

# Cradle attitudes – grave consequences

The development of gender differences in  
risky attitudes and behaviour in road use

## Summary Report

The University of Reading



**Foundation for Road  
Safety Research**

# Cradle attitudes – grave consequences

The development of gender differences in  
risky attitudes and behaviour in road use

Authors: Andrea Waylen and Frank McKenna

## Summary Report

The University of Reading 

 **Foundation for Road  
Safety Research**

# Preface

This Summary Report provides an outline of the study entitled

*Cradle attitudes – grave consequences*

*The development of gender differences in risky attitudes and behaviour in road use*

together with the implications from the findings.

The text produced on the following pages is a summary of the full report, which is available from the AA Foundation of Road Safety Research at a cost of £20.00 sterling.

Enquiries relating to all AA Foundation for Road Safety Research matters should be addressed to:

AA Foundation for Road Safety Research  
Norfolk House  
Priestley Road  
Basingstoke  
Hampshire  
RG24 9NY

Telephone: 01256 491925; International +44 (0)1256 491925

Facsimile: 01256 492092; International +44 (0)1256 492092

# Contents

<b>Lists of Tables and Figures</b>	iii
<b>AA Foundation for Road Safety Research</b>	v
<b>Introduction</b>	1
1.1 Background	1
1.2 Accident statistics	2
1.3 Study Aims	5
1.4 Summary	5
<b>2 Pedestrian study</b>	7
2.1 Introduction	7
2.2 Aims of the study	7
2.3 Questionnaire study	8
2.4 Observational study	10
2.5 Summary	11
<b>3 Pre-driver study</b>	13
3.1 Introduction	13
3.2 Aims of the study	13
3.3 Beliefs and attitudes about anticipated driving	13
3.4 Affinity for speed	16
3.5 Violations	17
3.6 Individual characteristics	18
3.7 Associations between individual characteristics, speed choice and violations	20
3.8 Summary	22
<b>4 Internet study</b>	25
4.1 Introduction	25
4.2 Aims of the study	25
4.3 Associations between individual characteristics	26
4.4 Summary	26
<b>5 Driver observational studies</b>	27
5.1 Speed Choice	27
5.1.1 Introduction	27
5.1.2 Aims of the study	27
5.2 Speed choice on bends	30
5.2.1 Introduction	30
5.2.2 Aims of the study	30
5.3 Close following behaviour	31
5.3.1 Introduction	31
5.3.2 Aims of the study	32
5.4 Gap acceptance	34
5.4.1 Introduction	34
5.4.2 Aims of the study	34
5.5 Summary	37
<b>6 Structural equation modelling using EQS</b>	39
6.1 Aims of the study	39
6.2 The databases	39
6.3 AA Foundation data 1998	40
6.4 The internet database	41
6.5 Pre-driver study (Ignore see Tech Annex 1.4)	41
6.6 Summary	42

<b>7</b>	<b>Implications</b>	45
7.1	Responsibility for road safety – child pedestrians	45
7.2	Pre-driver attitudes	45
7.3	Driver attitudes and behaviour	46
7.4	Summary	47
<b>8</b>	<b>References</b>	49
<b>9</b>	<b>Acknowledgements</b>	51
<b>10</b>	<b>Appendices and Technical annex</b>	53
	Introduction	53
	<b>Appendix A</b> Pedestrians study questionnaire	55
	<b>Appendix B</b> Pre-driver questionnaire	59
	<b>Appendix C</b> Road user questionnaire	69
	<b>Technical Annex</b> Structural equation modelling	75
	Annex 1.1 Background	75
	Annex 1.2 Results	76
	Annex 1.2.1 Correlations between accident predictions, sensation seeking, social motives and the thrill of driving	76
	Annex 1.2.2 Multiple regression analysis	76
	Annex 1.2.3 Final path models	76
	Annex 1.3 The Internet database	77
	Annex 1.3.1 Correlations between accident predictors, sensation seeking, social motives and competitiveness	77
	Annex 1.3.2 Multiple regression analysis	78
	Annex 1.3.3 Final path models	78
	Annex 1.4 Pre-driver study	78
	Annex 1.4.1 Correlations between violations, speed choice, competitiveness, social motives and sensation seeking	79
	Annex 1.4.2 Multiple regression analysis	79
	Annex 1.4.3 Final path model	79

