

Car driver training and licensing systems in Europe

**Report on behalf of Forum of European Road
Safety Research Institutes supported by European
Commission Transport Directorate (DG VII)**

by D Lynam (TRL) and D Twisk (SWOV)

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CAR DRIVER TRAINING AND LICENSING SYSTEMS IN EUROPE

**Report prepared by members of Forum of European Road
Safety Research Institutes (FERSI) and supported by
European Commission Transport Directorate (DG VII)**

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EXECUTIVE SUMMARY

This report describes a survey of car driver licensing and training systems in European countries, undertaken by the Forum of European Road Safety Research Institutes (FERSI) supported by the Transport Directorate of the European Union. The primary objectives were

- to define similarities and differences between the systems in different countries
- to assess whether initiatives already developed in some countries should be encouraged more generally
- to recommend what areas should be developed further to improve systems generally.

The report concentrates on the systems used within the European Union and the current applicants to the Union.

The literature review concluded that driving performance of novices fall short in many aspects (eg adequate speed choice, visual search and safety margins). Studies have failed to show the effectiveness of driver training. Areas for improvement are identified but simple solutions are unlikely to suffice.

Collation of the details of current systems was greatly aided by the availability of a recent survey by BASt, on behalf of OECD. Analysis of these systems suggested a typology including:

- age at which accompanied driving during training allowed
- age at which unaccompanied driving allowed
- extent of theory training and testing
- extent of practical training by professional instructors
- availability of private (layman) practice
- conditions for driving after practical test.

There has been a general tendency for all countries to extend the period during which training and testing authorities have contact with novice drivers. Two differing philosophies have recently begun to emerge - one focusing on improving the control and quality of professional training, and the other seeking a reduction of formal education and wider opportunities for practice.

Analysis of young driver accidents, using national statistics, showed that while the excess of accidents among this age group was a general problem, the pattern of excess accidents by age differed between countries. A separate analysis showed consistent general factors contributing to young driver accidents, including both cognitive and attitudinal deficiencies.

In-depth studies were made in three countries - France, Britain, and Germany - which were examples of differing system typologies, and which included most of the key features whose use might be encouraged more broadly. These studies included:

- factors explaining why the systems were adopted in these forms
- detailed training process
- detailed testing process
- qualifications of instructors
- description of product of systems in terms of accident records, offences, and attitudes of novice drivers.
- evidence of contribution made to system effectiveness by features special to that national system.

These studies included collation of existing in-depth information in these countries, plus small additional surveys where gaps were identified in these data.

The study also sought information more generally from other countries in order both to supplement information on the performance of key system features, and to provide a larger database of national statistics to explore the scope for using these as national monitors of changes in accident occurrence resulting from improvements to licensing and training systems.

CONCLUSIONS

By and large, there is no evidence that the differences in the national systems produce any major differences at the level of national casualty totals. The way in which the system is applied is likely to have a much greater influence.

There is little evidence to support a change to the EC Directive on driver testing at present. All countries surveyed comply with, or are moving to compliance with, this Directive.

There seems to be little evidence to support any attempt to seek a common age of access to driving.

There appears at present to be only limited support for a strict two-stage licence system for driving unaccompanied. Many countries are seeking to influence novice behaviour during their early years of driving but they do this primarily through further training or introducing probationary periods during which more severe sanctions for offenders apply. No European country requires a special test to be passed to move out of the probationary period.

Data is described which could provide a national monitor to show trends in accident liability among novice drivers within countries.

RECOMMENDATIONS ON AREAS WHERE GOOD PRACTICE AND FURTHER RESEARCH SHOULD BE ENCOURAGED

Training techniques should be improved to include more emphasis on cognitive skills (such as hazard recognition and risk perception), drivers' ability to assess more closely their own skills, and development of responsible attitudes towards driving.

Research is required to improve the value of private practice as part of accompanied driving during training.

Education and training of instructors will probably need to be extended to enable them to deliver these skills effectively.

Ways should be sought to improve further the theoretical and practical test processes.

The scope for, and benefits of, lower alcohol limits for young drivers should be explored further.

INITIATIVES FOR YOUNG DRIVER YEAR

Ways in which some of the recommendations above might be carried forward during "Young Driver Year" include

- information packs
- database of experience with different training techniques
- encourage regular compilation of statistics required to provide the common monitor of accident liability proposed
- incentives to reduce car use by young drivers
- further use of insurance schemes to provide incentives for more structured training
- encourage closer links with road safety education in schools, to foster more positive road safety attitudes
- prepare research projects to develop techniques or materials required to implement these recommendations

CAR DRIVER TRAINING AND LICENSING SYSTEMS IN EUROPE

ABSTRACT

This report describes a survey of car driver training and licensing systems in European countries, undertaken by the Forum of European Road Safety Research Institutes (FERSI) supported by the Transport Directorate of the European Union. A literature review and collation of general information on systems was supplemented by in-depth study of the practice in three countries - France, Britain, and Germany. The study concluded that there was no evidence that the differences in the national systems produced major differences at the level of national casualty totals. There is a general need to improve training techniques to include more emphasis on cognitive skills, to ensure that instructors are equipped to provide this training, and that the testing process ensure its objects are achieved.

INTRODUCTION

This report describes a survey of car driver licensing and training systems in European countries, undertaken by the Forum of European Road Safety Research Institutes (FERSI) for the Transport Directorate of the European Commission. The primary objectives were

- to define similarities and differences between the systems in different countries
- to assess whether initiatives already developed in some countries should be encouraged more generally
- to recommend what areas should be developed further to improve systems generally.

The report concentrates on the systems used within the European Union and the current applicants to the Union.

The report starts with

- a literature review (Chapter 1)
- a summary (Chapter 2) of the characteristics of current western european systems, including a brief description of developments in these systems, and comparison with initiatives outside these countries.
- a summary of the young driver accident problem (Chapter 3)

An in-depth description of the systems in three countries - France, Germany and Great Britain follows. Chapter 5 provides an outline of the legal requirements of these systems. Actual practice is much less well documented and Chapter 6 describes surveys of learner or novice drivers and surveys of instructors in the three countries that provide a fuller picture of the training process. These surveys attempt to address how some of the higher level skills such as hazard perception are addressed, and how both instructors and learners assess their progress in acquiring driving skills. Chapter 7 examines the data sources that are available to monitor the effect of systems in terms of accidents, offence records, and attitudes of novice drivers. Chapter 8 summarises the results of studies of the effectiveness of key elements within the systems in the three countries, which between them include examples of most of the general variations in western Europe. References to experience in neighbouring countries is also included where this helps to amplify the comparisons.

Finally, chapter 9 discusses the changes that are currently being considered, and the similarities and differences

between the views in different countries, and Chapter 10 lists the recommendations for future development of systems.

Past studies of "driver training" have shown that it is very difficult to provide clear evidence of its benefits. Problems exist both in establishing what training is done and how it influences subsequent performance. It would therefore be overly ambitious for this report to seek to be evaluative in the sense of demonstrating that training in one country is 'better' than in another. More realistically the report focuses on bringing together existing knowledge from several countries in a comparable way, and exploring how and why practice differs.

Several supplementary documents have been prepared or drawn upon for this study (contacts for further information are given below). They include:-

- Review of factors contributing to the high accident liability of novice drivers and the role of driver training - full version of Chapter 1 (Divera Twisk SWOV)
- Driver Training Systems in Europe: survey for OECD of 27 countries (Hanns Heinrich, Nicola Neumann-Opitz BAST)
- Driver training and licensing systems in France (Francoise Chatenet, Jean-Pascal Assailly INRETS)
- Driver training and licensing system in Germany (Nicola Neumann-Opitz BAST)
- Driver training and licensing systems in Great Britain (Clive Downs TRL)

The following terms have been used within the report:-

Process data: - description of how learners acquire experience, including formal training undertaken, additional practice during the period of "training" in which the learner must drive accompanied, how standards (eg for examination and for instructor qualification) are met, and the conditions under which the novice driver develops further experience after passing the test to drive unaccompanied.

Product data: - a measure of the result of application of the system; usually showing the combined effects of the regulations associated with licensing, testing, and training, and the process which learners follow in acquiring experience through formal and informal training, and early novice driving.

Novice drivers: - drivers who have recently passed the test to drive unaccompanied and are still acquiring experience likely to improve their safe driving ability; the period when a driver exhibits the characteristics of a novice will vary with exposure, skill and temperament, but for most drivers will be at least 2 to 3 years.

Experienced drivers: - drivers who have passed through this novice period, and experienced sufficient exposure to be no longer modifying their driving significantly; some of these may nevertheless continue to have poor accident records.

Formal or professional training: - training provided by a qualified instructor for payment.

Informal or layman training, or private practice: - the driving experience gained by practising during the period when an accompanying driver is required, but the accompanying driver is not a professional instructor. The support provided in this case may involve no attempt to 'train' the learner, or may involve varying levels of advice or encouragement. The nature of this support is unregulated and unmonitored, and the ability of the people providing it is unknown; it is possible that inappropriate and inaccurate advice may be given in some cases.

National symbols are used as follows: A:Austria B:Belgium CH:Switzerland D:Germany DK: Denmark E:Spain F:France FIN:Finland GB:Gt.Britain GR:Greece I:Italy IRL:Ireland L:Luxemburg N:Norway NL: Netherlands P:Portugal S:Sweden

CAR DRIVER TRAINING AND LICENSING SYSTEMS IN EUROPE

CHAPTER 1: REVIEW OF LITERATURE ON NOVICE DRIVER ACCIDENT LIABILITY AND THE ROLE OF DRIVER TRAINING

1.1 INTRODUCTION

The nature of accidents involving novice drivers is continually debated, and no single answer has yet been found to the question of what causes the high accident figures. This chapter aims to review the literature on research into novice driver behaviour, to describe the known contributing factors, and to discuss the results with particular reference to how driver training may contribute to greater safety of young and novice drivers. Only a summary of the review is provided here; the full literature survey is given in Annex 1.

1.2 YOUNG/NOVICE DRIVER BEHAVIOUR

A motorist's participation in traffic can be divided into two aspects, which, in the training stage develop one after the other (Brown, 1982). These are 'vehicle control' and 'road craft'. Vehicle control implies the ability to operate the car, such as changing gears, declutching and steering. Road craft implies the ability to respond adequately to the requirements resulting from traffic conditions. Perceptual and cognitive skills are preconditions for the latter. It is assumed that road-craft will only develop to an optimal extent if the driver is able to control the vehicle.

Novice drivers are rather competent in handling the vehicle but there are marked differences between novice/young drivers related to visual search, speed choice, safety margins in situations with high level of uncertainty.

1.3 WHY DO THEY DRIVE IN THIS MANNER?

There is some evidence that cognitive skills and perceptual abilities are still developing at the age of 18 years in young people.

Novice drivers are poor in 'hazard perception' skills. According to McKenna and Crick (1990), 'hazard perception' refers to the ability to detect potentially threatening events by the employment of a mental model of the road network. This mental model allows the driver to accumulate infor-

mation and then run a simulation of what might happen. Furthermore, the use of the mental model enables the experienced and expert drivers to make predictions about future events in that system.

Novice drivers seem to accept more risks. Different motives may underlie this risky behaviour. It may be the result of weighing up of the advantages and disadvantages (risk utility) or it may relate to deliberate risk taking just for the thrill of it.

When asked to assess driving competence, most drivers would consider their own competence to be above average (Svenson, 1987). This also applies to young drivers.

Novice drivers have to carry out new tasks, fast and without errors. After licensing the task complexity in traffic is the same for novice and experienced drivers. In these conditions, task demands may easily exceed the driving capacity of the novice and as a result sensory overload may occur, showing in the missing of significant information and thus making inappropriate responses.

Youngsters drive relatively frequently under the more dangerous conditions, such as, during darkness, for leisure purposes (Weissbrodt, 1989; Forsyth, 1992b; Kampen, 1989), often accompanied by friends (Van Kampen, 1989; Forsyth, 1992b).

Behaviour amongst some young drivers may also be influenced by the following factors:-

- the young adults 'use' driving to create an image of themselves, with the intention of supplying a particular image to others.
- at the individual level, driving style and identity are closely related and both are shaped by peer group influences.
- cars and car driving have a symbolic meaning in industrialized countries.

1.4 HOW MAY DRIVER TRAINING CONTRIBUTE TO YOUNG DRIVER SAFETY

Within the context of driver training, the question is raised as to what role driver training has to play in teaching safe driving routines and in influencing the other contributing factors. Drivers learn to drive safely as a result of practice

and experience. So what can 'experience' do, that the current driver training can't do? May driver training be able to accelerate the acquisition of skills?

1.4.1 What do they need to learn

Driving is a complex task that requires fast responses to fast changing situations, in which attention should be paid to numerous aspects simultaneously. Driving is not complex in terms of vehicle control, such as steering, braking, shifting gears etc. The complexity of the task is more of a cognitive nature. Furthermore behaviour that is not automatic is prone to errors. This proneness to errors is intensified by stress factors. By experience, that is practice on the task, driving becomes more or less automatic, so that attention can be devoted to other matters. The other side of the concept of automation is that it can lead to inadequate and inappropriate behavioural routines becoming 'ingrained'. Erroneous routines will easily creep in, if feedback on the quality of the performance is low.

1.4.2 The role of driver training

The above illustrates the important role of feedback with the correct acquisition of new skills. Learning through experience is the adaptation of behaviour as a result of feedback.

In the daily traffic environment, feedback will not consistently "occur" in every situation. Furthermore as a car driver, one is in a physical and social sense isolated from others.

In contrast, in driver training, the instructor is able to provide immediate feedback and can show the pupil the correct behaviour. This teaches the correct behaviour at the initial stage of skill acquisition, before the bad habits are formed and ingrained. In this respect it is to be expected that driver training is superior to 'practice on one's own'. Further-more, the instructor may play an important role in structuring the task of the learner, so that his task load is not so great that it makes him unable to assimilate and process the feedback.

1.4.3 Efficacy of driver training: current state of affairs

Driver training courses have developed on an ad hoc basis. That is to say, no systematic studies have been carried out in order to investigate which components of the driver training course are effective, and contribute to the safety objective. In a comparison between countries which offer a different, or even no driver training course, no differences are noted with regard to accident rates (Leutzbach et al, 1988). Gregerson (1994) states that no differences are shown between systems that have mandatory driving schools, and those which do not.

The literature also shows conflicting findings on the validity of driving tests and investigators generally concluded that the road test lacked sufficient predictive validity to support its use as a screening device to determining who will be permitted to drive.

1.5 WHERE MAY IMPROVEMENTS BE FOUND

It may be concluded that driver training has a role to play, but that the system is not developed to its full potential; the following elements could contribute to driver training fulfilling that potential.

1.5.1 Varying Licensing age?

In most countries in Europe the licensing age is 18, with the exception of Great Britain where a driving licence can be obtained at the age of 17. In comparison between the states of Australia, in New Zealand, and USA, licensing ages vary from 15 to 18 years. Several studies on these continents have addressed the question of licensing age but, so far, no European study has specifically done so. This may be partly due to the fact that within Europe there is less variation in licensing age, and also the licensing age of 18 years is rather high from a world wide perspective. Nevertheless, recent developments such as the introduction of the accompanied driving scheme in France which allows driving at the age of 16 years, calls for a European discussion regarding an optimum licensing age. A European discussion might be quite different in content. In Australia and New Zealand the wish to lower the driving age is the result of a need to separate the legal drinking and driving ages. Such a need is not present in Europe as in none of the European countries are laws on legal drinking ages in force.

1.5.2 TRAINING COGNITIVE SKILLS

a. knowledge and theory

In most countries, in order to get licensed, the candidate should possess an adequate knowledge of the traffic code. Novice drivers should know and understand that safe behaviour is not guaranteed by just applying the traffic rules, and should also understand that safe behaviour may imply a temporary deviation from the formal traffic rules e.g. that the legal speed limit is not always the safe speed limit.

b. hazard perception

Mckenna and Crick (1992) argue that novice drivers have an under-developed mental model, tend not to anticipate future events, and fail to respond to those events in good time. In Europe, no country has a standard test of cognitive skills, which are believed to be a prerequisite of safe driving. Most often, tests are limited to the knowledge of traffic rules.

1.5.3 Training of Self-assessment

According to Brown and Groeger (1988) hazard perception is not only affected by the identification of potential hazards in the environment, but also by the self-perceived ability of the driver to handle it. Young/novice drivers tend to overestimate their driving skills. No information is available on how novice drivers learn to assess their ability. However, formal instruction may have an important role to play in the acquisition of accurate self-assessment skills. Although one might be able to train this, up to now we have not found any studies that have investigated how 'self-assessment' can be tested.

1.5.4 Attitudes and individual needs

A neglected area within the driving course is learning activities aimed at attitudes, motivations and emotions, which all relate to the traffic participation of the young driver. To date, recommendations have been given on how to clarify this field (Varvick, 1989), but there are few concrete programmes known which attempt to realise an effective implementation. It is shown that particular sub-groups of drivers are more at risk than others, as a result of different skills, personalities and opinions. In driver training a differentiation should be made according to the needs of the candidates. The instructor then, should be able to differentiate between candidates and select the right training scheme for each of the candidates (Glad, Personal communication).

1.6 THE INHERENT LIMITATIONS OF DRIVER TRAINING: HOW THESE MAY BE OVERCOME

A driver training course is subject to inherent limitations. The skill must be acquired in a restricted number of lessons. Not all critical traffic situations present themselves during the lesson time and so are learnt in practice.

After the driving exam, learning may stop in a 'formal' sense, but informal learning continues. Studies show that driving style changes considerably over time (driving speed goes up and errors in driving routines develop) and driving performance falls below test standards after qualification.

As learning continues after licensing, with novice drivers not having reached adequate performance yet, the driving task could be structured such that overload is prevented. The complexity of the conditions can be regulated by putting restrictions on the novice drivers. When the driver acquires more experience, the restrictions can be gradually lifted. Furthermore, error free routines should be protected, at the post-exam stage. This may be achieved by introducing a second test after a fixed driving period or by accompanied driving in which the novice is continuously provided with feedback on his performance. Last but not least

a safety-oriented attitude should be nurtured in the novice driver, and repeat offenders should be penalized, e.g. by implementing a strict point demerit system for novice drivers (Haque, 1987; Tannahil, 1986; Meewes and Weissbrod, 1992; Scotchmer, 1984).

1.7 CONCLUSION

Driving performance of young/novice drivers falls short in many aspects, such as adequate speed choice, visual search and safety margins. These limitations may account for the high accident risk of young/novice drivers. There are many factors that are contributing to inadequate performance on the one hand and accident risk on the other hand. These factors are associated with inexperience, immaturity, age, exposure and extra motives and range from technical driving deficits to the role of youth in western society and the value of car driving.

Despite the fact that studies have failed to show its effectiveness, driver training has an important role to play, and improvements may be found in the field of the training of cognitive skills, the emotional meaning of driving and the social responsibility of youngsters.

However the scope of the problem also indicates that simple solutions will not suffice and that improving driver training on its own will not be sufficient. In addition to the improved driver training, in the post-test period safe driving circumstances should be created in order to enable young/novice drivers to gain experience in a safe manner and to stimulate a safety-oriented attitude.

CHAPTER 2: OVERVIEW OF CURRENT TRAINING AND LICENSING SYSTEMS AND THEIR RECENT DEVELOPMENT

This chapter describes the initiatives that have emerged in different countries over the last ten years, and provides a summary of the system features included in each country. Readers should refer to the BAST (1994) study for a more detailed comparison. A simple typology of key system characteristics is used to compare the systems in France, Germany, and Great Britain which are the subject of the later in-depth studies. A brief description is given of central European systems and some of the systems outside Europe.

2.1 SITUATION IN 1980s

The driver training and licensing systems in Europe have traditionally developed along different lines. Although the general syllabus for training is similar, the age and conditions under which learners are allowed to practice and to subsequently drive unaccompanied, differs between countries.

From surveys available at the end of the 1980s, such as those made regularly by the instructor organisations (CIECA) the following picture emerges. GB and Ireland were the only western European countries to allow a full driving licence to be held at age 17. Some other countries allowed accompanied practice between 17 and 18, but the practical test could not be taken until age 18. France had already introduced the *apprentissage* (AAC) scheme allowing controlled accompanied driving from age 16, but drivers under this scheme, as well as those following the more standard training route, were not able to hold a full licence until age 18.

Two countries (Germany and Sweden) described their initial full licence period as probationary, and France and Luxembourg reported restrictions on the speeds allowed by novice drivers. Four countries (Denmark, Germany, Luxembourg and Switzerland) quoted "refresher courses" being provided for experienced drivers.

Changes currently being made or under consideration in several countries are likely to introduce more common elements between European countries, as experience is transferred. But it is important when considering such changes to be aware of the training culture and organisations that have built up in each country based on the historical differences. Any differences in product data identified later in the report will largely relate to pre-1990 training rather than to the newer initiatives that are now being introduced.

2.2 EMERGING INITIATIVES

During the 1980s, four initiatives are worthy of particular note:-

- the probationary licence system operated in Germany
- the *apprentissage* system of early accompanied driving introduced in France
- the revision of the content of the Danish training and testing system
- the two phase training format introduced in Finland in 1989 which includes compulsory training after the practical test emphasising risk reduction

The first two of these will be discussed in more detail in the in-depth studies.

The emphasis of the Danish changes was on improved integration of the theoretical and practical aspects of training, and in particular, a revision of the Danish theory test. The most important change was probably the inclusion of hazard and risk perception as a fixed part of the training curriculum, as well as in the tests. The philosophy behind this has been reported by Johanssen (1991) and an indication of the results is given by Carstensen (1993).

Finland introduced a revised training format in 1989 which divided training into two phases, and emphasised the integration between theoretical and practical training throughout these phases. An examination is taken at the end of the first phase, which allows drivers to follow a subsequent period of independent driving. This can vary from 6 to 24 months. The compulsory second phase of teaching emphasises the importance of avoiding risk situations and includes the night-time and slippery road training. During this phase, the novice's driving is evaluated and advice given by the instructor, but a further formal test does not have to be passed.

Austria introduced a probationary scheme, similar to the German scheme "Führerschein auf Probe" at the beginning of 1992.

Variants of the *apprentissage* system have now been adopted by Sweden and Belgium, and most recently by Norway. The commitment from the learner, instructor, and accompanying driver is less strict than in the original French model. In the Swedish case, for example, although the learner and accompanying driver are given a syllabus for training during the *apprentissage* period there is no check on how they follow it. This simpler system may overcome one of the factors restricting the take-up of the French system, but its effect on shaping attitudes and driving behaviour is yet to be assessed.

Belgium has also recently adopted a wider set of options combining private practice with lessons with instructors to meet their minimum training requirements. Whilst these combinations appear logical, with less formal instruction needing to be complemented by more private practice, there is little evidence for deciding which combinations are equivalent.

Sweden have attempted experimentally to integrate private practice with traffic school practice and theory by offering the latter free to a group who were not otherwise planning to take lessons. No subsequent effects on total accident risk over the first two years of driving could be detected (Gregerson 1994), but there was a lower risk in the integrated group during the second year of driving.

