



Editorial for Special Issue – Improving cycling safety through scientific research

Marjolein Boele-Vos & Arend L. Schwab

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EDITORIAL

Editorial for Special Issue – Improving cycling safety through scientific research

This special issue of *Traffic Injury Prevention* is dedicated to cycling safety. Twelve papers were selected from the more than 50 papers and 40 posters that were presented at the International Cycling Safety Conference on 10 and 11 October 2018 in Barcelona, Spain. It was the seventh edition of the conference, which is solely dedicated to research in cycling safety and brought together more than 150 researchers, practitioners and policymakers from all over the world. The researchers shared their latest findings and challenges on topics such as cyclist behavior, cyclist-driver interaction, road design and infrastructure, methodologies for naturalistic observation and simulation, all related to improve cycling safety. The papers in this special issue cover some of the relevant topics for cycling safety research. Hereafter follows a short introduction to these papers.

Three papers address cycling behavior. De Winter et al. executed a large scale Cycling Skill Inventory (CSI) to understand to what extent individual differences of cyclists are associated with crash involvement. They concluded that, similar to car drivers, safety motives are a predictor of self-reported crash involvement among cyclists. The main goal of the quantitative online survey of Francke et al. was to identify distinct types of cyclists and to describe them as detailed as possible. The study resulted in a multidimensional typology with four groups of cyclists; this information allows for better integration of cyclist's safety needs in planning cycling infrastructure. Meijer et al. developed a measurement method to determine objective cycling behavior parameters to be able to judge comfort and safety critical events on a bicycle path. They concluded that their method, in its current state, can be used to obtain information to change the infrastructure to improve comfort and safety of cyclists.

The next three papers deal with cycling safety of children and youngsters. Axelsson and Stigson investigated injury and crash characteristics of young Swedish cyclists (0–17 years) and evaluated the use and protective effect of bicycle helmets. Their results showed that more than 80 percent of the injury related crashes were the result of a single-bicycle crash and many occurred on trips to and from school. The AIS2+ injuries were primarily sustained to the extremities and to a lower extent to the head. Helmet use was relatively high among the younger children and less frequently used by teenagers. The proportion of head injuries increased with age, which indicates the need for actions to increase bicycle helmet use among teenagers. In the Netherlands, from age 12 onwards, cycling injuries begin rising. In their explanatory field study Twisk and Vlakveld

found that 20% of children (11–13 years) sometimes or more often take risks in traffic. Furthermore, the way in which children perceive their social environment is a strong predictor of intentional risky cycling in traffic. Childhood safety was also investigated by Hamann and Conrad. They created an inventory of youth bicycle safety programs, which resulted in a comprehensive list of program components and approaches that can be used as a basis to evaluate child bicycle education standards.

Interaction between cyclists and car drivers are the research topic in the next three papers. Impact speed is an important factor explaining injury severity of cyclists in car crashes. Isaksson-Hellman and Töreki investigated the effect of speed limit reductions in urban areas in Sweden and their results show that cyclists have, in collisions with cars, a significantly lower risk of a moderate-to-fatal injury with lower speed limits (30–40 km/h) compared to higher speed limits (50–60 km/h). Another car-to-cyclist crash analysis was done by Gohl et al., who assessed whether car drivers' behavior when turning right is more safety critical than turning left. With their newly developed multi-measure method they have found that only a small share of car drivers in their dataset would have posed an actual risk to cyclists entering the intersection from the right; these safety critical events arose for both left and right turning behavior. Schleinitz and Petzoldt investigated the effects of a unique appearance for e-bikes, showing that information about the characteristics of e-bikes together with an unique appearance can lead to more cautious driver behavior.

Finally, the last set of three papers address understanding risk factors of cycling. Eriksson et al. looked into cyclists' speed when they use the combined pedestrian and cycle paths in Sweden. It is well known that the speed of motorized vehicles is a crucial factor for road safety. However, little is known about the importance of speed in cycling safety. Therefore they analyzed cyclists' speed at combined pedestrian and cycle paths and concluded that the relationship between bicycle type and measured speed was not clear, however, their results suggest that paths with more electric and racing bicycles have higher average speeds. In a next step, with more in-depth data, they plan to investigate how speed levels and speed variance affect crash risk. E-bikers are faster than conventional bicycles and may be more prone to be in conflict with other road users and are expected to perform evasive maneuvers more often, such as braking. With naturalistic data Huertas-Leyva et al. investigated e-bikers' braking strategies during routine and unexpected conflicts. Their kinematic analysis showed that with

larger decelerations, e-bikers used combined braking more frequently than single braking. Related to sudden stops, Niska and Wenäll investigated if it was possible to simulate single bicycle crashes in a laboratory and to examine the influence of bicycle design and speed on head impact. The crash tests showed that the falling motion is different for sideways dislocation and sudden stops, with the latter causing a forceful head impact. Furthermore, the pedelec had a clearly different falling motion from the other bicycle types.

The papers in this special issue show the diversity and broad scope in cycling safety research topics. Research in cycling safety is and remains relevant because of changing mobility patterns. Nowadays, more people choose to cycle because of their health and/or environmental reasons. Also new modes of transport emerge, such as micromobility. These light electric vehicles for personal, e.g., e-scooters, shared bicycles, and professional use, e.g., cargo bicycles, share the road with cyclists. So far, little is known about their crash safety, and, in case of the cargo bicycles, how their weight influences the outcome of a crash. We expect to see more research addressing these issues in the near future. ICSC has shown to be an international forum for researchers and experts in the field of cycling safety to

exchange their knowledge and bring up new research topics or safety solutions.

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ORCID

Marjolein Boele-Vos  <http://orcid.org/0000-0001-9843-9713>

Arend L. Schwab  <http://orcid.org/0000-0001-5897-9790>

Marjolein Boele-Vos
SWOV, Institute for Road Safety Research, The Hague,
The Netherlands
 marjolein.boele@swov.nl

Arend L. Schwab
Department of Biomechanical Engineering, Delft University of
Technology, Delft, The Netherlands