently, they spend the most per month. Clifton, *et al.* looks into other aspects of the econometrics of bicycling, like the idea of "Bicycle-Supported Development" (taken from the newly accepted term in the transportation field – Transit-Oriented

Development), bike corrals, bike-sharing, and other programs and amenities. However, for my research, the most profound piece in both of these articles was the call-out for more empirical analyses of the economic impacts of bicycle facilities:

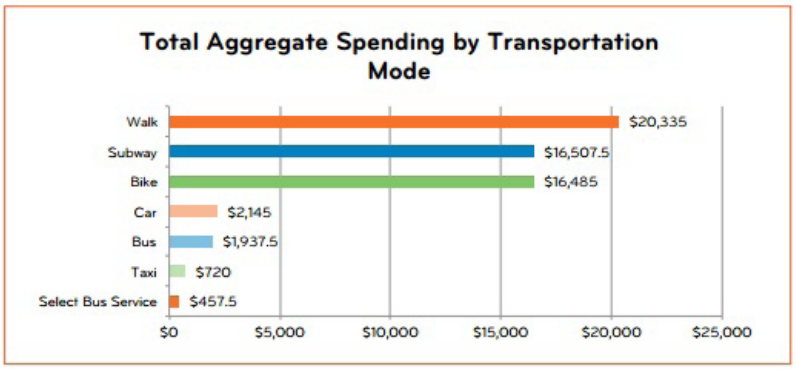


Figure 1: East Village Shoppers Study: Results

> "Although improvements that support bicycling can offer benefits such as reduced congestion, improved air quality, and healthier communities, many question the economic impacts, specifically for the business community. Some evidence supports the assertion that bicycling is good for business, but many business owners express concern that cyclists are not a lucrative market compared with customers who arrive by automobile. They argue the efforts to cater to cyclists – such as increasing bicycle parking and adding bike lanes – can hamper access for automobiles and that an economic return from new facilities is not guaranteed.
>
> Empirical evidence to settle these claims is lacking, but anecdotal evidence points to an interesting awareness of the benefits that bicyclists bring to local businesses… A few emerging studies are working to understand the returns on these investments for businesses and for the community at large" (Clifton, Morrissey, and Ritter 2012)."

As we can tell from this excerpt, Clifton, *et al.* stress the importance of conducting more econometric-based analyses of bicycle improvements. Drennen had made the same suggestions in her conclusions from the survey she conducted on Valencia Street in San Francisco. This is exactly the type of methodology I think will create a compelling argument for businesses to rethink how their customers access the NBD, and which commute modees result in the most economic gain. The following studies have provided the most guidance for designing a study of this nature.

Focus Studies

The question of how bicycle infrastructure affects the economy is no new enquiry for Seattle; in 1987, the Office of Planning evaluated the *Burke-Gilman Trail's Effect on Property Values and Crime.* The need for this study was made evident when many property owners became concerned about the trail and its potential to lower property values, increase crime, and generally reduce the quality of life. Based on interviews with real estate companies, the study gathered that the Burke-Gilman trail helps attract buyers and sell property. The analysis into property values found that property near, but not adjacent to, the trail sells for an average of 6% more because of its proximity to the trail (Puncochar and Lagerwey 1987).

A 2006 study in Delaware took a similar approach as the 1987 Burke-Gilman Trail study, however it used actual property sales data instead of relying on real estate companies' data. This study, implemented by the Delaware Center for Transportation, found that properties within 50 meters of a bike path were sold for $8,800 more, which is about 4% of the average sale price in the study (Dhanju and Racca 2006). Although both the Delaware and Burke-Gilman studies found support for bicycle trails, neither shows any connection to neighborhood business districts, and the economic activity in the districts.

Last year, the Seattle Department of Transportation (SDOT) and Office of Economic Development (OED) conducted a *Neighborhood Business District Access Survey* to get a better understanding of how people were getting to six different neighborhood business districts in Seattle. Since this study was a collaboration between two very different city offices, the objectives were broad and many. It did hope

