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Naturalistic study of personal and free-floating electric scooters: profiles and behaviours

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This article is about the results of a naturalistic study aiming to understand the profiles of personal and free-floating electric scooter users, their behaviours and their risky situations. This study was conducted in France in the cities of Paris and Lyon.

The development of electric personal vehicles makes the sharing of urban layouts facilities more and more complicated. Data accidents (ONISR, 2020) show that 10 motorized personal vehicles users were killed in France in 2019. The body of research on the user of electric scooter behaviour is very small and mainly related to accident data. The principal weakness of this approach is that a number of events that are meaningful for users are omitted from accident registers: the presented study focuses on incidents and near misses.

This study is part of cognitive ergonomics which presents tools for the data collection in natural situations, i.e. situations that are not controlled by the analyst. The methodology used is based on naturalistic studies carried out on electric scooter users (Todd et al., 2019) and cyclists (Dozza et al., 2016; Huertas-Leyva et al., 2018).

41 users of electric scooters (mean age 32, 12 females and 29 males) were recruited: 17 with personal one and 24 with shared scooters. Participants were divided into two groups according to their use: occasional users were followed for 1 week and or regular users for 4 weeks each.

Three data collection methods were combined: 1) recordings of all their journeys thanks to a camera embedded on the chest with an integrated GPS sensor, 2) completion of a diary describing each trip and critical situation, and 3) an interview per week based on the diary and the video recordings to deepen with the user's behaviours.

The results show that even if the distance traveled for personal e-scooters (average of 4,1 km) is double the distance traveled by free-floating electric scooters (average of 2,1km), the trips made are relativity short for both users.

Data highlighted a couple of differences in terms of usage. Firstly, it is massively leisure trips (68,7%) for free-floating electric scooters and pendular use (70,3%) for personal vehicle. Secondly, 70,6% of personal electric scooters studied perfectly know the existing regulations regarding electric scooters, contrary to free-floating electric scooters users (18,2%). Thirdly, the safety equipment is more used among the users of personal electric scooters (47,1%) than the users of free-floating (4,5%) who consider it inappropriate for their use.

125 risky situations were collected. The typical risk scenario the most encountered by these users is « the presence of another road user on the bike pavement (obstacle) » (29,6% of all critical situations). The participants mainly consider other road users responsible for the risky situations, particularly car drivers who are involved in 33,6% of risky situations. The riskiest pavement is the bike lanes on the road (21.6%) and the shared pavement (16.8%).

The results us make it possible to report risky situations in the two cities and to compare accidents and near misses situations. These data are necessary for public policies in order to the promotion, the supervision and the design of urban layouts and facilities including e-scooters users.

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