National Association of City Transportation Officials

NACTO BIKE SHARE EQUITY PRACTITIONERS' PAPER #3
JULY 2016

EQUITABLE BIKE SHARE MEANS BUILDING BETTER PLACES FOR PEOPLE TO RIDE

In cities that are building protected bike lane networks, cycling is increasing and the risk of injury or death is decreasing. Pairing appropriately-scaled bike share with protected bike lanes increases ridership and is essential to equity and mobility efforts.

The connection between bike share ridership and high-quality bike lanes is clear: people ride more when they have safe places to ride. Less explored is the positive feedback loop between bike share, the creation of protected bike networks, and overall cyclist safety – and the importance of this feedback loop in helping to address the systemic inequities in the U.S. transportation system.

Over the six years from 2010 to 2015, there were over 62 million bike share trips in the United States and zero fatalities; an enviable safety record.[1] There are many explanations for bike share's safety advantage over general bicycling, but strong evidence is emerging that bike share is a tool for improving the safety of all riders. NACTO's new analysis of seven major cities across the U.S. shows that, as cities build more bike lanes, the number of cyclists on the street increases, and the individual risk of a cyclist being killed or severely injured drops, often dramatically. The investment in bike lanes spurs additional cycling, increasing visibility and further reducing risk for all cyclists. Deployed across city neighborhoods at a meaningful scale, as NACTO has described in other reports,[2] bike share can help increase overall bike ridership at accelerated rates and spur a city to develop more—and better—bike infrastructure. By increasing the number of people riding, bike share systems can directly make cycling safer for all, including people on their own bikes.

"PEOPLE OF COLOR ARE ACTUALLY VERY INTERESTED IN BIKE INFRASTRUCTURE AND BIKE SAFETY BUT THERE NEEDS TO BE RESOURCES ALLOCATED TO MAKE SURE THEY ARE ENGAGED."

Rio-Jill Contreras
Multicultural Communities for Mobility

Cities across the country have demonstrated how to kick-start this process. Chicago and New York—like Paris and Montreal before them—began to develop a protected bike lane network years before launching a large bike-share system and subsequently have seen high and sustained bike share use from day one, as users immediately found safe places to ride. Riders in these cities have seen their risk of death or injury from motor vehicles decline steeply. A similar story plays out in Minneapolis—where the bike share system was matched with bike network expansions—and Portland, where the bike network and overall ridership have continued to grow.

These safety gains are particularly important for low-income people and people of color. These groups make up an increasingly large part of the cycling population but often lack protected bike lanes in their neighborhoods. They disproportionately bear the burden of fatalities and injuries from dangerous drivers and poorly designed streets. An analysis from the League of American Bicyclists found that Black and Hispanic cyclists had a fatality rate 30% and 23% higher than white cyclists, respectively, and similar racial/ethnic safety gaps are found for pedestrians.[3] In focus groups and surveys, low-income people and people of color cite concerns about safety and lack of bike lanes as a main reason not to ride.

A myth pervades that people of color do not bike, but the data shows otherwise. Non-white householders in the Portland metropolitan area, for example, bike at a higher rate than white ones.[4] Research conducted for PeopleForBikes in 2014 found that 38% of Hispanic Americans and 26% of Black Americans bike at least once a year and that the number of Black Americans biking increased by 90% from 2001-2009, faster than any other racial or ethnic group.[5] Cycling is also a fact of life in many low-income communities. Analysis of national Census data by the Kinder Institute for Urban Research shows that 49% of the people who bike to work earn less than $25,000 per year.[6] In 2014, PeopleForBikes reported that the lowest-income households—Americans making less than $20,000 per year—are twice as likely as the rest of the population to rely on bikes for basic transportation needs like getting to work.[7]

Ensuring that people have transportation options that are efficient, convenient, and safe is fundamental to efforts to reduce income inequality in the United States today. Indeed, as found in an ongoing Harvard study and reported in the New York Times, "commuting time has emerged as the single strongest factor in the odds of escaping poverty."[8] Large scale bike share programs are part of the solution: they increase the reach of rail and bus transit, help people make short trips faster and more easily, are cheaper to implement than other transportation options, and cost the user pennies per trip.

But, for bike share to fulfill this role and for its benefits to be equitably distributed, bike share programs must be matched with extensive protected bike lane networks that offer people safe, comfortable places to ride, regardless of income level, ethnicity, or race. Safety benefits from bike share are greatest when cities pair appropriately scaled systems with an extensive protected

bike lane network built for people who are "interested but concerned," strategically place on-street bike share stations in ways that calm traffic, and remove legal and regulatory obstacles to bicycling. Like offering inclusive pricing structures and payment mechanisms,[9] or ensuring good service quality by maintaining a walkable distance between stations,[10] providing people access to places to ride where they feel comfortable and safe is essential to larger equity and mobility efforts.

