

ADOLESCENTS AND LEARNING TO DRIVE: RECOMMENDATIONS TO IMPROVE ROAD SAFETY THROUGH ADDITIONAL DRIVER EDUCATION

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Review article

Abstract: Motor vehicle accidents have catastrophic consequences and whilst the presumption is that every accident can be identified to a single unambiguous cause, educational campaigns are being implemented to reduce the high rate of accidents that occur on the roadway. Whilst the premise behind these campaigns is to highlight the risks to the road user, they appear to be misguided in their approach by focusing on the changing the behaviours that have already been learned. To incorporate these campaigns into the Graduated Licensing Scheme new driving modules can be integrated to ensure every new motorist understands how to drive safely.

Keywords: Adolescent drivers, Accidents, Educational programs, Learning to drive, Adolescent behaviour, Adolescent risk factors.

Introduction

Driving any motor vehicle safely requires neuropsychological abilities and perceptuomotor skills (Stutts et al., 2005) to maintain concentration and ‘predict ahead of time the risks that will appear in the roadway’ (Stahl et al., 2014). Whilst the motor vehicle is not formally recognised as a traditional means of which to cause injury or harm its lethality has been well documented from the commencement of formal record-keeping in Australia in 1925 (Elnour and Harrison, 2008; Federal Office of Road Safety, 1998; Peck and Warner, 1995). The main concern for many road users is that sharing the road with a large and often heavily loaded vehicle will increase the likelihood of a serious or fatal accident (Delaney, 2018; NTC, 2016). However, with a large percentage of influenced by other road users, it could be suggested that truck drivers are generally known to drive safer than drivers of other vehicles (BITRE, 2010; NTARC, 2017).

The likelihood that an accident between a standard motor vehicle and a truck occurring continues to increase as the number of cars and trucks on the road is also increasing due to

changes in contemporary work patterns, increasing urbanisation and the ongoing demand for goods and services (Mooren et al., 2014). However, as there is very little known about what causes or influences motor vehicle accidents and as there is no distinction made between an accident involving a truck and one involving a standard motor vehicle. With no two people driving a vehicle the same way, it will always be difficult to ascertain what factors caused or contributed to the accident particularly if looking wider than just the driver not abiding by the road rules or the vehicle not being roadworthy (Boyer, 2006; NTC, 2018).

Materials and methods

To develop an understanding into the adolescent driver and how their actions and behaviours influence the accident sequence, a review of literature will be able to examine motor vehicle usage and the potential for causing an accident (Jesson et al., 2011). The review will include word strings which may comprise of learning to drive, graduated licencing scheme, motor vehicle accidents\vs and adolescent drivers. Whilst aspects in the literature does not distinguish how experience, cognition

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or driving abilities influence other road users in the accident sequence, 'Grey literature' or the materials and research that typically fall outside of traditional academic publishing will be included (Schöpfel and Farace, 2009) which should clarify some of the areas not addressed in traditional academic publishing.

With the focus on driver distractions and mobile phone usage whilst driving and by introducing harsher penalties that are intended to curb this behaviour, it could be suggested that a large number of aspects which will benefit the adolescent driver to reduce the high prevalence in causing or influencing an accident. Therefore, by conducting a theoretical analysis, a better understanding of driver education and its relationship on driver behaviour can be discovered and translated into practice for the Australian adolescent. As part of this analysis international driver education models will be included to identify if any concepts can be introduced into the Australian Graduated licencing scheme.

Results

Driving any vehicle is as individual as it is similar, the problem is that no two people drive a motor vehicle the same way and the behaviours they exhibit have been learned from a very young age. At the same time, in the event of a road accident, the investigation does not consider age, gender or driving experience or the influence the vast array of in-vehicle technologies that now standard in most vehicles. This means that if an accurate measurement of a persons driving ability is going to be undertaken, it must reflect the actual abilities of that one driver (Kieras and Butler, 1997) and demonstrate that any alternative scenario would have the same effects on the driver because it exceeded their capabilities (Mathew and Rao, 2007).

Whilst there are educational campaigns now being introduced to provide all motorists with a better understanding of their surrounds and the risks unsafe driving presents to all road users, these campaigns do not appear to be having the intended benefits in reducing the high rate of accidents that occur on the roadway. This is where incorporating these same concepts into the Graduated Licensing Scheme will provide all adolescent drivers with safer driving modules that can be integrated across the scheme to ensure every new licence holder understands the consequences of unsafe driver behaviour which will form the foundations of their driving abilities into the future.