Switzerland have introduced an 8 hour theory module as a mandatory part of driver training, to attempt to focus more on development of cognitive skills. Evaluation of the effect of the module showed no impact on driver behaviour or on danger recognition but there was some improvement in attitudes to safety.

Norway had for some years required specific training in driving in the dark and driving on slippery surfaces to be included for novice drivers (Sweden also includes training on slippery surfaces). A recent Norwegian evaluation (Glad 1988) suggests that the former did result in some reduction in accidents but that the latter did not. A study of Finnish skid training suggested that it might suit older students better than the youngest ones. Perception of risk needs to be stressed more than training of skilled performance. Norway, in the recent change to its system described below, no longer require these courses to be taken.

The most recent system change, in Norway at the end of 1994, is a major shift of emphasis from extensive mandatory training to more extensive tests of the product of the training. The minimum age for driver training and the mandatory training period have both been reduced. All restrictions on where and when training can take place are removed, and training with laymen is encouraged. Both written and practical tests are increased from 45 minutes to 90 minutes length. Violation of certain traffic offences during the 2 year probation period can result in withdrawal of licence and the need for a retest.

2.3 SUMMARY OF LICENSING AND TRAINING SYSTEMS IN 1990S

A questionnaire survey made by BAsT, on behalf of OECD, has enabled current systems to be defined and categorised.

TRAINING

Great Britain and Ireland currently allow driving lessons and accompanied practice from age 17. Norway, has reduced its minimum driving age from 17 to 16, from the

beginning of 1995. France and Sweden (at 16) and Belgium (at 17) also allow early access through apprenticeship schemes. Austria and Finland allow practice at 17.5 years. Minimum age in other EU countries remains at 18. Those countries which require a minimum number of practical lessons to be taken typically quote 20-30 hours, but Norway has reduced its requirement to 9.5 hours. Denmark, Germany, Spain, Britain, Ireland, Netherlands, Sweden and Switzerland have no minimum requirement.

Practice must be with a qualified instructor in Denmark, Germany, Luxembourg, Netherlands and Portugal. Practice on motorways is required in Austria, Germany, Denmark, Luxembourg, and Sweden, and is customary in France, Spain, Belgium, Switzerland, Norway and Netherlands. The Scandinavian countries as might be expected appear to give more emphasis to night-time driving practice and skid control lessons, but some night-time driving is also required in Germany and Austria.

The majority of countries have a compulsory national curriculum for instructors, although this cannot of course be applied consistently where there is no minimum requirement for lessons with professional instructors. Britain and Ireland are in a minority in not having special facilities for theory lessons.

TESTING

The majority of countries have a separate written or audio-visual theory test of 30-60 minutes duration. Britain is a notable exception with only 5 minutes being spent on theory testing. Pass rates are generally 75-90 per cent.

Practical driving tests are typically 20-45 minutes duration; Norway has extended its test to 90 minutes. Netherlands, and often France, Belgium, Switzerland, Denmark, and Luxembourg, include motorway driving in these tests. Britain and Sweden are alone in allowing tests to be taken in cars without dual control.

CONTROL OF INSTRUCTORS

Most countries require instructors to be at least 21 years old and to have at least two years driving experience. Germany and Netherlands, which both require all driving instruction to be by professionals, differ in that Germany require age 23 with at least three years experience, while Netherlands require no minimum experience, accepting instructors at age 18.

All countries except Ireland require practical training of instructors. Most countries have a system for supervising instructors, with the notable exception of Netherlands, but in Germany, Austria, Denmark, France, Italy, Portugal and Sweden this supervision only occurs rarely.

COMPLIANCE WITH EC DIRECTIVES

The 1991 EC Directive on driving licences (91/439/EEC) basically requires that driving licences shall only be issued

to applicants who have passed a test of skills and behaviour and a theoretical test, and who meet required medical standards. Annex (ii) provides a qualitative description of the types of knowledge, skills and behaviour to be covered in the test.

In principle, all countries covered by the OECD survey, either comply with the aims of this objective or are taking steps to comply. However, many countries fall short to

some degree of the full recommendations of the Directive, and the quality of the practice is difficult to assess.

Medical requirements differ between countries, but in most countries at least an eye test is required. Coverage of subjects included in the theoretical training and testing also differs - Britain and Ireland are the most limited in their coverage at present although both are reviewing their current practice. Ireland also, at present, does not require

2.4 SUMMARY OF DIFFERENCES

System feature	Countries with feature in 1992	Countries recently added	Countries without
Full access to driving at age 17	GB, IRL		All others (mainly 18)
Road practice at 17	GB, IRL, N, F(aac) S,A,FIN @ 17.5	S,B,N via aac	All others
Mandatory theory training	All others		GB, NL (F)
Mandatory practical training	All others		GB, NL (F)
Apprentissage: road practice at 16	F	S 1993 B 1993 N 1994	All others
Layman training or private practice	GB,S,I,B,IRL (FIN,N,CH,E,A F limited)		D, DK,NL P,L,GR
Theory test before road practice	B,E (A lessons)		
Theory test closely related to practical	DK, D, FIN, S	GB to introduce	
Restrictions during layman training			
- speed	F,E	N - layman training on motorways from 1994	
- no alcohol	I,S,FIN		
- added insurance	F,E,IRL		
- not weekends	B,E		
- not motorways	A,GB,IRL,N		
Probation for new drivers (same licence)	24m: D, S, P 12-24m: N	GB to introduce retesting; F speed limit now 24m	All others
-improvement course	24m: D, A		
-speed limit	12m: F, E, L		
-no alcohol	24m: A		

practical training of its driving instructors. Although most countries claim to have some system for supervising the operation of driving instructors, the extent of this supervision is very variable. Finally, some countries (eg Greece, Italy, Portugal) do not generally follow the EC recommendation to assess behaviour in traffic on roads outside built-up areas as well as within towns.

Despite this variation, it is not obvious that the Directive can be improved at present, or that tighter compliance would have a major effect on safety. If a firmer quantified evaluative process could be established through further research, this might form the basis for a future revision of the Directive. EC competence is primarily concerned with the test process and subsequent driving conditions, and the focus for future extension is likely to be on conditions for unaccompanied driving. A variety of approaches to training prior to the driving test might be consistent with achieving test candidates of the desired standards.

2.5 BASIC TYPOLOGY OF SYSTEMS

The basic elements of a system typology can be defined as:

- age at which - accompanied driving allowed
- age at which - unaccompanied driving allowed
- extent of theory training and testing
- extent of practical training

- availability of practice with laymen
- conditions for driving after practical test

Under this typology, France, Germany and Great Britain can be seen to reflect different types of system (see Figures). Systems in other countries include a mixture of the features seen in these countries, although some have been developed in different ways.

2.6 CENTRAL AND EASTERN EUROPEAN COUNTRIES

Unaccompanied driving usually allowed from age 18, except for Hungary and Poland (age 17). Driver training is mandatory except for Russia. Generally all require theory lessons, and number of both theory and practical lessons not dissimilar from EU countries. Systems are generally more prescriptive in the number of hours to be devoted to each topic during training. There is more general use of simulators and of commentary driving.

Instruction by laymen is allowed in Russia, Bylo Russia, Czechoslovakia, and Baltic states, but not in Hungary, Poland and Roumania. Several countries allow accompanied driving at age 16. Alcohol limits are tighter than EU countries (as for all drivers). Most CEE countries require intermediate theoretical and practical tests to be taken.

There is more involvement of police as examiners, and examiners need to obtain a minimum secondary education level. Tests tend to be shorter (theory 15 mins; practical 20-

Typology feature	Other similar countries
Accompanied driving at 16 (apprentissage) Traditional training: no driving until 18 Minimum theory training period	S, B, N D, CH, NL, I, E, P, GR
F Practical training (lengthy for apprenticeship) Most practice with professional instructor Speed restriction during early driving	S, B, N FIN, CH, E, A E, L
Accompanied driving not until age 18 Unaccompanied driving from age 18 Theory training closely integrated	CH, NL, I, E, P, GR, F(trad.) " " " " DK, FIN, S, F(appr.)
D No minimum hours of training but instructors assess readiness for test All accompanied driving with instructor Probation stage after passing test	DK, NL, P, CH(mostly) S, N, A, P,
Accompanied driving at age 17 Unaccompanied driving from age 17 No separate theory test (until 1996)	IRL, N; S, FIN, A (17.5) IRL IRL
GB No requirement for professional instruction Practice with laymen is very common Retest for novice driver offenders	IRL, GR B, IRL, S, FIN, I(over 21)

30 mins) except in Poland and Hungary. Poland includes night-time and motorway driving in the practical test, but others do not. Speed limits are common during early novice driving. CEE countries tend to have different systems of theoretical and practical instructors. Supervision of driving schools is reported to be tighter than that for EU countries.

2.7 RECENT INITIATIVES OUTSIDE EUROPE

NEW ZEALAND

New Zealand was the first country to introduce a graduated licensing system, in 1987. In 1986, in the 15-24 age group, New Zealand had the worst record of road deaths of any country in the international Road Traffic Database (IRTAD). The number of teenage drivers involved in injury accidents per km driven was 6-8 times that of middle aged (the lower figure being that for females) and about 2.5 times that for age 20-24.

A need was therefore identified to encourage formal driver training, but only require it when research demonstrates it to be cost beneficial. Learners should be phased in more gradually to a full licence. During this period they should gain on-road driving experience under conditions of low risk, by restricting the manner and time of their driving.

A licence system was proposed which included

- 6 months on LEARNERS licence after which a practical test must be passed
- 18 months (or 9 months if an approved course passed) on a RESTRICTED licence, with conditions that no alcohol is consumed, no passengers carried, and a night-time curfew is imposed unless the novice is supervised. If these conditions are breached, the restricted period can be extended. The full licence is obtained by administrative action; no further test is required.

An evaluation (Frith and Perkins 1992) of the system was confounded by substantial changes in amount of driving among 15-24 age group. Traffic accidents among this group were reduced; it was concluded that this was mainly, but not exclusively due to reduced driving by young people. Between 17 and 33% of young drivers claim to break some of the restrictions on at least a weekly basis.

The ratio of accidents per vehicle km among young and mature drivers, shown by the IRTAD, remains higher than in most western European countries.

AUSTRALIA

Graduated licensing has also been advocated in Australia (eg Hampson 1988). Added emphasis was given to helping young drivers to acquire safety-relevant perceptual and decision-making skills, and to reduce over-confidence in

young drivers. It was further proposed that testing should be extended to drivers in their first year of solo driving through a graduated licensing scheme.

The State of Victoria is the most advanced in implementing these ideas. Driver licence procedures in 1992 included two car licence types:-

- "learner permit" which could be obtained at age 16; drivers on this permit need to have passed a knowledge test and be accompanied by a full licence holder - zero BAC limit applies.
- "probationary licence" which can be obtained at age 18; drivers need to have passed a more complex knowledge test and a practical driving test. Drivers must display a P-plate, must not drive a high powered car, and zero BAC limit continues to apply.

In parallel to the computerisation of their knowledge tests Victoria have introduced a computerised Hazard Perception Test which is taken at the same time as the Probationary Licence Knowledge test. Scores obtained during the development of this test were lower for less experienced drivers than for experienced drivers, and lower for recent accident involved drivers.

CANADA

Several Canadian provinces (Nova Scotia, British Columbia, Ontario) have been considering graduated licensing systems during the last two years. Debate has centred around the trade off between reduction in driver risk that might be achieved by such a system, based largely on the New Zealand evidence, and the need to retain an acceptable level of mobility.

After public consultation during 1993, Ontario introduced a system in April 1994, which required novices to spend at least 20 months acquiring a full licence. For the first 12 month stage, learners must be accompanied, have zero BAC, and observe a driving curfew between midnight and 5 am. Driving is not permitted on divided, controlled access expressways. This 12 month period can be reduced to 8 months by completing an approved driver education course. After passing a practical driving test, novices can drive unaccompanied but the zero BAC limit remains. A second 'advanced' road test must be passed to obtain a full license; this second stage test emphasises cognitive skills and is still undergoing development and refinement.

The graduated licensing programme implemented in Nova Scotia in October 1994 requires a learner stage of 6 months (can be 3 months if a recognized driver education course is taken) during which no passengers other than the experienced driver can be carried. After successfully completing a road test, for a minimum two year period drivers must continue with a zero blood alcohol limit and a curfew on

driving between midnight and 5 am unless accompanied by an experienced driver. An exemption from this curfew for employment purposes may be applied for. To graduate from this newly licensed stage, a driver must successfully complete a 6 hour defensive driving course. Violations leading to license suspensions at either of these stages will delay graduation into next stage by minimum of time required for that stage.

USA

Driving is allowed at different ages in different states, some as young as 14, but there are tight restrictions on most young drivers. Driver education is offered by most (47) states through their public school system, but only 12 states mandate it. There are no federal requirements for these programmes; they are regulated by the states. Some of the requirements are minimal, involving only a few hours behind the wheel training. Some states do not require an on-road driving test before issuing a licence.

Initiatives in California and Maryland in the early 1990s provided experience of the effects of tighter control over novice driving. A Bill was introduced in the Senate in 1993, encouraging States to establish graduated licensing programmes, with two stages of licences, a 0.02 BAC limit and a system of penalties for drivers violating licence restrictions. NHTSA produced a research agenda in 1994 calling for evaluation of the components of such systems over the next few years, with a full scale evaluation towards the end of the decade. NHTSA have also emphasised the role of parents in providing supervised practice.

2.8 CONCLUSIONS

1. There is a general tendency for all countries to have extended the period during which the training and testing agencies have contact with learner drivers. This has been typified by one or more of:

- tendency to lower legal age at which practising is allowed
- tendency to expand practising opportunities (by allowing accompaniment by experienced driver)
- tendency to look for ways of limiting exposure and risk in early driving
- introduction of probation periods after licensing

2. The precise form of each measure adopted by each country differs making useful comparison difficult

3. Recently two differing philosophies have begun to emerge, in the face of lack of evidence of the value of training

- one going in the direction of improving the quality of formal education and the abilities of the educators (eg Germany, Austria)
- the other seeking a reduction in formal education in favour of the wider introduction of opportunities for practice (eg Sweden, Norway)

4. Although there has been much discussion of the New Zealand and Australian "graduated licensing" schemes, it is only the current Canadian schemes which require a second test before the licence is made 'full'. Some aspects of the two- stage training systems already exist in Europe.

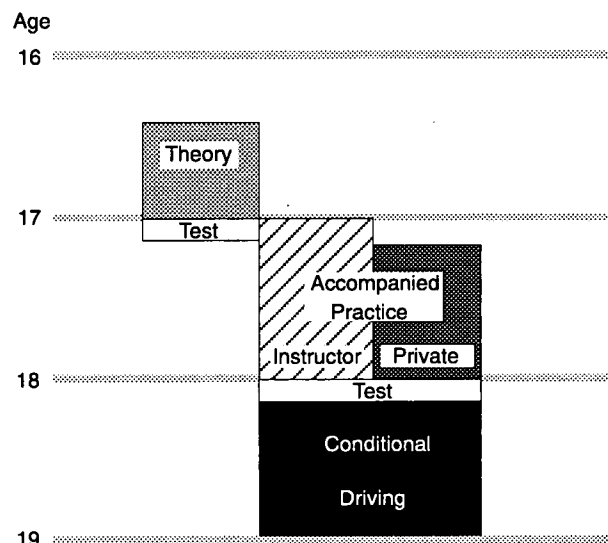


Fig 2.1a Elements of typology

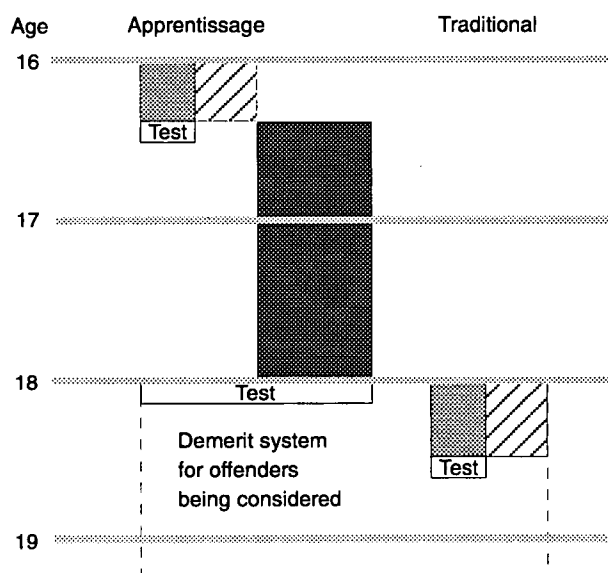


Fig 2.1b France

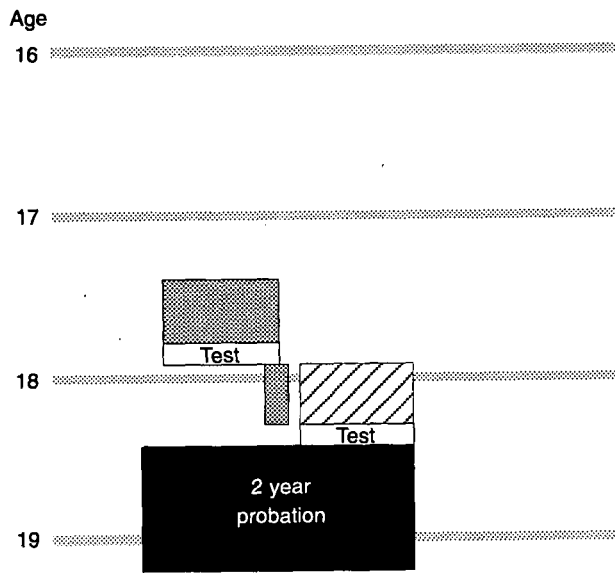


Fig 2.1c Germany

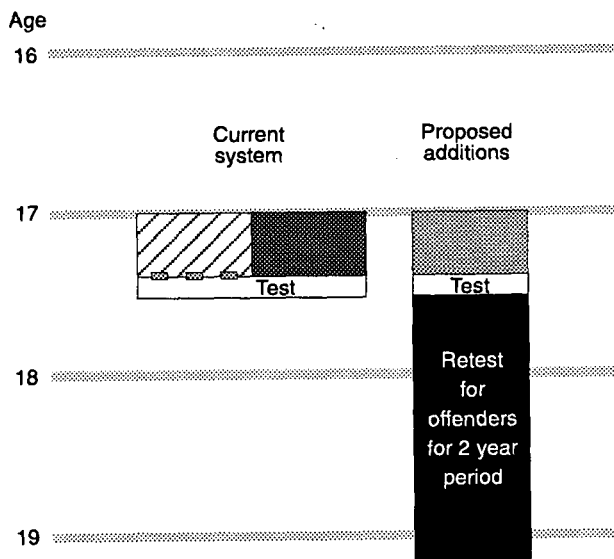


Fig 2.1d Great Britain

CHAPTER 3: YOUNG DRIVER ACCIDENTS

This chapter describes

- differences between countries in accident numbers and rates
- accident types in which young driver accidents are overrepresented
- studies of effect of age and experience on accident liability

Data sources include international statistical compilations (eg DOT 1993, OECD 1994) and also data collected specifically for this study by special interrogation of national accident databases.

3.1 NATIONAL DATA

3.1.1 All car occupant fatality rates

Rates for both deaths per vehicle km and deaths per head of population, shown in Figure 3.1, are generally lower for northern European and Scandinavian countries, than for southern Europe. Rates for Italy are also relatively low however, while Austria, Belgium, Luxembourg and France have comparatively higher rates, notably per head of population.

3.1.2 Car user as a proportion of all fatalities.

Car occupant fatalities usually form the largest group among road user fatalities, but the size of the group varies from 45% in GB and Denmark to 62% in Sweden (OECD

1994). In GB, the largest minority group are pedestrians, while in Denmark and Netherlands cyclists are higher than average elsewhere.

3.1.3 Car user fatalities aged 18-25

Most countries have at least 25% of car user fatalities amongst the 18-25 age group, although that group typically only accounts for about 11% of population. But the distribution of these young fatalities between ages 18-20 and 21-24 differs between countries (Figure 3.2). Netherlands, France, Spain, Italy and Greece all have higher proportions in the older age group. Norway and Denmark have higher proportions in the younger age group. These differences probably primarily reflect differences in the age at which driving is taken up, but the influence of the licensing system on these patterns is unclear.

3.1.4 Accidents involving young drivers

The road users killed in accident involving young drivers are shown below (Figure 3.3). Great Britain and Norway show a higher proportion of passengers and a lower proportion of drivers than Austria, Netherlands and Finland. In France, a lower proportion of vulnerable users appear to be involved.

