

## **Summary**

Thesis title: Study on Driving Stress and Driving Behaviors of Professional Drivers in Yangon, Myanmar

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Traffic accidents made more than 1.2 million deaths annually in worldwide, especially in low and middle income countries. Traffic accidents, deaths and injuries are ascending trend annually in Myanmar and starting from 2008, the trend have more than doubled nationally. Traffic injuries are one third of all injuries reported by hospital. As a result, road safety is a critical issue in Myanmar. Numerous researchers identified that traffic accidents are mainly from a consequence of driving stress and driving behavior. However, there are still rare public experimental research about driving stress, driving behaviors and the relationship between driving stress, driving behavior and accident involvement as well as the effect of roadway condition on the driving stress in Myanmar. The purpose of this study is to analyze different driving stresses on various roadway conditions in Yangon, Myanmar by using heart rate variability (HRV), to study Myanmar Professional driver' behaviors, to investigate the relationship between unsafe driving behaviors, accident involvement, and driving behaviors related to stress, to know the impact of age, driving hours per week, driving experiences, driving stress, driving behaviors related to stress, and unsafe driving behaviors on accident involvement and to evaluate the impact of roadway conditions and land-use on the driving stress and give some suggestions for reduction of the driving stress that results from exposure to certain roadway conditions and land use.

At first, the study used two polar watches V800, a heart rate sensor H7, and a Garmin

Virb video camera to collect data and carried out time-domain and frequency-domain analysis of HRV by using the Kubios HRV analysis software. The results showed that drivers experience different driving stresses depending on various roadway conditions. In particular, highly crowded places and those requiring attention such as mixed roads, lane-changing points, jaywalking pedestrian places, rough and bad pavements, traffic congestion areas, and flyover are the most stressful segments along the roadway for drivers.

The second step of the study used questionnaires about unsafe driving of the driving behavior and driving behaviors related to stress to analyze the driving behaviors through professional drivers in Yangon, Myanmar. A two-factor clarification such as violations and errors for the unsafe driving behaviors was accounted for 36.4% of the variance and a three-factor structure for driving behavior related to stress composing of aggressive driving, exaggerated safety/cautious driving, and anxious driving, which accounted for 43.9% of the variance were provided by principal component analysis. Violation was directly related to driving hours per week, aggressive driving, and accident involvement. In addition, the driving hours per week are also associated with age and driving experiences. On the other hand, only the aggressive driving that is related to stress driving behavior has a strong effect on the violation, which is unsafe driving behavior.

After that, the research investigated the impact of age, driving hours per week, driving experiences, driving stress in the real world, driving behaviors related to stress, and unsafe driving behaviors on accident involvement among professional drivers in Yangon, Myanmar. Structural equation modeling (SEM) is developed to represent the relationship, and Yuan-Bentler residual-based test statistics are used to validate the model structure because of the small sample size. The results confirm that driving stress, driving

hours per week and driving experiences affect driving behaviors and lead to traffic accidents.

Finally, the study evaluate the impact of roadway conditions and land-use on driving stress among professional drivers. Multiple indicators multiple causes (MIMIC) model was used to empirically investigate which variables of the roadway conditions and land-use affected the driving stress among drivers in Yangon, Myanmar. The results suggest that certain roadway conditions reduce driving stress. Specifically, using roundabouts and traffic lights at intersections to control traffic and increasing the number of lanes are the effective ways to reduce driving stress. However, roundabouts rather than traffic lights are more efficient. Conversely, industrial zones are associated with an increase in driving stress.

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