PERCEIVED SAFETY AND SEPARATED BIKE LANES IN THE MIDWEST: RESULTS FROM A ROADWAY DESIGN SURVEY IN MICHIGAN

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Background

Knowing cyclists' roadway design preferences is critical to encouraging more cycling, but research has not always examined these preferences in a nuanced way. For example, a person may prefer the most direct route when commuting, but may prioritize roads with low-stress bicycle facilities when riding with children. Furthermore, given the needs of practitioners to plan for all modes, it is important to understand how motorists' comfort levels for sharing the road with bicyclists change depending on roadway design. However, few studies have examined drivers' design preferences.

This research strengthens our knowledge about drivers' roadway design preferences and contributes to a nuanced understanding of bicyclists' design preferences, providing particular insight into how they differ when bicycling by oneself versus with children.

Methodology

This survey was conducted in the fall of 2016 for the Michigan Department of Transportation as part of an effort to provide guidance for building sidepaths. It was modeled after the NCHRP 08-102: Bicyclist Facility Preferences and Effects on Increasing Bicycle Trips survey where feasible, and was distributed online and on paper in English and Spanish using an address-based sample. The survey asked respondents about opinions and experience driving and bicycling in general, level of comfort while bicycling and driving on seven different roadway designs, and demographics. The final sample contained 351 respondents, resulting in a 4.9% response rate.

ROADWAY DESIGNS

Bike lane on a two-lane roadway



Bi-directional separated bike lane on a four-lane roadway



Bike lane on a four-lane roadway



Separated bike lane on a four-lane



No bicycle facility on a four-lane roadway



Buffered bike lane on a four-lane roadway



Sidepath adjacent to a four-lane roadway



RESPONDENT CYCLIST TYPOLOGY

- Frequent cyclist (n=116): Bicycles at least once a week for any purpose (transportation, recreation, or exercise), and is not "absolutely limited" by not having a bike or not knowing how to ride a bike.
- Occasional cyclist (n=83): Bicycles at least once a month (but less than once a week) for any purpose, or bikes at least once a week but is also "absolutely limited" by not having a bike or not knowing how to bike.
- Rare cyclist (n=93): Bicycles occasionally, but less than once a month for any purpose.
- Never cyclist (n=54): Never bicycles for any purpose; or did not indicate bicycling frequency, but is either "absolutely limited" by not knowing how to ride a bike or not owning a bike, or "cannot bike at all".
- Five respondents remained unclassified due to insufficient information.

Findings

Demographic Characteristics of Survey Participants and Michigan Residents

Demographic Characteristics	Never Cyclists (n=54)	Rare Cyclists (n = 93)	Occasional Cyclists (n = 83)*	Frequent Cyclists (n = 116)	Total (n = 351) ¹	Michigan ²
Age						
18-24	4%	3%	0%	1%	2%	10%
25-34	7%	22%	17%	14%	15%	12%
35-44	11%	12%	24%	19%	17%	12%
45-54	20%	23%	23%	22%	23%	14%
55-64	22%	22%	23%	24%	23%	14%
65+	33%	17%	12%	19%	18%	15%
Unknown	2%	2%	1%	2%	2%	N/A
		Kruska	l Wallis significant (p	o < 0.05)		
Sex						
Male	52%	46%	60%	68%	58%	49%
Female	46%	52%	37%	31%	41%	51%
		Kruska	l Wallis significant (p	o < 0.05)		
Race/Ethnicity						
White or Caucasian (only)	85%	81%	83%	83%	83%	76%
Black or African American (only)	4%	1%	5%	3%	3%	14%
Hispanic or Latino	2%	2%	4%	1%	2%	5%
Unknown	7%	10%	5%	10%	9%	N/A
	Kruskal Wallis not significant					
Children < 16 in Household	k					
At least one	15%	27%	40%	23%	27%	30 % ³
Unknown	0%	0%	1%	3%	2%	N/A
		Kruska	l Wallis significant (p	0 < 0.01)		

¹ Total includes five respondents unable to be classified in the cyclist typology.

² American Community Survey 2011-2016, Five Year Estimates.

^{3} Data for Michigan is based on the number of children in a household under age 18, not age 16.





Strength of Barriers to Biking to Work/School







Safety while bicycling is a key issue, along with weather and distance

facilities are



Limitations

This study's sample was mostly White/Caucasian, so care should be taken when extending these conclusions to other races and ethnicities. Also, as with all surveys, there may be some bias because people are more likely to respond when interested in a subject. In addition, the seven roadway designs did not represent the universe of designs available; some respondents may have preferred other designs more or less than the ones discussed in this survey. Finally, it cannot be guaranteed that all respondents held the same definition of "comfort" or "limit" when answering the survey questions.

Conclusion

These findings corroborate past research, clarify the impact of bicycling with children on roadway design preferences, and suggest that perceived safety as a barrier to bicycling can be addressed through infrastructure. In particular:

- The findings show an overwhelming preference for more bicycle accommodations, and particularly for more separated facilities.
- Most respondents felt considerably more comfortable and were more willing to try bicycling on a roadway with any bike facility over one with no facility; this comfort was most strongly associated with physical separation from cars.
- The strong preference for greater separation was consistent between bicyclists and drivers, and was most pronounced (p<0.001) when considering bicycling with children.
- Preferences for separation were strongly associated with perceived safety as a barrier for all groups, but particularly for non-transport cyclists.

Future research examining how bicycling comfort changes after separated facilities have been installed and used will help clarify their impact on the willingness to bicycle and their potential to help address perceived safety as a barrier to bicycling.