3.1.5 Motorization rates and motorcycle usage and accidents

Motorization rates vary between the countries in the European Union, with about 600 vehicles per 1000 population in France and Italy to 272 (Greece), 317 (Ireland) and 364 (Portugal) -(OECD 1994). This has two implications -first a disproportionate growth in licensed car drivers can be expected in the latter countries, and second, higher motor-

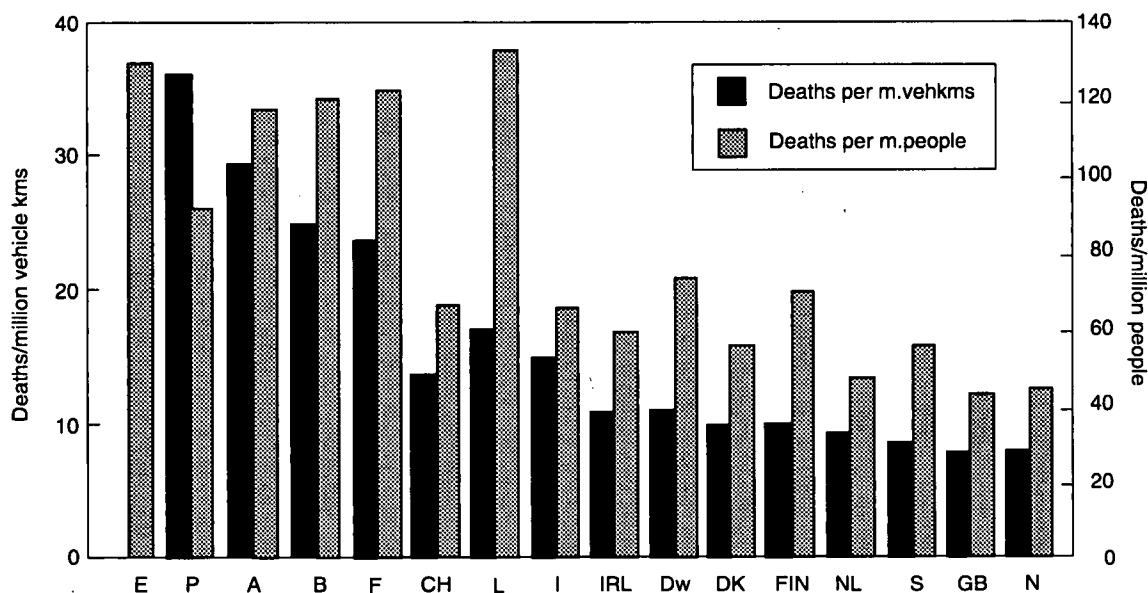


Fig 3.1 National fatality rates. Car users

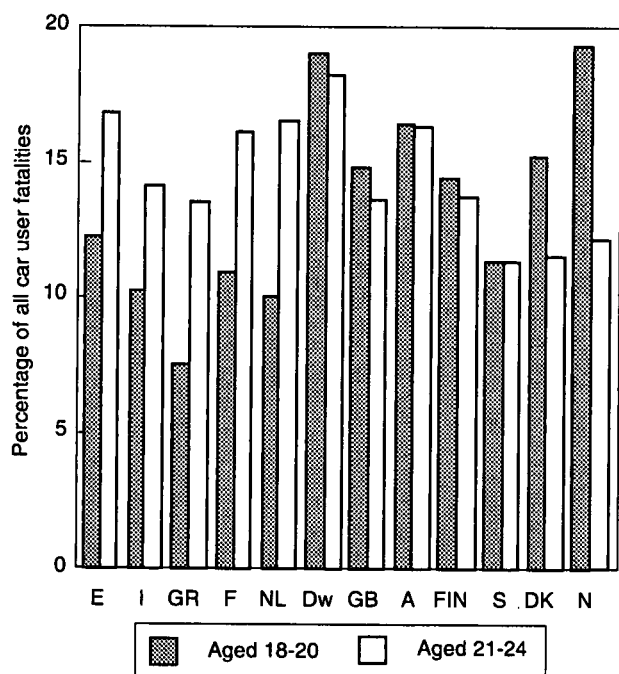


Fig 3.2 Car user fatalities by age

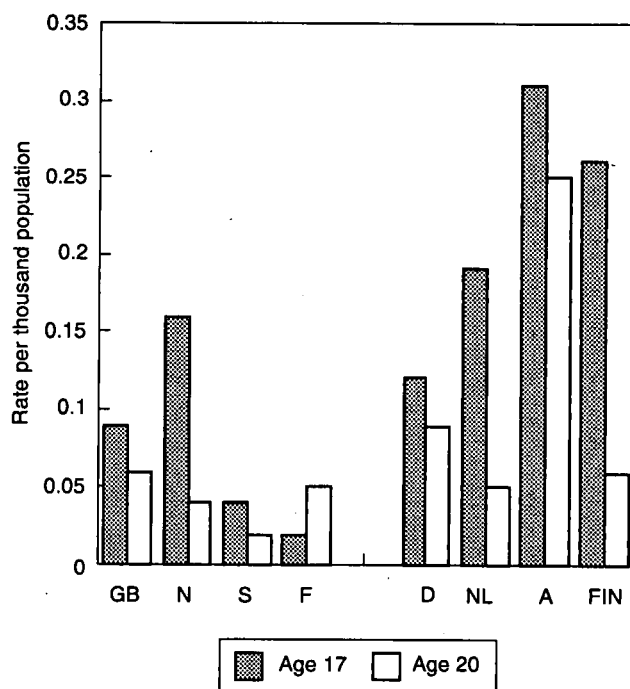


Fig 3.4 Motorcyclist accident rates. Males

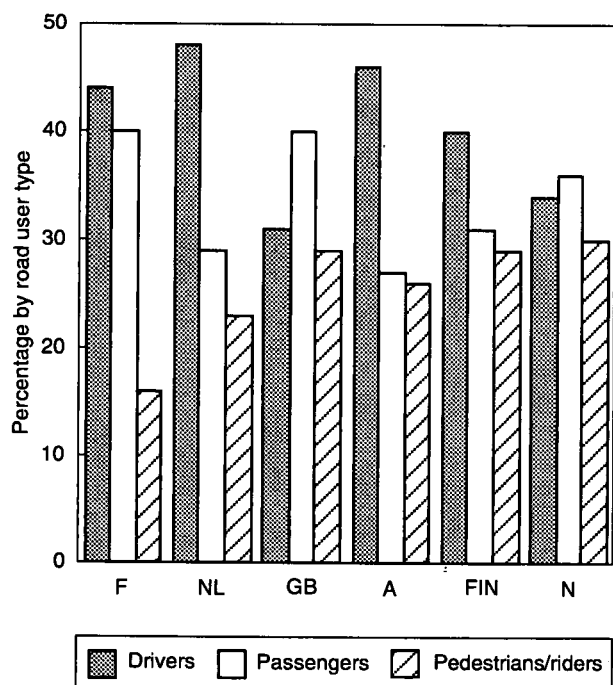


Fig 3.3 Young driver accident fatalities. 17-20 year old male drivers

cycle usage can be expected currently in these countries. Patterns of higher motorcycle use in other countries might also be related to later access to car driving. Motorcycle accident rates (Figure 3.4) show considerable variation between northern European countries but do not show any clear relation with age of access to car driving. Rates per head of population at age 17 in those countries not allowing

car driving until age 18 are lower than the car driver rates in the first years of driving.

3.2 ACCIDENT TYPES IN WHICH YOUNG DRIVERS ARE OVERREPRESENTED

Information from most European countries has been collated during 1994 and is reported in Twisk (1994). Common factors in high incidence of young driver accidents are:-

- week-end nights accidents (exposure is also higher)
- single vehicle accidents (which decrease with age and experience)
- accidents involving driving too fast for prevailing conditions
- serious accidents (probably related to both speed and high passenger rates)
- accidents involving male drivers, although both males and females are at risk

Young drivers are not generally over-represented in alcohol related accidents, except on week-end nights.

Twisk concludes that young driver accidents have features in common that differ from accidents involving more experienced drivers, and that there are similarities between countries. It is not possible to provide an explanation for the

similarities on the basis of the information currently available. Further, the relative absence of information in the southern European countries makes recommendations for a European policy on young drivers hazardous.

3.3 AGE AND EXPERIENCE

Several studies have attempted to assess to what extent the high accident involvement among young drivers is due to age related factors and how much to lack of experience in early driving. Both factors can be affected by licensing and training systems, but in different ways. Better training, delay in access to driving, or control of early driving conditions could all play a part.

The majority of the data on accident rates among drivers shows a general tendency to reduce with both age and experience. However this overall trend can be complicated by changes in exposure during early driving. Brown et al (1988) have described a tendency for accident numbers to increase during the first year of driving. This can be ascribed to differing rates of change in control skills and cognitive skills against a change in exposure which is more likely to be driven by the former rather than the latter.

Maycock et al (1991) show modelled accident liability curves based on a study of 18,000 drivers of varying age and experience (Figure 3.5). These suggest that during early driving, a larger part of the reduction is due to gains in experience than to increasing age, although over a longer period the two factors contribute fairly equally. Similar patterns have been shown by Mayhew and Simpson (1991) using Canadian data, although the relative influence of age and experience is different.

A study by Peck (1993) brought together the results of a large number of studies including the latter two. He concludes that a large number of driver characteristics influence their likely accident involvement; he lists prior accident history, being young, being male, being inexperienced, being from lower socio-economic background, higher

mileage, poor social background (eg education, criminality, family disorganization) and certain attitudinal and personality traits.

3.4 CONCLUSIONS

1. The young driver accident problem is common to all countries regardless of licensing and training systems used. The systems used should still be optimised to keep to a minimum the excess of accidents likely to arise due to youth and inexperience (ie additional frequency of accidents amongst young drivers per km driven compared with their more experienced counterparts).
2. There are differences in the proportions of fatalities in the age groups 18-20 and 21-24 years in different countries. The influence of licensing systems on this should be investigated, under similar conditions of exposure.
3. The percentage of car users among fatalities varies with motorization. Effective licensing and training systems will be particularly important in those countries where motorization is expected to increase rapidly, although there may be some offsetting benefit from reduction in motorcycle fatalities.
4. The majority of the data on accident rates among drivers shows a general tendency to reduce with both age and experience, but different studies have come to different conclusions about their role.

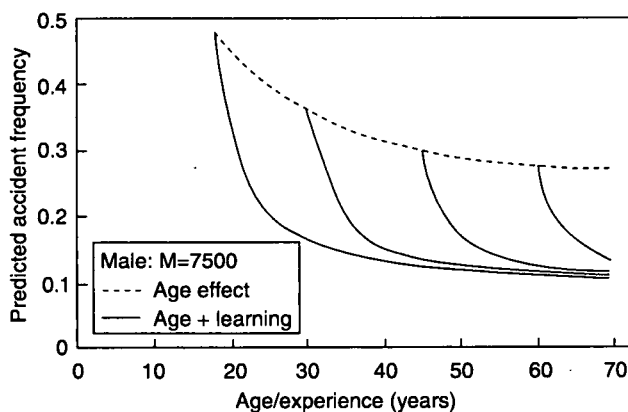


Fig 3.5 Accident liability of car driver. Age and experience effects

CHAPTER 4: DESIGN OF IN-DEPTH STUDIES OF TRAINING IN 3 COUNTRIES

4.1 NEED FOR FURTHER STUDY

The conclusions from the three initial chapters suggest two topics that would be worth investigating in greater depth.

a. the product of the different licensing and training systems (i.e. the extent to which new drivers are involved in accidents; the frequency of traffic rule violation; and the safety related attitudes) should be compared more thoroughly to see if the differences can be related to differences in the systems applied.

b. the content and quality of the current training provided should be assessed in relation to some of the factors identified as being important in the literature survey of past research on the effectiveness of training systems. A thorough investigation would require more basic research on the way in which drivers learn to drive and subsequent modifications they make in their driving style after passing the test to drive unaccompanied (full-licence). Information of this nature is not available yet.

However even the detailed nature of the training currently offered is poorly documented, and within the context of the current study, it is useful to investigate whether practice typically differs between countries offering different training regimes.

Three sample countries have been investigated to explore these topics in more detail. The next four chapters (5 to 8) summarise the results of these in-depth studies; fuller

information is available in the supplementary documents listed in the introduction.

4.2 THE CHOICE FOR THE THREE SAMPLE COUNTRIES

The countries chosen for full study are France, Germany and Great Britain as they give a wide range of features to be studied as shown in the table below. Where appropriate, the data from these countries is supplemented by information from other countries having similar system features or practice.

4.3 THE OBJECTIVE OF THE IN-DEPTH STUDY

The objective of the in-depth study is to understand more clearly how the training process and the licensing requirements affect the safety of the drivers being trained, in order to make recommendations on good practice in these systems.

The study will incorporate the following elements:

- documentation of how and why current systems were adopted in France, Germany and Britain, including comparisons with the requirements of the Annex 2 of the EC Directive on driver testing.
- assessment of the effectiveness of the systems of apprenticeship, private accompanied practice and probation after full licence, analyzing both the product and the process of the current system in more detail in these and other countries.
- reinforcement of the conclusions obtained from comparing the results of these studies by adding comparable data (where available) from other

	France		Germany	Gt Britain
age (full licence)	traditional 18	AAC 16	18	17
practice conditions	professional instruction only	private practice allowed	professional instruction only	private practice allowed
apprentissage	no	yes	no	no
compulsory theory training	no	yes	yes	no
involvement of trainer in system	medium to high	high	high	medium
probation after test	no	no	yes	no
other restrictions	speed limit		none	none

NB AAC (apprentissage) only taken up by about 10% of French learner drivers

countries whose systems include similar typology

- more extensive documentation of current thinking and arguments for and against changes to the current systems in different countries.
- identification of lessons to be learned, and recommendation of good practice.

4.4 METHOD

Four sources of data will be used:

- Collation of existing information on the training process, similar to the data obtained in the TRL cohort study of learner drivers (Forsyth 1992, Maycock 1995).
- Additional interviews with driving instructors.
- Data on novice driver accident involvement collected from as many countries as possible
- The SARTRE data base was used to compare attitudes and self-reported driving behaviour between the three countries selected for in-depth study (between country comparisons). The data base was also used to compare the 18-25 years old with all age groups in a country (within country comparison).

CHAPTER 5: THE TRAINING SYSTEMS IN FRANCE, GERMANY AND BRITAIN

5.1 BACKGROUND INFORMATION

5.1.1 Social factors, lifestyle, opinions and driver behaviour

Driver training is not operating in a social void. New drivers are influenced by the culture in which they were raised, and affected by the norms and values related to traffic behaviour, and the examples that are set by other drivers. For that reason data is provided on opinions and self-reported behaviour on traffic safety issues. For this purpose comparisons of relevant questions from the International Study on Driver Behaviour (Sartre questionnaire) were used. Comparisons of attitudes to a range of issues are given in 7.4. Four specific issues are highlighted below to illustrate the differences in the attitude to driver training systems in the three sample countries.

1. Concern about road accidents

Drivers in Britain are the most concerned and west German drivers the least.

2. Opinion of general standard of driving in country

British, and to a lesser extent French, drivers had the highest opinion; German drivers had the lowest, but were similar to the average for all European drivers.

3. Should government devote more resources to driver training?

British drivers were most in favour, well above the European average, French drivers were also more in favour than the majority of countries, but German drivers, in both east and west Germany, were less in favour than the European average.

4. In favour of driving at age 17?

Not surprisingly, the large majority of British drivers, who already have access to driving at this age, were in favour of this. The French drivers were near the European average of 45% in favour, although they had a slightly higher than average proportion against. Only about a third of German drivers were in favour, and over 50% against.

5.1.2 Pre-driver education

Driver training can be seen as a more specific training within a context of general traffic safety education, often described as permanent education. It is likely that the content of driver training is affected by the content of pre-driver education. If for instance the traffic code is taught and tested in high school then this topic need not have as prominent a position as when such courses are lacking in pre-driver education. Furthermore it is often assumed that pre-driver training may have a positive effect on driver behaviour. The presence or absence of traffic education may also serve as an indication of how important a country takes traffic education to be.

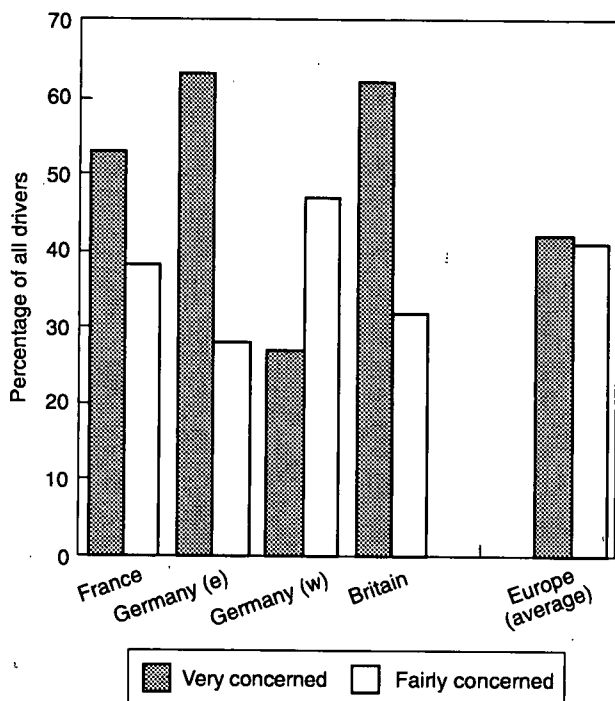


Fig 5.1 Concern about road accidents

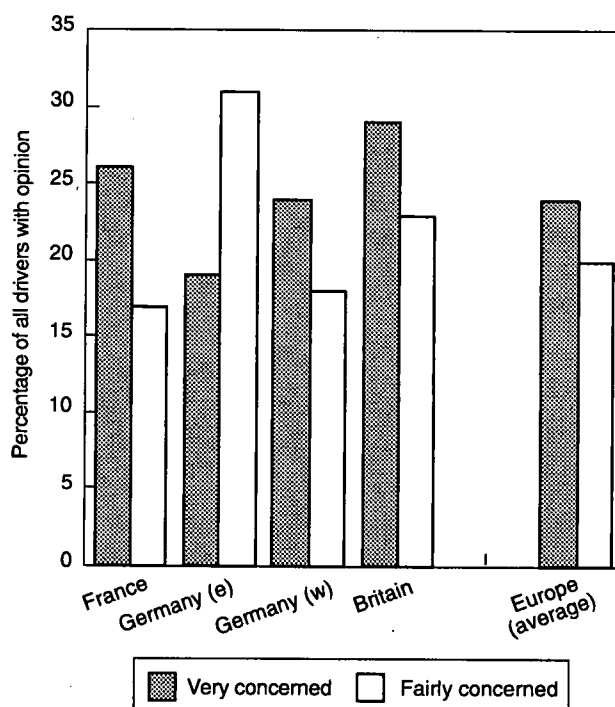


Fig 5.2 General driving standards

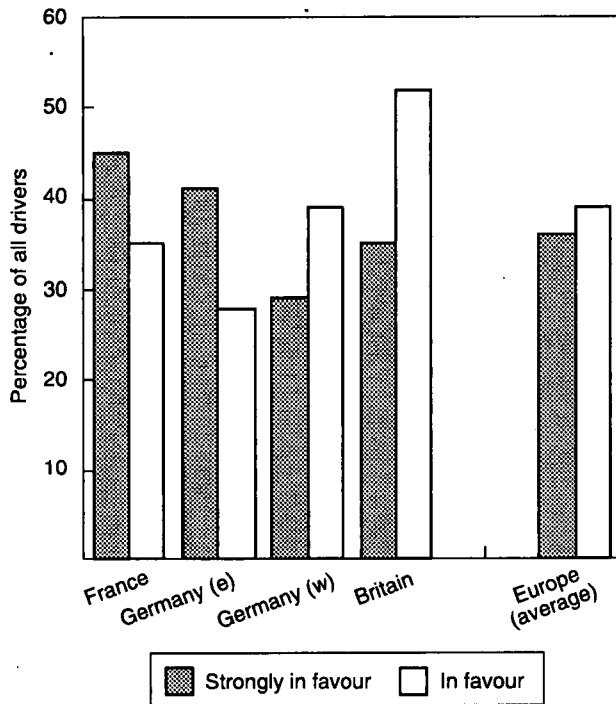


Fig 5.3 Want improved driver training

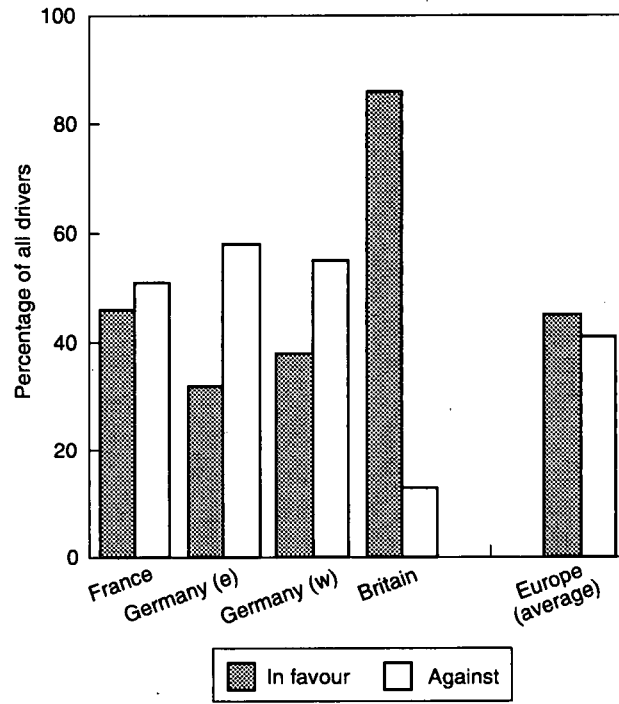


Fig 5.4 In favour of driving age of 17

France

Teaching of the Highway Code has been compulsory in the French state school system since 1957. From 1977, all students at secondary school have been required to study for a road safety certificate (ASSR). At the end of the second year of secondary education (about age 12), this covers pedestrians and two wheeled vehicle riders; another ASSR has been added in 1993 at about age 16 which covers wider road safety and travel concepts and the student's future status as motorists.

This second measure could encourage easier access to driving, and consultation is in progress on possible links with bonus points for theory test, reduction in training time, or financial advantage in preparing for the driving test. Education for the second ASSR is mandatory, not as a separate topic but integrated in nearly all subjects. It is mandatory for access to moped training and riding. The general aim of ASSR is to create links and continuity with the apprentice driving scheme for 16 year olds, and more generally to car driving.

All teachers in schools involved in the ASSR scheme, received information enabling them to cover these topics at start of 1992-3 academic year.

Germany

Traffic education is in Germany a mandatory part of school education. In primary school in the 1st and the 3rd year 10 lessons a year are obligatory and in the 2nd and 4th year 20 lessons a year. In the first two years, pedestrian training, and in the fourth year, cycle training are compulsory.

In the secondary school traffic education is also obligatory, not as a separate topic but integrated in the other topics such as biology and physics. Pupils very often use the opportunity to take moped training in school. Traffic education not only addresses the issue of traffic safety but also its interaction with environment and mobility.

Britain

Road safety education is not compulsory in secondary schools in Britain, although there is strong encouragement through local highway authority road safety officers, and many safety related materials have been developed for use in schools. A review of practice in 1980s (Singh and Spear 1989) concluded that there was a need for far greater co-ordination between teachers and other relevant agencies. Few teacher training courses included road safety. Most police forces have community liaison officers who visit schools, and some of these include discussion of motorcycle rider and driver training issues. In addition, some specialised agencies visit schools providing theoretical and practical instruction related to motorcycle use.

In 1994, the British government announced an initiative to encourage more road safety education for those aged 16 and over, and new materials have been prepared focusing on this age group.

5.2 KEY HISTORY OF DEVELOPMENT OF THE SYSTEM

In this section an attempt is made to show how the current systems in three sample countries were adopted. Information is included on the historical developments, the choices that have been made, the changes that were introduced and the reasons for these changes.

France

- 1892 The first driving licences were issued only requiring the ability to start the engine.
- 1900-1974 The driving test consisted of a practical test followed by oral questions on the Highway Code.
- 1974 Introduction of an audio-visual multiple choice theory test
- 1987 Introduction of the apprentissage scheme in a few pilot areas
- 1989 Nation wide introduction of apprentissage scheme, and the introduction of the National Driver Training program, which indicates the topics that should be taught and the aims that should be reached.
- 1992 The introduction of a point demerit system for repeat offenders, which includes an educational measure (rehabilitation)

Germany

- 1910 Driving test introduced for safety reasons
 - one hour driving and theory test and interview
 - no qualification required for instructors
- 1921 Driving instructor licence introduced
- 1921-57 Legislation on driving instructors extended to emphasise:-
 - good understanding of car technique
 - ability of instructor as a "teacher"
 - use of teaching room with models to show motor vehicle technology
- 1976-79 Revised regulations on
 - (i) theoretical and practical instruction of learners
 - (ii) driving instructor course
 - (iii) examination for driving instructors

1986 Introduction of "driving licence on probation"

- instructors responsible for driver improvement courses
- training of learner drivers by lay persons prohibited

The general tendency in Germany seems to be a further development in the field of professional teaching based on legal requirements which guide the content of training.

Britain (and Northern Ireland)

- 1930s Introduction of voluntary driving test due to public anxiety over traffic safety
- 1935 Driving test made compulsory
 - age limit of 17;
 - professional instruction not compulsory
 - practical test followed by oral questions on Highway Code
- 1968 (N.Ireland only) driver speed restricted to 45mph during first year of driving
- 1975 Necessity to demonstrate arm signals removed from test
- 1989 Computerised register of Approved Driving Examiners introduced
- 1990 Requirements for accompanying driver increased to age 21 with licence held for at least 3 years
- 1990 Feedback from examiners to candidates increased
- 1991 Reverse parking manoeuvre added to test
- 1992 Extended test for drivers disqualified of certain serious offences

5.3 LICENSING, TESTING AND TEACHING REQUIREMENTS

The table below summarises the (legal) requirements of the three licensing, testing and teaching systems. These are then described in more detail for each country.

