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Young Driver Research Program - Overview report

The over involvement of young drivers in road crashes is a very large and, to date, intractable road safety problem. In recognition of the need for a comprehensive research effort aimed at gaining a more detailed understanding of contributory factors to young driver crashes, this report presents an overview of the young driver research program which has been established under the auspices of the Federal Government's Road Safety Research Initiative. After the presentation of background information, the report describes the nine elements which comprise the research program.

MONASH UNIVERSITY ACCIDENT RESEARCH CENTRE**A Drummond et al****Young Or Novice Drivers****1993**

SERIES

YEAR

SUBJECT

AGENCY

A to Z

**THE FEDERAL GOVERNMENT'S
ROAD SAFETY INITIATIVE**

**YOUNG DRIVER RESEARCH
PROGRAM -
OVERVIEW REPORT**

MONASH UNIVERSITY ACCIDENT RESEARCH CENTRE

for

FEDERAL OFFICE OF ROAD SAFETY

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Abstract
The over-involvement of young drivers in road crashes is a very large and, to date, intractable road safety problem. In recognition of the need for a comprehensive research effort aimed at gaining a more detailed understanding of contributory factors to young driver crashes, this report presents an overview of the young driver research program which has been established under the auspices of the Federal Government's Road Safety Initiative.

After the presentation of background information, the report describes the nine elements which comprise the research program.

Keywords
young driver, crash, exposure to risk, graduated licensing, driving performance, motivation

- NOTES**
- (1) FORS Research reports are disseminated in the interests of information exchange
 - (2) The views expressed are those of the author(s) and do not necessarily represent those of the Commonwealth Government
 - (3) The Federal Office of Road Safety publishes four series of research report
 - (a) reports generated as a result of research done within FORS are published in the OR series;
 - (b) reports of research conducted by other organisations on behalf of FORS are published in the CR series
 - (c) reports based on analyses of FORS' statistical data bases are published in the SR series
 - (d) minor reports of research conducted by other organisations on behalf of FORS are published in the MR series

EXECUTIVE SUMMARY

One of the most serious and seemingly intractable problems in road safety is the over-involvement of young drivers in road crashes. Whether State, national or international road crash statistics are examined, the over-representation of young drivers in crashes in absolute terms, or relative to their proportion of the population, licences held or distance driven, is very marked. In recognition of the need for a comprehensive research effort aimed at gaining a more detailed understanding of factors contributing to young driver crashes, the Federal Office of Road Safety is funding a major young driver research program under the Federal Government's Road Safety Initiative. This report is an overview of that research program.

A model of factors contributing to young driver crash risk is advanced which indicates that there are perhaps **three** basic ways in which the improvement of young driver safety can be tackled:

1. DRIVING SKILL

- **By raising their level of driving skill. This approach has the fundamental aim of making new drivers better drivers**

2. MOTIVATION

- **By changing their personal approach to driving. This approach has the fundamental aim of making young people "older" people.**

3. AMOUNT AND/OR TYPE OF DRIVING

- **By modifying the type of driving young drivers do or reducing the amount of driving they do. This approach has the fundamental aim of making young drivers into young non-drivers or young drivers doing different types of driving.**

The comprehensive research program being conducted by the Monash University Accident Research Centre is designed to generate information which will contribute to the development of effective and efficient crash countermeasures for young drivers. The research program comprises the following elements:

- | | |
|--|--|
| • Characteristics of Young Driver Crashes (derived from crash studies) | • Characteristics of Young Driver Crashes (derived from behavioural studies) |
| • Mass Crash Data Analyses | • Exposure Reduction Measures |
| • Evaluation of Graduated Licensing | • Qualitative Dimensions of Exposure |
| • Effect of Degraded Visual Information | • Skill-Motivation Interactions |
| • Motivational Factors (young driver problem versus young problem drivers) | |

Each of these elements is described in the report.

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1.0 INTRODUCTION

The over-involvement of young drivers in road crashes is a major road safety problem and has so far not been amenable to solution. In examining State, national or international road crash statistics, the over-representation of young drivers in crashes in absolute terms, or relative to their proportion of the population, in relation to licences held or distance driven, is very pronounced.

Developing effective crash countermeasures for young drivers has proved to be a considerable challenge. While measures designed to reduce the amount of driving done by young people have been shown to be effective, such approaches are not necessarily popular with the community. Consequently, there are limits to the extent to which such measures can be applied in an acceptable manner. On the other hand, strategies designed to reduce young driver risk (i.e. to make them safer per kilometre travelled) have generally not proved to be effective.

In recognition of the need for a comprehensive research effort aimed at gaining a more detailed understanding of contributory factors to young driver crashes, a young driver research program has been put in place under the auspices of the Federal Government's Road Safety Initiative. Other research programs carried out under the Initiative are in the areas of alcohol, drugs, fatigue and passenger car occupant protection.

This overview report provides some background information and describes the various elements of the research program, together with some of the initial outputs. The program is still in progress. Detailed reports on individual components of the program will be published.

It is hoped that the information in this report generates interest in general road safety issues and, in particular, young driver safety. Follow-up with the research team and/or the Federal Office of Road Safety is encouraged; details of reports produced and other background information can be provided to interested parties.

