MONASH University
Accident Research Centre

HAZARD PERCEPTION AND LEARNER DRIVERS

A THEORETICAL DISCUSSION AND AN IN-DEPTH SURVEY OF DRIVING INSTRUCTORS

by

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Hazard perception and learner drivers: A theoretical discussion and an in-depth survey of driving instructors

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Abstract:

A study was undertaken to investigate the content of driver training and attitudes towards computerised testing of hazard perception skills using the introduction of the VicRoads Hazard Perception Test (HPT) as an example. A review of the literature regarding hazard perception was carried out and Klein's (1989, 1993) Recognition-Primed Decision Making Model was introduced as a basis for developing a better understanding of hazard perception as a cognitive process with behavioural outcomes. In-depth interviews with fifty driving instructors were undertaken to investigate the methods used to teach cognitive based driving skills, and to determine attitudes towards the computerised tests and the HPT. It was concluded that driving instructors were aware of the skills essential for safe driving, however these were not the traits they necessarily looked for when recommending that Learner Drivers attempt the Driver Licence test.

Key Words:
(IRRD except when marked*)

Hazard perception, driver training, Learner drivers, cognitive driving skills,

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EXECUTIVE SUMMARY

The VicRoads Hazard Perception Test (HPT) was introduced as part of Victoria's graduated licensing scheme. The HPT is an example of computerised assessment of hazard perception skills and its introduction was used as an opportunity to assess the attitudes of driving instructors to this type of test, the effect its introduction has on the instructional behaviour of instructors, and instructors' understanding of hazard perception as a novice driver issue. There is evidence that novice drivers do not perform as well as more experienced drivers on hazard perception tasks, which may have implications for the safety of young drivers if hazard perception skills can be improved.

A hazard has been described as any aspect of the road environment or any combination of circumstances on the road that an individual perceives to be dangerous. The term "hazard behaviour" was introduced in this report to describe the perception of a hazard, information processing, and the resulting behaviour. It was considered that perceiving a hazard or potential hazard is only likely to aid the safety of road users if the behavioural response to the hazard is appropriate and timely.

In-depth interviews with fifty driving instructors were conducted to investigate their approach to training learner drivers and their attitude towards computerised hazard perception testing and the Victorian Hazard Perception Test in particular. This project provided an opportunity to investigate the attitudes of instructors to computer-graphics based tests of hazard perception in general in addition to the specific test used in Victoria. It was considered that the success of the this approach to hazard perception testing would depend, in part, on the specific attitudes of instructors towards the test and, in a broader sense, on their attitudes towards cognitive skill development amongst learner drivers.

Driving instructors identified many of the cognitively based skills which are identified in the young driver literature. Twenty percent of the driving instructors interviewed rated hazard perception skills as the most important skill for Learner drivers to learn in order to become safer. Instructors generally used a combination of explanation and practice as their teaching method.

Driving instructors were able to recommend a number of methods for assessing hazard perception skills besides the current computer based test, including in-car testing. At the time the interviews were conducted, driving instructors held a neutral attitude towards the Hazard Perception Test.

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There is increasing interest in the role of hazard perception and other cognitive skills in safe driving behaviour. Concern about the ongoing crash problems associated with novice and inexperienced drivers has led to interest in the way poor cognitive skills might contribute to them. It is generally accepted that there are differences, in particular, between the hazard perception skills of inexperienced and experienced drivers.

The possibility that these differences in hazard perception skills have a causal involvement in the novice-driver crash problem can lead to a number of potential solutions, depending largely on the perceived nature of this skill and its development:

- If it is held that hazard perception skills are amenable to training or education, then it might be argued that additional training or educational experiences early in the driving career could be used to assist in their more-rapid development. Such a viewpoint would lead to the development of educational programs or instructional material for learner or novice drivers, or to the inclusion of specific training for hazard perception by professional driving instructors during the learner period.

- If it is thought that hazard perception skills develop with chronological maturity, then an appropriate countermeasure would be to increase the age at which young drivers are able to drive without an accompanying, experienced driver.

- If hazard perception skills are thought to result from experience in the driving environment and are not considered amenable to an instructional approach, an emphasis on increased levels of driving experience within the safe context of a graduated licensing scheme would be appropriate. Such an approach might stress the development of hazard perception and other cognitive skills in the relative safety of the learner period by recommending or requiring some minimal level of driving experience in increasingly complex driving situations.

- Regardless of the processes underlying the development of hazard perception skills, it may be appropriate to assess drivers' skills in this area as part of the licensing process, with the intention of postponing some stage of the graduated licensing scheme until the driver is able to demonstrate some minimal level of skill.

Aspects of the licensing system in Victoria are consistent with each of these approaches. There are a number of educational or training resources available in the hazard perception area; the minimum licensing age (18 years) is relatively high compared to other jurisdictions (both in Australia and elsewhere); the Victorian graduated licensing system allows two years between the minimum learner permit age and the minimum licence age, with recommendations of minimal levels of driving experience to be accrued in that time; and a test of hazard perception skills has been introduced recently that requires a minimum level of performance before drivers can move from the learner period onto a probationary licence.

A hazard perception test, in addition to providing an assessment of skills, might also be expected to impact on the way in which driving instructors and others teach learner drivers. It might be expected, for example, that the use of educational and training resources and approaches directed towards the development of hazard perception skills would increase, and it

might also be expected (if the emphasis on experience is widely accepted) that the amount of driving experience accrued by learners would increase.

This project was planned in the period following the introduction of the Hazard Perception Test in Victoria, and reflects the focus, at that time, on the effect of the test. The focus of the project was broadened, taking in a more-general interest in the nature and role of hazard perception skills, their development, and the potential role of the driving instruction industry. This report therefore reflects a number of different aims, including:

- A review of the literature concerning the current understanding of the role of hazard perception skills in novice-driver crashes.
- A discussion of the place of hazard perception skills in the broader context of safe driving behaviour.
- The application of a decision-making model to hazard-related behaviours.
- An analysis of the processes that might underlie the development of hazard perception skills and the implications of these processes for the different measures introduced above.
- An investigation of the effect of the introduction of the Hazard Perception Test on the instructional practices of a sample of driving instructors.
- An investigation of the attitudes of driving instructors to computerised assessment of hazard perception, their knowledge of the importance of cognitive skills in driving safety amongst novice drivers, and their practice in relation to these skills.
- The development of recommendations that might improve the effectiveness of driver assessment and driving instruction in the learner period, and recommendations that might be useful to other jurisdictions considering the introduction of this type of assessment method.

This report, therefore, consists of a review of relevant literature and a discussion oriented towards placing hazard perception in its broader context, a presentation of the results of the survey of driving instructors designed to assess the place of hazard perception in the driving-instruction process, and a discussion of the implications of both the theoretical discussion and the survey results.

It is important to emphasise that the Victorian Hazard Perception Test was used here as a specific case of a more-general approach to the incorporation of a hazard perception test into the licensing system. The attitudes and responses of driving instructors in Victoria are likely to be duplicated in other jurisdictions considering the introduction of a similar approach, and it was considered appropriate to develop some general recommendations that might be useful in such jurisdictions.

LITERATURE REVIEW AND THEORETICAL DISCUSSION

Background

It is well known that young or inexperienced drivers have a higher rate of crash involvement than older, more experienced drivers (Finn & Bragg, 1986; Matthews & Moran, 1986, Cavallo & Triggs, 1995). Factors such as sensation seeking and risk taking behaviour (Jonah, 1997), personality and social factors (Jung & Huguenin, 1992), drink driving (Deery & Love, 1996), hazard perception latency (Elander, West & French, 1993), overconfidence (Summala, 1987; Gregersen & Bjurulf, 1996), automation, and workload management have all been found to influence the safety of novice drivers. This report is specifically concerned with the involvement of hazard-perception skills in the relatively high crash risk of younger or less-experienced drivers.

Armsby, Boyle and Wright (1989) define a hazard as "any aspect of the road environment or any combination of circumstances on the road that an individual perceives to be dangerous" (p.45) and Graham and Kinney (1980) define a hazard as "some potential danger beyond one's immediate control" (p.13). A hazard, therefore, may be viewed as an event which is out of the driver's control, and which has some perceived element of danger associated with it. Both Crick and McKenna (1992) and Mills, Hall, McDonald and Rolls (1998) define hazard perception as "the ability to identify potentially dangerous traffic situations" as they arise, and Mills et al. (1998) add that it is the ability to "read the road".

Hazard perception skills are considered essential for safe driving (Bailey, 1994; Benda & Hoyos, 1983; Mills et al., 1998), and there is evidence that novice drivers do not perform as well as more experienced drivers on hazard perception tasks (Armsby et al., 1989; Benda & Hoyos, 1983; Finn & Bragg, 1986; McKenna & Crick, 1997). There may be implications for the safety of young drivers if hazard perception skills can be improved as a result of training (McKenna & Crick, 1997; Mills et al. 1998), although there is little evidence that driver training produces road safety benefits (Lund & Williams, 1985; Lund, Williams & Zador, 1986; Raymond, Jolly, Risk & Shaoul, 1973; Skelly, 1968).

There is evidence that experience as a driver is important for the development of hazard perception and other cognitive skills. Brown and Groeger (1988) suggested that younger drivers might be more likely to misperceive and misjudge traffic hazards due to their limited driving experience. One of the major findings of laboratory tests of hazard perception is that the time taken to respond to a hazard is related to age and experience (Quimby & Watts, 1981). In their extensive review of the literature, Mayhew and Simpson (1995) emphasise the role of experience in perceiving hazards. Because hazard perception skills are cognitively based, it has been argued that these processes may only be improved by experience and that training may create cognitive strategies that are dissimilar to those strategies that result from experience (Harrison, 1997, 1999a).

It is important to recognise the tension between training and experience as appropriate measures for the development of hazard perception skills. Harrison (1999a) suggested that training (as opposed to experience) was unlikely to provide any substantial road safety benefits. He also argued that there are reasons to believe that training or educational approaches might result in increases in crash involvement in some circumstances. This point of view is not widely held, however, and the level of use of professional driving instruction during the learner period suggests that the wider community view is more favourably disposed towards driver training as

a road safety measure. This issue is discussed below in the context of hazard perception skills in general, as is the current state of the graduated licensing system in Victoria.

The Victorian Graduated Licence and the Hazard Perception Test

The Licensing System

The Victorian graduated licensing scheme aims to have novice drivers gain experience whilst minimising their exposure to high risk driving situations. In Victoria, Learner Drivers must be accompanied by a fully licensed driver and must have held their Learner Permit for six months before they can attempt the Probationary licence test. If a Probationary licence is acquired in an automatic vehicle, the Probationary driver is restricted to driving an automatic vehicle throughout their Probationary period. Probationary licensed drivers must have zero blood alcohol content and must not drive high-powered vehicles (VicRoads, 1992).

The minimum age for obtaining a learner permit is 16 years, and the minimum age for obtaining a probationary licence is 18 years. At the time of the introduction of the Hazard Perception Test, the driving test attempted at the end of the learner period involved a theory test and a practical driving test.

The Hazard Perception Test

The VicRoads Hazard Perception Test (HPT) was introduced as a road safety measure. Hull (1991) claimed that the existing licence test (theory and practice) was not predictive of crash involvement or good driving behaviour. The HPT was introduced to encourage the acquisition of hazard perception skills during preparation for the licence test, increasing on-road experience as a Learner permit holder, and potentially delaying probationary licensing for some learners .

The aim of the new test was to "assess those elements of cognitive functioning which affect the driving task" (Hull, 1991, p.5). The new test was proposed to be a mass screening test for all Victorians wishing to obtain their Probationary Licence. To complement the introduction of the Hazard Perception Test, VicRoads released training materials for Learner drivers. They comprised a video and a workbook titled *Look to Live: A Guide to Hazard Perception.* The guide specifies three key behaviours (following distance, safe gap, and visual scanning).

The Hazard Perception Test was initially piloted in the city of Geelong in February 1994, and was then introduced throughout Victoria in 1996. All Victorian licence candidates must pass the HPT in order to attain their Probationary licence.

The test is currently under review, but at the time of writing the HPT was a screen-based test. Candidates are faced with a touch-sensitive computer screen that displays a series of vignettes of real life traffic situation presented in video format. Candidates are instructed to touch the screen at the time they feel they would either change their speed or commence a manoeuvre. For example, an item on the test might have applicants in the driver's seat, driving at a given speed, with a tram some distance in front of them. The applicant must touch the screen at the most appropriate time to slow down or go. For items where it is not appropriate to change speed or commence a manoeuvre, the applicant must not touch the screen to pass the item. For other items, there is a time window in which the applicant achieves a pass for the item. If the screen is not touched during this time, they fail the item.

Driving Instruction in Victoria

Evidence suggests that most learner drivers take some driving lessons from professional instructors at some stage in their learner period, with most taking lessons towards the end of the period prior to attempting the licence test (Harrison, 1999a; Harrison, Triggs, Wheeler & Fitzharris, 1997). There are no compulsory requirements for the number of lessons or amount of time that learners spend with a professional instructor, and recent data (Harrison, 1999a) suggests that most learners view professional instruction as an adjunct to lessons and practice with one or both of their parents.

The driving instruction industry in Victoria has recently become regulated (after a period of deregulation) and is overseen by the Driving Instructor Authority. This Authority was established on 1st March, 1999. There were approximately 1,000 driving instructors registered with the Authority at the time of writing. In order to become registered with the Driving Instructor Authority, driving instructors must have completed Certificate III in Road Transport (Motor Vehicle Driving Instruction), which is offered at some Colleges of Technical and Further Education (TAFE) and driving schools in Melbourne. This is a one year part-time course and includes components such as assessing Learner drivers, communication skills for driving instructors, delivering one-to-one driver training sessions, evaluating and reporting driver training, motor vehicle instruction method, planning driver training programs, road law, safe and efficient car driving, the driver instruction industry, the Learner driver, and training vehicle presentation and maintenance (Casey Institute of TAFE).

Hazard Perception as a Multifaceted Skill

Without placing hazard perception in the broader context of safe driving, it is still apparent that the detection of hazards and potential hazards in the driving environment relies on the operation of a number of cognitive and behavioural processes. These processes form the foundation for hazard perception, and in their absence hazard perception skills are unlikely to function effectively. These underlying skills include:

1. Workload Management: The driving environment is dynamic and busy. Effective detection of hazards most likely relies, in part, on there being available cognitive capacity above that being used for vehicle control, navigation, and non-driving activities. Hoyos (1988) suggests that crashes may result from a lack of balance between the activation level and the performance capacity of a driver. Experienced drivers cope with the high workload levels characteristic of driving through the use of a number of cognitive strategies that are not available to the novice driver, leading to potential overload situations for the novice and poorer hazard perception skills.

2. Automation: As with other skills, driving a car becomes automated and is generally a routine task of limited intensity and complexity once it has been mastered. The perception, recognition, and decision-making processes relating to hazards are less likely to be automated (as they may be experienced relatively rarely in day-to-day driving) and a repertoire of appropriate responses may not yet be established in novice drivers (Gregersen & Bjurulf, 1996; Hoyos, 1988).

3. Attention: It is important to be able to reorient attention rapidly to relevant stimuli whilst driving (Kahneman, Ben-Ishai & Lotan, 1973). Attentional control, that is switching attention in an appropriate manner in a dynamic situation, is essential for hazard perception

and safe driving. Kahneman, Ben-Ishai and Lotan (1973) found that the people who were prone to disruption of attention had a significantly higher accident rate. Visual scanning is a sensory or behavioural component of attentional control. Effective hazard perception relies on effective scanning of the driving environment. A number of studies have noted scanning differences between experienced and novice drivers (e.g. Brown, 1982; Brown & Groeger, 1988; Cavallo & Laurent, 1988; Mourant & Rockwell, 1972) that reduce the safety of novices.