## Tables

2.1	Mean scores for “responsibility for teaching road safety”	8
3.1	Cell sizes by age and sex – pre-drivers	14
4.1	Demographic details of internet questionnaire respondents	25
5.1	Cell sizes for speed observations by age, sex, passenger and weather	28
5.2	Cell sizes by age and sex for speed choice on bends	30
5.3	Cell sizes for close following observations by age, sex, passenger and weather	32
5.4	Cell sizes for gap acceptance observations by age, sex, passenger and weather	35

## Figures

1.1	Year on year trends for accidents at bends at bends by age and sex	1
1.2	Year on year trends for accidents in the dark by age and sex	1
1.3	Relative annual risk of a transport accident for males and females by age	3
1.4	Relative annual risk of an accident for males and for females by age in an educational situation	3
1.5	Relative annual risk of an accident for males and and females by age at home	4
2.1	At what age should road safety education begin?	9
2.2	How careful are children when crossing the road?	10
2.3	How easy is it to teach road safety to children?	10
2.4	Distance between child and carer by child’s sex	10
2.5	Distance between child and carer by school	11
3.1	Do you think you know how to drive?	14
3.2	Will learning to drive be easy?	15
3.3	Will you drive the way your friends expect you to?	15
3.4	Does driving make you popular?	16
3.5	Affinity for speed	17
3.6	Violations (Is it ok for drivers to.....)	17
3.7	Sensation seeking	18
3.8	Anti-social behaviour	19
3.9	Competitiveness in pre-drivers	20
3.10	Perceptions of the danger involved in road activities by sex	22
5.1	Mean observed speeds in dry weather by driver age, sex and passenger type	29
5.2	Mean observed speeds in wet weather by driver age and sex (drivers alone)	30
5.3	Speed choice according to driver sex and age (bends)	31
5.4	Mean observed following distances in dry weather by driver age, sex and passenger type	33
5.5	Mean observed following distances in dry weather by driver age and sex (drivers alone)	34
5.7	Mean observed gap sizes in dry weather by driver age, sex and passenger type	36
5.8	Mean observed gap sizes according to weather type	36
6.1	Final path model for the relationships between video speed choice, violations, speed thrill, social motives and sensation seeking	40
6.2	Final path model for competitiveness	41
6.3	Final path model for pre-drivers	42

## Technical annex Tables

Annex Table 1	Descriptive statistics for the AA, Internet and Pre-driver databases	75
Annex Table 2	Correlation co-efficients for measures of attitudes/behaviour associated with accident involvement from the AA database	76
Annex Table 3	Regression Statistics	76
Annex Table 4	Goodness of fit statistics for Video Speed/Violations model	77
Annex Table 5	Correlation co-efficients for measures of attitudes/behaviour associated with accident involvement from the Internet database	77
Annex Table 6	Regression Statistics (p-value)	78
Annex Table 7	Goodness of fit statistics for Competitiveness model	78
Annex Table 8	Correlation co-efficients for measures of attitudes associated with accident involvement from the pre-driver database	79
Annex Table 9	Regression Statistics (p-value)	79
Annex Table 10	Goodness of fit statistics for pre-driver model	80



# The AA Foundation for Road Safety Research

The AA Foundation for Road Safety Research was formed by the AA in December 1986 as part of its continuing efforts in the road safety field and as a major contribution to European Road Safety Year.

Registered as a charity (number 295573), the objectives of the Foundation are:

- to carry out, or procure, research into all factors affecting the safe use of public roads;
- to promote and encourage the safe use of public roads by all classes of road-users through the circulation of advice, information and knowledge gained from research; and
- to conceive, develop and implement programmes and courses of action designed to improve road safety, these to include the carrying out of any projects or programmes intended to educate young children or others in the safe use of public roads.

Control of the AA Foundation is vested in a Council of Management under the chairmanship of Sir Brian Shaw, with day-to-day activity being the responsibility of the Foundation Management Committee. The Research Advisory Group recommends topics worthy of research to the Management Committee.

Members of the Advisory Group at the time this research was undertaken were: John Dawson, Managing Director, AA Foundation for Road Safety Research and AA Policy Director (Chairman); Professor Richard Allsop OBE, Centre for Transport Studies, University College London; Sir Peter Baldwin KCB, former Chairman of the AA Foundation for Road Safety Research; Rod Kimber, Technical Director, AA Foundation for Road Safety Research and Director Science and Engineering, Transport Research Laboratory; Brian Langer, Manager, AA Foundation for Road Safety Research; Professor Frank McKenna, Psychology Department, University of Reading; Kate McMahon, Economic Adviser, Road Safety Division, Department for Transport, Local Government and the Regions; Bert Morris, Manager, AA Motoring Policy; Howard Sherriff, Accident and Emergency Consultant, Addenbrooke's Hospital, Cambridge; Janet Swain, Principal Project Engineer, Accident Investigation Unit, Nottinghamshire County Council; and Keith Willett, Consultant Trauma and Orthopaedic Surgeon, Critical Care Centre, John Radcliffe Hospital, Oxford.

## **FINANCIAL SUPPORT**

Financial support for the AA Foundation's research programme is encouraged through donations from companies and other bodies that have a concern for and an interest in road safety.

The AA Foundation continues to seek such support in order to ensure that its research programme can continue towards 2010 when the government's revised casualty reduction targets should be achieved. Since 1986, the AA Foundation has enjoyed financial support from many companies; those supporting its activities in 2002 are:

- Amery-Parkes, Capital Bank, The Caravan Club, Centrica, Europcar (UK), Fennemores, Herbert Smith and Vodafone, and the following insurance companies:
- Allianz Cornhill, Axa, CGNU, Fortis, Groupama, Hiscox, MMA and Zurich.

# Cradle attitudes – grave consequences

## A developmental approach towards risky attitudes and behaviour in road use

The aim of this report was to trace a developmental track through risky road user behaviour from young pedestrians right through to older qualified drivers. It was considered pertinent to do so in the light of considerable previous research which has highlighted the fact that across the life span (until people reach the age of about 60 years) males are over-involved in most types of accidents both on and away from roads. As far as drivers are concerned, this pattern of accident involvement has been associated with issues of exposure (eg males have higher mileage as drivers than females and are more likely to use bicycles) and also individual characteristics such as sensation seeking and anti-social behaviour. Age is also an issue – male cyclists (Rodgers, 1997) and also male pedestrians (Evans, 1988) show a peak in their accident involvement at around 20 years of age. Novice drivers are more likely to be involved in an accident than those who have been driving for longer and accidents also peak at about 20 years of age for male drivers. However, it is unclear whether risky driver behaviour is due to the novelty of being able to drive or alternatively, a manifestation of more general risk-taking behaviour which can be observed across the life-span.

This project is concerned with tracking individual characteristics such as sensation seeking and anti-social behaviour across the lifespan to explicate any associations with risk-taking in general and risky road user behaviour specifically. Sensation seeking has been described by Zuckerman (1979) as risk-taking by an individual in order to encounter varied and novel sensations and experiences. Arnett (1994) also reported that the intensity of such experiences was important – this report contains data gathered using both Zuckerman's and Arnett's sensation seeking measures. Previous research using each of these scales has shown that males are more "into" sensation seeking than females and that an individual's affinity for sensation seeking is likely to decline with age (Zuckerman, 1979; Arnett, 1994).