Theory training and testing

There are two concepts of the theory test:

- a test which is designed as a supplement to the practical test and which therefore takes place at the end of this. In this case the questions are asked orally on a one-to-one basis, and can be directly

Legal requirements

licensing requirements	F	D	GB
certificate issued by police		yes	
medical check-up			
eye test	yes	yes	yes
hearing test			
mandatory theory training		yes	
mandatory practical training		yes	
often in private driving schools	yes	yes	yes
theory training:			
minimum theory lessons		12	
methods used			
- lectures	x	x	
- role play		x	
- group work	x		
- filling in test papers	x		
- class room talks	x	x	
- studying on ones own	x		x
acquisition theory knowledge by:			
-private driving instructors (%)	99	100	20
-laypersons (%)	0.5		
-study at home (%)	0.5		80

related to what happened in practical test. In particular with this type of test it is possible to stress the candidate's weak points or situations which did not arise during the practical test.

- a test designed to be distinct from the practical test, and taken prior to it. It is necessary to pass this theory test before taking the practical test. In this case, all candidates can be questioned on similar subject matters, and in a standardised way.

France

Training

There is no compulsory minimum number of theory lessons.

Topics covered in theory training must be linked to the objectives in the apprenticeship log book which every learner driver possesses. The topics are studied in the classroom, generally in groups of learners who are the same level.

Theory test

Candidates must have passed the theory test in order to be allowed to take the practical test. Test duration is 60 minutes, with 40 questions of which 35 must be answered correctly in order to pass. Up to 40 candidates are tested together using audio-visual materials.

The syllabus for the theory test is in several sections, dealing with:

- the vehicle, the driver, the passengers
- driving in built-up areas, motorway driving
- adverse conditions and driving at night
- speed, braking, skidding, accidents and risky behaviour
- economical driving

Germany

Training:

A minimum of 18 hours classroom instruction is compulsory.

Theory training includes

- licensing matters and regulations on vehicle operation
- regulations governing behaviour in traffic
- hazard perception/knowledge and traffic dangers
- information on traffic violations and their penalties

Theory Test

- can be taken up to 3 months before 18th birthday
- must be passed before practical test taken
- practical test must be passed within 12 months of theory test pass or the theory test retaken

It is a written test with questions drawn from a national bank of 900. 30 multiple choice questions need to be answered resulting in 96 points; 88 points are required to pass. In addition 6 questions must be answered on issues of energy conscious driving and environmental protection.

Britain

Theory training in Britain is not conducted as a separate task, as there is no specific test other than the questions on the Highway Code asked as part of the practical test. All candidates are recommended to read this document. Most instructors also recommend their pupils to read the government publications "Driving Manual" and "Your Driving Test". These include advice on defensive driving.

The current verbal test consists of six questions one of which usually requires several road signs to be recognised. The pupil's answers are judged as part of the practical test assessment so there is no separate pass mark.

The theory test now being developed in the UK will reflect the themes specified in Annex 2 of the EC Directive.

Practical training and testing

France

Training

- four objectives laid down in apprenticeship log book which every learner driver possesses
- control of car at slow speeds in light traffic
- correct position on carriageway, at intersections etc
- driving under normal conditions on urban and rural roads
- awareness of particularly difficult situations
- instructors must undertake a prior assessment of learner's knowledge and attitudes to decide on training required
- compulsory training monitoring sheet for each learner
- several learners may be taught at once in practical sessions

Content of test

- 22 minutes duration

- route includes built-up and non-built up areas; motorway included wherever possible
- one compulsory parking task in built-up section of route
- 2 candidates can take test in same vehicle in order to lengthen test routes

Germany

Training

- pupils must take a course of instruction at a driving school
- regulations state explicitly that theoretical and practical instruction must interlink
- learners must use a car with dual controls
- there is no fixed number of hours of basic training, but learner must take as many hours of practical exercises and instruction as the instructor considers necessary to attain the required skills
- course includes additional compulsory training of minimum duration
- rural roads: 225 minutes (each drive at least 50km)
- motorways: 135 minutes (each drive at least 45 minutes)
- darkness/dusk: 90 minutes (at least half on rural roads)

Content of test

- 45 minutes duration about half outside built-up areas
- examiner chooses route; motorway included wherever possible
- 2 compulsory parking tasks plus either turning or hill-start task

Britain

Training

- learner decides when ready to take test
- no requirement for professional instruction
- government published handbook describes 20 aspects of test in terms of faults to avoid, skills to master, requirements of test, and assessment of task; also includes recommended syllabus to be followed when learning to drive, structured in ten sections on different topics.

Content of test

- 35 minutes duration

Summary of the characteristics of the legal requirements as collected in the OECD study
(modified on the basis of Heinrich et al, 1994 in preparation)

practical theory test (mandatory elements)	F	D	GB
basic driving task	yes	yes	yes
taking account of special regulations	yes	yes	yes
driving on a motorway		yes	
driving outside built-up area	yes	yes	
driving inside built-up area	yes	yes	yes
driving in heavy traffic		yes	
emergency braking high speed			
driving on slippery roads			
after licensing: speed restrictions apply	yes		

- examiner chooses from small number of set routes in each town
- 4 compulsory parking, turning and hill start tasks

5.4 TRAINING AND TESTING DRIVER TRAINERS

Lourens (1989) reports a study of 12 European countries aimed at identifying practices which resulted in the safest driving. He noted that all countries except Ireland enforced instructor certification, and that all certificates were specific to driving licence categories; instructor licences were valid for life in most countries. Mostly there was no requirement for a minimum level of education for instructors. The examination of instructors was always conducted by government agencies.

Features of the systems in the three sample countries, including changes made since Lourens' study are given below.

France

Systematic checks on tuition given in driving schools were initiated in 1991 and a dialogue is in progress between instructors and examiners to make improvements where necessary. Ratings are provided in terms of "good", "fair", or "inadequate".

Germany

The German system requires the highest level of education amongst its potential instructors (of the three countries compared) and its training is slightly more extensive. The examination committee includes experts in adjudication, transport, and driving instruction. Monitoring of driving

schools and instructors must be done every two years, and includes classrooms, teaching aids and training vehicles. Further training of instructors is optional.

The instructor system is currently a focus of interest in Germany; a group of government experts were tasked in 1988 with reviewing instructor training regulations, and their proposals are currently being discussed, some already having been taken up. A complete curriculum for instructor training has just been finished.

Britain

The government's Driving Standards Agency (DSA) maintains a register of Approved Driving Instructors (ADI), and issues a syllabus for driver training. All ADIs have periodically to take a test of 'continued ability and fitness to give instruction'. During these tests, a DSA Examiner is present while an ADI is giving a driving lesson to a pupil. Gradings are given to instructors as a result of these tests. New ADIs are usually checked within a year of registration.

5.5 SPECIAL FEATURES OF THE SYSTEMS

Practice without professional instructors (Laymen's education) and access to full driving licence at age 17 (Britain)

Apart from the requirements applying to the accompanying driver (age at least 21 driving licence to have been held for at least 3 years), there are no restrictions during practice with laymen that do not apply to all learners. Raising the age of access to a full driving licence to 18 was one of the items included for further consideration in the recent consultation document on new measures for young drivers, but there was no strong opinion in its favour.

Summary of requirements for driver trainers

	France	Germany	Britain
Minimum age	-	23	21
Education	-	beyond secondary	-
Other	-	no criminal record	no driving offences for 4 years
Training period	4 months	5 months	
Training content			
• traffic rules	Yes	Yes	Yes
• automotive eng	No	Yes	Yes
• risk behaviour	Yes	Yes	Yes
• hazard situations	Yes	Yes	Yes
• vehicle safety	Yes	Yes	Yes
• traffic psychology	Yes	Yes	No
• vehicle maintenance	No	Yes	No
• insurance law	No	Yes	No
• teaching methods	Yes	Yes	Yes
Examination			
• theory (oral)	Yes	Yes	No
• theory (written)	Yes	Yes	Yes
• demonstration lesson			
theory	Yes	Yes	No
practical	Yes	Yes	Yes
• test drive	Yes	Yes	Yes

Driving licence on probation (Germany)

In November 1986, a two year probationary period was introduced for new drivers. Their driving licence was considered to be provided "on probation". If the novice driver violated certain traffic rules during this period, a driver improvement course had to be attended. Two classes of violation were defined; one serious violation or two less serious were considered to break the probation condition. Violations of a general nature required attendance on a general driver improvement course; special course were provided for drink-drive violations.

The research prior to the introduction of this sanction led to a recommendation for a broader package of measures including (in addition to driver probation)

- the development of two phases of instruction; driving after the initial test would be subject to alcohol and speed restrictions, with a second stage of instruction being required 9 to 18 months later before a driving licence was issued for life.
- more recognition of training for safe participation in traffic rather than passing the test
- qualifications for instructors and examiners extended to enable the new instruction system to be delivered effectively.

Due to doubts about the political feasibility of the full package of measures only the probation element was introduced in 1986. Introduction of the other measures has remained under discussion.

Apprentissage at 16 (France)

Registration is open to persons of 16 years and older, after they have been issued with a certificate from the insurance company stating that the insurance of the vehicle to be used for accompanied driving has been extended. A contract is signed between learner driver, an accompanying driver and a driving school.

The training process consists of three phases:

- initial training at a driving school, with a minimum of 20 hours tuition. The driving school has sole responsibility for issuing the certificate at the end of initial training; at this stage, the candidate must also pass the theoretical test.
- the period of accompanied driving. No restrictions apply to accompanied driving with the exception that apprentice drivers must comply with the speed limits which apply to drivers who have held their license for less than two years. Also AAC drivers need to be recognizable by a "A" sign shown on the vehicle.
- entering for the driving test

5.6 CONCLUSIONS

- There are large differences between the countries in the driving population's concern with traffic safety in general. British drivers are most concerned about accidents but have the highest opinion about driving standards in their country. They also believe the most strongly that government should devote more resources to driver training. German drivers generally take views on the opposite side of the European average, perhaps reflecting that their system is already elaborate; French opinions lie in between the other two countries.
- The three countries differ in the requirements for pre-driver education, with Germany having the most elaborate system; pre-driver education is not compulsory in Britain and appears to be the least developed.
- Driving licences and driving examinations were introduced in all three countries early this century; several modifications have been made, but the main changes in 1980s have been in Germany and France.
- All three are similar in that no fixed number of practice hours are required but the standards are guaranteed by the compulsory examination.

Special Features

- Practice with laymen and professional instruction seem to be independent aspects of the system, in the sense that they co-exist, but are not integrated in the form of legal requirements
- Driving licence on probation can be seen as a logical extension of the driving licence system as a whole in that it provides a means of controlling bad driving but it does not provide any control over exposure to risk
- The apprenticeship system can provide a controlled environment in which the skills sought with the "traditional driving licence system" are developed over a longer exposure period and, in France, in a more structured way.
- There does not seem to be a strong debate about the 17-year licensing age in Britain. This is contrary to the situation in the US and Australasia where it is considered that early exposure of youngsters to car driving will increase the likelihood of fatalities in this age group; in the latter cases however driving as early as age 15 has been allowed in the past.

CHAPTER 6: THE TRAINING PROCESS IN FRANCE, GERMANY AND BRITAIN

6.1 THE TRAINING PROCESSES

In understanding the working of the systems it is essential to look at the "practice" - ie what is really done - as a result of the presence or absence of legislation. Observed and reported descriptions have been sought of the training received or provided to trainee drivers under different systems, with particular reference to ways of combining teaching of control and cognitive skills.

Such questions should not only explore what is actually being done, but also

- how it is done;
- what its value is in the overall process
- how it might be improved

Existing information was supplemented by mounting small scale *new* surveys, with a similar set of questions in the three countries.

6.2 LENGTH OF DRIVER TRAINING

France

Drivers can either learn under the *apprentissage* system or the traditional driver training system for those over age 18. Data obtained through surveys of a small sample of instructors, summarised in Table 6A shows that the time spent with the professional instructors is similar in both cases. The main difference is that the apprentice drivers cover a further 3500kms on average, of accompanied driving, making a total of distance of about 4000km driven before the test is taken.

For *apprentissage*, as well as for traditional training, lessons last for 45 to 60 minutes when a pupil is trained alone, and 60-90 minutes when two pupils are in the car. In both systems, pupils generally have only one trainer during their basic training.

Germany

On average a German driver takes about 30 hours of professional training. But there is a lot of variation. Some only need 12 lessons, others need 100 lessons. Men need less lessons (25 hours) than women (32 hours). The number of lessons is not the same in the former East and West Germany. In the East one needs on average 31.9 practical driving lessons, whereas in the former West one needs about 27,5 number of lessons.

Britain

Despite the fact that professional instruction is not compulsory in Britain, virtually all learners (98%) take some driving lessons. The amount of professional instruction taken increases with age; almost 40% of those aged 17-19 had less than 20 hours compared to less than 20% aged 40 or over. The average number of hours of professional instruction is 31.2 hours. The average number of private practice hours is 17.4. That implies that in the UK on average the learner driver has 48.6 practise hours before licensing. Women receive more hours of professional instruction than men; 18% of women had 20 hours or less compared with 44% of men.

6.3 INSTRUCTOR'S METHODS : HOW IS CURRICULUM IMPLEMENTED

In each of the three countries, a recommended syllabus for training exists, which is generally well followed by instructors. In France, 13% of instructors said they followed this closely, while 87% followed the main objectives. In Britain, 53% followed very closely, and another 44% quite closely.

The level of detail of the syllabus was considered about right by most instructors (62% France, 60% Germany, 84% Britain).

It is more difficult to assess how the training is actually structured in practice. The majority of instructors claim that practice routes are chosen to suit the ability of the trainee, usually starting with quieter roads and progressing to busier and higher speed roads as the pupil's ability increases.

Observation of driving lessons in Britain (Groeger and Grande 1991) has shown that the simpler common

Table 6A	Apprentissage	Traditional
professional training kilometres	515	521
professional training hours	40-50	45-55
costs per lessons	155 ff	155 ff
total costs	4500 ff	4000 ff
Average lessons a week	3.7	2.8

manoeuvres are repeated often during training, but less than 5% of training is spent on the more complex manoeuvres such as overtaking and lane changing, in which risk assessment and anticipation of other driver's action is particularly important. The vast majority of instruction relates to car controls and road positioning. There is very little explicit reference to hazards or other types of traffic judgement. Drivers start to take the test during the period when comments on distance, gap judgement and interaction with other traffic become more apparent.

6.4 INSTRUCTOR AND PUPIL ATTITUDES

6.4.1 How good a test of pupil's ability to drive is the present practical test?

German and British instructors were more positive than French instructors and British instructors were slightly more positive than their pupils. (Table 6B).

6.4.2 How able are pupils to deal with all situations when they pass the test?

French instructors regarded 'apprentissage' pupils as much more able. British instructors again were more positive than their pupils. (Table 6C).

French instructors commented that generally the "apprentissage" subjects are more at ease in traffic but less at ease in manoeuvres than the "traditional" subjects. The results of the French survey also suggested that male drivers were more able than female drivers in control skills but not in decision making in hazardous situations.

In both Germany and Britain learner drivers find their driving instructor very supportive (data not available for France). In Britain, both sexes, at all ages, had high opinions of their driving instructors. The factors measured were friendliness, patience, helpfulness, levels of encouragement and quality of teaching. Similar differences to those

in France, between males and females in control skill ability are evident from the errors made during driving tests.

6.4.3 Instructors feelings about the following statements about their role.

(percentages given are for those agreeing or strongly agreeing with statement) In the surveys these questions were asked in an order designed to mix up the three topics addressed (mechanical factors, attitudes, and practise with friends)

Apart from the responses to the questions on mechanics where there may be some differences in interpretation of the questions, the answers from the three countries are fairly consistent. All see improving pupils attitudes as an important part of their role. Interestingly also, British instructors, although differing very strongly from German instructors in their view of the usefulness of practice with friends, nevertheless agree that this can provide pupils with inaccurate advice and present problems for the instructors. Only 11% of British instructors did not encourage their pupils to practise with friends; of those that did, most waited until after at least 6 lessons and many thought more than 10 lessons were needed first. (Table 6D).

6.5 INTEGRATION OF PRACTICAL AND THEORETICAL TRAINING

The intention here was to look at both the extent to which practical training was supplemented by discussion and explanation of theoretical aspects, and also the extent to which higher order cognitive skills were addressed by the practical trainers.

6.5.1 Methods of feedback from practical driving

Table 6E shows the percentage of instructors using each method; either commentary during pupil driving or

Table 6B	France	Germany	Britain instructors	Britain pupils
very good	0	9	10	11
fairly good	7	57	62	55
neither good nor bad	48	27	19	22
fairly bad	38	6	8	11
very bad	7	1	1	2

Table 6C	France apprentice	France traditional	Germany	British instructors	British pupils
extremely able	23	0	9	5	2
fairly able	77	35	57	81	54
not very able	0	65	6	14	41
not able at all	0	0	1	0	3

Table 6D	F	D	GB
	%	%	%
A basic understanding of the mechanics of the car is vital if you are to be a good driver	65	35	68
Understanding how the engine works will not make anyone a better driver	65	97	34
Every driver should be taught to make routine safety checks on a car		90	98
A trainers job is to get pupils through the L-test	32	16	21
Practising with friends or relatives can create problems for the instructor.	69	67	65
Pupils are often given inaccurate advice when practising with a friend or parent	96	85	92
Practice with friends or relatives is useful to build confidence		6	80
A trainer cannot stop aggressive attitudes to driving being formed	28	33	21
A trainers is partly responsible for a pupil's attitude towards driving		77	91
A trainer cannot influence the driving style a pupil will adopt after the test has been passed		37	35

subsequent discussion during lesson are the most common.

In France, instructors develop from theory to practice but with an overlap between the two. Theoretical concepts are related to traffic situations encountered through the methods listed above. Training in searching for clues to anticipate potential hazards is included during practical lessons. Some visual aids are used in preparation for the practical test, for describing dangerous situations, and to teach manoeuvres. In Britain, although methods used during practical training are similar to the other two countries, the absence of separate theory training means that the opportunity for group discussions or for use of videos and books during lessons does not usually exist.

In Germany, integration appears particularly good, and covers discussion of accident causes as well as hazard perception and defensive driving.

In each country, information is provided on the main causes of accidents and the major hazards to driving, such as fatigue, alcohol and medicinal drugs. Instructors, when asked what they tried to teach in defensive driving, replied similarly with phrases such as "anticipate or foresee events", "search for clues", and "awareness of risk to others". But Groeger and Grande (1991) suggest that their observations show that comments are tailored very closely to the current traffic situation. As lessons progress there is a consistent pattern of reduction in frequency of comment, and character of comment becomes less dominated by car control issues. But

higher order skills did not have explicit tuition and seemed unlikely to become established to a sufficient degree through the experience gained during supervised practice.

6.6 GENERAL CHARACTERISTICS AND EXPOSURE OF LEARNERS

Levels of traffic experience of learners will differ within countries but also between countries. This experience may effect the speed by which the necessary skills are acquired in driver training

6.6.1 Motorcycle experience

France

No information available.

Germany

About 49% of the candidate drivers have ridden a moped or a light moped. About 20% of all candidates have a licence for another vehicle. Those need less practical lessons in order to be able to pass the test.

Britain

About 15% of candidate drivers (26% of males, 8% of females) had previous experience of riding a motorised two-wheeled vehicle. This group had a higher test pass rate (by 6-8%) than those who had never ridden.

Table 6E	France	Germany	Britain
Commentary during driving	51%	88%	78%
Time set aside later in lesson	20%	44%	61%
Written report	-	-	21%
group theory lessons	12%	92%	-
video/books	10%	65%	-

6.6.2 Under which conditions do learners practice ?

The number of hours spent in learning have been given in 6.2 and the topics covered during training are claimed to conform fairly well with the published syllabus, but in all the countries detailed information on the conditions to which learners are exposed is very limited.

France

No detailed interviews with learners were available, so the main source of source of information on learning conditions was the instructor survey already described.

Germany

In 61% of all cases the candidate drivers have a training that corresponds with the legal requirements. Only 2% do not receive this special training, and 31% completed only 2 out of the three special drive categories. Although in Germany "training" outside the driving school is not allowed, about 34% of the candidate drivers practice on their own, although most of them (90%) have less than 2 hours of this practice. This "illegal private practice" does not lead to a reduced number of formal training hours.

Britain

Virtually all learners have some professional instruction and 65% practise with friends. Eighty two per cent of males and 80 per cent of females had driven in the dark while learning. Average number of miles driven for cohort sample was 670. Most had trained in busy town centres at least

once a week and over half had driven this often on fast dual carriageways.

Those who practised without professional instructors in Britain were more likely than other learners to have had some practice in the dark; their frequency of practising in the dark was also higher. Those who had professional instruction were more likely to have practised in rain or snow. These exposures may result directly from the opportunities available, and not relate to choice. Although practise in the dark and practice with friends were both shown to be associated with greater likelihood of passing the driving test, neither were strongly correlated with subsequent accident records.

6.6.3 Age distribution of candidates for driving tests

Despite the availability of earlier access to driving in Britain, the two sample surveys of learner drivers suggest that the age distribution of new drivers may be older rather than younger than that in Germany (although the groups of those taking the test and those passing it are not strictly comparable)

6.7 INSTRUCTOR ASSESSMENT OF DRIVER COMPETENCE

The way in which instructors assess driver's readiness to take the practical test is not straightforward to define, as it involves professional judgement of how well a pupil is

Conditions of learner's practice (Percentage of all learners) - Britain

Frequency of driving	In busy town centres	On fast dual carriageways	On narrow country roads
More than once a week	32	17	19
About once a week	52	34	28
Twice a month	8	16	13
Less often	5	21	24
Not known	3	13	16

Exposure of British learners having professional instruction and practice with friends (percentage of drivers in each grouping experiencing these conditions)

	All drivers taking some professional instruction	All drivers having some practice with friends
Driving in dark	63	73
Driving in the rain	92	73
Driving in the fog	22	22
Driving in snow	14	11
None of these	5	17

Age distribution of candidates for driving test

Germany			Britain		
Age when taking test	Men	Women	Age when passing test	Men	Women
18 - 20	70	69	17 - 19	56	38
21 - 25	14	13	20 - 24	21	24
26 - 30	6	8	25 - 29	13	14
31 - 35	4	4	30 and over	10	24

dealing with traffic situations as well as specific performance of manoeuvres.

To assess whether a pupil will subsequently be a 'good' or 'safe' driver is even more difficult and involves assessment of attitudes and values as well as skills.

