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The effect of cognitive load on the driver's recognition of pedestrian road-crossing intention*

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Correctly recognizing pedestrian intentions is very important to ensure the safety of drivers and pedestrians. In the driving process, divers may need to complete other tasks that are not related to driving (e.g., remembering phone numbers), resulting in varying degrees of cognitive load. Therefore, this study explored whether cognitive load affects the driver's recognition of pedestrian intentions, and meanwhile considered whether the Time to Arrival (TTA; the time when the car reaches the position of the pedestrian at the current driving speed) has an effect in this influential relation. Based on the driving simulation platform (including Logitech G29, Carla), the cognitive load was manipulated by the auditory n-back task, and the recognition of pedestrian intention was measured by the situation present awareness method (SPAM), so as to explore the influence of cognitive load and TTA on the driver's recognition of pedestrian intention. The results found that: (1) As the cognitive load increased, the accuracy of identifying pedestrian intentions decreased; (2) The shorter the TTA, the faster the driver correctly identified pedestrian intentions. Accordingly, in order to improve driving safety, the drivers should keep their cognitive load as low as possible during driving, and for pedestrians, the earlier they express their intention to cross the road, the more easily the driver is able to recognize their intentions.
Keywords: cognitive load, time to arrival, pedestrian intention recognition, signal detection theory

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