

Changing driving beliefs, attitudes and self-reported
driving behaviour amongst young drivers through
classroom-based pre and post driving test
interventions.

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Abstract.

This pragmatic study consists of four cross-sectional and two inter-linked longitudinal studies designed to review two classroom-based interventions aimed at modifying driving related attitudes and self-reported driving behaviour. Subjects, (N=451), were divided into three groups. Subjects in Group 1 (N=176), learned to drive, passed the driving test and completed a questionnaire schedule. Group 2 subjects, (N=123), in addition to the above, attended classroom-based pre-driver training course while learning to drive. The subjects in Group 3, (N=152), after learning to drive, received a classroom-based post-driver training course within three months of passing the driving test. Questionnaires were issued as the subjects started driver training (Time 1), on passing the driving test (Time 2), three months post-test (Time 3) and nine months post-test (Time 4). The first study, Time 1, tested the predictive ability of Ajzen's (1985, 1988) Theory of Planned Behaviour with regard to the intentions of new drivers to conform to the social and legal conventions of driving and was successful in explaining 34% of the variance. Study two, Time 2, tested for increased driving knowledge and additional driving motives between groups for effects of the pre-driving test intervention. No support for this type of intervention was found. Study three, Time 3, assessed the performance of a post-test intervention informed by the Health Belief Model (Rosenstock, 1966) and Protection Motivation Theory (Rogers, 1975). Using the Drivers Skills Inventory (Lajunen and Summala, 1995), results revealed that subjects in Group 3 perceived themselves to be significantly less skilled and less safe. Study four, Time 4, was designed to test for effects of both interventions at nine-months post-test. The results revealed that only those subjects in Group 3 had better behavioural intentions with regard to speeding behaviour. Overall no support was found for pre-driver training. However, limited support was found for post-driver training in influencing self-reported driving behaviour.

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Preface.

I would like to dedicate this thesis to Sheila, Ben and William, I love you all so much. Perhaps we now have time to go that holiday, watch that match or play that game of pool.

Chapter One.

Overview, introduction and definitions of both young drivers and road accidents.

1.1. Overview.

In Chapter One of this thesis the extent of the problems associated with young drivers taking to the road and their over-representation in road accidents is reviewed. Definitions are also provided with regard to the terms 'young driver' and 'road accident'. The chapter suggests that despite a considerable body of research being undertaken into the involvement of young drivers in road traffic accidents, as far as the United Kingdom is concerned the number of casualties per annum remains almost constant.

Chapter Two examines the methods of driver training and driving licence acquisition along with the effects on driving of age, gender and experience. The chapter begins with a description of previous research. It has been suggested that in the process of acquiring driving skills new drivers pass through several stages of competence. Each of these stages, and the implication for traffic safety, are explored along with the problems associated with intervening in that process too early and the difficulties that may arise from delay. Chapter Two concludes with a discussion on the one key element of driver research, the issue of exposure. Also in the chapter a review of the specific types of road accidents in which young drivers are most commonly involved is presented.

Chapter Three examines previous research in relation to risk and risk-perception in the driving task. Linked to volitional and non-volitional risk-taking are issues surrounding the perception of hazards, unrealistic optimism and over-confidence; these are described and their relevance discussed. This chapter also introduces how the lifestyle issues of the age group under review may impact on their accident involvement along with the effects of other more general social factors. Social issues and their link to personal motives and beliefs have been identified as being important with regard to the driving task, or at least as having the potential to bring about change in young driver behaviour. To date these areas have received very little research attention but are revisited in the chapter and the major issues explored. Chapter Three also reviews the effects of previous educational efforts to reduce accidents.

In Chapter Four attention switches to the potential of social cognition models (SCMs) and their use in providing a descriptive framework and explanation for the understanding of how various cognitive components combine to predict behavioural intentions. In addition this framework also provides clues for the design of intervention strategies that can be operationalised around individual theoretical constructs. For example, the chapter describes how the attitudes, subjective norms and perceived behavioural control beliefs of young drivers were used to predict behavioural intentions with regard to conformity to traffic law.

Discussed in Chapter Five is the methodology used in the study along with a detailed description of both classroom-based interventions that were designed and used in the study.

The first results of the study are reported in Chapter Six. This cross-sectional study was designed to test the ability of the Theory of Planned Behaviour (TPB) to predict the intentions of new drivers to conform to the social and legal conventions of driving behaviour with regard to speeding, at a time when young drivers were at the very start of their driving career. The results showed that the TPB accounted for 34% of the variance of behavioural intentions with regard to speed choice and rule compliance.

The results of the second cross-sectional study are given in Chapter Seven. This study was designed to explore the driving related knowledge and self-expectancies of young drivers immediately after passing their practical driving test. Of specific interest in this cross-sectional study were any differences between groups that had resulted in the self-reports of the subjects with regard to specific driving knowledge items and driving choices that may have occurred as a consequence of the classroom-based intervention. Subjects in Group 2 had been exposed to this intervention during the period they had been learning to drive. The results of the pre-driver training intervention in relation to the measures used were equivocal with no significant differences in driving knowledge or driving choices being found between those who had attended the pre-driver training and those who had not.

Chapter Eight reports the results of the first longitudinal study. The study was designed to explore any effects of a classroom-based post driving test intervention procedure informed by the two social cognition models, the Health Belief Model (HBM) and Protection Motivation Theory (PMT). Lajunen and Summala's (1995) Driver Skills Inventory was used to measure differences between the subjects in Group 3 who had attended this intervention and the subjects in both Group 1 and Group 2 who had not. The results showed significant differences with the subjects attending the intervention reporting significantly lower levels of perceived skill and safety motives than the other two groups indicating a positive intervention effect.

In Chapter Nine the results of the second longitudinal study are reported with the subjects now at nine months post-test. Of particular interest in this study was the performance of the two classroom-based interventions that had been attended by subjects in Group 2 and Group 3. Subjects in Group 1 had acquired their driving licence without attending either intervention. Also discussed in this chapter is West and Hall's (1994) Attitudes to Driving Violations Scale (ADVS) and measures of additional motives in the driving task in conjunction with a measure of self-reported speeding behaviour that were incorporated into a predictive model of intentional speeding behaviour based upon Ajzen's (1988) Theory of Planned Behaviour. The design of this last study also allowed for a series of repeated measures analyses to be undertaken investigating changes over time. The results of this last study revealed no differences between the groups as far as driving exposure was concerned. Regression analysis of the constructs of the TPB model showed that 43% of the total variance could be accounted for with regard to self-reports

of actual speeding behaviour. Separate repeated measures analysis for the ADVS and additional motives indicated that both these factors significantly increased as a function of time indicating a worsening of attitude and self-reported driving behaviour for all three groups. The implications of these findings are discussed. There were no intervention effects evident for those subjects who attended the classroom-based pre-driving test education. However, subjects in the post-test intervention group reported significantly better behavioural intentions with regard to speeding behaviour indicating some effect for the classroom-based post-driving test intervention. The relationship between the four studies and the implications for road safety are explored in Chapter Ten along with the study's conclusions and recommendations.

1.2. Introduction.

On the 29th January 1886, the Imperial Patent Office in Berlin issued Patent number 37435 to Mannheim factory worker Karl Benz. The patent was for his 'vehicle with gasengine drive'. In the same year, in Cannstatt, Germany, not far from Mannheim, Gottlieb Daimler was conducting trials with a 'motor carriage'. Both men, who had been working independently, laid the foundation of the modern transportation age at this time, and set the people of the world in motion (Daimler-Benz AG, 1987).

In 1901 Carl Benz thought that the global market for the automobile was limited because 'There were going to be no more than one million people capable of being trained as chauffeurs' (cited in Mackay, 1990). The next hundred years was to prove Benz very

wrong. His invention, that has fuelled the industrialisation of nations, created wealth, employment and provided freedom of travel for the peoples of the world has also brought untold misery, suffering and death to an incalculable number of others.

There are many ways in which road accidents statistics can be, and have been, presented to create an impact and describe the extent of the problem of road deaths and injury through the use of the car. For example, in just an eleven-year period between 1977 and 1988 the total number of traffic deaths on American roads exceeded the total number of all the U.S. battle deaths in all wars from the American revolutionary war through to the Vietnam war, and moreover, the injuries resulting from road accidents during this period outnumbered the deaths by about a factor of 70 (Meadows, 1994).