Decision Making – A Context for Cognitive Skills and Hazard Perception[1]

Hazard perception is embedded in the broader context of driver behaviour. Effective hazard perception skills, on their own, are unlikely to be sufficient to make a driver safer. The translation from effective hazard perception to safer road use requires that the detection of a hazard result in appropriate behavioural response to the hazard.

Thus, it may be overly simplistic to view hazard perception as an independent skill. It is better viewed in the wider context of driving behaviour where drivers in the road system are required to make moment-by-moment decisions as they drive which take into account their motivational needs and the dynamic environment in which driving occurs. Whether these decisions are made consciously or automatically as a result of experience (see Harrison, 1999a), perceptual information about hazards and potential hazards is likely to be an important input into the decision-making processes that occur while driving.

The application of decision-making models to driving behaviour has recently included the application of naturalistic models to drink-driving and speeding behaviour (Harrison, 1998, 1999b). Naturalistic models of decision-making describe the processes underlying decision-making by experienced people in dynamic, complex environments such as those experienced when driving. They are well suited to application in the more-general area of hazard perception and are discussed here as a framework for better understanding hazard perception as a cognitive process with behavioural outcomes.

The recognition-primed decision making model (RPD) of Klein (1989, 1993) was used by Harrison (1998, 1999b) in relation to speeding and drink-driving behaviours. It seeks to provide an underlying cognitive structure for decision-making in contexts such as driving, where behaviours must be generated in response to complex, dynamic sensory inputs when the decision-maker is time-pressured and operating under competing motivations. The model is summarised in Figure 1.

The RPD model emphasises the role of experience in decision-making, recognising that experience in a particular behavioural context provides the basis for the recognition of common situations and the generation of behaviours or choices based on previous experience. The RPD model therefore provides a mechanism that allows faster, more efficient (and potentially more reliable) decision-making in complex situations such as those faced by drivers. Where situations and cues in the driving environment can be matched to commonly-experienced situations, behaviours associated with them in the past can be used in the present to reduce the need for a conscious decision-making process. The potential value of this mechanism for hazard-related behaviours is clear.

[1] This section represents a further development (by the second author, WH) of theoretical considerations presented at the recent Canadian Multidisciplinary Road Safety Conference (Harrison, 1999b)

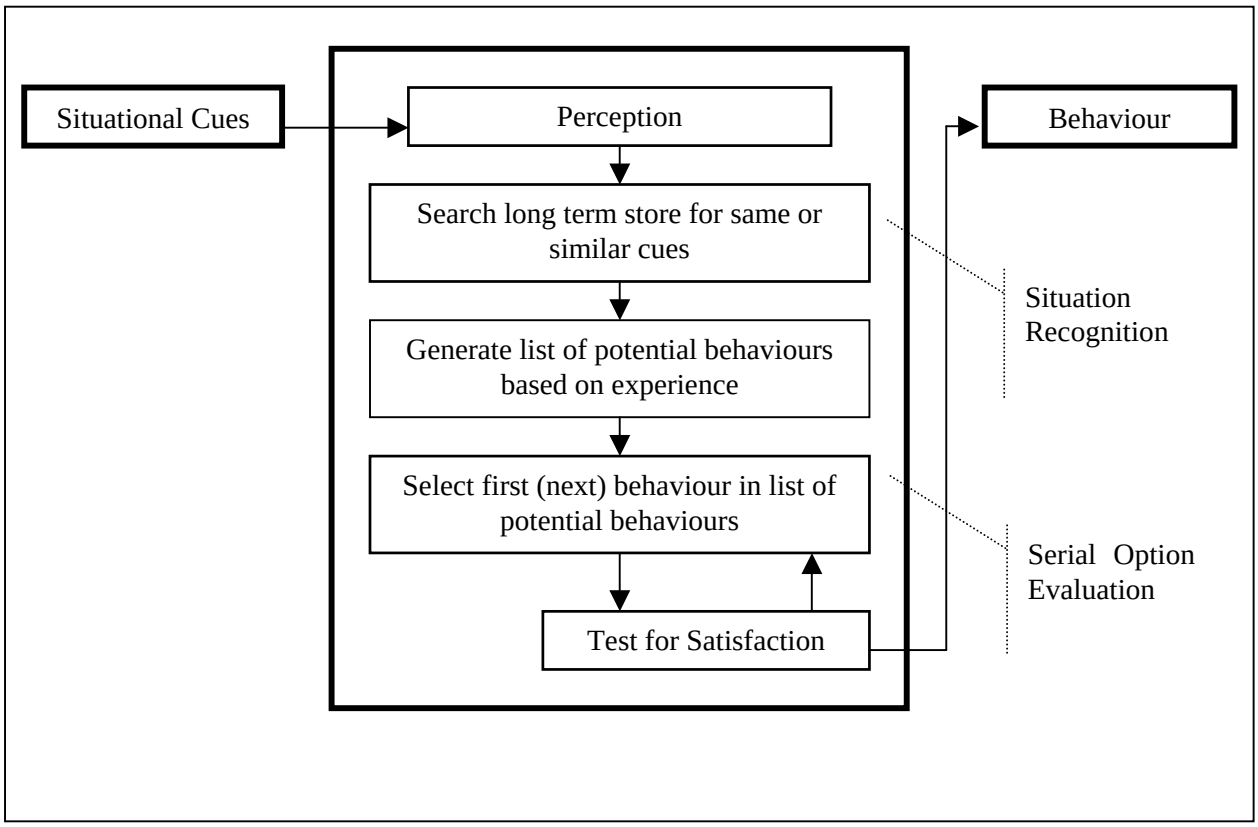

Figure 1: Recognition-Primed Decision Making Model

Klein suggests that there are a number of stages in the behavioural decision making process. The first stage (Situation Recognition) involves the classification of the context or situation as either novel or familiar. This most likely involves the mapping of current perceptions onto internal representations of previously experienced situations until a match is found. Where a match is found, potential behavioural responses depend what behaviours were successfully used in that situation before.

Thus, the second stage (Serial Option Evaluation) of the RPD model involves the generation of an "action queue" of potential behaviours ordered in terms of their "typicality" as responses to similar situations in the past, and then the evaluation of them one at a time until one is judged to be a satisfactory behaviour in the current context or situation. Evaluation of the potential behaviours is based on a mental simulation of the likely consequences of the behaviour based on prior experience and other expectations, and under the RPD model the cognitive computations required to evaluate these consequences are only required for as long as it takes to find a satisfactory (not necessarily optimal) behavioural response.

Thus, the driver might be viewed as responding to the changing situation in the driving environment by a constant mapping of current perceptual cues onto stored information about prior driving experience, and favouring behavioural responses that match behaviours commonly associated with those cues in the past.

Klein's (1989, 1993) RPD model is similar in some respects to the Instance Theory of automaticity developed by Logan (1988) which argues that experience with a particular behaviour in a particular context leads to an increased likelihood that the behaviour will be generated automatically in that context subsequently. Logan argues, consistent with developments in areas as diverse as cognitive psychology (e.g. Cowan, 1988, 1995; Ohlsson, 1996) and animal learning theory (e.g. Dickinson, 1980; Rescorla, 1978), that the strength of the association between contextual cues and behaviour depends on the number of instances of contingent occurrence of each. Indeed, it is one of the strengths of the RPD model (which is not shared by other approaches to decision making) that it is consistent with recent developments in cognitive psychology.

Application of Klein's (1989, 1993) RPD model to hazard-related behaviours is straightforward, with critical stages occurring in the perceptual processes that result in the initial activation of internal representations of hazard-related cues, the recognition process where cues are judged to signal hazards or potential hazards, the activation of internal representations of linked behaviours that are then assessed, the testing process, and the actual generation of an appropriate behaviour.

Hazard perception is generally viewed as encompassing only the perceptual and recognition components of the decision-making process, but it is considered important to place these two components in the broader context of the driving process. It is therefore considered appropriate to use the term "hazard behaviour" to describe the focus of this report and of the broader focus of driver training. Perceiving a hazard or potential hazard is only likely to aid the safety of road users if the behavioural response to the hazard is appropriate and timely. For this reason, the term "hazard behaviour" more correctly describes the true focus of road safety interest in this area. Figure 2 shows the likely effect of inexperience on each critical point in the RPD model as it applies to hazard behaviour.

The effects of inexperience noted in Figure 2, apart from those related to the Perception component of the RPD model, all relate to the amount of driving experience accrued by drivers. It is one clear implication of the RPD model, Logan's Instance Theory, and other recent treatments of cognitive skills and driving (e.g. Harrison, 1999a) that driving experience is a key factor in the development of many skills associated with safe driving. As Harrison (1999a) notes, it is difficult to see a role for training in many components of the hazard behaviour process outlined in Figures 1 and 2. Thus one immediate consequence of this view of hazard behaviour is that the driver-training aspects of the learner period are probably best directed towards either the perceptual component of the process or the provision of considerable driving experience in increasingly-complex situations. The extent to which this is already occurring is an important issue in the current study.

The notion of hazard behaviour (rather than the more-limited notion of hazard perception) and the structure of the RPD model are useful for a number of reasons:

1. The RPD structure provides a way of understanding the various factors that influence hazard behaviour;

2. The notion of hazard behaviour ensures that the perceptual and cognitive processes often discussed as components of hazard perception are understood in terms of their place in the broader structure of driver behaviour; and

3. The RPD structure ensures that the hazard-related instructional behaviours of the driving instructors interviewed as part of the project can be better understood in terms of their place in the general driving-behaviour context.

4. The RPD model and the emphasis on the context of hazard perception have a number of implications for the assessment of learner drivers which are discussed later in the report.

It is believed that the application of the RPD model to hazard behaviour in the driving domain (where hazard perception is viewed as a component of a behavioural decision-making process where behaviours are generated to cope with hazards or potential hazards in the driving environment) is an important theoretical contribution of this report.

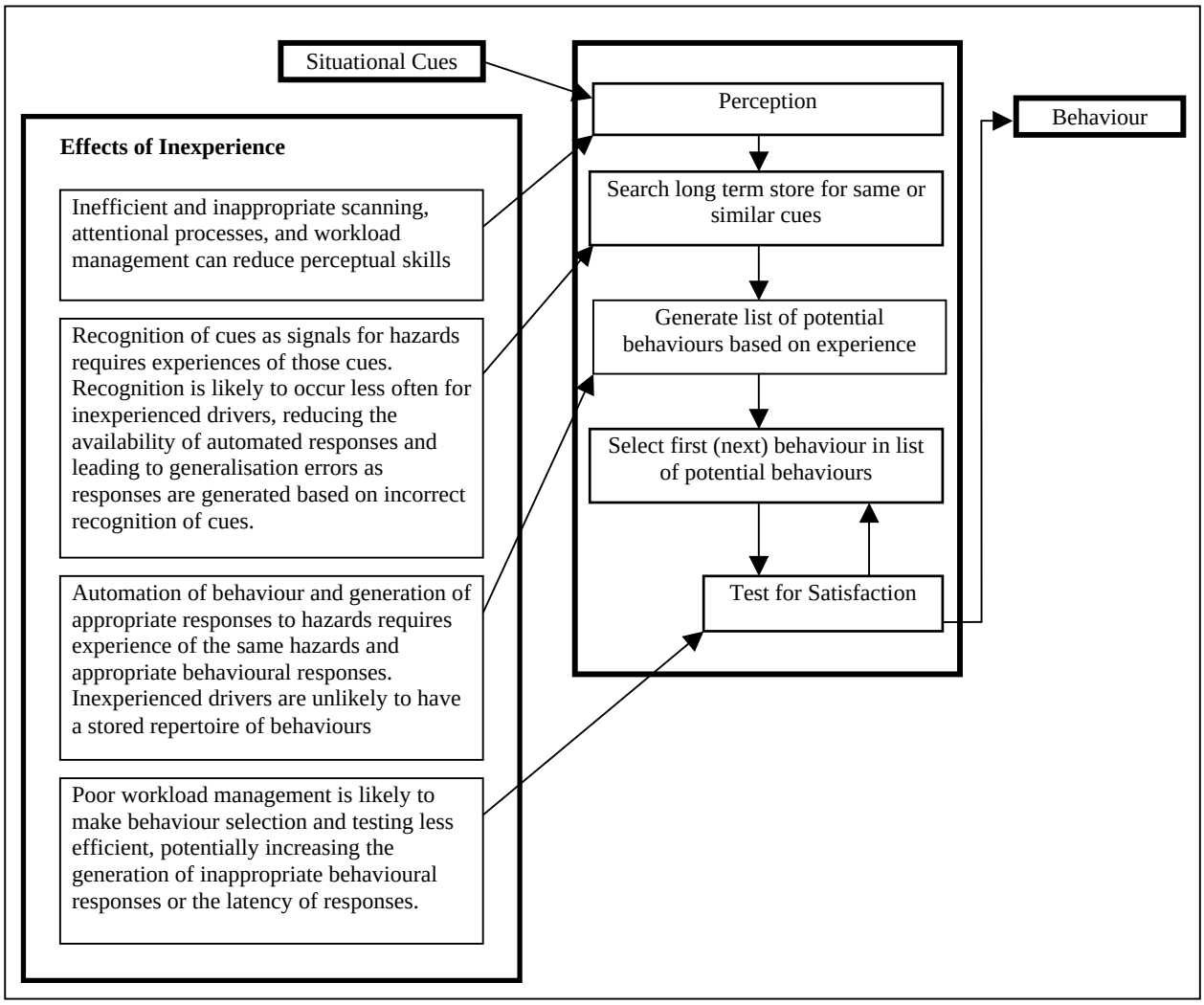

Figure 2: The RPD Model and Potential Problems for Inexperienced Drivers in Hazard Behaviour

The Present Study

The introduction of the Hazard Perception Test by VicRoads was, in part, designed to encourage driving instructors to teach hazard-perception skills to learners. This, and the importance of hazard behaviour for safe road use, led to the present study which was designed

to investigate the behaviour, attitudes, and knowledge of driving instructors. While some general instructional issues were canvassed, the primary focus of this investigation was in the hazard behaviour area. A structured in-depth interview with driving instructors was used as a means of collecting this information from a sample of driving instructors.

It was hoped that the results of the survey would provide some insight into the methods used by driving instructors to assist learner drivers develop some of the component skills that are important in the safety of their behaviours around hazards and potential hazards. It was expected that the results of the survey would allow some recommendations to be made concerning improvements to the way in which the learner driver period is utilised.

In more general terms, the Victorian HPT was viewed as a model that might be taken up in other jurisdictions. It was considered that the attitudes of driving instructors towards the Victorian approach, and their instructional methods in light of the introduction of the HPT might be used as the basis for making some general recommendations relevant for the introduction of this style of test in future.

METHOD

Participants

Participants were 50 driving instructors randomly selected from the Accredited Driver Trainers Association of Victoria (ADTAV) membership list. An explanatory letter was initially sent to 85 driving instructors, inviting them to participate in a face to face interview. To ensure that there was a representation of instructors from both small and large schools, a similar letter was sent to the managers of four large driving schools asking if they would nominate between two and four driving instructors from their school (depending on the school size). All of the driving instructors were then contacted by telephone to determine whether they were willing to participate in the study. The first fifty driving instructors who agreed to participate made up the sample. The acceptance rate (from these telephone calls) was 43.5%. Some driving instructors were unable to be contacted by telephone (14.1%). Interviews took place during August and September, 1998. A total of ten driving instructors were nominated from the four large driving schools. Participants were paid $25 for their involvement in the study.