French instructors, for example, quote four parameters that they would try to assess

- quickness of application of training
- motivations
- estimation of respect for others, courtesy, civility.
- autonomy and responsibility

The majority of instructors (70-80%) usually or always try to provide pupils with a mock test to assess their readiness to take the practical test. They use the error score in this test as an indication of readiness. Pupil assessment by instructors is particularly important in Germany where instructors are required to formally assess their pupils' readiness for test. This is regarded as an important skill for instructors to possess, and needs to be tested as part of their own training. Recent work in UK has shown that both instructors and the pupils themselves can provide quite an accurate assessment of whether the learner will subsequently have a good or poor accident record.

Analysis of the results of the British learner driver cohort study has shown (Maycock 1995 in preparation) that driver's subsequent accident rates can be related to their "minor" error scores on tasks such as awareness and observation during their driving tests. The same study, and others (eg West et al 1992, Reason et al 1991) have also shown that self-reported accident rates are also related to higher scores in driving deviance (violation) scales.

6.8 EDUCATION AND QUALITY OF INSTRUCTORS

Lourens study (1989) concluded that little research had been conducted into the effectiveness of driver training, and no firm evidence of beneficial effects had been identified. The workshop following the study identified three major issues: (a) the wish to enhance the professional status of driving instruction, for instance by the provision of educational regimes for instructors which would cover

practical in-car training, as well as theory (b) the need for a standard curriculum for instructor training, and (c) the requirement for research into the effectiveness of driving instruction, and particularly whether it results in safer driving.

6.9 CONCLUSIONS

1. Although the legal requirements differ between countries, there are indications that the practical situations are less different than might be expected from the legal requirements.

2. Two examples are:-

- although requirements for compulsory professional training or the legally fixed minimum number of hours of training varies, the average number of professional training hours actually received by the learner driver is very similar. Even in the UK where practice without professional instructors is permitted, learners take almost as many lessons as in Germany where such practice is forbidden. Similar findings were reported about the Swedish system for practice with laymen.
- the fact that "training" with laymen is not allowed in Germany does not deter the youngsters from small amounts of practice on their own. In the Netherlands where driving with laymen is also not permitted, practising on ones own is common.

3. German and British instructors are more positive about their training systems, and about the expected outcomes in terms of pupil performance, than French instructors are about their "traditional" system. The latter are much more positive about the 'apprentissage' system and the ability of the pupils who learn in this way. Instructors in all three countries consider they have an important role to improve pupil's attitudes to safety.

4. Information is lacking on:

- the conditions under which learners practise
- the teaching of self-assessment
- the teaching of hazard perception
- how instructors try to influence driver attitudes
- the ways in which instructors assess pupil's needs and performance

CHAPTER 7: WHAT DATA IS AVAILABLE TO MONITOR SYSTEMS

Driver licensing systems aim to introduce new drivers to the road system with the minimum of accident risk to themselves and others. Restrictions on age and nature of access can limit exposure of these new drivers, but the driver training and testing regime must attempt to prepare the new drivers as adequately as possible for the driving task.

The aims of driver training are therefore manifold:

- to teach candidate drivers safe driving skills,
- to develop cognitive skills that enable candidate drivers to take adequate decisions,
- to motivate candidate drivers do behave safely
- to pass the driving test.

The actual effectiveness of the training system could therefore be judged to some extent on the basis of all the following parameters - pass rates, accident rates, offence rates, and the quality of the driver performance. But at the same time, many other factors affect these parameters, in different ways in different countries, making it difficult to judge convincingly the role of licensing and training regimes in different countries in influencing these parameters. This chapter will describe what data are available, or might be made available, to monitor these parameters. Chapter 8 will discuss their relevance to investigating the value of changes to licensing and training systems.

7.1 CONDITIONS EXPERIENCED DURING INDEPENDENT DRIVING.

Data are available from detailed studies of novice driver samples to investigate changes during early driving, and from SARTRE for young (18-25) drivers compared with all drivers.

7.1.1 Time spent on different road types

France

Time on motorways is 12% (18-20 year olds) and 15% (21-24%) compared with 18% for all drivers. Time spent in towns averages 35%, 39% and 33% for the same three groups respectively.

Germany

Over first three years of driving, time spent on motorways increased by 15% for men and 9% for women. Novices drive more frequently in large towns after the first year; men drive more often than women in these towns. Novices generally drive more on local roads and less on motorways than older drivers.

Britain

Time spent on motorways increases from 12% to 17% for men, and 8% to 12% for women over the first three years of driving. In their first year of driving men spend 35% of their time and women 41% of their time on quiet roads. Both spend about 50% of their time driving in towns.

Distance (kms) driven by novice drivers during early independent driving

		Novice driver studies			SARTRE	
		Year 1	Year 2	Year 3	YOUNG	ALL
F	M	14.000	15.500	17.500		
	F	8.400	9.700	11.000		
	ALL					
	A.C.C	12.700	14.300	15.800		
	NORMAL	10.400	11.800	13.400		
	ALL				12.900	15.600
D (west)	M	16.800	18.500	20.700		
	F	8.600	10.300	12.400		
	ALL				16.700	19.500
GB	M	11.800	13.200	14.300		
	F	7.700	8.700	9.200		
	ALL				14.500	16.500

7.1.2 Frequency of driving in the dark

Germany and Britain

Men drive in the dark slightly more often than women in both countries; about three quarters of the male sample reported driving often in the dark.

7.1.3 Size of vehicle driven

France

A sample of 20-22 year olds reported 46% of men and 31% of women driving vehicles with power above 5 CV.

Germany

Cars with capacity above 1500cc were reported to be driven regularly by 37% of first year drivers and 39% of third year drivers.

Britain

Among 17-24 year olds, 30% of male drivers in their first year rising to 45% in their third year reported driving vehicles above 1500cc capacity.

Equivalent proportions for women were 19% and 25%. Only 4% of men and less women reported driving a vehicle above 200cc regularly.

SARTRE data shows similarly that younger drivers use high-powered vehicles regularly less often than older drivers in all three countries. These data suggest 10% of UK drivers aged 18-25 are driving cars over 2000cc, while less than 2% of young French drivers and 6% of young west Germans do so. 43% of young French drivers are shown as driving cars of less than 1000cc compared with 19% west Germans and 9% British.

7.1.4 Use of motorcycles as well as cars

Germany

About 30% of men rode motorcycles as well as driving cars; this proportion remains constant over the first three years of driving.

Britain

Use of motorcycles drops from 12% in first year of driving, for men, to 8% in third year; average annual travel is about 4500kms. Comparative data for women are 4% reducing to 2%, with annual travel distance of 2250kms.

7.2 ACCIDENTS

7.2.1 Ideal data required

Ideally, the product data should show all fatalities associated with young driver involvement in accidents. Also data on accidents using alternative modes of transport to the car and with

young people as passengers, is relevant, where the licensing system affects mode choice and driver involvement.

Secondly, the data needs to discriminate changes in accident liability with experience, not just with age. This data is not so readily available within national databases.

Thirdly, accident data needs to be related to exposure. Population by age group is fairly readily available, but to account substantially for exposure requires data on take up of driver licensing by age, and average distance travelled by age and/or experience.

Data has been sought from each of the three sources below to compare accidents (corrected for exposure) among young drivers (16,17,18,19,20), a somewhat older group (21-24) and a mature group aged 25-64, assumed to be mainly experienced drivers. Data were also sought separately for drivers of these ages with one, two, and three years driving experience. Using these data an estimate has been made of the excess accident rate among novice drivers (ie the extent to which their accident rates were higher than those of the experienced group). Data is compared not just for the three countries involved in the in-depth studies but also for a wide range of European countries. However because of the national cultural differences which are known to exist, such estimates may be of most use in monitoring trends within countries rather than comparing between countries.

7.2.2 Existing international database

Initially an analysis was made of the comparative data available from IRTAD (the international road traffic fatality database held at BAST). This was limited to all fatalities by age, or car occupant fatalities by age group (combining several years). The only exposure factor available was population. The results showed some similarity between the apparent excess fatalities by age for novice drivers in different countries, but different ages at which the maximum excess occurred.

7.2.3 National accident statistics

These allow detailed disaggregation of police reported accidents by age; casualty data resulting from accident involvement can be identified in many countries but few hold parallel information on the experience (i.e. numbers of years for which a licence has been held) of the driver.

For adequate comparisons accident data need to be related to the total distance driven by drivers in a particular age group. It has proved very difficult to gather data of this type on a comparative basis. Most countries have a very unclear picture of the numbers of drivers licensed among different age groups; without this accident comparisons will be misleading.

Differences between countries in their estimated accident frequency will also be due to factors other than driver training. All analyses and data collection attempt to distinguish between male and female drivers, as the literature survey shows major gender differences in accident risk.

7.2.4 Insurance data

These provide data based on claims from accident involved policy holders (assumed to be the drivers involved), but few companies are willing to provide access to this data even for research purposes. If available it will only represent drivers from a selected part of the insurance market.

GB studies comparing insurance accident data with national data suggest not only that it is difficult to obtain a representative sample of drivers unless several different insurers are involved, but also that young drivers are likely to be under-represented in insurance claims. This is particularly crucial to the current study which is attempting to compare novice and mature driver accident rates. From this evidence therefore it seems unlikely that insurance data will be helpful to understanding relative accident rates. However a sample of insurance claim data was sought from a GB insurer so that a direct comparison could be made with the picture provided by the national statistics. The insurer in this case was not able to identify driver experience or driver exposure from their records, so the only comparison was with age related rates (using total insured driver population as the measure of exposure).

Several of the countries which supplied separated age and experience data obtained these from insurance databases, and the limitations suggested need to be borne in mind when considering these data. The Finnish insurance data is an exception however. All companies have a common database in which all reported accidents are included, and the accidents are coded by drivers as well as by insurance claimant.

7.2.5 Excess accidents (ie additional accidents among novices compared with mature drivers)

Excess casualties by driver age

Using data supplied by individual countries the following parameters have been calculated, separately for male and female drivers, (Figure 7.1, 7.2 and 7.3)

- Ratio between young and mature driver groups of total fatalities in accidents in which they are involved - related to population only
- Proportion of the population that had obtained full driving licences by age; since the data available for these estimates was very limited, these should be treated very cautiously and regarded as illustrative

only (this is particularly true for Germany and France)

- number of kms driven by licensed drivers in each group - calculated using the proportions of drivers estimated above, and the kms driven by drivers of differing age and experience

Excess casualties by driver age and experience

Where both data on accidents and on licence holding by age are available, it is possible to make an estimate of the way in which accident liability varies

- by age, during the first year of unaccompanied driving
- by years of experience, at different ages of passing driving test

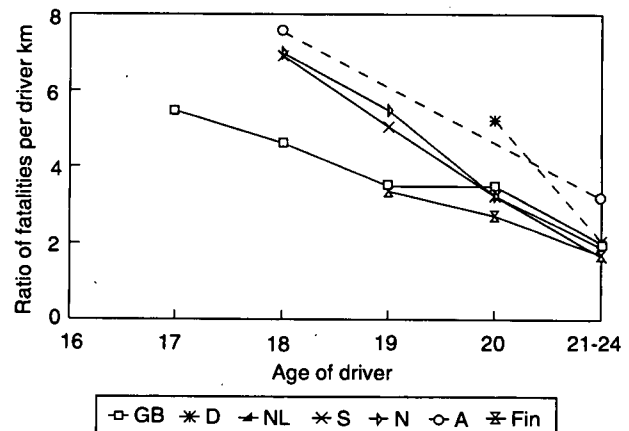
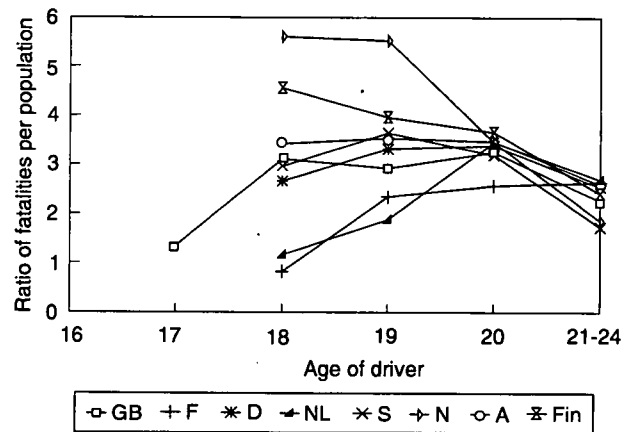


Fig 7.1 Male driver fatality rates
Mature driver rate = 1.0

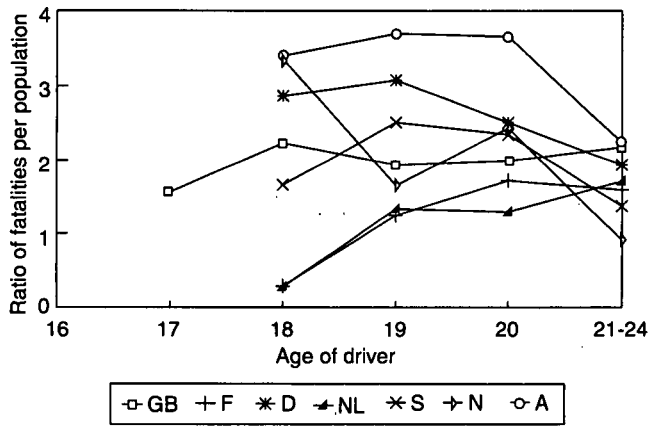


Fig 7.2 Female driver fatality rates
Mature driver rate = 1.0

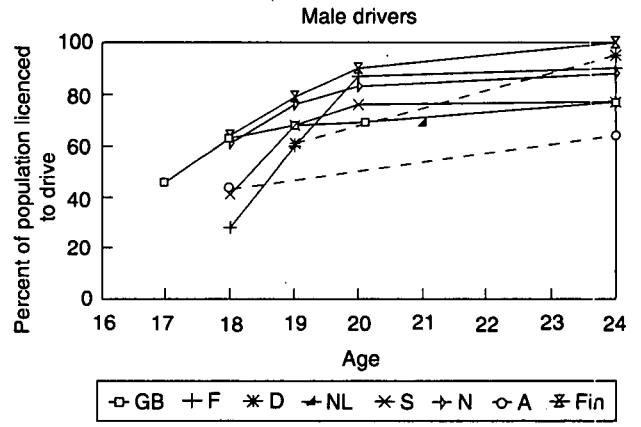
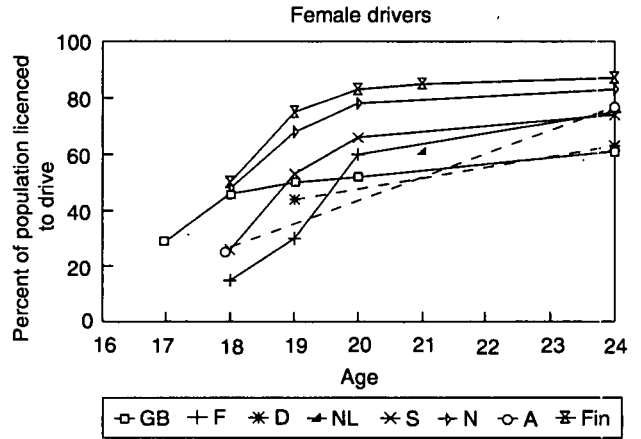
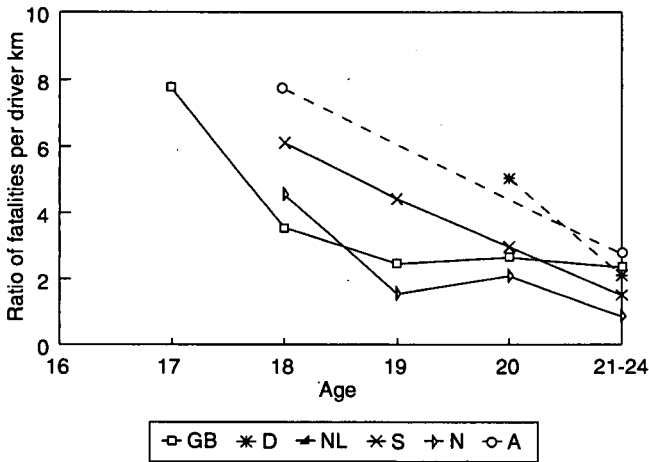


Fig 7.3 Driver licensing by age
Estimated



7.2.6 Accident data from special studies

These are usually in-depth studies or questionnaire studies of samples of drivers of differing age and experience. They provide a more detailed data set on specific topics, but usually represent a cross-section of drivers at a specific date, and rely largely on self-reported information.

7.3 OFFENCE RATES

General data on offence rates are likely to be too inconsistent to provide a fair comparison between countries because of the difference in offences and relative enforcement levels. The inconsistency would remain even if the ratios of the number of novices and mature drivers were used.

However some British and German data are summarised below to explore what patterns appear to exist in violations amongst young drivers.

Also data from the SARTRE questionnaire on self-reported driver violations is summarised, and compared between the young drivers and general driving population in the countries described in the in-depth studies.

7.3.1 Pattern of offences among British drivers

The table shows the number of offences per driver per year by age, for different offence types, for a sample of drivers during 1990-1993. For men at age 17, most offences (60%) are associated with provisional licence violations. By age 20, half the offences are for speeding, but this rises to two thirds for mature drivers. Careless driving offences are highest at age 18 and 19. At 17, men are detected committing only half the number of offences, compared with mature drivers; by 19 they are detected committing 80% more offences than when mature. There is a similar general pattern for women, at slightly older age, but only at a level about 15% of that of men. Although the offence type might be biased by police enforcement strategies, the differences between offences by age groups are likely to be more valid.

7.3.2 Offences among German drivers

Offence data from west Germany show only a small number of unlicensed drivers under the age of 18, suggesting that the higher age of access to driving does not give rise to problems with this offence.

Offences among British drivers by age

AGE OFFENCE	MEN (offences per 1000 driver/year)						WOMEN					
	17	18	19	20	21-24	25-64	17	18	19	20	21-24	25-64
Unlicensed driving	4	6	5	4	4	2	0	0	1	0	0	0
Provisional licence	16	21	14	9	6	2	0	1	2	1	1	0
Drink/drive	1	2	5	8	8	6	0	0	0	1	1	0
Speeding	0	25	41	41	43	31	0	4	7	9	9	6
Bad driving	2	12	13	10	8	3	0	2	3	1	1	1

7.3.3 SARTRE self-report violations

The picture provided by the SARTRE analysis is of West Germans admitting to offending most, in a wide range of violations (eg following too closely, not giving way to other vehicles with right of way, overtaking when can only just make it, overtaking on the inside on motorways). The French are also more likely to offend than the British, with the Dutch appearing least likely apart from a tendency to drive through amber lights. Generally, young drivers are more prone to offend than all drivers. East Germans also appear to be generally law abiding, apart from seat-belt wearing.

French and Dutch are less likely to wear seatbelts than British and Germans, although their wearing rate increases on the more busy, long distance routes. Young frenchmen wear belts as often as others on motorways. Frenchmen reported being stopped most frequently when not wearing belts.

West German and French drivers reported driving while over the limit more often than east German, British and Dutch drivers. Young French drivers reported doing so more often than older French drivers, while in contrast, young British drivers offended even less often than older British drivers. When asked how much they drank in these circumstances, all French drivers were likely to drink much more than drivers in other countries, and this was particularly true for the young drivers.

7.4 ATTITUDES AND OPINIONS

For the between country comparisons, SARTRE data can again be used, comparing the young driver group (18-25) with the attitudes and opinions of the driver population as a whole. Other comparisons can be made on the basis of studies which have been carried out in some of the countries; these have not used quite the same questions, observation methods etc, but similar issues have been addressed.

Drinking and driving

East Germans and Dutch are most in favour of low BAC limits, of more breath tests and of harsher penalties for offenders; French and West Germans are generally least in favour. Young Frenchmen are most in favour of being able to drink and drive, while young British drivers are more in favour of harsher measures for offenders than other young drivers. There is generally less support for a special lower limit for inexperienced drivers (although two-thirds of drivers still support the measure except for the Netherlands where two-thirds of the drivers are against it).

Young drivers are generally even more against the measure, except in Britain.

Speeding

British and French drivers think that drivers generally break the speed limit in these countries more often than West Germans and Dutch think their compatriots do. In all countries widespread law breaking is acknowledged, with young drivers believing it occurs more frequently than all drivers. Drivers individually in France, Netherlands and Britain were inclined to claim they drove "a little faster" than average drivers more often than German drivers claimed. The young drivers generally claimed to do so more often than the average driving population.

Factors affecting risk

Frenchmen quoted the largest number of factors affecting accidents, particularly among driver related factors. British drivers stressed drink driving, following too close, speeding and drugs and medicine, whilst German drivers primarily saw driving too fast as the most important factor relative to other countries. French and British also saw bad road design as an important cause of accidents, whilst Frenchmen also cited bad signing and bad vehicle condition. Young German drivers were concerned about following too close and bad road design a little more than the general German driver sample.

Standards of driving

Drivers from all countries, young and old, generally quoted driving standards as "acceptable".

All drivers thought themselves better than average drivers, but Germans and British to a lesser extent. Young drivers do not have any greater tendency to overestimate their ability than drivers in general; young French drivers think themselves nearer to average than French drivers generally.

General concerns

British drivers are most concerned about road accidents, followed by French drivers, with Dutch and Germans least concerned. Young drivers in Britain, France and Netherlands are less concerned than older drivers, but this is not true of young German drivers. No country has a clearly more positive attitude toward health in general, with different aspects being of concern in different countries.

French and east German drivers are more in favour of measures to increase enforcement and to improve driver training; Dutch and west German drivers are least in favour. In all cases younger drivers are slightly less in favour than the general driving population.

7.5 CONCLUSIONS

1. Data on driving experience in the early years of novice driving is available from specialised studies. Patterns are fairly similar between countries, but periodic surveys of actual distance driven would be useful to provide a basis for accident rate comparisons.
2. Data on accidents available from national data bases can provide the basis for a monitor of trends within individual countries, but only if concurrent data are available on trends in licensing by age, and trends in distance driven in the first few years of driving.
3. Data from insurance companies in some countries provide estimates of variation of accident liability (based on claims by licence holders) by age and experience that are consistent with the results of more detailed national studies. Similar data are available from national casualty statistics in one country (Sweden). The value of organising these data more effectively to provide a basis for long term monitoring in all countries, should be investigated further.
4. Data on offences is based on unknown and variable enforcement strategies and is therefore difficult to use for comparison either within or between countries. SARTRE provides a source of reported offending behaviour to provide some comparison between countries. Self reported "driving while impaired" and self-reported violation frequency in general is highest in France and west Germany, despite the Point demerit systems in those countries. Actual offence data are not available on a consistent basis to substantiate these self-reported differences.

5. The SARTRE database also provides a source of data on attitudes and opinions on some issues related to driver licensing and driver training, but these are not explored in any depth within that survey.

CHAPTER 8: EVIDENCE OF EFFECTIVENESS OF SYSTEMS IN FRANCE, GERMANY AND BRITAIN

This chapter examines the data discussed and defined in Chapter 7 to see what evidence exists that particular system features improve the effectiveness of the driver licensing and training system in producing safer novice drivers. Evidence will be sought both of the contribution of a feature within national system, and of the overall effect of a national system in comparison with other systems.