Of course road accidents are not just an American problem; they are a global problem. A review of Canadian accident statistics in 1983 revealed that road accidents were the single most common cause of premature death among young people between the ages of 16 and 24 years with over 58% of total accident fatalities coming from this section of the driving population (Statistics Canada, 1983). Similar research in America about this time revealed much the same picture (Sleet, 1984).

Almost half of those people who obtain a full driving licence in the United Kingdom begin learning to drive at the age of 17 and many of these drivers are likely to be involved in an accident within the first two or three years. Over 1000 people each year are killed in United Kingdom in accidents where one driver is between 17 and 21 years

of age. The drivers in this age group represent only 10% of the licence holders and have a lower than average mileage, yet they are involved in over 20% of the accidents. In addition statistics reveal that road accidents are now the most common cause of death amongst young people in the United Kingdom, accounting for 76% of those aged between 16 and 19 years (New Driver Safety, 1993).

Research shows that the accident liability on new drivers reduces by 30% during the first year of driving but at this time it is not clear what aspects of the experience gained brings about this change (Maycock, Lockwood and Lester, 1991). While it is clear that young drivers are at particular risk of being involved in a road accident the question still exists today; can the driving of new or young drivers be modified to reduce this unacceptable accident toll?

It was proposed by Greenwood and Woods (1919) that some drivers may be more accident prone than others. This proposition has sparked nearly eighty years of debate regarding the concept of accident proneness as a human trait and whether or not some drivers may be simply more likely to be involved in a road traffic accident than others. A now infamous quote, from (Tillman and Hobbs, 1949), suggests that 'a man drives as he lives' was intended, by them, to illustrate that accident involvement or 'accident proneness' generalises across many different behavioural activities. McKenna (1983), constructively argues that accident proneness is a statistical artefact based on mis-placed assumptions that has lead to inconsistencies in definition and meaning. McKenna goes on to suggest that a more meaningful term to describe differing individual accident rates

may be 'differential accident involvement'. Whatever the final outcome of the debate on the concept of accident proneness, and central to the research presented in this study, is that for one reason or another some young drivers will be involved in road traffic accidents and some will not.

According to the findings of Broughton (1988), out of a group of 1000 male drivers who start to drive at 17 and have not died from other causes by the age of 70, an average of 3.3 will have been killed while driving a car and 37 will have been seriously injured. Out of the same total about 132 will have been slightly injured and 9 of these will have been injured in at least two accidents, In addition Broughton argues that the percentage chance of a male between the ages 17 and 70 years becoming involved an road accident of any kind is now as high as 1 in 3.

The over-involvement of young drivers, especially males, is one of the most consistently observed phenomena in traffic research throughout the world (Evans, 1991). However much of the research so far has been disappointing in that no solution has been found to reverse this continuing trend. A comparison of accident figures in the United Kingdom from Road Accidents Great Britain (1997), The Casualty Report, indicates that there has been negligible decline (1.6%) in casualties, for males only in the 17-21 age group, between an average taken from the 1981-1985 figures and statistics presented in 1997.

In support of the position of Evans above, Lynam and Twisk (1995), after a review of car driver training and licensing systems in Europe, also argue that although the nature of

accidents involving novice drivers is continually debated no single answer has yet been found to the question of what causes the high accident figures.

1.3. The young driver – a definition.

A major problem is that methodological differences between previous studies have hampered the clear understanding of problems associated with new drivers taking to the road. For example there are wide variations in the definition of 'young driver'. Young drivers have been variously described as belonging to age groups that generally range between 16 years (some American states allow licensing at this age) and 25 years. This wide variation in age range is a methodological difficulty when comparing past studies. This diversity has resulted from the different research perspectives of the many different agencies that have been involved in this area of research such as the reviews of drinking and driving behaviour (Carlson, 1972; Smith, Wolynetz and Wiggins, 1976) or the accident involvement of high school students (Robertson, 1980). However, at present no succinct definition of term 'young driver' exists. The term 'new driver' is also used which disregards the factor of chronological age and describes driving experience in terms of time since passing the driving test. This has been a further confounding variable in comparing the findings of some previous studies. A further term used in the research area is that of 'novice driver'. Lynam and Twisk (1995), used this term to define such a driver as follows: 'drivers who have recently passed the test to drive and are still acquiring experience likely to improve their driving ability; the period when the 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’.

The subjects involved in the present series of studies will be variously described as young, new and novice drivers. Young because they are all between 17 and 21 years of age, this is in line with the first age band used by the Department of the Environment Transport and The Regions for the United Kingdom for road accident statistics (Road Accidents Great Britain, 1998); new, as the subjects in the study were recruited with less than two hours of professional instruction; and novice, as their progress was monitored until a point 9 months post practical driving test. An apparent benefit of following the subjects over this period of time (the time period learning to drive obviously varies between subjects) is that the data produced by the study are likely to be free of the issues resulting from the confounding of age and experience (a full description of this important issue is given in Chapter Two). This avoids the controversy arising from the issue of studying particular age bands in particular as Cameron (1982) notes, in terms of driving experience, drinking experience, and various other social, psychological and behavioural factors, persons aged 16 or 17 are very different from those age 21 or 24.

1.4. United Kingdom driving licence requirements.

To obtain a driving licence to drive a motor vehicle unsupervised on a road in the United Kingdom requires that two forms of test have to be passed, a theory test and a practical driving test. The Department of the Environment, Transport and the Regions (DETR)

administers both tests in the United Kingdom. The Theory Test for Car Drivers and Motorcyclists was introduced in July 1996 and is designed to improve the safety of newly qualified riders and drivers by making them think more carefully about the right attitudes needed to drive safely. Areas of assessment included in the theory test are. (1) driver attitudes, (2) traffic signs and regulations, (3) the effects of alcohol, drugs and fatigue on driver behaviour, and (4) safety and environmental aspects of vehicles. To pass the theory test examination a pass mark of 30 is required out of a possible score of 35. All theory test questions are in multiple-choice format. The theory test costs £15.50p.

The DETR practical driving test, which costs between £36.75p and £46.00p depending on the time taken lasts for approximately 70 minutes and includes a test of driving on a wide variety of roads including where possible dual carriageways. Drivers undertaking the test are assessed by driving examiners who award either a pass or a fail on the basis of the type and severity of any errors made by the candidate. A total of 46 types of error are classified into three groups; minor, serious or dangerous (Forsyth, 1992). A candidate fails the test if he or she commits one or more serious or dangerous errors. (Throughout the present study the terms 'theory test' and 'driving test' will be used).

1.5. Road accidents – a definition.

Road accidents occur at all levels of severity. Road accidents can involve multiple vehicles, occur between two vehicles or can involve one vehicle that has collided with something or someone else. The legal definition of a road traffic accident in the United

Kingdom is both complex and broad but could be summarised as 'Owing to the presence of a mechanically propelled vehicle on a road, an accident occurs' (Section 170, of the Road Traffic Act, 1988: Part VII). This all-encompassing legal definition is unlikely to be applicable globally. A road accident that is reportable in the United Kingdom is conditional on several factors. Where injury occurs to someone other than the driver of the vehicle or damage is caused to the property of a third party the accident is not necessarily reportable to the authorities if details of the driver and his or her insurance details are made available to those injured or those who have had property damaged. Notwithstanding the foregoing the road accident can be reported to the police if the question of reckless, careless or inconsiderate driving is apparent. However, many collisions that occur are so slight and involve little or no injury or damage that they go unreported to the police or insurance companies. As a result the accident statistics reported by official agencies are likely to be substantially lower, at least in regard to minor accidents, than the actual numbers of accidents that are occurring. For research purposes, however, Parker, Reason, Manstead and Stradling (1995), give a good definition of a road as 'any accident that involved injury to another person or yourself, damage to property, damage to another vehicle, or damage to the vehicles that you were driving'. This definition is useful in conceptualising the minimum severity level of the vast numbers of accidents that are reported in official statistics. In contrast to this the terms 'fatalities' and 'fatal road traffic accident' are self-explanatory.

It is clear that young drivers represent a group that is overly represented in road traffic accidents. From their European review, Lynam and Twisk (1995) suggest that the

problem of young driver accidents is a complex mix of the following areas of concern: (1) exposure and experience; (2) the type and state of the vehicle; (3) the use of alcohol and/or drugs and driving; (4) the personality of the driver; (5) the type of training, the level of driving skill and the type of driving in which the young drivers engage; and (6) the features of accidents involving young drivers and methods of data collection and analysis. For the present study, however issues surrounding the type and state of the vehicle, the personality of the driver and the use of alcohol and drugs, while acknowledged, were not explored.

