Reviewer's report

Title: Impact of transportation infrastructure on bicycling safety

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Reviewer: Anne Lusk

Reviewer's report:

1) Major Compulsory Revisions (the author must respond to these before a decision on publication can be reached.)

The title of the article, “Impact of transportation infrastructure on bicycling safety,” is broad and the framework of making bicycling safer and increasing rates of bicycling to improve health extremely inclusive. The relevant papers investigated transportation infrastructure and a metric of bicyclist safety. Articles are from research conducted in Europe and non-European countries. The transportation infrastructure is reviewed based on two categories – straightaways and intersections. For straightaways, roads, lanes, and paths were included from North America with one conducted in Europe on lighting. The roundabouts studies were conducted, except for one study, on European facilities. The conclusion suggested improvements to bicycling-related infrastructure in North America could reduce injuries and that evidence is beginning to accumulate for guidelines to be adopted for cyclists’ safety. This text would suggest that all of the bicycle facility designs available in North America and Europe would have been included in the review.

Though transportation infrastructure and safety is the framework, the authors state that they included no studies on bicycle “tracks.” This exclusion is further revealed in Table 1 under the definitions of the facilities. Here, an asterisk indicates that cycle tracks (called bicycle tracks in the article) are not included in this review. Based on the above information, the safety, popularity, and rate of construction of cycle tracks in Europe, and that the paths on roundabouts in Europe are indeed barrier-separated bicycle-exclusive cycle tracks, this omission should be corrected for the review on straightaways. Cycle tracks on straightaways should be included, in particular, because cycle tracks would then connect to the cycle tracks discussed as safer on the European roundabouts. Also, if only straightaways are described in studies in the U.S. and the lack of safety in North America is compared to the higher safety in bicycling in Europe, then the bicycle facilities which are so much safer in Europe should be included in the review. This section states, “If cycling is safer in European cities, it can be made safer in North America.” Therefore, the safest facilities in Europe should be included and studied as a network of connected straightaways and roundabouts.

In more detail, the authors should try to be consistent with all of the names for bicycle facilities. In the abstract, a roundabout was said to be safer if a separated bike path is included. In the U.S., a separated bike path would be a shared-use
path whereas for the articles from Europe, this path is a cycle track and bicycle-exclusive. Marked bicycle lanes are referenced and yet, in the U.S., these can be painted extremely close to parallel parked cars, and thus make the rider vulnerable to being doored, or they can be painted adjacent to a curb cut for a sidewalk in a less vulnerable location in relation to car doors. The authors are correct in that much U.S. safety emphasis has been placed on helmet wearing while, in contrast, the Dutch and Danes provide safer bicycle-exclusive facilities and the Dutch and Danes do not wear helmets. John Pucher’s research is discussed but Pucher and colleagues also included cycle tracks in their discussions. In the conclusion, the authors suggest that purpose-built bicycle-only facilities (e.g., bike lanes and paved off-road paths) reduce risk but in only a very few instances are there bicycle-only facilities in the U.S. A bicycle lane is shared with cars, trucks, and buses while a paved off-road path is shared with dog walkers, joggers, and baby carriage pushers. In Europe, these paths, called cycle tracks or green cycle tracks if they pass through park lands, are bicycle-exclusive and a parallel path or sidewalk is available for the other users including pedestrians.

The Ridership and Safety section starts to describe the safety differences between North American and Europe without mentioning that it is extremely difficult to build the European bicycle facilities in the U.S. That is why there are no studies on cycle tracks in the U.S. The American Association of State Highway and Transportation Officials “Guide for the Development of Bicycle Facilities” does not include any guidance for cycle tracks and lists 9 reasons why sidepaths are discouraged from being built. In contrast, the Quebec design guidelines include cycle tracks. Because cycle tracks exist in Toronto and Vancouver, it is assumed that cycle tracks are also in other Canadian design guidelines. In sum, the U.S. has extremely few cycle tracks but it does have bike lanes beside parallel parked cars or beside curbs. The U.S. also has shared-use paths. Canada has the same bicycle facilities but it also has cycle tracks though not as extensive a network system as in the Netherlands and Denmark. Roundabouts with separated bicycle facilities (really cycle tracks) are suggested as safer but North America would want to have cycle tracks leading to these roundabout cycle tracks and not road facilities or share-use paths leading to these roundabout cycle tracks. If on-road facilities lead to the roundabout cycle tracks, only on-road users would be on the roundabout cycle tracks. Safe bicycling facilities need to have a network of the same types of facilities to increase ride share in under-served bicycling populations (women, children, seniors). If safety is the focus of this article on infrastructure, articles on cycle tracks should be discussed and in detail.

This is a highly contributory article which is extremely valuable for addressing safety but also obesity, global warming, and pollution. This article needs to be published and the suggested inclusions and changes are manageable in a short amount of time. The suggestions are offered to ensure that North America, and other countries, are able to build networks of bicycle facilities on which all populations can safely bicycle, as in the Netherlands, Denmark, and certain cities in Germany. It is imperative that this article be published but also be clear on the
definitions of facilities and inclusive of the range of facilities if bicycling is to be made safer in North America.

2) Minor Essential Revisions (The author can be trusted to make these. For example, missing labels on figures, the wrong use of a term, spelling mistakes.)

The authors state that bicycle facilities need to be clearly defined. In the article, every effort should be made to also use exactly the correct terms.

A) In the description of separated bicycle paths at roundabouts, because these were based on European articles, these paths would be barrier-separated bicycle-exclusive cycle tracks. In the U.S., a separated bicycle path is shared with pedestrians, dog walkers, joggers, baby-carriage pushers, and in-line skaters.

B) The bicycle track under definitions needs to have added to the definition the clarification that a bicycle or cycle track is also “bicycle exclusive.” This is what distinguishes a cycle track from a separated bicycle path.

C) The straightaway list should include roads, lanes, paths, and cycle tracks.

D) The definition of bike lanes should differentiate between the two types of on-road bicycle lanes. Both are painted with no separation between cars (can double park) but some are beside parallel parked cars (can be doored) while others are beside sidewalk curbs with no parallel parked cars (can’t be doored but can find cars double parked in the bike lane).

E) The bicycle infrastructure studied in Europe on roundabouts would mean the bicycle component is a barrier-separated and bicycle-exclusive cycle track and not a separated bike path.

Discretionary Revisions (These recommendations for improvement which the author can choose to ignore. For example clarifications, data that would be useful but not essential.)

None.

Level of interest: An exceptional article

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests.