Australian Automobile Association

RSRP

DISTRACTED DRIVING RESEARCH FORUM

OUTCOMES

March 2021

NRMA RACV RACQ RAA RAC RACT

Introduction

AAA Road Safety Research Program

Every month 100 Australians die on our roads, and every day the same number are hospitalised for road crash-related injuries. Every year road trauma costs the national economy almost $30 billion (1) and brings tragedy into the lives of thousands of Australians. Road safety is a national crisis that demands real leadership, collaboration, and solutions.

In September 2019, Australia's motoring clubs, as represented by the Australian Automobile Association, launched the AAA Road Safety Research Program (the Program) in response to this national crisis. The Program is making significant investments and commitments to long term research and solutions that will focus on addressing road safety issues. The Program supports research and translation activities that will deliver tangible benefits for road users and the wider community and have a strong potential to prevent road fatalities and injuries on Australian roads.

In its first year the Program focused on the road safety issue of fatigued driving with funding approved for a foundational piece of research and two projects:

- A comprehensive literature review relating to fatigued driving.
- Understanding and managing fatigue in the workplace – to be undertaken by Monash University Accident Research Centre in collaboration with the National Road Safety Partnership Program and Tip Top Bakeries.
- Evaluation, validation, and comparison of fatigued driving monitoring systems to be undertaken by Monash University in collaboration with Central Queensland University.

For 2021, the AAA Board identified a new priority area in road safety research, tackling the ongoing road safety challenge of *distracted driving.*

1 Australian Automobile Association (Sept. 2017) Cost of Road Trauma 2015

Stakeholder Engagement

A key component of the Program is to undertake stakeholder engagement and consultations with a wide range of stakeholders interested in improving road safety and who are working to address some of Australia's critical road safety issues. This engagement enables the AAA to select the most appropriate road safety research projects that are aligned with the Program's desired outcome to reduce fatalities and injuries on Australian roads.

As a part of the stakeholder consultation process, the AAA has engaged with key experts specialising in distracted driving, including representatives from both industry and academia.

As with the fatigued driving research round, the AAA also convened (COVID-19 safe) face-to-face stakeholder forums to bring together key stakeholders and experts. The goal was to identify the most appropriate research topics related to distracted driving and provide experts with an avenue to discuss potential ideas (including any potential limitations).

Forums were held in Melbourne and Brisbane.

The distracted driving forums focused on five key themes that had emerged from the stakeholder consultations held prior to the forum.

The key distracted driving research themes

- human factors (the driver)
- types of distractions
- technology
- cultural Norms
- policy, legal and regulation.

These themes also reflected the outcomes of the recently completed distracted driving literature review (available at https://www.aaa.asn.au/research/findings/) that was still undergoing editing at the time of the forums.

Participants were provided with the executive summary of the literature review to support their discussion at the forums.

This paper captures the key discussions and perspectives considered during the two days, which contributed to the development of the research concepts detailed in this document.

Why Distracted Driving?

The second research round of the Program focusses on the challenge of distracted driving. Distracted driving plays a large role in the number of road crashes and subsequent road fatalities and injuries in Australia and globally. Research has shown that in Australia (1), distraction is the main contributing factor in approximately 16% of serious casualty road crashes (2). Research suggests that distracted driving is as dangerous, if not more dangerous than drink driving (3). It is a serious problem on Australian roads.

Driver distraction can be understood as any circumstance where the driver is diverting attention away from critical activities for safe driving towards another competing activity (4). Distraction can be cognitive or mental (the mind is engaged with non-driving related tasks), visual (taking eyes of the road), auditory (noise that diverts attention), or manual (taking hands off the vehicle controls) (5).

The literature relating to distracted driving can be categorised into three main streams: 'studies focused on the impact of distracted driving on driving behavior; studies focused on identifying the performance attributes mostly impacted by distracted driving; and studies focused on the secondary tasks that cause significant changes to driving behavior' (3).

Distraction causes increased reaction time (including braking), impairs a driver's ability to maintain speed and lane position, and impacts the operational efficiency of traffic (6); bringing with it the potential to seriously and negatively impact a broad range of road users.

The Program is looking to fund research into distracted driving that will help us to better understand the scope of the problem, understand what causes distraction, what countermeasures are effective and innovative solutions to tackle this serious road safety problem.