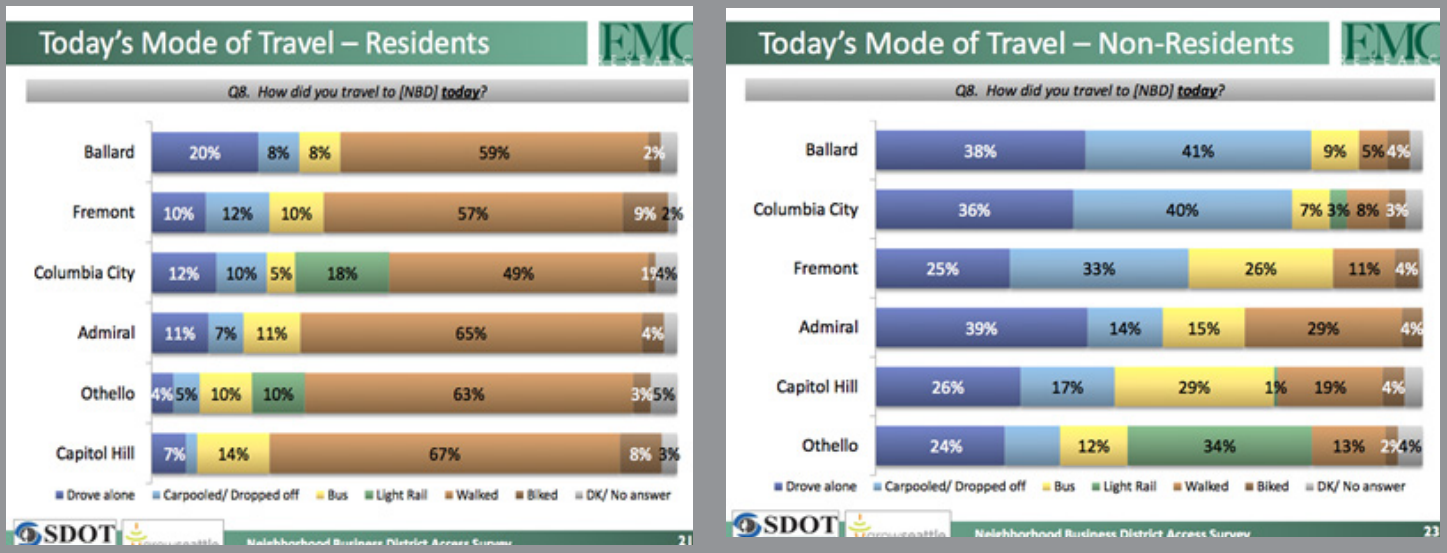


Figure 2: Neighborhood Business District Access Survey

to gain an understanding of how visitors access each business district and why they use their mode of choice; which is very applicable to the analysis I am interested in. Because the political battle for bicycle facilities is most often against cars (whether its because of parking spots or travel lanes), this study helped me gain an idea of the mode split for each business district, and helps ensure that my study includes a variety of business district access structures. The results for residents and non-residents of the six neighborhood business districts are displayed above in figure 2.

Not surprisingly, the respondents who live in the business district where they were surveyed had a higher rate of bicycling. Fremont and Capitol Hill have the largest share of cyclists as their access mode split, while Columbia City and Ballard have the least for residents of those neighborhoods ("Neighborhood Business District Access Survey: Intercept Survey of Seattle Neighborhood Visitors" 2013).

Similarly, Commute Seattle released their data for 2012's commute trends, which is specific to people traveling to downtown Seattle for work. A Seattle Times writer analyzed this data and broke it up by neighborhood, which found that University Heights has the highest bicycling mode split to downtown, 9.5%, and Pioneer Square had the lowest at 0%. Although helpful for getting an idea of where bicycling is popular, this data is specific to home-to-downtown-workplace commutes, and not for home-to-neighborhood-business-district commutes, except for the downtown business district, of course (Balk 2013). The Commute Seattle survey found that bicycling is growing fastest, second only to public transit (see figure 3).

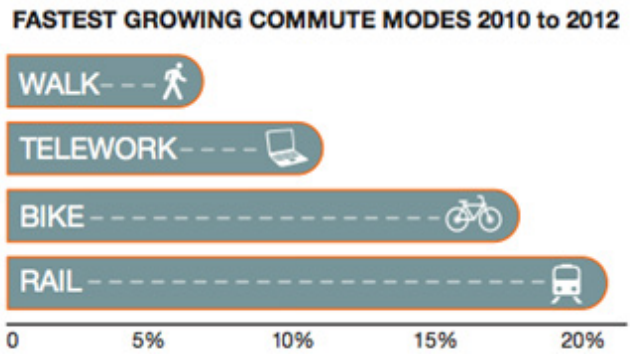


Figure 3: "Downtown Seattle Commuters Increasingly Walking, Biking, and Riding Transit" 2013

It is evident that biking in Seattle is growing as a commute option, but the connection to economic activity in neighborhood business districts is still unclear. One study has investigated this correlation, conducted by New York City's Department of Transportation (NYC DOT), and was completed just a few months ago. The study is so new that the report has not been completed yet; but project consultants Bennett Midland LLC hosted a webinar to share some preliminary findings, and NYC DOT released a short report that included some of the data.

In the webinar, Bennett Midland LLC cited the same issues with past studies, and the need for more rigorous economic analyses. They agree that research based on surveys or property values, while helpful, does not directly track economic activity. Bennett Midland LLC outlined three criteria for the type of study they saw a need for: "impartial data that is a direct measure of economic activity; accounts before-and-after changes, which occur in a short span of time; and measures impact in a small geographic area." For impartial data, Bennett Midland LLC looked at sales tax data, commercial leases and rents, and city-assessed market values. The sales tax data ended up being the most telling of the economic impact, and hence was the only data included in the webinar. Once the report is released, I will be able to see the usefulness of the commercial leases and city-assessed market values as well. To get an idea of how the economic activity changed, they looked at data one year before the facility was built, and subsequently in the

