

Drivers' attitudes and behaviors toward bicyclists: Stereotypes, normative beliefs, and the role of personal experience

Tara Goddard*

*PhD candidate, Urban Studies
Portland State University
PO Box 751-USP, Portland, OR 97207, USA
email: goddard@pdx.edu

Keywords: driver attitudes, driver behavior, bicyclist stereotypes

1 INTRODUCTION

Although overall traffic deaths in the United States have declined since the 1970s, car crashes remain a leading cause of death. Vulnerable road users (VRUs) like bicyclists and pedestrians continue to be injured or killed at rates that outpace their mode share or miles traveled. In the United States, bicyclists are twelve times more likely to be killed in a traffic crash than car occupants. Planners, engineers, and advocates are increasingly adopting Vision Zero approaches, and the US DOT's Mayors' Challenge for Safer People and Safer Streets calls on cities to adopt Complete Streets approaches and better understand the underlying causes of dangerous roadway interactions. However, existing research into crash causation has focused on instrumental factors (e.g. intersection type, vehicle speed) but little research has probed the role of attitudes or socio-cognitive mechanisms in interactions between roadway users (Musselwhite et al., 2010). Drivers' attitudes toward bicyclists, and how those attitudes may affect drivers' behavior, are a largely unexplored area of research, particularly in the United States.

Bringing together social psychological theories with existing survey techniques for measuring driver attitudes, this study examined drivers' attitudes toward bicyclists. An Implicit Association Test (IAT) was used to test for implicit bias between drivers and bicyclists, and to compare drivers' implicit attitude with their self-reported attitudes toward themselves as a driver, toward other drivers, and toward bicyclists.

2 METHODOLOGY

The online survey was conducted in May and June 2016 and hosted by Project Implicit. Project Implicit is a non-profit organization and international collaboration between researchers interested in implicit social cognition, that is, thoughts and feelings outside of conscious awareness and control. Researchers have used implicit methods to examine bias in domains as varied as racism, healthcare, hiring, women in STEM, ageism, and politics. In transportation, implicit methods have not yet enjoyed widespread use. However, a study out of MIT found that implicit methods measured additional biases toward bus use not captured by explicit survey measures (Moody, Goulet Langlois, Alexander, Campbell, & Zhao, 2016).

This study is the first use of a similar implicit method to examine transportation biases between drivers and bicyclists. Following the IAT, respondents completed a survey that included measures of drivers' attitudes toward their own driving behavior, other drivers, and bicyclists. The attitudinal measures included both global stereotypes of bicyclists and potential sub-groups (e.g. the "avid cyclist") and whether drivers' differentiated between bicyclists based on appearance. The survey also asked drivers to report their safety-related knowledge and behaviors around bicyclists, and to report crashes or near-misses involving bicyclists. The IAT portion of the

survey examined whether people demonstrate implicit biases toward bicyclists, and whether those implicit attitudes were consistent with their explicit (i.e. self-reported) attitudes.

The final survey sample included 676 respondents from across the United States. The sample include 449 women (mean age: 40.9 years) and 227 men (mean age 42.6 years). Respondents were mostly experienced, frequent drivers: seventy-five percent had been driving for ten or more years, and seventy-three percent drive 6-7 days/week. Two-thirds (65%) of the households did not have children, while almost one-third (28%) had 1-2 children in the household. The majority was middle-income and had at least a 4-year college degree.

3 RESULTS

3.1 Factor analysis

To examine whether the variables were correlated and whether they could be reduced to factors, an exploratory factor analysis was conducted using Principal Components Analysis with a Varimax rotation. The rotation was chosen for ease of interpretation. Factor loadings below 0.4 were suppressed. Through this analysis, the items were reduced to four factors that explained 54 percent of the total variance (Table 1). The driver identity, system justification, and social dominance factors emerged as expected, with a fourth factor that was named “legitimacy” due to its composition of the two items measuring drivers’ agreement that bicyclists need to be licensed, registered, and pay taxes to be legitimate roadway users like drivers.