Questionnaire and Data Collection

A questionnaire was designed to collect data concerning the methods driving instructors' employ when instructing Learner drivers (refer Appendix A). A particular focus of the questionnaire was the teaching of higher-order cognitive skills. Participants were asked general questions about themselves and their own training and were then shown a list of twenty-eight driving skills identified in the literature as important skills for safe driving. Participants were asked to select and rate the five most important skills that a Learner driver should learn in order to become a safe driver.

In order to understand the underlying mechanisms of these skills, and to group the skills accordingly, a brief questionnaire was distributed to experts in the young driver and road safety areas. Four groups were identified and classified. These were 1) *information processing/cognitive skills*; 2) *knowledge*; 3) *skills in context*; and 4*) hazard related skills*. Table 1 shows the skills allocated to each category.

Each of the five skills selected was discussed in terms of 1) why the participant considered the skill important; 2) the method of teaching the skill; 3) how easily the skill is taught and learnt; and 4) the recommendations made to the Learner driver between lessons. The questionnaire was also designed to determine driving instructors' understanding of hazard perception skills and their attitudes towards the VicRoads Hazard Perception Test and the testing of hazard perception skills in general. General questions relating to driving instructors' experience were included at the end of the questionnaire.

Face to face interviews were conducted at the Monash University Accident Research Centre by the first author (EF). The interviews were generally between forty-five minutes and an hour. In the case that driving instructors were unable to come to the Centre the interview was conducted at the driving instructors' residence or at their place of work. Interviews were tape-recorded unless the respondent specified that they felt uncomfortable with this. The taped interviews and written summaries recorded during the interviews were used as the basis for data entry into a Microsoft Access Database which was then used for subsequent analyses.

Table 1: Driving Skills, Grouped According To Their Underlying Mechanisms

Information processing/cognitive	**Knowledge**
• Decision making under conditions of uncertainty • Automation of driving behaviours • Anticipating other drivers intentions • Coping with multiple tasks • Focusing attention on driving task • Hazard perception skills	• Road rules • Effects of overconfidence • When to indicate • Recognition of fatigue • Stopping distance • Head checks • Awareness of effects of stress and other emotions
Skills in context	**Hazard-related skills**
• Overtaking • Skid control • Steering in curves • Wet weather driving • Parking • Following distance • Freeway driving • Maintaining lane placement • Night time driving • Gap selection when changing lanes • Vehicle control at low speeds • Braking in an emergency	• Mirror use • Distance scanning • Scanning the immediate environment

RESULTS

Sample Characteristics

The sample consisted of 8 females (16%) and 42 males (84%). The mean age of the driving instructors interviewed was 47.7 years (minimum of 27 years and maximum of 65 years). Participants had worked as a driving instructor for an average of 12.2 years (minimum of six months and maximum of 40 years). Forty-seven participants (94%) reported that driving instruction was their main form of employment.

The driving instructors worked an average of 5.4 days per week and the mean number of lessons taught per day was 6.8 (minimum of 1 lesson per day and maximum of 13.5, excluding one participant who taught approximately one lesson per month).

Many participants had difficulty estimating how many lessons each Learner driver would have before they passed the licence test, saying that it depended on the person and how much previous experience they had accrued. They were encouraged to answer as if the Learner driver was a complete novice. On average, Learner drivers were expected by instructors to have 14 lessons before they passed the licence test (minimum of 6 lessons and maximum of 25 lessons). Twenty-six instructors taught in cars with manual transmission (52%) and 7 instructors taught in cars with automatic transmission (14%). The remaining 17 instructors (34%) taught in both manual and automatic cars.

Driving Instructor Training

Forty two driving instructors received training prior to becoming a driving instructor (84%) and thirty-six (72%) received training both prior to becoming a driving instructor and whilst working as a driving instructor. Two instructors (4%) had not received any training at all, however one of these instructors had received some general guidance prior to becoming an instructor. Of the six instructors who had not received training prior to working as an instructor, but had received training whilst an instructor, four said they had received general guidance, mainly from the driving school they had joined.

Training Received Prior to Working as a Driving Instructor

Seventeen of the forty-two instructors (41%) who received training prior to working as a driving instructor sat a test and obtained a driving instructors licence either from VicRoads or the Police. Seventeen driving instructors (41%) reported being trained by a driving school, fourteen driving instructors (33%) undertook specialist driver education training, eight driving instructors (19%) were trained by another driving instructor and three cases (7%) could not be coded. The courses seemed to vary in their duration and depth. Some of the comments driving instructors gave regarding their training include[2]:

[2] Where appropriate, comments made by instructors have been included for descriptive purposes. Responses to items in the discussion were recorded and then entered (in point form) into a database. The comments included here are the point-form summaries entered into the database and are not, therefore, fully verbatim.

Training for 20 lessons in road laws, 10 lessons on the road

Trained by a driving school. Tested by police officer. Test was harder - I went for it 3 times.

Partner trained him. Full training for 10 lessons

D.E.C.A. Driving education, 3 week course - theory and practical. Theory was instructions about general road law. Skid pad for skid training.

Certificate III accreditation course. Trained by driving school - on-road training, role playing as a student.

Instructors course, road rules, road craft, road skills, driving lessons. Theory and practical. Saturday all day for 6 months.

Sigma driving school, trained for 6 months

Certificate III in motor vehicle driving instruction. Dad is an instructor.

Formal driving instructor course - fee for prescribed time - about 2 months. Intensive, detailed, classroom for road laws, training in commentary, intensive training on how to drive properly before you can teach. 3 main components for an instructor to be good at what he does.

By another instructor and applied through police force. Train you how to talk but with time it comes with experience. I am a school teacher so it easier for me.

Night school, 1 evening a week, theory for 6 months then practical with qualified trainer for 10 lessons. VicRoads licence assessment

Self funded from Shepparton driving instruction course. 1 week of instruction on-road and theory and advance driving course.

From other driving instructors, general run-down and went out in car. Got licence from police.

Couple half hour Saturday mornings prior to going for licence. Went out on the road with principal of school.

The majority of instructors received between 3 weeks and two months of training for a few hours a week.

Training Received Whilst Working as a Driving Instructor

Of the forty-two participants who reported receiving training whilst working as a driving instructor, thirty-seven (88%) reported having completed Certificate III in Road Transport, fourteen instructors (33%) reported completing a Train the Trainer course, six instructors (14%) reported completing an Assessors course, eight instructors (19%) completed other certificate

courses, four instructors (10%) had completed advanced or defensive driving courses, and twelve instructors (29%) reported other ongoing training.

Five Important Skills Learnt During Training

Participants were asked to list the five most important skills they had learnt during their own training, both prior to and whilst working as a driving instructor. These are reported in Table 2. Forty-nine participants gave 203 responses. (Twenty-six participants gave less than five responses to this question). The skills reported as being important were 1) knowledge of the road rules; 2) specific driving techniques e.g., turning and indicating; and 3) teaching methods. Some instructors mentioned two or more skills which were coded into the same category.

Table 2: The Five Most Important Skills Driving Instructors Reported Learning During Their Training

Skill learnt during training	Frequency	Percent (excluding missing responses)
Road rules	27	13.3
Specific techniques e.g., turning and indicating	23	11.3
Teaching methods/skills	20	9.9
Communication skills	19	9.4
Personal presentation and organisation	12	5.9
Observation/awareness	11	5.4
Patience	10	4.9
Safety	8	3.9
Understanding/empathy	7	3.4
System of car control	7	3.4
Hazard perception	6	3.0
Developing rapport/people skills	5	2.5
Business related skills	5	2.5
Controlling emotions/attitude	5	2.5
Defensive driving	4	2.0
Not to discriminate	4	2.0
Awareness of Learner driver and their abilities	4	2.0
Plan/checklist for Learner	3	1.5
Road craft	3	1.5
Test preparation	2	1.0
Re-learn own driving/skills	2	1.0
Be a good example	2	1.0
Coordination	2	1.0
Conducting an assessment	2	1.0
Concentration	2	1.0
Did not answer/nothing more important	2	1.0
Communication within driving industry	2	1.0
Aptitude	1	.5
General poor standard of drivers	1	.5
Controls needed for teaching people with disabilities	1	.5
Product knowledge	1	.5

This table shows the responses from 49 participants.

Skills Important for a Learner Driver to Learn

Participants were shown a list of skills (see Appendix A) and were asked to nominate the five most important skills they thought a Learner driver should learn in order to become a safe driver.

Five Important Skills

As shown in Table 3, the skills rated as the most important were generally driving skills which require the driver to use information processing and cognitive functions, however the most frequently nominated skill was knowledge of the road rules. The responses to questions about knowledge of the road rules are not presented in this report as the focus here was on hazard perception and cognitive skills rather than knowledge.

Table 3: Driver Instructors' Selection of Five Important Skills for Learner Drivers to Learn

Skill	Category	Frequency	Percent
Road rules	K	33	66
Hazard perception skills	IC	28	56
Anticipating other drivers intentions	IC	25	50
Decision making under conditions of uncertainty	IC	19	38
Following distance	SC	19	38
Distance scanning	HR	15	30
Coping with multiple tasks	IC	13	26
Mirror use	HR	12	24
Gap selection when changing lanes	SC	10	20
Scanning the immediate environment	HR	9	18
Head checks	K	8	16
Focusing attention on driving task	IC	8	16
Stopping distance	K	7	14
Automation of driving behaviours e.g., clutch and gear coordination	IC	6	12
Effects of overconfidence	K	6	12
Awareness of effects of stress and other emotions	K	6	12
Wet weather driving	SC	5	10
Recognition of fatigue	K	5	10
Vehicle control at low speeds	SC	4	8
Other (attitude, observation, speed control and steering)	-	4	8
Maintaining lane placement	SC	2	4
Braking in an emergency	SC	2	4
Overtaking	SC	1	2
Skid control	SC	1	2
Steering in curves	SC	1	2
Parking	SC	1	2
Night time driving	SC	1	2
When to indicate	K	0	0
Freeway driving	SC	0	0

K = knowledge, IC = Information processing/ cognitive, SC = skills in context, HR = hazard-related skills

This table shows the responses from 50 participants.

Skill Rated as the Most Important Skill

After selecting five important skills from the list of skills, participants were asked to rate the importance of these skills from one to five. Driving instructors most frequently rated knowledge of the road rules as the *most* important of the five skills they had chosen, followed by hazard perception skills and decision making under conditions of uncertainty. As shown in Table 4, these are amongst those skills most frequently included by the driving instructors in their list of five important driving skills. Tables 4 shows the frequencies of the skills rated as the *most* important for a Learner driver to learn

Table 4: The Most Important Skill for Learner Drivers to Learn

Most important skill	Frequency	Percent
Road rules	12	24
Hazard perception skills	10	20
Decision making under conditions of uncertainty	6	12
Focusing attention on driving task	5	10
Mirror use	3	6
Anticipating other drivers intentions	3	6
Other	3	6
Coping with multiple tasks	2	4
Automation of driving behaviours e.g., Clutch and gear coordination	1	2
Following distance	1	2
Recognition of fatigue	1	1
Distance scanning	1	2
Scanning the immediate environment	1	2
Did not rate one as more important	1	2

This table shows the responses from 50 participants.

In-Depth Analysis of Important Skills

Hazard Perception Skills

Twenty-eight participants included hazard perception skills in their list of the five most important skills a Learner driver should learn. Their reasons for including this item were coded into the categories shown in Table 5. The most frequent response as to why this skill is important to learn was so that Learner drivers can *anticipate* whilst driving (24% of the responses). Driving instructors also responded that that a lack of hazard perception skills would result in *accident involvement* (16% of the responses) and 11% of the responses indicate that hazard perception skills are important so that Learner drivers are able to *recognise a hazard* (as opposed to simply perceiving it). Some of the responses given for this question did not describe why hazard perception skills are important for Learner drivers to learn and therefore were excluded from the table.

Table 5: Why Hazard Perception Skills are Important to Learn

Response	Frequency	Percent
Learn to anticipate	13	23.6
Lack of hazard perception skills leads to an accident	9	16.4
So one can recognise a hazard	6	10.9
In order to react	5	9.1
To gain awareness	2	3.6
To select following distance/gap selection	2	3.6
Overconfidence	2	3.6
Speed control	1	1.8
Lots of things going on (high mental workload)	1	1.8
To learn appropriate judgement	1	1.8
Braking	1	1.8

This table shows the responses from 28 participants.

The data in Table 6 show the responses driving instructors gave when asked how they taught hazard perception skills. Driving instructors explain what is happening on the road to their clients, and explain what could happen which could create a potential incident (22% of the responses). They also describe asking their students questions on the road, such as "What do you see?" or the driving instructor asks them to recall the signs or landmarks they have just passed (14% of the responses). Scanning and mirror use (13% of responses) and observation and awareness (10% of responses) were also used as methods for teaching hazard perception.

Table 6: Method of Teaching Hazard Perception Skills

Response	Frequency	Percent
Explain what is happening on-road/incidents which may happen	16	22.2
Ask questions – "What do you see?"/ test them	10	13.9
Scanning/mirror use etc	9	12.5
Observation and awareness	7	9.7
Practice in driving situation	6	8.3
Exposure to/explanation of different situations	4	5.6
Emphasis on unpredictable situations/anticipation	3	4.2
Multimedia/videos	3	4.2
Following distance/gap selection	2	2.8
Driving at safe/appropriate speed	2	2.8
Watch other drivers critically	2	2.8
Diagrams	1	1.4
Knowledge of road law	1	1.4
Give them a fright in a controlled situation	1	1.4
Commentary driving	1	1.4
Prioritise items as they occur	1	1.4
Importance of reaction time	1	1.4
Give them exercises	1	1.4
After instruction, observe how they drive on their own	1	1.4
Conform to VicRoads guidelines	1	1.4

This table shows the responses from 28 participants.

Table 7 shows the teaching methods used to teach hazard perception skills by those instructors that did not include hazard perception skills in their list of the top five skills for learner drivers.

Table 7: Method of Teaching Hazard Perception Skills (if not Included in Top Five)

Response	Frequency	Percent
Anticipate what others do	9	24.3
Provide feedback and explain to them	6	16.2
Observation and awareness	6	16.2
Provide commentary	4	10.8
Learn how to react and what to do	4	10.8
Gradual build-up of tasks	2	5.4
Drive slower in the wet	1	2.7
Stop before an intersection and observe	1	2.7
Distance scanning	1	2.7
Stay calm	1	2.7
Recognise hazard	1	2.7
Video – *Hazard Perception – Look to Live*	1	2.7

This table shows the responses from 28 participants.

Driving instructors were asked to rate how easy hazard perception skills were to learn and how difficult they were to teach on a five point scale. The mean ratings for hazard perception skills are shown in Table 8. Driving instructors rated hazard perception skills as easier to teach than to learn. See Appendix C for a Summary Table of ratings of ease to learn and difficulty to teach for each of the factors described in Table 1.

Table 8: Rating of Difficulty of Teaching and Learning Hazard Perception Skills

Question	Mean rating
How easy is this skill for the Learner driver to learn? [1]	3.57
How difficult is this skill to teach?[2]	2.86

[1] 1 is very easy to learn and 5 is very difficult to learn.

[2] 1 is not at all difficult to teach and 5 is very difficult to teach

This table shows the responses from 28 participants.