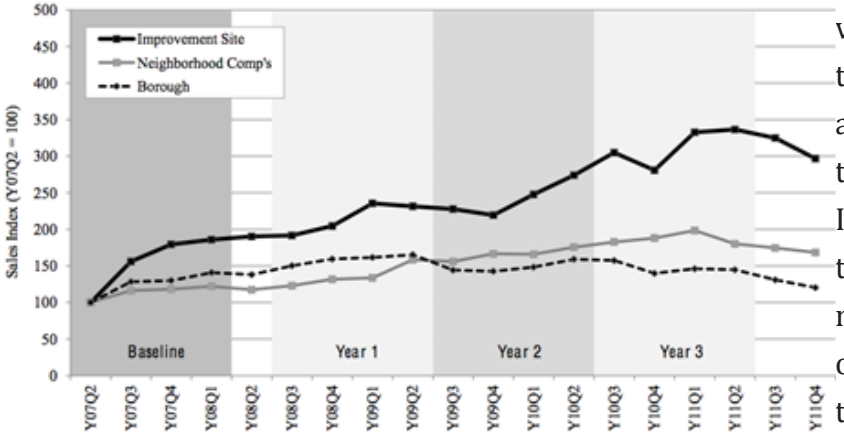


Figure 4: NYC Retail Sales Study Example (Lee and Sprung 2013)

first, second, and third years after completion. Lastly, to account for other factors affecting the business district, they compared each improvement site to a street with similar characteristics and the economic trends of the entire neighborhood. An example of the results they gathered is shown in figure 4.

Eight of the eleven sites studied were classified as strong performers, which meant they outcompeted the comparison street and the neighborhood as a whole (Lee and Sprung 2013). Specifically, Eighth and Ninth Avenues in Manhattan saw a 49% increase in retail sales – compared to a 3% increase borough-wide, and Pearl Street in Brooklyn saw a 172% increase in retail sales – compared to 18% borough-wide ("Measuring the Street: New Metrics for 21st Century Streets" 2013).

Application to my project

My study builds off many of these studies, but it is going to take a very similar form to the NYC DOT / Bennett Midland LLC study that was completed quite recently. In my analysis, I will go into more depth about the benefits of intercept surveys, but the methods that I used for this study are modeled after the NYC DOT study. In conclusion, I was excited to learn that this topic is being analyzed across the country, and that finally researchers are seeking more economically rigorous methods. I hope to contribute to this effort with my own experience.

Methodology

Unfortunately, taxable retail sales data is not publically accessible. After each fiscal quarter, every business that profited must report their retail sales to the Washington Department of Revenue. This data is protected under RCW 82.32.330 "Disclosure of return or tax information." However, RCW 82.32.330 also states that the Department of Revenue is not prohibited from disclosing tax data, but that this data must be classified to prevent identification of a particular return. For my project, this simply meant aggregating data to the whole NBD, making it legal to collect the total taxable retail sales for the NBD given that it is impossible to identify how each individual business performed. From my experience, establishing a good relationship with the Department of Revenue and being very clear with data requests limits the issues that may occur when gathering data.

However, before soliciting data, I had to first identify the boundaries for my requested data; which meant finding bicycle projects in Seattle that fell within a NBD and were good cases for studying the impacts on other mode choices. The Department of Revenue keeps taxable retail sales data specific to fiscal quarters for only five years; data from six or more years ago becomes dissolved to just one data point for each year. Therefore, the bicycle projects had to between 2008 and now; which led to another barrier.

SDOT does an adequate job of keeping an updated portfolio of bicycle projects on their website, but it is limited in its capabilities and information (http://www.seattle.gov/transportation/bikeprojects.htm). Not only are there a very limited number of projects to choose from, but the details on these projects are hard to come by. This research established that the true opportunity to implement this analysis is yet to come; the miles of forthcoming bicycle facilities in the Bicycle Master Plan update are exorbitant compared to the existing miles. Luckily, I was able to utilize my resources as an intern at SDOT to probe the right people about the types of bike projects I was looking for, as well as get more detailed information on the projects. After extensive research, I chose the projects on Greenwood Ave North and NE 65th Street.

To account for potential economic impacts beyond the change to the right-of-way, I gathered data on a comparison site and on the entire neighborhood. The comparison site needed to be an NBD similar in size and business mix to the improvement site. Additionally, taxable retails sales data was collected for one whole year before the start of the project. Ideally, data would be collected for three years after the completion of the project, but each of my two case studies were too recent and therefore only two years of post-project data was available. At the time that I requested the data, Q4 of 2012 was the most recent dataset available. Lastly, the sales index over time for each dataset is plotted on the same time axis, allowing us to compare the economic flow of the improvement site to both constants - the neighborhood comparison and the neighborhood-wide datasets.

Project Requirements:

- ***Includes a bicycle facility***
- ***Occured after 2008***
- ***On a retail street***

Case Studies

Greenwood Ave N

Figure 5: Greenwood Project Overview

Figure 6: Greenwood Datasets

Greenwood Ave N and NW 85th Street fall at the very center of the Greenwood business district. The boundary used extends from NW 90th Street to NW 84th Street and only includes businesses on Greenwood Ave N (blue box in figure 5).

The project on Greenwood Ave N is a perfect example of a *road diet*. A road diet is popular practice in Seattle and occurs when a street that has four lanes of traffic – two going each direction – and rebuilds it to contain one lane going either way with a center turn lane. The space gained from a road diet is often made into bicycle lanes - one going either direction. Greenwood Ave N also has a lane of parking on each side of the road; therefore, the bicycle lane lies between the travel lanes and the parking. This results in the bicyclists having to travel in the dreaded "door zone," where the chance of a person swinging their car door open and stopping you in your tracks is a possibility. However, five feet of space is better than no space. The project extends from NW 105th Street to NW 85th Street (green line in figure 5). The project was finished in Q4 of 2010.