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Distracted Driving Research Forums

Recently, the AAA convened two separate invitation-only distracted driving research forums as a way of bringing together the experts in a face-to-face workshop environment. The forums, held in Melbourne and Brisbane, were designed to encourage open discussions and collaboration across sectors. The forums had the following objectives:

- Raise awareness and create a shared understanding of road safety challenges and research opportunities focused on distracted driving.
- Foster relationships across sectors and disciplines that can help to tackle these contemporary road safety challenges.
- Collaboratively develop a small number of research concepts to address the road safety challenge of distracted driving.

Throughout the forums, the participants worked in small groups to delve further into the distracted driving research themes and work in groups to narrow down the key research ideas.

Rydges Melbourne, 9 February 2021

With last minute changes to the format needed to accommodate border closures, the forum in Melbourne was facilitated on behalf of the AAA by Mr. Jerome Carslake (Director, National Road Safety Partnership Program). This forum had representatives from the following organisations:

- Monash University Accident Research Centre
- Australia Post
- Viva Energy
- National Transport Commission
- Australasian College of Road Safety
- Victoria Police
- Acusensus
- University of Sunshine Coast
- Commercial Passenger Vehicles Victoria
- ABMARC
- Telstra
- Jemena
- Amy Gillet Foundation
- Busy Brain Syndrome
- RACV

To start the day, participants heard presentations on the following:

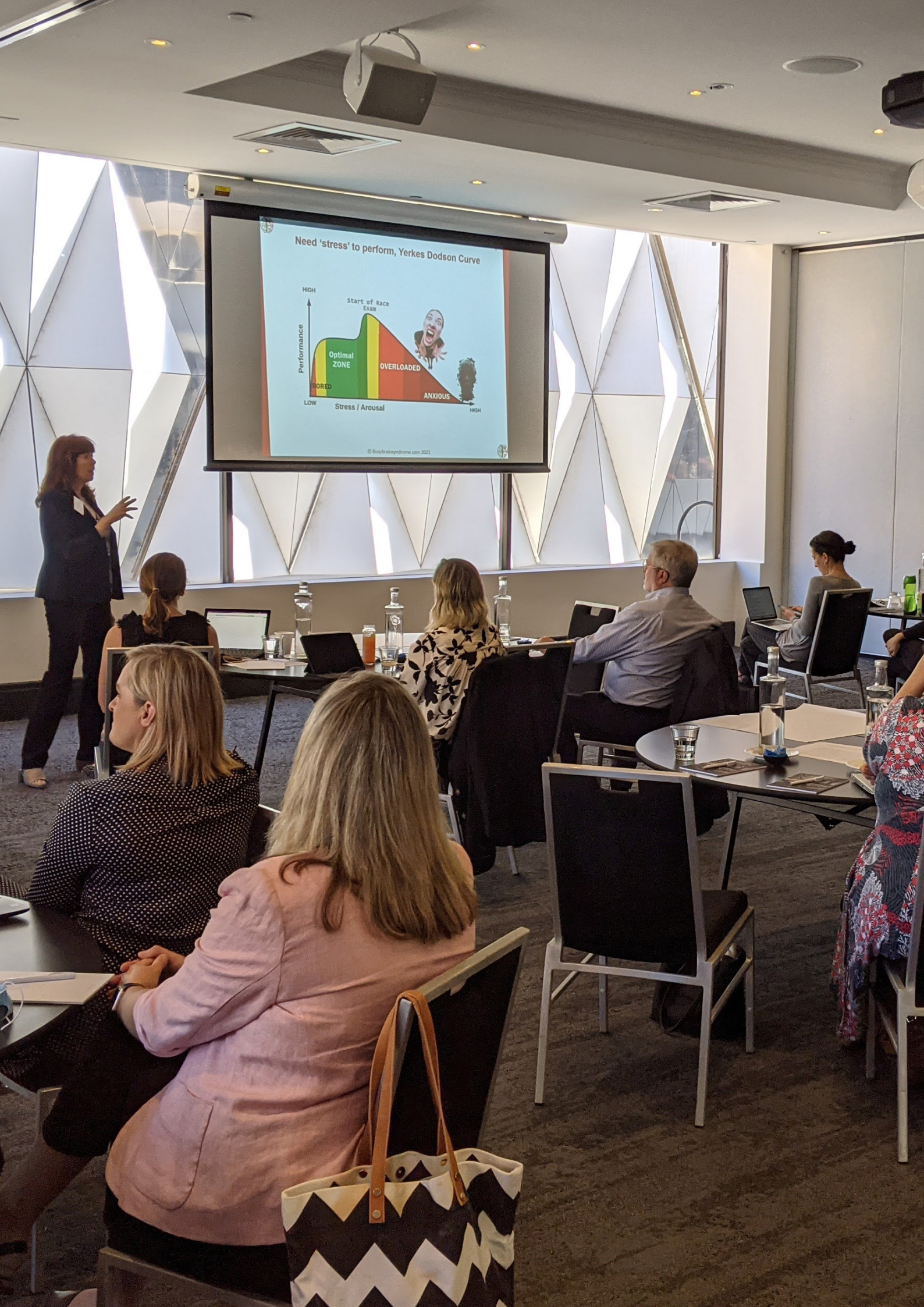
- A summary of a recently commissioned distracted driving literature review, noting key research gaps related to distracted driving (Dr Lyndel Bates, Griffith University)
- An overview 'Busy Brain Syndrome' and how the digital world has caused distraction to become the default, which can have catastrophic outcome for road users (Dr Lucia Kelleher)
- A panel discussion by health and safety leaders, outlining distracted driving issues, challenges and potential solutions that impact their industries (Mr. Stephen Hehir Australia Post, Mr. Felix Ohre Viva Energy and Dr Lucia Kelleher).

