

Increasing motorcycles attention and search conspicuity by using Alternating-Blinking Lights System (ABLS)

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Abstract

Poor conspicuity of Powered Two-Wheelers (PTW) is one of the main factors contributing to their involvement in accidents. The current study examined the influence of different rider's outfits on PTWs' detectability, and evaluated the potential of a unique Alternating-Blinking Lights System (ABLS) to increase the rider's conspicuity. This study included two experiments that examined the visual search involved in the process of scanning video clips of dynamic traffic scenes. The first experiment examined PTWs' attention conspicuity, while the second evaluated PTWs' search conspicuity. In the attention conspicuity experiment participants were not alerted to the possible presence of a PTW and were asked to report the types of vehicles that were present in each video clip. In the search conspicuity experiment the participants were asked to actively search for a PTW and report its presence or absence in each video clip. Every participant was presented with a series of 96 video clips, 48 with a PTW and 48 without (controls). The independent variables were: (i) level of ambient illumination, (ii) road type, (iii) PTW's initial distance from the viewer, and (iv) rider's outfit. The results of the attention conspicuity experiment indicated that the environmental context has a strong effect on the probability of detecting the PTW. The ABLS increased the PTWs' attention conspicuity by moderating the effects of environmental context, and was most effective at dusk and in urban environments. The results of the search experiment indicated that detection rates decreased and reaction time (RT) increased as the level of luminance decreased. RT was shortest with the ABLS across all driving environments. The ABLS increased PTWs detection rates in both experiments and mitigated the difference in detection rates between the attention and search conspicuity experiments. The results indicated that the ABLS was the most potent conspicuity treatment of the ones evaluated in this study. In conclusion, PTW conspicuity should be enhanced by incorporating aspects of both attention and search conspicuity. The riders need to take into consideration the perceptual characteristics of their riding environment, and be equipped with a conspicuity aid that is less susceptible to the changing environment and

provides the rider with a unique visual signature. In parallel, the expectancy of car drivers to the presence of PTWs should be increased.

Highlights

► Increasing PTWs' conspicuity should involve both the riders and car drivers. ► Aids to PTWs conspicuity should be less susceptible to environmental influences. ► The ABLS increased PTWs' attention and search conspicuity. ► The ABLS was less susceptible to environmental changes and to expectancy levels. ► The ABLS dramatically increased PTWs detections in all driving environments.

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Keywords

Powered Two-Wheeler (PTW); Motorcycle conspicuity; Attention conspicuity; Search conspicuity

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