REPLICA

Photo: Jeffrey Blum

Biking surges in US cities during COVID-19.

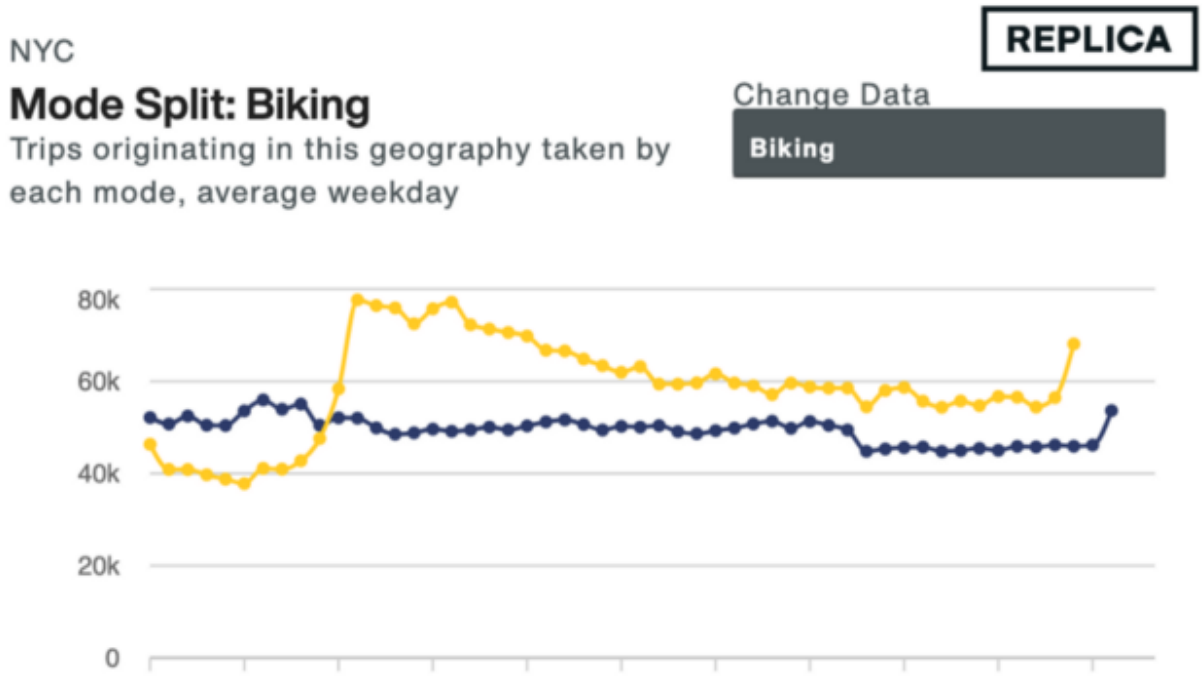
Replica 3 hours ago · 8 min read

Replica works with academics like Eric and Elif to uncover insights in, and explore new ways of working with, its data. If you are a researcher interested in exploring Replica data, please contact us here.

When looking at the change in travel behavior across the United States in 2020 — a year marked by the Coronavirus pandemic and resulting lockdowns and remote work — vehicle miles traveled by residents of cities across the US plummeted, creating an opportunity for urban planners to invest in alternate modes of transportation, accommodating a post-pandemic normal in which people are traveling less overall and locally more than ever.

We see a massive decrease in the use of public transit and an increase in other modes of travel, including cycling and walking. While it's still too early to know exactly how pandemic travel preferences will translate into permanent changes in travel behavior, cities should begin to plan for this increased cycling activity as it is likely that more people continue to seek alternatives to public transit and spend more time working from home.

Figure 1: New York Bike Trip Volume 2019–2020



New York City bike trip totals 2019–2020 Source: replicahq.com

Replica's Trends mobility data estimates cycling trip origins by census tract and neighborhood tabulation area, enabling year-over-year comparisons between 2019 and 2020. By combining Replica's Trends travel data with crash data and data on existing bicycle networks, we can show where cycling is growing and where it still remains relatively dangerous, helping government make informed decisions about where to site new infrastructure, and support safer biking.

Starting in 2021, New York City's Department of Transportation will begin installing 250-miles of protected bicycle lanes over the next five years. This makes New York an ideal test case for using Replica's Trends mobility data to identify which streets should receive protected bicycle lanes. This debate has become more urgent over the last year as the competition for scarce road space has yielded another gruesome year for cycling deaths. The City of New York can reverse these troubling trends with smart, targeted interventions.

Citywide, New York saw a massive increase in bike trips, particularly in the outer-boroughs, in 2020.

Map 1: Bike Lanes, Crashes, and Increase in % of Bike Trips

Bike lanes, crashes, and increase in % of bike trips. Source: Eric Goldwyn and Elif Ensari

Using the Replica's Trends mobility data, we developed a method for evaluating and selecting where future protected bicycle lanes should be installed. We apply some basic principles from the literature:

1. Extending existing infrastructure and focusing on connectivity will yield a greater ridership and safety boost than building world class infrastructure that is separated from the extant network.
2. We overlay crash data to identify the most dangerous streets for cyclists.
3. We compared travel behavior from April 2019 through October 2019 and April 2020 and October 2020 to see how travel patterns have shifted during the pandemic. Even now, bus and subway ridership is down more than 50% from 2019. Even though the evidence suggests that transit usage can be managed safely, it is reasonable to assume that New Yorkers will continue to seek out alternatives to mass transit, especially for short, local trips.