2.0 THE IMPORTANCE OF THE YOUNG DRIVER ROAD CRASH PROBLEM

There are two main reasons for concern about young driver safety:

- Given their representation in road crash statistics, there can be no doubt that young drivers represent both a major road safety and public health problem as the following data indicate.

In the two years 1990 and 1991, 596 drivers aged 17 to 25 years were killed on Australian roads. In the same period, 501 drivers aged 26 to 39 years (an age span of 14 years, compared to only 9 years between 17 and 25) were killed.

Young drivers represented some 33% of drivers killed on Australian roads in this two year period.

As general road users, young people (17-25 years of age) represented some 31% of the total number of people killed in road crashes in 1991 (with young drivers contributing some 44% of all young fatalities), yet this age group represents only about 14% of the Australian population.

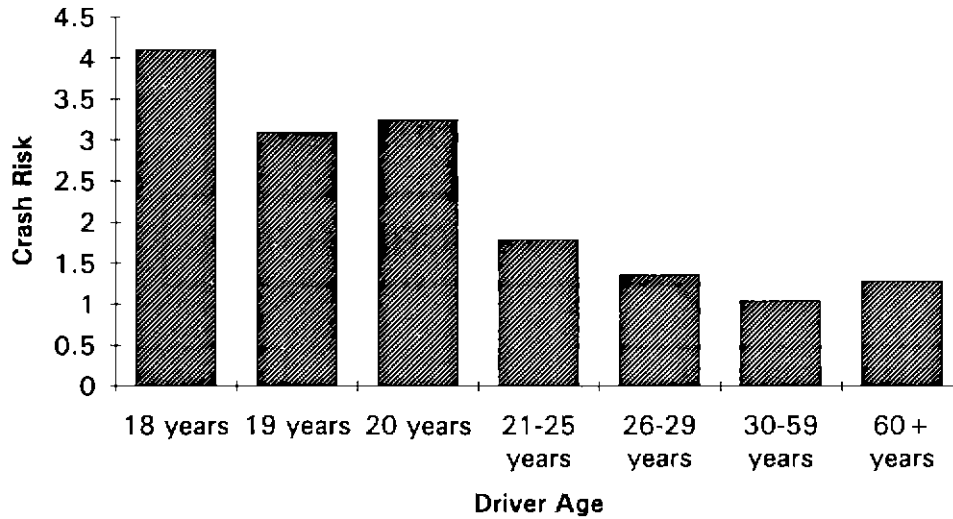
- Despite advances made in other road safety areas and massive resources allocated worldwide to novice driver education and training, there has been virtually no progress in improving young driver safety specifically by reducing their risk of crash involvement.

There is some evidence that young driver crashes tend to be more severe, a finding which could be partly responsible for the above statistics. However, their over-representation remains if those drivers involved (but not necessarily injured) in reported casualty crashes are analysed. For example, between 1986 and 1990 in Victoria, there were 1,140 more 18-25 year old drivers involved in casualty crashes than were aged 26-40 and almost 9,400 more than the total for drivers aged 41-55 years (18,200 c.f. 17,060 and 8,807 respectively).

A straightforward explanation for the above findings could be simply that young drivers drive more than older drivers and that this greater exposure to the risk of a crash is reflected in greater crash frequencies. The over-involvement of young drivers remains, however, if crash frequencies are adjusted by the distance that each age group travels, as shown in Figure 1.

