1 Introduction

> "Continued expansion of the bike network, bike parking, and the bikeshare program are moveDC priorities that will help ensure a safe and convenient bicycling environment in the District for cyclists of all ages and abilities" (DC Department of Transportation 2014, p. B-1).

Many cities, including Washington, DC (DC Office of Planning 2011; DC Department of Transportation 2014), have policies to increase the proportion of people who ride bikes and walk for personal transport, and generally to reduce the number of people who drive cars on a regular basis. However, many people are reluctant to bike and walk more because so much of their cities' transportation infrastructure has been dedicated to moving passenger automobiles—"bicycle riding in many American towns and cities is neither enjoyable nor safe because of the dominance of the automobile" (Nelson and Allen 1997).

Commercial areas are often particularly problematic, with wider roads to accommodate greater traffic volume, more frequently-turned over parking areas, and assorted passenger and cargo delivery and pickup activities. Unfortunately, many times when bike lanes are proposed in commercial areas, especially when they will replace on-street parking for individual cars, business owners protest, claiming that their customers drive and that new bike-oriented facilities will displace customers. There have been studies in several cities, from Portland (Clifton, Currans, et al. 2013; Clifton, Muhs, et al. 2013) to New York (Schaller 2006), Toronto (Arancibia et al. 2019) to San Francisco (Drennen 2003; Bent and Singa 2009), and even New Zealand (Fleming (Allatt), Turner, and Tarjomi 2013) and beyond which suggest, however, that

- many commercial districts' customers *do not* drive,
- some existing bike-riding customers will *use*, not be displaced by, any new bike-

oriented facilities,

- some customers who don't ride bikes will start, and
- some bike riders who aren't customers will become customers.

In this paper, I will attempt to combine these studies and others into an overview of the relative impacts on retail businesses of having nearby parking or being accessible by biking or walking. Hopefully this will help provide an answer to the question of whether it is more worthwhile to have street parking or a wide sidewalk and protected bike lane in front of a retail establishment.

2 "Can't they just ride in the street?"

> "Bicycling should not be reserved only for those who are trained, fit, and daring enough to navigate busy traffic on city streets" (Pucher 2001).

But first, it's important to respond to the several authors who have questioned to what extent it is even necessary to build special infrastructure and set policies to encourage bike riding (such as Goetzke and Rave 2011; Rietveld and Daniel 2004)—some have even argued that for many trip types, policy is less influential than "social network effects" (i.e., do other people ride?) (Goetzke and Rave 2011).

Even if such authors are correct, even if people *will* ride regardless of whether city policy and infrastructure support their choice, it is still incumbent upon the government to make it possible to do so safely. As Pucher and Buehler (2016) suggest, it "is crucial to improve cycling safety in the United States" and "bicycle infrastructure can indeed help improve cycling safety and increase cycling levels." (And even Goetzke and Rave (2011) acknowledge that "bicycle infrastructure matters"—they say "only"—"for shopping and errand trips.")

Other authors have found significant positive associations between the provision of a connected bikeway network and increased bike usage (Nelson and Allen 1997; Dill and Carr 2003; Buehler and Dill 2016; Buehler and Pucher 2012), particularly among women (Furth 2008; Garrard, Rose, and Lo 2008; Prati 2018; Le et al. 2019; Garrard, Handy, and Dill 2012). A long list of collaborators at Portland State University and Alta Planning studied new protected bikeways in five cities across the United States and found that "ridership increased +21% – +171% within one year of building the protected lanes"; while ridership across the cities was rising, the gains shown on these routes "appear to be greater than [the] overall increases in bicycle commuting in each city" (Monsere et al. 2014). Naturally, how far away that bikeway is also matters; in a study of bike commuting in Montréal and Vancouver, "one-kilometer closer proximity [to a bikeway] was associated with four times higher cycling commute mode share" (Teschke, Chinn, and Brauer 2017).