Pullman Brisbane, 16 February 2021

The forum in Brisbane was facilitated on behalf of the AAA by Mr. Chris Nightingale (Chris Nightingale Consulting). This forum was organised to reflect the changing COVID-19 restrictions, and due to this had smaller number of attendees than Melbourne. The forum was attended by representatives of:

- Department of Transport and Main Roads
- University of Sunshine Coast
- University of Newcastle
- Griffith University Criminology Institute
- Origin Energy
- RACQ
- RAA

The delegates in Brisbane heard the presentation from Dr Bates on the distracted driving literature review and also heard from Professor Paul Salmon (University of Sunshine Coast) who outlined a 'systems model' approach to road safety challenges and how this could be applied to distracted driving.


Need 'stress' to perform, Yerkes Dodson Curve
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Forum Discussions and Outcomes

Distracted driving is a multi-faceted and complex challenge for road safety and requires solutions that are both collaborative and holistic. When contemplating solutions to this issue, the groups considered the breadth of the distraction issues, noting it is more than just mobile phones.

In the workshops, participants were asked to think about the following two questions when developing research ideas:

- What is the biggest question we cannot answer?
- With unlimited funds how we would tackle this question?

Both workshops started with general discussions around the distracted driving themes, giving initial thought to the types of research that could be undertaken within overarching ideas. Whilst the discussion remained relatively high level, the groups were able to make some observations about the challenges to be considered when looking at solutions to the issue of distracted driving. These observations are summarised below under a few key headings:

Fleet management and safety cultures

Several participants across the two forums recognised the challenges faced by fleet managers in Australia, noting the issue of distracted driving impacted fleets of all sizes. Work-related driving was widely acknowledged as one of the biggest risks for organisations. There was agreement that development of a strong safety culture within the workplace was a key factor in ensuring safe driving practices, noting that it needs to cover several factors to be truly effective, including:

- sound procedures and policies (such as orientation to new/different vehicles to minimise distraction whilst driving)
- encouraging safe environments for drivers and supervisors to be able to freely discuss issues that may affect driving
- setting realistic expectations for the drivers (distance and hours to be driven), and
- reasonable leave provisions.

It was also raised that a broad range of industries not typically associated with road safety could have vital learnings that could be leveraged with regards to distraction and driving, such as the aviation industry.

The participants also noted the changing profile of people who drive for work, particularly due to the increasing number of ride-share/food-delivery organisations now available. These companies (such as Uber and Uber Eats) rely on 'everyday drivers' to complete the work as opposed to the more traditional logistic companies who provide specific driver training as a part of the job. This, combined with the use of apps in cars to allocate work, raised questions around the increased levels of risk associated with distracted driving for these contemporary companies.

