

Title: INCREASING PTWS' DETECTABILITY BY USING PHI-PHENOMENON

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Abstract:

Background: The vulnerability of powered two-wheel (PTW) riders, as well as bicyclists and pedestrians, highly increases their risk of being killed when involved in road accident. The majority of the accidents involving PTWs are the result of perceptual human errors, including the failure to notice the PTW within the dynamic traffic environment, lack of drivers' attention, temporary view obstructions or low conspicuity and visibility. **Objective:** The current study evaluates the potential of a unique and novel display of two helmet-mounted lights that blink in an alternating manner to create movement illusion to increase PTWs' conspicuity and visibility. The study includes two experiments to evaluate this blinking light system (BLS): in the first experiment we evaluate whether the conspicuity of PTWs to un-alerted viewers is increased by the BLS. In the second experiment we evaluate BLS' effects on the PTW's visibility to alerted viewers. Alerted and unalerted refer to the viewers' prior cueing to search for a PTW. **Method:** A total of 20 (10 male and 10 female) students will participate in experiment 1. The experiment is a within-subject design and includes three phases: demographic data collection, training session, and an experimental session in which every participant is presented with a series of 48 short movies, 24 with a PTW present and 24 without (controls). The 800 millisecond movie clips are displayed in a random order, after which the unalerted participant is asked to report the types of vehicles that were present in the short movie. Experiment 2 also includes 20 students (10 male and 10 female), and will incorporate the same short movies as in experiment 1. However, in this experiment the participants will be alerted to search for a PTW in the movie and to report its presence or absence as soon as they reach a decision. In this experiment reaction time is measured and the maximal presentation time of each movie is 2000 milliseconds, after which the movie will disappear. **Preliminary results**:** Preliminary results of experiment 2 indicate that the BLS increases PTWs' detectability by 33 percent compared to the control conditions. Moreover, the results indicate that the influence of the BLS is greater in the dusk (early evening) hours, where it increases the PTWs' detectability by approximately 14 percent (vs. 3 percent increment in daytime). In the experiment 2 the average reaction time required to identify a PTW by an alerted viewer decreased by 60 milliseconds when using the BLS. As expected, the difference in average reaction time during dusk (718 milliseconds) was shorter than in daytime (737 milliseconds). **Conclusions:** Overall, the preliminary results show that the BLS has a positive effect on the detectability of PTW. Previous studies on PTW conspicuity and visibility have shown that the conspicuity of a PTW rider can be increased by using an appropriate outfit that distinguishes the rider from the background scenery. However, due to the dynamic nature of the driving surroundings, it is nearly impossible to always meet this requirement. It seems that the BLS has the potential to increase PTW detectability regardless of the background especially, at dusk.

** This abstract represent work in progress, but the study will be completed by February 2010.

Keywords: Powered Two-Wheel (PTW), Visibility, Conspicuity.