Chapter Two.

Learning to drive and the acquisition of driving skills.

2.1. Introduction.

Welford (1968) suggests that learning occurs through the repetition of behavioural sequences. With regard to driving behaviour, Duncan, Williams and Brown, (1991) suggest that expertise develops through increasingly content-specific learning, leading experts to have a considerable reliance on schemata. Duncan et al., suggest that the driving task involves a large set of interrelated skills including information acquisition (especially visual scanning), perceptual motor co-ordination, anticipatory skills and risk assessment skills in traffic situations.

From a more practical perspective (Naatanen and Summala, 1976) suggest that the acquisition of car control skills is a result of feedback from the inputs to the vehicle controls. The term 'feedback' relates to any information that indicates to the learner a relationship between actions taken and overall goals including progress through traffic or safety. Naatanen and Summala also argue that 'Every decision made, every action taken, every traffic situation one is exposed to provides some feedback to the driver'. Therefore the actions necessary for the control of a vehicle in response to differing traffic situations may be expected to be acquired through any type of in vehicle practice. In addition, for a new driver, a secondary form of feedback may be gained through responses given to

particular driving situations through the verbal guidance of an accompanying, more experienced, driver or professional driving instructor. This is important as, according to Duncan et al. (1991), the driving task is a matter of balancing several disparate goals. Newell (1985) also argues this position suggesting that learning can be greatly enhanced by direct instruction and practical demonstration with a skilled operator showing the novice the sequence of actions to be performed in order to carry out a manoeuvre correctly.

Findings from a very small British study by Groeger and Brady (1999) (n=46), showed that the errors pupils make while learning to drive reduce steadily as they gain actual experience in driving. Further analysis of their results also revealed that this gaining of experience can be viewed as a 'power function', i.e. a negatively accelerating curve, showing a slowing of skill acquisition as practice increases. The Groeger and Brady study, in contrast to the findings above, also suggests that practice with non-professional instructors, such as family and friends, appears to be a more important determinant of successful driving licence acquisition than professional training per se. However Groeger and Brady add the caveat that that both professional instruction and private practice appear to be essential in successfully meeting the test standard. As a result of his research Gregersen (1993), also supports this position.

Many researchers suggest that learning to drive occurs in stages or phases. Fitts and Posner (1967) (in Evans 1991), for example, suggest that driving skill acquisition occurs over three phases:

1. Early, or cognitive phase.
2. Intermediate, or associative phase.
3. Final, or autonomous phase.

According to Fitts and Posner (1967), while learning to drive in the early or cognitive phase, the novice driver has to understand the component parts of the driving task, the location of the vehicle controls and the resultant vehicle responses. The intermediate phase involves the exploration of different strategies available while driving with the learner attending to immediate feedback. During this stage the learner devotes full attention to the task and skill increases, they suggest, by the novice responding to the feedback from the consequences of inputs or from direction from the instructor. The skills learned at this stage include knowing what action is required in a specific traffic situation and this is combined with the skill of knowing what input produces the required output. For Fitts and Posner, the third and last stage in driving skill acquisition is the autonomous stage, where the driving task is completed at a high cognitive level with minimal driving effort. In this autonomous phase the task is accomplished using a small fraction of the driver's attention. In this stage, there is cognitive capacity spare for other tasks. In the autonomous stage the amount of processing assigned to the driving task is still sufficient to monitor any potentially threatening incidents. Fitts and Posner (1967) argue further that, should an incident occur after this phase has been reached, all attention can be quickly switched back to the driving task to allow avoiding action to be taken. Summala (1985) also argues that when a high level of 'automatization' in driving

skills is achieved the driver begins to experience feelings of being in full control and at this point over-confidence may occur. It must be noted that the above description mainly relates to issues of actual car control and road positioning in the first two stages of learning to drive. However, it is not until a good measure of automatization is accomplished that the novice driver has the spare cognitive capacity to focus on other more strategic driving skills (McKnight, 1985).

The understanding of the phases of skill acquisition is important in one key respect. It appears that novice drivers pass through the various stages according to how well they can handle the large number of simultaneous tasks involved in driving (Gregersen and Bjurulf, 1996). It is likely that the driving test will occur for most of the novice drivers during the phase, as described by Fitts and Posner (1967), as the second stage. McKnight (1985) suggests that this may be problematical in that the driver's level of skill at this point may not be sufficiently developed to allow for driving to be undertaken in any kind of strategic manner, as too much cognitive processing is still being deployed in carrying out basic vehicle handling tasks. This may mean that much of the strategic information provided to the driver by the way of traffic related education or safety information may be lost. In addition, as will be seen in the following paragraphs, when driving reaches the third or autonomous phase it has been suggested that the now automatic driving response or behaviours become almost impossible to change.

Lewin (1982), in an analysis of driver behaviour from a cognitive psychological perspective, again describes learning to drive as also having three distinct stages. Lewin

argues however that the first stage is the cognitive stage, which involves the 'intellectualisation' of the driving task and its associated rules. The second stage 'the associative stage', is where the correct patterns of the driver's motor actions are refined and co-ordinated. In this stage the errors in initial understanding are eliminated by experience and practice. For Lewin the third stage, or 'autonomous' stage, is where the acquired skills become increasingly automatic and rapid, errors are now at a minimum and a resistance is formed to interference from other activities that are being performed concurrently. This is broadly in agreement with the position of other researchers (Fitts and Posner, 1967; Summala, 1985; and Gregersen and Bjurulf, 1996).

This differentiation between two levels of functioning, suggested by Lewin as concurrent tasks, is labelled by Brehmer (1994) as the 'automated' level and the 'deliberate' level. The automated level, Brehmer suggests, 'is distinguished by rapid, effortless, non-conscious information processing where there is little or no analysis of input'. The driver reacts to information as signals at this level, and Brehmer argues that there is no direct problem solving. The behaviour is habitual, as described by Rasmussen (1984), and is the result of a long learning period. At the deliberate level, on the other hand, information processing is conscious, slow and effortful. Information is interpreted and this interpretation determines subsequent behaviour. In support of this view Lewin (1982), also adds that once a behavioural unit reaches the autonomous stage it becomes almost invulnerable to cognitive influences such as changes in knowledge, beliefs or attitudes, especially when it is a well-connected link in a complex perceptual-motor chain. In addition, Lewin argues that perhaps the only way to change autonomous

behavioural units may be to arouse the awareness and attention of the individual just prior to their execution of those specific behavioural units. Lewin argues further that in order to bring about change in behaviour this procedure has to be consistently repeated in order to offset the incorrect autonomous behavioural unit. From a road safety perspective this may be a difficulty as it is difficult to see how this may be done. However, as important to the driving task as automated cognitive functions may be, they are not the whole issue.

It appears from the foregoing research that broad agreement has been reached in usefully identifying the stages of learning to drive. In the early stage novice drivers have difficulty in bringing together all the required components of the driving task. As experience increases elements of the driving task appear to become automated and impervious to change. A gap therefore seems to exist in the literature. In order to maximise the potential to shape or bring about change in inappropriate driving behaviours it becomes apparent that interventions may have the greatest potential for success, if they were deployed after the novice has achieved mastery over the control of the vehicle but before that mastery becomes so deeply embedded as an inappropriate and automated cognitive process. While the previous studies have been successful in reaching common agreement over the identification of stages of learning to drive, a failing is evident in that if an optimum period of time exists, where drivers may be most receptive to strategic and safety oriented driving information, this has yet to be identified.

2.2. Driver training, methods of learning to drive and the driving test.

The most comprehensive research into new drivers in the United Kingdom was conducted by Forsyth (1992). The study objectively gathered detailed information regarding the relationship between the methods used by young drivers while learning in order to identify any aspects of the learning experience that could be identified as either good or bad practice. Also under review was performance in the driving test, attitudes, subsequent accident rates and the development of skill after passing the driving test. The study was based on data drawn from subjects who sat their driving test, nationally, on four specific dates in 1988 and 1989 (n=29,500).

After her review Forsyth suggests that the best method for learning to drive appears to be a combination of both professional training and private practice with family and friends. Swedish research by Gregersen (1994) (n=2000, all subjects aged 17 years) gives this assertion cross-cultural support.