Considering the impact to the business district from this project, the loss of automobile capacity on

Greenwood Ave N is of greatest interest. Traffic capacity for cars and trucks from the north decreased, while safety for bicyclists was significantly enhanced. Additionally, three parking spots were removed for the project, a minimal impact on parking capacity.

The datasets used to analyze this case study are defined by the NBD boundaries in figure 6. The intersection at Greenwood and 85th Street is the focus of this case study, while the business district centered at the intersection of 15th & 85th is the comparison site, and NW Seattle is the neighborhood-wide boundary.

NE 65th St & Latona Ave NE

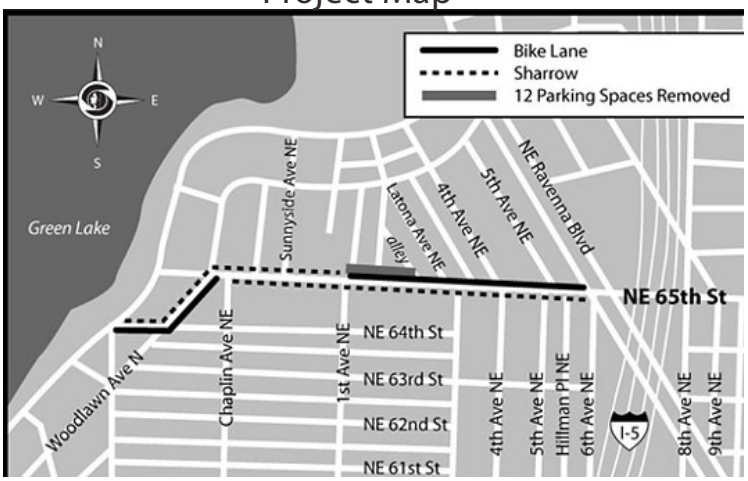


Figure 7: NE 65th St Project Overview (SDOT)

Figure 8: Latona & 65th Datasets

At the intersection of NE 65th Street and Latona Ave NE lies a small neighborhood business district. The boundary used includes businesses primarily at the intersection, but also runs along NE 65th Streets for a short distance.

This project installed a "climbing lane," which simply means painting a bike lane on the uphill side and a shared lane marking (sharrow) on the downhill side. The climbing lane extends from NE Ravenna Blvd to 1st Ave NE and from Green Lake Drive N to Chaplin Ave NE, with shared-lane markings connecting them (see figure 7). Although this project did not affect the travel lanes, twelve car parking spots were removed. For a small NBD, this is a significant decrease in parking capacity and serves as the focus of this case study. This project finished in Q3 of 2011.

The datasets used to analyze the 65th & Latona case study are defined by the NBD boundaries in figure 8. The comparison site is a pocket NBD commonly referred to as Tangletown. Tangletown is larger NBD and is completely surrounded by single-family residential neighborhoods, whereas 65th and Latona is on an east-west arterial closer to multi-family housing and other land uses. Again, the neighborhood-wide boundary pulled data for all of NW Seattle.

Results and Analysis

Greenwood

Figure 9 displays the results for the Greenwood case study. On the x-axis is the timeframe of the dataset, which spans from Q4 of 2009 to Q4 of 2012. The road diet was implemented in Q4 of 2010, labeled by the bike lane; therefore Q4 of 2009 to Q3 of 2010 is our baseline data, and Q1 of 2011 to Q4 of 2012 is our impact analysis data. On the y-axis we have the sales index – see the glossary for a definition of a sales index. The dashed gray line represents the neighborhood-wide sales index throughout the three-year timeframe, the solid gray line represents the sales index for the comparison site, and the solid green line represents the sales index for the improvement site – Greenwood Ave N.

When assessing these results, it can be seen that the improvement site performed quite similar to the comparison site and the neighborhood-wide retail sales. All three graphs stay above 100% sales index and have similar peaks and troughs. It is obvious that all three datasets show comparable economic performance. Based on the data, it can be concluded that the loss of automobile travel lanes and three parking spots, and the addition of two bicycle lanes did not have a negative impact on the Greenwood Business District.

the loss of automobile travel lanes and three parking spots, and the addition of two bicycle lanes did not have a negative impact on the Greenwood Business District