The analyses in this chapter will look for differences in exposure, accidents, offences, and attitudes which might be related to the known differences between systems. For example, is there any indication that:

- more theoretical training leads to better attitudes or lower accident rates?
- a longer practical training period leads to greater early exposure when unaccompanied ?
- access to a full licence at a younger age leads to higher accident rates?
- a probationary period after passing practical test leads to less offences, or to less accidents?

The data available to compare complete national systems, whether accidents, offences or driver attitudes, will reflect a large range of other policies within a country. Thus even with the use of the ratios between mature and novice driver accident rates described in Chapter 7, comparisons between countries are unlikely to identify correctly real absolute differences. The comparisons should therefore be viewed against the differences in national attitudes and opinions shown by the SARTRE analyses in 5.1 and 7.4.

8.1 PASS RATES

Pass rates (ie percentage of candidates passing the test) are included here for completeness but they do not provide any indication of the ability of the licensing and training system to deliver safe drivers. They are indicative of balance between the quality of the drivers presented for test and the quality of the test, rather than the quality of the driver finally produced. If consistency in testing between countries was established then more uniform driver standards might be achieved, providing the test was a good test of safety rather than primarily control skills.

France

Average pass rate on theoretical exam was 65% in 1992; pass rate in practical test was 54%. Pass rate on first try was

80% for those trained on Apprentissage system compared with 50% for those trained by traditional method.

Germany

Pass-rate of women on the first practical exam is 63% while that of men is about 75%. The theory test pass rate is similar for both sexes (7-9%). When candidate drivers have received training on other vehicles this had a positive influence on pass-rate. In general women need more training (7 hours more) than men before they pass.

Britain

Pass rate on the first exam is 52%. Prior experience on motorcycles has a positive effect on pass rate, as does greater amount of private practice. Women, on average take 12 hours longer in practice before passing practical test, but this partly reflects taking training when older.

8.2 EFFECT OF SYSTEM ON EXTENT OF EXPOSURE TO EARLY INDEPENDENT DRIVING

The distances travelled by novices in the three countries (France, Germany and Britain) are not markedly different, taking into account the differences in the road systems. The comparative distances travelled by men and women, and the increase in driving over the first three years, are also very similar. The use of motorways and the extent of driving in the dark is also similar. There is a greater proportion of car drivers reported to use motorcycles as well in Germany than in Britain, but this may result from a difference in interpretation of the question. The SARTRE data suggest a tendency in France towards use of smaller cars, but this does not seem to be confirmed by other French data.

Overall therefore there seems to be little difference in the way in which the licensing system as a whole influences exposure in the three countries.

Some differences can be seen between groups within countries. German studies indicate that those who need few lessons tend to have high mileage. French studies show the drivers from the Apprentissage training travelling 25% further than other novices in the first year, although the difference is slightly less by the third year.

8.3 ACCIDENTS

8.3.1 Comparison of national accident rates

Given the wide range of other factors likely to influence national accident rates, there is surprising consistency between the patterns of excess accidents amongst novice drivers, as shown by the ratios of novice to mature driver accident rates per driver km in Chapter 7. The ratios

produced are also consistent, on the whole, with accident liability studies based on specific novice driver samples. The estimates in this report are based on many assumptions; better data are needed for a convincing comparison.

8.3.2 Special studies of young driver risk

Germany

Research in Germany (Bruhning and Kuhne) has investigated the differences in risk among different groups of young drivers and shown that:-

- only 43 % of young drivers show a risky driving style
- self-reported risky behaviour (which most youngsters admit to) does not correspond with actual risky driving style.
- those with more risky driving style have low education and social status
- men are more at risk than women
- different lifestyles are probably associated with different accident rate partly because of exposure
- extra risk is associated inexperience in relation to high task demands or detrimental effects of factors such as alcohol (Kruger, 1990a. b.)

Britain

Research was based on tracking a cohort of novice drivers (Forsyth 1992 and Maycock 1995). Characteristics of their accident liability and attitudes to risk were:-

- when differences in exposure are allowed for, women have an accident liability 12% lower than men
- those starting to drive at age 18 will have 9% fewer accidents in their first year of driving than those starting to drive at age 17; similarly those starting at 19 have 8% fewer accidents than those starting to drive at age 18.
- drivers in the lower socio-economic groups have accident liabilities 24% lower than those in the highest groups
- five percent of drivers (9% men, 2% women) have been summonsed for offending during their first 3 years of driving; 80% of these were men. Speeding was the most common offence. Ten per cent of drivers had been warned by the police about offending.

- forty-two percent of those who had had summons for offending during their first year of driving had also been involved in an accident, compared with 18% of those who were not alleged to have offended.
- drivers who had been warned had an accident liability 39% higher than drivers who had not been warned; drivers summonsed had a liability 65% higher than those who had not.
- male drivers who considered themselves much better than average drivers had a higher accident liability than those who thought they were worse than average; those classifying themselves as risk aware had fewer accidents than those who did not so regard themselves.

8.4 OFFENCES

It is of interest to see whether there is any evidence of less unlicensed driving in countries where access to driving is allowed at a younger age. But offence rates in different countries will also be affected by social and economic conditions and by police activities in these countries. Also the existence of controlled access to driving at an early age (eg apprentissage) appeals mainly to those with higher education and more positive attitudes, so availability of such schemes may not influence less law abiding groups. Experience from Sweden following the introduction of lower age accompanied driving does not show any change in the number of accidents involving young unlicensed drivers.

It is also of interest to see if there is any evidence of lower general violation rates in those countries with probation systems. There appears to be little evidence of this at the aggregate level (ie in national offence rates). However this is perhaps not surprising as the specialised studies of these schemes show that although there can be significant benefits from probation, the changes are small in percentage terms.

8.5 OPINIONS AND ATTITUDES

Is there any evidence that the current training systems in some countries have produced more positive attitudes towards road safety than systems in other countries? This is very difficult to gauge because the attitudes of all drivers differ between countries. The pattern is not generally good or bad, but tends to reflect different aspects as important. Attitudes towards drinking and driving are most negative in France, but this is clearly related to social habits rather than to any major influence of safety campaigns or training. Seat belt wearing is also resisted more in France and Netherlands, but this again reflects different views of individual freedoms and conformity.

Young drivers have a general tendency towards less concern about violations and more risky behaviour. Young French drivers have even less positive attitudes towards drinking and driving than older French drivers. On the other hand, French drivers in general are more concerned about safety than drivers in other countries (apart from Britain), and quote more factors causing road accidents. They are also more in favour of measures to increase enforcement and improve driver training.

Drivers in all countries overestimate their driving ability, but younger drivers do not have any greater tendency to do so than their older counterparts. Young French drivers appear a little more aware of their potential deficiencies than the older French drivers.

Views of instructors and trainers about the current training systems have been shown to be less positive in France, for their traditional training system, but this may reflect the comparison with the more controlled learning offered under apprenticeship. British surveys show novice drivers to be less positive about their own abilities after completing training than the instructors who trained them. The novice's view of their driving style does not change noticeably during the first three years of driving, except that men consider themselves as becoming more skilled.

8.6 EVALUATION OF SPECIFIC SYSTEM OPTIONS: (PRIVATE PRACTICE/ APPRENTISSAGE/ PROBATION)

8.6.1 Fuhrerschein auf Probe (German system of probation during novice driving)

German evaluations have concluded that the probationary system has a positive effect on road safety.

In accident terms,

- the reduction for men (4% to 6%) is larger than for women (0 to 2%)
- the effect was larger on serious accidents than on less serious accidents
- the effect on serious accidents remained constant over the 2 years of the study, while the effect on numbers of less serious accidents declined
- the effects were most prominent within the built-up areas (-5%); but no improvement could be determined in country areas.

In terms of violation rates

- a reduction of 2.6% in number of persons committing violations among those with probationary licences in comparison with drivers not on probation.
- for the 18 year olds on probation, a statistically significant reduction in violation rate of 6%

Another study suggests driving licences are evaluated differently since the new regulation, being now regarded as "something that can be lost, not something one will possess for ever; novices have the impression they are "guests on the streets" and treated "with mistrust" by other drivers. For the majority of drivers, the system is considered to have a positive effect on driver culture, although for a minority of new drivers it was seen as a restriction on their newly won freedom.

It is estimated that about 3.5% of those with probationary licences have to undergo improvement courses. The number of drivers committing repeat violations has reduced by 7%, and by 9.4% among 18 year olds.

8.6.2 Jugend Fahrt Sicher (Young people driving safely)

This programme attempted to integrate theory and practical training more closely and to extend the "learning" period after the test pass to produce a second training phase. It comprised:

- a course system (all candidate drivers start and stop at the same time)
- an extended theory course (16 instead of the normal 12 double hours)
- practical training in defined stages
- further written material in the first year after qualification
- an exchange of experiences (2 group meetings and 1 group drive)
- 2 additional brochures after exchange of experiences
- car safety training (not compulsory)

An evaluation of this scheme showed an initial positive effect on attitudes, although this effect deteriorated over time. It is not possible to show that this programme is better than the traditional driver training. The more intensive supervision of the "fahrer fahrt sicher" program does not appear to stop the deterioration of attitudes once the driver experiences normal driving.

8.6.3 Apprentissage (France)

French trainers believe that once a candidate driver has passed the driving test and has been trained within the apprenticeship system he is "fairly to extremely" able to deal with any situation that might arise when driving. In comparison, novice passing through the traditional training system are considered to be "not very" to "fairly" able to handle any situation.

Apprentissage is seen as producing better driving skills. It appears to be effective for some groups of pupils but less effective for others. Accident based evaluations are so far inconclusive, but it seems likely that it will remain a useful option for some pupils but not supercede traditional training on a general basis. The quality with which the training is currently achieved, and the very structured course adhered to, also varies, and successful results depend on good implementation of the curriculum.

Pupils passing through the system tend to drive significantly further in their novice driving years.

8.6.4 Private practice during training (Britain)

Pupils are free to choose how much practice they have with friends, and how much professional instruction they take. Relevant questions are:

- a. How many drivers take up the option to practice, why do it and what factors affect their choice.
- b. how does the option affect their training process.

Sixty-five percent of learners do some practice, mostly with family (45% with father, 29% with mother, 47% with other family members, 21% with friends)

The mean number of hours of private practice is 17.4 hours; this amount is not related to the amount of professional instruction taken. Test failure leads to increased practice.

Only 11% of driving instructors in Britain did not encourage practice in addition to lessons, but many saw problems might arise from the advice given during this practice. Of those who encouraged it, 38% did so after 6 to 10 lessons, but % preferred to wait until after 10 to 15 lessons. Most gave advice on what and how to practice.

There is some indication from British studies that learners doing more private practice are more likely to pass test, but this may simply reflect that the better drivers are more confident about practising without instructors. There is no evidence from subsequent accident records that those who did more private practise whilst learners have any different accident rates when driving unaccompanied.

Private driving instruction in Finland

Private driving instruction is also becoming more common in Finland; in 1989 less than 10% of the candidates were trained with private instruction but the proportion had risen to 15-20% by 1993.

Comparison between drivers trained privately and those trained at driving schools (eg Keskinen 1992) showed the privately trained drivers to :

- be more likely to fail both theoretical and practical tests
- have similar numbers of accidents after passing test
- have less violations but also to be a special sector of the population which:
- drove less (19,400kms compared with 23,400kms) than school trained drivers
- were significantly better educated
- had more positive attitudes to safety

This suggests that regardless of the higher educational level and the better safety attitudes, the drivers with private training were no safer than those professionally trained.

8.6.5 Access to driving at 17 (Britain)

In 1989 in Britain, 50 % of all male candidates and 30 % of all female candidates for the driving test started learning to drive while they were 17, but many of these did not drive unaccompanied until age 18 or older.

Drivers who take their driving test at age 17 appear to have

- no disadvantage with respect to pass rate (they have slightly higher rates)
- no worse performance in subsequent voluntary assessed drives
- less need for lessons (mean 20.8 hrs) than any other age group before able to pass test.

Accident liability studies show that accident rates among 17 year olds are higher than among older age groups (Chapter 3).

8.7 CONCLUSIONS

1. Access to driving at an earlier age

Accident liability curves show higher accidents rates among younger drivers. The effect of the availability of access at 17 in Britain does not appear to have a major effect on accident totals among the young drivers as a group.

Drivers who pass their test at an early age tend to drive higher mileages.

2. *Apprentissage*

There is not yet any clear evidence of the safety benefits of this approach. There is evidence that it might have different effects on different driver groups, leading to lower accident liability than would have the traditional training system for some groups of drivers but not for others. The current participants (about 10% of all new drivers) are a self-selected group who are prepared to make a commitment to the more rigorous routine required and are likely to start with more positive attitudes to safety.

3. *Practice with laymen in addition to professional instruction*

Accident rates of those who have primarily learnt through practice with friends seem to be no better or worse than those who have had mainly or totally professional instruction. Finnish evidence, of drivers who have had only private training, suggests the process is likely to appeal to those who are better educated and already have better attitudes.

4. *Integration of theoretical and practical training*

The change of system, to a more integrated approach, in Denmark produced a positive effect on accidents but this is likely to have been influenced by the concurrent emphasis on improved theory training, particularly in risk perception. The attempts at integration in Germany through the "Jugend Fahrt Sicher" programme produced a positive effect on attitudes but this wore off when drivers were exposed to real traffic conditions.

5. *Greater penalties for offences during early driving (probation without additional licence)*

This produced small but significant reductions in accidents (up to 5%); the reductions were higher for men than for women.

CHAPTER 9: POTENTIAL FOR IMPROVEMENT

This chapter describes the future developments which individual countries are already considering. It also indicates the changes which are unlikely to be accepted in these countries and the arguments against them. These ideas are then combined with the conclusions of the earlier chapters to propose the general developments that seem most promising at a European level.

9.1 FUTURE DEVELOPMENTS UNDER CONSIDERATION

France

The French system is based strongly on the idea of graduated access to car driving. There is no documented general view of the way forward but future developments might focus on four aspects.

Development and extension of apprenticeship training by:

- a) development of educational materials for the accompanying person
- b) improvement of its field of application (improvement of the continuity and of the quality of contacts between the pupil, the accompanying person, and the driving school trainer);
- c) reinforcement of the supportive role of the apprenticeship system, as a means of integrating or re-integrating young persons who have problems in society.

Improvement of theoretical test:

This test has existed for twenty years. It does not incorporate recent data from traffic safety research (hazard perceptions, risk factors, risk-related attitudes, lifestyles). Discussions are currently being held on this topic. Future French young drivers are also now passing through improved pre-driver education (12 to 16 years); their traffic safety knowledge and understanding should be better than the previous generations, so the level and content of the driver training and testing system should be adapted to this.

Introduction of a probationary licence for young drivers

This probationary licence should be part of the points system, with an emphasis on specific courses for young people (group techniques, interviews on alcohol, speed risk-taking, lifestyles).

Improvement of teachers and trainers' training

A traffic safety course should be introduced in the teacher training course.

The status of certain categories of driving instructor is currently being changed; their field of practice will be extended to schools, workplaces and the rehabilitation sessions of the demerit points system.

Germany

Practical driver training

There has been discussion to move towards a fixed number of hours of practical training. This is not going to happen because of the low correlation between pass-rate and length of practical training in the sense that those with talent need less training.

There is discussion on the effects of learning climate on driving performance. This might lead to developments to improve on this.

Theory training

Germany has already a cognitive oriented theory training. Current studies have shown the importance of life style and motivational factors and their effect on driver behaviour. In Germany theory training will therefore not only concentrate on the cognitive aspects but also on motivational tendencies such as search for independence and autonomy. Themes include: coping with impatience, self-assertion in groups, behaviour in competitive situations, making decisions and time planning.

Improvements in the field of training of driving instructors

Research has shown that instructors suffer through:

- high task demands and stress
- high level of competition between driving schools
- lack of psychological and pedagogic training

It is concluded that the task of driver training requires not only teach skills and knowledge, but also the ability to develop positive attitudes. This requires a high level of pedagogical skills of the trainer; their didactical and psychological skills also need to be raised. The instructor should be able to handle activity directed teaching methods such as role play, discussion and groupwork.

This will influence the requirements set for instructors towards:

- a higher level of further education ensuring a higher level of intellectual functioning;
- a higher age

Within the course there needs to be emphasis on how to pass on information most effectively to the learner driver.

Limitations on novice driving

Additional limitations (no alcohol, no weekend driving, no motorway driving) for young drivers are under discussion.

Britain

In a 1993 Government report proposing measures to improve the safety of young and inexperienced drivers, many novice drivers are recognised to:

- lack higher order judgemental skills (such as hazard perception, risk perception, decision making)
- are more likely to violate traffic laws and take risks
- lack experience which is felt to be important in avoiding accidents

Recommendations are aimed at

- enhancing the learning of judgemental skills
- modifying behaviour patterns
- limiting young driver exposure to risk until they have acquired more experience

The specific measures proposed are:-

Theoretical testing

Introduction of theory test content which would focus more directly on topics relating to road safety, meeting the requirements of the EC Directive, is scheduled to be introduced in 1996.

Retesting for wider range of offences during novice driving

Under this sanction, drivers would automatically revert to only provisional licence entitlement (ie require accompaniment) if convicted for prescribed offences committed within a prescribed period after passing the driving test. A retest would need to be passed before a full licence was regained. Legislation now before Parliament would introduce a scheme requiring a retest on obtaining six or more penalty points (usually two minor offences) within two years of passing the driving test.

Encourage further training after passing the driving test

To be achieved by enlisting the support of the insurance industry to offer discounts on insurance premiums to those newly qualified drivers taking further training with Approved Driving Instructors. The scheme "Pass Plus" was launched on 6th February 1995.

Pre-driver education

Education programmes for the 16-plus age group are being produced and targeted at potential young drivers, learners and novices.

9.2 SCOPE FOR INTRODUCING OTHER OPTIONS

This section lists some of the features deliberately not included in the systems adopted by countries and the arguments against them.

France

Lowering of age of unaccompanied driving

Apprentissage has already lowered the age of access to car driving from 18 to 16 years, for those prepared to follow this training option; more general lowering of age is unlikely to be considered.

Accompaniment by non-professional instructors during practice ("education by lay persons")

This option does exist in France, although it is only taken up by a very small proportion of candidates. It would probably not be encouraged further because it does not show any advantage compared to apprentissage.

Curfew on young drivers

It is very unlikely that this measure would be accepted in France, in today's society.

Germany

Accompaniment by non-professional instructors during practice ("education by lay persons")

In 1986 the German government prohibited the training of learner drivers by lay persons. The reasons were that the layman generally have no educational concept or the competence enabling them to judge learning processes in order to use corrective measures. In addition there is the risk that wrong behaviour is practised during early learner driving which is very difficult to correct at a later stage.

Access to car driving at a lower age

This is very unlikely to be accepted in Germany. The major arguments for access at age 18 are:

- by age 18 a person has reached maturity; before this age he/she is not responsible for his/her actions in all respects.
- an age limit of 18 helps to emphasise that driving a car is a very responsible activity.

Britain

Accompanied driving under "Apprentissage" system

This is not seen to offer any advantages in Britain in its current form because

- accompanied driving by learners is already permitted
- it increases exposure by allowing driving at even younger age, albeit under controlled conditions

- it would involve high costs, enforcement and monitoring
- it is likely to appeal to those who already have positive attitudes towards road safety rather than those with poorer attitudes

Probation for novice drivers

Tougher penalties for offenders during first two or three years after passing test are already proposed above. The probation system with P-plates such as the scheme in Northern Ireland has not been adopted more generally in UK because there is no clear evidence of its effectiveness and enforcement would be expensive.

Restriction on driving (eg night-time curfews) during novice period

This was rejected because of the detrimental effects it would have on access to education and work opportunities.

9.3 GENERALLY AGREED AREAS FOR IMPROVEMENT

Based on the information above and the detailed assessment of systems in Chapter 5 to 8, the following areas should be considered for improvement by most countries. These are consistent with the needs identified in the literature review in Chapter 1.

Improvement in training techniques

Most countries recognise that their present training and testing regimes do not stop drivers being allowed onto the road without the skills and attitudes that would minimise their risk of involvement in accidents. Improvement in training content and techniques is therefore a requirement for most countries. The earlier analysis suggests this should focus particularly on

- developing better cognitive skills, particularly hazard recognition and risk assessment
- improving driver's assessment of their own skills in relation to the risks they face
- developing responsible attitudes to safety and recognising their responsibilities as a driver

Improving the quality of private practice

For those countries that allow this form of training, it is important to maximise its potential benefits whilst minimising the risk that it will allow poor driving habits to develop.

The evidence from research studies suggest that although this form of practice can help drivers to pass the practical driving test, there is no evidence that it produces drivers who are more or less safe than those who follow courses of

instruction with professional trainers. However, this finding relates to those drivers current taking this option; we do not know whether other, less able learners would fair better or worse if encouraged to take more unstructured private practice.

Private "practice" could be encouraged in a more structured way. The most controlled example of this is the French application of Apprentissage, involving a contract between learner, instructor and private accompanying driver, although there is some evidence that the proposed liaison may not always be well followed in practice. Other versions of early accompanied driving such as the Swedish scheme, do not require such rigid structure to the private training. The British system does not require any structure to be followed. So far, research studies have failed to prove that a more structured approach produces safer drivers; more work is needed to establish the value of guidance during private practice and how this is best monitored.

Improving the education of instructors

Improvement of the quality of training is likely to be dependent on improvement of the skills of the instructors. At the simplest level this can be influenced by ensuring a high standard in the training and testing given to the instructors. Some countries (eg Germany) seek higher educational standards for their trainers, with particular emphasis on their ability to teach and improve the attitudes and responsibility of their pupils.

A particular focus is the value of improving both the trainer's and the pupil's ability to assess whether the pupil is developing skills and attitudes which will lead to becoming a safe driver. There may be some benefit in involving instructors in assessment and improvement courses for novice offenders in order to improve their awareness of the characteristics which lead to bad driving after the test has been passed. But better techniques may also be developed by which instructors and pupils assess progress in safe driving practice rather than simply potential to pass the driving test.

If instructors are to be encouraged to improve their skills, some attention needs to be given to their status. Improved qualifications standards might be defined, and skills linked with other professions.

Improving the testing process

The importance of a test regime which would include demonstrate recognition of risk, ability to manage it within a good understanding of one's capabilities, and responsible attitudes to driving, is recognised generally. Enhancing the role of the theory test is seen as one way to make these factors more prominent, and encourage integration of theoretical and practical training. There is some evidence from Denmark that more attention to risk perception might lead to less accident involvement. Further development of test

techniques could be valuable at a European level. Such studies should seek to find out what test features are good predictors of subsequent accident involvement.

An additional means of linking this need with the improvement in the assessment abilities of instructors would be to encourage the need for instructor assessment of pupil capability (as in the German system) before a test application is made.

Other aspects examined during the study include:

Changing age of access

Access at an earlier age through accompanied driving is discussed above. There does not seem to be a case for lowering the age for access to unaccompanied driving (to 17 as in UK) in countries which restrict access to age 18. The accident liability data from Britain shows reducing accident liability with age, but it does not show a markedly higher change between ages 17 and 18 than between ages 18 and 19. Whilst therefore there would be expected to be some reduction in accidents if drivers were not allowed to drive unaccompanied until age 18, there would also be substantial restriction on the mobility of this age group. There is considerable social resistance to such a change in Britain and the benefits of the trade off with mobility remains unproven.

