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## Human factors and road safety in the 2nd international traffic safety conference

Wael Alhajjaseen

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## Human factors and road safety in the 2nd international traffic safety conference

This special issue presents selected articles submitted to the 2<sup>nd</sup> International Traffic Safety Conference 2023, Doha, (Qatar). More than 150 papers were submitted and they were peer-reviewed. Only 16 papers were highly evaluated and recommended for the journal's special issue. These papers were invited for the special issue and were peer-reviewed again to ensure the high quality of final accepted articles. Finally, 13 papers were accepted and published.

The special issue includes different studies that investigate the role of road user behavior in road safety and crash occurrence. As reported by many studies such as the National Highway Traffic Safety Administration traffic safety fact report in 2016 (National Highway Traffic Safety Administration, 2016), the human factor is a dominant contributor to road safety, where more than 94% of all road crashes are directly or indirectly attributed to road user behavior. This positioned road user behavior at the core of road safety research, which has been studied subjectively through questionnaires and interviews or objectively through real-world observations or simulation analysis to identify correlations with crash occurrence.

Cultures and beliefs affect perceptions and attitudes toward road safety. In the study by Dhibi et al. (2022), the perception of safety and security in informal transport in Tunisia was investigated through a questionnaire interview of 215 drivers and 255 passengers of informal transport. Passengers highlighted significant safety and security risks that they encounter with informal transport. The absence of strict enforcement was identified as a major contributing factor to the high tendency to accept violating traffic laws and displaying risky driving behaviors. This led to aberrant habits and behaviors as well as to a driving style beyond recognized standards.

In a study by Zabihi et al. (2022), the application of the health belief model on the usage of seat belts among front-seat passengers in Iran was studied through the collected data from 412 questionnaire survey responses. It was found that the health belief model can explain around 30% of seat belt use. This highlights the need to consider other factors such as perceived behavioral control, attitude, cultural factors, enforcement, and others in predicting seat belt use.

Pedestrian safety is always considered as one of the major challenges in road safety improvement programs. Saxena and Yadav (2022) investigated pedestrian perception of the relationship between safety risks, road environment, and traffic conditions considering demographic factors. A

questionnaire survey for pedestrians is conducted in Bhopal, India, where 488 samples were collected. Results showed that participants were mostly dissatisfied with the limited lighting facilities at crossings and the high pedestrian volume on sidewalks. Furthermore, female pedestrians reported fewer walking activities than males and a higher perceived collision probability with vehicles. In another study, Yadav et al. (2022) applied the beliefs-based theory of planned behavior to investigate the correlation between pedestrian beliefs towards distracted walking and the use of mobile phones through real-world observations of 560 pedestrians. It was concluded that the theory of planned behavior can reliably predict mobile phone use by pedestrians. Behavioral and normative beliefs are found to be significant predictors of the frequency of hand-held mobile use.

Another group of studies aimed at analysing driver behavior such as mobile phone use and risking overtaking behavior using real-world observations. Gazder et al. (2022) explored subjectively the relationship between mobile phone use (calling and texting) and crash likelihood for young drivers, through an online questionnaire. Results showed that texting or web surfing or using social media while driving have the same likelihood of causing crashes, which is significantly higher than mobile calling. Furthermore, drivers with mobile phone violation records showed a relatively higher probability of having two or more crashes, which is rational since more violations tend to induce more crashes. Arun Sagar et al. (2022) empirically investigated the overtaking behavior on two-lane roads in Kerala, India, in a non-lane-based heterogeneous traffic environment. Authors developed risk charts for overtaking maneuvers based on clearance time and vehicle interaction. Authors identified a lower probability of crash associated with the increase in the relative speed of vehicles compared to the insufficient clearance time which contributed significantly to high crash probability.

In another study, Bonela and Kadali (2022) analyzed the spatial trajectories of right turners at uncontrolled T-intersections in a left-side driving environment in India. Binary Logit Model (BLM) and machine learning techniques were applied to classify vehicle turning paths as conventional versus abnormal, and to estimate the degree of turning path distraction. Results showed that abnormal turning paths are sensitive to vehicle type, speed (of training and through vehicles), waiting time of turning vehicles, and vehicle volume (of tuning and through traffic). Authors claimed that the developed model can help in identifying sites that may

have high abnormal turning paths, which may contribute to higher crash risk.

