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Submission to National Transport Commission in Response to Consultation Regulation Impact Statement

Developing Technology-Neutral Road Rules for Driver Distraction

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Contents

1	Introduction	3
2	General Comment.....	4
3	Specific Comments.....	4
	Section 2.2.1 Responsibility for Distraction	4
	Section 2.3.3 Transition Towards Automation	4
	Section 3.2.1 Developing guiding principles for our options	4
	Section 3.2.4 Defining Driver Distraction	5
	Section 5.1.1 New offences introduced in the road rules	5
	Section 5.1.3 Offences in the current rules not maintained under this option	5
	Section 5.1.4 Exemptions in the Prescriptive Option	6
	Section 5.2 What is allowed and not allowed under this option	6
	Section 6.1 Description of the Performance-Based Option	7
	Section 8.2.2 Option 2: Prescriptive	8
	Closing comment.....	8
4	References	9

1 Introduction

The National Transport Commission is reviewing Australian road regulations to establish whether there is a better way to regulate general factors that cause driver distraction and the safe use of technology devices and recommend what changes, if any, should be made to the Australian Road Rules.

A Consultation Regulation Impact Statement (Developing Technology- Neutral Road Rules for Driver Distraction), released by the NTC in June 2019, assesses four options to compare the current technology-based road rules with different technology-neutral approaches for regulating driver distraction. The NTC has sought feedback on how the preferred option proposes to address the problem, the identified impacts of policy options on industry, governments and the community, the methodology used for measuring these impacts and conclusions on the preferred solution to the problem.

This submission, submitted by the Research Centre for Integrated Transport Innovation (rCITI) at the University of New South Wales, Sydney, is provided to the NTC in response to its request for feedback on the Consultation RIS. We have not addressed directly the questions raised by the NTC. Rather we have provided specific feedback in response to selected issues raised in the document that we believe to be most important to address.

This submission follows a previous submission prepared by rCITI (Regan & Prabhakaran, 2019), in response to the NTC's Issues Paper on Developing Technology- Neutral Road Rules for Driver Distraction.

The opinions contained in the submission are those of the authors, based on our own research, knowledge and understanding of the distraction and inattention literature.

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2 General Comment

Of the four options assessed, we agree with the NTC that the “Hybrid” option is the preferred option for the reasons stated in the Consultation RIS. It combines elements from the two other (non-baseline) options and seeks to provide the benefits from both approaches while minimising their disadvantages.

3 Specific Comments

The following are some specific comments on selected sections of the Consultation RIS.

Section 2.2.1 Responsibility for Distraction

Responsibility for the prevention and management of distraction is, as noted in the Consultation RIS, shared by many stakeholders who were highlighted during the recent National Summit on Driver Distraction convened in Brisbane by the Queensland State Government. There are some important stakeholders that could be added to the list here; although it is appreciated that the list is not exhaustive.

Section 2.3.3 Transition Towards Automation

It is important to note that, in most new vehicles equipped with SAE (2018) Level 2 Driver Support Features, a new activity critical for safe driving is created – the requirement for the driver to “supervise” the vehicle by periodically reassuring it (usually by touching the steering wheel) that s/he is still vigilant to other activities critical for safe driving. Whilst it is debatable whether this requirement is actually effective in maintaining driver vigilance (Cunningham & Regan, 2018), it is nevertheless a new driving task, required by automation, that should be considered: (a) in the context of defining what is proper and improper control of a vehicle under a Performance-Based option and (b) in the context of a Prescriptive option; in the sense that someone engaging in a secondary activity whilst the vehicle automation is operating may, in this case, have their eyes off the road, their mind off the road, and both hands off the steering wheel for appreciable amounts of time.

Section 3.2.1 Developing guiding principles for our options

It is stated in the Consultation RIS that “The Australian Road Rules define rider as the person who is riding a motor-bike, bicycle, animal or animal-drawn vehicle” and that “After considering this recommendation, we have decided that any changes or amendments proposed in the options considered in this consultation RIS should apply to drivers and cyclists.” (p.29-30).

The four options presented in the Consultation RIS are framed around drivers of *motor vehicles*. The definition of distraction, which informs the entire document, is an adapted version of a definition of motor vehicle driver distraction published by Regan, Hallet & Gordon (2011). Brown’s (1986) driving activities, which inform the Performance-based option, are derived from a functional analysis of motor vehicle driving; and the activities critical for safe driving derived from Engstrom et al (2013), which further inform the Performance-based option, also pertain to driving a motor vehicle.