At a more fundamental level of analysis Forsyth's (1992) study of driving licence acquisition reports a differential pass rate for candidates in the driving test by gender with males about 10 percentage points above females. It is also interesting to note from the Forsyth study that the pass rate actually decreases with age indicating that the younger candidates find it easier to acquire the skills to pass the driving test.

Forsyth (1992) included in her study a learning to drive questionnaire that incorporated amongst other variables, previous driving test attempts, amount and frequency of professional instruction and the amount and frequency of private practice. The importance of this study is that it gives a baseline of information that is useful for comparison purposes. The study also gives comprehensive details of both minor and major errors that led to candidates failing the driving test. The figures revealed that of all young drivers in the age range of 17–19 years, 41% of all males and 47% of all females failed the driving test on these dates. A review of the reasons why drivers were failing revealed surprisingly that candidates were making a variety of fundamentally simple observational, procedural or vehicle control errors. The results from the study also suggest that large numbers of learner drivers are attending for their practical driving test at a time when they do not yet have complete mastery and control of the vehicle. In a follow-up study, Forsyth (1992b) (n=2700) reported that many new drivers did not feel adequately prepared for driving on the road immediately after they had passed their driving test. Moreover, despite this feeling, hardly any of the respondents had made use of any further training. These findings are of significance as they may also reveal that the driving task has not yet become the highly automated process as previously has been described and that at this stage, immediately post-test, driver behaviour may still be amenable to change and influence.

With regard to the driving test Brown, Groeger and Biehl (1987) suggest that driver training, in general, has three aims; (1) to provide drivers with a set of perceptual-motor tools to enable them to control a vehicle; (2) To provide new drivers with an

understanding of driving rules based on traffic laws and conventional driving patterns of road user behaviour to allow them to interact safely with other traffic; and (3) to provide them with knowledge to interact safely with other traffic system components. Brown et al., also suggest, however, that, due to the very limited period that drivers spend under instruction, it is unclear whether or not these aims are equally met. They also concluded that the driver training offered to learners in the United Kingdom may not be providing novice drivers with adequate instruction in the perception of traffic hazards or an adequate perception of the limits of their own driving skill. Furthermore Brown et al., argue that too little of the current content of driver training courses is seen by learner drivers as being important to their driving careers. Moreover, they posit that more relevant training programmes may be required and cite the fact that many aspects of learner driver training involves low speed urban driving which necessarily needs close supervision, which is unlike driving in general. They also point out that most driving lessons are usually carried out during daylight and in good weather conditions. Brown and colleagues (1987) also propose that the practical purpose of the driving test is to establish whether or not learner drivers may be allowed to drive unsupervised in order to acquire both knowledge and experience of traffic conditions and their own driving abilities at their own pace thereafter.

The driving test is in essence a test of skill that younger male drivers appear to find easiest. Research suggests (Forsyth, 1992; and Groeger and Brown, 1989) that young males in particular, may pass this test before acquiring the higher-order judgmental skills that are seen by some to be the most important. It would appear at face value that an

increase in professional driving instruction would provide for an immediate gain in learner driver quality. Professional driving instruction is not a mandatory element or requirement for learner drivers in the United Kingdom, but it is in other European countries including Germany. Germany also places an additional obligation on the learner driver to acquire a predetermined number of hours driving on the motorway and driving during the hours of darkness. These clear differences in learning practices gave Tight, Hakkert and Allsop (1986), an opportunity to make cross-cultural comparisons between records of British and German young driver casualties in the age range of 18-20 years with regard to any differences that may have resulted from training procedures. Surprisingly they found that the German casualties were almost 2.3 times higher than comparable British casualties. It may be safe to conclude, specific methodological shortcomings aside, from this finding that an increase in professional training does not necessarily mean a reduction in casualties.

With regard to the effectiveness of driver training, Lynam and Twisk (1995) conducted a comprehensive review of earlier studies. They concluded that it is very difficult to provide clear evidence of its benefits. While many of the studies reviewed suffered from methodological weaknesses they found difficulty in establishing or describing clearly how driver training had been conducted and how it had directly impacted and affected subsequent driving performance. Lynam and Twisk also concluded from their review that driver training may not yet be developed to its full potential.

The effects of British professional driving instruction were also reviewed in a study by Maycock and Forsyth (1997) (n=29,500). Their findings revealed that, as far as male drivers only were concerned, those drivers who took longer or drove more mileage while learning to drive subsequently had fewer accidents. This study also reported a significant relationship between learning to drive and professional instruction, in that the more professional instruction received the higher the subsequent accident liability. Maycock and Forsyth argue, however, that this situation may be mediated by the fact that the less competent a learner driver actually is the more professional instruction may be required. This appears to argue a selective case for professional driving instruction.

From the results of a similar British study Groeger and Brady (1999) (n=46) argue, with regard to the prediction of a pupil's ability to pass the practical driving test, that neither the learning rate nor initial skill level themselves predicted first time test results. Where pupils were similar in terms of age and background, those who passed and those who failed their first driving test had similar amounts of professional instruction, driving with a parent-teacher, and experience of driving with non-teachers. That is, it would seem that professional instruction per se does not increase a pupil's likelihood of passing the first driving test.

In contrast to the foregoing, Gregersen (1995) argues that driver training has to be one of the most important measures available to reduce accident involvement amongst young drivers. Gregersen argues further that in nearly all countries traditional driver training has focused upon vehicle control skills and knowledge of traffic signs and rules.

Gregersen suggests further however that in order to concentrate more on safety, higher order skills should be taught, including describing to drivers the factors and processes that contribute the most to accident involvement.

Previous research in the same area of interest shows that novices actually drive relatively badly. British research by Quenault and Parker (1973) (n=200) compared age-matched groups, who had between 1 and 52 weeks of post-test experience. They found that car control (judged by the experimenter) improved with experience and compared to a selection of older more experienced drivers the novice drivers showed more lapses, errors and near accidents.

2.3. Methodological difficulties in controlling for the key element of exposure.

The term 'exposure' in research into driver behaviour is basically another term for the word 'driving'. Exposure is often used to describe driving at a specific time or set of circumstances where the driver is exposed to the risk of accident involvement. According to Jonah (1986), the further one drives the greater are one's chances of becoming involved in an accident. Carroll, Carlson, McDole and Smith (1971) defined exposure as 'the frequency of traffic events which create a risk of accident'. Exposure is determined by the amount of driving undertaken, or the mileage covered and by the type of roads used, or the time of the day, or day of the week, etc. In previous studies of young driver behaviour and accident involvement, exposure has been focused on as an important explanatory variable. In the analysis of crash statistics, in particular, the terms

'exposure', 'indirect exposure' and 'direct exposure' have become key words as comparisons are drawn between age ranges or other variables that identify drivers in groups to describe the accident liability of one section of the driving population with respect to another. Researchers have calculated measures of exposure for groups of drivers and their relative risk of becoming accident involved by dividing the estimated distance driven by the number of accidents that occurred. However, rates per mile or kilometre do not provide an ideal basis for comparison, as drivers with high annual mileages tend to drive relatively little in urban conditions where accident rates are especially high. Broughton (1988) suggests, for example, that the lower annual mileage of female drivers, driven on urban roads, accounts for many of the casualty differences by sex. Trankle, Gelau and Metker (1990) argue, however, that practically there is no uncontroversial way to adjust data for differences in amounts of driving as a control for exposure. In addition, with specific regard to young drivers; where the effects of age, driving experience and exposure appear to be inter-linked, Jonah (1985) points out that, even after adjustments are made for miles driven, young drivers still remain at a statistical high risk of accident involvement.

It is not always the total mileage driven that has been the focus of review with regard to exposure; Hodgdon, Bragg and Finn (1981), Bragg and Finn (1985), Williams (1985), Karpf and Williams (1983), Robertson (1981), and Williams and Karpf (1983) have all reported important associations between night-time driving and accident risk amongst young drivers. This could be said to add a further dimension to the issue of exposure (or perhaps even confound the issue totally); that is, it may not be the total amount of

mileage driven, but the type of driving undertaken by time of day or driving in adverse conditions. Reviewing accident statistics by this method has helped in identifying potential safety benefits; for example, a study by Williams (1985) investigated the differences in the casualty rate for drivers in selected states in America that had curfew laws with regard to night-time driving and other states that did not. The results showed that, while younger drivers drove considerably less than older drivers (therefore had less exposure in terms of mileage and time), they had a much higher percentage of driving time at night. Sixteen-year-old male drivers were found to have a higher rate of fatal crash involvement per miles driven than did older drivers but, in addition, their night-time accident rate was four times higher than the rate during the day. Williams correctly concluded from his study that night-time curfews had the potential to save lives.