Increased usage is positively associated with safety, known as the "safety in numbers effect", as coined by Jacobsen (2003) and discussed by Elvik and Bjørnskau (2017) and Fyhri et al. (2017), among others. Marqués and Hernández-Herrador's (2017) study of the mass-installation of protected bikeways in Seville, Spain, found that after the bikeways were installed, ridership went up and risk of injury went down across the city. Moreover, they found that this improved safety is a better explanation for the increase in cycling than the existence of the network itself—that is, people didn't start riding just because they had a new place to ride. The city having created a connected network of protected places to ride bikes made it safer to ride in the city, and the city being safer to ride in then induced more people to ride—which in turn made the city even safer to ride in. Marshall and Ferenchak (2019) even suggest that places with high rates of bike usage "are not only safer for bicyclists but for all road users." "Improving bike infrastructure with more protected/separated bike facilities is significantly associated with fewer fatalities and better road safety outcomes for all road users", they write, but their "results suggest that

more bicyclists on the road is not as important as the infrastructure we build for them."

So, creating separate bike infrastructure is necessary for achieving policy goals, and makes everyone else safer, too—but how do you do it? Creating bike infrastructure in a brand new place is relatively easy, but many existing cities can't just add another ten feet of blacktop between the street and sidewalk for people to ride on. Therefore, many cities will need to take space from another use in order to create space for people biking in dense, urbanized areas that are already built out. Since sidewalk space for pedestrians is also quite limited in many places, the main choice is thus whether to take out a general travel lane or a (automotive) parking lane.

3 "How did you get here?"

As noted in the Introduction (§ 1), many business owners believe that their customers drive and that new bike-oriented facilities will displace customers. Therefore, in order to build support for removing parking and creating bike infrastructure, it's important to determine what proportion of a business's clientele actually use each mode.

In Los Angeles, a study exploring differences between segments of York Boulevard, part of which had had a road diet, including new bike lanes, and part of which had not, found that "merchants' perceptions about their customers' travel patterns do not align with customers' stated travel modes. . . . Merchants on both halves of the corridor presume the majority of their customers arrive by car, when in fact no more than about a quarter of customers indicated that they drove" (McCormick 2012).

A survey of business owners in Toronto's Annex neighborhood found that the majority believed few customers drove to their business—30% said under 10% of customers drive, and 71% said under a quarter. Even most of these business owners overestimated their motorist clients: a contemporaneous survey of people in the neighborhood found that indeed, only 10% had driven—and those that drove to the neighborhood visit less often

and spend less money than all others surveyed (Sztabinski 2009).

Finally, even where it is the case that car owners make up a preponderance of spending in a retail district, their vehicles take up space well out of proportion to the amount they spend. Lee (2008) found in Australia that those who had driven to the Lygon Street business district in Carlton, Melbourne, spent roughly twice as much money per person as those who had ridden a bike—but in that district, 67% of public space is allocated to cars, and less than 3% to cyclists. In other words, drivers get 20 times as much space, but only spend twice as much money. Since parked cars take up significantly more space—it is possible to park six bikes in one on-street car parking space—replacing car parking with bike parking could theoretically earn 3.6 times as much money for local retailers (Figure 1). Lee points out that in "densely 'built out' environments in which space is a finite resource to be managed", retail visitors (and thus retail purchase dollars) are most efficiently delivered by bike. "That on-street parking enhances the retail economy has been found to be baseless" (p. 42).

4 Bikes Mean Business

> "The bike corral is a simple idea. You take on-street parking spaces and put a row of bike parking staples in them. The. . . transformation is magical, every business-owner's dream: Instead of places for two paying customers to park outside your front door, you have room for two dozen." (Blue 2013, p. 88)

An intercept survey of people in San Francisco's North Beach neighborhood found that people who came to the area by car tend to spend more money on each visit, but they make fewer trips than those who came by other modes, and thus over an entire month they actually spend less in total (SFCTA 2008). A survey of residents of Davis, Calif., even found that residents who went shopping by bike not only made more trips each month,