It is recommended that the NTC give consideration to this issue for several reasons:

- (a) Definitions of Cyclist Distraction, Motorcycle Rider Distraction, and those pertaining to animal or animal-drawn vehicles, which provide the starting point for changes to the existing regulations, will be necessarily different; although they could be adapted from the Regan, Hallet & Gordon (2011) definition.
- (b) Activities critical for safe driving of a motor vehicle are not necessarily the same as those required for safe riding of a motorcycle, bicycle, animal or animal-drawn vehicle.
- (c) The kinds of competing activities that distract a motor vehicle driver and take their eyes off the road, hand(s) off the wheel and mind of the road may be different from those that compete for the attention of a motorcycle rider, bicycle rider or rider of an animal or animal-drawn vehicle.
- (d) Definitions of, and examples of, proper and improper vehicle control will differ between these different vehicle types given that they have different control characteristics and requirements.

Consequently, the observable behaviours associated with engagement in distracting activities will vary across these vehicle platforms, and any degradation in proper control of the vehicles when operators are distracted will vary across vehicle platforms. This will have obvious implications for the execution of Police enforcement activities.

Section 3.2.4 Defining Driver Distraction

We would like to note, in passing, that the definition of driver distraction by Regan, Hallett and Gordon (2011) was itself endorsed by a group of international experts. This was noted in our previous submission in response to the NTC's Discussion Paper.

Section 5.1.1 New offences introduced in the road rules

Table 2.1 lists interactions deemed illegal under the Prescriptive option by introducing new technology-neutral offences.

Whilst we have no issues, in-principle, with the content of the table, we wonder whether, taxonomically, it could be refined: to distinguish, more clearly, between sources of distraction that are technological or non-technological; and to be more precise in specifying the actions performed on the sources of distraction identified Column 3 of the table.

Cunningham, Regan and Imberger (2016), for example, identified from the literature the following fundamental actions performed on a wide range of technological sources of distraction (from mobile phones, in-vehicle technologies and wearable devices): locating; holding; looking; touching; typing; pressing; listening; scrolling; inserting; reading, and swiping.

A more detailed discussion of taxonomic issues relating to the classification of driver behavioural interactions with sources of driver distraction can be found in Regan, Young, Lee & Gordon (2009; Chapter 15).

Section 5.1.3 Offences in the current rules not maintained under this option

It is stated that "The offence in rule 297(1) (a driver must have proper control of the vehicle) would be replaced by an offence deterring drivers from looking away from the roadway for more than two seconds at a time."

Perhaps we have misunderstood this statement but, clearly, having proper control of a motor vehicle involves more than keeping ones' eyes away from the roadway for less than two seconds at a time.

Section 5.1.4 Exemptions in the Prescriptive Option

We do not feel that the exemptions that would be provided in the Prescriptive option are well enough justified by research data on road safety grounds. This point was made in our previous Submission to the NTC (Regan and Prabhakaran, 2019), in relation to the Status quo option:

- Police and emergency service personnel operate their vehicles in high speed, high workload driving situations, in sometimes charged emotional states, which may make them relatively more vulnerable than the average driver to the effects of distraction. If they are to be exempted from the Prescriptive option, appropriate measures should be put in place, if they have not already been put in place, to protect them from any adverse impacts of distraction in these operating environments.
- Drivers' aids are not defined in the ARR and may themselves divert attention away from activities critical for safe driving. There is very little information in the literature on the impact on activities critical for safe driving of driver interaction with drivers' aids. There is evidence from research that image-based navigation directions such as those displayed by GPS units and navigation apps in mounted and integrated devices are less distracting than navigation using paper maps; however, they are nevertheless distracting to some extent, depending on how ergonomically well-designed the human-machine interface is.
- Similarly, workers' aids (e.g. dispatch systems; ticketing machines) are not differentiated from drivers' aids in the ARR; and nor are they defined. As for drivers' aids, there is, again, very little information we are aware of in the literature on the impact on activities critical for safe driving of driver interaction with workers' aids. We are familiar with the study by Olsen et al (2009), cited in the NTC Consultation RIS, suggesting that commercial driver use of CB radios may reduce their crash risk. What is less clear, however, is how this "protective effect" comes about when it does. It is highly likely that CB radios distract commercial drivers; but that the net outcome is a reduction in fatigue-related crashes brought about by a mechanism of arousal (from talking on the CB radio).

Section 5.2 What is allowed and not allowed under this option

It is stated in this section of the Consultation RIS (p. 51) that "We are aware of research that indicates that interactions can be cognitively demanding and should not to be performed indiscriminately while driving (Strayer, et al., 2016)." and that "However, as we discussed in subsection 3.2.1, various studies suggest that using voice-controlled functions may be less detrimental to driving performance than visual manual interactions with technology (Simmons et al., 2017, cited in Goodsell, Cunningham & Chevalier, 2019)".

