

## Visual attention and speeds of pedestrians, cyclists, and electric scooter riders when using a shared road – a field eye tracker experiment

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### Background

To common forms of individual locomotion within the urban environment belong walking and cycling. Recently, portable and quite efficient electric scooters (e-scooters) were developed and quickly gained popularity. They frequently compete with pedestrians and cyclists for space within shared roads, which may create conflicts and cause accidents. Because both research and legislation are lagging behind the proliferation of e-scooters, there was a need to evaluate some aspects associated with their use to assure safety for all road users.

### Aim

The goal of this research was comparison of visual attention of cyclists, e-scooter users, and pedestrians travelling within the same shared space. Their interaction with other road users and speeds were analysed to understand the differences and similarities associated with each of these modes of transport during trajectory selection and manoeuvres. The knowledge of the resulting adjustment in visual perception and behaviour should bring better understanding of their specific needs.

### Method or methodological issues

Eye tracking with a wearable device was utilised to analyse visual attention of 12 young people, each of whom was given the task of following the same urban route, about 1500 m long, with these three methods of micromobility. Their observation of objects within six visual zones, assigned based on functional and not spatial parameters, were analysed. In addition, speeds and manoeuvring due to other road users were assessed. This thorough analysis was limited to a stretch of shared road that was only 50 m long, which permitted for elimination of distractions caused by side traffic.

### Results

The study has shown that average speeds of bicyclists and e-scooter riders were similar (average about 16 km/h) and their visual attention was dominated by observation of the road ahead and pedestrians (about 80% of their fixations, regardless of the speed). The same test participants while walking were moving on average at almost 6 km/h and their visual attention was divided almost equally between sides (seldom observed by riders), other pedestrians, and the road ahead. There was no indication of 'slow' and 'fast' test participants and the variations in speeds were controlled mostly by the number of other encountered road users. The number of fixations per minute was similar, regardless of the transport mode.

### Conclusions

The outcome indicated that, based on travel speeds, visual attention, and manoeuvring, e-scooters should be treated as a special kind of bicycle and subjected to the same privileges and restrictions for riders moving within shared space.