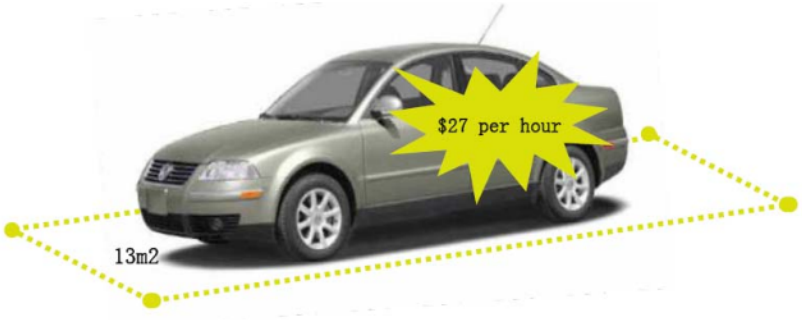

Figure 30 Retail spend per hour generated by one car parking space allocated to car parking in Lygon Street, Carlton, where the car park is fully utilised at at all times by a car.

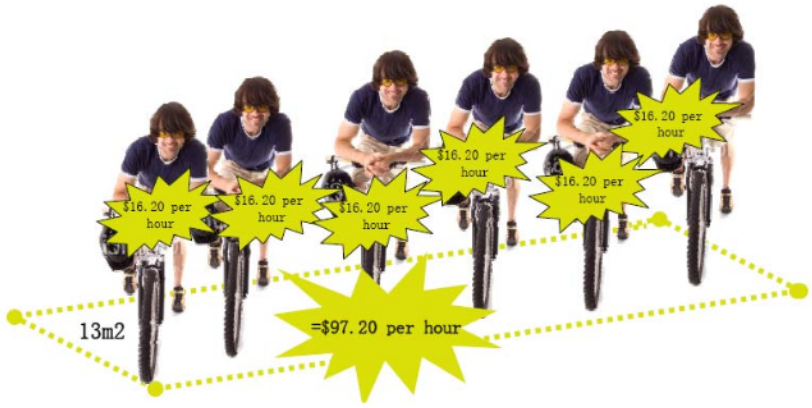

Figure 31 Retail spend per hour generated by one car parking space allocated to six bike parking spaces in Lygon Street, Carlton, where the car park is fully utilised at all times by six bikes.

Figure 1: A now-classic pair of images (Lee 2008, p. 40), illustrating how much more money would be spent in a retail district if the space allocated to parking a single car were instead used to park six bikes.

but on average they spent more per trip, so that on the whole, bike-riding shoppers spent over 36% more each month than drivers did (Popovich and Handy 2014, p. 52).

A survey of Swiss consumers "found that businesses made more profit per square meter of bike parking ($9,900 per year) than car parking ($8,800)" (Szczepanski 2013). Sztabinski's (2009) survey of shoppers and visitors to Toronto's Bloor Annex neighborhood—an area with no dedicated bike facilities at the time of the study, yet to which one of every eight customers came by bike—found that half of bike riders spent over $100 per month in the area, while only 34% of drivers did.

5 Bike Lanes Bring Business

As noted previously, creating bike lanes—connected, protected bike lanes in particular—is likely to create bike riders. And those riders will tend to shop, and otherwise go out, along those new bike lanes.

After New York City installed its first protected bicycle lane—the first in the US—on 9th Avenue in Manhattan, the city recorded an "up to 49% increase in retail sales" at local businesses on 9th between 23rd and 31st Streets, compared to an increase of just 3% for Manhattan as a whole (NYC DOT 2012).

An in-depth study of a new bike lane in San Francisco found that 44% of business owners "thought that the bike lanes have the potential for bringing economic revitalization to an area. . . . 'Bike lanes couldn't hurt' " one business owner is quoted as saying. " 'They brought more business. When people can bike, they bring their business.' " (Drennen 2003, p. 47). A study of several bike lanes and bikeways in five cities found that, in both an intercept survey of people riding on the facility and in a survey of nearby residents who bike, one in five respondents stop more often at shops and businesses along a new protected bike lane (Monsere et al. 2014). Near one new bikeway in Austin, Texas, one in four residents, including those who don't ride it, said they were more likely to visit businesses along the route (p. 135).