FIGURE 1

**RISK OF CASUALTY CRASH INVOLVEMENT
(per million kilometres travelled)
BY DRIVER AGE GROUP,
VICTORIA, 1988**



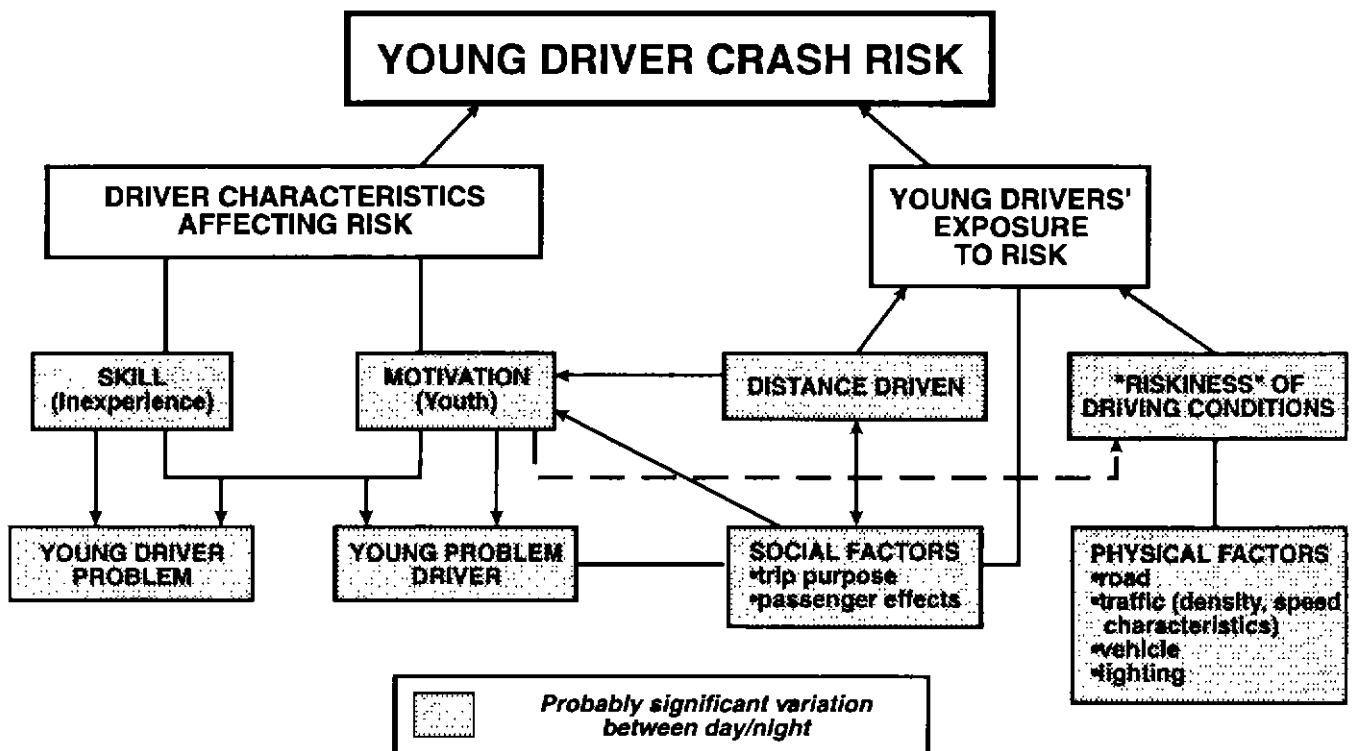
The above graph indicates that, after controlling for the distance driven, the risk of crash involvement generally reduces as age increases, with a slight increase for drivers aged 60 years or more.

3.0 CONCEPTUAL ISSUES

As shown in Figure 2, the factors which contribute to young driver crash risk may be divided into two broad categories: factors determining a driver's exposure to crash risk (external to the individual driver), and driver characteristics (internal to the individual driver). According to the model, crash risk is determined by the interacting effects of these two sets of factors.

FIGURE 2:

CONTRIBUTING FACTORS TO YOUNG DRIVER CRASH RISK



The model indicates that there are perhaps **three** basic ways in which the improvement of young driver safety can be tackled:

1. DRIVING SKILL

- **by raising their level of driving skill. This approach has the fundamental aim of making new drivers better drivers**

Despite the fact that driving is a complex psychomotor skill, young drivers are "expected" to reach high levels of performance after only the most basic of instruction. The available literature gives a pessimistic view of the efficacy of driver training and education, reflected in the inability to produce drivers safer than those who have not been so trained.

It may be that the failure (to date) to achieve a safety benefit from driver training is due to the fact that such programs have taught necessary, but not sufficient, skills for safe driving. Thus, the lack of positive safety outcomes should be seen in its proper perspective, i.e. a reflection on the content of the courses evaluated rather than on the concept of education and training. A better understanding of the important differences in performance between young and more experienced drivers, and the incorporation of strategies to reduce these differences through a driver training program, may well be the way to improve young driver safety.

2. MOTIVATION

- **By changing their personal approach to driving. This approach has the fundamental aim of making young people “older” people.**

There is sufficient evidence to suggest that part of the young driver problem can be attributed to motivational factors relating directly or indirectly to risk taking. More general attitudinal factors may also partially explain the over-involvement of young drivers in crashes. Thus, if strategies could be developed to reduce the level and/or frequency of risk taking behaviour (i.e. by “putting older heads on young shoulders”), a decrease in the incidence of young driver crashes could reasonably be expected.

3. AMOUNT AND/OR TYPE OF DRIVING

- **By modifying the type of driving young drivers do or reducing the amount of driving they do. This approach has the fundamental aim of making young drivers into young non-drivers or young drivers doing different types of driving.**

If young drivers cannot be made safer per kilometre driven, either by improving their ability to drive or their “attitudes” to driving, the potential exists to simply reduce the amount of driving or modify the type of driving that they do. The most striking examples of such an approach are to raise the licensing age, raise the legal drinking age or to impose a nighttime driving curfew.

4.0 THE RESEARCH PROGRAM

4.1 INTRODUCTION

The research program has two distinct components, a Year 1 program specified in advance by the sponsor and a Year 2/3 program which was developed by MUARC and approved by FORS. The elements comprising the first component are set out below.