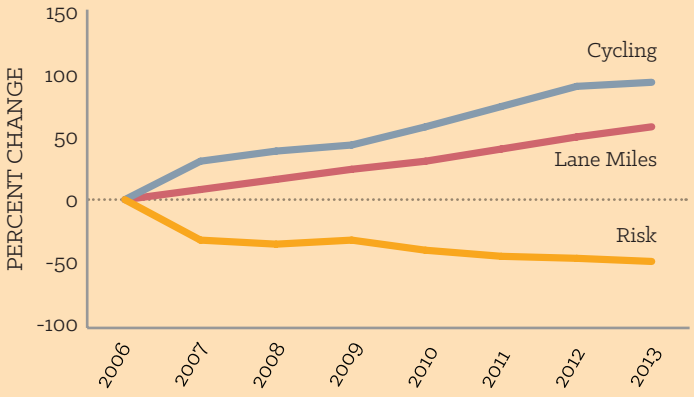
MORE CYCLISTS + BETTER LANES = REDUCED RISK

The combination of increased ridership and more bike lanes is a powerful recipe for safety. For this paper, NACTO collected data from seven cities across the U.S. on bike network mileage, number of cyclists killed or severely injured (KSI), and bicycle volume. The resulting analysis shows that cycling is on the rise in the U.S. and that there is a clear correlation between an increase in the number of cyclists on city streets, growth in the city's bike lane network, and an improved safety rate for riders. In all seven cities studied, the risk per cyclist decreased as bicycling ridership increased, and the rate of growth in cycling far outstripped the rate of cyclist injuries or fatalities. Municipal policies that increase cycling, like implementing a large scale bike share system, when combined with significant enhancements to bike infrastructure, are associated with large decreases in the risk of injury or death borne by each person cycling.

In particular, New York, Chicago, and Minneapolis have made significant investments to build protected bike networks and their transportation departments have begun to aggressively target high-crash, high-volume locations and corridors. NACTO analysis shows that the risk of injury or death to cyclists in these cities has fallen dramatically from 2007-2014. The work of big cities, like New York and Chicago, is particularly impressive, reducing the risk to cyclists by more than half and bringing the overall cyclist risk rate more closely in line with smaller cities. Investments in cycling, and the resulting safety gains, can be largely credited to strong leadership from mayors and transportation commissioners. Since 2007, New York City has built an average of 54 miles of bike lanes each year, while Chicago has built an average of 27 miles per year since 2011.

Cycling is getting safer as more people ride.

Aggregate data from Chicago, Minneapolis, New York City, Philadelphia, Portland, OR, San Francisco and Washington, D.C.

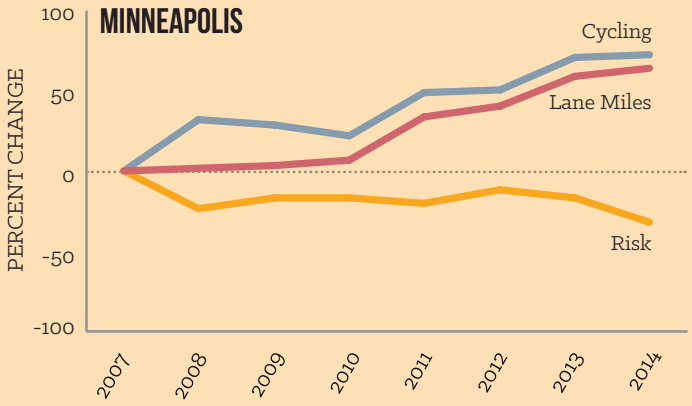


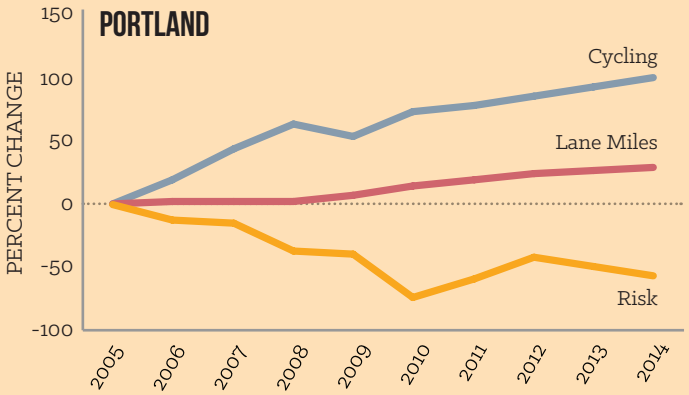
Source: NACTO (2016)

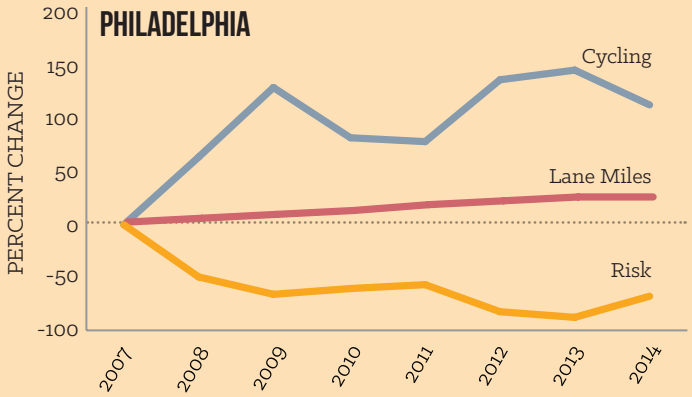
MORE CYCLISTS + BETTER LANES = REDUCED RISK

