Impacts of bicycle networks on bicycle traffic over time in US cities

Abdirashid Dahir[1], Daniel Harrington[1,2], Seyed Sajjad Abdollahpour[3], Steven Hankey[3], Huyen T. K. Le[1]*

[1] Department of Geography, The Ohio State University

[2] Bureau of Transportation Statistics

[3] School of Public and International Affairs, Virginia Tech

*Corresponding author: Huyen T. K. Le, le.253@osu.edu. Phone: +1 (614) 292-2764. Address: 1110 Derby Hall, 154 N Oval Mall, Columbus, OH 43210, USA

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Abstract

Previous studies have shown that while cycling has increased in the US, little is known of whether the existing bicycle infrastructure and bikeable urban street networks have induced bicycling demand, and by how much. Using bicycle network data and repeated counts of bicycle traffic from 2004 through 2016, we investigated the impacts of multiple bicycle facility types and bikeable network characteristics on within-city changes in bicycle traffic over time in 12 US cities. Our results suggest that closeness centrality was negatively associated with bicycling at segments (5 cities) and intersections (6 cities) while betweenness centrality showed null results. We also found that investment in off-street and minor bicycle facilities has largely contributed to higher bicycling uptake in 9 and 6 cities respectively while on-street bicycle infrastructure exhibited no statistically significant impact on bicycling over the study period. Findings from our study could help policymakers and urban planners evaluate existing bicycle networks and design well-connected city-wide bicycle networks.

Keywords: cycling, bicycle network, traffic monitoring, network analysis, longitudinal analysis