YEAR 1

FOCUS	ACTIVITIES
1. Evaluation of Australian Graduated Licensing Schemes	Process Evaluation)) (Section 4.2.5) Outcome Evaluation) - crash outcomes (if possible) - strategic outcomes
2. Exposure Reduction Countermeasures	Technical overview)) (Section 4.2.4) Strategic overview)
3. Characteristics of Young Driver Crashes	Mass Crash Data Analyses (4.2.3) - State (casualty crash files) - National (FORS Fatal file) - International (U.S. data files) Literature Reviews - review of crash studies (4.2.1) - review of non-crash (behavioural) studies (4.2.2)

YEAR 2/3

The structure of the Year 2/3 program was built around day/night comparisons and contrasts as daytime and nighttime driving could be thought to represent qualitatively different safety problems for young drivers (in a number of dimensions). In terms of basic research questions, the framework suggests there is a need to determine :

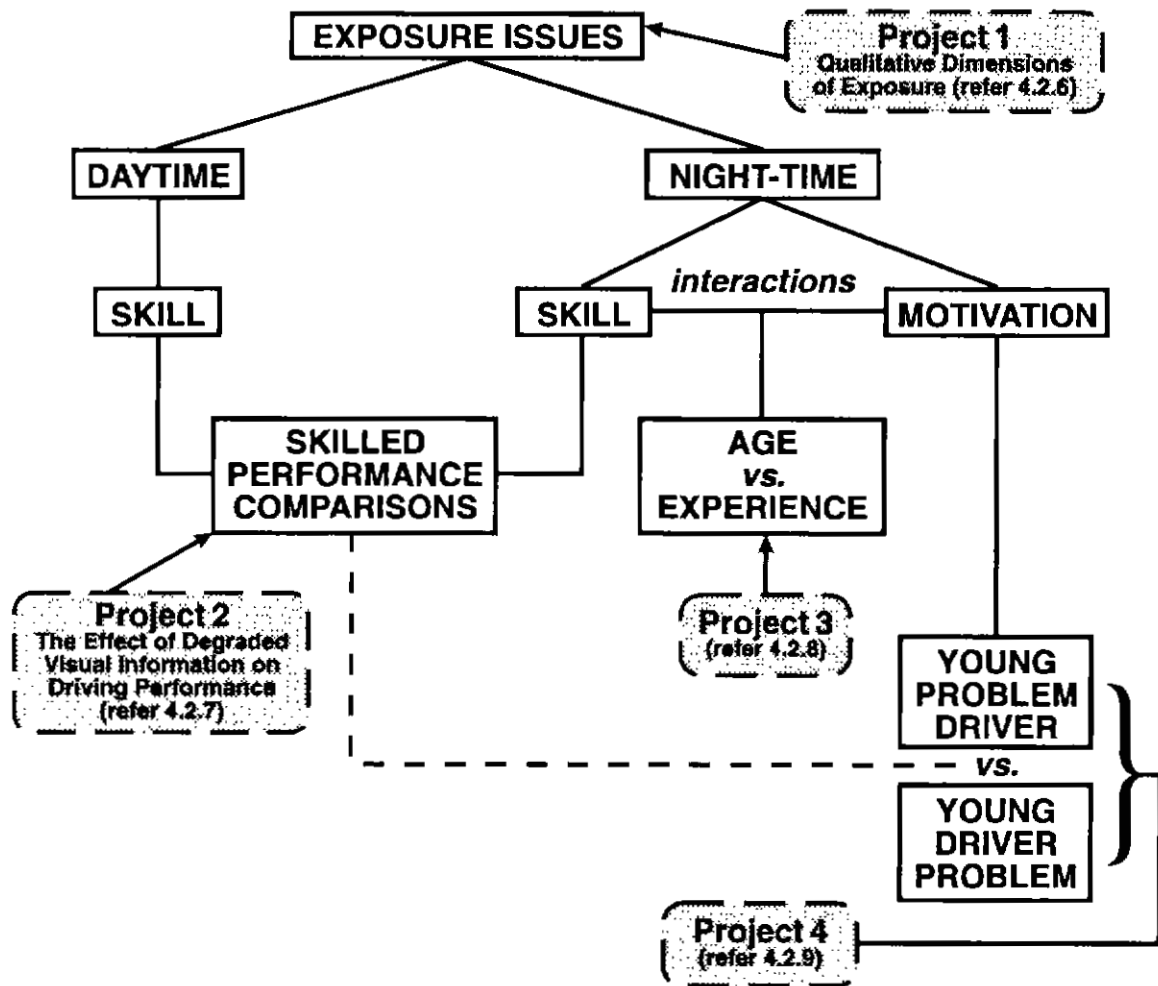
- the nature and extent of differences in exposure to risk of crash involvement as a function of:

- . time of day (daytime versus nighttime)
- . driving experience
- the nature and extent of differences in driving skill as a function of.
 - . time of day (skilled performance comparisons between daytime and nighttime driving)
 - . driving experience (controlling for time of day)
- the nature, extent and effect of interactions between driving skill and driving motivation, in particular age versus experience comparisons
 - . controlling for quantitative and qualitative differences in exposure
- the nature and effect of motivational influences on the risk of young driver crash involvement
 - . controlling for differences in exposure, levels of skilled performance and time of day

The framework is presented in Figure 3.

FIGURE 3

THE STRUCTURE OF THE YEAR 2/3 PROGRAM



4.2 PROGRAM ELEMENTS

4.2.1 Characteristics of Young Driver Crashes Derived From Crash Studies

The primary aims of this literature review are:

- . to discuss some of the major conceptual issues underlying the young driver crash problem, and to present a theoretical framework for subsequent work
- . to present information on the magnitude of the young driver crash problem
- . to describe the nature of the problem in terms of information available from studies of crash occurrence.