Safe driving

There is an underlying assumption that all road-related accidents are caused by human or driver error, vehicle or mechanical failure and then as a wider system issue for the trucking industry, the influence exerted by other parties involved in the transportation of products by road (Jones, 2013; NSW Police Force, 2017; Queensland Police Service, 2018). A general problematic assumption is that every driver has the same series of skills and will apply these skills the same way. However, motorists can be motivated by unconscious impulses, are different in age and gender and may have more or less driver experience (Åkerstedt and Kecklund, 2001; Phillips, 1979; Scott-Parker et al., 2009) with subsequent actions and behaviours known to influence the sequence of events which caused or contributed to a road accident.

Every licence holder develops driving habits and traits over an extended period of time with these influencing their safe operating of a motor vehicle; therefore, influencing the extensive range of skills needed in the learning to drive process (Lewis-Evans et al., 2011). It is within these taught skills and abilities that all drivers should learn to be able to apply the correct response to any changes in driving conditions, process large volumes of information from different sources and be consciously aware of the environment in which they are in whilst often continuously and simultaneously stationary and mobile (Delaney, 2018). However, there is always the potential that the driver could become decoupled from the task of driving a vehicle safely because of these very same reasons (Dingus, 2014).

Road-related accidents causing injury occur every 2 seconds and fatal injuries are recorded every 50 seconds (Goniewicz et al., 2012). With very little reduction in motor vehicle accidents, an attempt to address these concerns has witnessed an increasing number of safe driving campaigns being introduced and communicated across popular media (Antoun et al., 2016; Cismaru and Nimegeers, 2017; NSW Centre for Road Safety, 2018; Yadav and Kobayashi, 2015). The problem with these campaigns is that they have been designed to change the behaviours of the driver who has developed poor driving behaviours from the very moment they passed their driving test as an adolescent (Elvik, 2016; Lewis-Evans et al., 2011). This means that any behaviour exhibited by a driver is deemed as subjectively rational because the behaviour reflects the drivers own moral and ethical codes of what is or is not acceptable (Barbosa and Jiménez-Leal, 2017).

The underlying issues with road safety campaigns is that to change a specific series of behaviours that guide actions which may not be appropriate needs to be considered in a multi-dimensional construct, as there is the possibility that any singular campaign will generate unintended outcomes (Bailey and Wundersitz, 2019). The value of road safety campaigns, therefore, comes into question, as the actions or behaviours of each driver may reduce; however, secondary or tertiary issues could arise. This means that by addressing one set of issues that influence the potential that a serious or fatal accident will occur, will be offset by another series of issues which were not addressed in the first instance. Therefore, most drivers will see no reason to change their behaviours because the actions will be defined as rational and will produce a satisfactory outcome that is more appropriate than any alternative actions or behaviour (Elster, 2015).

Cognition and driving

It is important to understand the relationship between the driver's cognitive processes and early driving behaviours as these processes are linked to attention, concentration, general cognition and memory (short term and long term). Spiers and Maguire (2007) discovered that premotor, parietal and cerebellar regions of the brain predominately control starting, turning, reversing and stopping a motor vehicle and the lateral occipital and parietal regions control evasive manoeuvres that are essential avoiding an accident. If a driver is not being attentive because of a lack of attention or a misprioritised, neglected, cursory or diverted gaze (Beanland et al., 2013b), the disruption to the drivers visual, auditory, biomechanical, physical and cognitive functions may influence the sequence of events that lead to an accident (Ghazizadeh and Boyle, 2009).

One of the key problems identified is that over half of the time a driver spends behind the wheel, is taken up with both physical or behavioural distractions (Fitch et al., 2011). This may be the reason that the cognitive responses for every driver is linked to road signs which are designed to convey a specific message and the required specific cognitive response will hopefully instigate an action that is based on the information contained within the sign (Coronado et al., 2011; Merat et al., 2014). Visual input or stimuli is also required to ensure the driver can pre-empt a change in the environment (Stahl et al., 2014) and these planned or pre-emptive actions are solely based on the volume of information the driver can reasonably focus on at any given time (Ferdinand and Menachemi, 2014). Indicating that to drive any vehicle safely is reliant on a complex

information system, the number of action choices presented to the driver and how these are interpreted and then acted (or not acted) upon.