The data in Table 9 show that driving instructors most frequently recommended observing other drivers on the road, either as a passenger, as a pedestrian or from public transport (33% of responses) to help improve their hazard perception skills. Driving practice and gaining experience was the second most reported recommendation (25% of responses), and reviewing the *Look to Live – A Guide to Hazard Perception Workbook* and video was described in 10% of the responses.

Table 9: Recommendations Driving Instructors Make to Help Learner Drivers With Hazard Perception Skills

response	Frequency	Percent
Observe others on the road as a passenger, pedestrian, from public transport	16	32.7
Practise driving/experience	12	24.5
VicRoads video and booklet	5	10.2
Think about what they have been taught	4	8.3
Nothing they can do	3	6.1
Watch parents when they are driving	3	6.1
Don't pick up bad habits from parents	2	4.1
Needs a scare	1	2.0
Take Learner to a situation previously created	1	2.0
Parents should learn techniques instructors use	1	2.0
Giving a commentary	1	2.0

This table shows the responses from 28 participants.

Extra information was provided by some participants because of the unrestricted nature of the data collection. Driving instructors generally commented that hazard perception skills were difficult to teach, that it took Learner drivers a long time to learn them, and some implied that experience with hazards was a necessary part of the learning process.

Anticipating Other Drivers' Intentions

Twenty five driving instructors included anticipating other drivers' intentions in their list of the five most important skills a Learner driver should learn. The reasons given by instructors for including this item were coded into categories as shown in Table 10. Participants described this skill as important to learn as one cannot assume that other drivers will follow the road law or behave as expected (28% of responses). Driving instructors also responded that failing to learn this skill may lead to accidents (24% of the responses) and 9% of the responses highlighted the need to allow enough space on the road in case one needs to react suddenly. Some responses did not explain why this skill is important for Learner drivers to learn, and were therefore excluded from the table.

Table 10: Why Anticipating Other Drivers' Intentions Is Important To Learn

Response	Frequency	Percent
Cannot assume other drivers will do the right thing/follow road law/ behave as you expect	13	28.3
Accidents	11	23.9
Need to allow reaction space	4	8.7
Hazard perception/other drivers are a hazard	3	6.5
Can then make a decision	2	4.3
Determines whether a safe driver or not	2	4.3
Cooperation with other drivers	1	2.2

This table shows the responses from 25 participants.

The data in Table 11 show the responses driving instructors gave when asked how they taught Learner drivers to anticipate other drivers intentions. Driving instructors describe verbally explaining to the Learner what is ahead when teaching them to anticipate other drivers' intentions whilst on the road (27% of responses). Other methods included teaching that one should not make assumptions whilst driving, emphasising scanning and observation (14% of responses), and introducing the Learner driver to different driving situations (14% of responses).

Table 11: Method of Teaching Learner Drivers to Anticipate Other Drivers' Intentions

Response	Frequency	Percent
Verbally explain what's ahead etc. whilst on the road	16	27.6
Do not make assumptions	8	13.8
Emphasise scanning/observation	8	13.8
Introduce Learner to different driving situations/ experience	8	13.8
Make eye contact/observe position of hands on the wheel	7	12.1
Watch other drivers and scenarios to anticipate	4	6.9
Reduce speed	2	3.4
Presentations and diagrams	2	3.4
Observe other drivers (how they do it)	1	1.7
Drive on the testing course	1	1.7
Be constantly aware	1	1.7
Give them a scare	1	1.7

This table shows the responses from 25 participants.

Similarly to hazard perception skills, anticipating other drivers intentions was rated as relatively difficult to learn, and slightly easier to teach, as shown in Table 12.

Table 12: Rating of Difficulty of Teaching and Learning to Anticipate Other Drivers' Intentions

Question	Mean rating
How easy is this skill for the Learner driver to learn? [1]	3.92
How difficult is this skill to teach?[2]	2.72

[1] 1 is very easy to learn and 5 is very difficult to learn.

[2] 1 is not at all difficult to teach and 5 is very difficult to teach

This table shows the responses from 25 participants.

The data in Table 13 show that driving instructors most frequently recommended that Learners observe other drivers, either as a passenger, a pedestrian or on public transport (24% of responses) and practice driving with their parents (24% of responses), in order to learn to anticipate other drivers intentions. Fourteen percent of the responses described being particularly observant as a driver and trying to understand why things happen.

Table 13: Recommendations Driving Instructors Make to help Learner Drivers to Anticipate Other Drivers Intentions

Response	Frequency	Percent
Observe others as a passenger/pedestrian on public transport	10	23.8
Practise driving with parents	10	23.8
As a driver, be observant and understand why things happen	6	14.3
Train parents – careful not to pick up their bad habits	3	7.1
Learner provides a commentary when with parents	2	4.8
Experience only	2	4.8
No recommendations	2	4.8
Bring back questions to instructor about what has happened between lessons	2	4.8
Video (*Look to Live – A Guide to Hazard Perception*)	1	2.4
Be consistent (don't suddenly change your mind)	1	2.4
Attend advanced driving courses	1	2.4
Get parents to do commentary driving	1	2.4
Make eye contact with other drivers	1	2.4

This table shows the responses from 25 participants.

Decision Making Under Conditions Of Uncertainty

Nineteen participants included decision making under conditions of uncertainty in their list of the five most important skills a Learner driver should learn. Their reasons for including this item are shown in Table 14. The most frequent response as to why this skill is important was that failure to do so may lead to accidents (28% of responses). Nine percent of the responses described scanning and knowing what to do.

Table 14: Why Decision Making Under Conditions Of Uncertainty Is Important To Learn

Response	Frequency	Percent
Wrong decisions may lead to accidents	9	28.1
Scan/observe to know what to do	3	9.4
Linked to hazard perception skills	1	3.1
Pressure of overload	1	3.1
Learner panic when on their own	1	3.1

This table shows the responses from 19 participants.

The data in Table 15 shows the responses driving instructors gave when asked how they taught Learner drivers to make decisions under conditions of uncertainty. Scanning was the most frequently cited method (17% of responses), followed by explaining what could happen in certain situations (13% of responses) and maintaining a low speed (11% of responses).

Table 15: Method of Teaching Learner Drivers To Make Decisions Under Conditions Of Uncertainty

Response	Frequency	Percent
Scanning	8	17.4
Explain what could happen	6	13.0
Low speed	5	10.9
Take then to potentially hazardous situations	5	10.9
Forward planning	4	8.7
Tell them to leave time and space	3	6.5
Anticipation of other drivers	3	6.5
Gradual build up of tasks	3	6.5
Practice/experience	2	4.3
If not certain, stay where you are	2	4.3
Improve motor skills (automation)	1	2.2
Demonstration	1	2.2
Parents play a role	1	2.2
Defensive driving course	1	2.2
Don't make decisions for them	1	2.2

This table shows the responses from 19 participants.

Participants rated making decisions under conditions of uncertainty as relatively difficult for the Learner driver to learn, and only slightly easier to teach, as shown in Table 16.

Table 16: Rating Of Difficulty Of Teaching And Learning To Make Decisions Under Conditions Of Uncertainty

Question	Mean rating
How easy is this skill for the Learner driver to learn? [1]	4.32
How difficult is this skill to teach?[2]	3.74

[1] 1 is very easy to learn and 5 is very difficult to learn.

[2] 1 is not at all difficult to teach and 5 is very difficult to teach

This table shows the responses from 19 participants.

The data in Table 17 shows that driving instructors most frequently recommended practising driving (45% of responses) to help improve their ability to make decisions under conditions of uncertainty. Observation (10% of responses) and reading the Handbook (10% of responses) were also recommended.

Distance Scanning

Distance scanning is categorised as a hazard related skill, as it is a skill which alerts the driver to potential hazards in the driving environment. Fifteen participants included distance scanning in their list of the five most important skills a Learner driver should learn. Their reasons for including this item are shown in Table 18. The most frequent response as to why this skill is important to learn was so that the driver had enough time for evasive action. Driving instructors

also indicated that this skill was important for accident prevention (20% of responses) and for gaining an overall, holistic picture of the road environment (16% of responses).

Table 17: Recommendations Driving Instructors Make To Help Learner Drivers Make Decisions Under Conditions Of Uncertainty

Response	Frequency	Percent
Practice as a driver	13	44.8
Observation	3	10.3
Read the handbook	3	10.3
If uncertain, don't go or come to a stop	2	6.9
Practice as a passenger/pedestrian/public transport	2	6.9
Don't practice with parents	1	3.4
Choose appropriate speed	1	3.4
Use own initiative	1	3.4
Anticipation	1	3.4
Think about it	1	3.4
No recommendations	1	3.4
Do not follow others example	1	3.4

This table shows the responses from 19 participants.

Table 18: Why Distance Scanning Is Important For Learners Drivers To Learn

Response	Frequency	Percent
To allow enough reaction time for evasive action (inc. anticipation and hazard perception)	13	52.0
Accident prevention	5	20
To gain an overall picture (Learners tend to look at the immediate environment)	4	16.0

This table shows the responses from 15 participants.

The data in Table 19 show the responses participants gave when asked how they teach distance scanning. Driving instructors encourage the Learner to raise their vision, i.e., to look ahead (39% of responses), and to point out what is in the distance, including describing what may happen and asking the Learner what they see (35% of responses).

Table 20 shows the ratings of the ease of teaching and learning distance scanning.

Table 19: Method of Teaching Distance Scanning To Learner Drivers

Response	Frequency	Percent
Encourage to look ahead	10	38.5
Point out what is ahead, ask questions, explain scenarios	9	34.6
Instructor watches Learners eyes	2	7.7
Use peripheral vision also	1	3.8
Two second safe distance rule	1	3.8
Encourage Learner to practise	1	3.8
Encourage Learner to make decisions early	1	3.8
Let them make mistakes	1	3.8

This table shows the responses from 15 participants.

Table 20. Rating Of Difficulty Of Teaching And Learning Distance Scanning

Question	Mean rating
How easy is this skill for the Learner driver to learn? [1]	3.33
How difficult is this skill to teach?[2]	2.27

[1] 1 is very easy to learn and 5 is very difficult to learn.

[2] 1 is not at all difficult to teach and 5 is very difficult to teach

This table shows the responses from 15 participants.

The data in Table 21 show that driving instructors recommend that the Learner driver practise what they learnt during the lesson when driving with parents (47% of responses) or as a passenger/pedestrian (35% of responses) to help the Learner driver with distance scanning.

Table 21: Recommendations Driving Instructors Make To Help Learner Drivers With Distance Scanning

Response	Frequency	Percent
Practise what was learnt when driving with parents	8	47.1
Practise skills as a passenger/pedestrian	6	35.3
Observe experienced drivers	1	5.9
Go over what was learnt in lesson i.e., think about it	1	5.9
Encourage to look far ahead and keep eyes moving	1	5.9

This table shows the responses from 15 participants.

Coping With Multiple Tasks

Thirteen driving instructors included this skill in their list of five most important skills a Learner driver should learn. Their reasons for including this item are shown in Table 22. The most frequent response as to why this skill is important to learn was that the driving task demanded the driver be able to do many things at once (38% of responses). Driving instructors also responded that a driver was likely to miss something if they could not cope with multiple tasks

(19% of responses), and that a driver must be able to perform tasks without consciously thinking of what they are doing (10% of responses).

Table 22: Why Coping With Multiple Tasks Is Important To Learn

Response	Frequency	Percent
Have to be able to do many things at once	8	38.1
Likely to miss something if doing multiple tasks	4	19.0
Have to be able to do things without thinking	2	9.5
Learner must understand what they are doing	1	4.8
They will become a danger on the road	1	4.8

This table shows the responses from 13 participants.

The data in Table 23 show the responses driving instructors gave when asked how they taught Learner drivers to cope with multiple tasks. Driving instructors teach the Learner driver to break down the task, to prioritise and to do one thing at a time (31% responses), verbally explain how to cope with multiple tasks (15% of responses) and suggest that the learner practise this task during the lesson (12% of responses).

Table 23: Method of Teaching Learner Drivers To Cope With Multiple Tasks

Response	Frequency	Percent
Break things down, prioritise, one thing at a time	8	30.8
Verbally explain to them	4	15.4
Practise with Learner	3	11.5
Speed control	2	7.7
Put Learner in different driving situations	2	7.7
Demonstrate	2	7.7
Observation/ awareness of what is around	2	7.7
Don't panic	1	3.8
Experience	1	3.8
Family meeting if having trouble coping with multiple tasks	1	3.8

This table shows the responses from 13 participants.

This task was rated as relatively difficult for Learner drivers to learn, and slightly easier to teach, as shown in Table 24.

Table 24: Rating Of Difficulty Of Teaching And Learning To Cope With Multiple Tasks

Question	Mean rating
How easy is this skill for the Learner driver to learn? [1]	4.23
How difficult is this skill to teach?[2]	3.61

[1] 1 is very easy to learn and 5 is very difficult to learn.

[2] 1 is not at all difficult to teach and 5 is very difficult to teach

This table shows the responses from 13 participants.

The data in Table 25 show that the most frequent recommendation driving instructors make to help Learner drivers with this skill is to practise driving (28% of responses). Other recommendations included thinking about and visualising driving (16% of responses) and observing others (12% of responses). Driving in an automatic car or in a quiet street was also suggested to minimise the Learner's workload, which presumably allows a gradual increase in complexity as the Learner driver improves their driving (12% of responses).

Table 25: Recommendations Driving Instructors Make To Help Learner Drivers To Cope With Multiple Tasks

Response	Frequency	Percent
Practise driving	7	28.0
Thinking and visualising	4	16.0
Observe others	3	12.0
Drive in an auto, or in a quiet situation to reduce workload	3	12.0
Practise as a passenger	2	8.0
Look ahead	1	4.0
Be prepared for multi-tasks – don't leave to last minute	1	4.0
Break down to smaller tasks	1	4.0
Speed control	1	4.0
Commentary driving by student	1	4.0
Don't practise with parents	1	4.0

This table shows the responses from 13 participants.

Mirror Use

Mirror use is a hazard-related skill, and is assumed to be a less complex task than some of the other information processing/cognitive skills discussed previously. Twelve participants included mirror use in their list of the five most important skills a Learner driver should learn. Their reasons for including this item are shown in Table 26. The most frequent response as to why this skill is important was that it is important to be aware of others on the road, and to have a holistic view of the driving environment (65% of responses).

Table 26: Why Mirror Use Is Important For Learner Drivers To Learn

Response	Frequency	Percent
Important to be aware of others and have the whole picture, incl. behind the vehicle	13	65.0
To make decisions	2	10.0
To be safe on the road	1	5.0
Is the least practised skill	1	5.0
In order to trust what they see in the mirror	1	5.0
Prepares you for the unexpected	1	5.0

This table shows the responses from 12 participants.

The data in Table 27 show the responses driving instructors gave when asked how they taught Learner drivers mirror use. Driving instructors use verbal reinforcement (48% of responses). Some instructors described mirror use as a part of the system for car control (19% of responses). The blind spot was described in 10% of responses, and thus the necessity for a head check when checking mirrors (head check was also reportedly included in the system for car control).

Table 27: Method of Teaching Learner Drivers To Use Their Mirrors

Response	Frequency	Percent
Verbally reinforce	10	47.6
As a part of system for car control	4	19.0
Emphasise that mirror has a blind spot, therefore head check also	2	9.5
Flick eyes to check mirror rather than move head	1	4.8
Demonstrate with diagrams	1	4.8
Take Learner through step-by-step	1	4.8
Encourage to check mirrors continually	1	4.8

This table shows the responses from 12 participants.

