講演番号	314

The effect of Camera Monitoring System information presentation on the sense of security of automobile drivers and motorcycle riders

Koki Miyamoto [1)] **Keisuke Suzuki** [1)] **Takuya Izumiguchi** [2)] **Seisi Takagi** [2)]

1) Kagawa University
2217-20 hayashi-cho, Takamatsu-shi, Kagawa, 761-0396, Japan
2) Penstone
1-2-15 Yanoshin-cho, Aki-ku, Hiroshima-shi, Hiroshima, 736-0084, Japan

KEY WORDS: **Safety, Driving simulator, Driving support/Driver support,** Sense of security(C1)

As information display technologies for driver assistance systems continue to advance, even if a system is safe, it will face low user acceptance and struggle to gain market traction unless it provides a sense of security. However, very few studies explicitly define what "sense of security" means in comparison to "safety," and various arguments have been made on the subject. The challenge remains that the definition of a sense of security and the mechanisms by which it is generated have not yet been clarified. Furthermore, visual information constitutes the majority of cognitive information. As a means of obtaining visual information, there exists a camera monitoring system (hereinafter referred to as CMS) that replaces the optical mirrors of automobiles by displaying images of the vehicle's surroundings on a monitor, thereby enhancing the driver's visibility. However, due to the potential increase in cognitive load caused by excessive information, it is necessary to analyze what types of visual information contribute to a sense of security. In this study, we focused on Structural Equation Modeling (SEM) as a method for visualizing the mechanisms that generate a sense of security. To obtain broader insights, experiments were conducted using both automobiles and motorcycles, and SEM was applied to analyze differences in the underlying mechanisms between them. Finally, we will examine how to design visual assistance devices that provide a high level of reassurance.

To clarify the relationship between the method of presenting information and the fostering of a sense of security, we conducted an experiment using the driving simulator and the riding simulator. We then used SEM to construct separate models for automobiles and motorcycles, as shown in Figures 1 and 2, respectively. The results showed that "Situational Awareness" had the most direct and significant impact on the sense of security for automobiles, while "Psychological Stability" and "Physical Load" had the most direct and significant impact for motorcycles. Although "Situational Awareness" may not be a primary factor for motorcycles, it does have a direct impact on the sense of security. Furthermore, the study showed that "Task load," "Satisfaction," "Fatigue," and "Concentration" indirectly influence a sense of security in automobiles, while "Sensory Integration" does so in motorcycles.

There were significant differences in the latent variables directly influencing the sense of security between automobile and motorcycle, resulting in differences in the models. Possible causes include differences in the field of view provided by the CMS, differences in the driver's posture, and differences in the magnitude of lateral sway.

Based on these results, improving situational awareness and reducing physical and mental strain are considered key factors in designing visual assistance systems that enhance the sense of security.

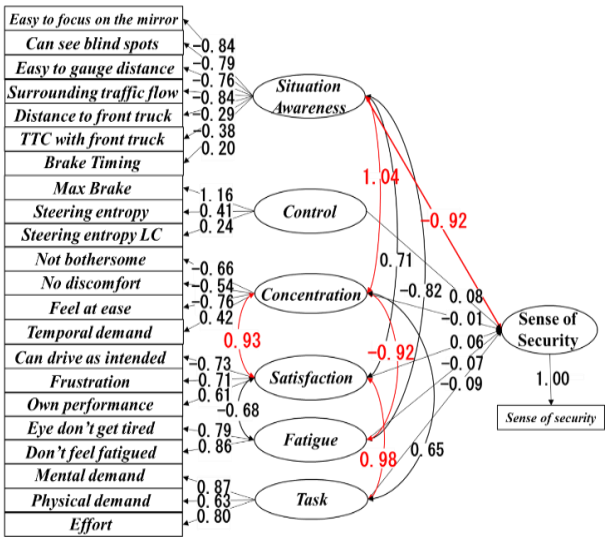

Fig.1 Sense of security model(automobile)

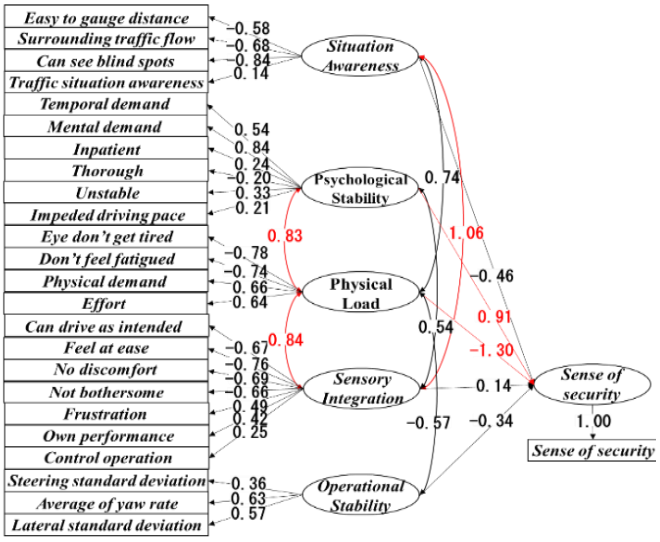

Fig.2 Sense of security model(motorcycle)