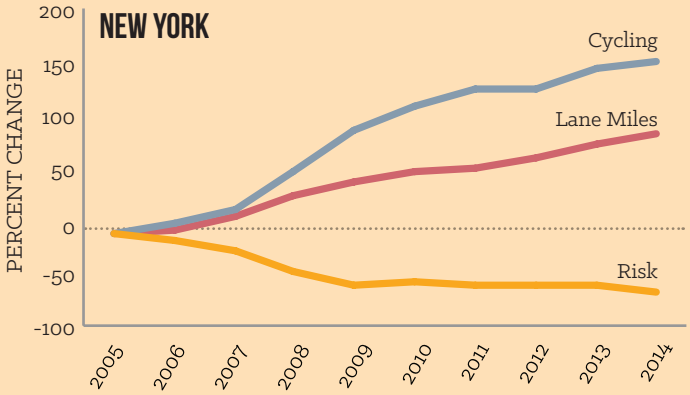
Across the U.S., cycling is increasing and risk is falling. There is a clear correlation between increases in the number of cyclists on city streets, improved access to safe places to ride, and increased safety for riders. City policies that increase cycling, like implementing a large scale bike share system, when combined with significant bike network development, are associated with large decreases in the risk of injury or death borne by each person cycling.

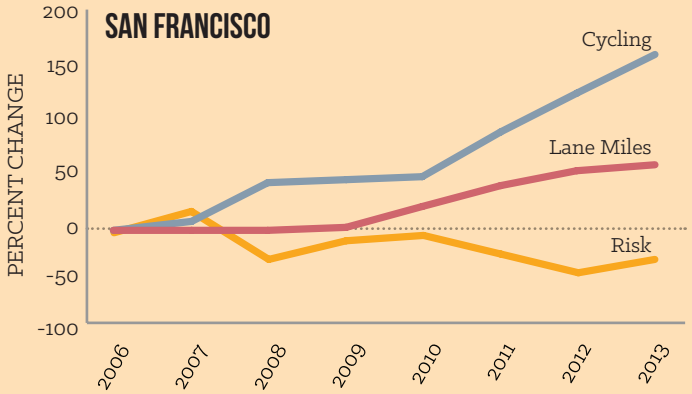
Source: NACTO (2016)

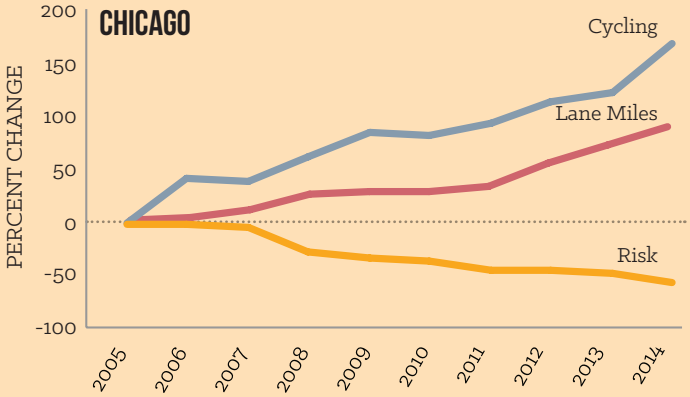


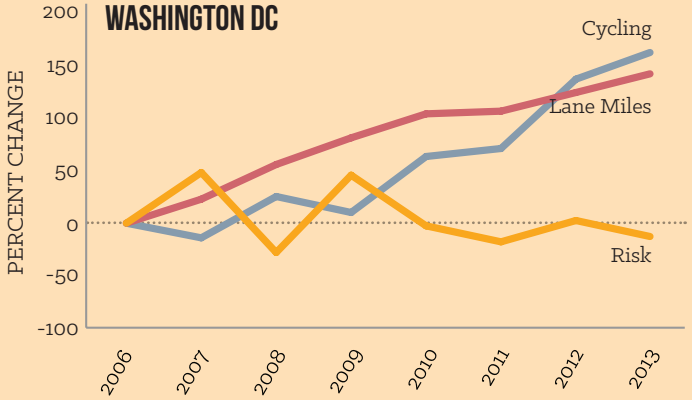












In five of the seven cities studied—Chicago, Minneapolis, New York, Philadelphia, and Portland—the absolute number of cyclists killed or severely injured also declined from 2007 to 2014, even as cycling rates soared. Portland, which has been building bike infrastructure for decades and has seen corresponding growth in cycling, has cyclist fatality and injury rates well below that of comparably sized cities.[11] New policies in Portland make protected bike lanes the default design for all separated bike lanes, which will further increase cycling safety and accessibility.[12] NACTO analysis shows that even in the cities where the absolute number of cyclists killed or severely injured is increasing, the rate is rising at a slower pace than cycling itself. Taken together, this analysis shows that an overall reduction of risk to cyclists is correlated with the increased presence of cyclists on the road and municipal investment in bike infrastructure.