In relation to exposure and age, Karpf and Williams (1983), after reviewing American data, point out that when it is considered that drivers in the lower age ranges have fewer licences per capita than older drivers (50% for 17 year olds, 70% for 18 year olds, which eventually rises to nearly 90% by the age 21 years), and it is often sometime after their birthday before a licence is acquired, a further issue with regard to the confounding of exposure arises in that this pattern of licence acquisition restricts the amount of potential mileage that could be driven by drivers of 17 years of age as a group. Moreover Karpf and Williams (1983) suggest that by simply reviewing the rates of accident per 100,000 of population per age group, for example, may simply be a way of underestimating the size of the problem. In agreement with this position, Lynam and Twisk (1995) argue that the main problem in controlling for exposure is to account for all the factors that relate to

both the type and nature of a driver's exposure. This is a methodological procedure that has yet to be mastered.

2.4. Accident liability in relation to age, gender, accident types and experience.

Forsyth, Maycock and Sexton (1995) argue that the accident liability of a group of drivers who commence driving at the age of 17 years will be different for those who start driving at 18 or older. They argue that this is not only because of age but that, as a group, they are a fundamentally different set of people with different backgrounds, attitudes and motivations. While accident liability is known to reduce in the first year, Forsyth et al. argue that the year 1 age effect model predicts, for example, that those drivers who start driving at 18 years will have 9% fewer road accidents than those who start driving at 17 due to the effect of age alone.

Pelz and Schuman (1971) suggest from their American findings, that traffic violations peak as an apparent function of age found between the ages of 18 and 19 years. They also found that this increase coincided with a similar peak of accident involvement. In addition, British research by Brown and Copeman (1975) (n=224), which used two gender balanced sub-groups in the age ranges of 18-25 years and 35-55 years, suggests, that young drivers perceive road traffic offences less seriously than do older drivers. They also found that young male drivers rate offences as less serious than do younger females. However, in most studies into young driver behaviour, age and experience

appear to be confounded. Jonah (1986) concludes 'rarely do we find a 16 year old driver with 5 years experience nor a 60 year old with only one years experience'.

The age effects for single vehicle accidents with no injured pedestrians are also markedly different. This is a very common type of accident for young drivers, indeed, more male drivers aged between 17–20 years were injured in this type of accident than any other. The frequency of these accidents falls rapidly with age, until it is the least common type for drivers over 35 years. Moreover, the male casualty rates for this type of accident are almost three times the female rate, yet male and female rates are similar for other accident types.

One advantage youthfulness may bring to the driving task is that of simple speed of reactions. However, Goldstein (1961, in West, Elander and French 1992), argues there is no evidence in the literature as yet, that links faster reaction times to any reduction in the accident frequency of young drivers and, that appears still to be the case today. Broughton (1988) found that the rate at which car drivers are involved in accidents varies with age, as does the rate at which they are injured. Rates fall with age among younger drivers and it has been shown that the accident-involvement and casualty rates per driver in 1985, among the youngest males (17 – 20 year old), were 2.4 and 3.2 times greater than the average rates for male drivers. Among young female drivers, the rates were 2.0 and 2.4 times greater than the average female rates.

Cooper, Pinili and Chen (1995) (n=149,000) in a Canadian study, again showed that those drivers aged 16-18 had significantly different accident experience from those aged 19-21, and the young generally appear to display group accident characteristics different from those of older drivers. In their study, the exposure characteristics of high-risk groups were found to be different in quality and significantly higher in quantity from those of low risk groups. As a group, the 16 year olds had significantly less driving exposure than those 18 years or older. However, Cooper et al. point out that a limitation facing many studies is the attempt to link risk with the class of driver using only evidence of aggregate statistics.

Forsyth, Maycock and Sexton (1995) concluded, after a longitudinal study in Britain, which recorded the experiences of 7000 novice drivers over a three-year period, that the experience gained in the first few years of driving is crucial in determining accident liability. Maycock, Lockwood and Lester (1991) suggest that, for young drivers, accident liability can reduce by between 35% and 40% due to the experience gained in the first year of driving alone. Broughton (1988) argues further that the decline in casualty rates up to the age of about 40 is likely to be the result of; (1) increasing experience, leading to greater competence; (2) increasing maturity, leading to a more considered attitude to risk-taking.

When making comparisons of young drivers and older drivers the failure to control for years of driving exposure is an inherent problem (Jonah, 1986). To gain experience, novice drivers must spend more time driving but in doing so the chances of becoming

involved in an accident increase. Warren and Simpson (1976 in Jonah, 1986) referred to this dilemma as the 'young driver paradox'. It appears, however, that it is not age itself that is the problem in the driving task but more the effects of the behaviours associated with youthfulness.

2.5. Gender differences and driving.

The British study by Forsyth (1992) (n=29,500) indicated that, despite the overall differences in the proportions of male and female candidates failing the driving test due to certain error types, where the methods used to learn to drive and where the same personal characteristics were evident, the pass rates for males and females were found to be very similar. Forsyth argues that the difference in pass rates may be due more to the different methods of learning to drive or different levels of experience. These findings imply that the resultant difference in post-test accident involvement may be a function of just being male. In a later study that modelled the effects of gender, Forsyth et al. (1995) assert that once the differences in exposure have been controlled for, women still have an accident liability which is about 12.5% lower than that of men. The suggestion from these two studies, at least, is that gender effects may manifest themselves as a function of time after the practical driving test has been passed. In addition, Storie (1977 in Broughton, 1988) identified various differences between male and female drivers with regard to the factors that contribute towards road accidents. It was argued, for example, that females were more prone to distraction and were more likely to make errors with

regard to driving skill, while male drivers tended to drive too fast and overtake improperly.

With regard to exposure, a British study Maycock, Lockwood and Lester (1991) (n=18,500) found that, as annual mileage increases, the proportion of miles travelled on motorways increases while the proportion of miles on urban roads is reduced. The fact that women drive less than men is likely to mean that women drive more on urban roads than men. However, evidence presented in the National Travel Survey (1991/1993, reported in McKenna, Waylen and Burkes, 1998) suggests that the differences that previously existed between the mileage of male drivers and female drivers are being steadily eroded.

The research by McKenna et al. (1998) also reports that, in 1972, the ratio of men to women who obtained driving licences was approximately 3 to 1. By 1998, this ratio had fallen to less than 2 to 1. The gap in mileage driven between men and women has decreased also from 88% difference in 1973/76 to 65% in 1985/86 and to 56% in 1994/96. Broughton (1988) has also concluded, after analysis of statistical returns, however, that the driving fatality risk, for males, is higher than that for women and has been consistently so.

While all the differences noted above are informative it appears that the issues of accident involvement by gender reported by these studies have been descriptive in nature

with no indications from a psychological perspective of why gender brings about a differential accident liability. This is a weakness in the literature.

The main differences between males and females as far as accident involvement is concerned appears to be they are differentially involved in gender specific accident types with males being prone to, for example; single vehicle accidents, accidents on bends, overtaking accidents and accidents during the hours of darkness. For females on the other hand, it appears to be turning right and left at road junctions that pose the greatest risk of accident involvement (McKenna et al., 1998; Trankle, Gelau and Mekter, 1990; Broughton, 1988).

2.6. Age, experience, exposure and their inextricable confounding.

It has been argued that age and experience are inextricably confounded (Brown, 1982). An example of this can be seen in the comparison of two similar studies. Michels and Schneider (1984) concluded, from a Swiss survey of traffic offending (n=2753), that experience (in this case length of time since licence issue) is more important than age. They found that drivers with less than two years experience, but ranging from 18 upwards, committed similar types of traffic offences. Pelz and Schuman (1971), in an American study (n=3000), using age groupings of 16-25 and 35-44, concluded, after studying accident involvement and violations by age, while controlling for both distance travelled (as a measure of exposure) and years of driving experience, that a peak of accidents and driving infractions occurred in their sample of young drivers around 18 to

19 years of age. However in contrast to the position of Michels and Schneider (1984) Pelz and Schuman (1971) concluded, that the amount of driving experience gained did not appear to be as important as age as a predictor of accident involvement.

