

Shedding Light on the Dark-Field of Cyclists' Safety Critical Events: A Feasibility Study in Germany

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The amount of killed cyclists in European traffic was steadily increasing over the last 10 years. German accident data from 2018 reveal that at 27 percent of all traffic accidents at least one cyclist is involved. Data like this are crucial for infrastructure development. However, these numbers merely comprise cyclists' incident reports registered by the police or by hospitals. Experts assume that the dark-number of non-registered less severe incidents that do not result in hospitalizations such as near misses or safety critical events (SCE) is vastly greater. There are only few studies, which make estimates on the extent of this so-called underreporting of cyclists' incidents. Cross-cultural variations are expected. To our knowledge, there is neither an instrument nor a study that provides objective and precise information on the dark-number. Existing studies in this context mainly used questionnaires or online-surveys that are rather of subjective character and might be constrained by recall biases. Therefore, the aim of our study was to develop and evaluate an instrument that assesses SCEs objectively in a natural context. On basis of a definition for SCE, which was created upon a literature research, an observation instrument was developed. It can be used to examine situations regarding factors like number and type of involved interaction partners as well as their behavior, reasons for single-bicycle accidents or cyclists' follow-up reactions (i.e. deceleration, evasion, loss of stability). In order to evaluate the instrument, a one-week field study (5 days) was conducted in Chemnitz (Germany) in November 2019. The traffic hub locations for the observations were changed for each weekday. Cyclists passing the predefined locations were observed from 8 am to 5 pm daily. From 1202 passing cyclists, 17 cyclists could be observed having a SCE ($n_{\text{♀}} = 7$, $n_{\text{♂}} = 10$, age between 20 and 29). Typical characteristics of the observed SCE comprised cross traffic as well as overtaking manoeuvres being performed with insufficient safety margins and were mainly initiated by a car driver. As a consequence of the SCE, cyclists frequently had to brake or showed evasion manoeuvres in order not to end up in a crash. Even though SCE occurred rarely, we succeeded in assessing the objectively existing SCE using the developed instrument. However, besides rating situations as safety critical, it is also important to include cyclists' subjective sense of safety to depict SCE completely and in turn, to foster the improvement of cycle traffic safety.

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