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### Title

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# A San Francisco Case Study: What Bicycle Investments Have the Greatest Influence on Where People Ride?

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POLICY BRIEF

## Issue

Bicycling is on the rise in many cities<sup>1</sup> in part owing to substantial public investment in bicycle infrastructure. However, concerns over road safety continue to impede bicycling, suggesting a need for continued investments. But on what roads should improvements be made, and what types of facilities should be built to most benefit bicyclists?

To better understand the link between how new bicycle infrastructure (Figure 1) influences the routes that bicyclists choose, we analyzed bicyclists' route choice before and after a 45% increase in bike lanes and 178% increase in sharrows (among other bicycle investments) in the City of San Francisco.<sup>2</sup> San Francisco is an informative setting due to having a unique confluence of events, where rapid investment in bicycling infrastructure coincided with novel bicyclist route measurements through the smartphone app CycleTracks<sup>3</sup> and a survey of CycleTracks users.

## Key Findings

**Conventional and buffered bike lanes are more likely to cause route change compared to sharrows.** While

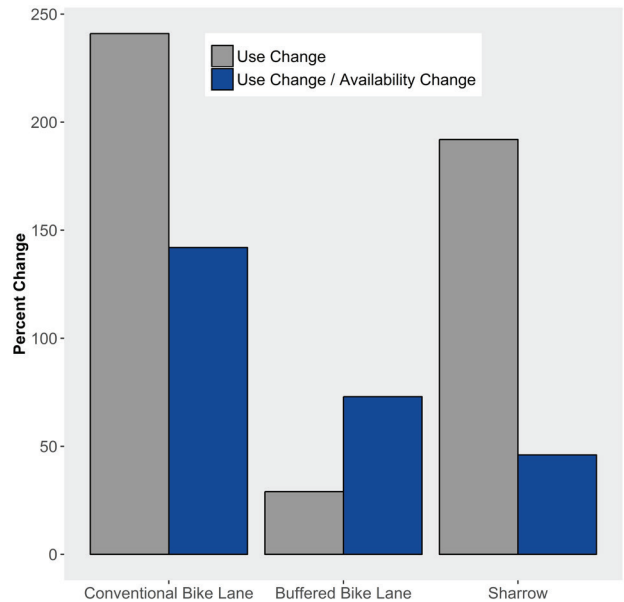


Figure 2. Percent change of infrastructure use, and ratio of infrastructure use to availability, from 2009 to 2013.

the availability of routes with sharrows increased dramatically between 2009 and 2013, use of these routes did not increase at the same pace, suggesting these facilities were less likely to change route behavior (Figure 2). In contrast, fewer conventional bike lanes were built in the study period, yet bicyclists used these facilities in much greater numbers. This was also the case for buffered bike lanes, even though they made up a substantially smaller portion of the San Francisco bicycle network than sharrows. The remaining innovative bike lanes (i.e., safe-hit posts,



Figure 1. Examples of bicycle infrastructure. From left to right: buffered bicycle lane, contraflow bicycle lane, bicycle route marked by a sharrow, conventional bicycle lane, and a physically separated bicycle lane.

curb separated, and parking protected) are too scarce to definitively draw similar conclusions.

**Evidence from multiple sources links new bicycle infrastructure to changes in route choice in San Francisco.**

A majority of survey respondents reported altering their routes based on a change in bicycling infrastructure, particularly to ride on innovative (e.g., buffered bike lanes) and conventional bike lanes (e.g., striped on-street bike lanes) (Figure 3). In addition, bicyclists’ routes measured using the CycleTracks app also suggest a link between bicycling infrastructure and a bicyclist’s route choice; where new infrastructure was built parallel to existing, commonly-used routes, use of the existing routes declined and use of the routes with new infrastructure increased. In other cases, new infrastructure was installed on existing routes, leading to an increase in the use of bicycle infrastructure without a shift in routes.

While disparities in the use of different types of infrastructure are clear, infrastructure investments appear to have a larger impact on route choice in areas with limited bicycle infrastructure to start with.

