The Centre’s Associate Director (Human Factors), Associate Professor Mike Lenné was the Guest Editor of the issue which highlights a number of exciting approaches in which vehicles are instrumented in order to obtain greater insight into road user behaviours.

The special issue is an excellent illustration of an array of research platforms that are now available to researchers. At MUARC, we are continuing to enhance our driver simulation capabilities and have recently obtained a military vehicle crew simulator from the Defence Science and Technology Organisation. This will enable MUARC to continue to support the Army through research addressing how fatigue and workload influence the performance of drivers and commanders within army vehicles. To supplement this laboratory the university is also establishing a CAVE (Cave Automatic Virtual Environment) which could for example, provide the centre with considerable opportunity to simulate infrastructure changes or model complex data from in-depth crash investigations.

It has been an exciting three months. The Centre was awarded two competitive research grants from the Australian Research Council, our student research program continues to grow – with the Centre welcoming its 17th PhD student, approximately 15 papers presented at the recent Road Safety Conference and the number of research papers, presentations and reports continuing to grow.

Please review our latest reports on the website (www.monash.edu/miri/research/research-areas/transport-safety) and please approach the various scientists if you have questions about the research featured here.

Professor Mark Stevenson
Director, MUARC

Below are a sample of recent MUARC publications


MUARC’s Associate Professor Michael Lenné achieved a major milestone recently as guest editor of a special issue of the prestigious Accident Analysis and Prevention journal.

Devoted to developments in the use of on-road methods to better understand road safety crash risks and risk factors, the journal issue specifically looked at the use of vehicle instrumentation, through on-road and naturalistic studies, and the value of the “wealth of data about road user behaviour in real traffic” these studies contribute, said Associate Professor Lenné. “Studying behaviour in its natural setting is inherently more attractive and by definition overcomes many of the limitations of more traditional laboratory based methodologies” he wrote in the editorial.

The field is booming with increased publications of these studies and an increase in research funding in the US and Europe. Associate Professor Lenné, in his editorial, asks the question: “given the significant investments being made in on-road research it is timely to ask questions around the contribution of these approaches to road safety” referring to the main areas of research – studies using instrumented test vehicles and naturalistic approaches to the study of drive behaviour. In answer he points to the journal issue highlighting that both areas are well covered by a number of articles published in the special issue. These papers “highlight how instrumented test vehicles, in combination with other measures, continue to be used to provide new knowledge about road safety issues illustrates how more naturalistic approaches are changing the road safety landscape with the respect to the study of everyday behaviour on-road.”

The special issue includes four research studies with MUARC authors, two of which are discussed in this issue of Big Impact.

How distractions impact on vehicle accidents, new study findings

Driver inattention and distraction have received considerable attention over the past decade and is the current target of a TAC campaign in Victoria, who, in the last financial year paid out over $1 billion dollars for the medical costs, rehabilitation and care of people injured in road crashes in Victoria.

A new study by Dr Kristie Young and her colleagues from the Monash University Accident Research Centre, and published in Accident Analysis and Prevention, is an on-road examination of the errors made by distracted and undistracted drivers.

Participants in the study were joined in a vehicle by two observers who recorded driving errors and in-vehicle video and other recording devices collected other data including speed, braking, steering wheel angle etc. While it is intuitive that distraction leads to more driving errors there is actually little evidence as to the relationship between the two, according to Dr Young. “Although the two phenomenon are both popular areas of road safety research and are ostensibly related, there has been little explanation of how they are related and interact.”

She added that it is important to understand the role of distraction in driving errors as the information “can inform the development of better countermeasures to mitigate these errors through driver focussed technologies such as collision warning systems and roadway design such as tactile lane markings.” It is interesting to note that the study revealed that – even when not distracted – drivers made at least one error for every kilometre travelled, “indicating that while driver distraction does have a significant impact on driver errors – it is part of a wide range of factors that impact on the number of errors drivers make when driving,” Dr Young said.