Anti-social behaviour, as described by West *et al.* (1993), is a measure of mild social deviance rather a measure of criminal behaviour. It can therefore be measured on a continuum across the population – in doing so, previous research has shown that sex and age differences similar to those described for sensation seeking also exist here.

It is also intended to examine the potential role of another individual characteristic in risky road use – competitiveness. Competitiveness may be described as "the desire to win in interpersonal situations" (Houston, Farese and LaDu, 1992) and has been associated with aggressive behaviour and risk-taking generally but not explicitly in the context of road safety.

In order to examine the role of these behaviours in risky road use, questionnaire and observational studies were carried out on children aged four to six years and their parents, pre-drivers aged eleven to sixteen and also on people who were old enough to drive. A summary of each of these studies is provided below – conclusions were drawn from consideration of parametric statistical analysis of the data. In order to facilitate ease of reading, this analysis is provided in detail in a series of technical annexes available separately.

## Pedestrian study

In 1998, 40 per cent of pedestrian casualties involved children aged 15 or under. Previous research has cited inadequate supervision (Christie, 1995; West, 1998), socio-economic group and unsophisticated perceptual skills (Pfeffer and Barneclutt, 1997) as some of the factors which may be influential in such a statistic. Other research has indicated that ambiguity about whose responsibility the teaching of road safety actually is (ie In order to examine these issues two separate studies were devised. Two hundred and nineteen parents of children aged up to eleven years were asked to complete a questionnaire concerning their attitudes towards the road safety of their children. The questionnaire focussed on issues such as the relative care taken by boys and girls in road-side situations, the relative ease of teaching road safety to boys and girls and also ages at which children were given their independence in road environments. This was done, in part, to evaluate a pedestrian training programme developed by Oxfordshire County Council: the "Footsteps" programme. In addition, an observational study was carried out of 228 children aged between four and six years as they walked to or from school. The distance of the child from their carer was measured and analysed according to the sex of the child and the socio-economic composition of the school. Results indicated that parents report there is no difference in the age at which their sons and daughters are allowed by the road alone (mean ages = 9.55 and 9.66 years respectively). They also perceive their sons to be less easy to educate about road safety and that they are less careful when crossing the road than girls. The observational study showed that when actually by a road, boys are at greater distances from their carers than girls are (mean distances = 4.7 and 2.3 metres respectively). Children from a mixed socio-economic group were further from their carers than those from a school in a higher socio-economic area (mean distances = 5.8 and 2.1 metres respectively). The distances were such that the children were obviously out of reach. These results support previous suggestions that inadequate supervision may be partly responsible for sex and socio-economic differences in child pedestrian accidents.

## Pre-driver study

Although previous research has highlighted relationships between individual characteristics such as sensation seeking and anti-social behaviour in drivers (Zuckerman, 1979; Arnett, 1994; West *et al.*, 1993) to the authors' knowledge there has been little research examining the role of such characteristics in people too young to drive. It is unclear whether the over-involvement of novice drivers in road accidents is due to the novelty of being behind the wheel of a car or whether it is simply a manifestation of more general personality traits which might ostensibly be observed in other aspects of road use. In order to examine such a theory, 567 students aged 11 to 16 were asked to complete a questionnaire about their attitudes to road use in general and driving as they anticipated it would be. The questionnaire also measured individual characteristics such as sensation seeking (Arnett, 1994), anti-social tendencies (West, 1993) and competitiveness (Smither and Houston, 1994). Results show that there are age and sex differences in attitudes to anticipated driving and road use in general in both boys and girls from 11 years old. Boys have a greater affinity for speed than girls do (ie they report an increased tendency to enjoy fast speeds) and they are more likely to condone violations committed by drivers than girls (eg speeding, running red lights). Boys think driving will be easier and make them popular to a greater extent than girls. They also report that they will be more influenced by the expectations of their friends while driving than girls ("will you drive the way your friends expect you to?") although this tendency decreases with age.