Mandatory minimum hours of practical training

It is clear from studies in UK and Germany that different learners are capable of passing the driving test, and driving equally safely, with very differing amounts of training. To force drivers to have a fixed minimum amount of training, unless this was small, may be counter productive. At the same time there may be the concern that if minimum amounts are made small, they might be regarded as the norm, with all drivers expecting to be able to take the test after this minimum training.

An alternative approach to the situation might be to involve instructors more clearly in making an assessment of drivers' skills before they were allowed to apply for the test, as currently applied in Germany. This option could be investigated further.

Controlling exposure to modify elements during early driving which training regimes cover least effectively

In general, restrictions on early driving, such as curfews are not favoured and are seen as costly to enforce and potentially penalise mobility. One control for which there is more apparent support and more evidence to justify, is the use of a lower alcohol limit for young or novice drivers. Possible difficulties in applying such a policy would include identifying driver age/experience, and the need for police to carry two separate screening devices, but the potential of this option should be explored further.

9.4 EMPHASIS FOR DIFFERENT COUNTRIES

Most of the data for this report comes from the northern or mid-European countries. Information is much more scarce regarding the operation of the systems in southern Europe. Here, apart from in Italy, motorization is at a lower level and driver training systems may not have developed so quickly in the past. Twisk 1994 suggests some differences in her review of young driver accident problems, summarised below.

In Greece, 82% of all casualties are described as "car occupants", but this may indicate a loose definition of "car" and a low level of reporting of other casualties. Fifty-two percent of these casualties are under age 30, with 21-25 being the age group with most frequent casualties (about 20% of total).

In Portugal the accident involvement of drivers by age differs according to time of day. Thirty-seven percent of accidents to 18-24 age group happen during darkness, compared to only 30% of 25-45 age group. In contrast to most other countries, young driver involvement in single vehicle accidents does not seem to be higher than for the older age group. The proportion of female drivers killed is very low, probably reflecting low exposure of this group.

In Spain, the incidence of female driver involvement in accidents is also very low (4%). Males aged 18-24 are involved in 20% of accidents, whilst males aged 25-34 are involved in 25%.

The situation in the Republic of Ireland also differs from that in most European countries. Here youngsters in the 18-24 age group still more likely to be killed as motorcyclists than as car drivers. Car driving safety is mainly seen as a problem amongst the 20-35 year olds.

The patterns of change in general level of motorization and in the take-up of driving licences by males and females in these countries may differ therefore over the next decade from those in other European countries. Any transfer of experience from licensing and training systems in other countries should take this into account.

CHAPTER 10: CONCLUSIONS AND RECOMMENDATIONS

Many of these are based on the broader literature examined, but where possible we have sought to find further detailed information to support them through the in-depth studies.

CONCLUSIONS ON GENERAL SYSTEM FEATURES

1. Most countries suffer in a similar way and to a similar extent from an excess of accidents amongst novice drivers.

2. Current licensing and driver training systems can be characterised by the following features:

- age of access to accompanied driving
- extent of theory training and testing
- extent of practical training
- availability of practical training without professional instructor
- age of access to unaccompanied driving
- conditions for driving after practical test

3. Historically systems have developed in different ways. Some key elements differ, and would be difficult to introduce in countries where they do not already exist. Most countries have a similar overall concept of the requirements of a system, and are seeking improvements in a similar way, but the detailed nature of the elements is likely to remain different.

4. Practical training differs less than might be expected from differences in legal requirements of systems. Average number of professional training hours actually received is similar; some private practice occurs even in countries where not formally allowed.

Information is lacking in most countries on conditions under which learners practice, if and how novices are taught to recognise hazards and assess their own risk in relation to their capabilities, and how development of positive attitudes and motivation are encouraged.

5. All countries surveyed comply with, or are moving to compliance with, the EC Directive on driver testing. But the nature of this Directive is sufficiently broad that it does not provide any detailed control over the quality and quantity of the training provided prior to the test, or the effectiveness of the test process.

6. Data is described which could provide a national monitor to show trends in accident liability among

novice drivers within countries. In the majority of countries, some of these items of data are not collected routinely. Such a monitor, even if available, would not provide a fair comparison between countries because of the large number of other factors affecting national accident rates. Specially designed studies will still be needed to understand the effects of changes to systems.

7. By and large, there is no evidence that the differences in the national systems produce any major differences at the level of national casualty totals. Studies in individual countries have demonstrated small benefits from changes made within systems.

CONCLUSIONS ON THE SCOPE FOR FURTHER GENERAL LEGISLATION

8. There is little evidence to support a change to the EC Directive on testing at present, but research proposed below should be directed towards developing testing processes which can assess more convincingly the likely subsequent accident liability of drivers.

9. There seems to be little evidence to support any attempt to seek a common age of access to driving. The focus on a common testing process would provide a better guarantee that all drivers gaining access to unaccompanied driving had a similar likelihood of accident involvement.

10. There is considerable interest in schemes which aim to influence driver behaviour both before and after the practical test is passed, but there appears to be only limited support for a two-stage licence system; most countries appear to favour either additional driver assessments to help novices develop their skills further (rather than additional driving tests) or rely on probationary periods which provide severe sanctions for those adopting unsafe driving behaviour, but allow non-offenders to progress naturally to mature driving.

RECOMMENDATIONS ON AREAS WHERE GOOD PRACTICE AND FURTHER RESEARCH SHOULD BE ENCOURAGED

11. Training techniques should be improved to include more emphasis on cognitive skills (such as hazard recognition and risk assessment), drivers' assessment of their own skills, and development of responsible attitudes towards driving. Some research is already available to inform this but more is needed.

12. Research is required to determine ways of improving the value of private practice during accompanied driving, for those countries wishing to use this option.

13. Education and training of instructors will probably need to be extended to enable them to deliver the improved training techniques required, with particular emphasis on

their teaching and motivational skills, and to improve their status as professionals.

14. Ways should be sought to further improve theoretical and practical test processes in order to link assessment more closely with the aspects of novice driving which seem most closely related to accident factors, with particular emphasis on cognitive skills and attitudinal factors. As a starting point, a study should be made of the effectiveness of the present practical test.

15. The scope for, and benefits of, lower alcohol limits for young drivers should be explored further.

IDEAS FOR INITIATIVES FOR YOUNG DRIVER YEAR

16. Information packs on accidents, driver risk, and the need for training and education to target the broader cognitive and emotional factors underlying novice accident involvement. These would be targetted at police/ educationalists/ instructors. This is already proposed in some individual countries.

17. Database of experience with different training techniques. The aim is to document, qualitatively and quantitatively, what has been tried in various countries, either nationally or within groups. This would be a difficult task to achieve effectively; a protocol would need to be developed to enable this data to be stored and accessed in a usable way.

18. Encourage countries to compile on a regular basis the data needed to provide a common monitor of accident liability. This would need, in particular, data on driver licensing rates by age, and young driver accidents compiled by age and experience. This might be done, on a trial basis, for 1994 and 1995. It might also provide an indication of whether initiatives in Young Driver Year appeared to have influenced novice driver accident rates in that year.

19. Consider incentives to reduce car use by young drivers. The preparation for unaccompanied driving provides an important opportunity to influence new young drivers' future car use. Trainers can emphasise the risks involved and highlight alternative options, particularly at times and on journeys where young drivers are most at risk. Incentives could aim to delay the take-up of licensing, or lower annual car use among young drivers, and could form part of a general campaign to encourage less car use.

20. Make further use of insurance schemes to provide incentives for more structured training. Previous examples have included schemes both during accompanied driving (as with apprenticeship) and after the practical test has been passed. But such schemes will only be effective if the training provided can be shown to address skills which will lead to safer driving, and the incentive is recognised by the young drivers.

21. Encourage closer links with road safety education for 12-18 year olds on issues known to be most relevant to young driver attitudes and behaviour.

22. Prepare research projects to tackle the common needs listed in 11-15 above.

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ANNEX FULL LITERATURE REVIEW

FACTORS CONTRIBUTING TO THE HIGH ACCIDENT LIABILITY OF NOVICE DRIVERS AND THE ROLE OF DRIVER TRAINING

1.1 INTRODUCTION

Since the 1960s it has been acknowledged that young drivers in the 18-24 age group run a greater risk of being involved in an accident. The casualty figures show that in youngsters, death in traffic is the prime cause of death, of which a large proportion are car drivers. These figures call for effective countermeasures, especially in the field of driver training, as this is the prime task, to 'produce' safe drivers. However, to be able to select the most effective measures, it is necessary to know what factors contribute to this high accident risk. Information on accident risk only tells us how large the problem is. Information on driver behaviour tells us more on what drivers do, or fail to do, that might increase their chance of accident.

The nature of accidents involving novice drivers is continually debated, and no single answer has yet been found to the question of what causes the high accident figures. This chapter aims to review the literature on research into novice driver behaviour, to describe the known contributing factors, and to discuss the results with particular reference as to how driver training may contribute to greater safety of young and novice drivers.

The chapter is structured as follows. First, it is discussed how well novice drivers actually drive. Secondly, the question addresses what factors might contribute to the poor "performance" of novice drivers. Finally the role of driver training, its efficacy, inherent limitations and scope for improvement are discussed. The chapter then concludes with a discussion on how these inherent limitations can be overcome.

1.2 YOUNG/NOVICE DRIVER BEHAVIOUR

A motorist's participation in traffic can be divided into two aspects, which, in the training stage develop one after the other (Brown, 1982). These are 'vehicle control' and 'road craft'. Vehicle control implies the ability to operate the car, such as changing gears, declutching and steering. Road

craft implies the ability to respond adequately to the requirements resulting from traffic conditions. Perceptual and cognitive skills are preconditions for the latter. It is assumed that road-craft will only develop to an optimal extent if the driver is able to control the vehicle. Furthermore, excellent vehicle skills do not guarantee equally high levels of road-craft, as the high traffic accident involvement of racing drivers show (Williams & O'Neil, 1974)

Novice drivers are rather competent in handling the vehicle (De Velde Harsenhorst & Lourens (1988). However, novice drivers are devoting much of their attention to the vehicle handling routines (Mourant & Rockwell, 1971) and as a result of the limited capacity of human attention (Kahneman 1973) less attention is available for traffic situations. This shows in their insufficient visual search routines. Novice drivers primarily look at nearby hazards and their search patterns are more error prone. Expert levels of perception routines will not be reached before 3.5 to 5 yrs of driving experience (Cohen, 1985).

With regard to reaction times to sudden obstacles, novices and experienced drivers do not differ (Olson and Sivak, 1986). But, this is not a very common task in real traffic as it is the driver's prime task to adopt appropriate safety margins which would allow him to stop at all times. Young drivers in cases of blocked view, adopt smaller margins, than more experienced drivers. By driving 'too' fast, they allow themselves only a short period of time to take evasive action (Quimby and Watts, 1981).

Experienced and novice drivers did not differ with respect to safety margins adopted in car following distances. The 'two second rule' was spontaneously adhered to in both groups. (Colbourn, 1978a. Although, there is evidence that the cognitive processes involved are more demanding for novice drivers and more sensitive to errors. (Cavallo & Laurant, 1988; Cavallo 1989). Which also may account for the frequent head tail collisions of novice drivers as reported by Colbourn (1978b).

In general young drivers (especially males) drive at higher speeds (van de Velde Harsenhorst & Lourens; Forsyth, 1992b; Schlag et al, 1986). This does not necessarily mean that they 'speed', that is, violate the speed limit but that they drive too fast for prevailing conditions (Schlag et al, 1986). Contrary to common beliefs, young drivers do not drink and drive more frequently than more experienced drivers (Mathijssen, 1990; Markey, 1993)

In conclusion there are marked differences between novice/young drivers. These differences are related to visual search, speed choice, safety margins in situations with high level of uncertainty. In the next part of the chapter explanations for these differences will be discussed.

1.3 WHY DO THEY DRIVE IN THIS MANNER?

1.3.1 Psycho-biological immaturity

Human abilities (such as perception, walking, abstract reasoning) develop in the period between birth and adulthood. This development is the result of both the maturation of the nervous system and of learning processes. It is often assumed that after the 18th year, no further development of ability occurs.

Based on these findings, it seems likely that the observed differences between expert and novice drivers are not the result of differences in psycho-biological abilities.

Hale & Glendon (1987) in contrast quote findings that show that the 18 year-old has not yet reached the peak of his 'ability'. Peripheral vision, which is important for the observation of speed and movement continues to improve up to 22 years of age. (Rumar, 1985; Popivanova (1986). In addition, 'abstract reasoning' has not yet reached optimum levels at 18 years of age. This becomes apparent in inadequate, hazard perception, and poses problems in integrated 'rule-based' behaviour, required to respond to danger (coping). The ability to detect potential hazard continues to develop during the teenage period and then changes in nature. Although the number of detected hazards remains the same, a shift occurs towards more abstract risks, such as, hazards that are located further into the future and hazards for which the signs are present in a less concrete form (Sheehy et al, 1985, Martin & Heimstra, 1973). Such patterns of hazard perception have also been found in opinions among youths regarding general health risks (such as smoking) (Lewis, 1985). Lewis's research indicates that in youngsters future consequences of current actions were only to a limited degree foreseen and considered during decision making.

It can therefore be concluded that there is some evidence that cognitive skills and perceptual abilities are still developing at the age of 18 yrs in young people.

1.3.2 Limited Hazard perception skills

According to McKenna and Crick (1990), 'hazard perception' refers to the ability to detect potentially threatening events by the employment of a mental model of the road network. This mental model allows the driver to accumulate information and then run a simulation of what might happen. Furthermore, the use of the mental model enables the experienced and expert drivers to make predictions about future events in that system.

Novice drivers are poor in 'hazard perception' as was shown in the following studies. If a driver is explicitly asked to identify hazards it was found that young/novice drivers spot less hazards and concentrate on non-moving

objects (Soliday & Allen, 1972) at close range. (Brown, 1982) spotted children less often as a source of hazard (Oude Egberink, 1986).

Both experienced, and novice drivers, regard a condition as non-hazardous, if the situation is unchanging, the information input is low, and no control action is needed. However, novice drivers mention hazards more frequently when related to the infrastructure such as narrow roads, road conditions, and the presence of intersections. They concentrate less on the other traffic participants (Benda & Hoyos, 1982). Young inexperienced men regard driving at high speeds as less hazardous than more experienced drivers, whereas they considered snow covered roads to be more hazardous, than experienced drivers do (Bragg & Finn, 1982). When young males become more familiar with a route, they tend to lower their hazard estimates (Bragg & Finn, 1982). Familiarity with a route not only affects these estimates, but also the perceived level of control. Young males have lower estimates of hazard as drivers than when they are passengers. (Bragg & Finn, 1985). Furthermore young/novice drivers are less able to detect sudden changes in the task condition, which would require a lower driving speed (Wilson and Anderson; 1980).

1.3.3 Risk acceptance

Novice drivers seem to accept more risks. Different motives may underlie this risky behaviour.

a. It may be the result of weighing up of the advantages and disadvantages (risk utility). For example, youths are very much aware that DWI is associated with extra risk. They also know that the likelihood of an accident is relatively small and that they are more likely than not to arrive home unscathed. The observed disadvantage of 'not driving' after consuming alcohol is that with regard to the balance of power within the family, the younger member must admit that he has drunk too much if he arrives home without a car. This is an almost certain outcome. The parents in that case often punish the fact alcohol was consumed while failing to reward the decision not to drive (Rothe, 1987).

b. Risk-seeking refers to deliberate risk taking just for the thrill of it. Within the group of young drivers there is a sub group of drivers who are deliberate risk takers. These drivers often have personalities with a high need for sensory stimulation, which generates a search to satisfy this need. About 25-30% of young men are in this group along with 5-10% of young women. They have greater confidence in their own skills, do not think activities are so dangerous, are more often prosecuted for traffic violations and are more frequently involved in accidents (Moe and Jensen, 1993). Deliberate risk-seeking happens most often during, the night, after alcohol consumption and encouragement by friends. Women play a secondary role and are not able to stop

men from entering into risk-seeking behaviour (Farrow, 1989).

1.3.4 Self assessment

When asked to assess driving competence, most drivers would consider their own competence to be above average (Svenson, 1987). This also applies to young drivers. Young men in particular attach most value to 'courage and sensation' and 'vehicle control', while these skills contribute little to traffic safety. Furthermore they underestimate the traffic complications, (Moe, 1987; Spolander, 1983, Rolls et al. 1991; Forsyth, 1992b) and overestimate the possibility of correction in an the 'accident process' (Brown & Copeman, 1975). This in contrast to young females who tend to underestimate their skills and overestimate the complexity of the traffic situation (Spolander, 1983). Young men do not modify their opinions of themselves on the basis of accident statistics, but take their personal experiences as a guide (Matthews and Moran, 1986).

In males, differences in self-assessment are probably associated with exposure. That is, the more one drives, the more positive self-assessment one has. Females tend to drive less, when they initially have negative self-assessment. (Hattakka et al, 1992).

1.3.5 Overload

Novice drivers have to carry out new tasks, fast and without errors. After licensing the task complexity in traffic is the same for novice and experienced drivers. In these conditions, task demands may easily exceed the driving capacity of the novice and as a result sensory overload may occur, showing in the missing of significant information and thus making inappropriate responses. Overload can be prevented if the pace of the task can be set by the driver himself. In theory, by choice of speed, and position on the road, the driver can adapt the driving task to fit his capabilities, and the driving task is self-paced (Brown, 1982). This is probably what expert drivers actually do. The novice driver being inexperienced, is in a different class altogether. He has not acquired the necessary skills to anticipate future events and to perceive and encode the relevant signals. It is therefore, unlikely that a novice is able to drive in such a manner that driving is self-paced. Up to now, no study has scrutinized this in more detail and consequently no information is available on how the relevant (yet unknown) skills can be acquired by training.

It may be because of the problem of (cognitive) overload that novice drivers are not able to benefit from any improvement in driver training (Gregerson, 1994), and positive effects of training on accident involvement may only show 2 years after licensing.

1.3.6 Exposure

The risk associated with driving in different circumstances varies. For instance, driving on a motorway is far less risky

than driving on a rural road, and driving during darkness is more risky than driving during day-light. Furthermore, the more one participates in traffic, the higher the chance of accident. Consequently the high accident risk may be only partly associated with driving behaviour itself, but more likely with the circumstances under which the young drivers choose to drive, and the number of kilometres driven.

Youngsters drive relatively frequently under the more dangerous conditions, such as, during darkness, for leisure purposes (Weissbrodt, 1989; Forsyth, 1992b; Kampen, 1989), often accompanied by friends (Van Kampen, 1989; Forsyth, 1992b). In Germany young males drive on average more kilometres than more mature men (Weissbrodt, 1989).

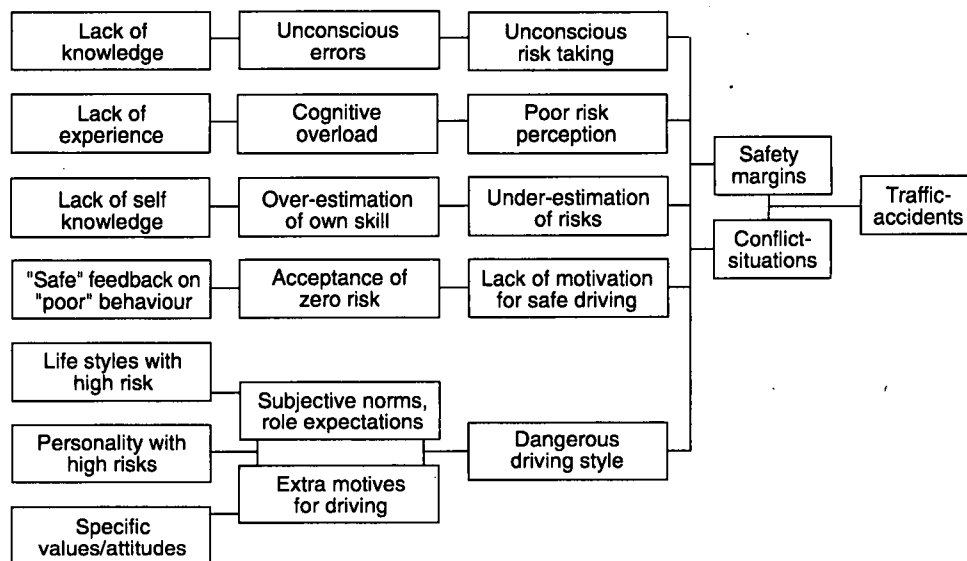
1.3.7 Extra Motives

The previous section dealt with the factors that might contribute to the differences between driving behaviour of young drivers and older more experienced drivers: young drivers have a too optimistic view about their driving ability, and expose themselves to risk by driving under the more dangerous conditions, and indicated that sub groups had a risk-seeking personality. Here the analysis may stop, and it could be argued that this might be enough upon which to base effective countermeasures. However such an approach may miss important factors, e.g., it may not be possible to change certain behaviours if the driver is strongly motivated to perpetuate that behaviour, in other words if he has strong extra motives (Summala, 1987).

a. Identity:

The young adult 'uses' driving to create an image of themselves, with the intention of supplying a particular image of himself to others. Goffman (1956). Boys, believe driving to be a natural (male) skill; they do not have to learn it, they are born with it. Driving lessons and exams are obstacles that have to be taken in style, in order to eventually be allowed to do what they were always capable of. For boys, it is important to be good 'drivers'. They believe that they should be good at controlling the vehicle, in order to give them status within the peer group (Rothe, 1987). Driving style is important for reputation and identities (Rolls et al, 1992). Other people (members of the peer group) do not actually need to be present, to motivate the driver to show the peer group valued driving style. Thus styles of driving, even when alone reflect individual identities which are to a large extent shaped by social processes (Rolls et al, 1992 pg. 78). Young men in particular consider traffic offences to be associated with little hazard, and so punishment is regarded as disproportionately severe by this group. Social pressure can most effectively be exerted by their peer group (Brown & Copeman, 1975)

Not only is driving style and identity closely related, but also, the way driving style is interpreted by others is influenced by the image that it creates. For example, driving errors made by young female drivers are most



Young driver problems (Gregerson: VTI)

frequently seen as a result of incompetence whereas errors made by male drivers are seen as a result of deliberate risk-seeking (Rothe, 1987). A further example shows that young drivers are more frequently breathalysed than older drivers (Markey, 1993, Homel, 1988). While roadside surveys show that youngsters DWI less frequently than older drivers do (e.g. Markey, 1993, Matthijsen, 1990, Homel, 1988).

b. Lifestyle

At the individual level, driving style and identity are closely related and both are shaped by peer group influences. One can take this one step further and conjecture whether at group level, particular values, preferences, attitudes and behaviours (lifestyle) are associated with good or poor traffic safety records.

Studies have shown that deviant driving styles may be concentrated in small sub groups (Jonah, 1986b), such as DWI (Elliott, 1987), and that motives for DWI differ so widely that marketing techniques should be used in order to become more acquainted with the target groups in the interest of effective education (Lastovicka et al, 1987). Furthermore, within these subgroups combinations of risky traffic behaviour occur, e.g., no use of safety belts, DWI, high speed. Jonah and Dawson (1987) call this the 'risk syndrome'.

