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Editorial

Salient Human Factors Issues in Motor Vehicle Accidents

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INTRODUCTION

According to the World Health Organization (WHO), nearly 1.35 million fatalities are attributed to motor vehicle accidents (MVA) annually (3,425 fatalities per day), with 50 million additional injuries reported and a combined cost of $518 billion worldwide [1]. WHO also reports that traffic fatalities are the leading cause of death among those aged 5-29 years and more than half of ground transportation deaths occur in people 15-44 years of age [1]. In the United States, over 36,000 fatalities have been attributed to MVAs and more than 2 million additional people were injured or disabled, according to a recent report from the U.S. Department of Transportation [2]. Human Factors (HF) professionals work toward reducing the incidence of MVAs and their deleterious effects by applying knowledge with respect to human performance within the contexts presented by motor vehicle systems and those found in highway systems and other operating environments. HF practitioners involved in traffic safety efforts are interested in human performance domains that include sensation-perception, attention, judgment/decision-making and reaction time [3]. Variables, such as age, driving experience, medical conditions, vehicle design, environmental conditions and even personality can influence driver performance. Salient areas of interest to HF professionals interested in traffic safety are briefly discussed. The aim in presenting this material is to provide a concise, contemporary overview of prominent areas of interest and ultimately, to eliminate or reduce the incidence of MVAs.

Age

According to a recent report, the highest rate of crash involvement is among drivers aged 16-17 years and drivers 80 and over have the highest fatality rate [4]. MVA fatalities are highest among those 25 and under and in those 65 and older, a finding that has been temporally stable [5]. The following constitute the most prevalent risk factors for young driver involvement in an MVA [6].

Inexperience (e.g., hazard recognition, decision-making errors, allowing shorter headways)

- Intoxicating substance use
- Non-use of seatbelts
- Risky driving behavior

Risk factors for older driver involvement in MVAs include [3]:

- Reduced sensory-perceptual processing capacity (visual processing is especially relevant)
- Reduced musculoskeletal performance and resilience (e.g., "frailty," orthopedic conditions)
- Possible reduction in perception-reaction time.

Automation

The concept of "self-driving," or autonomous, automobiles is becoming more of a reality as automobile manufacturers produce increasingly automated systems. Examples of automation in motor vehicles include self-steering technology and adaptive cruise control. Automated and fully autonomous systems are intended to reduce workload, extend human capabilities and enhance safety. However, such advances in technology can change the nature of work or require that tasks be executed in a different way. Further, automation can be misused, disused and abused [7]. Misuse is the overreliance on automation that results in monitoring deficits or decision errors; disuse is the neglect or underutilization of automation; and automation abuse is the implementation of automation without consideration of the consequences for human performance [7]. Factors associated with automation errors often include automation bias and complacency [8]. Automation bias occurs when humans trust decision-making capabilities automated systems even when those outcomes are contradictory to what is desired [8]. A similar construct, automation-induced complacency, is the result of the lack of attention and monitoring of automation output due to the perception that the output is reliable [9]. Sources of error such as these arise from an over-reliance on automation and a lack of understanding of system limitations, potentially resulting in a loss of driver situation awareness. As a result, designers are tasked with determining the appropriate level of automation required to optimize performance.

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Distraction

According to the National Highway Traffic Safety Administration, distracted driving caused more than 3,000 fatalities in 2017 [10]. Distracted driving is the diversion of attention from the primary task of safe driving. Distraction involves visual distraction, in which the driver's visual field is diverted from the road. It also involves both manual distraction, taking one's hands off the wheel or other vehicle controls, and cognitive distraction, where one's attentional resources are diverted from driving tasks [11]. In MVAs, a common cause of driver distraction is cell phone use. Texting while driving combines all three types of distraction and causes drivers to take their eyes off the road for approximately 5 seconds [11]. Division of attentional resources during driving can impact decision-making in a manner that increases the likelihood of a collision.

CONCLUSION

In the United States there are more than 175 million licensed drivers among other road users such as pedestrians, bicyclists and motorcyclists. It is a major challenge to design vehicles and road transportation systems that facilitate safe and efficient travel. Age, automation and distraction are prominent among HF that are considered during both design efforts and MVA investigations. With HF being implicated in the vast majority of MVAs, an understanding of human abilities, limitations and other characteristics is integral to roadway and vehicle safety.

REFERENCES

1. https://www.who.int/violence_injury_prevention/road_safety_status/2018/en/
2. Traffic safety facts 2016: A compilation of motor vehicle crash data from the fatality analysis reporting system and the general estimates system. U.S. Department of Transportation, National Highway Traffic Safety Administration. 2018.
3. Olson PL, Farber E. Forensic aspects of driver perception and response. (2nd edition), Tucson, AZ: Lawyers and Judges Publishing Company, Inc. 2003.
4. Tefft BC. Rates of Motor Vehicle Crashes, Injuries and Deaths in Relation to Driver Age, United States, 2014-2015. AAA Foundation for Traffic Safety. 2017.
5. Traffic safety facts 2008: Comparison of crash fatalities by sex and age group. U.S. Department of Transportation, National Highway Traffic Safety Administration. 2008
6. www.cdc.gov/motorvehiclesafety/teen_drivers/teendrivers_factsheet.html
7. Parasuraman R, Riley V. Humans and automation: Use, misuse, disuse, abuse. Human Factors. 1997;39:230-253.
8. Wickens CD, Clegg BA, Vieane AZ, Sebok AL. Complacency and automation bias in the use of imperfect automation. Human Factors. 2015;57:728–739.
9. Goddard K, Roudsari A, Wyatt J. Automation bias: A systematic review of frequency, effect mediators, and mitigators. J Am Med Inform Assoc. 2011;19:121–127.
10. www.nhtsa.gov/risky-driving/distracted-driving
11. Center for Disease Control and Prevention. Distracted driving. 2019.