This type of contradictory finding perhaps prompted Jonah (1986) to conduct a review of young driver research. From the review it was concluded simply that, even when controlling for the quantity and quality of exposure to risk, young drivers still appear to be at the greatest risk of casualty accident involvement, particularly those aged between 16 and 19 years. However, according to Jonah (1986), until an appropriate methodology emerges, the relationship between the effects of age and experience or exposure still remains confounded for the time being.

The issue that confronts studies attempting to control adequately for the effects of experience or exposure is that not only does one need to account for the length of time the licence has been held; the amount of mileage travelled within that time; the time of day; the day of week; the type of roads travelled on, but more importantly other more social issues also have a bearing on the quality of the exposure control. For example, passenger types may have a salient effect on driving performance along with other factors that include the purpose of the journey being undertaken (Gregersen and Berg, 1994).

In addition to the differences by age and sex that can be observed, of relevance are other factors that have been discovered that add to the understanding of young driver

accidents. The high rate of casualties between 8 pm and 4 am for young males is an example of findings from past research that illustrates that simply the time of day when accidents occur can be important. For male drivers up to the age of 28 years, for example, the hourly casualty rate is greatest between 10 and 12 pm: by contrast, the highest rates for female driver casualties occurs between 4 and 6 pm. These differences presumably arise from age and or sex dependent variations in social habits and travel patterns (Michels and Schneider, 1984). In a Canadian study, Stewart and Sanderson (1984) examined relative casualty risk while controlling for time of day. Their study revealed that, for drivers between the ages of 16 and 19 years, the casualty rate was twice as high during the period from 9.00 pm until 4.00 am than at other times of the day. This finding again illustrates the extreme robustness and global nature of young male night-time accidents. The question that results once again from these descriptive reviews of young driver road accidents is why are accidents of this type still occurring and what are the behaviours that need to be modified to bring about a change in the behaviour of young drivers?

A British review of accident involved drivers by Maycock, Lockwood and Lester (1991), however, revealed that a reduction in accident liability occurs through the passage of time and, broadly speaking, the magnitude of importance of both of the variables, age and experience, are about equal. As legislation determines the minimum age at which drivers are allowed to take to the road, reducing the number of road accidents amongst young drivers therefore falls to the combination of factors that combine and lead to what is termed 'driving experience'.

Chapter Three.

New drivers and accident their involvement.

3.1. Introduction.

Statistical sources in the United Kingdom reveal that young drivers amount to only 10% of licence holders but are involved in approximately 20% of accidents (New Driver Safety, 1993). Research by Karpf and Williams (1983) (n=4198), into the accident involvement of 16 to 19 year olds, also reveals that the statistics in America appear to be broadly similar with young drivers holding only 8% of licences and yet being involved in 17% of all road accidents.

The use of accident statistics however poses a methodological problem in that they only record accident involvement without apportioning blame, therefore a large percentage of all reported accidents will also include details of the age and gender of those that have been accident involved in a passive sense. Nevertheless Lewin (1982) suggests that his research reveals that about 85% - 90% of road accidents could have been avoided had the drivers been more alert and skilful. A review of accident statistics by Sabey and Taylor (1980) supports this position, concluding, that human factors contributed to around 95% of all road accidents in Great Britain. A weakness in the studies mentioned above is that, while they are important in identifying the major causal effects of road accidents, in this case human factors, they do not propose how beneficial changes in behaviour can be

brought about in terms of practical procedures or what human mechanisms need to be modified or what techniques might be involved in facilitating the required modification of driving behaviours. Nevertheless, for one reason or another human error seems to be the biggest single causation factor in road accidents and young drivers appear to commit the most.

3.2. Risk, risk perception and risk-acceptance.

Evans (1987) reports that one of the most dominant and stable observations in traffic safety is the substantially higher than average accident involvement of younger drivers. Central issues related to this over-involvement, Evans argues, may depend on two separate factors, lack of knowledge or lack of skill, which he suggests result from basic inexperience and other characteristics that may be inexorably associated with youthful behaviour. Supporting this view, Jonah (1986) suggests further that a major factor underlying over-involvement in traffic accidents may be simple youthful risk-taking.

Fuller (1988) suggests that risky behaviour is not only under the control of conscious decision making but may also arise out of the individual's conditioning history. Fuller argues that a predominant feature of driving behaviour is that of avoidance responding. He suggests that younger drivers may place themselves in risky situations through inexperience, which manifests itself through the lack of an appropriate response at a time of danger and this has the potential to involve them in more accidents. The requirement for a decision to be made about what to do arises whenever alternative actions are

possible. Fuller argues further that this aspect of young driver behaviour may also be linked to issues of hazard perception. Rumar (1986, in Rothengatter, 1988) points out however that the probability of a driver actually becoming involved in a serious accident is actually quite small, especially when calculated over a life-time of driving. Rothengatter (1988) suggests that this aspect must be borne in mind when considering elements of risk in the driving task, in that not all drivers are constantly scanning the road ahead for risks that may or may not materialise.

Jonah (1986) makes an important point with regard to risk-taking in arguing that it is important to note that risk-taking does not necessarily imply volition. Jonah also argues that the first problem in the study of risk taking behaviour is the subjective nature of risk assessment, in that one person's perception of danger may be another person's perception of caution. In addition, Jonah argues that risk perception can be sub-divided into perceived risk of accident involvement overall, or perceived risk as a result of specific driving behaviours in specific traffic situations. It could also be argued that specific types of risk-taking can also be differential in the sense that speeding behaviour may be seen to involve an additional risk of becoming accident involved to some, where to others the perceived risk may be the likelihood of being caught by the police for a speeding offence, for example.

Hodgdon, Bragg and Finn (1981) argue that, for the young driver, risk may have the following utilities; an outlet for stress, an outlet for aggression, be an expression of independence, a means of increasing arousal or a method of impressing others. Jessor (1984) suggests that risk in general for youth has a far wider set of functions including; taking control of their lives by acting independently; expressing opposition to adult

authority and conventional society; to cope with anxiety; a result of frustration; gaining acceptance; and demonstrating to others adult capability. Zuckerman and Neeb (1979) would also argue further that risk-taking behaviour may also be the result of a physiological need for stimulation or arousal.

In contrast to the above, Jonah (1986) suggests that the penalties involved in risky driving would include being killed or injured, being responsible for the death or injury of another, damage to property resulting in the increase of insurance premiums, losing one's licence, traffic fines or being censured by authority. With so many apparent facets the study of risk-taking behaviour, or, more importantly, the study of the mediators of the utility or disutility of the behaviour, becomes extremely complex.

In relation to this, Jonah (1986) noted that methodological problems were common in previous studies into driver risk-taking. He also noted that the study of risk-taking has had several different methodological approaches such as self-reports, personal interviews, simulators, and assessments of video displays. Jonah suggests that this diversity in methodological approach and the attendant variations in the operational definitions of risk may have led to some of the contradictory results especially concerning the role of exposure to risk. However, Jonah does assert that the research evidence indicates, as far as young drivers are concerned, that the overrepresentation in traffic accidents may result from specific types of risky behaviours, such as their propensity to drive too fast and too close following, for example. American research by Evans and Wasielewski (1982) (n=2576) also found associations between young drivers and higher approach speeds to traffic signals, while Konecni, Ebbesen and Konecni (1976) found that younger drivers were more likely to drive while impaired by alcohol.

Several authors have studied risk-taking behaviour in the driving task by studying the driving behaviour 'close following' (also known as gap acceptance or headway), (Bottom and Ashworth, 1978; Lalonde, 1979). An ingenious study into this behaviour by Evans and Wasielewski (1982) demonstrated risk-taking by observing younger drivers on two different highways. Studying film from a motorised camera, the headway or following distance between vehicles, selected by the driver, could be measured. The driver's age was then estimated. The results from the study revealed that younger drivers, those under 21, allowed for shorter headways than did older drivers. By using information gained from the vehicle license plate number observed on the film, it was discovered that the drivers who left shorter headways were found to have been involved in more accidents and driving violations as indicated by the entries on their driver record. However, research of this type may simply be an example of the issues surrounding volitional and non-volitional risk-taking in that, if the drivers being observed *knew* that close following was a risky behaviour, then it could be accurately described as risky driving behaviour. If on the other hand, the drivers were oblivious to the fact that they were following the vehicle in front too closely, and this was causing them to be involuntarily exposed to risk as a result, then the psychological origins of the behaviour may be different.

