

Method of Preventing Distracted Driving in Advanced Driver Assistance Systems

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Currently, distracted driving is a social problem in Japan. However, excessive warnings or interventions may make drivers feel uncomfortable and make the system unacceptable. Therefore, it is important to develop a system that considers how the driver feels when receiving a warning.

In this study, the effect of the presence or absence of out-of-vehicle risk and the type of support method (“warning light,” “warning light plus warning sound,” and “warning light plus warning sound plus braking control”) on the support system for side-distracted driving was investigated. The experiment was conducted using a driving simulator. Seventeen participants were asked to follow the vehicle in front of them and perform a subtask in which they were supposed to look aside. The vehicle ahead stopped suddenly when there was an outside risk. When there was no outside risk, the circumstance was that the speed of the vehicle ahead was set to be the same as that of the vehicle of the participant, and the distance between the two vehicles remained constant, preventing the risk of collision.

In the experiment, when there was an external risk, the intrusiveness was smallest when the support method was warning light plus alarm sound plus braking control. As for the sense of security, it was greater when there was an external risk than when there was no risk; in particular, it was greater when the support was provided by warning light plus warning sound plus braking control.

The subjective evaluation value of the sense of intrusiveness was larger in the case of no risk outside the vehicle than in the case of risk inside the vehicle for all the support methods, and it was the largest when the support was provided by warning light plus warning sound plus braking control. The subjective evaluation value of intrusiveness was large for all support methods, and it was largest when the support method was warning light plus alarm sound plus braking control. The analysis of eye movement reaction time showed that a warning with a warning light and warning sound brought the eyes back to the front faster than the warning with warning lights alone; the faster the eye movement reaction time, the faster the braking reaction time tended to be.

Therefore, it was found that, when there is a risk of an accident when the driver is distracted, not only warnings and alarms but also braking control is appropriate because it ensures safety and is not extremely bothersome. However, when there is no risk of an accident, braking control support is likely to cause annoyance. Moreover, from the standpoint of safety, it is better to use a method that combines warning lights and alarm sounds that enable drivers to return their eyes to the front quickly.

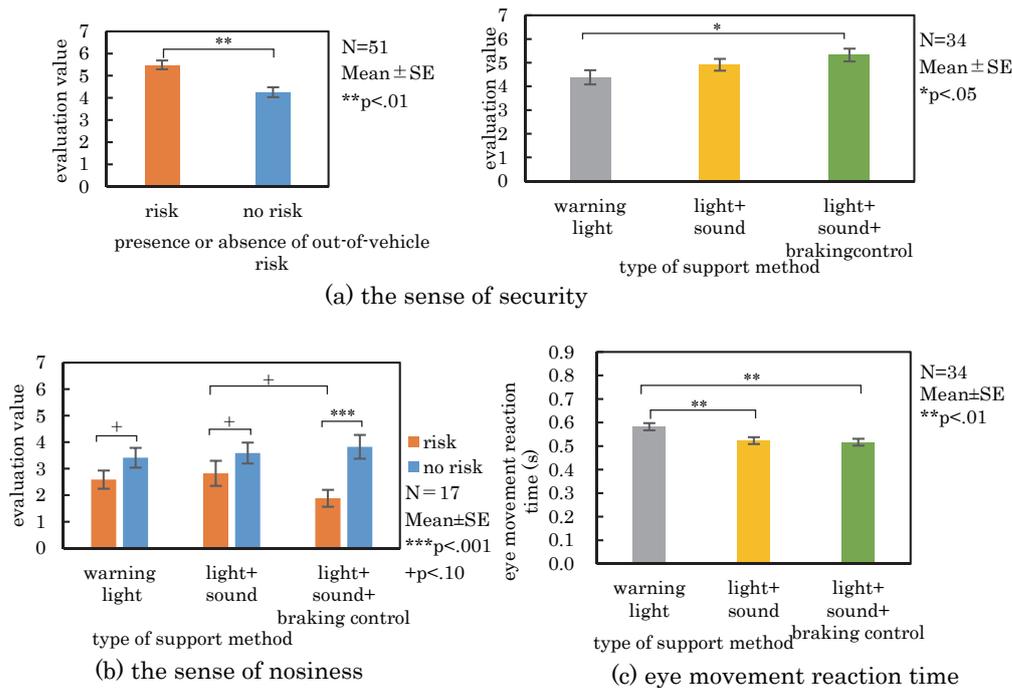


Figure 1 Experimental results