A model of the determinants of young driver crash risk is proposed, in which causal factors are categorised as those determining exposure to risk (external to the driver), and specific driver characteristics. According to the model, driver characteristics are sub-divided into skill factors (underlying the 'young driver problem'), and motivation factors (underlying the 'young problem driver', in interaction with social factors). Exposure to crash risk is determined by quantitative factors (distance driven) and qualitative factors (nature of the environment, the road, vehicle and traffic conditions).

Information from mass databases and from special studies of crashes is reviewed, and the role in crashes of the following factors is discussed:

- . driver age
- . driver experience
- . driver gender
- . time of crash occurrence
- . passenger characteristics
- . crash type, pre-crash vehicle manoeuvres and driver errors
- . alcohol and seatbelt offences

In summary, some of the findings from this review were.

- . young male drivers are more likely than young females to be involved in crashes due to excessive speed, while young females are more likely to be involved due to inadequate driving skills
- . the youngest/least experienced drivers are involved in a greater proportion of single vehicle crashes compared to older drivers, particularly young male drivers driving at night
- . other crash types in which some studies have found young drivers to be overrepresented in are head-on, overtaking and rear-end (young drivers in the rear vehicle) crashes

- very young drivers appear to be involved in crashes due to poor vehicle control skills more often than in the case of older drivers, and are more often responsible for causing the crash.

It was evident throughout the discussion of information about crash rates and their patterns that interpretation of crash data is difficult or impossible without more extensive and detailed information on exposure to crash risk than is currently available (the collection and analysis of qualitative aspects of exposure to risk is being undertaken in another project: refer Section 4.2.6).

4.2.2 Characteristics of Young Driver Crashes Derived From Behavioural Studies

The literature reviewed for the previous section, being focussed on information related to crashes, is useful in understanding the role of distance driven, of some physical environmental factors and of two basic driver characteristics, viz, age and gender. However, the effects on crash risk of other driver characteristics, particularly driving skills, driving-related motives and associated social factors, are not able to be investigated by means of “crash” literature. This report, then, reviewed information on young driver behavioural and personal characteristics, drawn from a wide variety of sources.

The report contains an overview of young driver behaviour, in which the effects of skill deficits and motivation on young driver performance are detailed. In summary, some of the effects of skill deficits were noted as:

- the less developed vehicle control skills of young drivers are evident in a lower level of vehicle control performance and reflected in the reduced quality of the use of vehicle controls. It appears that vehicle control skills improve rapidly with increasing experience but that their development is still incomplete after one or two years, and possibly after considerably longer periods
- inexperienced drivers show less awareness than older drivers of the realities of road system operation; for example, that other road users cannot always be relied upon to follow road laws
- there are major differences between drivers of different levels of experience in the way in which they perceive hazards and risks
- less-skilled drivers have to devote a greater proportion of their attention to conscious decision making and monitoring of their driving, and therefore have less “spare capacity” available.

Some of the motivational effects on young driver behaviour consist of:

- the personal goals or motives of young drivers may sometimes conflict with safety-related goals: importantly, there is evidence that young driver motivation related to some risky behaviours differs significantly between daytime and nighttime, and that these differences are influenced by the presence/absence of a passenger

apart from their effects on deliberate risk-taking, some typically youthful motives and values may affect driving performance by altering the ways in which young drivers allocate attention while driving. Thus, young drivers may be less willing than older drivers to modify their driving, for example by driving more slowly, to compensate for other driving demands

motivational factors have a greater influence on the driving performance of young males than on that of young females (on the other hand, there is evidence of greater skill deficiencies in the driving of young females).

4.2.3 Mass Crash Data Analyses

To complement the above two literature reviews, extensive interrogation of various mass crash databases has been undertaken in order to provide a current and comprehensive description of the characteristics of young driver crashes reported to authorities.

In addition to providing an overview report of the entire project, the analyses covered three types of data files for a selection of Australian States and a representative United States crash sample. The various data files comprised crash data over a one, five or six year period up to 1990. Australian data sets which have been systematically interrogated are:

Casualty Crash Data

- New South Wales, 1986 - 1990
- Victoria, 1984 - 1990
- South Australia, 1986 - 1990

FORS Fatality File, 1988

- New South Wales, Victoria, South Australia

In order to provide comparisons and contrasts with Australian crash outcomes, the U.S. General Estimates System (GES) file for 1989 was also analysed. The GES obtains its data from a nationally representative probability sample selected from an estimated 6.6 million police-reported crashes involving fatalities, injuries or major property damage which occur annually in the United States. The 1989 sample data file consisted of approximately 44,000 police accident reports.

It is intended that these analyses be presented as a report series, which will serve a very useful function as a consolidated set of source documents on young driver crash patterns.

4.2.4 Exposure Reduction Countermeasures

While young and/or inexperienced drivers have undoubtedly benefited from both general and targetted (e.g. black spot treatment) improvements to the road safety system, the only Australian evidence which possibly indicates that countermeasures targetted specifically at young/novice drivers have been effective comes from

evaluations of Zero BAC legislation. The reasonably consistent proportion of road trauma which young drivers contribute indicates that there has been little success in specifically improving young driver safety.

In this way, the “young driver” problem may be considered atypical compared to other road safety problems, and this could explain why there has been a focus in, for example, the United States, Australia and New Zealand, on exposure reduction initiatives (i.e. reducing the amount or type of kilometres driven by young drivers) as the sole variety of effective, targetted crash countermeasures for the young/novice driver.