Road accident investigations

Causal factors for all motor vehicle accidents will vary depending on the outcomes of the post-accident police investigation. The police are responsible for investigating road-related accidents and every accident, irrespective of vehicle type, will be subjected to the same series of investigation police investigation protocols to determine who and what was at fault. Whilst the investigation will encompass a range of known causes, the assessments will only be looking for evidence that clearly determines a single cause, for the purposes of proportioning blame and commence prosecutorial actions against one or more drivers for operating a motor vehicle in such a manner that it contravenes the applicable road traffic legislation (Aworemi et al., 2010).

Road accident investigation may be adversely influenced by investigator bias in the analysis of the data that is collated from the evidence that is available (Hutchinson et al., 1981). Generally, evidence is collected which only looks at the behaviour of the driver and vehicles involved in the accident. Key findings are often based on the presence or absence of alcohol and other drugs, the identification of vehicle speed and the roadworthiness of the vehicle will be examined as well as determining if the driver was using a portable mobile device (Goel and Vidal, 2014; Häkkinen and Summala, 2001; Queensland Police Service, 2018; Soole et al., 2013; Summala and Mikkola, 1994; Wundersitz, 2014).

Whilst there is no evidence to support the premise that every driver does not possess the cognitive capacity to understand the consequences of risk and safety (Keating, 2007), however, the road accident investigation process does not appear to consider the experience, age and gender of the driver (Scott-Parker et al., 2009), or the fact that every driver can potentially underestimate how dangerous a situation is, make critical decision errors (McDonald et al., 2014) and behave inappropriately at a single point in time (Sivak et al., 1981) There will, therefore, be wider complex road and transport system issues that will not be identified and which caused or contributed to the accident because these factors fall outside of the current investigation scope.

Other industries such as rail and aviation take a more pronounced wider system view of accident phenomenology, the road transport system is currently limited in its view of the accident in

the context of police investigations. Issues such as driver fatigue and fatigue-related symptoms related to a reduction of reaction time, less attention and inappropriate decision making are usually not considered (Dawson and Reid, 1997; Dawson et al., 2018; Sadeghniaat-Haghighi and Yazdi, 2015). To mitigate against the risk that fatigue presents to the motorist, there is the recommendation that all drivers will take additional rest breaks for long journeys and be well-rested before driving, as fatigue typically associated with a lack of sleep, driving while drowsy, and pathological sleepiness (Arnold et al., 1997). However, in the event of a serious or fatal injury the evidence may not support the notion that the accident was in any way fatigue-related, including unexamined issues with the driver's cognitive fatigue that will cause deficits in attention (Guillemin et al., 2018) and muscular fatigue which can compromise performance of activities (Taylor et al., 2016).

Whilst the motor vehicle is not formally recognised as a traditional method of suicide, it is widely suggested that a small percentage of motor vehicle accidents are suicides (Elnour and Harrison, 2008; Peck and Warner, 1995). The major issues that the accident investigator must overcome is that intent must be established (Andriessen, 2006) and with a percentage of motorists acting impulsively or engaging in high-risk behaviour, there may only be speculation on whether a motor vehicle accident was a deliberate act of the driver or just a traditional road accident resulting in a fatality (Gullone and Moore, 2000; Spano, 2003). This would mean that unless some message was conveyed by the driver of the motor vehicle, intent will be difficult to determine as the normal characteristics found in the motor vehicle accident will typically mask the factors that can be identified as an intentional act (Bollen and Phillips, 1981).

Blind zones that surround all vehicles must also be considered in the accident investigation, as these zones obscure large parts of the vehicle from the driver, which will result in the driver not being able to visually identify the location of pedestrians and smaller motor vehicles as well as physical structures (Fitch et al., 2011). Depending on the size of the vehicle these blind zones may not be expansive; however, they are commonly overlooked as a possible causal factor. While the driver will fill in these blind zones, by making assumptions on where an object was the last time it was visible (Driver and Noesselt, 2008) the integration of the information from other senses to offset any gaps in calculations may not provide the driver with a detailed understanding of the environment (Knight et al., 2008).