Driving instructors rate mirror use around the middle of the scale in terms of both difficulty to learn and difficulty to teach , as shown in Table 28.

Table 28. Rating Of Difficulty Of Teaching And Learning Mirror Use

Question	Mean rating
How easy is this skill for the Learner driver to learn? [1]	2.75
How difficult is this skill to teach?[2]	2.33

[1] 1 is very easy to learn and 5 is very difficult to learn.

[2] 1 is not at all difficult to teach and 5 is very difficult to teach

This table shows the responses from 12 participants.

The data in Table 29 show that driving instructors most frequently recommended practising as in the lesson (33% of responses). Fourteen percent of responses indicated that no recommendations were given, and the same percentage recommended studying brochures and the handbook, or watching the *Hazard Perception – Look to Live* video.

Scanning The Immediate Environment

Similarly to mirror use and distance scanning, scanning the immediate environment is categorised as a hazard-related skill. Nine driving instructors included this skill in their list of five most important skills a Learner driver should learn. Their reasons for including this item are shown in Table 30. The most frequent response as to why this skill is important to learn was that the driver must be aware of everything around them (50% of responses), also so that they have time if they need to take evasive action (29% of responses) and because it may otherwise lead to accidents (14% of responses).

Table 29: Recommendations Driving Instructors Make To Help Learner Drivers With Mirror Use

Response	Frequency	Percent
Practise as per lesson	7	33.3
No recommendations	3	14.3
Brochure/video/handbook	3	14.3
Educate parents about mirror use	2	9.5
Teach mirrors for test	2	9.5
Make sure they keep head straight	1	4.8
Place note around the house for reflection	1	4.8
As a passenger, install portable mirror	1	4.8
Don't encourage practising with parents	1	4.8

This table shows the responses from 12 participants.

Table 30: Why Scanning The Immediate Environment Is Important To Learn

Response	Frequency	Percent
So they are aware of everything around them	7	50.0
Give reaction time for evasive action	4	28.6
Leads to accidents	2	14.3
Learners tend to have tunnel vision	1	7.1

This table shows the responses from 9 participants.

The data in Table 31 show the responses driving instructors gave when asked how they taught Learner drivers to scan the immediate environment. Driving instructors explain why certain things on the road are important, give the Learner examples of things they may encounter, and ask them questions about what they see (47% of responses). They also teach the Learner driver scanning techniques (13% of responses).

Table 31: Method of Teaching Learner Drivers To Scan The Immediate Environment

Response	Frequency	Percent
Explain why things are important/ examples/ question	7	46.7
Scanning techniques	2	13.3
Point out/observe others	1	6.7
Watch what they look at	1	6.7
Emphasise gap selection	1	6.7
Mirror use	1	6.7
As a passenger	1	6.7
Let them make a mistake and learn from it	1	6.7

This table shows the responses from 9 participants.

Both teaching and learning to scan the immediate environment are rated similarly by driving instructors, with learning the skill rated as slightly more difficult than teaching it, as shown in Table 32.

Table 32: Rating Of Difficulty Of Teaching And Learning To Scan The Immediate Environment

Question	Mean rating
How easy is this skill for the Learner driver to learn? [1]	3.67
How difficult is this skill to teach?[2]	3.44

[1] 1 is very easy to learn and 5 is very difficult to learn.

[2] 1 is not at all difficult to teach and 5 is very difficult to teach

This table shows the responses from 9 participants.

The data in Table 33 show that the most frequent recommendation made by driving instructors to help Learner drivers scan the immediate environment is to practise as a passenger (42% of responses). Participants also recommended educating parents in how to help (25% of responses) and recommend the Learner driver practise driving with a licenced driver (17% of responses).

Table 33: Recommendations Driving Instructors Make To Help Learner Drivers With Scanning The Immediate Environment

Response	Frequency	Percent
Practise as a passenger	5	41.7
Educate parents about how to help	3	25.0
Practise driving	2	16.7
No recommendations	1	8.3
Pull up to a situation and observe	1	8.3

This table shows the responses from 9 participants.

Focusing Attention On The Driving Task

Eight driving instructors included focusing attention on the driving task in their list of the five most important skills a Learner driver should learn. Their reasons for including this item are shown in Table 34. The most frequent response as to why this skill is important to learn was that Learners tend to lose concentration (33% of responses), that if they can focus their attention, all else will follow (22% of responses).

Table 34: Why Focusing Attention On The Driving Task Is Important To Learn

Response	Frequency	Percent
Learners tend to lose concentration	3	33.3
In order to know what to do/ everything else will follow	2	22.2
Could result in an accident	1	11.1
Enables them to master other skills	1	11.1
Learn what is most important to focus on at the time	1	11.1
Important because equivalent to concentration	1	11.1

This table shows the responses from 8 participants.

The data in Table 35 show the responses driving instructors gave when asked how they taught Learner drivers to focus their attention on the driving task. Driving instructors describe giving feedback and verbal explanations (40% of responses). Other responses are set out in Table 35 and include encouraging Learners to concentrate on one thing at a time (20% of responses) and to have the Learner provide a commentary whilst driving (13% of responses).

Table 35: Method of Teaching Learner Drivers To Focus Their Attention On The Driving Task

Response	Frequency	Percent
Give feedback and verbal explanations	6	40.0
Concentrate on one thing at a time	3	20.0
Commentary by student	2	13.3
Don't use radio	1	6.7
Watch where their attention is	1	6.7
All other skills follow	1	6.7
Practise/experience	1	6.7

This table shows the responses from 8 participants.

Participants did not rate this skill as either easy or difficult to learn, but rated it mid-scale. Again, the skill was rated slightly easier to teach than it is to learn, as shown in Table 36.

Table 36: Rating Of Difficulty Of Teaching And Learning To Focus Attention On The Driving Task

Question	Mean rating
How easy is this skill for the Learner driver to learn? [1]	3.13
How difficult is this skill to teach?[2]	2.75

[1] 1 is very easy to learn and 5 is very difficult to learn.

[2] 1 is not at all difficult to teach and 5 is very difficult to teach

This table shows the responses from 8 participants.

The data in Table 37 show that driving instructors most frequently recommend that the Learner drivers practise what was taught in the lesson (25% of responses), they encourage Learner drivers to focus and concentrate (17% of responses) and they recommend the Learner drivers does not drive if they feel tired and distracted (17% of responses).

Automation Of Driving Behaviours e.g., clutch and gear co-ordination

Six participants included automation of driving behaviours in their list of the five most important skills a Learner driver should learn. Their reasons for including this item are shown in Table 38. The most frequent response as to why this skill is important to learn was that otherwise an unsafe situation may arise (50% of responses). Automation of driving behaviours in this context refers to the manual operation of the car, and not the automation of more cognitive behaviours such as focusing attention and decision making.

Table 37: Recommendations Driving Instructors Make To Help Learner Drivers To Focus Their Attention On The Driving Task

Response	Frequency	Percent
Practise what was taught in lesson	3	25.0
Encourage to focus and concentrate	2	16.7
Don't drive if tired and distracted	2	16.7
Note how easy it is to lose focus	1	8.3
Don't drive with parents	1	8.3
Educate and talk to parents	1	8.3
Read VicRoads information	1	8.3
Observe other drivers	1	8.3

This table shows the responses from 8 participants.

Table 38: Why Is Automating Driving Behaviours Important For Learner Drivers To Learn

Response	Frequency	Percent
Otherwise will be a very dangerous driver/get in bad situations	4	50.0
This skill comes before anything else	1	12.5
Must be smooth to pass test	1	12.5
To control speed	1	12.5
To drive a manual and to therefore plan ahead	1	12.5

This table shows the responses from 6 participants.

The data in Table 39 show the responses driving instructors gave when asked how they taught learner drivers to automate their driving behaviour. Driving instructors explain the mechanics of the car (31% of responses), they demonstrate the mechanical workings of the car, such as clutch and gear co-ordination (23% of responses) and they keep the workload low (15% of responses).

Table 39: Method of Teaching Learner Drivers To Automate Driving Behaviours

Response	Frequency	Percent
Explain mechanics of car	4	30.8
Demonstrate	3	23.1
VicRoads pamphlet and book	2	15.4
Keep work load low	2	15.4
Use of progress reports	1	7.7
Initial practise run to get feel	1	7.7

This table shows the responses from 6 participants.

Driving instructors rate automation of driving behaviours as slightly easier to teach than to learn, as shown in Table 40.

Table 40: Rating Of Difficulty Of Teaching And Learning Automation Of Driving Behaviours

Question	Mean rating
How easy is this skill for the Learner driver to learn? [1]	4.0
How difficult is this skill to teach?[2]	3.17

[1] 1 is very easy to learn and 5 is very difficult to learn.

[2] 1 is not at all difficult to teach and 5 is very difficult to teach

This table shows the responses from 6 participants.

The data in Table 41 show that driving instructors most frequently recommended that Learner drivers practise what they have learnt in the lesson with a licenced driver.

Table 41: Recommendations Driving Instructors Make To Help Learner Drivers Automate Their Driving Behaviours

Response	Frequency	Percent
Practise what they've learnt in lesson	5	50.0
Verbal explanation	1	10.0
Practise with parents only when can control vehicle	1	10.0
Read the book	1	10.0
Watch others	1	10.0
Think about it	1	10.0

This table shows the responses from 6 participants.

The Best General Method for Teaching Learner Drivers to Drive

Driving instructors were asked to describe the best general method for teaching Learner drivers to drive. The data in Table 42 show the responses. Generally, participants described working on gradually building up the skills of the Learner driver, and allowing them to practise driving in all conditions, in order to give the Learner driver a wide range of experiences. These two methods accounted for 36% of the responses. Some of the responses given by participants included:

> There is no best way. Driving, talking, presenting, not only telling them, talking to them. Start from easiest to hardest. Learn one manoeuvre then practise until they can do it properly. Step by step using lots of variety of roads. Often instructors only go in the test area. Instructors should have extra training. Many instructors only teach for the money, only interested in passing the test not teaching properly, always use the same area.
>
> Just put them out on-road, I don't believe in off-road courses. Shock treatment is best, varies with individual, take them out there.
>
> Parental practice is important.

There were some other interesting responses, including providing education in schools, and the use of a log book to document progress. A number of instructors use a log book in their lessons, which allows both the Learner and the driving instructor to monitor the Learner's progress and to identify the Learner's weaknesses. Some instructors also encourage parents to be involved in the use of logbooks in order to document practise drives. Responses included:

Important that logbook system comes out, it will encourage parents to practise with their kids a lot more because it is compulsory, it will put them in varied driving conditions.

When in the car with parents keep watching what is going on around them as passengers. Practise with parents, who then record it in a logbook - work on any problems they may have. Look for other peoples' mistakes.

Table 42: Driving Instructors Description Of The Best General Method For Teaching Learner Drivers To Drive

Response	Frequency	Percent
Theory of gradual build up of skills	22	24.2
Practise in all conditions	11	12.1
On-road experience/allow them to have control of the vehicle	7	7.7
Driving lessons	7	7.7
Commentary from driving instructor	6	6.6
Focus on relaxing them/reassuring/gaining confidence	6	6.6
Be patient, show empathy	4	4.4
Progress book/assessment plan/log books	4	4.4
Start with instructor from the very beginning	3	3.3
Give positive or negative feedback	3	3.3
No best method because all Learners are different	2	2.2
Education in schools	2	2.2
Focus on areas they need to improve on	2	2.2
Demonstrate on paper	2	2.2
Demonstrate on the road	2	2.2
Constant reinforcement of road law	2	2.2
Conform to test requirements	1	1.1
Review at end of lesson	1	1.1
Avoid the testing area	1	1.1
Through training courses after licensing	1	1.1
Should be one standard method	1	1.1
Start driving as young as possible	1	1.1

This table shows the responses from 50 participants.

Driving Instructors Understanding of Hazard Perception Skills

Driving instructors were asked what the hazard perception skills meant to them. Most participants had a basic understanding of hazard perception. Some responses given by participants were:

To spot a hazard on the road; traffic wise, weather wise, anything connected.

Testing reflexes.

The ability to recognise something before it occurs.

Sounds like a difficult word. Watch out for danger.

Being able to predict and prepare yourself for the situation ahead well in advance, not leaving it until the last minute before performing tasks.

Anticipating other road users movements.

To perceive oncoming hazards early enough that you are able to safely react and take evasive action.

Perception means understanding and seeing the hazard and understanding what it is and knowing what action they have to take.

When to stop or when to go, changing speeds. Anything can be a hazard

The distance you are from a particular hazard

The data in Table 43 show the responses to this question.

Table 43: Driving Instructors Definition Of Hazard Perception Skills

Response	Frequency	Percent
To perceive hazards ahead	29	39.2
Evasive action/how will you react	17	23.0
Process that it is a hazard	7	9.5
Anticipating other drivers intentions	5	6.8
To predict and prepare for a situation	5	6.8
Unexpected things on the road/understanding what hazards are about	3	4.1
No longer a hazard if it has been perceived	1	1.4
Decision making under conditions of uncertainty	1	1.4
Testing reflexes	1	1.4
Cooperate with danger to protect themselves	1	1.4
Adjusting speed for conditions	1	1.4
Judgement	1	1.4
Most skills on list: scanning, head checks, being aware	1	1.4
Distance you are from hazard	1	1.4

This table shows the responses from 50 participants.

The data in Table 44 show the hazards driving instructors identified which may be encountered whilst driving. The most common hazard cited by driving instructors was pedestrians, followed by other road users and intersections.

Table 44: Hazards Which May Be Encountered Whilst Driving

Response	Frequency	Percent
Emerging people/objects	56	24.5
Erratic movement of other drivers	27	11.8
Intersections/school crossings	22	9.6
Road conditions	14	6.1
Weather conditions	13	5.7
Cyclists/motorcyclists	13	5.7
Parked vehicles	13	5.7
Buses, trucks, trams	12	5.2
Foreign objects on-road eg roadworks	11	4.8
Vehicles coming out of driveways/pulling out	10	4.4
Signs	8	3.5
Speeding	7	3.1
Elderly pedestrians and drivers	5	2.2
Night driving	4	1.7
Speed humps/road markings	4	1.7
Shopping centres/parking areas	3	1.3
Mechanical condition of car	2	.9
Freeways	2	.9
Emergency vehicles	1	.4
Road rage	1	.4
Internal distractions e.g., changing cassette	1	.4

This table shows the responses from 50 participants.

Training Provided to Driving Instructors Prior to the Introduction of the Hazard Perception Test

Driving instructors were asked if they had received any training or information prior to the introduction of the Victorian Hazard Perception Test that was related specifically to the new test. Twenty four instructors (48%) reported that they had received training or information and seventeen instructors (34%) reported that they had not received training or information prior to the introduction of the Hazard Perception Test. Of these, three instructors reported that they actively sought information, including trying the test. Table 45 shows the types of training and information received by driving instructors prior to the introduction of the Test. Five instructors felt the question did not apply to them (generally because they were not instructing at the time the Hazard Perception Test was released).

Table 45: Training And Information Received By Driving Instructors

Response	Frequency	Percent
Group meeting at VicRoads	13	29.5
Trialed the Hazard Perception Test	10	22.7
Video and booklet – *Hazard Perception: Look to Live*	10	22.7
Received *Hazard Perception: A guide for instructors*	6	13.6
Brochure of hazard perception/handouts	5	11.4
Saw a demonstration of the Hazard Perception Test	3	6.8
ADTAV meeting	2	4.6
Felt had opportunity to provide input into the test	1	2.3

This table shows the responses from 45 participants.