Arancibia et al. (2019) studied a Toronto business district before and after bike lanes were installed (Bloor Annex, the same area Sztabinski had looked at ten years earlier). They found that the proportion "of [retail] customers arriving by car did not change (8.8% pre-intervention, 8.9% post-intervention), [but] the proportion arriving by bicycle rose from 7.4% to 19.6%" (p. 472). After reviewing estimated customer counts from merchant surveys, estimated spending and visit frequency from visitor surveys, and vacancy counts, they found that "all indicators point to increased economic activity on Bloor Street following the installation of the bike lane" (p. 463–464).

6 Parking impacts may be felt—even if they don't exist

Monsere et al. (2014) found that after a protected bike lane was installed in five cities, a third to half of nearby residents perceived a negative impact to parking in the surrounding area—"even in cases where a minimal amount of parking was removed, or parking was increased." While the authors don't offer a larger conclusion to be drawn from this point, it suggests two to me: that people will object to change even when it doesn't actually affect them, and/or that a new bikeway facility can attract so many new visitors to a business district—even those who don't ride—that it can affect non-bike parking. (Monsere et al. did find that about one in eight residents, even those who don't ride, said they were "more likely to visit a business on the corridor since the protected bike lanes were built"....)

7 (Auto) congestion may actually be good for business

Drennen (2003)'s interviews of San Francisco shop owners found that nearly half thought that auto traffic on their street being congested or speeds reduced would be a positive—"great for business", one said. While some noted congestion could push some to go elsewhere instead, they also noted that "with traffic congestion, people see more businesses, which is good". Several noted that on a free-flowing street, drivers don't have the ability to see a business, whereas people who have to move slower do: "I have noticed more traffic on Valencia this past year (which is bad), but it also means the more people are seeing my store which is good. Traffic congestion is also a sign of people being in the area which is good."

Similarly, business owners along York Blvd in Los Angeles "perceive that slower traffic makes their businesses more noticeable to passing motorists," which makes them more likely to stop (McCormick 2012). McCormick combines this information with the fact

that many overestimate how many of their customers drive and need to park nearby to suggest that, where there is a choice of removing a travel lane or a parking lane to make way for a bike lane, projects should tend to remove the travel lane.

8 Conclusion

More than four years after installation of the bike lanes Drennen (2003) studied, 65% of neighboring business owners thought they'd had "an overall positive impact on their business and/or sales", with only one reporting a ("slightly") negative impact. In Vancouver, a restaurant owner who had initially opposed the installation of a bike lane past his business a year later told magazine *Business in Vancouver* that "business is now better than ever. . . . 'We definitely have benefited from the increased usage of the bike lane'" (St. Denis 2014). In Toronto's Bloor Annex, "patrons arriving by foot and bicycle visit the most often and spend the most money. It appears in the best interest of merchants to favour reallocating space toward their most frequent and higher-spending patrons—in this case, pedestrians and cyclists" (Sztabinski 2009). In San Francisco, "the belief that retail or recreational customers predominantly travel by car and spend more than transit riders is not reflected in the data" (Bent and Singa 2009). And in Los Angeles, "quantitative data do not support the notion that road diets negatively affect surrounding local businesses and property values. Opposition to road diets on economic grounds therefore appears unfounded" (McCormick 2012).

In order to achieve stated policy goals, as well as to make progress on other, broader goals (such as the drive to limit global climate change), the District of Columbia and jurisdictions across the United States and around the world need to increase the proportion of their residents who ride bikes and walk to get where they're going. In order to get more people riding bikes, it is necessary to build more bike lanes which are separated and protected from motor vehicles, and to build them in connected networks that span

the breadth of cities. In order to make room for these bikeways, it will be necessary to take back some of the space cities in the last several decades have given over to drivers. Although there will, in most cases, be those who say that to do so will be the death of their business, they are, in most cases, wrong. More of their customers than they think already arrive by bike; those who do spend more money than those who arrive by car, in aggregate if not on each individual trip; and they are likely to receive even more business once they are accessible by bike. (However, for a number of reasons including the fact that some will perceive a loss of parking even when they have slightly more of it, when given the opportunity to choose between taking out a second (or fourth. . .) travel lane or taking out a parking lane in order to make way for a bikeway, planners should tend to choose to remove the extra travel lane.)

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