It is a truism to say that road crashes could be reduced if people stopped driving: similarly, the frequency of young driver crashes could be reduced if the legal licensing age was raised by several years. Before this extreme is reached, however, there are still potential road safety benefits to be obtained from reducing the opportunity for young drivers to be involved in crashes, i.e. from reducing their exposure to risk of a crash.

Decisions on the type, extent and value of exposure reduction measures raise a number of significant issues in both the technical and policy domains. The project report places exposure reduction countermeasures in an appropriate context and identifies a range of strategic and technical issues which are relevant to a comprehensive and useful discussion of such measures.

The report concludes that, to date, the discussion of exposure reduction countermeasures has been superficial and fragmented. While the road safety system has the immediate capacity to reduce the incidence of crashes involving young drivers by reducing their exposure, primarily through restrictions on the amount of nighttime driving, this is an area in which there are no “right” answers. Even though most road safety practitioners would place greatest emphasis on the potential public health benefits, a reduction in the number of young driver crashes does not necessarily indicate the “best” outcome from a community perspective. The principal problem with exposure reduction countermeasures is that they are generally socially and politically unpopular.

Ultimately, an effective, efficient and equitable balance must be reached between a range of competing objectives in order to reach a consensus policy position on the desirability of exposure reduction countermeasures as one method for reducing young driver crashes.

4.2.5 Evaluation of Australian Graduated Licensing Schemes

The objective of this project is to propose and set in place the mechanisms necessary to evaluate the Federal Government’s Graduated Licensing Scheme, as implemented in each jurisdiction.

Graduated licensing schemes (GLS) are a combination of measures to reduce or restrict novice driver exposure. They are designed to provide new drivers with the

opportunity to gain driving experience under conditions that reduce their exposure to risk, and are predicated on the following three general propositions:

- . the failure (to date) to develop a pre-licence driver training strategy which is more effective than other strategies in terms of reduced subsequent crash involvement
- . the recognition of the fact that different types of driving are associated with different levels of risk of crash involvement
- . the fact that crash risk decreases with increasing experience/age and the belief that if novice drivers can accumulate more experience under lower risk conditions, this will serve to improve the level of safety associated with higher risk types of driving which might be tackled at a later stage.

Thus, road safety benefits of graduated licensing schemes could be expected to accrue from two interdependent mechanisms:

- participation in lower risk driving while young and/or inexperienced
- reduced levels of risk for other types of driving which are only undertaken when older/more experienced.

The components of the GLS introduced as part of the Federal Government's 10 point safety package are:

- . zero blood alcohol concentration (BAC) for learner drivers
- . zero BAC for the first three years after obtaining a non-learners licence, up to 25 years of age
- . no learner permits to be issued before 16 years of age
- . no probationary licence to be issued before 17 years of age
- . the minimum period for a learner permit to be six months
- . licences issued for automatic vehicles are to apply for the probationary period unless a test in a vehicle with a manual transmission is undertaken or other requirements, specified by the State or Territory, are met

The evaluation comprises both qualitative and quantitative aspects. The qualitative component involves the collection of information on young driver attitudes to safe driving and the GLS, as well as measures of community awareness of young driver issues. Specifically, surveys are being used to:

- . assess attitudes to components of the GLS

- for young drivers, measure behavioural intentions and/or behaviours expected to be changed by these components, the extent of compliance with GLS and investigate the effectiveness of sanctions and reinforcements
- assess community attitudes to other proposed (or implemented) measures to improve young driver safety.

Additionally, information has been collected on the extent to which the licensing changes made within each jurisdiction conform to the GLS concept. These data are essential to establish whether the principles and practice of GLS across jurisdictions are congruent, and that outcome evaluations are fair and valid, both to the GLS concept and each jurisdiction. The differences between States in the timing and implementation of specific elements of graduated licensing mean that a combined evaluation is not feasible. Currently, only the licensing systems in New South Wales and Queensland incorporate all of the components of the Federal Government's graduated licensing package, but even these two States differ in other characteristics of their licensing systems.

The outcome evaluation component is designed to establish the effect of GLS implementation. In the road safety domain, the ultimate criterion is casualty crash reduction: however, given the implementation pattern and the lack of appropriate control over the effects of other factors potentially affecting the incidence of road crashes, conclusions on effect attribution may be tentative at best. Nevertheless, trend analysis of young driver crashes will provide useful insights into young driver safety.

A strategic evaluation will also be undertaken to identify tactical/strategic opportunities for the safety enhancement of GLS practice.

4.2.6 Qualitative Dimensions of Young Driver Exposure

The framework of basic research questions which has been used to structure the Year 2 and 3 work program is built around daytime/nighttime comparisons and contrasts. The essence of the program is an attempt to determine the relative contributions of exposure to risk, driving skill, motivational factors, and their interactions, to the increased crash risk of young drivers driving at night.