Change in Teaching Method Since the Introduction of the Hazard Perception Test

Thirteen driving instructors (26%) reported that their teaching method had changed since the introduction of the Victorian Hazard Perception Test. Five instructors were not teaching at the time of the introduction of the HPT. The data in Table 46 shows how driving instructors described the change in their teaching method. New teaching methods included specifically focusing on hazard perception (25% of responses) and explaining and practising the demonstration version of the Hazard Perception Test (20% of responses). Some responses included:

> Make sure I familiarise them with the Hazard perception test using the facility at Burwood. Teach them to take in the whole of the road scene and see all of the problems, see everything and then eliminate what is not applicable. Begin to plan a course of action and then execute it.
>
> Not changed, enhance what I was doing because of decision making. I was on the right track. Every time you mention to the client about the Hazard Perception Test it reminds me - enhancing all the time.
>
> Mirror checking more thorough now - result of HPT.

Table 46: Description Of How Teaching Methods Have Changed Since The Introduction Of The Hazard Perception Test

Response	Frequency	Percent
Focus on hazard perception	5	25.0
Explain the Hazard Perception Test and practise the test	4	20.0
Use of *Hazard Perception - Look to Live*	3	15.0
Focus more on observation/holistic view	2	10.0
In general reinforced and improved teaching	2	10.0
Focus on mirror checks	2	10.0
Focus more on two second stopping/following distance	1	5.0
Form and execute a plan of action	1	5.0

This table shows the responses from 15 participants.

Of the thirty two (64%) instructors who reported that their teaching method had not changed, all of them reported including hazard perception skills in their training anyway. All of the five new instructors reported including hazard perception training in their lessons.

Forty-four driving instructors were able to express their hazard perception instruction as a percentage of their teaching time. The mean percentage of time was 48% (SD=25), the minimum was 10% and the maximum 100%. The driving instructors who nominated 100% all qualified their statement by saying they continuously taught hazard perception. It was assumed that 100% was more likely to represent the idea that hazard perception was taught throughout the lesson but not continuously for every lesson. That hazard perception instruction was an ongoing process was a sentiment expressed by most of the driving instructors when asked this question.

Participants were asked to list any other methods they knew of for teaching hazard perception, although not necessarily methods they would use themselves. The responses to this question are presented in Table 47. Thirteen of the responses (26%) indicated that driving instructors didn't know any other methods for teaching hazard perception skills. The most frequently reported methods included the use of a simulator, practising on the VicRoads computer and using videos (either *Look to Live – A Guide to Hazard Perception*, or other educational videos).

Table 47: Other Methods For Teaching Hazard Perception Skills

Response	Frequency	Percent
Don't know	13	25.5
Simulator	4	7.8
Practise on VicRoads computer	4	7.8
Videos, either *Look to Live – A Guide to Hazard Perception*, or others	4	7.8
Play video games (car racing)	3	5.9
Classroom inc. video, handouts	3	5.9
Off-road to learn skids/set up hazards	3	5.9
Advanced driving course/defensive driving course	2	3.9
Pencil and paper demonstrations	2	3.9
Read literature	2	3.9
Apply *Look to Live* recommendations	2	3.9
Quiz them	2	3.9
Virtual reality	1	2
Watch movies	1	2.0
Commentary driving, either by Learner or accompanying driver	1	2.0
Spend time in casualty hospital	1	2.0
Software to take home	1	2.0
TAC ads	1	2.0
As a passenger	1	2.0

This table shows the responses from 39 participants.

Attitudes Towards the VicRoads Hazard Perception Test

Participants were asked to rate their attitude toward the Victorian Hazard Perception Test on a scale from 0 to 10, where 0 represented a very negative attitude and 10 represented a very

positive attitude towards the test. The mean score on this scale was 4.50 (SD = 3.08). The majority of comments made about the Hazard Perception Test were negative, and included:

> It doesn't make sense. The kids don't like it, what is the point of touching a computer when they have to learn on the road.
>
> Doesn't teach you anything. You can't judge distances.
>
> The test is artificial, the graphics are blurry.
>
> Students come out saying "I didn't know what I was doing".

Other more positive comments included:

> I agree (with the test) but I don't like the way it is operated.
>
> I like the concept but I don't like the way it is handled.
>
> Anything that can keep the driver aware and safe is important. It does have scope for improvement.
>
> Excellent concept that needs refining.

Participants were also asked to rate whether they thought the Hazard Perception Test accurately measured hazard perception skills on a scale from 0 to 10, where 0 means it is not at all effective and where 10 means it is extremely effective. The mean score on this scale was 3.88 (SD = 2.77).

Forty three participants (86%) thought that there could be a more effective way of measuring hazard perception skills, other than the present Hazard Perception Test. These are shown in Table 48. Many instructors felt hazard perception skills would be best evaluated on the road (34% of responses). Some responses to this question included:

> Something with a steering wheel and gears, like a video game but use suburban street. More like a simulator.
>
> Simulator, perhaps we don't need it at all?
>
> Should be done earlier than the licence test, when they book for the test or focus on these skills when they get learners. Measure them out on the road as part of practical test.
>
> Driving test should be much longer and should cover driving in freeways/multi-lane highways, this gives tester better scope of learner driver.
>
> In the vehicle with the driver to see how they perceive. Practical test. The young ones might get more out of the video screen than older drivers - 9 times out 10 they come out and say "that was really crazy".
>
> Practical, in the car. Include it in the driving test.
>
> No way you can test it. Simulators are difficult, confusing.

Table 48: Suggestions For More Effective Ways Of Measuring Hazard Perception Skills

Response	Frequency	Percent
On the road	22	34.4
Simulator	8	13.1
Improve graphics/3D/make it more real life	7	11.5
Longer driving test	5	8.2
Introduce test earlier, while learning or booking for P's	5	8.2
Scenarios are too short	3	4.9
Only one view (front on)	2	3.3
Is it needed at all?	2	3.3
Have an instructor present to explain the test and when to touch the screen (as an example)	1	1.6
Increase number of selections in video	1	1.6
Learn hazard perception skills better and assess over a period of time, eg with logbooks	1	1.6
Give scenarios they may not experience during the test	1	1.6
Vague answer – something better	1	1.6
Give instructors a method to teach hazard perception skills	1	1.6
Place the test before the drive test	1	1.6
Make it harder/higher pass rate	1	1.6
On-road, but don't over-emphasise hazard perception	1	1.6

This table shows the responses from 49 participants.

Instructors were asked what they told learners about the Victorian HPT. The data in Table 49 show that driving instructors tend to show their students the practise test located at some VicRoads offices, and they explain how the test works. Only one instructor responded that he told his students to count to three before touching the screen. Although most driving instructors did not tell their students this, there was a general perception amongst driving instructors that the test could be passed in this way, as shown in Table 50. There is no evidence that it is possible to pass the test using any of the "easy" methods suggested by instructors.

Table 49: What Driving Instructors Tell Students About The Hazard Perception Test

Response	Frequency	Percent
Show them the practise test	17	18.7
The general workings of the test	9	9.9
What to expect and why, explain purpose of the test	8	8.8
Touch the screen as soon as you see a hazard	8	8.8
How the scenario's work, including timing	7	7.7
That you don't have to touch the screen for all questions	7	7.7
Hazard Perception – Look to live video, other videos, handbook	6	6.6
How much you need to pass	4	4.4
Touch screen when you believe you should, as in driving	4	4.4
Work out exactly what the screen is asking you	3	3.3
Relate driving lessons to HPT	3	3.3
That they have to do it	3	3.3
That it is not difficult	2	2.2
Advise not to repeat a question	2	2.2
It cuts out automatically	1	1.1
Tell them more questions	1	1.1
If you don't pass it doesn't mean you can't drive	1	1.1
Don't tell them anything	1	1.1
If you don't pass, you can go for it again	1	1.1
There are some trick questions involving tailgating	1	1.1
Know the road rules	1	1.1
Tell them to count to three and then touch	1	1.1

This table shows the responses from 50 participants.

Table 50: Driving Instructors' Reports Of An Easy Way To Pass The Hazard Perception Test

Response	Frequency	Percent
Count to three	26	74.3
React as quickly as possible	2	5.7
Don't touch screen on certain questions	2	5.7
By using hazard perception skills	1	2.9
Don't touch the screen at all	1	2.9
Don't replay question	1	2.9
Don't accelerate	1	2.9
Touch screen only for a change of speed	1	2.9

This table shows the responses from 50 participants.

Over-Involvement of Novice Drivers in Crashes

Driving instructors were asked some questions of a more general nature at the end of the interview, including why novice drivers might be over-involved in crashes. Driving instructors identified some characteristics of Learner drivers which the literature has also identified as contributing to the over-involvement in crashes of novice drivers, including lack of experience, lack of skills and overconfidence. Some responses included:

> Negative senses, competitive

Not experienced, drive too fast. They do know how to drive but they think they can do anything.

Being young you tend to daydream a lot.

Australian attitude ("I'll be right mate").

Overconfident; assume they have the right of way, don't focus on what could happen; speeding is cool.

Inexperience.

Lack of skill.

They think they're invincible or they are not concentrating on what they are doing. Think once they've got their licence they know everything, nothing else to learn - that's it.

Rashness; lack of anticipatory skills; simply not seeing enough.

Table 51: Reason Driving Instructors Give For The Over-Involvement Of Novice Drivers In Crashes In Their First Year Of Driving

Response	Frequency	Percent
Lack of experience	24	20.9
Lack of skill	14	12.2
Overconfidence	9	7.8
Feelings of immortality/invincibility	8	7.0
Lack of concentration	8	7.0
Not enough driving instruction	7	6.1
Peer group pressure	5	4.3
Non-compliance	5	4.3
Attitude	5	4.3
Driving test is below standard	4	3.5
Speeding	4	3.5
Forget what was taught/throw it out the window	4	3.5
Not enough confidence	3	2.6
Following distance	3	2.6
Impatience	2	1.7
Take things for granted	2	1.7
Human error	1	.9
Aggressive	1	.9
Playful	1	.9
Competitive	1	.9
Emotionally upset	1	.9
They think once licenced there’s nothing more to learn	1	.9
Vehicle road worthiness	1	.9
Lack of support and parents attitudes	1	.9

This table shows the responses from 49 participants.

When asked whether they tended to focus on the problem area they identified, 43 participants (86%) said that they did. Those who did not tend to focus on these areas had identified factors such as experience. These instructors may have felt this was out of their realm.

Learner Drivers and Parents' Roles

Participants were also asked what role they felt parents should play in helping their children learn to drive. Throughout the questionnaire, some participants had been adamant that parents should not be involved in teaching their children to drive, or that they passed on bad habits to their children. This was, however, a minority. The data in Table 52 show that the majority of driving instructors believe parents should have at least some role in helping to teach their children to drive.

Only two driving instructors said that parents shouldn't have role in helping their children to drive, and five said parents should learn from an instructor before teaching their children to drive (seven instructors identified that parents can pass on bad driving habits to their children).

Table 52: The Role That Driving Instructors Feel Parents Should Play In Helping Their Children To Drive

Response	Frequency	Percent
As a passive accompanying driver	24	31.6
As an active accompanying driver	13	17.1
Client should start with instructor, parents come in later	11	14.5
Can pass on bad habits	7	9.2
Parents should learn from instructor	5	6.6
Parents should encourage and support training	3	3.9
Be a good example	3	3.9
Parents shouldn't have a role	2	2.6
Have parents fill in log book	2	2.6
Sit in back of car during lessons	2	2.6
Parents should pay for more driving lessons, attitude towards lessons	1	1.3
Encourage a different sport to unleash risk-taking	1	1.3
Shouldn't teach without dual control	1	1.3
Use parents for 18 months and then polish with driving school	1	1.3

This table shows the responses from 50 participants.

Recommended Hours of Driving Practice

Driving instructors generally recommended that Learner drivers should have as much driving time as possible before attempting the licence test (45%). Forty-seven participants responded to this question. It appeared that driving instructors gave an estimate of what they thought was an appropriate number of hours, as shown in Table 53, but that they may or may not have explicitly expressed this to their students.

Table 53 : How Many Hours Driving Do You Recommend Learner Drivers Should Have Apart From Lessons

Response	Frequency	Percent
As much as possible	21	44.7
15-50	16	34.0
Don't make recommendations	5	10.6
51-150	4	8.5
20-150	1	2.1

This table shows the responses from 47 participants.

When Should a Learner Driver Attempt the Licence Test?

Driving instructors were asked what characteristics a Learner driver must show before attempting the licence test. The data in Table 54 shows that the most frequent response was car control skills (15%), followed by confidence (not overconfidence) (9%) and knowledge of the road rules (9%). The skills or attributes most frequently reported did not include the information processing/cognitive skills which were frequently mentioned as important for Learners to learn in order to be a safe driver. Hazard perception skills were mentioned five times (4%) as a skill Learners must show before attempting the licence test.

Driving instructors were also asked what sort of things they would look for to discourage a Learner driver from taking the test. The data in Table 55 shows that many instructors said they would look for the opposite characteristics to those they listed in the previous question. There were some differences, however. Driving instructors would discourage a Learner from taking the test if they were still asking the instructor questions, or if the instructor was still correcting mistakes (4% of responses), if the Learner lacked concentration (2% of responses), if the Learner appeared overconfident (2% of responses) or impulsive (1% of responses), or if the instructor feels the Learner is too focused on attaining their licence and not on learning to drive (1% of responses).

The lack of hazard perception skills was more frequently mentioned as when instructors would discourage the Learner from taking the test, as opposed to a Learner showing good hazard perception skills and consequently being encouraged to attempt the licence test.

Table 54: Characteristics A Learner Driver Must Show Before A Driving Instructor Recommends That They Attempt The Licence Test

Response	Frequency	Percent
Car control skills	21	15.1
Confident but not overconfident	13	9.4
Knowledge of the road rules	13	9.4
Able to make decisions/judgements	11	7.9
General driving competence	10	7.2
Ability to drive unaided	9	6.5
Observation skills	8	5.8
Good attitude	6	4.3
Pass a mock test	6	4.3
Vehicle manoeuvres (lane change, safe gaps, following distance)	6	4.3
Hazard perception skills	5	3.6
Show maturity and responsibility	4	2.9
Doesn't speed	3	2.2
Awareness of safety issues	3	2.2
Parking and low speed manoeuvres	3	2.2
System of car control	3	2.2
Conformity to VicRoads guidelines	2	1.4
Drive in a predictable way	2	1.4
Not panicking	2	1.4
Patience	2	1.4
Instructor feels safe and confident	2	1.4
Show courtesy	2	1.4
Able to handle an emergency	1	.7
Coping with multiple tasks	1	.7
Anticipating skills	1	.7

This table shows the responses from 49 participants.

Other Issues

Driving instructors were asked about other issues they thought were important that hadn't been covered in the questionnaire (see Table 56). They were concerned about the standard of the licensing test (9% of responses), the credibility of the driving industry (7% of responses), and also that Learner drivers should practise in all conditions (7% of responses). The data in Table 58 show the responses to this question. Some responses included:

> Parents should drive better - don't forget what they learnt when they did their test. Kids drive by example so parents should be more responsible in their driving.
>
> Teach instructors how to use books - need training - as in Certificate III. Low speed manoeuvring pinpoints the quality of the driver.
>
> It's important at some stage to drive on the freeway in the wet, skid control movements. Compulsory that everyone should do some sort of advanced driving course
>
> Important that logbook system comes out, will encourage parents to practise with their kids a lot more because it is compulsory will put them in varied driving conditions.