Adolescents and driving

If there is a need to change the behaviours and actions of all drivers to reduce the number of road accidents, then it is reasonable to assume that by providing every driver with the correct skills and abilities to drive safely will have the greatest impact. A major problem with road accidents stem from adolescent drivers who are one of the largest population groups to be fatally injured because of their inexperience and sometimes risk-taking driving behaviour (AIHW, 2007; Ellemers et al., 2013). The adolescent is typically considered reckless, impulsive (Commons and Pekker, 2008), many will take risks (Romer et al., 2014; Steinberg, 2004) and disregard the road rules. In this tumultuous and unique period of development that encompasses the years between ages 10 and 19 (Smith et al., 2013), a large percentage of adolescents will not understand how the rapid and overlapping changes in their development influence their ability to rationalise their own behaviour (Commons and Pekker, 2008; World Health Organisation, 2018).

In respect of being authorised to drive an underlying issue is that when a person is legally permitted to learn to drive a motor vehicle at 16 years (Soll, 2006), seen as a very important in the journey into adulthood (Graham and Gootman, 2008), there is an the influx in antisocial behaviour (Fuhrmann et al., 2015). While the adolescent driver's cognitive reasoning is limited by lack of experience and understanding, every jurisdiction in Australia has implemented a graduated licence approach that integrates the Australian Road Rules (NTC, 2018) for all new drivers. This scheme provides the adolescent with the skills required to drive, curb the risk taking behaviours that are embedded within the adolescent and address the conduct that is influenced by the physiological and psychological developments and numerous environmental factors (Mokdad et al., 2004; Romer, 2003; Steinberg and Lerner, 2004).

What is not considered by the scheme is there are many adolescents who will mature earlier than their peers and often experience the desire to take more risks, become adventuresome and display increased impulsiveness (Gullone and Moore, 2000) and the connections they form at this early age will often influence these behaviours (Mokdad et al., 2004). This means that their own moral code could be conflicted, and they will find it difficult to control their emotions and behaviours. It could also be suggested that with most adolescents typically starting to engage in dangerous behaviours from as early as 11 years and which will peak at around 16 years (Bräker et al., 2015) it will be unlikely that alcohol consumption, experimenting with illicit

substances as well as other antisocial behaviours (Arnett, 2000; Fuhrmann et al., 2015), will start to reduce until they reach 26 years (Chiasson et al., 2017).

Learning to drive

To drive a motor vehicle safely requires the integration of numerous complex tasks and because of this and before the adolescent is permitted to drive any standard motor vehicle without restriction, the graduated licencing scheme is separated into three individual stages all of which must be successfully completed. However, because learning to drive a motor vehicle is difficult to navigate the learner driver stage has been segregated into sub-groups which allows the driver to understand the road rules, undertake practical supervised driving and demonstrate these skills to an independent assessor before they are permitted to transition to the next stage (Department of Transport and Main Roads, 2018; Roads and Maritime Services, 2018; VicRoads, 2018a).

One of the reasons that every adolescent driver must successfully complete the graduated licencing scheme is to ensure every newly licenced driver in Australia can apply the foundational principles of safe driving (Chen et al., 2006; Morrisey et al., 2006). However, with the National Truck Accident Research Centre (NTARC, 2017) finding that 93 % of all truck accidents are influenced by other road users and with the adolescent driver having higher probability of being involved in a fatal accident (AIHW, 2007), it could be suggested that there is a flaw in the foundations of the scheme. Whilst the scheme itself has been developed to ensure every newly licenced driver can apply the road rules, recognise and dismiss common distractions and apply the skills and abilities that are essential to correctly estimate the position of all other road users (Grünwald, 2016; Summala et al., 1996), there appears to be a misalignment in how the scheme grades the competence of every newly licenced driver.

The indication is that the educational value of the graduated licencing scheme is limited because it does not appear to consider normal adolescent behaviours and the influence these have in terms of reducing serious and fatal injuries (Audrey and Langford, 2014). Therefore, the framework that underpins the scheme will need to be altered to ensure every newly licenced driver in Australia understands and applies the foundational principles of driving safely. This will be reflected in the way the adolescent drives in all weather conditions and around vehicle types, because without these skills

they may inadvertently influence a sequence of events which will result in a motor vehicle accident (BITRE, 2018a; National Road Safety Strategy, 2019).