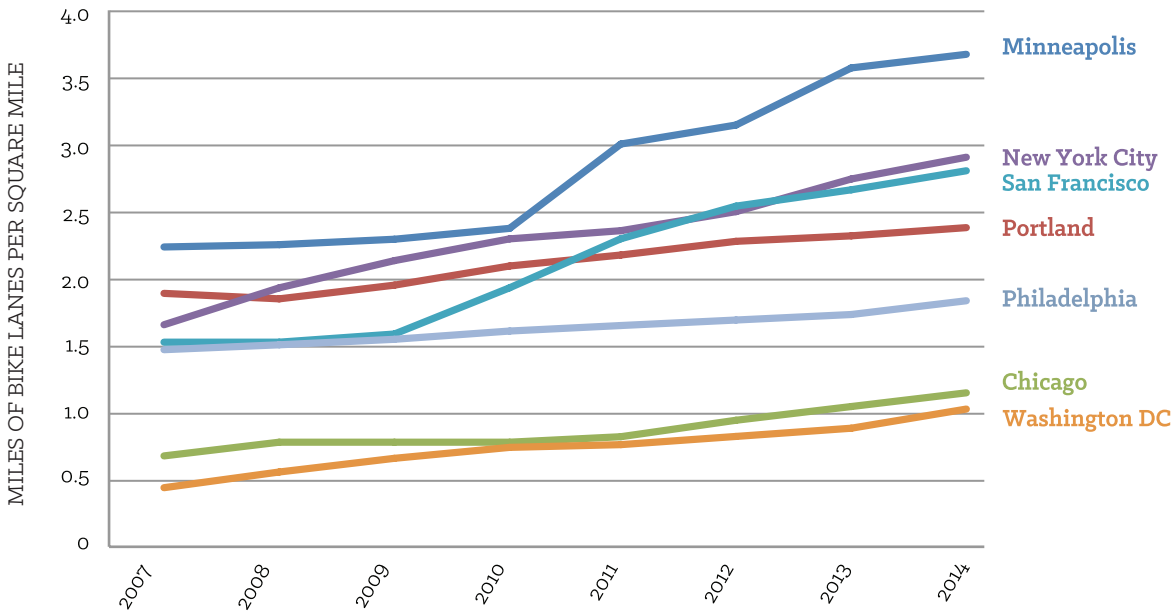
More cyclists on the road also increases the visibility and safety of cyclists overall, a phenomenon known as "safety in numbers." As previous research has documented, the risk of a cyclist being struck by a motorist declines as the number of cyclists on the road increases.[13] Put in simplest terms, a driver who sees 20 cyclists over the course of a few minutes is less likely to forget to look for cyclists than a driver who sees just one. Anecdotal evidence suggests that the increased awareness may extend beyond cyclists and that drivers looking for cyclists may be likely to look more for pedestrians too. Appropriately scaled bike share systems, conceived of as part of a transportation network, can dramatically increase the number of cyclists and help build political momentum for bike lanes. In New York City, for example, over 10 million trips were made on Citi Bike in 2015, significantly increasing the volume of cyclists. At rush hour on busy connector streets, like Jay Street in Brooklyn, there is a person on a bike for every two cars, a huge increase in cyclist visibility.[14]

Data and Methodology

This analysis relies on three data sources collected from cities: the number of bike lane miles, excluding signed routes with no other enhancements; the number of cyclists killed or severely injured (KSI), as gathered by police; and the number of cyclists counted in standardized bike counts or American Community Survey (ACS) data where counts are not available.

Cycling risk was calculated by dividing KSI by the count of cyclists or ACS sample. All data was indexed to reflect percent change from a base year of 2007. Indexing focuses the analysis on overall trends rather than absolute numbers, illuminating whether cycling and cycling risk are increasing or decreasing over time, and by how much.

