

## Drivers' gap acceptance in front of approaching bicycles – Effects of bicycle speed and bicycle type

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### ABSTRACT

The growing popularity of electric bicycles [1] gives rise to a variety of road safety questions. One of the issues is e-bikes' potential to achieve a higher speed compared to conventional bicycles. Especially for road users that are unfamiliar with that type of bicycle, underestimations of speed might be suspected which could lead drivers to accept unsafe gaps (e.g. for turning manoeuvres) in front of approaching e-bikes. But also higher speed as such might prove problematic, as previous studies have shown repeatedly that drivers tend to choose smaller time gaps in front of vehicles approaching at higher speed [2,3]. Forty-two drivers (two age groups) were recruited to investigate their gap acceptance behaviour on a test track. Participants were seated in a car, waiting to enter traffic, which would have required crossing a lane on which a cyclist approached. Cyclists were approaching at speeds between 15 and 35 km/h and rode either a regular bicycle or an e-bike. Participants were instructed to press a foot pedal to indicate the last moment at which they would be willing enter to traffic in front of the bicyclist. Results show that with increasing cyclist speed, accepted time gaps became significantly shorter. At the same time, participants appeared to select shorter time gaps when the approaching bicycle was an electric one, even though the two different bicycle types could not be distinguished from the participants' position. Although we found only few accepted gap sizes that would have been especially risky, our findings indicate that the effect of bicycle speed has to be considered when discussing the consequences of an increased e-bike prevalence for road safety.

**Keywords:** road safety, e-bike, time to arrival.

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