Human behaviours and social norms

Both forums raised the importance of considering human factors, in particular mindfulness and mind-wandering, when considering any solutions to the distracted driving problem. There was general agreement among participants about the promotion of attentive driving being a key factor in finding solutions to distracted driving, noting that there needs to be a balance to ensure the correct level of sensory stimuli as people will look for distractions to maintain cognitive stimulus.

The participants also discussed the nature of drivers in Australia, noting a few key issues that could be considered in relation to human behaviours and social norms. These issues (and potential research gaps) included:

- Australia's ageing population – are older drivers more distracted when driving and is this a research gap that should be further explored?
- What is Australia's driving culture? Do we have an aggressive and individualistic attitude to driving on the road? Does age increase the likelihood of distracted driving?
- Are Australian drivers competitive or collaborative? Do drivers lack a sense of community and responsibility to keep our roads safer?
- Why is mobile phone use still considered socially acceptable? How do we achieve the change in attitude like the one that has been seen with drink driving?

The importance of recognising the impact of emotional stress on a person's driving was also considered during the forums with the view that even small changes in life can have an impact on driving, creating a greater potential to be distracted.

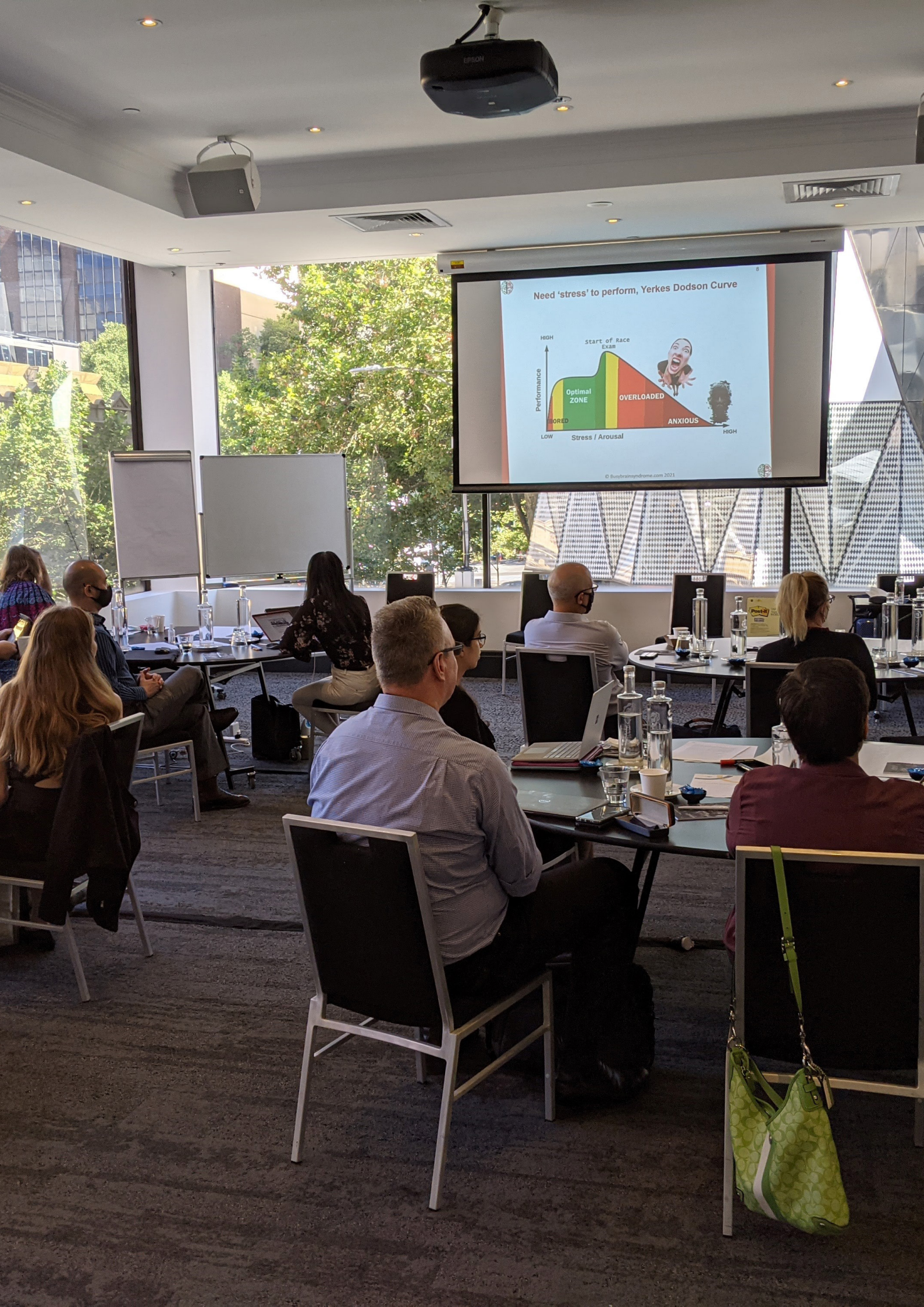
Technology

The two groups noted that one of the biggest issues in relation to distracted driving is how to keep ahead or abreast of technology. The participants agreed that enforcement and regulations/polices need to become more contemporary and dynamic to keep up with the rapid developments and advancements.

It was also observed that not all technology should be considered "bad". There is a growing reliance on utilising phones and the technology in cars for safety reasons as well as for such tasks as navigating. There needs to be consideration by technology developers of how the designs can be made seamless and safe (and not focus solely on the visual appeal) to counteract the changing way the various technologies are used by drivers.

Overall, the groups agreed that it is unlikely for the technology to be removed from the driving situation. It will be imperative to consider the human factor issues when designing new technology to encourage better driving behaviours in the vehicle.

The forum participants worked together collaboratively, sharing ideas, different perspectives and various opinions resulting in the identification of nine potential distracted driving research projects (across the two forums). The research ideas included a broad project overview, potential project limitations and the identification of project stakeholders.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RESEARCH PROJECT 1

Educating about the link between a driver's emotional state and driver distraction
(Human factors)