Emphasise to public safety is more important than cost. Most important is safety and not the test.

There are not enough good instructor out there to teach learners. There should be some sort of standard in place for instructors - they should be dedicated, look on it as a service to society. Licence test is of low standard, especially for parking.

Learners are not checked for their reaction in emergencies, person should be checked for his character before receiving licence - may be aggressive - danger to others, not to be off P plates until a 2nd exam, no overseas visitors should be allowed to drive without experience from driving instructor, all States should have same traffic rule, Hazard perception test is unnecessary.

Behaviour of cyclists and young kids in vicinity of road / pedestrians. As car drivers be aware of these things.

Table 55: Skills A Learner Drivers Shows That Would Make The Driving Instructor Discourage The Learner From Taking The Licence Test

Response	Frequency	Percent
Poor car control skills	23	15.6
Do not know or comply to the road rules	14	9.5
Poor car manoeuvres, eg turning, lane placement	11	7.5
Don't show adequate general driving skills	10	6.8
Not confident	10	6.8
Poor hazard perception skills	10	6.8
Poor judgement/decision making skills	9	6.1
Drive at an inappropriate speed	6	4.1
Student still asking questions or instructor still correcting mistakes	6	4.1
Lack of observation/awareness	6	4.1
Fail a mock test	6	4.1
Bad attitude	5	3.4
Poor system of car control	5	3.4
Unlikely that they will pass the test	4	2.7
Lack of concentration	3	2.0
Instructor doesn't feel safe	3	2.0
Overconfidence	3	2.0
If person seems too focussed on attaining their licence and not on how to drive	2	1.4
Impulsive	2	1.4
Lack of maturity	2	1.4
Don't follow VicRoads guidelines	1	.7
Little regard for others on the road	1	.7
Not driving in a predictable manner	1	.7
Show bad habits	1	.7
Not able to cope with multiple tasks	1	.7
Bad parking/low speed manoeuvres	1	.7
Poor mirror use	1	.7

Table 56: Other Important Issues Of Driving Instructors

Response	Frequency	Percent
Driving Industry Issues		
Driving industry needs more credibility (guidelines for instructors)	5	7.1
Instructors need training (Certificate III)	3	4.3
Concern about deregulation of the driving industry (reduced skill of driving instructors)	2	2.9
Too many people teach just to pass the licence test	1	1.4
Probationary Licence Issues		
Needs to be more enforcement focussing on p-plate drivers	2	2.9
Compulsory advanced training courses	2	2.9
Advanced training courses lead to overconfidence	2	2.9
5 year alcohol ban from when attain licence	1	1.4
Peer group pressure is a problem	1	1.4
Licence is a privilege, not a right	1	1.4
Sign a contract that they will comply with road law	1	1.4
Introduce an exit test, before full licensure	1	1.4
Colour of P-plate to change with experience	1	1.4
Learner Driver Issues		
Learners should practise in all conditions	5	7.1
Need a log book system	4	5.7
Learners should be tested on emergency situations	4	5.7
Importance of anticipation/hazard perception/ decision making	2	2.9
Improve skills and attitudes of parents	2	2.9
Should be a compulsory number of driving instruction hours	2	2.9
Experience is very important	2	2.9
Drivers need to be aware of pedestrians/ cyclists/ kids	1	1.4
Should understand vehicle mechanics	1	1.4
Importance of attitude	1	1.4
Nothing wrong with speed, just use it appropriately	1	1.4
Low speed skills are important	1	1.4
Importance of mirror use	1	1.4
Negative emotions lead to human error (anger, aggressiveness, abusive)	1	1.4
Need to have more respect for other drivers	1	1.4
Right turns at traffic lights need more focus	1	1.4
Push bikes should have a rear view mirror	1	1.4
Instructor takes Learners for test when he decides they are ready, not them	1	1.4
Expose Learners to TAC ads prior to licensing	1	1.4
Learner should come to lessons with the proper frame of mind	1	1.4

Table 56 continued.

Learners should have a character check before licensing (screen for aggressiveness)	1	1.4
Testing Issues		
Concern about the standard of the test	6	8.6
The HPT is unnecessary	1	1.4
Other general issues		
More emphasis on public safety rather than costs	1	1.4
Overseas drivers should have lessons with a driving instructor	1	1.4
All states should have the same road rules	1	1.4
Should be more enforcement on indicator use and letting others know your intentions	1	1.4

This table shows the responses from 40 participants.

DISCUSSION

The results presented in this report provide information regarding the content of driver training and the skills regarded as important by driving instructors. Most novice drivers receive some driving instruction during their learner period. Harrison (1999a) reports that 92% of Learners in his Victorian sample intended to take professional instruction. It was therefore considered important to understand what is being taught to the Learner driver, and how it is being taught. This information could be used to provide feedback to driving instructors regarding the teaching of hazard perception skills and other cognitive skills essential to safe driving, and to understand the acquisition of these skills by novice drivers.

It was also considered important to focus on hazard-related behaviours as these appear to contribute to the high crash risk of novice drivers. The introduction of the Victoria Hazard Perception Test provided an opportunity to collect some data relevant both the this test in particular and to the broad issues associated with the assessment of hazard-related skills in the context of a graduated licensing system.

The Model

As a means of integrating hazard perception with the broader driving context, it was proposed that a study of hazard perception skills should also encompass the behavioural response, thus the term "hazard behaviour" was coined. Klein's (1989, 1993) Recognition-Primed Decision Making Model was presented in the Introduction as a means of understanding how inexperience may contribute to poor decision making in the driving context, based on the limited number of experiences novice drivers have in their driving repertoire.

It is considered that the application of a broad model of decision-making to driver behaviour in the context of hazard detection and behaviours is a significant contribution of the present report. It provides a basis for understanding the instructional practices for learner drivers, and also has some implications for the selection of hazard-related assessment methods in graduated licensing schemes.

The RPD model suggests that novice drivers are better placed to make decisions on the road if they have a variety of automated responses to choose from, based on experience. Using hazard perception as an example, most instructors focus on teaching their students to be aware of what is around them and they explain what may happen whilst they are driving. Some instructors described exposing their students to different situations during the lesson, which would contribute to building their repertoire of appropriate responses to hazards.

This may be an effective method of teaching "hazard behaviour", along with encouraging novice drivers to gain as many practise hours as possible with a fully licensed driver. This would aim to increase the number of automated responses available to novice drivers, and thus allow them to handle a greater variety of hazardous situations when they become probationary licence holders. It is therefore important for Learner drivers to practise on the roads as much as possible, and particularly that they vary the conditions under which they drive (e.g., weather conditions, different traffic environments).

While the RPD model supports the use of practice as an important component of the instructional process, it implies that the assessment of hazard-related skills amongst novice

drivers needs a broader base than that likely within the constraints imposed by a computer-based assessment method. Computer-based assessment methods, such as the Victorian Hazard Perception Test, are unable to assess the behavioural component of the hazard-behaviour domain. A computerised test can, in a limited sense, measure the ability of drivers to perceive hazardous and non-hazardous situations. It can also allow an assessment of the timing of an artificial response to a hazardous situation. As an assessment method, however, this approach is limited by the artificial context within which the assessment occurs. This is of some concern given the putative importance of experience in the real world in the development of these skills, and given the context in which the skills are ultimately required.

Hazard-behaviour skills are learned in the context of controlling a motor vehicle in the complex, dynamic driving environment. Assessment of those skills using a computerised system that lacks much of the complexity, dynamism, and control of real-world driving necessarily limits the assessment to some specified subset of the skills relevant to the broader behavioural skill. In the case of the Victorian Hazard Perception Test, the assessment focuses on skills that are perceptual and interpretive in nature, but limited to events in the relatively small visual angle subtended by the image in the video display.

Assessment of a subset of the skills that contribute to hazard-related behaviours requires some caution. While the results of a computerised assessment system may be correlated with crash occurrence, this correlation may be the result of a number of factors that are not necessarily equivalent to hazard behaviours. It is also important to note that people with relatively weak skills in a computerised assessment task which focuses on perception and interpretation may offset this weakness in real-world driving by modifying other aspects of their hazard-related behaviours or their broader driving behaviour.

These types of issues may underlie the suggestions of driving instructors in the survey concerning the potential assessment of hazard-related skills using other techniques. Many instructors raised concerns about the artificial nature of computerised hazard perception tests, and over one-third of respondents suggested (without prompting) that this type of assessment task would be better conducted on-road as part of the licence test.

This suggestion is consistent with a view that places hazard perception more completely in a behavioural and environmental context. Full assessment of the hazard-related skills of drivers may be better conducted in the same context. This approach to the assessment of higher-order driving skills is currently used in the licence test developed in New Zealand as an exit test from the graduated licensing system, where drivers are assessed in a number of ways over a 45-minute drive in normal traffic conditions. Such as an approach would provide a more holistic assessment of hazard behaviours and their likely safety-related consequences. It may also result in increased practice as training for the test.

If computerised methods to assess hazard perception are intended to predict crash involvement and so serve to restrict the driving of higher-risk drivers, these issues are not important and it remains only to demonstrate (in a methodologically sound way) that there is a strong predictive relationship between test scores and crash involvement. If there is a need to assess hazard-related skills more fully, other assessment methods may be more valid.

Cognitive Skills

The literature identifies a number of cognitive skills essential to the driving task. These are discussed in the Introduction and include workload management, automation, and attentional control. The skills rated by driving instructors as important in this study were generally

comparable with these, however learning the road rules was rated by driving instructors as the most important skill Learner Drivers should learn. This 'road rules' skill was not discussed here as it was outside the information processing/cognitive skill focus of the study. It is important, however, to draw attention to the fact that driving instructors tend to place this ahead of other cognitive based skills.

Understanding the road rules is an important aspect of the licence test and driving instructors may therefore attribute a greater weight to this skill than to the more 'invisible' cognitive type skills. It is also clearly the case that safe driving relies on consistent behaviour between individuals, and these are (in part) the purpose of road rules. It may, therefore, be reasonable for driving instructors to emphasise road law knowledge in their responses. Road law knowledge is less important than the cognitive skills discussed in the literature, however, and it is apparent that the instructors gave greater emphasis to this aspect of driver training than might be appropriate.

Driving instructors identified coping with multiple tasks (which is equivalent to workload management), attention, and automation as important for driver safety. The instructors' understanding of automation may have been more task-specific than that described by Gregersen and Bjurulf (1996). The present study used clutch and gear co-ordination as an example of automation, whereas the literature refers to automation of both the control of the car and driving in the general traffic environment (Gregersen & Bjurulf, 1996). It is possible that the instructors meant the automation of car control when they suggested automation as an important skill rather than the automation as a cognitive heuristic.

It appears that driving instructors are aware of the importance of certain cognitive skills which have previously been identified by research in the young driver area. Whether this relates to an awareness of research outcomes is, however, unclear. More importantly for this study, the instructors seemed to have a relatively simplistic understanding of these cognitive skills. They were generally unable to explain why such skills were important (except that they related to safety as a driver) and, most importantly, generally seemed unable to discuss teaching or instructional methods targeting each cognitive skill. Suggested instructional methods such as "explaining the skill", "scanning ahead", and "practice" are not specific instructional strategies for skill development in the domains suggested by the instructors.

An important question that this study aimed to address was the method of teaching higher order skills, particularly hazard perception skills. The most commonly reported technique for teaching cognitive skills was verbal explanation. Explanation serves to provide knowledge of a skill, but the development of the skill itself requires additional methods or strategies. Such strategies were described only rarely (e.g. commentary driving as an instructional method for attentional control). The nature of the driving lesson is practical however, and it might be assumed that the practice of a skill which was explained verbally would generally occur near to the time it is explained, but the lack of structure implied in this approach is of concern.

It is possible that the lack of suggestions for cognitive skill development reflects a number of problems for learner driver instruction:

1. It may be the case that there are no effective instructional strategies for cognitive skill development in the driving domain. It may be that the specific skills that underlie hazard behaviour, for example, are simply not amenable to current instructional strategies and that while the instructors were aware of the skills, there is no knowledge base from which to draw appropriate strategies and methods for instruction. This would be consistent with Harrison's (1999a) view.

2. It is possible that cognitive skills are amenable to instructional intervention, but that the general lack of training reported by driving instructors makes it difficult for them to develop or apply instructional methods in the driving domain with young adults. Driving instructors are not instructional experts or educators and may have insufficient training in this area to effectively develop or apply strategies that might be more obvious to people with greater expertise.

3. Consistent with the second issue, it may be the case that driving instructors believe that explanation and broadly-based methods (such as practice, scanning etc) are sufficient to teach all the cognitive skills discussed in this study. The driving instructors may consider that they are using an appropriate instructional strategy. Given the issues raised by Harrison (1999a) and the sizeable literature on skill development, this possibility is very concerning as it underscores the need for substantially greater training for driving instructors.

It is unclear whether an instructional strategy is available that would provide for skill development in the hazard behaviour area. This is an important area for future research as the outcomes might guide the training of driving instructors to ensure that they are able to apply appropriate, targeted strategies rather than non-specific approaches to instruction. While Harrison (1999a) is pessimistic on theoretical grounds, he leaves open the possibility that additional work in this area might result in the development of an appropriate technique.

In light of the evidence which points towards increasing experience as an important factor in reducing the crash risk for novice drivers, it is encouraging to note that driving instructors generally recommended that novice drivers' practise cognitive skills between driving lessons (Harrison et al., 1997; Gregersen & Bjurulf, 1996). Some driving instructors in this study recommended that the Learner driver should not practise between lessons. This recommendation was generally skill specific however, and applied when the driving instructor felt it would be unsafe for a Learner to perform the skill in traffic until they were competent at that skill.

Attitudes Towards Higher-Order Skills

The driving instructors interviewed in this study generally emphasised the importance of higher-order skills, such as hazard perception skills, anticipation of other drivers and decision making. In spite of this, car control skills was most frequently cited as a characteristic a Learner must have before they attempt the licence test, followed by confidence and knowledge of the road rules. There appears to be an incongruence between skills rated as important for safe driving, and skills used by instructors to assess the progress of their students. This may reflect either a real belief on the part of instructors that car-control skills and road-rule knowledge are important predictors of readiness to drive, or an inability on the part of instructors to assess higher order skills in spite of their beliefs about their importance. Either way, there is a need for additional training for instructors.

An incongruence also appears between driving instructors attitude toward the parents' role in teaching their children to drive and the number of recommended hours of practice a learner should attain. Almost all of the driving instructors believed that parents should have a role in teaching their children to drive, however they tended to underestimate the number of hours a learner driver should accrue. Although approximately 45% of the driving instructors

interviewed reported that Learner drivers should have as much practice as possible, it is unclear exactly how many hours these instructors envisaged[3]. A concerning number of instructors (34%) recommended that less than 50 hours of driving practice was sufficient before attempting the licence test. VicRoads supports a recommendation for a minimum of 120 hours of driving practice (VicRoads, 1995).

Driving Instructors' Attitudes Towards Computerised Hazard Perception Testing

The driving instructors were generally neutral in their ratings of the Victorian Hazard Perception Test. Their comments, however, were generally negative. Those instructors who spoke positively of the Test still had suggestions for improving it. A number of positively inclined instructors specifically supported the notion of computerised assessment but were critical of the Victorian implementation of this approach.