The most common error made by driver – whether distracted or not – was exceeding the speed limit, accounting for over one third of all errors recorded in the study. Other errors included lane excursions, activating indicators too early and travelling too fast when turning.
AS the driving population ages, balancing injury risk while maintaining mobility is becoming an increasing focus of attention.

Using older driver crash statistics and the vast body of knowledge on cognition and ageing as the starting point for their research, Associate Professor Judith Charlton and her research team applied new in-vehicle monitoring technologies and a novel analytical approach to study some of the difficult driving manoeuvres that older drivers encounter on the roads. The results of this research were the subject of a recent article published in Accident Analysis and Prevention (AAP) which looked at how older drivers deal with in car distractions, particularly when negotiating intersections.

The study was a Monash University Accident Research Centre (MUARC) and GM Holden collaboration funded through the AutoCRC.

Honours student, Matthew Catchlove, a co-author of the paper, analysed data from the “1000 Intersection Study” which examined broader aspects of driving behaviours at intersections. Intersections feature prominently in the crash statistics for older drivers – with particular problem areas including failure to yield; looked but failed to see; and inaccurate gap selection. According to Associate Professor Charlton, relatively little is known about the role of inattention and the propensity for older drivers to engage in distracting behaviours whilst driving at intersections.

Researchers have speculated that difficulties experienced by older drivers might be explained, at least in some measure, by declines in cognitive capacities - a well-documented feature of the aging process which is particularly evident in complex environments requiring coordination of multiple tasks. This has serious implications for driver distraction because the additional cognitive load in having to process different sources of information may slow drivers’ decision-making process to dangerous levels and in turn, lead to safety errors and increased risk of crash.

The hypothesis for the study published in AAP was that older drivers would be less willing to engage in secondary behaviours when negotiating complex intersections compared to less complex intersections. “Specifically we expected that when making left/right turns, older drivers would self-regulate by reducing the proportion of
time engaged in secondary behaviours at intersections which required gap judgements (partly controlled or uncontrolled) compared with intersections that were fully controlled by traffic lights,” Associate Professor Charlton said.

Older drivers (65-83 years) drove a vehicle equipped with a video camera system and a data acquisition unit which records trip distance, vehicle speed, braking, accelerating, steering and indicator use. The study found that the most frequently observed behaviours were:

- Scratching/grooming – 42.5%
- Talking/singing – 30.2%
- Manipulating the vehicle control panel – 12.2%

The investigators also measured two aspects of driver performance which have high relevance for safety: hands off the wheel and eyes off the roadway for longer than two seconds. In the current study secondary activities that were most commonly associated with both hands being taken off the wheel were reading (100%), mobile phone use (100%) and reaching for an object (50%). Glances “off road” two seconds or longer were associated with reading, reaching and manipulation of the vehicle control panel. However drivers’ engagement in these potentially unsafe activities was generally limited to when the vehicle was stationary.

A key finding was that “older drivers engaged less in secondary activities at uncontrolled intersections compared with less demanding intersections such as those with traffic lights,” Associate Professor Charlton said.

While the findings suggest that the older drivers may reduce some of the risks associated with secondary activities by refraining from these activities when the driving situation is more complex, Associate Professor Charlton emphasised that this does not mean that it is a safe practice. “The concern is that drivers may underestimate the potential risk associated with secondary activities, particularly when driving at intersections.” Because intersections pose a significant problem for older drivers, the failure to recognise the full impact of engaging in secondary activities such as grooming, while negotiating turns at intersections, has serious implications, the paper concluded.

The study has provided important insights from real-world driving evidence of older drivers’ self-regulation practices in complex driving situations and paves the way for more large-scale applications of naturalistic driving studies in the future.

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Further information
Monash University Accident Research Centre (MUARC)
Building 70, Clayton Campus
Monash University, VIC 3800
Telephone: +61 3 9905 4371
Email: miri-enquiry@monash.edu