We would recommend that the NTC exercise some caution in deciding whether or not to allow motor vehicle drivers to control system functions with their voice, and draw their attention to the following abstract from a PhD dissertation successfully completed in 2018 by Dr Nurul Ikhmar (Ikhmar, 2018) - a PhD student who was co-supervised by the senior author of this

report. The study involved an extensive review of the peer-reviewed literature on this topic, and is currently being written up for publication.

“Distraction from the use of mobile phones has been identified as one of the causes of road traffic crashes. Voice control technology has been suggested as a potential solution to driver distraction by the manual use of mobile phones. However, new evidence has shown that using voice control interfaces while driving could require more from drivers in terms of cognitive load and visual attention compared to using a mobile phone manually. Further, several factors that moderate the use of voice control interfaces, for example usability and acceptance, are poorly understood. Thus, the current study aims to investigate the safety impact of using voice control interfaces on driving performance. A preliminary study, an online survey and a driving experiment were conducted to investigate how drivers interact with smartphone voice control interfaces and their effects on driving performance. First, the usage pattern of voice control interfaces while driving was explored using focus groups and interviews (preliminary study) and an online survey. Next, 55 participants completed a simulated driving task that utilises a valid and standardised method called the Lane Change Test (LCT). The purpose was to measure degradation of driving performance due to the concurrent performance of secondary tasks; either contact calling, playing music or text messaging task.

*These secondary tasks were identified as common tasks in the survey of the pattern of use of voice control interfaces while driving. Secondary tasks were performed in both visual-manual and voice control modes with either an Apple or a Samsung smartphone. Data on eye glance behaviour, workload and, usability and acceptance of the voice control interfaces were also collected. **Findings support the view that interacting with voice control interfaces while driving reduces distraction from visual - manual interfaces but is still distracting compared to driving without using any devices. Texting was found to degrade task and driving performance regardless of control modes and phone type.** Moreover, poor system performance leads to low acceptance of the voice control technology. Smartphone voice control interfaces have an apparent advantage over visual-manual interfaces. However, they still can impose some elements of distraction that may have negative implications for road safety.”*

Section 6.1 Description of the Performance-Based Option

We would like to make three comments on this section of the Consultation RIS.

It is important to appreciate that the kinematic behaviours and signatures of vehicles being operated “improperly” due to driver engagement in competing activities involving visual-manual interactions, and which would need to be detected and interpreted by Police under the Performance-based option, may overlap with kinematic behaviours and signatures of vehicles being operated “improperly” due to other driver states e.g. alcohol intoxication or fatigue.

Secondly, whilst the focus of the Performance-based option is on “improper” control brought about by driver engagement in competing activities involving visual-manual interactions, it is important to understand that the kinematic behaviours and signatures of vehicles being operated “improperly” due to visual-manual interactions may be confounded by vehicle kinematic behaviours and signatures induced by cognitive distraction. It is now well established, for example, that cognitive distraction (e.g. from mobile phone conversation) can actually improve lane keeping performance (due to various psychological mechanisms; see Wijayarathna et al., 2019); but while degrading other aspects of driving performance (e.g. event detection).

Finally, the kinematic behaviours and signatures of vehicles being operated “improperly” due to distraction from visual-manual engagement in competing activities will vary across the vehicle platforms within scope of the Performance-based option (motor vehicles, motorcycles, bicycles, animals and animal-drawn vehicles), as noted previously.

Section 8.2.2 Option 2: Prescriptive

It is stated that “In addition, law enforcement agencies have noted the significant enforcement challenge of requiring police to detect the eyes-off-road behaviour under various conditions. This could result in overzealous or too lenient enforcement in detecting this offence.”

We would like to point out that the challenge of requiring Police to detect the eyes-off-road behaviour of others under various conditions may, in a perverse way, require them to take their eyes off the road for periods of time which impact adversely their own safety. Measures should be in place to ensure that the act of enforcement itself does not carry an increased crash risk.

Closing comment

The current ARRs are focussed on high-risk behaviours brought about by distraction in the vehicle, and not on high risk behaviours emanating from driver engagement with sources of distraction from outside the vehicle – such as digital advertising billboards (especially moving billboards), which have been shown in several studies to take drivers’ eyes off the forward roadway for two seconds or longer (Dukic, 2013); and, in a recent study, to contribute to between a 40 to 50% increase in injury crashes (Gitelman, Doveh & Zaidel, 2019). The new Prescriptive and Performance-based options presented in the NTC’s Consultation RIS may provide an avenue for regulating driver engagement in such activities.

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