Walking by the road is perceived to be less dangerous than cycling on the road which in turn is perceived to be less dangerous than driving. Younger children perceive cycling and driving to be more dangerous than those who are older. Girls believe that cycling is more dangerous than do boys. Students who perceive themselves good at cycling and/or sports perceive that they will be better drivers than those who are less skilled at these activities.

### *Cradle attitudes – grave consequences*

Differences in individual characteristics associated with risk-taking in pre-drivers show the same patterns as those found in drivers: males report more sensation seeking, anti-social and competitive behaviour than girls. These individual characteristics are positively associated with affinity for fast speeds and acceptance of violational behaviour, even in people who are too young to drive.

### **Internet study – self-report questionnaires for drivers**

Anecdotal reports of competition between drivers are supported by items from Reason *et al.*'s (1990) Driver Behaviour Questionnaire: "How frequently do you get involved in unofficial races with other drivers?" and "How frequently do you drive especially close to the driver in front as a signal to get out of the way?" However, while associations between competitiveness and general aggression have been examined in previous research, there appears to have been no such research focussing on driver behaviour specifically. This study was administered to drivers via the Internet in order to facilitate such an investigation. It examined associations between individual characteristics such as sensation seeking (Zuckerman, 1979) and anti-social tendencies (West, 1993) with speed choice and driver violations (Reason *et al.*, 1990), and also examined the potential role of competitiveness (Smither and Houston, 1994) in risky attitudes towards road use. Three hundred and thirty drivers responded to the questionnaire. Results indicated that anti-social behaviour predicts violational behaviour (those who score more highly on the anti-social behaviour questionnaire are more likely to jump red lights/drink-drive) for both males and females. Also, competitiveness is a predictor of risky driving behaviour (those who are more competitive report engaging in faster speeds and being more likely to commit violations) for male drivers only. The role played by competitiveness seems to have eclipsed the role played by sensation seeking in other studies – when competitiveness is included in analyses, sensation seeking loses its ability to predict speed choice and violations. However, as with previous research, in this study if competitiveness is not included in statistical analysis, then sensation seeking is a significant predictor of both violations and speed choice.

### **Internet study – self-report questionnaires for drivers**

Previous research has shown that male drivers engage in more risk-taking than females and also that younger drivers display and take more risks than those who are older in various types of driving behaviour eg speed choice, close following behaviour (Evans and Wasielewski, 1982; Wasielewski, 1984; Galin, 1981). There has also been debate about whether risk-taking by drivers is reduced or increased in the presence of passengers (Preusser *et al.*, 1998; Evans and Wasielewski, 1982; Galin, 1981). Galin (1981) also reported that, in wet weather, speed choice (ie risk-taking) was reduced although a more recent study (Edwards, 1999) suggests that any such reductions are insufficient to compensate for the increased risks promoted by a wet road surface and reduced visibility. The aim of this study was to record differences in actual driver behaviour according to passenger age and sex, the presence or otherwise of passengers and also any potential changes in driver behaviour according to weather type. Observations were taken of drivers judged to be aged between 17 and 25 years or between 30 and 50 years of age. The behaviours observed were speed choice (N = 1074), close following (N = 1203) and gap acceptance (N = 975). Measurements of these behaviours were taken in both dry and wet weather. Speed choice on bends was also measured in dry weather for drivers in both age groups who were travelling alone (N = 244).

### *Cradle attitudes – grave consequences*

The observational study of drivers has revealed behaviour which may be associated with accident risk. Younger drivers choose speeds which are faster than those chosen by older drivers – specifically, younger males choose speeds which are faster than the speeds chosen by other groups of drivers on various types of road. The speeds chosen by drivers seem to be associated with the presence or otherwise of peer passengers. Younger drivers choose more risky speeds in the presence of a male passenger; older drivers reduce their speeds in the presence of any passenger. In wet weather there are no sex or age differences in speed choice. However, when comparing speed choice according to weather type, male drivers are observed to reduce their speed if it is raining whereas female drivers make no alteration to their speed choice. In bend situations, young male drivers choose speeds which are significantly faster than the speeds chosen by either older males or female drivers of any age.