3.3. Mediators of risk-taking.

Wilde's (1976, 1982) Risk Homeostasis Theory was an attempt to integrate risk perception and risk utility into a single model of driver behaviour. Wilde argues that drivers have a target level of objective risk that they find acceptable and try to maintain it at that level. Wilde argues further that while driving people react to the level of risk they

perceive and adjust their driving accordingly. This would mean that, at times of low perceptions of risk, speed would be increased and, at high levels of perceived risk driving speed would be reduced, for example. Wilde also argues that if the design of vehicles or roads creates safer driving environments, drivers will adjust their driving style accordingly and drive faster to maintain the same level of risk, thereby restoring the homeostatic balance and negating safety progress being made. However, Wilde's theory has not been universally accepted and has received considerable criticism see Slovic and Fischhoff (1982).

Notwithstanding the fact that the concept of risk is widely used in the literature on young drivers, Haight (1986) argues that there is no consensus on a concise definition of the term. This is a methodological difficulty. Brown and Groeger (1988) have attempted to define risk as, 'the ratio between some measure of adverse consequences of events and some measure of exposure to the conditions under which those consequences are possible' and to date this appears to be the only workable definition available.

The acceptance of risk is an issue that has been researched by Matthews and Moran (1986). In this Canadian study (n=46), using videotaped traffic sequences, they found that young drivers (18-25 years) accepted higher levels of risk than did older drivers (35-50 years), being more confident in their own (false) abilities. After a review of issues that may be involved in the risk-taking behaviour of young drivers, Jonah (1986) argues that there is 'growing evidence' to suggest that those persons who demonstrate risk-taking behaviour in one driving domain, such as drinking and driving, are also likely to be risk-takers in other areas of driving, such as speeding for example. Jessor (1984) supports this

position proposing that risky driving behaviour may be part of the general health-risk behavioural syndrome among youth. Further related Canadian research by Jonah and Dawson (1986) (n=2,207), using self reports from young drivers in two groups, 16-20 and 21-24 years of age, found that those who were more likely to engage in particularly risky driving habits, such as gap acceptance and speeding, were also more likely to have been previously involved in road accidents and traffic violations. This interrelatedness of risky behaviours is an area that is likely to have a bearing on the whole issue of young drivers and their driver behaviour in that any proposed interventions to modify particular types of risk-taking in the driving task may prove to be ineffective. This could be not as a result of the intervention being inappropriate, but because of the entrenched risk-taking propensity of the respondents.

In describing risk-taking behaviour of specific groups of drivers in specific situations, Trankle et al. (1990) noted three differing aspects of driver risk-taking; firstly, risk tolerance (the acceptance of risk) of the drivers may be greater; secondly, the drivers may perceive the risk in the situation to be lower; and thirdly, the drivers' skills in handling the situation may be lower. As far as young drivers were concerned, Trankle et al. argue that the second factor, lower perceived risk, was the factor that most affected the young driver. The findings of Finn and Bragg (1986) also lend support to the theory that young male drivers are over represented in traffic accidents at least in part because they fail to perceive specific driving situations as being as risky in the ways that older drivers perceive them. In addition, Evans, Wasielewski and von Buseck (1982) and Wasielewski (1984) have shown that drivers who regularly fail to wear seat belts have

more accidents and violations than regular seat belt wearers. It also may be possible to conclude from these findings that non-users of seat belts may be simply intrinsically greater risk-takers than regular seat belt wearers.

What some previous studies do show is that the risk of accident involvement is vastly over-estimated by drivers. Berger and Persinger (1980) report that young drivers tend to produce higher estimates of accident and injury than do older drivers, a finding largely supported by Finn and Bragg (1986). A British study by Rolls and Ingham (1992) (n=56), involving drivers in the age range 17-25 years, illustrates this point by suggesting that, even when driving behaviour is known by novice drivers to be risky, it is unlikely to act as a moderator for behaviour. Using the results from a previous study (from Rolls, Hall, Ingham and McDonald, 1991, [n=439]), they were able to classify novice drivers as 'safe' or 'unsafe' using a variety of measures including assessments by an expertly trained driving instructor. Rolls and Ingham asked subjects in both groups to estimate the amount of traffic casualties and traffic deaths per annum in the United Kingdom at that time and obtained the results show in Table 3.1.

Table 3.1 (Mean) estimates of traffic casualties by 'safe and 'unsafe' drivers Rolls and Ingham (1992)

	Traffic casualties (all severities)	Traffic Deaths
'Unsafe' drivers	548,034	36,394
'Safe' drivers	184,000	15,848
Actual Figures	341,592	5,373

These figures indicate that the greater perception of accident liability actually lay with the 'unsafe' drivers. Furthermore the 'unsafe' drivers' estimated their risk-taking activity

to be equally as risky as their peers but more risky than an older age group. It appears from this evidence that young drivers may be more willing to accept risk for a number of reasons. Moreover, Rolls and Ingham reported that the 'unsafe' drivers listed testing out their own and the cars capabilities and that they deliberately indulged in risky behaviour - but only when it was safe to do so! Feelings of subjective risk appear to be generated by the driver's assessment of the objective risk associated with a particular situation and the driver's assessment of his/her ability to avoid these undesirable consequences. It may be that it is subjective not objective risk that is influential. If young drivers believe that more motorists are killed than actually are, hence exaggerating the objective risk of the traffic environment, then young drivers should behave more cautiously if objective risk influences behaviour. That young drivers patently do not, might lead one to suggest that young drivers disregard objective risk, as proposed by Jessor (1984) and others. Related to this position Brown and Groeger (1988) argue that low risk-ratings for a traffic situation can result from a low evaluation of the potential danger inherent in a situation, or from the high evaluation of the driver's own ability to cope.

A German study by Trankle, Gelau and Mekter (1990) (n=308) reviewed the risk evaluations in groups of drivers aged between 18-21, 35-45 and 65-75 years, by their response to traffic situations presented by the use of photographic slides. In general, young male drivers rated the risk of accident as being lower than middle-aged drivers. Trankle et al. (1990) also noted that young male drivers were proportionally over involved in accidents in situations characterised by darkness, incline/decline and rural environments. In keeping with this pattern of risk, younger drivers were seen to assess

the degree of danger as lower on slides displaying these features, noting that in general these traffic situations contain few explicit danger cues than urban, densely populated or heavy traffic situations. Trankle et al. also suggest that, as far as training, driving instruction and driver improvement courses for young drivers are concerned, these should emphasise different aspects for both young men and young women. Trankle and colleagues also argue that risk-perception within traffic situations, which do not display explicit danger signals, are a specific area of concern for young males while gap acceptance at intersections is a problem that should be addressed especially from a female perspective. (It is also interesting to note that all accident categories in which the young age group are over represented, e.g. traffic accidents, drowning and firearm accidents, involve activities with clear elements of risk taking.)

The connection between risky driving and involvement in fatal road traffic accidents was investigated by Rajalin (1994). He conducted two linked studies, the first of which compared the driving records of 615 Finnish drivers who had been involved in fatal accidents with a sample of drivers randomly selected from driver records, and a second that compared the recorded offences of 143 drivers stopped by police for risky driving with the prior records of a control group of drivers stopped at the same locations. It was found that, compared to the control samples, the drivers involved in fatal accidents and those stopped for risky driving had been convicted more often for traffic offences. While the links between risk-taking and accident involvement become better understood, and notwithstanding the complexities surrounding risk-taking as a youthful trait, the potential

does exist for techniques to be developed that can enhance the identification of hazardous circumstances and teach risk avoidance.

3.4. Hazard Perception.

Hazard or risk perception tests are thought by some to have potential for improving driver safety. Hazard perception has been studied by various means using a range of methodologies including verbal descriptions of the hazards concealed in textual descriptions of traffic scenes, the identification of hazards encountered on actual drives, ratings of the events shown in pictures, slides or videos (Finn and Bragg, 1986; Soliday, 1975; Pelz and Krupat, 1974; Quimby and Watts, 1981; Trankle, Gelau and Metker, 1990 and McKenna and Crick, 1994). Regardless of technique the usual outcome from these studies is a difference in the amount, type or severity of the hazards perceived between differing groups of drivers, implying different levels of driving skill. However Groeger and Chapman (1996) argue that it is difficult to establish whether or not the same psychological processes are at work as a result of the various stimuli used.

