



Caltrans Division of Research,  
Innovation and System Information

# Research



# Results



Transportation  
Safety and Mobility

## Bicyclist Behavior in San Francisco: A Before-and-After Study of the Impact of Infrastructure Investments

A before and after study of bicycle Infrastructure improvements impact.

### WHAT IS THE NEED?

There is growing evidence that bike-specific infrastructure positively affects the choice to bicycle as well as the routing decisions of bicyclists. However, at the local level, the relationship between the type and placement of infrastructure and bicycling behavior varies. Many major cities in California have goals of increasing their bike mode share as a way to increase the sustainability of travel in their city. From a planning perspective, many questions emerge: Should particular groups of people be targeted for increasing bicycling (e.g. women, existing bicyclists, non-bicyclists)? Where should communities construct new bike infrastructure and what should be the focus of the infrastructure (e.g. connection to commercial services, schools, workplaces, etc.)? What type of infrastructure should communities build (e.g. bike lanes, off-street paths, sharrows, green pavements, bicycle parking, etc.)?

### WHAT WAS OUR GOAL?

San Francisco serves as an excellent case study to examine the impacts of bicycle infrastructure investments given the quirks of its recent bicycling history and its unique prioritization of non-automobile modes as part of its Transit-First Policy. In 2006, San Francisco's Bicycle Plan was served a court injunction as part of a CEQA (California Environmental Quality Act) challenge of the plan's environmental review (Superior Court of California - County of San Francisco, 2006), resulting in a dormancy in bicycling infrastructure investments until 2009, when the injunction was lifted (San Francisco Municipal Transportation Agency Bicycle Program Staff, 2010). The San

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San Francisco Municipal Transportation Agency (SFMTA) thereafter rapidly made a variety of bicycle infrastructure investments across the city (San Francisco Municipal Transportation Agency, 2012). Simultaneously, in 2009 the San Francisco County Transportation Authority (SFCTA) developed a smartphone application called “CycleTracks”, which allowed users to record and upload their bicycle rides for SFCTA’s use in improving their travel demand forecasting model. San Francisco bicyclists have continued to use the CycleTracks application into the present day, providing a steady stream of bicycle route data to the city.

## WHAT DID WE DO?

We compare CycleTracks users’ routes from late 2009 and early 2010, at the tail end of the bicycle infrastructure stasis, with routes in late 2013 and early 2014, allowing us to evaluate the influence and impact of the flurry of infrastructure investments made by San Francisco in the intervening years. We also attempt to control for two concurrent changes: the cohort of CycleTracks users has almost completely turned over between 2009 and 2013 and overall bicycling volumes in San Francisco have increased steadily since counts began in 2006, rising to 206% over 2006 levels in the most recently published counts in 2014 (San Francisco Municipal Transportation Agency, 2015).

## WHAT WAS THE OUTCOME?

Our analysis provides evidence that, on average, San Francisco bicyclists are able to ride on bicycle infrastructure for a greater portion of their routes through the city in 2014 than they were 5 years previously. We come to this conclusion by utilizing volunteered bicycle route GPS data provided by San Francisco bicyclists using a smartphone

application developed by SFCTA called CycleTracks as well as by a survey of CycleTracks participants. Given the complexity of bicycle route choice decision-making and the characteristics of the available data, we use a before-and-after quasi-experimental approach and compare four possible explanations for this trend of increased infrastructure use.

Ultimately, we suggest that a combination of targeted planning (i.e. planners putting infrastructure where bicyclists currently ride) and route change (i.e. infrastructure placed on alternative routes causes changes in chosen routes) best describe the increased use of San Francisco bicycle infrastructure in an average rider’s route, rather than being caused simply by changes in the characteristics of our sample between 2009 and 2014.

## WHAT IS THE BENEFIT?

Provides valuable knowledge to governments and the public to implement strategic planning efforts that are

## IMAGES

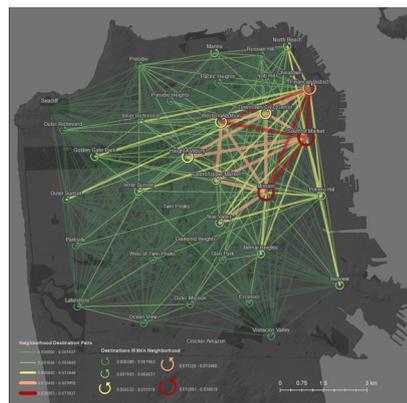


FIGURE 2: Map of person weighted trip distribution for all trips