Real-world data is usually limited in quantity as well as in detail. Thus, simulation tools such as driving simulators were widely used to study driver behavior in a safe and controlled environment. Although driving simulators have proven to be effective tools in studying driver behavior, the experimental setting and procedure are crucial to effectively utilize them and to avoid problems during experiments such as simulation sickness. Pawar et al. (2022) compared the subjective experience of driving in the real world and simulated environments to investigate factors contributing to simulator sickness. Authors concluded that repeated exposure to a simulated road environment and driving under time pressure to complete a driving task yielded to high mental workload, which was attributed to simulation sickness and low sense of presence. Authors recommended introducing mandatory practice sessions on driving simulators, and to develop short driving sessions with less visually demanding objects as an approach to reduce the probability of having simulation sickness.

Alhmaidat et al. (2022) investigated the impact of crash fact signs on speeding behavior along freeways through a driving simulator experiment. Fifty-six subjects participated in the experiment. The study concluded that the combination of crash fact signs with speed limit signs is the most effective in limiting driver speed in the freeway sections under the speed spillover effect with an average reduction of 7.8 km/hr.

Reinolsmann et al. (2022) analyzed the impact of variable message signs on driver attention on expressways considering road environment and traffic conditions using a driving simulator and eye tracking tool. The driving behavior of 79 participants was collected. Authors reported that the presence of heavy vehicles in the traffic stream might reduce the attention (number of fixation) to variable message signs since drivers' attention is directed toward heavy vehicles. However, when considering the average eye fixation duration to the speedometer and side mirrors, there was no significant impact of the presence of the drive safely variable message sign. This suggests that the VMS drive safely message did neither worsen nor improve the drivers' attention allocation to in-vehicle instruments.

In another study, Khanfar et al. (2022) developed a data driver machine learning approach based on a K-means clustering algorithm with an elbow method to classify driver behavior into conservative, normal, and aggressive at signalized intersections. The impact of flashing green signal indication before the onset of red indication was investigated. Data was collected through a driving simulator experiment. It was concluded that the flashing green signal setting may induce more conservative driving behavior through slowing down and stopping even in cases where drivers can clear the intersection safely. This can be attributed to the difficulty in estimating the remaining distance and timing to the start of the red signal indication.

Connected vehicle technology is promising in providing drivers with more information about intersection signal

settings, which can significantly aid the driver's decision-making. Alzoubaidi et al. (2022) investigated the potential safety improvement of having connected vehicle technology at coordinated signalized intersections using a VISSIM microsimulation environment. Analysis yields to less crash likelihood at coordinated signals when all vehicles are connected. Furthermore, connected vehicle technology showed a stronger impact on reducing the number of conflicts compared to signal coordination only. In general, the study demonstrated significant safety improvement due to connected vehicle technology at uncoordinated and coordinated signals.

All previously introduced studies aimed at quantitatively or qualitatively studying road user behavior or safety perception; however, another important dimension in maintaining and ensuring safer road infrastructure is the assessment during the planning, design, and construction of road projects. There are many different practices and regulations on these assessments, commonly called road safety audits, in different countries around the globe. Road safety audits are introduced as the main official procedure to ensure that roads are being planned, designed, and constructed following road safety standards, and all safety risks are being identified and mitigated. The efficiency and impact of road safety audits are rarely discussed in past literature. AlHamad et al. (2022) conducted a global survey to explore the understanding of road safety audits (RSA) and their requirements between road safety experts (408 participants). Results showed that the majority of respondents complemented the important role of road safety audits in improving road safety. Furthermore, a misunderstanding of the independence requirement for conducting RSA is observed among auditors, especially from low- and middle-income countries. The study highlighted the urgency of introducing guidelines to improve RSA practices and promote them effectively in the world.

International academic conferences are excellent platforms for young researchers to present their ongoing research and receive feedback. Selecting the highly evaluated studies to be included in journal special issues is very important since this will expose their important outcomes to the larger safety community.


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Wael Alhajyaseen 

Qatar Transportation and Traffic Safety Center, College of Engineering, Qatar University, Qatar  
Department of Civil and Architectural Engineering, College of Engineering, Qatar University, Qatar  
 [wvaseen@qu.edu.qa](mailto:wvaseen@qu.edu.qa)