Figure 2: New York Transit Volume 2019–2020

NYC transit volume drop in 2020. Source: replicahq.com

This methodology does not identify corridors where new protected bicycle facilities might stimulate latent demand. But it offers a sound means of selecting locations where direct investment would yield immediate safety benefits and stimulate continued ridership growth in areas that have experienced higher demand during the pandemic.

With these three overarching ideas governing our analysis, we selected four specific interventions spanning Queens, Brooklyn, Manhattan, and the Bronx. While we didn't forget Staten Island, the data in Staten Island did not suggest an obvious infrastructure intervention akin to the other four boroughs.

Queens

Map 2: Queens Recommended Improvements

An extended protected lane on Queen's Blvd. Source: Eric Goldwyn and Elif Ensari

We suggest that the Department of Transportation extend the Queen's Boulevard bicycle lane to Hillside Avenue or Jamaica Avenue. By extending the lane eastward, it will provide much needed new infrastructure in Southeast Queens, which has virtually no protected bicycle lanes despite a 35% gain in cycling in Jamaica in the past year. From April 2020 to October 2020, there were 8 cyclist injuries along Hillside Avenue and 10 along Jamaica Avenue. Since the two Avenues parallel one another, this is a great opportunity to create a single lane that will serve as a main east-west spine through Jamaica, Queens and provide connectivity all the way to the Queensboro Bridge and neighborhoods like Jackson Heights, Elmhurst, and Long Island City.

Brooklyn

Map 3: Brooklyn Recommended Improvements

A suggested protected bike lane on Broadway in Brooklyn. Source: Eric Goldwyn and Elif Ensari

Brooklyn's primary protected bicycle lane infrastructure is restricted to Eastern and Ocean Parkways. These spines provide good north-south and east-west coverage, but provide no connectivity to those cycling north of Prospect Park or connecting to East River bridges, which is a key connection to Manhattan. The Replica cycling data suggests that the neighborhoods flanking Broadway, such as Bedford-Stuyvesant and Bushwick, have seen year-over-year increases ranging from 25% to 55%, amounting to hundreds of thousands of more cycling trips between April and October 2020 compared to the prior year. Broadway, in particular, strikes us as the perfect location for a protected bicycle lane because it connects to the Williamsburg Bridge, the Kent Avenue bicycle lane, and subway stops along the corridor. A protected lane along Broadway will also mitigate the severity and reduce the frequency of the nearly 40 cyclist injuries that have occurred along the avenue in 2020.

Manhattan

Map 4: Manhattan Recommended Improvements

A suggested protected lane through Harlem. Source: Eric Goldwyn and Elif Ensari

place to reassess an existing lane's utility. Adam Clayton Powell's connection to Central Park, and its network of cycling infrastructure, makes this area a strong node in the existing cycling network. A protected bike lane would also facilitate safe access to cultural amenities like The Studio Museum of Harlem, as well as employment centers like the Adam Clayton Powell State Office Building. Between April and October of 2020, there have been nearly 20 cyclist injuries in the span of two miles. If we add in cyclist injuries on parallel north-south streets, Frederick Douglass Boulevard and Malcolm X Boulevard, there were an additional 50 cyclist injuries. Harlem has seen the greatest uptick in cycling, on a percentage basis, of any neighborhood in New York City, year over year, amounting to more than one hundred thousand additional cycling trips since April. In the southern portion of the neighborhood, where Adam Clayton Powell extends north from Central Park, cycling is up more than 75%.

The Bronx

Map 5: Recommended Improvements in the Bronx

The Grand Concourse with a protected lane in the Bronx. Source: Eric Goldwyn and Elif Ensari

it clearly needs a protected bicycle lane just based on the number of cyclist injuries (more than 20) and one fatality, since April. But what should this new protected lane connect to? A protected lane on its own is not as useful as a protected lane that connects to another protected lane. The southern terminus of the Grand Concourse is East 138th Street, where two cyclists have already been killed this year. This provides an excellent opportunity to create a protected north-south lane along the Grand Concourse that folds into an east-west lane across East 138th Street, connects to Manhattan, and links up with the proposed protected bicycle lane on Adam Clayton Powell.

Though this analysis has focused on New York, it is easy to see how it could be applied to other cities where we have similar data. During the pandemic, cities like Dallas, Birmingham, and Kansas City have all seen a decrease in residents' vehicle miles traveled at the same time that cycling has increased, suggesting that bicycle trips are viable alternatives for activities like errands or visiting friends.

Figure 3: Private Auto Trips in Dallas, 2020

Dallas private auto trips week over week, 2020 Source: replicahq.com

Figure 4: Vehicle Miles Traveled in Dallas, 2020

Dallas vehicle miles traveled since March 2020. Source: replicahq.com

By analyzing where this increase in cycling has been most robust, cities around the country can target near-term investment to encourage permanent behavior changes, while investing in the infrastructure necessary to provide safe, convenient, travel options to all its residents.

Eric Goldwyn is a Research Scholar in the Transportation and Land-Use Program at the Marron Institute at New York University. He received his Ph.D. in Urban Planning from Columbia University. He teaches courses on urban planning and urban studies and his writing on cities and transportation technology has been published in academic journals and popular press outlets.

Elif Ensari is a Research Scholar in the Transportation and Land-Use Program at the Marron Institute at New York University. She was trained as an architect specializing in architectural design computing. She holds a master's degree from Southern California Institute of Architecture (SciARC) and a dual Ph.D. degree from Istanbul Technical University and University of Lisbon. Her research utilizes urban analytics to support design and planning for sustainable mobility.

Replica is a data platform that makes complex, rapidly-changing urban ecosystems easier to understand. See your city better at replicahq.com

Cycling New York Urban Planning Tech City Planning