International driving models

The drivers licence is one of the most sought after and guarded privileges a person, irrespective of nationality can have in their lifetime. It can be surmised that most countries worldwide will experience the same issues with their adolescent drivers and have similar road types, weather conditions and traffic volumes and because of this, the guidelines that have been incorporated in learning to drive are intended to better prepare the adolescent driver. Whilst there are many countries that incorporate a Graduated Driver Licensing System into their learning to drive process, there appears to have considerable differences in the legal age, the duration that a person must be supervised by an authorised person (Department of Transportation, 2018; Goodnow, 2017)

The noticeable differences in these types of schemes include the Driver Education program that has been incorporated into many secondary schools across the United States of America, as this includes a purpose-built curriculum which is delivered by qualified educators in the school system (Department of Transportation, 2018). In Colombia, the adolescent must complete approximately 40 hours of practical driving, prior to the adolescent applying for a full licence; however, a practical driving assessment must be completed before an unrestricted licence is issued (Agencia Nacional de Seguridad Vial, 2018). In France to better prepare young drivers about the dangers of the road (Ministry for Transport, 2018), the model requires the adolescent driver to complete 20 hours of practical driving before they can undertake a theory-based assessment which is followed by completing approximately 3,500 kilometres of supervised driving, prior to being issued with an unrestricted drivers licence.

The Graduated licencing scheme

It is suggested here that there are a significant number of elements found in the current Graduated Licencing Scheme are necessary in learning to drive; however, there are equally a number of elements which does not address the reasons that safer driving is essential as the adolescent gains practical driving experience. This means that by incorporating the driver education campaign currently being implemented for experienced drivers, the adaptation to the scheme will see significant gains in 'social,

emotional, behavioural, and academic outcomes' (Spencer et al., 2017), which can be capitalised on through mentoring the adolescent driver as they practice the skills needed to drive in real-world environments (Dhar, 2015; Hanowski et al., 2007).

Whilst including driver education models in the secondary school system may appear to have value in improving driver behaviour as the driver education program is more structured; the Department of Transportation (2018) found that these types of programs have little impact in reducing the number of adolescent road-related fatalities. This is the reason that the changes to Australia's program can introduce educational campaigns that are similar to those found in Australia's rail networks (Public Transport Victoria, 2013; Queensland Rail, 2018) and the aviation industry (CASA, 2018), as these campaigns identify unsafe behaviours and the measures that may be taken that prevents continued unacceptable behaviours. Suggesting the adolescent driver will be rewarded for exemplary driving habits and provided with the resources to understand the consequences of a behaviour and highlight how these influence critical decision errors (McDonald et al., 2014; Simons-Morton et al., 2016) and other typical driving risks that can impact on other road users (Yannis et al., 2013).

Additional elements in the scheme can include the mandatory registration with an accredited driving school, where the adolescent driver must undertake a targeted driving course in a controlled environment that focuses on the road rules, road signage and other safety directions prior to undertaking the theory-based assessment required for the Learner's permit (Finnerty, 2014). Therefore, the learning to drive process will ensure that the adolescent driver is better prepared to drive a motor vehicle and be aware of the conditions that are commonly found when driving and develop an understanding into what may be the most appropriate response to prevent an accident (Fig. 1).

Additional training modules

Given that driver education does not decrease the risk of an accident for the adolescent driver in the early stages of driving, there is the supposition that the training and driver assessments influence the driving skills (Tilleczek, 2004). For example, task disengagement and episodes of mind-wandering are likely to be encountered by the adolescent driver as external events will play a significant part in the abilities of the driver to remain focussed on the road (He, 2011; Seli et al., 2013). Whilst there