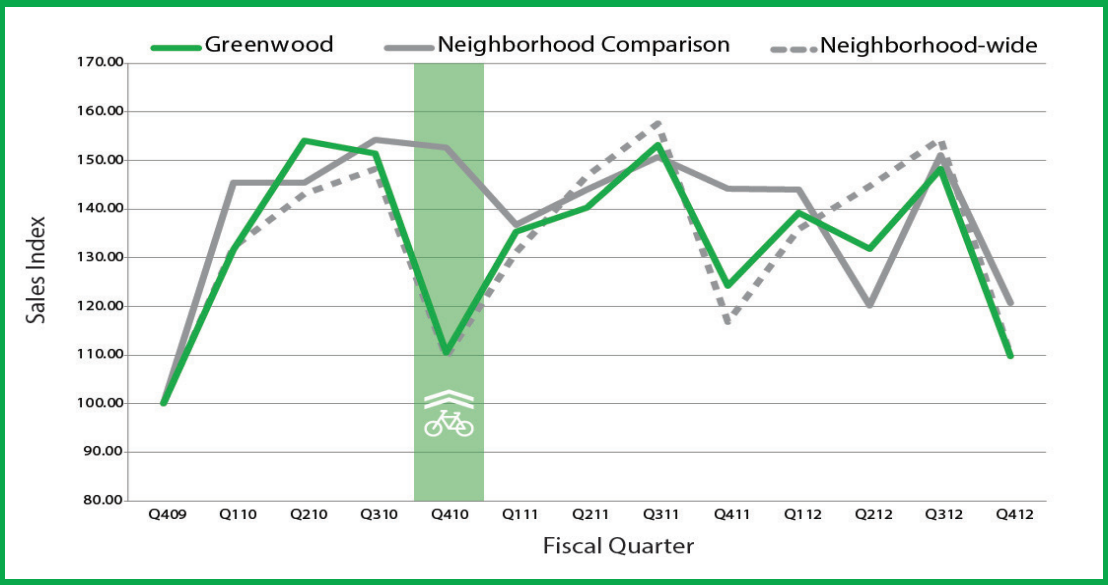


Figure 9: Greenwood Case Study Results

Latona & 65th

Figure 10 displays the results for the Latona & 65th case study. The timeframe for this case study is shorter than that of the Greenwood case study due to more recent installation of the bicycle facility, in July 2011. The entire dataset spans from Q1 of 2010 to Q4 of 2012, and the bicycle facility was installed in Q2-Q3 of 2011, labeled by the bike lane. Again, the dashed gray line represents the neighborhood-wide data, the solid gray represents the comparison site, while the solid green line represents the improvement site – Latona & 65th.

Based on the retail sales data, the three datasets display similar economic trends before the bicycle project. However, after the facility was installed, the business district around Latona & 65th improved to 400% sales index while the neighborhood-wide and comparison site stayed around 100%. Therefore, it can be concluded that the loss of twelve parking spaces and the installation of climbing lanes and sharrows did not have a negative impact on the NBD at Latona & 65th.

the loss of twelve parking spaces and the installation of climbing lanes and sharrows did not have a negative impact on the NBD at Latona & 65th

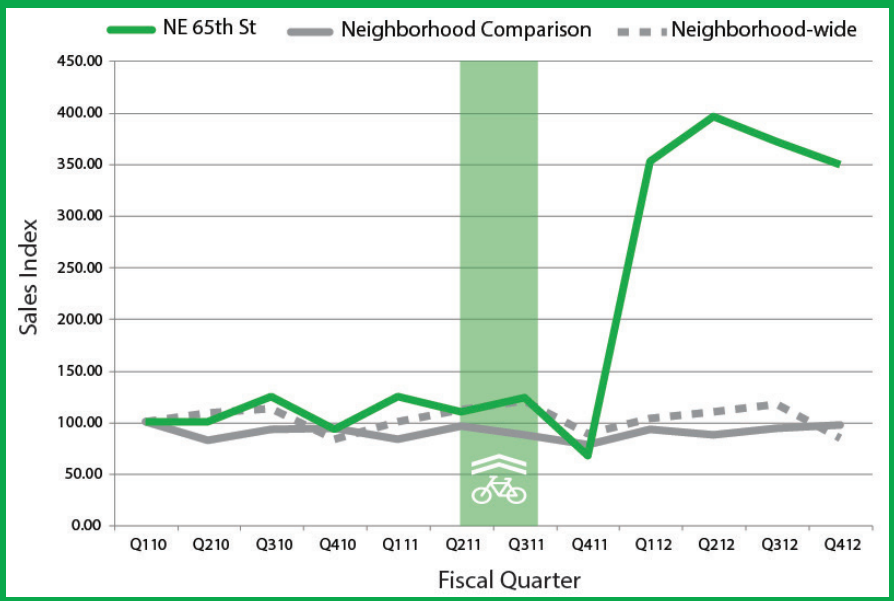


Figure 10: Latona & 65th Case Study Results

Nature of Retail Sales Data

Even though Latona & 65th performed significantly better than both constants, the conclusions cannot assume that the bicycle facility was the reason for this success, solely because of the nature of retail sales data. Taxable retail sales data has no connection to mode split, therefore we have no understanding of who was coming to the Latona & 65th NBD and shopping after the bicycle facility was installed. It would be logical to assume that more bicyclists were coming to the NBD because of the new facility, but no conclusion can be made to connect mode choice to economic performance. The only conclusion that can be drawn from the data is that the changes to the right-of-way at the Greenwood and Latona & 65th NBDs did not have a negative economic impact on the businesses. This is a significant barrier of the methodology approach that relies solely on taxable retail sales data.

