A Comparison of the Hazard Perception Ability of Accident-involved and Accident-free Motorcycle Riders

Abstract

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Published: Accid Anal Prev. 2011 Jul;43(4):1464-71

Hazard perception is the ability to read the road and is closely related to involvement in traffic accidents. It consists of both cognitive and behavioral components. Within the cognitive component, visual attention is an important function of driving whereas driving behavior, which represents the behavioral component, can affect the hazard perception of the driver. Motorcycle riders are the most vulnerable types of road user. The primary purpose of this study was to deepen our understanding of the correlation of different subtypes of visual attention and driving violation behaviors and their effect on hazard perception between accident-free and accident-involved motorcycle riders.

Sixty-three accident-free and 46 accident-involved motorcycle riders undertook four neuropsychological tests of attention (Digit Vigilance Test, Color Trails Test-1, Color Trails Test-2, and Symbol Digit Modalities Test), filled out the Chinese Motorcycle Rider Driving Violation (CMRDV) Questionnaire, and viewed a road-user-based hazard situation with an eye-tracking system to record the response latencies to potentially dangerous traffic situations.

The results showed that both the divided and selective attention of accident-involved motorcycle riders were significantly inferior to those of accident-free motorcycle riders, and that accident-involved riders exhibited significantly higher driving violation behaviors and took longer to identify hazardous situations compared to their accident-free counterparts.

However, the results of the regression analysis showed that aggressive driving violation CMRDV score significantly predicted hazard perception and accident involvement of motorcycle riders. Given that all participants were mature and experienced motorcycle riders, the most plausible explanation for the differences between them is their driving style (influenced by an undesirable driving attitude), rather than skill deficits per se. The present study points to the importance of conceptualizing the influence of different driving behaviors so as to enrich our understanding of the role of human factors in road accidents and consequently develop effective countermeasures to prevent traffic accidents involving motorcycles.