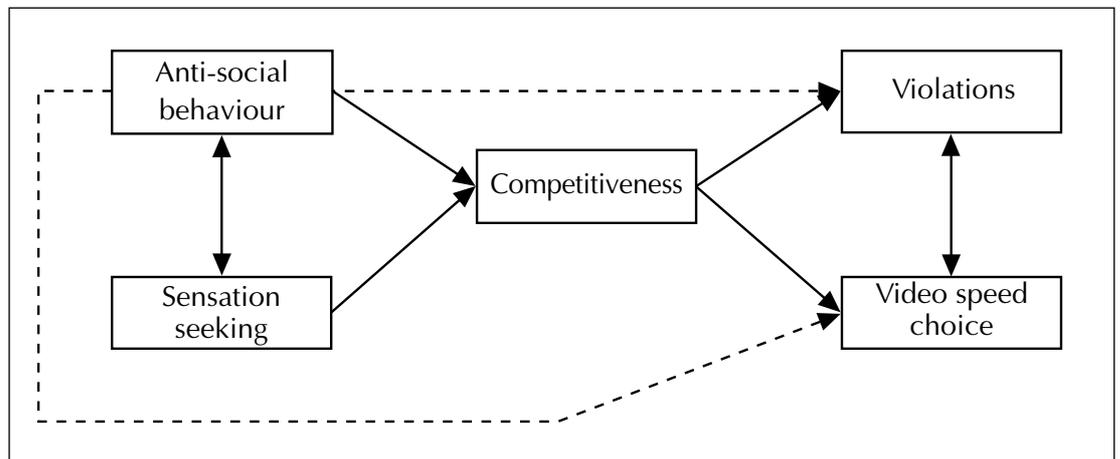
In dry weather, drivers tend to pursue following distances (ie the distance between the front of their own vehicle and the back of the preceding vehicle) which are much shorter (more dangerous) than the two-second distance advised. Overall, there are no age and sex differences for close following behaviour although young female drivers display close following behaviour which is as risky as that displayed by young males. If the sample is split by age, younger drivers accompanied by a male passenger are observed to pursue smaller following distances than those who are either alone or in the presence of a female passenger — no passenger effects are observed for older drivers. In wet weather, drivers do not, on average, increase their following distance, despite the increased risk due to the wet road surface.

In dry weather, there are no overall age or sex differences for gap acceptance behaviour (ie there is no difference in the size of gaps between vehicles that drivers choose to pull into according to the sex or age of the driver). However, younger drivers choose smaller gaps if they are accompanied by a male passenger than if they are alone or in the presence of a female passenger. There are no passenger effects for older drivers. There are also no differences in gap acceptance behaviour according to weather type.

## Structural Equation Modelling

EQS is a structural modelling package combining factor analysis and regression in order to test the validity of theoretical models. It compares the relationships between a hypothetical model with those within an actual data set and determines whether or not significant differences exist between the model and the data. It was decided to carry out structural equation modelling in this research in order to determine whether it was possible to develop a model of driver behaviour common to both drivers and people who were too young to drive. A particular model was developed and found to be appropriate for two different driver datasets and the pre-driver data (see Figure 1 below).

**Figure 1**  
**Basic model for video speed choice and violations**



### *Cradle attitudes – grave consequences*

For each dataset, the model works in the same way for both male and female populations. In two of the models, the strength of the relationships between social motives and violations and social motives and speed choice appears to be stronger for females than males. Males seem to choose inappropriate speeds and commit violations, at least in part, as a means to achieve thrills while driving whereas, for women, anti-social behaviour is more likely to predict speed choice and violations. Only in the pre-driver model is there a direct pathway between sensation seeking and speed choice – it seems that drivers don't choose fast speeds simply to pursue sensation seeking (intense and novel) behaviours. It may be that the role of sensation seeking in speed choice is, at least in part, associated with competitive behaviour. The relationships indicated by the pre-driver model are less clear than in the other models. It should be remembered that the data in this model have been gathered from people who do not yet drive and therefore it is less surprising that their attitudes towards driving behaviours are less well defined.