Discussion

Improving the methods

Given the obvious faults in the retail sales data approach to this analysis, we must search for a new way to study this correlation. Thinking back to the literature review, there were two methods that emerged from existing studies – taxable retail sales data (implemented in this study) and intercept surveys (utilized in most studies). Initially, I dismissed the intercept surveys from being a reliable method because the economic data was based off of an individual's estimation on how much they spent per visit - very subjective. While I still believe this is a valid approach, I also think there is less margin of error in the question: "How did you get to this NBD?" It is unlikely that someone would lie, or forget how they commuted to the business district; therefore, we can utilize intercept surveys to understand how the mode split fluctuates in the same time frame that we are analyzing the taxable retail sales data. Looking at the 400% increase in sales index at the Latona & 65th NBD, if we had mode split data on how people were accessing the NBD after the bicycle facility was installed, conclusions as to why the NBD increased its sales so drastically would be easier to find. I propose that future studies in Seattle should collect intercept surveys for one year prior to and three years after the bicycle facility is installed, and then compare that with the taxable retail sales data for the same time period.

Choosing a comparison site:

- ***Average Daily Trips***
- ***Transit Service***
- ***Road width / travel lanes***
- ***Parking capacity***
- ***Proximity to downtown***
- ***Residential density***
- ***Job density***

There are other areas where my methods could have been improved as well. First, the decision framework for choosing a comparison site lacked rigidity. One challenge I faced in solidifying a comparison site framework was in my search for precedent. While I hoped for a release before my project's completion, the similar study in NYC was not published in time for me to thoroughly review and model their methods. I exchanged emails with their consultants – Bennett Midland LLC – but was unable to obtain any information on their approach to choosing a comparison site. I propose that future studies should refine a checklist for comparison sites and choose the NBD that comes the closest to the improvement site.

Lastly, there are many types of retail, and it is possible that not all of them are the types that we want to include in the datasets. The Department of Revenue categorizes business types, which can be found in the RCW, allowing us to choose who we want to analyze. Additionally, future studies could create their own categories for business types to allow for a better understanding of how the street improvement affected different business types; for example, how the bicycle lane impacted retail trade versus food services. I propose that future studies research the retail categories defined in the RCW, select only those that would be affected by changes in right-of-way, and categorize them into logical business types for a better understanding of the impacts.

Seattle – the best time and place for this analysis

There could not be a better place to implement this analysis than Seattle in the coming years. With the draft Bicycle Master Plan's recent release, the City is primed for bicycle network implementation. With 161 miles of bicycle facilities coming to retail streets in Seattle, there are plenty of opportunities to study this correlation and compare results. Once we conduct enough case studies, conducting further analysis could shed light on which type of bicycle facilities work on retail streets. The impact that a cycle track has on right-of-way is very different than a shared-lane marking. It is possible that a happy medium exists among facility design that provides cyclists sufficient safety and still allows for other modes to function. Similarly, not all NBDs are the same. Lake City in the northeast corner of Seattle contains a very different business mix and customer base than The Ave in the U District. A plethora of case studies could help planners understand what types of NBDs will prosper from increased bicycle access. I do not propose that there will eventually be a formula for deciding whether or not to put a bike lane on a retail street, but I do believe that with each new bicycle facility, there is opportunity to study the impact by assessing the economics of that NBD before and after said street improvement. Analyze enough bicycle facilities, and we can approach future projects with an understanding of the economic impact.

Fortunately, City departments in Seattle have started to think about NBD and commuter mode split. In February of 2012, SDOT and the Office of Economic Development partnered on a *Neighborhood Business District Access Survey* (see figure 2) to understand how people in Seattle were traveling to some of the main NBDs. Although this study did not analyze economic impacts or implement the survey around a street improvement, we can use this data to understand how mode splits have changed.

Imagine twenty years down the road – most of the bicycle master plan's network has been built and this analysis has been implemented on a plethora of projects. Planners will have a better understanding of the impacts that a bicycle facility will have to different types of NBDs. There is no doubt that a cycle track would have different impacts on Lake City Way versus The Ave in the U District. The business mix and customer base are vastly different in these two examples, therefore a bicycle facility may be good for one but not the other. Similarly, planners will gain an understanding of how different bicycle facilities work on retail streets. The impacts that a cycle track has versus a shared lane marking are quite different, and it is possible that certain designs are better than others for NBDs.

Other benefits to retail

Lastly, there are several benefits that bicycle facilities can offer retail districts beyond the increased access for non-motorized commuters. First, traffic-calming measures are usually included in non-motorized street improvements – for the purpose of increased safety to the pedestrians and bicyclists. With traffic-calming comes slower speeds for automobiles, which would increase the chance of a driver seeing a business's storefront, spotting a lunch special, or seeing a particular cuisine that catches their eye. Additionally, with slower car speeds comes an enhanced pedestrian environment. It is no surprise that bicycle and pedestrian street improvements often come in a package; they have a mutual relationship. Lastly, cars require a lot of land. The amount of space that one car parking space occupies can fit 12 to 15 bicycles in a bike corral. With the implementation of a new bicycle facility, there is strong potential for benefits to NBDs should they choose to install a bike corral.

