



ELSEVIER

Contents lists available at ScienceDirect

Transportation Research Part F

journal homepage: www.elsevier.com/locate/trf

Motivating and deterring factors for two common traffic-rule violations of cyclists in Germany

Anja Katharina Huemer

Traffic & Engineering Psychology, Technische Universität Braunschweig, Gaußstraße 23, 38106 Braunschweig, Germany



ARTICLE INFO

Article history:

Received 12 July 2016

Received in revised form 8 February 2018

Accepted 10 February 2018

Keywords:

Cycling safety

Rule violations

Cycling on forbidden paths

Cycling without light

Deterrence theory

Theory of planned behavior

ABSTRACT

Cyclists have a rather high risk of being injured in traffic accidents compared to motor vehicle occupants. Contributing factors leading to these crashes still need to be properly understood.

Two online surveys were conducted concerning reasons, motives and likelihood for two common violations: riding on the wrong path ($N = 198$) and cycling without light in the dark ($N = 755$). Motivations for the infringements were examined by multiple linear regression models, including variables derived from the theory of planned behavior (Ajzen, 1991) and deterrence factors as predictors of the intention to infringe.

Results show that reported motives for the violations differ. For cycling on the wrong cycling path, 55% of variance could be explained. The most influential motive was a positive attitude towards the infringement. Twenty-nine percent of variance could be explained by the model for cycling without light in the dark. Subjective norms and assumed deterrence factors were found to have very little influence on intended violations in both surveys. Participants' rule-knowledge was found to be generally low. Participants reported perceived regulative discrimination and technical hurdles to hinder rule-compliant behavior. Overall, the findings suggest that a more comprehensive, educational approach is required to manage cyclists' behavior.

© 2018 Elsevier Ltd. All rights reserved.

1. Introduction

1.1. Cycling in Germany

About 80% of all German households possess at least one bicycle (Schreck, 2016). Modal split of cycling is about 10% wherein 90% of cycling trips are shorter than 5 km (Lenz et al., 2010). The federal government aims to significantly boost cycling modal share (Nationaler Radverkehrsplan 2020) and also aims to reduce road fatalities by 40% in 2020 compared to 2011 (Verkehrssicherheitsprogramm, 2011). At the moment, about 11% of all fatalities in German traffic are cyclists (Schreck, 2016; Statistisches Bundesamt, 2016).

Urban cycling in Germany for the most part takes place on special infrastructure, such as cycling paths adjacent to pedestrians' paths. This infrastructure is generally found on the side of the streets and separated from the driving lane by parking lots and/or secondary green areas. On those cycling paths, it is generally only allowed to cycle on the right side of the road (Straßenverkehrs-Ordnung; StVO, 2013). Legally opening left cycle paths is only allowed after rigorous examination (Allgemeine Verwaltungsvorschrift zur Straßenverkehrs-Ordnung, VwV-StVO, 2015). Bicycles used in traffic need to have

E-mail address: a.huemer@tu-braunschweig.de

<https://doi.org/10.1016/j.trf.2018.02.012>

1369-8478/© 2018 Elsevier Ltd. All rights reserved.

functioning lights at the front and the back of the bicycle. These lights can be powered by batteries or by a dynamo (Straßenverkehrs-Zulassungs-Ordnung, *StVZO*, 2012).

While cyclists report to seldom use wrong paths, and even less often to put themselves at risk deliberately, even their own reports on fines show a different picture (Von Below, 2016). In Von Below's (2016) survey, a representative sample of German cyclists (N = 2158), 23.6% of cyclists reported to have been fined by the police within the last two to three years. Of those, 26.9% were fined for cycling on the left cycle path and 18.5% for cycling without light in the dark. Reported reprimands were found more often in younger participants (15–34 years) with about 35% reporting reprimands than in older participants (≥ 35 years) with about 20% and less reporting reprimands.