GROWING BIKE NETWORKS



BIKE SHARE RIDERS WANT BETTER BIKE LANES

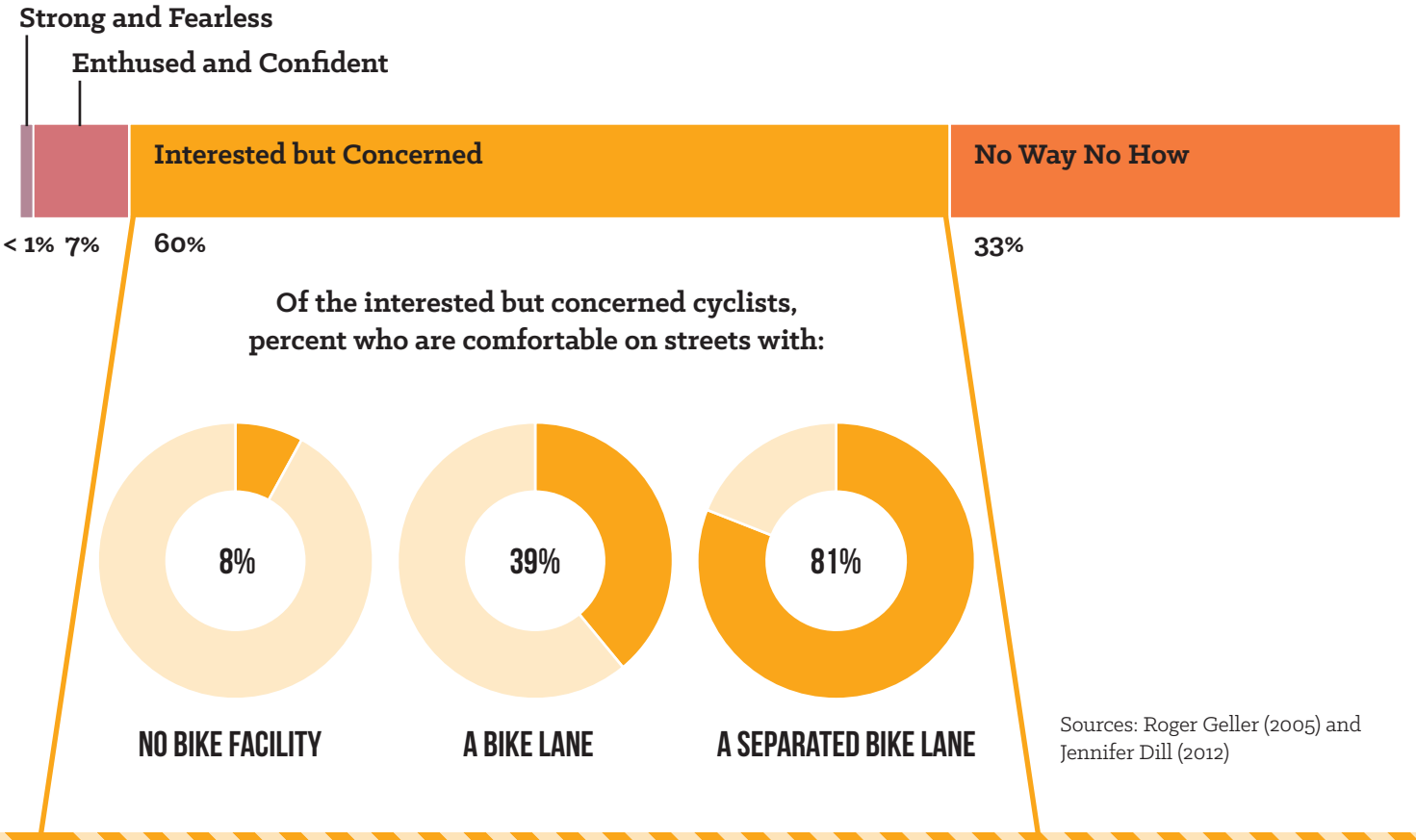
Building a connected network of on-street protected lanes is essential for cities considering bike share programs and should be a core component of a city's overall equity and mobility strategy. Many bike share users are new to bicycling for transportation and want protected infrastructure in order to be willing to make even the shortest trips.

Concerns about safety and the lack of bike lanes are cited as a main reason not to ride among low-income people and people of color. In bike share focus groups in Philadelphia and Memphis with low-income and of-color residents, participants routinely cited the lack of bike lanes and a fear of reckless, "crazy" drivers as reasons they would be hesitant to use bike share.[15] A recent PeopleForBikes report found that people of color are more likely to say that adding protected bike lanes would make them ride more.[16] The Philadelphia focus groups found that women were more likely than men to cite concerns about safety and lack of bike infrastructure as reasons not to use bike share, another example of how the lack of safe places to ride limits cycling's transportation potential for large segments of the population.[17]

Protected bike lanes make cycling accessible to the majority of the population who have reason to ride but are concerned about safety, dramatically increasing the pool of people who might choose to use bike share.[18] In follow-up research to Roger Geller's influential categorization of potential bike riders[19], Jennifer Dill found that people who are "Interested but Concerned" about cycling, who make up around 60% of the total population, are strongly influenced by bike lane type. Fewer than 5% reported feeling comfortable or very comfortable on streets without a bike lane; in contrast, over 80% reported being comfortable and willing to ride on streets with separated or protected lanes.[20]

THE MAJORITY OF PEOPLE WILL RIDE WITH PROTECTED BIKE LANES

Of the total population



Sources: Roger Geller (2005) and Jennifer Dill (2012)

Case Study

THE PEOPLE WANT BIKE LANES

All across the country, people want better bike lanes. For example, in 2014, community members in Boyle Heights, a predominantly Latino neighborhood in Los Angeles, came out en masse to support proposed bicycle and pedestrian safety improvements along two major neighborhood corridors, Soto Street and Boyle Ave. The community wanted the city to make the streets safer for cyclists and pedestrians and help the neighborhood gain economic benefits from increased mobility options, while also addressing larger gentrification and police enforcement issues.[21]