**Better data on infrastructure investments is needed.** Data collected through CycleTracks and similar apps provide detailed behavioral information across time. Data on infrastructure investments needs to also be maintained across time in order to determine more definitively whether bicycle facilities are the main driver of route changes.

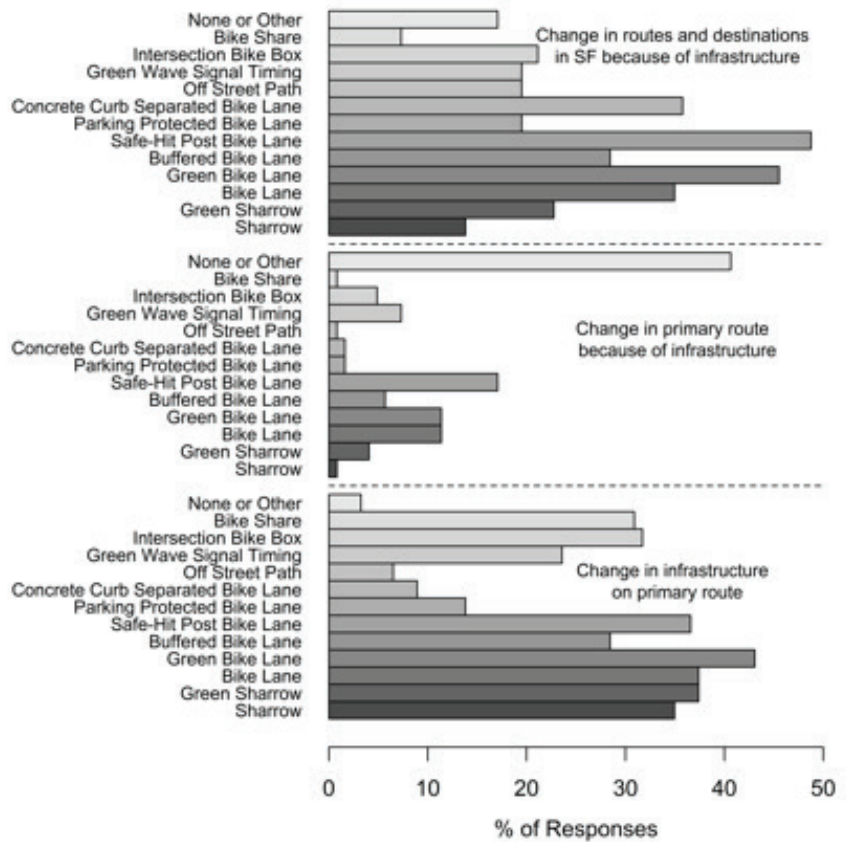


Figure 3. Survey responses about infrastructure installation and change of routes. Top section indicates route change in general, middle section indicates route change of primary route, and bottom section indicates if infrastructure was installed on an existing route.

**Further Reading**

This policy brief is drawn from the “Bicyclist Behavior in San Francisco: A Before-and-After Study of the Impact of Infrastructure Investments” research report prepared for the California Department of Transportation by Dillon Fitch, Calvin Thigpen, Antonio Cruz, and Susan Handy with the Institute of Transportation Studies at the University of California, Davis. The full research report can be found here: <https://ncst.ucdavis.edu/project/ucd-ct-to-012/>

<sup>1</sup>Pucher, J., Buehler, R., Seinen, M., 2011. Bicycling renaissance in North America? An update and re-appraisal of cycling trends and policies. *Transp. Res. Part A Policy Pract.* 45, 451–475.

<sup>2</sup>San Francisco Municipal Transportation Agency, 2012. 2012 San Francisco State of Cycling Report. San Francisco, CA.

<sup>3</sup>Charlton, B., Sall, E., Schwartz, M., Hood, J., 2011. Bicycle Route Choice Data Collection using GPS-Enabled Smartphones. In: *Transportation Research Board 90th Annual Meeting.*

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