Conclusion

I believe that the data I found makes a compelling argument for implementing this analysis on future bicycle projects in Seattle. A 400% increase in taxable retail sales data after a bicycle facility is installed, compared to no change at the neighborhood-wide and comparison sites, is certainly something to consider. The disagreements between planners, business owners, and the public regarding the proper use of right-of-way are unfortunate and an impediment to the advancement of the livability and accessibility of this city. However, one cannot point a finger at the businesses for resisting change given that they have little to no information on how street improvements will affect their business. Additionally, planners are not able to tell them anything useful, aside from that they hope and predict that the new facility will be beneficial. Shortening this data gap will not only decrease stakeholder resistance but potentially increase stakeholder support and allow for planners and the retail industry to work together on these projects. We know that bicycle facilities are good for people and for the environment, but to be a comprehensively sustainable city we need to ensure that they are good for the economy.

Works Cited

Works Cited

Balk, Gene. 2013. "Is Your Neighborhood One of Seattle's Cycling Hot Spots?" *Seattle Times*. http://blogs.seattletimes.com/fyi-guy/2013/02/22/is-your-neighborhood-one-of-seattles-cycling-hot-spots/.

Bernier-Heroux, Louis, and Jono Ryan. 2012. *East Village Shoppers Study: A Snapshot of Travel and Spending Patterns of Residents and Visitors in the East Village*. Transportation Alternatives. http://www.transalt.org/files/newsroom/reports/2012/EVSS_Final.pdf.

Clifton, Kelly J., Sara Morrissey, and Chloe Ritter. 2012a. "Business Cycles: Catering to the Bicycling Market." *TR News*, July 5. 2012b. "Exploring the Relationship between Consumer Behavior and Mode Choice", July 5.

Davis, Benjamin, and Tony Dutzik. 2012. *Transportation and the New Generation: Why Young People Are Driving Less and What It Means for Transportation Policy*. Frontier Group. http://www.uspirg.org/sites/pirg/files/reports/Transportation%20%26%20the%20New%20Generation%20vUS_0.pdf.

Dhanju, Amardeep, and David P. Racca. 2006. *Property Value/Desirability Effects of Bike Paths Adjacent to Residential Areas*. Center for Applied Demography & Survey Research: University of Delaware. http://128.175.63.72/projects/DOCUMENTS/bikepathfinal.pdf.

"Downtown Seattle Commuters Increasingly Walking, Biking, and Riding Transit." 2013. *Commute Seattle*. Accessed March 2. http://www.commuteseattle.com/wp-content/uploads/2013/02/CS_One_Pager_Final.pdf.

Drennen, Emily. 2003. *Economic Effects of Traffic Calming on Urban Small Businesses*. http://www.bikewalk.org/2004conference/sessions/28_Business_calm/TrafficCalming_summary.pdf.

Flusche, Darren. 2012. *Bicycling Means Business*. Advocacy Advance. http://www.advocacyadvance.org/site_images/content/Final_Econ_Update(small).pdf.

Lee, Eric, and Ben Sprung. 2013. "Bike and Pedestrian Street Improvements and Economic Activity in NYC". Webinar February 21. ssti.us.

Measuring the Street: New Metrics for 21st Century Streets. 2013. New York City Department of Transportation. Accessed February 14. http://www.nyc.gov/html/dot/downloads/pdf/2012-10-measuring-the-street.pdf.

Miller, Stephen. 2012. "TA Survey: Customers on Foot Bring Big Business to East Village Retailers". Blog. *StreetsBlog*. http://www.streetsblog.org/2012/10/02/ta-survey-customers-on-foot-bring-big-business-to-east-village-retailers.

"Neighborhood Business District Access Survey: Intercept Survey of Seattle Neighborhood Visitors." 2013. Accessed February 25.

Puncochar, Brian, and Peter Lagerwey. 1987. *Evaluation of the Burke-Gilman Trail's Effect on Property Values and Crime*. Seattle Engineering Department, Office for Planning. (Puncochar and Lagerwey 1987)

"Right Size Parking: King County Multi-Family Residential Parking Calculator." 2013. Accessed March 2. rightsizeparking.org.

Strawser, Chuck. 2005. *The Economic Impact Bicycling in Wisconsin*. Bicycle Federation of Wisconsin. http://www.dot.wisconsin.gov/business/econdev/docs/impact-bicycling.pdf.

Sztabinski, Fred. 2009. *Bike Lanes, On-Street Parking and Business: A Study of Bloor Street in Toronto's Annex Neighborhood*. The Clean Air Partnership. http://www.cleanairpartnership.org/pdf/bike-lanes- parking.pdf.

Walljasper, Jay. 2013. "How Bicycling Is Transforming Business." *Yes! Magazine*, January 1. http://www.yesmagazine.org/happiness/how-bicycling-is-transforming-business.

Appendix A: Glossary

Bicycle Facility

Any use of land for the safety and use of bicyclists is considered a *bicycle facility.* For example, a bike lane and a bike box (green boxes at intersections) are each bicycle facilities because both allocate space on the street for bicyclists. However, a bicycle facility does not need to be on a street; trails and paths are also bicycle facilities. For example, the Burke-Gilman Trail in Seattle does not share space with any motorized vehicles, but is certainly a "highway" for bicyclists and is highly used by pedestrians.