The efforts of the Boyle Heights community were supported by the Multicultural Center for Mobility (MCM), which focuses on multi-lingual, "culturally-competent" safety and cycling advocacy particularly in low-income neighborhoods. MCM hired four born-and-raised Boyle Heights residents, called Promoturas, to gauge and build support from residents and businesses. While Los Angeles city planners and MCM organizers both say that the strong community support came because the bike lanes were packaged into a larger safety program, the Promoturas were essential to the process—spreading information, gathering feedback, and helping the people in the neighborhood identify additional measures that would address related community concerns such as police training around cycling and the desire for a cyclist warning-and-diversion program, rather than ticketing. MCM's decision to hire and pay locals to engage their neighbors, rather than bring in outside consultants, further strengthened the feeling that the proposed lanes were a community benefit, not an outside intrusion. The Soto and Boyle Ave bike lanes are on the LADOT project roster.

TO ENCOURAGE RIDING, BUILD BETTER LANES

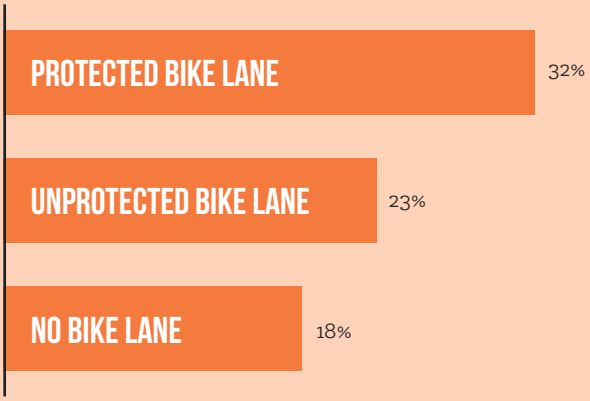
Across the U.S., cities are listening to local requests for safe places to ride and building more and better bike lanes. And in response, more people are riding. Bike count data shows that building lanes encourages more people to ride.

A 2015 study of Calgary, Canada found a 95% increase in the number of weekday bike trips in the three months after the introduction of a bike network, underscoring the importance of a robust, linked bike network as part of any city's cycling strategy.[22] A 2014 study of bike infrastructure in Austin, Chicago, Portland, OR, San Francisco, and Washington, DC showed that adding protected bike lanes increased ridership on that street by 21% to 171%.[23] A 2015 report on the 300 South/Broadway protected bike lane in Salt Lake City found a 30% increase in cyclists, with anecdotal reports suggesting increased use by families and casual cyclists.[24]

In New York City, in close consultation with community organizations, the Department of Transportation began a rapid expansion of the bike lane network in 2007, building 431 miles of bike lanes, including 40 miles of protected lanes, over the following seven years. The number of daily cyclists in New York City doubled over

Bike share riders prefer protected lanes.

Citi Bike riders as a percent of total riders by lane type:



Source: Peter Tuckel and William Milczarski, CUNY (2014)

that time period and increased four-fold from 2000 to 2013.[25] In addition, the Citi Bike bike share program, which launched in 2013, adds up to 56,000 cyclists daily.[26]

The reverse is also true. A judicial injunction in San Francisco halted bike lane development from 2006 to 2010.[27] SFMTA bike count data shows that the number of people biking increased only slightly over that time period. When the injunction was lifted in 2010, cycling rates began to rise quickly and have almost doubled since.[28]

When it comes to bike share, ensuring that there are safe places to ride is essential to ridership. Cities that invest significantly in cycling infrastructure prior to, or while, rolling out bike share systems have seen the largest increases in ridership. A 2011 study found that more people started trips from Capital Bikeshare stations near bike lanes and that ridership increased with the number of nearby lanes.[29] A 2014 Hunter College study found that Citi Bike riders made up a greater share of the total cyclists on streets with protected bike lanes than those without.[30] In a national survey by PeopleForBikes, almost half of respondents said they would ride more if high quality, protected cycling infrastructure existed in their areas.[31]

SMART STATION PLACEMENT CAN MAKE STREETS SAFER

Even for people who will never ride a bike, bike share stations can help make streets safer. In cities like Austin, Arlington, New York, and Philadelphia, thoughtful station placement has helped create a safer environment for cyclists and pedestrians alike. For example, in Austin, bike share stations have been incorporated into painted bulb-out designs, helping to shorten crossing distances

for pedestrians and demarcate sidewalk space. In New York City, stations placed in the buffer of protected bike lanes create high-comfort areas for people to start and end their bike share trips. In Philadelphia, stations placed along newly-created pedestrian space, such as road reclamations and painted plazas, help anchor the space and create a permanent buffer from vehicular traffic.