Observational data also regularly finds rule violations: A recent naturalistic cycling study in Chemnitz, Germany, showed that in accident-free cycling, 17.1% of cyclists did not stop at red traffic lights (Schleinitz, 2016). Alrutz and colleagues (Alrutz, Bohle, & Busek, 2015; Alrutz et al., 2009, 2015) who have been investigating cycling paths in Germany for several decades, find about 15% of cyclists cycling on the left side of the road even though this is not allowed. Initial observations in the city of Braunschweig revealed more than half of the observed cyclists engaging in some kind of rule violation: about one fifth of cyclists cycled on a left cycle path where it is not allowed, 46% were found to cycle without sufficient light at nights, and another 10% were found to run red traffic lights (Huemer, Buttersack, Laubersheimer, & Führer, 2015).

Rule-compliance is only possible if cyclists know the regulations. A questionnaire study in Germany found a severe lack of rule-knowledge among cyclists of all age groups (Huemer & Eckhardt-Lieberam, 2016). We found that more than half of the participants did not know at least half of the regulations they were asked about. Similar results were found in Australia (Johnson, Oxley, Newstead, & Charlton, 2014).

1.2. Cyclists' accidents and rule-violations

Unfortunately, cyclists have a rather high risk of being injured in accidents compared to car drivers, internationally as well as in Germany (for the international overview, see Chaumand & Delhomme, 2013; for German data, see Schreck, 2016). In 2015, 78,506 severe cycling accidents (accidents with injuries or with regulatory offenses or crimes) happened on German roads, accounting for 0.3% of all police recorded traffic accidents in Germany. 383 cyclists (0.05% of those cyclists who had an accident) were killed, accounting for 11.1% of all persons killed in traffic accidents in Germany in 2015 (calculations based on Statistisches Bundesamt, 2016). 91% of police-reported cycling accidents happened in urban areas (Statistisches Bundesamt, 2016), therein 16% were single-bike accidents, and 72% included motorized vehicles (calculation based on Schreck, 2016). Most bicycle-car crashes in Germany occur while cars are turning at intersections, or while entering a road from a minor road/from private property. Motor vehicle drivers are found at fault in about 56% of these accidents (Schreck, 2016).

While infrastructure layout clearly contributes to cyclists' risk of being involved in an accident (see Alrutz et al., 2015; Räsänen & Summala, 1998), accident statistics also show that cyclists' rule-violations contribute to their accidents. For the 45% at least partially at-fault-cyclists in urban cycling accidents, the most commonly coded errors were (1) "cycling on the wrong path" in 17.1%, followed by (2) "cycling too fast for conditions" in 7.5%, and (3) "errors while entering fluent traffic" in 6.9% of cyclist-at-fault accidents. In police-recorded urban single-bike accidents, the leading causes are (1) "cycling too fast for conditions" in 17.0%, (2) "alcohol" in 15.9%, (3) "cycling on the wrong path" in 4.6%, and (4) "technical failures", including cycling without light in 3.6%, of these accidents (calculations based on Bundesanstalt für Straßenwesen, 2015).¹ As cyclists' violations of traffic regulations contribute to a major share of cyclists' accidents, enhancing rule compliance in cyclists may help reducing these severe accidents.

1.3. Motives for rule-violations in cyclists

For Germany, data on cyclists' motivations for rule violations are scarce. Schleinitz (2016) coded plausible motivations for the rule violations that she found in her naturalistic cycling data. For red-light running, she found that cyclists often seemed to want to avoid stopping. In cyclists turning right at red lights, changes onto the pedestrians' path, and cycling on the pedestrians' path, were found to be even more common than rule-compliant stopping. For cyclists riding on the pedestrians' path she also found efficiency (i.e. not slowing down) but also safety concerns (i.e. dense traffic on the road) to be plausible motives. For cycling on the left cycling path, shortening the cycling distance, but also insufficient infrastructure, were found to be plausible motivations.

Taken together, rule-violations in cycling are, at least in Germany, commonly found and, at least for some cyclists, as well fined. Rule violations contribute to cyclists' accidents. Studies on cyclists' motives for rule-violations are scarce, plausible motives have been deducted from observations.

¹ However, it should be noted that single bike accidents are estimated to be underreported by 89% (Von Below, 2016) in Germany. Nevertheless, it appears that most of the single bike accidents with severe injuries are recorded and that the majority of accidents missing in the statistics seem to be the ones with no or only minor injuries.

Download English Version:

<https://daneshyari.com/en/article/7257905>

Download Persian Version:

<https://daneshyari.com/article/7257905>

[Daneshyari.com](https://daneshyari.com)