Researchers believe there is a link between the driver's emotional state and being distracted on the road – this project will investigate the impact of this link on distracted driving particularly with regards to aggression and mental fatigue.

Research into the areas of aggression, mental fatigue and distraction is currently siloed. Initial output would be the collation of existing research in these areas.

The project would develop a training package and campaign materials based on the research and links between these emotional states and then evaluate their effectiveness.

Key Stakeholders

- Road Safety Organisations
- Fleet managers / operators
- Research organisations
- Road users / drivers

Research considerations

- This project could consider the link with drugs (both prescription and non-prescription) and alcohol in terms of the aggression / distraction link.
- This project would require good stakeholder consultation as a part of the project design

RESEARCH PROJECT 2

Evaluating driver interactions with the Human Machine Interface (HMI) system in vehicle
(Technology)

The Human Machine Interface (HMI) in modern vehicles often presents a computer screen to the driver to operate vehicle controls. The project will evaluate the distractibility of HMI systems with a view to develop guidance materials for vehicle and systems designers, fleet operators and everyday drivers to enable safer vehicle choices.

The project would also focus on the distractibility of HMI amongst different cohorts of driver – learner, professional, shift workers and older drivers to see if there are other factors that increase the chances of being distracted by the vehicle.

The project will also develop a toolkit to enable testing and evaluation of future technologies with a view to ensure best practice is considered in design and implementation of HMI systems.

Key Stakeholders

- Experienced research partners
- Fleet managers / operators
- Road users / drivers
- Insurance companies
- ANCAP

Research considerations

- Consideration will need to be given to the links to other data collected by the vehicle – could telematics or monitoring technology improve the research.
- There is extensive existing research in this area (mostly overseas) which should be factored into the research.
- How could this benefit ride share operators – could this research be extended to include apps/tablets that are used for these purposes.

RESEARCH PROJECT 3

Incentivising attentive driving behaviour through apps (Human factors, Technology)

A range of mobile phone apps are available that "gamify" behaviour and provide incentives through prizes or discounts to reward particular behaviours. This includes "pay how you drive" insurance that monitors driving behaviour via an app and adjust premiums based on risk.

The project proposes to evaluate the effectiveness of "apps" that seek to encourage drivers to be attentive whilst they are driving.

The research would test and evaluate the use of such apps amongst a variety of driver cohorts – such as new drivers, older drivers, professional drivers, and shift drivers.

The project would also develop best practice guidelines for such apps.