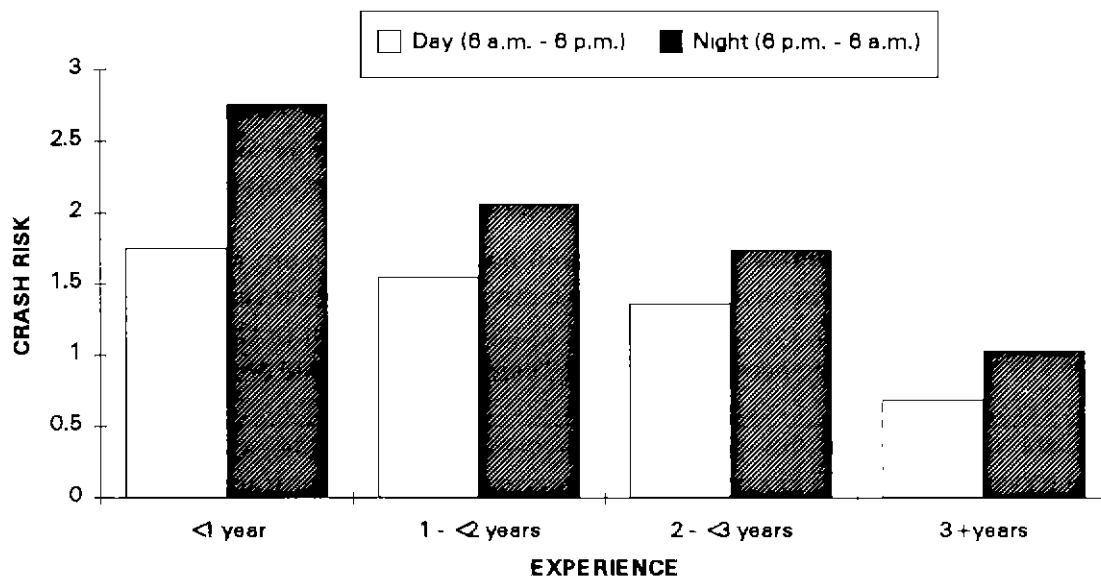
It has been demonstrated that the risk of crash involvement varies as a function of time of day, as Figure 4 (overleaf) demonstrates.

While crash risk increases for all driver groups at night, the least experienced driver group shows:

- the greatest nighttime risk in absolute terms
- the largest crash risk increase in absolute terms from day to night driving
- the largest proportional increase in crash risk from day to night driving.

FIGURE 4

**RISK OF CASUALTY CRASH INVOLVEMENT
(per million kilometres travelled)
BY DRIVER EXPERIENCE AND TIME BLOCK**



While there are some **quantitative** data available, such as that reported above, on young driver exposure as a function of time of day, information on the **qualitative** aspects of exposure to risk is not available. Thus, while it is known that the relatively greater involvement of young drivers in nighttime crashes cannot be explained simply by the fact that they do relatively more nighttime driving (i.e. by quantitative exposure factors), the extent to which characteristics other than amount (i.e. qualitative exposure factors) can explain the increased risk of nighttime driving is yet to be determined.

The specific aim of this project is, therefore, to determine to what extent the increase in nighttime risk of crash involvement may be explained by, for example:

- . the type of young driver,
- . the location(s) of nighttime driving by young drivers,
- . the motives for young drivers driving at night, and/or
- . the correlates of young drivers driving at night

To illustrate, it may be that the increase in nighttime crash risk is a (partial) result of:

- . young problem drivers (however defined) being more likely to drive at night than other young drivers and that this relatively riskier young driver exposure generates higher nighttime crash risk. In this scenario, nighttime is only a correlate of crash risk, as it is the type of young driver driving at night which is the primary contributor, and/or
- . young driver nighttime driving being undertaken in locations which are inherently more risky than average, i.e. such driving is concentrated in areas which are more dangerous for a variety of reasons, and/or
- . the reasons for young driver nighttime driving generating higher levels of risk in that it, perhaps, involves more recreational driving; more spontaneous (as opposed to routine or commuter) driving; the carriage of unlicensed peers to social events; driving in possibly less familiar environments and/or
- . other characteristics of nighttime driving entailing more risk, such as greater likelihood to involve young people driving their own car (as opposed to a work or family car), more likelihood of alcohol involvement or the fact that nighttime driving may be perceived as being "easier" than daytime driving.

Data collection for this project has involved two methods, a national residential interview survey of 3000 drivers, and interviews conducted at Random Breath Testing (RBT) stations. Interviews cover areas such as the type of vehicle usually driven, driving patterns (both day and night, work and non-work related), driving styles, driving behaviours, driving skill assessment and demographic data, including a set of general attitudinal statements.

4.2.7 The Effect of Degraded Visual Information on Driving Performance

The above project is designed to determine the qualitative exposure factors which may explain the increased risk of nighttime driving, and the possible size of the contribution. However, to assess the latter, it must also be established how much more difficult nighttime driving is (in terms of driving performance).

Therefore, this study is designed to provide complementary information to that collected on young driver exposure in order to make assessments on the relative contributions of exposure-related and driving difficulty-related factors. Where driving difficulty-related factors are concerned, possibly the most important driving performance effect is due to the degradation of visual information.