Using bike share equipment to further traffic safety goals allows cities to make their limited resources go further. For example, in New York City, community members in Battery Park City voiced concerns about frequent illegal U-turns and speeding on West Thames Street, an overly wide two-way street. Working with the Community Board, planners addressed these safety issues by placing a doubled-sided station in the painted median. The station immediately created a mid-crossing refuge space for pedestrians, helped define the travel lanes, prevented illegal U-turns, and calmed traffic. A full discussion of best practices in bike share station siting can be found in NACTO's Bike Share Station Siting Guide.[32]

MANDATORY HELMET LAWS REDUCE BIKE SHARE RIDERSHIP AND DON'T INCREASE SAFETY

While questions about helmets are frequently raised in conjunction with bike share, data shows that mandatory adult helmet laws reduce biking and bike share ridership—and thus reduce overall cycling safety. A number of cities, such as Mexico City, Tel Aviv, and Dallas, TX, have repealed their helmet laws in preparation for launching bike share systems.[33]

The impact of mandatory adult helmet laws on bike share and general bike ridership is large and negative. Cycling in Sydney, Australia decreased 48% in the five years following the passage of their mandatory adult helmet law.[34] A study in Melbourne, Australia found that 61% of people who did not use Melbourne's bike share system cited difficulties finding a helmet or not wanting to wear one as their main reason for not riding.[35] In Seattle, the only U.S. city with a mandatory helmet law, bike share ridership has been well below expectations, less than one ride per bike per day.

Case Study

MAKING HELMETS AVAILABLE

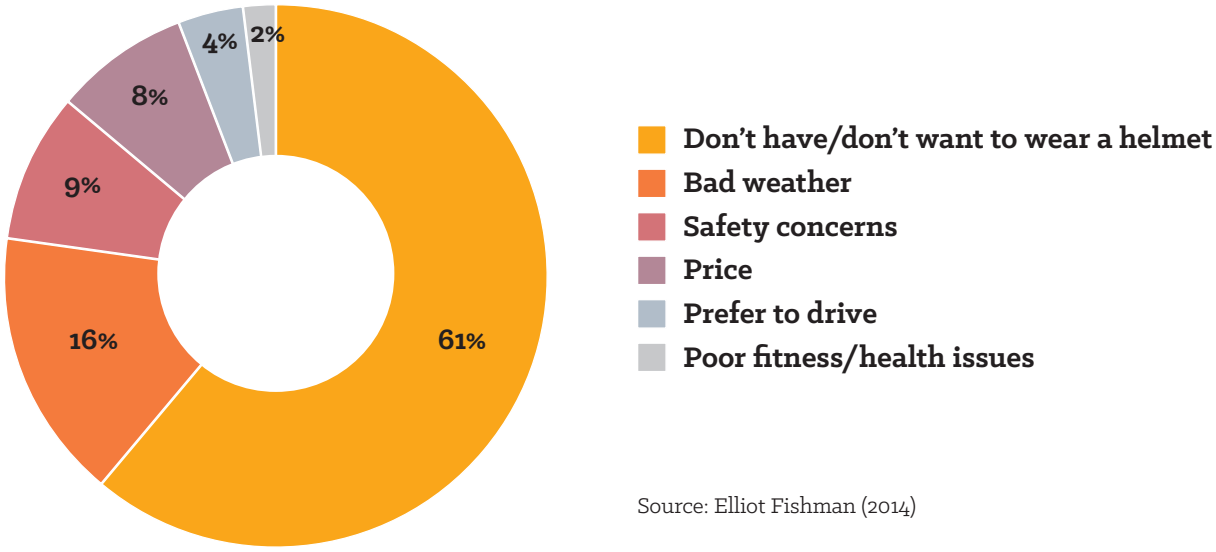
While making helmets mandatory for adults can reduce ridership, making helmets readily available to those who want them is good public policy. Many bike share systems, such as the Boston area's Hubway and Salt Lake City's GREENbike, offer free bike helmets with bike share memberships.

In New York and Chicago, the city wanted to encourage people to go to local bike shops rather than have their operator act as a helmet distributor. New York City and Motivate worked together to create a helmet discount for anyone who signs up for Citi Bike. The program launched with a few helmet providers, such as Bern, Nutcase and Bontrager, and is now available for seven different helmet brands in bike shops in all five boroughs. Depending on the helmet selected, the $10 discount represents up to 30% off the price of a helmet. NYC DOT also gives away bike helmets, targeting many of their give-away events in low-income areas. Since 2007, the city has given away 150,000 helmets.

Safety analyses from around the world suggest that mandatory adult helmet laws have limited safety benefits. While helmets can protect individual cyclists from head injuries in some types of crashes, mandatory adult helmet laws do not reduce the overall number of crashes (which may or may not involve a cyclist hitting their head) and may work against safety benefits conferred by increased ridership. In Australia, where mandatory adult helmet laws were introduced regionally between 1990 and 1992, bike count and safety data collected shows that "enforced helmet laws discourage cycling but produce no obvious response in percentage of head injuries." [36]

Mandatory helmet laws pose additional issues for communities aiming to address longstanding issues of racial disparity in policing. Reports from around the United States suggest that such laws often give police an additional reason to stop and question people and are disproportionately enforced against low-income people and people of color. A review of court and police records in Dallas found significantly uneven enforcement of the city's helmet law, with 96% of citations outside of downtown being written in neighborhoods of color and 86% in areas with large numbers of households below the poverty line.[37] Similarly, a study in New York City of citations for riding on the sidewalk found that communities where most residents are Black or Latino represented 12 of the 15 neighborhoods with the most citations. In contrast, predominantly white neighborhoods, many of which have large cycling populations, made up 14 of the 15 neighborhoods with the fewest citations.[38] In Florida, the Tampa Bay Times found that 8 out of 10 bike citations in Tampa were given to Black people and concluded that "Tampa police are targeting poor, Black neighborhoods with obscure subsections of a Florida statute… Officers use these minor violations as an excuse to stop, question and search almost anyone on wheels." [39]

WHAT STOPS YOU FROM USING MELBOURNE BIKE SHARE?