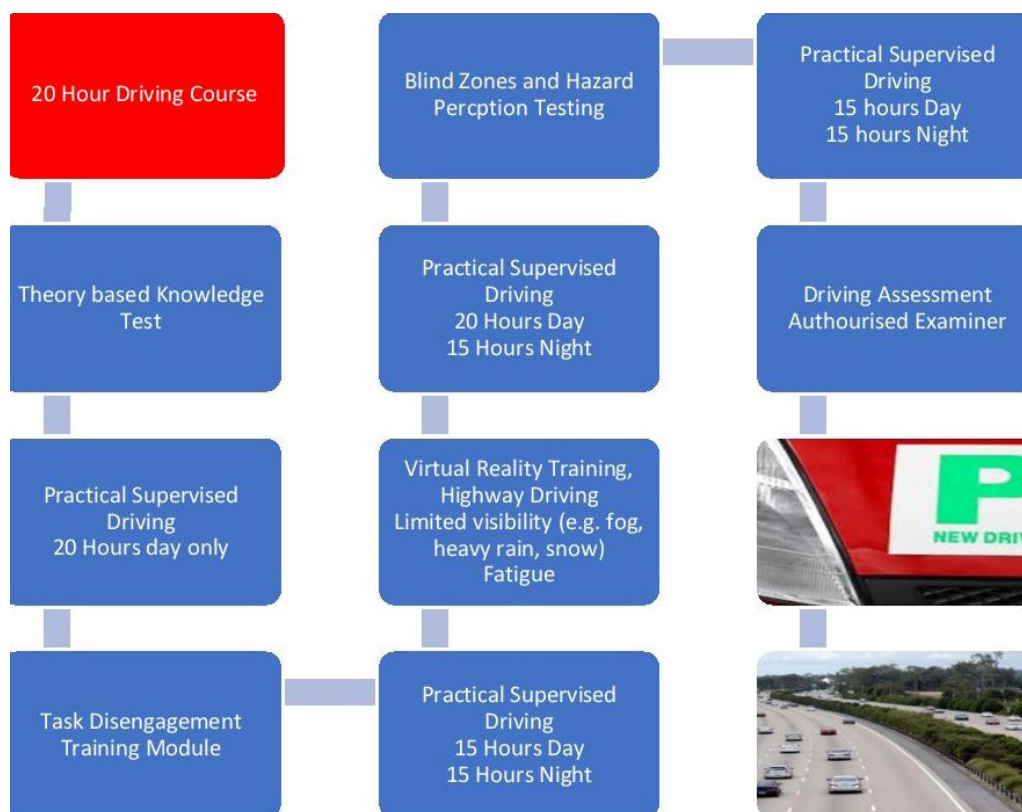


Fig. 1 Proposed Graduated Licencing Framework

is a need to ensure that the adolescent driver is provided with the correct training to learn to drive safely, the training must be complementary to the learning modules included in the current learning to drive practice and be able to address the numerous actions and behaviours that many adolescent drivers exhibit which are copied from the driving behaviours of others.

Relative to experienced drivers, road accidents involving adolescent drivers typically involve exceeding the posted speed limit, driving too fast for the prevailing conditions, inadequate surveillance, distraction and colliding with stationary objects (Curry et al., 2011). By introducing the most appropriate training; for example, stress exposure training will enable the adolescent driver to identify and respond appropriately to the numerous stressful situations encountered while driving (Driskell and Johnston, 1998). At the same time the adolescent driver's willingness to replicate the driving styles they use when playing the numerous PC and video console driving games can be addressed (Kostermans et al., 2014), as these virtual driving environments do not prepare the adolescent driver for how to accurately anticipate the consequences of their actions (Keating, 2007).

Whilst incorporating additional modules into the learning to drive process should influence the accident potential, it is important to ensure that these do not significantly alter the fundamental principles that are needed to drive a motor vehicle safely. This is the reason that each of the components or series of assessments must be successfully completed, prior to moving through to the next stage that will include an additional component (Department of Planning Transport and Infrastructure, 2018; Department of Transport, 2018). This is where the key issues in driving under the influence of alcohol, exceeding the posted speed limit or using a mobile phone (Cumiskey, 2017; Goel and Vidal, 2014; Häkkänen and Summala, 2001; Summala and Mikkola, 1994) will include guidance on the behaviours of motorcycles, trucks and other vehicle types and the blind zones these vehicles create or travel in (Peter, 2013).

A New approach to driver training

To reformat the Graduated Licencing Scheme is essential to ensure each driver is provided with the skills that are needed to drive through practical guidance and not pre-emptive actions (VicRoads, 2018b) and address typical adolescent behaviours. This is noticeable with the gaps in the framework that forms the Hazard Perception Test (HPT) which is incorporated into stage one or two of the scheme.