A supportive instruction industry is critical for the success of this type of assessment technique, but it is not sufficient that industry representatives lend their support if individual instructors are less positive. Many learner drivers use driving instructors in the final lead-up to their licence test, and their attitudes towards the assessment process are likely to be affected by the attitude and instructions of their driving instructor. Where an instructor is positive about the assessment method, it is likely that this attitude will lead to training experiences that focus on the skill assessed by the test. A more negative attitude may result in training experiences that focus on passing the test rather than developing appropriate skills. Further, a negative attitude on the part of many driving instructors may have an impact on the attitude of learner drivers via peer influence and word-of-mouth.

It was not possible to assess the impact of instructors' attitudes to computerised assessment on learner drivers in this study. It is of some concern, however, that the responses of instructors to items in this area were rarely positive. The main issue that instructors raised, and that might need to be addressed in jurisdictions considering this type of assessment technique, was the face validity of the assessment tool. Many instructors were concerned that a computerised approach to assessment did not adequately reflect the requirements of real-world driving. While this may reflect a failure to understand the nature of assessment in the context of cognitive skills, it never-the-less is an attitude that might impact both on their instructional strategy and their students.

General Perceptions

The responses given by driving instructors regarding the over-involvement of novice drivers in crashes was consistent with factors identified in the literature, particularly risk taking behaviour, inexperience, speed, losing concentration, overconfidence, feelings of invincibility and lack of skills.

Participants separated the role parents could have in helping their children learn to drive as passive and active. The active role implies that the accompanying driver takes on a training role, whereas the passive role implies the accompanying driver is simply a passenger. A concern was expressed by driving instructors that the accompanying driver may teach the

[3] These participants were encouraged to give a response in hours.

Learner driver bad habits and undo what was taught during the lesson. Whether this concern is appropriate is an empirical question that might profitably be investigated in future.

It is interesting to note that driving instructors most frequently reported that they would recommend a learner driver attempt the driving test when they showed car control skills. Only a small number of participants reported that hazard perception skill was a characteristic they looked for before recommending they attempt the licence test. Other issues which driving instructors considered important were issues regarding the driving industry, probationary licensing, the Learner driver, the licence test and other more general issues.

CONCLUSIONS

The Victorian Hazard Perception Test is a specific example of computerised assessment that was used here as the basis for an investigation of the attitudes and behaviours of driving instructors in relation to higher order skills thought to contribute to safe driving. Some theoretical issues suggest that caution needs to be exercised in the application of such an approach to assessment, and that on-road techniques may provide a more-complete approach to the assessment of hazard-related behaviours. The Victorian HPT most likely assesses a component of this broader driving domain.

Driving instructors appear to be aware of the skills which are essential for safe driving. They were generally unable, however, to suggest instructional strategies specifically targeting these skills. At the least this implies the need for further work to develop appropriate strategies and methods for instruction in this area, and then training for instructors in the use of these strategies. Driving instructors are generally unlikely to have the expertise in instructional design required to develop such strategies without assistance.

In spite of their emphasis on cognitive or higher-order skills, driving instructors did not generally use these as the basis for assessing the learner's readiness for driving. Instead, they focused on car-control skills and road-law knowledge. This suggests that there may be a need to develop (and teach) assessment tools that instructors can use during lessons to assess the level of skill in areas such as hazard-behaviour and attentional control.

Driving instructors had either a neutral or negative attitude towards the Hazard Perception Test, and generally focused on the apparent validity of the test as a measure of hazard-related skills. Their suggestions, consistent with the theoretical issues discussed earlier, focused on making the assessment task more realistic. Negative attitudes on the part of driving instructors are of some concern. The development of assessment techniques in other jurisdictions could minimise these problems either by developing and implementing a real-world assessment method, or by focusing a strong educational effort (for instructors) on the appropriateness of assessing a component of the hazard-behaviour domain as a way to predict the risk level of drivers.

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Appendix A - QUESTIONNAIRE FOR DRIVING INSTRUCTORS

Monash University Accident Research Centre

Thankyou for volunteering to participate in the Accident Research Centre's survey of driving instructors. The interview will take approximately 45 minutes to an hour and is completely confidential. There will be no identifying information recorded on the answer sheet. Firstly, I would like to ask you some general questions about yourself.

GENERAL INFORMATION

1. How old are you? _____

2. Observe sex M F

3. For how many years have you been a driving instructor? _____

4. Is this your main form of employment? Y N

4a. If No, what is your main form of employment? _____

5. What is the postcode of the suburb in which the driving school you work for is located? ☐

6. How many hours/days a week do you generally work as a driving instructor? _____

7. How many lessons a day do you generally teach? _____

8. On average, how many lessons would each Learner driver have with you before they pass the licence test?_____

9. Do you instruct in a manual or an automatic car, or both? _____

The following questions are related to general driver training information.

10. Did you receive training prior to becoming a driving instructor? Y N

10a. If Yes, could you describe this training? _____
_____
_____
_____
_____

10b. If No, did anyone give you any general guidance? Could you describe this?

_____
_____

11. Have you received training during the time you have been a driving instructor? Y N

11a. If Yes, could you describe this training? _____
_____
_____
_____

12. Could you list the five most important things you remember learning during this training?
1. _____
2. _____
3. _____
4. _____
1. _____

13. I would like you to look at this list of skills. Research has shown that these are skills a Learner driver should have in order to become a safe driver. Could you take a few minutes to read through the whole list and pick out the five most important skills that *you* think a Learner driver should learn to become a safe driver. Please ask if you are unsure of the meaning of any of the terms.

1. _____
2. _____
3. _____
5. _____
6. _____

14. Of these skills, which do you think is the most important? _____

14a. Why do you think _____ (above) is the most important skill for Learner drivers to learn?_____
_____
_____
_____

14b. How do you go about teaching Learner drivers this skill?

_____
_____
_____
_____
_____
_____

14c. On a scale from 1 to 5, could you rate how easy this skill is for Learner drivers to learn, where 1 means it is very easy to learn and 5 means it is very difficult to learn?

1 2 3 4 5

14d. On a scale from 1 to 5, could you rate how difficult this skill is to teach, where 1 means it is not at all difficult to teach and 5 means it is very difficult to teach?

1 2 3 4 5

14e. What recommendations do you make which may help the Learner driver with this skill between lessons? _____

_____

_____

_____

_____

I'd like to go through the other skills you picked in the same way that we discussed _____

15a. Why do you think _____(2) is an important skill for Learner drivers to learn?

_____

_____

_____

15b. How do you go about teaching Learner drivers this skill?

_____

_____

_____

_____

_____

_____

15c On a scale from 1 to 5, could you rate how easy this skill is for Learner drivers to learn, where 1 means it is very easy to learn and 5 means it is very difficult to learn?

1 2 3 4 5

15d. On a scale from 1 to 5, could you rate how difficult this skill is to teach, where 1 means it is not at all difficult to teach and 5 means it is very difficult to teach?

1 2 3 4 5

15e. What recommendations do you make which may help the Learner driver with this skill between lessons?

_____

_____

_____

_____

_____

16a. Why do you think _____(3) is an important skill for Learner drivers to learn?

_____

_____

_____

_____

16b. How do you go about teaching Learner drivers this skill?

_____
_____
_____
_____
_____

16c On a scale from 1 to 5, could you rate how easy this skill is for Learner drivers to learn, where 1 means it is very easy to learn and 5 means it is very difficult to learn?

1 2 3 4 5

16d. On a scale from 1 to 5, could you rate how difficult this skill is to teach, where 1 means it is not at all difficult to teach and 5 means it is very difficult to teach?

1 2 3 4 5

16e. What recommendations do you make which may help the Learner driver with this skill between lessons?

_____
_____
_____
_____
_____

17a. Why do you think _____(4) is an important skill for Learner drivers to learn?

_____
_____
_____
_____

17b. How do you go about teaching Learner drivers this skill?

_____
_____
_____
_____
_____
_____

17c. On a scale from 1 to 5, could you rate how easy this skill is for Learner drivers to learn, where 1 means it is very easy to learn and 5 means it is very difficult to learn?

1 2 3 4 5

17d. On a scale from 1 to 5, could you rate how difficult this skill is to teach, where 1 means it is not at all difficult to teach and 5 means it is very difficult to teach?

1 2 3 4 5

17e. What recommendations do you make which may help the Learner driver with this skill between lessons?

_____
_____
_____
_____
_____

18a. Why do you think _____(5) is an important skill for Learner drivers to learn?

_____
_____
_____

18b. How do you go about teaching Learner drivers this skill?

_____
_____
_____
_____

18c. On a scale from 1 to 5, could you rate how easy this skill is for Learner drivers to learn, where 1 means it is very easy to learn and 5 means it is very difficult to learn?

1 2 3 4 5

18d. On a scale from 1 to 5, could you rate how difficult this skill is to teach, where 1 means it is not at all difficult to teach and 5 means it is very difficult to teach?

1 2 3 4 5

18e. What recommendations do you make which may help the Learner driver with this skill between lessons?

_____
_____
_____
_____
_____

19. Could you describe the best general method you think can be used to teach Learner drivers to drive

_____
_____
_____
_____
_____
_____

The following questions relate to the Hazard Perception Test.

20. What do you think of when the term hazard perception skills is used?

_____
_____
_____
_____
_____

21. Could you list as many hazards that you can think of which may occur whilst driving.

_____
_____

_____
_____
_____

22. Were you provided with any extra training or information in preparation for the introduction of the Hazard Perception Test? Y N NA
(NA is for those who began instructing after the HPT was introduced)

22a. If Yes, could you please describe the extra training or information provided
_____
_____
_____
_____
_____

23. Has your teaching method changed at all since the introduction of the Hazard Perception Test?
Y N NA

23a. If Yes, could you please describe how your teaching method has changed, including how you now teach hazard perception skills _____
_____
_____
_____
_____
_____
_____
_____

23b. If No, do you include any hazard perception training in your lessons? Y N

23b.1. If Yes, could you please describe how you teach novice drivers hazard perception skills.
_____
_____
_____
_____
_____
_____
_____
_____

23c. If NA, do you include any hazard perception training in your lessons? Y N

23c.1. If Yes, could you please describe how you teach novice drivers hazard perception skills
_____
_____
_____
_____
_____
_____
_____
_____

24. What percentage of time overall would you devote to teaching hazard perception skills with each student? _____%

25. Could you list any other methods you may know of for teaching hazard perception skills (though not necessarily methods you would use yourself)

_____
_____
_____
_____
_____
_____
_____
_____

The following questions also relate to the Hazard Perception Test. I would like to remind you again of the confidentiality of this study, and that your answers will not be shown to anyone else.

26. On a scale of 0 to 10, could you rate your attitude towards the Hazard Perception Test, where 0 means you have a very negative attitude toward it, and 10 means you have a very positive attitude toward it _____

27. On a scale from 0 to 10, could you rate your opinion of the effectiveness of the Hazard Perception Test in measuring hazard perception skills, where 0 means you do not think it is at all effective, and 10 means you think it is extremely effective _____

28. Do you think there could be a more effective way of measuring hazard perception skills?

Y N

28a. If Yes, could you describe these _____
_____
_____
_____
_____
_____
_____

29. What do you tell your students about the Hazard Perception Test?

_____
_____
_____
_____

30. Do you know an easy way to pass the Hazard Perception Test? Y N

30a. If Yes, could you describe this? _____
_____
_____
_____
_____
_____

30b. If respondent described a method above: Do you tell your students about this way to pass the test?
Y N

That is the end of the questions about the Hazard Perception Test. The following questions are more general and relate to your experience as a driving instructor. There are no right or wrong answers. We are just interested in your opinion.

31. Research has shown that novice drivers are more likely to crash in their first year of driving than other drivers. What do you think is the main problem with novice drivers?

_____
_____
_____
_____
_____

31a. Do you tend to focus on this area more than others during your lessons? Y N

31b. If Yes, how do you incorporate it into your lessons?
_____
_____
_____

32. What role do you feel parents should play in helping their children learn to drive?

_____
_____
_____
_____

33. How much driving practise in hours, apart from lessons, do you recommend Learner drivers should have before attempting the licence test?

_____
_____

34. Could you list the characteristics that a Learner driver must show before you recommend that they attempt the licence test?

_____
_____

_____
_____

35. What sort of things would you look for that would make you discourage a Learner from taking the test?

_____
_____
_____
_____
_____
_____

36. Is there anything else you think is important when teaching Learner drivers to drive that we haven't covered in the interview so far? _____
_____
_____

LEARNER DRIVER SKILLS

	Decision making under conditions of uncertainty
	Road rules
	Overtaking
	Automation of driving behaviours e.g., Clutch and gear coordination
	Mirror use
	Skid control
	Steering in curves
	Wet weather driving
	Parking
	Following distance
	Effects of overconfidence
	When to indicate
	Recognition of fatigue
	Freeway driving
	Stopping distance
	Distance scanning
	Anticipating other drivers intentions
	Maintaining lane placement
	Scanning the immediate environment
	Night time driving
	Gap selection when changing lanes
	Coping with multiple tasks
	Hazard perception skills
	Vehicle control at low speeds
	Head checks
	Focusing attention on driving task
	Awareness of effects of stress and other emotions
	Braking in an emergency
	OTHER _____

APPENDIX B – Explanatory Statement

Investigation of Content of Driver Training
Chief Investigator: Max Cameron

The aim of this research project is to gain an understanding of changes that may have occurred in driver training after the introduction of the Hazard Perception Test. We are interested in finding out the methods you use in instructing Learners to drive, particularly for the development of hazard perception skills.

Monash University Accident Research Centre is seeking professional driving instructors who are prepared to take part in a one hour interview regarding their teaching methods and the Hazard Perception Test. The interview will take place at Monash University Accident Research Centre, Clayton, and where this is not possible MUARC research staff will travel to the participant. MUARC will compensate driving instructors $25 for taking part in this research project, the cost of an average driving lesson. The interviews will be tape-recorded and the tapes will be destroyed at the end of the project.

No findings which could identify any individual participant will be published. The anonymity of your participation is assured by our procedure, in which neither your name nor the name of your organisation will be recorded with your responses. The information we collect is for **research purposes only** and will be treated with the strictest confidence. Coded data are stored for five years, as prescribed by University regulations.

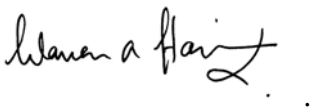
Participation in this research is entirely voluntary, and if you agree to participate, you may withdraw your consent at any time. You may also decline to participate in any section of the procedure.

If you have any queries or would like to be informed of the aggregate research finding, please contact Emma Fitzgerald on 9905 1801.

Should you have any complaint concerning the manner in which this research (Project 98/251) is conducted, please do not hesitate to contact The Standing Committee on Ethics in Research on Humans at the following address:

The Secretary
The Standing Committee on Ethics in Research on Humans
Monash University
Wellington Road
Clayton Victoria 3168
Telephone (03) 9905 2052 Fax (03) 9905 1420

Thank you



Warren Harrison
Research Fellow

APPENDIX C – Summary Table of Ratings of Ease to Teach and Difficulty to Learn

Information processing/cognitive	**How easy is this skill to learn**	**How difficult is this skill to teach**
Decision making under conditions of uncertainty	4.32	3.74
Automation of driving behaviours	4.00	3.17
Anticipating other drivers intentions	3.92	2.72
Coping with multiple tasks	4.23	3.61
Focusing attention on driving task	3.13	2.75
Hazard perception skills	3.57	2.86
Overall mean	3.86	3.14
Hazard-related skills		
Mirror use	2.75	2.33
Distance scanning	3.33	2.27
Scanning the immediate environment	3.67	3.44
Overall mean	3.25	2.68

[1] 1 is very easy to learn and 5 is very difficult to learn.

[2] 1 is not at all difficult to teach and 5 is very difficult to teach