## Implications

The research described within this report traces a developmental pathway from very young pedestrians who cannot be expected to be fully aware of the risks involved in road use, through people who are too young to drive but who are aware of driving processes, to people who actually do drive. It has been shown that risky attitudes and behaviours are associated with age, sex and, to a certain extent, with socio-economic group. Individual characteristics such as sensation seeking, anti-social behaviour and competitiveness can all be associated with risky road user behaviour and attitudes and it has been shown that risk-taking behaviour generally is more likely to be observed in males than females.

The pedestrian studies showed that parents have some awareness of the increased risks to which their sons are exposed. However, the observational study of five and six year old children showed that many children (especially boys) are far from reach and so the effective presence of an adult is debatable. Parents need to have an increase in the information available to them regarding the accident involvement of children as well as appropriate and effective ways of teaching their children to be safe in a road environment.

Examination of the responses given by pre-drivers aged between 11 and 16 showed that many of the attitudes and behaviours associated with risky drivers are actually present in individuals at ages much younger than 17. This means that learner drivers are starting out on their driving career with attitudes that are already well-engrained. Sex differences in individual characteristics associated with risky speed choice/violational behaviour can be observed in people before they start to drive and so it may be more appropriate to start delivering messages about safe driving specifically and safe road use in general at an age much earlier than 17. Parents need to be informed of the risks that their children face as road users in general (boys are more likely to be killed or injured than girls in a road environment) and novice drivers in particular. They need to have strategies available to them to help make their children aware of these risks and also to try and reduce the risks by, for example, being encouraged to join in teaching their children to drive rather than being penalised by increased insurance costs.

The age, sex and passenger effects reported in the driver observation studies have implications not only with regard to measures introduced in order to reduce accident statistics but also for driver training and education in general. For instance, when individuals first embark on their driving career, they should be made aware of the types of accident involvement most likely to involve people of their age and sex. Such awareness may serve to reduce the confidence displayed by novice drivers but this is not necessarily a bad thing — Byrnes and Miller (1997) have shown that fewer risks are taken by those who are less confident. It could therefore be argued that a role of driver education should be to limit the confidence of learner and novice drivers as they strive to master the necessary physical and cognitive skills required in a safer driver. Graduated licensing schemes

### *Cradle attitudes – grave consequences*

(restricting when novice drivers can travel and with whom) have been adopted internationally and are seen to be effective – these could be, at least, a subject for discussion. Other ways in which the conclusions of this research might be put into practice are more concrete: physical restrictions might be employed to reduce opportunities for inappropriate speeds in dangerous areas eg chicanes/road narrowing. Explanations could be given (eg via a road sign) explaining the rationale for speed restrictions in particular areas – these would need to be relevant and appropriate so that ignoring them would obviously increase the risk to both the driver and others.

While the measures described above are practical measures with concrete applications, the information from the structural modelling should be used to prompt and guide future research and inform future policy. For instance, it has been shown in previous research (West *et al.*, 1993; West *et al.*, 1994) that anti-social tendencies are associated with risky road use in both drivers and pedestrians and the structural modelling supports this. Therefore there is an issue about whether individuals who are known to be more anti-social (eg juvenile delinquents) should be allowed to put not only themselves but others at risk when they are allowed to drive. Perhaps people who score highly on anti-social measures need more stringent training and education about safe and responsible road use.

In conclusion, a developmental track for risky road user behaviour can be traced forwards from children to individuals of driving age. The sex differences in accident involvement which were described at the beginning of this report are likely to be associated with differences in individual characteristics rather than simply differences in exposure. In order to increase road safety, account needs to be taken of these individual differences and appropriate and relevant education needs to be provided.