This assessment contains fifteen technologically based questions that allow all new drivers to assess the speed that a person can identify and respond to a dangerous driving situation (Department of Planning Transport and Infrastructure, 2018; Department of Transport and Main Roads, 2018).

However, as the HPT is online-only it does not show the driver how dangerous a situation really is or include what the most appropriate response to the situation would be; therefore, the hazards which the adolescent driver is being assessed on does not accurately reflect real scenarios that may be encountered by the driver. This means that when they encounter an environment or hazardous situation they are unfamiliar with (Terry, 2011), there is the potential that they will not be able to apply the correct actions because they were not included. Nevertheless, by integrating the additional modules into the scheme will benefit the way the adolescent driver develops their driving skills, they can develop a vast library of driving practices that they will be able to draw on in the event they encounter these types of situations.

Recommendations for change

To limit behavioural change by imposing more restrictions and harsher penalties that encompasses mobile phone use, driving erratically or exceeding the posted speed limit (Dittmann, 2005; Shamo-Nir and Koslowsky, 2010), will not address the typical adolescent risk-taking behaviours that they are prone to adopt. In terms of driving a standard motor vehicle and to reduce the percentage of serious and fatal injuries, education and training must address driver behaviour to ensure that the adolescent driver is provided with the foundations of knowledge to understand how behaviours influence safe driving (Mayhew, 2007). This practice will not only benefit the adolescent throughout the Graduated Licencing Scheme, as they will have to identify their own behaviours and actions, these additional learning modules will form the framework that guides their future driving. (Norfleet et al., 2011)

The purpose of these changes are to ensure that the adolescent driver understands the consequences of behaviours and actions that are inappropriate when they are behind the wheel, which will see a positive impact on reducing road fatalities (Meadows, 1994). The learning materials provided to the adolescent will ensure they can drive a motor vehicle safely as well as make them more aware of the risks that they may encounter in unfamiliar environments. This way the foundational skills that are incorporated into the framework can be applied across multiple

platforms (Winston et al., 2015) which allows the adolescent to practice these skills in online and virtual reality simulations (Brown et al., 2016; Kemeny and Panerai, 2003), as each simulation can demonstrate how high-risk behaviours will influence the risk of a collision (Albert and Steinberg, 2011; Glendon et al., 2014).

In each of the new modules, the adolescent driver will be able to apply higher-order cognitive skills to anticipate or avoid dangerous driving situations (Beanland et al., 2013a). In particular, when the adolescent driver enters a new environment or experiences driving conditions that presents different hazards (Winston et al., 2015), the new modules can increase awareness and through reasoning, the adolescent apply the most appropriate strategy to navigate these environments effectively. Therefore, by changing the framework every driver who holds an open drivers licence will be able to consistently demonstrate by the completion of the P-Plate period 2, what actions are appropriate and have the tools and resources that can assist in reducing the high incidence rate of serious and fatal collisions that involve this population group (BITRE, 2018b; Romer et al., 2014).

Conclusion

To develop new practices that will limit the increasing number of road-related accidents, causing injury to persons, property or the environment requires an understanding into how the driver is provided the skills and experience and identify new models of practice that can

change the actions or behaviours of every driver. The underlying issue with the accident investigation process for road accidents is that the assumption is all drivers have developed the same extensive range of skills, can correctly respond to changes in driving in an environment which is continuously and simultaneously stationary and mobile. At the same time to ensure drivers are better informed, there are numerous behavioural change road safety campaigns which are intended to ensure each driver understands the consequences in not adopting the correct way to drive a vehicle.

The problem is that these types of campaigns only change behaviour and not promote the type of behaviour needed to reduce the accident and when the adolescent, applies for a permit to drive, they cannot understand the context these road safety campaigns have. This means that they must be incorporated into the learning to drive process, to support the adolescent driver's skill development with being more aware of the risks that they may encounter in unfamiliar environments. To ensure that the adolescent can develop the correct strategies and overcome their prevalence for taking additional risks, making inappropriate decisions and the consequences of acting outside of the law, they can enhance the practical guidance and apply this knowledge to drive safely throughout their adult life. Therefore, by changing the learning to drive process, before every open driver's licence is issued the driver will already understand which actions and reduce the increasing rate of serious and fatal collisions.

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