Given the complexity of driving performance, it is not possible (nor desirable) for drivers to use all of the information available. The perceptual opportunity costs from restricted information gathering are overcome in two ways as driving experience increases:

- information gaps are filled in on the basis of more direct experience of a variety of possible scenarios (i.e. drivers learn what is and isn't likely to happen, given a set of circumstances, as they gain experience).
- information gathering is optimised through experience so that crucial, situation-specific information is recognised and processed (i.e. experienced drivers recognise when something "out of the ordinary" is happening and perform accordingly).

Thus, there are strong reasons to predict that nighttime driving would present particular problems for young, inexperienced drivers as information from the driving environment is reduced due to lower levels of lighting and a reduced ability to see distances ahead.

The aim of this study is, therefore, to identify the type and magnitude of effects on driving performance as a function of available information and amount of driving experience. It is intended to use a driving simulator to investigate these issues, making the following general types of comparisons:

- how does the daytime driving performance of young, inexperienced drivers compare to their nighttime levels of performance?
- how does the performance of young, inexperienced drivers compare to that of experienced drivers during nighttime driving?

Experimental work is now proceeding using the PC-based driving simulation system installed at Monash University.

4.2.8 Skill - Motivation Interactions: Age versus Experience

In a discussion on young driver safety, it is important to establish a framework which delineates the relationship between driving performance, driving behaviour, and attitudes or motives in driving. Whereas the task described in Section 4.2.9 attempts to fill in some of this framework by looking at the youngest/least experienced driver group, this element adopts a longitudinal perspective. That is, it attempts to assess changes in crash, exposure, skill, motivation and risk patterns of different age/experience/gender young driver combinations.

In the past, this question has been simplified such that it has only involved a debate over whether young age or the lack of driving experience is the source of driving problems in the early years of licensing. This debate has been prolonged and inconclusive, the primary reason being that both are generic variables: it is not youth or inexperience per se that is the problem but rather a set of factors which correlate highly with them.

To illustrate the analytical approach to be used to establish the relative contributions of age and experience (controlling for driver gender), the global young driver group will be disaggregated into independent components such as (but not limited to) very

inexperienced, very young male and female drivers, inexperienced, young male and female drivers and relatively experienced, slightly older male and female drivers. This type of analysis will provide very useful information on how the mix of problems experienced by beginning drivers changes over time and as a function of the age at which they commenced driving. This will assist in determining what the focus of countermeasure development should be at any particular stage of the first several years of a driving career.

4.2.9 Motivational Factors: The Young Driver Problem versus Young Problem Drivers

It is generally acknowledged that risk taking behaviour and other types of motivational factors contribute to the over-involvement of young drivers in crashes. Some writers have taken this point to extremes by suggesting that deviant driving is to be expected as young drivers are members of a deviant population. A common outcome of the motivational model has been to represent this over-involvement as being mostly limited to a subset of young drivers, the so-called “young problem drivers”. This is in sharp contrast to the approach which views the problem as being distributed much more widely, i.e. the young driver problem (in addition to motivational factors, this approach also acknowledges the importance of other contributory factors, in the domain of driving performance).

The relevance, and relative importance, of these two approaches have obvious and important implications for developing crash countermeasures for young drivers. Work on the “young problem driver” issue has been superficial to date: consistent with the approach taken in this research program, there is a need to undertake much more detailed work with a view to improving understanding of the extent of individual differences within the young driver population.

This is largely an analytical study which seeks to achieve the following aims:

- . to determine factors which identify young driver sub-groups more likely to be involved in reported crashes, to commit traffic offences and/or to accumulate demerit points
- . to assess the impact on overall crash frequencies through sub-group targetting, through determining the representation of defined young driver sub-groups in crash data (for example, if the strongest “problem driver” predictive relationship is found for 18 year old, male, metropolitan, solo drivers, what is the incidence and proportion of total crashes young drivers are involved in and how do other groups compare?)
- . to calculate crash involvement recidivism rates, in order to assess the stability of the “problem driver” status and establish the magnitude of potential crash reduction.

5.0 CONCLUSION

The improvement of young driver safety is an important challenge for the Australian road safety system. Young drivers are substantially overrepresented in casualty crashes and have been demonstrated to be at a much higher risk of crash involvement per kilometre driven. High frequency and high risk of crash involvement, combined with a singular lack of success in improving young driver safety, indicate that young driver crash countermeasures should be a primary focus for road safety research and development. This effort should be directed towards achieving a much greater understanding of factors contributing to the over-involvement of young drivers in crashes and to facilitating the development of effective and efficient crash countermeasures.

To this end, under the auspices of the Federal Government's Road Safety Research Initiative, the Monash University Accident Research Centre is undertaking a comprehensive research program. The program comprises nine elements, viz:

- . Evaluation of Australian Graduated Licensing Schemes
- . Exposure Reduction Countermeasures
- . Characteristics of Young Driver Crashes Derived From Crash Studies
- . Characteristics of Young Driver Crashes Derived From Behavioural Studies
- . Mass Crash Data Analyses
- . Qualitative Dimensions of Young Driver Exposure
- . The Effect of Degraded Visual Information on Driving Performance
- . Skill - Motivation Interactions: Age versus Experience
- . Motivational Factors: The Young Driver Problem versus Young Problem Drivers

Each of these elements has been described in this report. This applied research effort will supply much valuable information which, it is hoped, will contribute directly to the improvement of young driver safety on Australian roads.