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Development and evaluation of a PC-based hazard anticipation training for cyclists

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ABSTRACT

Hazard anticipation skills are crucial for safe performance in traffic. Most hazard anticipation training programs have been developed for car drivers [1]. Traffic situations used in these programs may not be appropriate for cyclists because cyclists are subjected to specific types of hazards. In line with research evidence that hazard anticipation skills are suboptimal even in experienced road users, we aimed to develop and evaluate PC-based hazard anticipation training program for experienced adult cyclists. The first evaluation of this training program was conducted among electric bicycle users who seem to be more likely to be involved in a crash that requires treatment at an emergency department than people riding a conventional bicycle [2]. Sixty-six participants, randomly sampled into training and control groups (mean age of 58 and 57 years, respectively), completed either a PC-based training or a placebo intervention. The training intervention consisted of two modules: instructions and practice. In each module, participants saw video-clips of seven hazardous traffic situations. The screen was set to black just before a hazard developed, and participants had to choose one of the four responses to two questions: “What is the location of the hazard” and “What happens next?”. The placebo intervention consisted of the video-clips as well, but participants were asked questions about traffic rules and behaviors of other road users. Immediately after the training and placebo interventions, two video-based hazard anticipation tests were administered to the participants. During the first test participants saw video clips of hazardous intersection scenarios and were asked questions about (1) the prediction of the driver’s behavior, (2) the cyclist’s (own) slowing down behavior, and (3) perceived risk. In the second test, we measured hazard perception response time while participants watched video-clips in which hazards gradually developed. Participants were asked to press the space bar to indicate that the hazard was detected. After each video-clip, participants answered a question about how dangerous the viewed situation was. Results showed that participants assigned to the training group were more accurate in predicting what a car driver will do next in hazardous situations at intersections, and they reported more frequently that they would slow down in these situations compared to the control group. Cyclists who completed the training program outperformed cyclists in the control group regarding hazard perception response time ($t(64) = 3.028$, $d = 0.745$, $p = 0.004$). No significant differences between two groups were observed in perceived riskiness and dangerousness of the hazardous situations. Our preliminary results suggest that accuracy of predicting driver behavior at intersections as well as hazard perception response time among electric bicycle users could be improved with the developed hazard anticipation training program.

Keywords: traffic education, traffic conflict prediction, anticipation skill, electric bicycle.

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