Source: Elliot Fishman (2014)

LESSONS FROM THE CITIES

» **Support bike share systems with significant buildout of bike lanes networks:** Ensuring that people have places to ride where they feel comfortable and safe is essential to larger equity and mobility efforts. The safety benefits of increased ridership are enhanced when growth in cycling is matched with construction of new, better bike lanes.

» **Design for the "Interested but Concerned:"** The majority of the U.S. public is interested in biking but concerned about safety. Their willingness to ride is highly influence by the quality of bike lanes available to them. Matching convenient bike share systems with a protected bike lane network is a recipe for success.

» **Remember who is already riding:** Half of the people who bike to work earn less than $25,000/year. Years of highway building, car-based zoning, and exclusionary housing policies means low-income neighborhoods are often separated from job centers by highways and dangerous streets with limited-to-no space for bikes or pedestrians. As cities build for more cyclists they should ensure that the bike lane network includes safe routes for existing riders.

» **Long term community engagement is essential:** People in all neighborhoods want safe places to walk, bike, and play. Building long-term, reciprocal relationships in neighborhoods and with locally-trusted community organizations is essential to spreading information, getting feedback, and building local support for projects.

» **Use bike share stations as tools for safety:** Bike share stations can be placed in ways that increase overall street safety. Planners should strategically place stations in ways that define and protect bike lanes and pedestrian space, narrow streets to reduce speeding, and create pedestrian refuge islands that shorten crossing distances.

» **Eliminate mandatory adult helmet laws which restrict and reduce cycling:** Mandatory helmet laws reduce the number people riding and negatively impact overall cycling safety. In addition, such laws can be prone to abuse and are often disproportionately enforced in low-income neighborhoods and communities of color.

» **Counting counts:** Measuring the growth in cycling is one of the best ways to tell if a city is working effectively to make cycling commonplace, easy, and safe for everyone. Cities should focus on the trend of cycling and cycling risk—is it increasing or decreasing and by how much—year over year to get a big picture view of the success of their bicycle program.

1 The first U.S. bike share fatality occurred on July 1st, 2016 in Chicago.

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3 League of American Bicyclists, "The New Majority: Pedaling Towards Equity." p.2. Accessed via http://bikeleague.org/sites/default/files/equity_report.pdf & Smart Growth America, "Dangerous by Design 2014." p.20. Accessed via: http://www.smartgrowthamerica.org/documents/dangerous-by-design-2014/dangerous-by-design-2014.pdf

4 Oregon Metro, "2014 Regional Active Transportation Plan." p.11-147. Accessed via: http://www.oregonmetro.gov/sites/default/files/2014_regional_active_transportation_plan_0.pdf

5 Anderson, Michael, "Assumption Busters: 12 Facts About Race, Ethnicity, Income & Bicycling," People For Bikes, March 9, 2015. Accessed via: http://www.peopleforbikes.org/blog/entry/assumption-busters-surprising-facts-about-ethnicity-race-income-bicycles

6 Keatts, Andrew, "Memo to Cities: Most Cyclists Aren't Urban Hipsters." The Urban Edge/Kinder Institute for Urban Research, 10/20/15. Accessed via: http://urbanedge.blogs.rice.edu/2015/10/20/memo-to-cities-most-cyclists-arent-urban-hipsters/#.V30X7_krJpg

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8 Bouchard, Mikayla, "Transportation Emerges as Crucial to Escaping Poverty." The New York Times, May 7, 2015. Accessed via: http://www.nytimes.com/2015/05/07/upshot/transportation-emerges-as-crucial-to-escaping-poverty.html

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11 In Portland (pop. 609,000), from 2004 to 2014 an average of less than two cyclists were killed per year, a number below its similarly sized peers.

12 PBOT email from Treat, Leah, "protected bike lane as design standard." October 19, 2015. Accessed via: https://drive.google.com/file/d/0B8tOk7_upXv5TFZSd2tPb3RyTzlLc1k0cW1WbFhQVThJUm5n/view

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14 NYC DOT, "Jay Street: Schermerhorn St - Sands St, March 15, 2016. Accessed via: http://www.nyc.gov/html/dot/downloads/pdf/jay-schermerhorn-sts-mar2016.pdf

15 Hoe, Nina, "Bike sharing in low-income communities: An analysis of focus group findings," Fall 2014, Insitute for Survey Research, Temple University & Explore Bike Share Memphis Focus Groups & interviews with NYC DOT staff re 2011-2 focus groups

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