Key Stakeholders

- Government agencies
- Fleet managers / operators
- Research organisations
- Road users and drivers
- Insurance companies
- OEMs

Research considerations

- This research would need to consider how the apps work in an organisational context – are they impacted by the safety culture of the organisation and would incentives vary between levels.
- Would there be a link to enforcement – would drivers be punished or rewarded for certain behaviours and would this impact the use of the app.
- The app would need to have tangible and meaningful rewards to incentivise – does this vary between drivers? The research would need to take this into consideration.

RESEARCH PROJECT 4

Assessment of current distracted driving enforcement programs (Policy, legal and regulatory)

The project proposes to investigate long term impacts and effectiveness of fixed versus mobile deployment methods for mobile phone detection technologies.

The project will aim to ascertain the ideal deployment model for mobile phone detection technology – and will evaluate such factors as location, duration, overt versus covert, real time enforcement versus automated.

This will produce best practice guidelines for enforcement and government agencies for the use of this technology as a deterrent to distracted behaviours on the road.

Key Stakeholders

- Government agencies / transport departments
- Research organisations
- Enforcement agencies
- Technology firms
- Insurance companies

Research considerations

- This research could consider whether the technology could be used to reinforce good behaviour (non-distracted drivers) and what impact that might have.
- Could this feed into insurance or registration processes – that is an impact for bad behaviour or good behaviour.
- The research should consider the interactions between people, technology and infrastructure (a sociotechnical systems framework) to ensure there are no unintended consequences.
- This research may be better undertaken by a road authority or state government with responsibility for such enforcement (and at the very least would need to involve them as a stakeholder)

RESEARCH PROJECT 5

Assessment of in-vehicle monitoring technology for distraction.
(Technology, human factors)

There are several distracted driving monitoring technologies available but there is a lack of guidance for fleet managers and drivers on their effectiveness.

The project poses to investigate driver distraction monitoring technology (in the Australian context). It would look at how the technology assesses distraction and how the drivers react to the alerts provided.

The project will provide an overview of the various technologies with guidance materials (showing how it works, features, outputs) to allow fleet and other road users make informed choices when looking to deploy this technology. The project would develop a tool kit to guide future evaluation of this technology.

Key Stakeholders

- Fleet operators of all sizes
- Government agencies / transport departments
- Road users / drivers
- Research organisations
- Technology companies
- Insurance companies
- OEMs

Research considerations

- Is the technology validated? The research may need to determine appropriate distraction thresholds and metrics.
- The research will need to consider if there are any unintended consequences of using such devices / technology
- Existing research should be accessed as a part of the project – there is a lot of existing work in this area.
- The research should consider what is happening in Europe with distraction monitoring technologies – what can be learnt and how it can be adapted for Australia.

RESEARCH PROJECT 6

Investigating the types of driver distractions and associated crash risks.
(Types of distractions)

The project proposes to investigate the various types of distraction that impact driving (both internal and external to the car and driver) and their relative influence on crash risk. This will include looking into the road environment, driver tasks and activities, the vehicle and the person driving.

This project would consider the impact of a driver's cognitive load in relation to various distractions to determine whether some distractions cause a higher mental strain on the driver.

The research can assist the development of educational materials about the relative risk of various distractions for both fleet and regular drivers and identify the priority types of distraction to be targeted to deliver the greatest road safety benefits.

Key Stakeholders

- Road users / drivers (including private sector)
- Government agencies / transport departments
- Fleet operators of varying sizes
- Driver education providers
- Road safety organisations
- Insurance companies

Research considerations

- There has been a considerable amount of data collected from naturalistic studies both in Australia and overseas which could inform this research – any research design would need to consider this previous work.
- The research could undertake further analysis of previously collected data to reach conclusions.
- If unable to use existing research, this project would require collection of a large amount of data over a big sample size to be of benefit – which raises questions about the research methodology.

RESEARCH PROJECT 7

Development of a toolkit to assess future distraction technologies and systems.
(Technology, distractions, human factors, cultural norms, policy/legal and regulatory)

Drivers are exposed to a wide variety of distractions, some of which are part of the vehicle, some are external to the vehicle and others are brought into the vehicle. A good example is mobile phones that were not designed for in-vehicle use, but their in-vehicle use has created road safety problems as an unintended consequence.