Neighborhood Business District

In many cities, commerce is not a mono-centric function occurring only in a downtown, but rather, exists within many smaller neighborhood retail streets throughout the city. *Neighborhood Business Districts* (NBD) is the urban planning term for pockets of retail that are spread throughout the city, often at the center of residential neighborhoods. Seattle is often defined as a "city of neighborhoods" because people who live and visit the city identify and understand the city by the various neighborhoods that they live in or visit. In many neighborhoods, Seattle and elsewhere, NBDs organize themselves in various fashions; examples include Chamber of Commerce's and Business Improvement Areas (BIA). These organizations create a communal NBD voice that holds power in city government and politics.

Right-of-Way

The land that falls between parcels (units of land that an individual can own) is considered the *right-of-way*. It is space used for moving without hindrance. All levels of government manage right-of-way: the federal government manages the interstate highways, while your local city government would fix a pothole on your neighborhood street. Trails and paths are considered rights-of-way as well, however they restrict use to just pedestrians and bicyclists, just like an interstate highway only allows cars, trucks, and motorcycles.

Bicycle Master Plan Update

In 2007, the Seattle Department of Transportation (SDOT) wrote the Bicycle Master Plan as a document to guide the future of bicycle planning and facility construction within the city limits. Since 2007, the field of bicycle facility design and planning has substantially evolved, warranting an update to this plan. Therefore, in 2012, Seattle commenced the *Bicycle Master Plan Update* (BMPU) to revisit the 2007 plan. At the time of this project the BMPU was still in draft form, however SDOT kept the public updated and engaged throughout the process, sharing all the information and data on the proposed bicycling network.

Intercept Survey

One method for collecting data, especially in the transportation field, is to conduct *intercept surveys.* This method involves a surveyor asking questions of passersby. Survey questions can be subjective or objective, and understanding the difference is key to placing validity on your data. For example, asking someone how they commuted today is an objective question; the answer is car, bus, bike, walk, etc. Asking someone how often they visit this neighborhood is subjective; the answer requires estimation and is less likely to be true in comparison to the actual data.

Taxable Retail Sales

Every fiscal quarter, or every three months, retail businesses report their sales to the state for taxes. In Washington, businesses report to the Department of Revenue. The primary function of *Taxable Retail Sales* is for the state to collect taxes, but the data that results from each business's reports can provide other benefits like tracking the economic flow within specific geographic regions.

Sales Index

When comparing business districts of different sizes, researchers need a method for comparing the economics on the same scale. The best way to do this is to use *sales indexing,* which divides the total retail sales by the number of business that report sales, and then compares that average to the baseline (first quarter reported) of the dataset. When comparing NBDs, a sales index allows us to look at how each district performs compared to the same starting value – 100%.

Econometrics

This word is not as fancy as it sounds. *Econometrics* is simply the application of mathematical and statistical methods to solve an economic question or problem.

Appendix B: Personal Interest

Academic

Since joining the Community, Environment, and Planning (CEP) program, I focused my studies on transportation planning. However, since the field is so broad and encompasses a wide range of professions, I knew that I was going to need a niche field within transportation planning. It was a natural choice for me to go the route of bicycle planning, I have always enjoyed bicycling as a commute choice and I can relate to the concerns of an urban cyclist since it is how I move about Seattle. Not only do I support bicycling as a commute choice because of its benefits to the environment and the individual, but I also have a passion for "people-powered" movement.

The benefits to an individual's health, the natural environment, and to the community make bicycling a no-brainer for me. I truly believe that the most natural measure for a city's livability is the test of how easy it is to move around without a motorized vehicle – walking and biking. Unfortunately, bicycling is a hard sell for many Seattleites because it often feels like you are putting your life on the line when you join cars on the road – that is what I hope to change with my professional career.

Professional

Last spring I was hired by BDS Planning & Design as a GIS Specialist and Research Assistant. At BDS Planning & Design, we work with neighborhood business districts (NBDs) to assist in business improvement area (BIA) implementation and strategic planning. This was a new facet of planning for me, but I knew the basics of what it meant to be a planner and had gained many skills from my first year in CEP, so I was ready to put them to use. Then, my dream job opened up in the form of an internship. The Seattle Department of Transportation (SDOT) was hiring a GIS & Planning Intern to support an update to the Bicycle Master Plan. There was no way I could turn that opportunity down, so I applied and was hired very soon after. That left me with two jobs, school, a girlfriend, and the UW Ice Hockey team.

What I gained from this mayhem was a unique opportunity to engage in two very different aspects of the planning field and gauge how well they understood each other. In NBD planning, the goal is to plan for economic growth in a retail district by creating consensus among many stakeholders and utilizing businesses and/or property assessments to invest in streetscape enhancements, organizational support, etc. For the Bicycle Master Plan, SDOT is primarily concerned about the safety and connectivity of the bicycle network in Seattle. The venue in which these two fields meet is when bicyclists want to access a retail district, which happens to be quite often. I decided to analyze how bicycle facilities affect neighborhood business districts because this relationship is not yet understood. In most cities, and especially Seattle, merchants have a perception that customers primarily access their business by car and to remove infrastructure for cars – parking, travel lanes, etc. – will detrimentally affect their revenues. Despite this impression, the data to back up a correlation between commute choice and retail sales has not yet been studied.

BIKENOMICS

Kyle Rowe

Community, Environment, and Planning

2013