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Attitude vs. infrastructure: influences on the intention to overtake cyclists

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Background: The Theory of Planned Behaviour (Ajzen, 1991) has recently gained some heightened attention in the traffic safety community in predicting risky behaviour (e.g. Demir et al., 2019, Earle et al., 2019; Jiang et al., 2019; Huemer, 2018; Murphy et al, 2020; Piazza et al., 2020). On the other hand, infrastructure layout has often been shown to influence road user behaviour in direct ways in traffic observations (Chapman & Noyce, 2014; Chuang et al., 2013; Dozza et al., 2016; Harkey & Stewart, 1997; Love et al., 2012; Morrison et al., 2019; Metha et al., 2015; Parkin & Meyers, 2010; Pulugurtha & Thakur, 2014; Shackel & Parkin; 2014; Stewart & McHale, 2014) as well as in the driving simulator (Huemer et al., 2018).
Aim: The present study had two aims: on the one hand we wanted to find out if the results obtained in real traffic an in the driving simulator can also be found with more cost-effective online studies. On the other hand, we wanted to compare influences of infrastructure layout and personal motivations with each other.
Method: In an online survey, 108 holders (81% female) of a valid car-driving licence reported on their attitude, social norms, and perceived behavioural control towards overtaking cyclists with a smaller than legal margin. Additionally, they rated their willingness to overtake a cyclist as well as perceived risk for six traffic sketches. In these sketches, infrastructure layout was systematically varied on two dimensions: (1) streets with or without a centre-line between directions of travel and (2) streets marked with either a cycling lane, a safety path for cyclists or none of these.
Results: A repeated measures ANOVA with centre line and cycling street markings as independent variables and attitude, social norms, and perceived behavioural control as covariates showed that intention to overtake was only influenced by street markings ($F1; 104 = 16.474; p > .001; \eta 2 = .071$) and the interaction of attitude and street markings ($F1; 104 = 4.269; p = .041; \eta 2 = .018$), showing that intention to overtake was higher with markings than without, and even higher when attitude towards illegally small distances to overtake was more positive. Ratings of risk while overtaking were only influenced by street markings ($F1; 104 = 8.110; p = .005; \eta 2 = .037$), showing that ratings of risk were lower for any of the marked design than those without.
Conclusions: While explained variance was generally low, as well as effect sizes for the interaction effect as well as the effect on risk ratings, the effect of street markings on overtaking intention was at least medium sized. Data analysis suggest that personal motivations play a far less important role in the decision to overtake cyclists with a non-safe distance than infrastructure designs do. Even the judgement of risk for a given situation seems to be influenced by some markings on the street but not by personal motivations. Concerning the first aim of the study, the feasibility for online-studies for investigating infrastructure layouts, it seems like this may be possible, but will need further exploration in different settings.