This project seeks to develop a toolkit that can be used to assess any product or system for its likely level of driver distraction. The intention is to allow a potential future "mobile phone" type of situation to be understood and managed or prevented.

The toolkit would include:

- a set of design guidelines to minimise distraction
- methods to assess the distractibility of different technologies, products, and systems.
- processes to support the development of interventions targeted towards reducing distraction.

As such, the framework will be useful to a wide range of stakeholders.

Key Stakeholders

- Road users
- Government agencies
- Regulatory authorities
- Academics
- Advertisers
- Road engineers
- Car manufactures/OEMs
- Fleet operators
- Enforcement

Research considerations

- None identified

RESEARCH PROJECT 8

Which distracted driving countermeasures are most effective?
(Human factors)

Currently there are a variety of countermeasures used to deter drivers from driving distracted. This project proposes to investigate the countermeasures to find out which are the most effective.

This project will look at measures such as messaging and campaigns, enforcement and punishment and societal influence on the driver. The project will also look at these measures across various cohorts – such as old/young, gender, professional drivers, emergency drivers etc.

The project will develop guidelines for use of the various countermeasures to guide workplaces to ensure the most effective measure is used.

Key Stakeholders

- Road users
- Government agencies / Regulatory authorities
- Academics
- Advertisers
- Fleet operators
- Enforcement agencies

Research considerations

- This project could be run as a randomized controlled trial (RCT) or undertaken by using the Step Approach to message design and testing (SatMDT).
- Challenges would include recruitment of participants across the various groups (to ensure significant sample sizes).

RESEARCH PROJECT 9

Advanced driver assistance systems (ADAS) and driver distraction.
(Technology, human factors, policy/legal and regulatory)

There is an increasing number of advanced driver assistance systems in modern vehicles.

This project would investigate the impact of these systems on driver distraction and engagement. It would look at driver willingness to undertake other distracting behaviours whilst these systems are engaged and assess driver understanding of any risks involved in using the systems.

The project would develop practical guides and information for drivers and fleet operators to raise the awareness of distraction risks with these systems and develop best practice guidelines for future technologies for vehicles in Australia.

Key Stakeholders

- Road users
- Government agencies
- Regulatory authorities
- ANCAP
- Academics
- Car manufactures/OEMs
- Fleet operators

Research considerations

- This research would need to develop a framework / toolkit to allow ongoing assessment of increasing automation in vehicles in the Australian context and its impact on driver distraction/ engagement.

Next Steps

All research concepts have been considered by the Program's two advisory committees – the Club Advisory Group and the Expert Advisory Panel. These two groups considered the research concepts (those developed at the forums and those received as direct approaches to the AAA) and developed a recommended shortlist of projects to be considered by the AAA Board for approval at its March 2021 meeting.

At the meeting, the Board agreed to progress the following three projects to the feasibility stage of the program (which will include the development of a fully costed research proposal):

1. Toolkit to assess future distracting technologies and systems.

This project aims to develop methods to test and evaluate the distractibility of different technologies, products and systems. These methods can be used by systems designers, app developers, regulators, road safety practitioners, fleet managers and consumer advocates to understand and manage distraction risks from future technologies, rather than wait for safety problems to arise from their deployment.

2. Evaluating driver interactions with the human machine interface (HMI) system in vehicles.

The project will evaluate the distractibility of HMI systems with a view to develop guidance materials for vehicle and systems designers, fleet operators and everyday drivers to enable safer vehicle choices. It will assess the distractibility of HMI amongst different cohorts of driver – learner, professional, shift workers and older drivers to see if there are other factors that increase the chances of being distracted by the vehicle. The project will also develop a method of rating HMIs with a view to ensure best practice is considered in design and implementation of HMI systems. This also has the scope to look at work-related technology (such as tablets and apps).

3. Developing a 'roadmap' to reduce work-related/fleet driver distraction through education on emotional state and mindfulness training.

This project will investigate a mindfulness approach that may help drivers maintain a clear head and be able to better manage cognitive load. The project will focus on training of the drivers as well as the training of employers so that they are less likely to expect or require their drivers to engage in unsafe practices on the road. The project will develop a toolkit for implementation of the mindfulness program in other organisations.

Thank you

The AAA would like to express its thanks to all participants for their contributions to the discussion around distracted driving as a part of the forum and the broader consultation process.

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