Table 1. Factors for identity and attitudes

Factor	Statement	Loading*
Driver identity	I am a skilled driver	0.769
	Being a driver is important part of who I am	0.722
	I care if my family and friends think of me as a good driver	0.710
System justification	Building infrastructure for bicyclists is not a good investment of public funds	0.759
	I do not see bicyclist similar to me on city streets	0.595
	Bicyclists should not be allowed to filter forward through lanes of slow or stopped car traffic	0.529
	If a driver and a bicyclist collide, it is usually not the fault of the driver	0.406
Social dominance	It makes me angry if I see bicyclists breaking the rules of the road	0.689
	Bicyclists shouldn't hold up traffic	0.669
	It makes me angry if I see other drivers breaking the rules of the road	0.628
Legitimacy	Bicyclists should have to pass a license test just like drivers do	0.823
	Bicyclists should have to register and pay taxes	0.795

*Represents measure of association (i.e. correlation) of each statement with its factor

3.2 Association of Implicit Association Test score and explicit attitudes

One primary objective of this study was to determine whether a) it is possible to measure respondents’ implicit preference between drivers and bicyclists, and b) how an implicit measure of preference is related to explicit attitude measures. For the entire sample, the IAT scores neared a normal distribution. The IAT score were significantly correlated with all four of the factors, although correlations were small, ranging from 0.098 to 0.191. All associations were, however, in the hypothesized direction, with a preference for drivers over bicyclists positively correlated with stronger anti-bicyclist attitudes. The significant but small correlations with the explicit measures indicated that the IAT is measuring implicit preference and is not just random, and that implicit attitude is related but distinct from the explicit measures (Nosek, Greenwald, & Banaji, 2005).

This work is licensed under the Creative Commons Attribution 4.0 Unported License. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>.

Additional results to be presented yielded information about the dimensions of drivers' attitudes toward bicyclists, including legitimacy as a fellow roadway user, stereotypes about different sub-types of bicyclists, normative beliefs about roadway behavior, and sub-conscious preferences for drivers versus bicyclists. Respondents identified more strongly as drivers than expected, but demonstrated more support for public investment in bicycle infrastructure than anecdotal data would suggest. Encouragingly, one of the biggest predictors of more positive attitudes toward bicyclists was not demographics, but weekly driving frequency, weekly bicycling frequency, and whether respondents had bicycled as a child. Respondents did differentiate different sub-types of bicyclists and attributed disparate motivations and expected behaviors based on bicyclist sub-type.

4 CONCLUSIONS

The inclusion of social psychology in travel behaviour research has largely focused on how social cognitions, particularly attitudes, affect mode choice (Van Acker, Van Wee, & Witlox, 2010) and driving safety. The role of attitudes in interactions between roadway users, however, is relatively rare in existing research, but may help explain the interpersonal interactions between users of different modes. Attitudes have subconscious components that are subject to bias when measured with traditional transportation survey self-report methods. Bringing together social psychological theories with existing techniques for measuring driver attitudes, this study examined drivers' attitudes toward bicyclists.

As fits with theories of social identity, social dominance, and system justification, respondents held related beliefs about who is a legitimate roadway user and how people should behave in the roadway. Additionally, the implicit method appeared to be measuring a distinct but related attitude construct. This study provides evidence that implicit methods, which are widely used in psychology but have not enjoyed widespread use in transportation, deserve consideration by travel behavior researchers. The full research effort represents the most comprehensive exploration to date of United States drivers' attitudes and self-report behaviors toward bicyclists. These attitudes toward bicyclists, and their relationship with self-reported safety-related behaviors, suggest potential educational, legal, programmatic, and infrastructural interventions to improve bicyclist safety.

REFERENCES

- [1] Moody, J., Goulet Langlois, G., Alexander, L., Campbell, J., & Zhao, J. (2016). Measuring Explicit and Implicit Social Status Bias in Car vs. Bus Mode Choice.
- [2] Musselwhite, C., Avineri, E., Susilo, Y., Fulcher, E., Bhattachary, D., Hunter, A., ... Hunter, A. (2010, September). Understanding public attitudes to road user safety: final report. Road safety research report no. 111 [Report or Working Paper]. Retrieved April 9, 2015, from <http://www.dft.gov.uk/pgr/roadsafety/research/rsrr/theme5/researchreport111/>
- [3] Nosek, B. A., Greenwald, A. G., & Banaji, M. R. (2005). Understanding and Using the Implicit Association Test: II. Method Variables and Construct Validity. *Personality and Social Psychology Bulletin*, *31*(2), 166–180. <https://doi.org/10.1177/0146167204271418>
- [4] Van Acker, V., Van Wee, B., & Witlox, F. (2010). When Transport Geography Meets Social Psychology: Toward a Conceptual Model of Travel Behaviour. *Transport Reviews*, *30*(2), 219–240. <https://doi.org/10.1080/01441640902943453>