A large scale four-year longitudinal study showed that young people who became involved in motor vehicle collisions were more likely than non-crash involved youth to engage in a variety of high risk, and health compromising behaviours such as drug use, heavy drinking and other negative health behaviours (Beirness et al, 1993). Also a relationship with petty crime was also found (Maron, et al 1986, cited in Jessor, 1987). A German study failed to demonstrate differential accident involvement, but showed

that the presence of extra driving motives was connected with particular lifestyles that differed in leisure preferences, choice of clothes and music choice (Schulze, 1990). A Swedish study managed to relate lifestyle to accident risk. It was shown that between lifestyle groups accident risk (accidents per licence holder) varied from 150% over-risk and 75% under-risk (Gregerson and Berg, 1993). This pattern may be the result of different levels of exposures between the lifestyle groups.

It may be concluded that different lifestyles are associated with different accident risks, and that prevention could aim at the underlying personality and environmental factors that predispose particular groups to risk-seeking behaviour. It also implies that preventive measures do not need to be related to traffic and participation in traffic, but may focus on an entirely different field.

c. Culture

Cars and car driving have a symbolic meaning in industrialized countries. The symbolic meaning and the attitudes related to it, are handed down within families to the next generations. The way youngsters participate in traffic drive their cars, their preferences and beliefs, are also a result of their socialization (Evans, 1987; Sheppard, 1987).

From the socialization process of children within the family it is a small step towards influences from outside the family. Evans (1987) warns against the imitation of driving behaviour shown on television. Though, Aitkin (1989) having reviewed the literature on DWI and media portrayal, concluded that the socializing influence of TV on risk-related driving behaviour of teenagers is rather modest and mixed in directionality.

Other studies point to the negative influences that sales promotion literature of cars may have, as youngsters are

especially interested in these materials (Jung & Huguenin, 1992; Pfafferot, 1984; Huguenin et al, 1985). In contrast, Hale & Glendon (1987) quote studies which show that one learns more from friends, acquaintances and neighbours recognizing hazards in the surroundings than from media messages.

In conclusion:

The contributing factors could be summarized and visualized in the way indicated in the Figure at the top of the previous page.

(Gregerson, 1994)

1.4 HOW MAY DRIVER TRAINING CONTRIBUTE TO YOUNG DRIVER SAFETY

Within the context of driver training, the question is raised as to what role driver training has to play in teaching safe driving routines and in influencing the other contributing factors. Accident data show that the more kilometres someone drives, i.e. the greater the number of years someone participates in traffic, the less often one is involved in accidents. Apparently, driver training does not suffice in creating safe-drivers. Drivers learn to drive safely as a result of practice and experience. So what can 'experience' do, that the current driver training can't do? May driver training be able to accelerate the acquisition of skills? As we saw above, accident involvement is not only related to poor driving skills (e.g. poor hazard perception) but also factors such as, life style, and self-assessment, exposures which contribute to high accident involvement. Should driver training only focus on driving performance or should it also strive to influence these contributing factors?

1.4.1 What do they need to learn

Driving is a complex task that requires fast responses to fast changing situations, in which attention should be paid to numerous aspects simultaneously. Driving is not complex in terms of vehicle control, such as steering, braking, shifting gears etc. The complexity of the task is more of a cognitive nature. It implies the ability to detect and evaluate dangers and to foresee that an apparently 'normal' traffic condition, may change in seconds into a 'dangerous' one. This is a cognitive ability which needs to be developed. Moreover its application should also be more or less automatic (De Velde). Otherwise, the task of driving may exceed the resources of human attention and awareness. As a result drivers may become exhausted after only a short while, (Shiffrin & Schneider, 1977).

Furthermore behaviour that is not automatic is prone to errors. This proneness to errors is intensified by stress factors. Stress factors negatively affect driver performance, especially the performance of inexperienced drivers. Examples of stress factors with known effects include haste, tiredness, but also alcohol in low doses.

By experience, that is practice on the task, driving becomes more or less automatic, so that attention can be devoted to other matters. The other side of the concept of automation is that it can lead to inadequate and inappropriate behavioural routines becoming 'ingrained'. Erroneous routines will easily creep in, if feedback on the quality of the performance is low. It is not only routines which have to be trained. It is even more important to teach, to which classes of traffic situations these routines apply. Or to state it more broadly, training experiences in specific traffic situations need to be generalized to other similar traffic situations (Rothengatter, 1985). The prevention of errors in these generalisations might be of more importance to traffic safety than to prevent errors in the action routines themselves.

1.4.2 The role of driver training

The above illustrates the important role of feedback with the correct acquisition of new skills. Learning through experience is the adaptation of behaviour as a result of feedback.

In the daily traffic environment, feedback will not consistently "occur" in every situation. Furthermore as a car driver, one is in a physical and social sense isolated from others. Physical isolation can lead to a driver not noticing signals from outside. Social isolation can lead to feelings of 'detachment' from the rest of the system, and this may reinforce the illusion that one is invincible (Hale and Glendon, 1987). Moreover the novice driver lacks the cognitive ability to identify and evaluate the signals that might indicate inadequate performance on his part.

This indicates that 'learning' on one's own is seriously confined due to the absence of essential feedback. It is unlikely that learners will receive appropriate feedback and this may lead to reinforcement of undesirable driving behaviour.

In contrast, in driver training, the instructor is able to provide immediate feedback and can show the pupil the correct behaviour. This teaches the correct behaviour at the initial stage of skill acquisition, before the bad habits are formed and ingrained. In this respect it is to be expected that driver training is superior to 'practice on one's own'. Furthermore, the instructor may play an important role in structuring the task of the learner, so that his task load is not so great that it makes him unable to assimilate and process the feedback. He may organize his instruction, so that skill acquisition is built up hierarchically and in modular fashion. First the basic skills must be learnt, after which more complex skills can be trained. The learning process should therefore not simply aim to having the novice imitate the expert's example. He should learn in a stepwise progress, with a set strategy per phase adapted to the level of skill acquired.

Additionally, the instructor may be an influential model (Bandura, 1977) for the transmission of 'safety related behaviour and attitudes'. The small number of studies which relate to the learning of safe behaviour demonstrate that the instructors of security devices represents the most important factor in explaining the difference between groups of students with respect to the use of security devices (Hale & Glendon, 1987). There is no known study regarding such effects relevant to the behaviour of drivers. It is recommended that we study the effects of 'model behaviour' on the behaviour of young drivers. An obvious study in this context could be the "driving behaviour" of driving instructors.

1.4.3 Efficacy of driver training: current state of affairs

Driver training courses have developed on an ad hoc basis. That is to say, no systematic studies have been carried out in order to investigate which components of the driver training course are effective, and contribute to the safety objective. From the safety objective, safe driving should be the criterion variable for efficacy (a). If it is taken that the driving-test tests for safe driving ability, then pass rates are also a criterion (b). However there are some doubts on the validity of the driving-test as a predictor of safe driving behaviour (c).

a. Accidents

In a comparison between countries which offer a different, or even no driver training course, no differences are noted with regard to accident rates (Leutzbach et al, 1988). Gregerson (1994) states that no differences are shown between systems that have mandatory driving schools, and those which don't.

A limited number of aspects of the driver training course were evaluated. Simomnet et al (1982) compared the results of an intensive training method with those of a less intensive method and found no difference in accident involvement. Lewin (1982) used 'mental imaging'. This approach required students to imagine hazardous situations after the lesson. This produced only minor positive effect on involvement in accidents. Schuster (1978) evaluated a cognitive-avoidance lesson and found a difference in accident involvement in the first year after completing the course. Veling & Buist (1984) considered the efficacy of the traffic practice area. They did not find any difference with the control group. These studies are examples of studies which should to be carried out to arrive at a functional training system.

Gregerson (1994) demonstrated that when driving school education involved instructor commentary, the integration of driving school education and private practice, plus the introduction of a series of training tasks where the learner could experience his limitations. This did have a positive effect on accidents in the second year of licensing, whereas

no difference with a control group was observed in the first year. This might be due to the learner's limited capacity to benefit from changes during the first of the two years.

Hale and Glendon (1987) point out that training or education can have a negative effect on the prevention of accidents. Raymond & Tatum (1977) demonstrated this with motorcycle riders. Similar effects were found in a Norwegian evaluation of the second phase of the Norwegian driver education. In this second phase young drivers were taught how to control a skid and how to drive in the dark. The results indicated that this group was more often involved in skid accidents on slippery roads, had more accidents in the dark, and had more accidents in general than a control group. The negative effect only applied to male drivers. 'Drivers on a dark-driving course in phase 2 however, had significantly fewer accidents in the dark than drivers without this course. This positive effect only appears in the first couple of years after the course' [...] 'The different effects of the dark driving and the slippery road surface driving course are probably due to the different aims of the courses and the way the courses were carried out'. (Glad, 1988). A recently introduced skid course in Finland (although carefully designed not to result in high self confidence) showed a negative results on attitudes and accident rates in the 18-20 age group, but a positive effect on the 21-50 year olds (Keskinen et al, 1992).

The advanced driving course in Switzerland (Siegrist and Ramseier, 1992) resulted in showing that drivers who had participated in the course did not have fewer accidents than drivers of a control group. This was the case for all age groups and also for both sexes. The authors conclude: "A possible explanation is connected with the concept of the course concerned, which puts more emphasis on driving skills than on avoiding danger".

b. Pass rates

Forsyth (1992a) studied factors which lead to better performance in a driving test. She concluded that 'those who have had some professional instruction are at a considerable advantage over those who have not. It also showed that candidates should have as much professional instruction as they feel they need'. In addition, those candidates who had practised with friend or relations had a higher pass rate and were less likely to make errors related to the use of vehicle controls.

c. The validity of driving tests

'The purpose of the performance based test is to assess the candidate's competency by requiring that he/she demonstrate a minimal operating standard. While various types of tests are in use, a test is typically intended to measure one or all of three skills judged critical to the safe operation of a motor vehicle and safe driving practices, i.e., the perceptual, cognitive, and vehicle control skills of the licence candidates' (Mayhew, and Simpson (1990). According to

Macdonald (1987) these test primarily assess the vehicle control and to a lesser extent perceptual and cognitive skills.

The literature shows conflicting findings and investigators generally concluded that the road test lacked sufficient predictive validity to support its use as a screening device to determining who will be permitted to drive.

1.5. WHERE MAY IMPROVEMENTS BE FOUND

It may be concluded that driver training has a role to play, but that the system is not developed to its full potential. In this paragraph particular elements are described that could contribute to driver training to fulfil that potential.

1.5.1 Vary Licensing age?

In most countries in Europe the licensing age is 18, with the exception of Great Britain where a learners permit is given at the age of 17. A further exception is France where accompanied driving is allowed from the age of 16. Between the states of Australia, New Zealand and the US, licensing ages vary, ranging from 15 yrs to 18 yrs. According to Drummond (1989) the initial choice of licensing age is a historical artifact. However, according to Drummond: 'It is age, that plays a central role in novice driver safety, in terms of both absolute safety outcomes and potential strategies for improving novice driver safety. Given its centrality, there have been relatively few studies which have addressed the issue directly'. There have been two levels of results, in answering the question: is there an optimal licensing age?. Some results indicate that drivers aged 16-18 do not have a worse accident record than the 18 year olds (Cameron, 1972). and those who commenced driving at the age of 16-17 had most accidents at 18 yrs, but less than the 18 yr olds who commenced driving at 18 (Pelz and Schuman, 1971). In a Canadian accident study (Laberge-Nadeau et al, 1992) demonstrated that experience does not lead to the same effects in male and females and that driving experience of 1 year or more even may have a negative effect. Young male drivers with at least one year of experience have higher accident rates than the ones with less than one year of experience. This difference however may be the result of differences in mileage rather than differences in skills and attitudes. The authors postulate that in males only after 2.5 years of driving does experience reduce the accident rates (that is accidents per thousand licence holders). A French study (Simomnet, 1985) came to similar conclusions, estimating that it is necessary to drive 3,000 kilometres before experience becomes profitable.

The above mentioned studies have used rates (accidents/kilometres or accidents/licence holder) to compute the effects of licensing age. Other authors have argued that in evaluating the effect of licensing age on accident only the absolute number of accidents are valid measures. They argue that simply because of the fact that more youngsters

will drive, licensing at 16 to 17 yrs of age will lead to higher absolute numbers of accidents (e.g. Henderson, 1972). Toomath and White (1982) taking both exposure and accident frequency into account, reported a nett benefit of a lower licensing age, on absolute accidents. However a similar accident study could not establish such a benefit (Drummond, 1986). In the latter study it was concluded that "the additional accidents resulting from allowing persons to drive below the age of 18 yrs were not offset by their lower accident rates at ages 18 to 20 yrs Also a Finish study on accident involvement, shows that older novice drivers could drive the same amount of mileage with fewer accidents than younger drivers, which was especially true for males (keskinen et al. 1992).

The reported studies are primarily from Canada, United States, New Zealand and Australia. So far, no European study has specifically addressed this question of licensing age. This may be partly due to the fact that within Europe there is less variation in licensing age, and also the licensing age of 18 yrs is rather high from a world wide perspective. Nevertheless, recent developments such as the introduction of the accompanied driving scheme in France which allows driving at the age of 16 yrs, calls for a European discussion regarding an optimum licensing age. A European discussion might be quite different in content. In Australia and New Zealand the wish to lower the driving age is the result of a need to separate the legal drinking and driving ages. Such a need is not present in Europe as in none of the European countries are laws on legal drinking ages in force.

1.5.2 Training Cognitive skills

a. Knowledge and theory

In most countries, in order to get licensed, the candidate should possess an adequate knowledge of the traffic code. It has been shown that there is a positive relationship between the knowledge drivers have about the traffic code and the violations they make against the traffic code in real traffic (Veling, 1980). However, knowledge regarding the traffic code may be a necessary requirement in order to facilitate safe behaviour, it is by no means the only criterion. Novice drivers should know and understand that safe behaviour is not guaranteed by just applying the traffic rules, and should also understand that safe behaviour may imply a temporary deviation from the formal traffic rules e.g.

- the legal speed limit is not always the safe speed limit.
- formal rules with respect to right of way are not always in line with informal rules at specific locations.

Furthermore in order for theoretical knowledge to have a positive safety effect, the information should be structured in such a way that the candidate:

- understands to which traffic situations the information is applicable;
- is able to recognize and identify those situations correctly;
- his actions are the correct consequences of the applied rule;
- he is sufficiently skilled to perform the actions (see also Noordzij, 1987).

b. Hazard perception

Mckenna and Crick (1992) argue that novice drivers have an under-developed mental model, tend not to anticipate future events, and fail to respond to those events in good time. Novice drivers acquire this mental model by experience.

However there are indications that this is not an efficient way of learning. In traffic, accidents and 'near accidents' are sources with which information about hazard can be obtained. There are indications that these hardly affect the learning process. Behaviour is not altered (Rothe, 1987) regarding traffic accidents. Novices believed they did not make a error and the other party's behaviour was unpredictable. Furthermore becoming involved in an accident without serious consequences may give the person the impression that 'it isn't so bad after all'. The same applies with respect to 'near accidents'. The fortunate outcome of a risky activity can lead to the decision that 'there's no harm in it', so that the risky behaviour is not altered.

Mckenna and Crick postulated that a training programme that concentrated on forcing the novices to develop a more sophisticated mental model by engaging them on anticipation tasks could have positive effects. They developed a training program based on the presentation of sequences of road scenes and asked novices to make predictions about what would happen next. This course was evaluated and the results showed that novice driver who had taken the hazard perception course performed better on a hazard perception test than the control group, which had undergone advanced on-the-road-training. This result indicates that hazard perception skills can be trained in class, and that in-car training is not a necessary requirement.

This study has only analyzed the differences in test performance. A similar Swiss study on the effect of 8 hrs of training on traffic sense (which included hazard perception) failed to show a positive effect on hazard perception and actual driving performance. However, there was a positive effect on 'attitude'. Those candidates who had followed the training did have a lesser tendency to over-rate their driving abilities, than candidates of a control group (Bachly-Bietry, 1990).

In Europe, no country has a standard test of cognitive skills, which are believed to be a prerequisite of safe driving. Most

often, tests are limited to the knowledge of traffic rules. Some countries, are in the process of developing a test of cognitive skills. Switzerland (Bachly-Bietry, 1991) is developing a theory test in order to assess how well the goals of traffic sense instruction have been reached, the goals are as follows:

- expansion of danger cognition
- training of the ability to perceive and process information
- the influence of attitudes relevant to safety

In Victoria (Australia) a new test was developed and introduced on 1 August, 1992. "Rather than assessing motor skills and 'intellectual' knowledge of road (low ?) and road craft, the new test aims to assess those elements of cognitive functioning which affect the driving task. This test is known as the 'Hazard Perception Test'.

This test is proposed as a mass screening test for all Victoria's drivers wishing to proceed from a Probationary to a full licence. The test would be taken most often by novice drivers between the ages of 20 and 21 after two to three years of unsupervised driving. Test items have been developed on the basis of the analysis of crashes. Test items are presented as real time moving images on computer screens. The candidate has to assess dangerous situations which are shown on film.

A differences between the different versions of hazard perception tests as described, is the way the candidate has to respond. In the Australian and Swiss tests the candidate has to detect and assess a hazard, while in the McKenna test the candidate has to react as fast as possible on detecting an hazard. So the latter is emphasizing hazard-perception latency. In a review of research on hazard-perception Elander et al (1993) concluded 'The evidence points to slower detection of hazards as one source of individual differences in crash frequency but not simply as a result of slower reactions in general' [...]. Hazard-perception latency appears to play an important role, and this may be attributable to generalized abilities to identify visual targets in a complex background and with switching attention rapidly. With regard to hazard assessment the authors conclude: 'There is no evidence to date about whether the perceived level of hazardousness of situations is associated with crash frequency. If younger drivers perceive speeding and tailgating as less risky than older drivers, they would be expected to perform those transgressions more frequently and put themselves at greater risk.'

1.5.3 Training of Self-assessment

According to Brown and Groeger (1988) hazard perception is not only affected by the identification of potential hazards in the environment, but also by the self-perceived ability of the driver to handle it. In this view 'risk percep-

tion is the detection by drivers of any shortfall in their ability to avoid realizing the potential of the immediate task and environmental hazards. Safe driving is the monitoring and elimination of this discrepancy" (pg 588).

Young/novice drivers tend to overestimate their driving skills. No information is available on how novice drivers learn to assess their ability. However, formal instruction may have an important role to play in the acquisition of accurate self-assessment skills. There is evidence that it may be feasible to influence self-assessment by training (Brown and Groeger, 1988), and that skill oriented training in comparison to training oriented towards insight into own limitations, produces overestimations of ability without a rise in actual ability. A similar result was obtained in a course in which the young drivers did experience their limitations in controlling their vehicle in certain emergencies (Wittink & Twisk 1990; Vissers, 1990).

Although one might be able to train this, up to now we did not find any studies that has investigated how 'self-assessment' can be tested.

1.5.4 Attitudes and individual needs

A neglected area within the driving course is learning activities aimed at attitudes, motivations and emotions, which all relate to the traffic participation of the young driver. To date, recommendations have been given on how to clarify this field (Varvick, 1989), but there are few concrete programmes known which attempt to realise an effective implementation. Varvick even attributes the limited efficacy to the insufficient attention devoted to this area. Veling & Van Lierde (1987; 1989) therefore argue for a cursory approach in the driver training curriculum. As for other courses, theory and practical lessons should be offered as a systematic and integrated package. Within such a formal system, the motivation of the learner driver can be guided.

It is shown that particular subgroup of drivers are more at risk than others, as a result of different skills, personalities and opinions. In driver training a differentiation should be made according to the needs of the candidates. The instructor then, should be able to differentiate between candidates and select the right training scheme for each of the candidates (Glad, Personal communication).

1.6 THE INHERENT LIMITATIONS OF DRIVER TRAINING: HOW THESE MAY BE OVERCOME

A driver training course is subject to inherent limitations. For example, a limitation in time. The skill must be acquired in a restricted number of lessons, Certainly after a limited period of lessons taken, one may assume that 'learning' as a process does not stop. The novice learns new behaviour and so modifies behaviour (De Velde, Harsenhorst

& Lourens, 1988). Particularly higher order skills, such as taking decisions, develop slowly and require much more practice. Aside from limitations in time, a limitation in circumstances is also applicable. Not all critical traffic situations present themselves during the lesson time and so are learnt in practice.

After the driving exam, learning may stop in a 'formal' sense, but informal learning continues. Some studies have addressed the question of how the novice driver responds to this period himself with respect to attitude development, skill developments, and developments in mobility.

The results show that:

- the driving style is changing considerably over time: driving speed goes up and errors in driving routines develop (De Velde Harsenhorst & Lourens, 1988,1989; Forsyth, 1992b, Rolls et al, 1991);
- Driving performance falls below test standards after qualification (Vissers, 1990; Forsyth, 1992b, Rolls et al, 1991).

As learning continuous after licensing, with novice drivers not having reached adequate performance yet, the driving task should be structured such that overload is prevented. In other words a safe learning environment should be created. In this respect there is great potential in the French Accompanied Driving Scheme in which after a formal driving instruction period, a driver is only allowed to drive if he is accompanied by an experienced driver (Chevillot, 1988; Belloc & Ivaldi (1991). Also, elements of a graduated driving licence in which a driver is allowed to drive under more complex conditions has been reported to be effective (Hagge & Marsh, 1986; Preusser et al, 1984). The complexity of the conditions is regulated by putting restrictions on the novice drivers. Novice drivers are not allowed to drink any alcohol when driving (a evaluation study did not demonstrate a positive effect Haque & Cameron, 1987), they are not allowed to carry passengers, and not allowed to drive during the weekend nights. When the driver acquires more experience, the restrictions are gradually lifted.

Furthermore, error free routines should be protected, at the post-exam stage. This may be achieved by introducing a second test after a fixed driving period or by accompanied driving in which the novice is continuously provided with feedback on his performance.

Last but not least a safety-oriented attitude should be nurtured in the novice driver, and repeat offenders should be penalized, e.g. by implementing a strict point demerit system for novice drivers (Haque, 1987; Tannahil, 1986; Meewes and Weissbrod, 1992; Scotchmer, 1984).

1.7 CONCLUSION

Driving performance of young/novice drivers falls short in many aspects, such as adequate speed choice, visual search and safety margins. These limitations may account for the high accident risk of young/novice drivers. There are many factors that are contributing to inadequate performance on the one hand and accident risk on the other hand. These factors are associated with inexperience, immaturity, age, exposure and extra motives and range from technical driving deficits to the role of youth in western society and the value of car driving.

Despite the fact that studies have failed to show its effectiveness, driver training has an important role to play, and improvements may be found in the field of the training of cognitive skills, the emotional meaning of driving and the social responsibility of youngsters.

However the scope of the problem also indicates that simple solutions will not suffice and that only improving driver training will not be sufficient. In addition to the improved driver training, in the post-exam period safe driving circumstances should be created in order to enable to young/novice drivers to gain experience in a safe manner and to stimulate a safety-oriented attitude.

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