

Perceived Safety and Willingness to Use Bicycle Infrastructure in the Southern United States

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1 INTRODUCTION

Non-motorized travel modes are experiencing a resurgence in many areas of the United States and of the world. This mode of transport has many benefits that communities are trying to leverage [1]. With this resurgence, it is important to understand the safety of the mode, in terms of actual safety (measured by number of collisions or fatalities) and the perceived safety (measured through study of current and potential users). As cycling is still considered a fringe mode, there is a scarcity of data on actual safety, given that the only observations possible are those of existing users. Measuring perceived safety provides the opportunity to assess how the attributes affecting safety can influence the decision to bike as well as identify discontinuities between actual and perceived safety in cycling.

Most studies that have explored these topics have usually focused on regions where cycling is already a well-established travel option, such as the Netherlands and some other regions of Europe, or specific communities in the western U.S. states, such as California. As a result, there is little known about the concerns of potential cyclists who do not presently bike, possibly due to perceived lack of safety due to the absence of appropriate infrastructure. This is especially the case in those communities where cycling culture is not well established yet, as in small and medium-sized communities of the Southeastern United States.

2 PROJECT OVERVIEW

The methodology of this research includes focus groups held in three communities with planned bicycle infrastructure improvements, and a survey deployed to residents of those same three communities, plus three additional “control” communities (where no bike infrastructure is planned). Focus groups can provide important insights into attitudes, perceptions, and factors that might prompt changes in behavior. Variations in attitudes and behavior between rural and urban settings can be difficult to understand without the anecdotal and descriptive information obtained through these discussions. The focus groups were held in three study areas: Opelika, AL, Anniston, AL, and Chattanooga, TN. All three of these locations had significant bicycle infrastructure additions planned shortly following the focus groups. A survey was designed based on the results of the focus groups to perform a quantitative study that all for more rigorous statistical analysis. To accommodate a quasi-experimental survey design, three control locations were also sampled: Northport, AL,

Talladega, AL, and Birmingham, AL. One year after the first survey (and after the opening of the treatment infrastructure), an after survey will be administered to these six locations to test if opinions about bicycle infrastructure and measure of perceived safety have changed in the locations where infrastructure has been constructed.

In summary, participants in the focus groups clarified many issues related to perceived safety and personal comfort in using various types of infrastructure. Not surprisingly, the types of infrastructure that allowed for increased separation from potential hazards and through car traffic were perceived as safer among cyclists. Participants expressed a perceived lack of safety with facilities that are adjacent to parking, though the addition of barrier protection was the most effective way to mitigate the issue. Preliminary results from the survey data indicate that there is a sizable sample of potential and occasional cyclists in these communities. The analysis of the survey data (to be completed in time for the conference) will shed light on the perceived safety and willingness to cycle of these participants.

3 FOCUS GROUPS

The focus groups were conducted in April 2016. Participants were prompted to share background involving their experience as a cyclist and how they view the bikeability of their community. Respondents were also asked to share their thoughts on things that make them feel comfortable when biking. A major portion of the focus groups was dedicated to gauging responses to specific types of infrastructure. Images of various infrastructure types were created in Adobe Photoshop and presented to respondents. One common roadway setting was chosen as a base image to control for urban environment, weather, and other contextual variables. Variations were made based on different types of bicycle infrastructure, the presence or absence of on-street parking, and the number of vehicular lanes.

The types of bicycle infrastructure shown were sharrows, bike lanes, buffered bike lanes, and protected bike lanes. Each infrastructure treatment was shown for four roadway sections: two-lane, two-lane with parking, four-lane, and four-lane with parking. A shared use path was also shown, though the nature of this infrastructure required a separate built environment. Respondents were invited to indicate their comfort level in riding in each of the presented environments, and to express their concerns about each scenario.

In general, participants felt more comfortable biking on infrastructure types separated from both parked and moving cars. Barrier or buffer separated bike lanes with no curb parking were rated as most comfortable, followed by bike lanes with no curb parking. The presence of parking was one of the biggest deterrents to participants. Concerns about bicycling with on-street parking came from the threat of doors opening and cars pulling through the cyclists' space. Bicycle lanes between travel lanes and parking lanes made participants feel unsafe, even with buffers. The effects virtually negated the expressed positives of increased separation.

Many concerns about perceived safety rooted from driver expectations, and that drivers wouldn't know how to navigate the infrastructure. Many situations made respondents feel there was very little keeping drivers in check. Participants also noted that when they have seen such infrastructure interventions in their communities there was ample misuse of bike infrastructure through either lack of education or willful rebellion. Such observations included vehicles accessing protected bike lanes at curb-cuts and driving in buffers or bike lanes. Participants also felt that drivers in the South were more aggressive than in other areas, engaging in behavior that cyclists perceived as dangerous, such as speeding and improper passing.

The findings from the focus groups provide qualitative information about the concerns current and potential cyclists have about cycling in the Southeastern United States. Protection from moving vehicle collisions and

adjacent parked cars was a major factor in potential cyclists' willingness to use infrastructure, with substantial concern about unsafe driver behavior. Participants expressed both greater perceived safety and greater willingness to use infrastructure with a higher degree of separation, with even basic bike lanes providing reassurance given they were not adjacent to car parking.

4 SURVEY DESIGN AND DATA

A quasi-experimental approach was designed for implementation of the survey instrument. A sample of roughly 4000 was drawn from each of the three study areas composed of residents nearby planned bicycle infrastructure improvements and three control sites. From the sample of nearly 24,000 recipients there were 1,221 respondents. The survey was 12 pages in length, and consisted of questions about attitudes, technology use, daily travel, and bicycling experience. Respondents were also presented with a series of images similar to those presented in the focus groups. They were then given the opportunity to express their perceived safety and willingness to use each infrastructure configuration. The responses to these questions provide the stated preference data needed to model the comparative effect of each infrastructure element on perceived safety for cyclists. The reporting of mode choice for work and other uses allows for an additional analysis on revealed preferences.

Roughly half of respondents reported having at least one bicycle in their household, with 11% reporting biking for utilitarian purposes on at least a monthly basis. Additionally, nearly 20% reported cycling for recreation to some degree. However, only 1% of respondents reported daily utilitarian cycling. The discrepancy between the numbers of casual and regular cyclists provides a sizable portion of the sample that is already accustomed to cycling, but does not bike on a regular basis. Current analysis focuses on this group and the role perceived safety plays in why these individuals choose not to cycle regularly.

5 CURRENT ANALYSIS

The research described is part of an ongoing project. Data collection was completed over the last several months, with further data analysis currently underway (to be finished by the time of the conference). The data recorded from respondents' ratings of images of each scenario in terms of safety, comfort, and willingness to use is currently being used to study perceived safety among the potential cyclist group. By the time of the conference, results will be available for presentation on several key concepts: relative preferences of current and potential cyclists for different types of facilities, variation of such preferences due to individual characteristics, and relative effectiveness of different types of bicycle facilities for attracting new users in different environments. Additionally, the qualitative findings of the focus groups are being tested in a more rigorous quantitative fashion; results will be presented on the relative influence of infrastructure type, on-street parking, and number of vehicular lanes on perceived safety.

Models are being estimated that will segment these casual cyclists and evaluate the relative effects of individual design components on their perceived safety. The correlations between perceived safety, comfort, and individuals' willingness to use infrastructure will be presented, controlling for variables in a rich database of other potential barriers to cycling, such as age, bicycling experience, work, and a myriad of attitudinal variables. It is anticipated that this analysis will provide leading-edge estimates for factors influencing perceived safety and barriers to cycling for this target group as well as for the greater population.

REFERENCES

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