Hazard perception can be defined as the ability to read the road ahead and recognise potential hazards. Several authors have explored the notion of hazard perception testing. In recent times, hazard perception testing has involved watching a video of a moving traffic scene from the driver's perspective and operating a response button when hazards are detected or a response lever if the severity of the perceived hazard is under review. By this method, if the hazard is detected a response time can be measured or, on the

other hand, if the respondent misses a hazard this can also be discreetly recorded. Notably, Quimby and Watts (1981) found that the subjects' performance on their hazard perception test, conducted in a simulator, correlated significantly with their performance on the road. They also found, through the same driving simulator research, that young drivers under the age of 25 years, and older drivers over the age of 55 years, took longer to recognise potential hazards; this is despite younger drivers having faster simple reaction times. They concluded that the failure to perceive hazards as far as the young drivers' were concerned was that they simply didn't recognise the situations as dangerous. Brown (1982) supported this assertion, reporting that young drivers were poorer at identifying distant hazards than older drivers but no difference was apparent in the perception of proximate hazards. This supports earlier American empirical research into eye movement by Mourant and Rockwell (1972) who, using a very small sample (n=10), found that experienced drivers (n=4), aged between 21-43 years, tend to have a farther 'look ahead' than novice drivers (n=6) aged between 16-17 years. Mourant and Rockwell also discovered, using an eye-mark device, that novice drivers tend to direct their visual search of the roadway immediately in front of the vehicle. This may indicate that the novice driver is more pre-occupied with vehicle positioning than searching for hazards, in line with the findings of Brown (1982). Moreover, a related and interesting finding was forthcoming from Ahopalo (1987), who reported differences between groups of people who were licence holders and those who were not, indicating that hazard perception in the driving task is a skill that may have to be learned. In a British study by McKenna and Crick (1994), it was found that both novice (n=20, mean age 20.15 years)

and experienced drivers (n=13, mean age 40.23 years) could be trained in hazard perception to improve their task response speed.

It would appear, therefore, that hazard perception training and testing may have positive safety implications. However, hazard detection in the actual driving task is effortful and requires a high level of concentration. In addition to the acquisition of hazard perception skills, drivers also have to be highly motivated to deploy the amount of continuous visual and cognitive attention required while driving. Furthermore, detecting hazards may only play a small part as an accident reduction technique as it could be argued that it is the driving inputs in relation to the hazard, or lack of response to the hazard, that may be of more importance. Moreover, hazard perception is a skill that has to be deployed concurrently with other skills required by the driving task and the cognitive capacity, in respect of novice drivers, may simply be not available (see McKnight, 1985; Fitts and Posner, 1967).

In addition, Groeger and Chapman (1996) argue that the theoretical case for hazard perception has yet to be made. They suggest that there is no particularly firm evidence of a predictive nature linking poor hazard test performance with increased accident liability. Groeger and Chapman argue further that little is known, in theoretical terms, about the actual nature of hazard perception skills and how they develop. The importance of this issue is that without knowing how people learn about hazards it is difficult to know how to train drivers.

3.5. Unrealistic optimism.

Several authors have explored the proposition that most drivers tend to believe that they are more skilful and less risky than average drivers are (Naatanen and Summala, 1976; Svenson, 1981; Matthews and Moran 1986; McCormick, Walkey and Green, 1986; Groeger and Brown 1989; Rolls, Hall, Ingham and MacDonald, 1991; Forsyth 1992; McKenna, 1993 and Gregersen 1995).

This concept may be somewhat biased and artifactual but has two major implications. Firstly, in terms of driving skill, drivers may accept more risk than their actual skill will allow and secondly, from a methodological perspective, it may adversely affect the responses to self-reports and questionnaires that are used in studies with respondents claiming higher or better driving skills than they actually possess. The issue of unrealistic optimism may be of particular relevance to young drivers. Brown and Groeger (1988), for example, in a re-analysis of Svenson's (1981) paper, showed in a sample of younger drivers (median age 22) that they overrated their skills and safety more than did the older drivers in the study. It was concluded that this larger gap in illusory skills resulted from the belief held by the younger drivers that their reflexes and reactions were quicker than that of the older group which, of course, is the case. As DeJoy (1992) noted, while most drivers are aware of the risks involved in driving, they also tend to believe that these risks do not apply to them personally. Most drivers consider themselves to be safer, more skilful and less likely to be involved in an accident than most other roadway users. The DeJoy study also highlighted that young males have an exaggerated sense of their own

driving competency and revealed that this was significantly different to the sense of optimism felt by females. However, in contrast to this position, a review by Brown and Groeger (1988) suggested that, when unrealistic optimism is reviewed by gender, both male and female respondents describe their performance similarly. Nonetheless, the concept of unrealistic optimism has been used in an attempt to explain the high accident involvement of young male drivers (see DeJoy, 1992).

An early American study highlighted the deep-seated nature of unrealistic optimism in the driving task was conducted by Preston and Harris (1965). They compared two groups of drivers (n=100), 50 of whom had been hospitalised as a result of being involved in a road accident and 50 drivers who had never been involved in a road accident. Both groups of drivers were asked to rate how skilful a driver they were. The two groups gave almost identical means, rating themselves as more skilful than the average driver. This outcome is surprising when evidence later revealed by the police authorities indicated that the majority of the hospitalised drivers were directly responsible for their own accidents.

A cross-cultural study by Svenson (1981) investigated perceptions of both skill and safety in an American and Swedish sample (n=161); showed the mean responses for the subjects in both groups for both constructs were well above average, especially those in the American sample thus demonstrating the global nature of this phenomenon. In a further study in New Zealand, McCormick, Walkey and Green (1986) (n=178) explored eight bipolar dimensions related to unrealistic optimism. On each individual driving

related dimension, a significant unwarranted over-optimistic finding was recorded that again illustrates the multiplicity, consistency and robust nature of driver over-optimism.

Criticisms of unrealistic optimism in the driving task have been made mainly surrounding such issues as the age differentials of the groups being compared, driving experience or length of licensure of the subjects involved being uneven or that no controls for exposure to risk were in place (Brown and Groeger, 1988; and Groeger and Brown, 1989). These criticisms, however, may be somewhat premature until a better understanding of how unrealistic optimism in the driving task manifests itself is achieved.

The general outcome of studies involving unrealistic optimism is that, in most cases, drivers' report themselves to be above average. At best this may be 'largely artifactual' as reported by Groeger and Brown (1989), and may simply be a result of the phraseology used invoking a socially desirable response, as no driver realistically wants to report himself as being inept or unsafe, for example. It is possible therefore that much of the optimism data in these studies suffers from this bias but this may not mean that the notion of unrealistic optimism may not be of use, nor that the belief that those who are more optimistic accept more risk while driving is inaccurate.

Swedish research by Gregersen (1996) revealed the important effect of unwarranted overestimation in an experiment that was used to determine how different educational strategies influenced outcomes. Two groups of learner drivers (n=58, between 18-24

years) were given different types of training and were asked to estimate their abilities with regard to a specific driving task. Those drivers who were allocated to, and received, 'skill-training' gave higher estimations of their own abilities in comparison to the group of other drivers who were allocated to a group that were given 'insight' training to the probable level of their actual driving ability. Gregersen concluded from this study that practical driver training should be supplemented by educational training that makes drivers more aware of their own limitations.

The Rolls and Ingham (1992) study, undertook a further exploration of self-assessed driving ability. The study delineated the driving task into two components, driver skill (handling and car control) and driver safety. In relation to driving skill the young drivers rated themselves considerably above their peers. In addition, the same drivers also rated their skills as just above the average of more experienced drivers of 30 years and over. This finding suggests that while young drivers recognise that older drivers were more experienced and skilled than younger drivers in general, it does not necessarily apply to their own driving performance! Brown and Groeger (1988) also reported this greater over estimation of abilities by the youngest drivers. Extending these findings further Matthews and Moran (1986) provided evidence that self perceived driving abilities and perceived risk might be interrelated. Young drivers, they argue, had 'a tendency to view themselves as immune from the higher levels of risk, which they are prepared to ascribe to their peers but not to themselves'.

A factor that may be related to unrealistic optimism is that of overconfidence in the driving task, but this has received very little attention. Brown (1982) suggests, even if young drivers perceive as much risk as older drivers, it may be that they are more confident in their ability to avoid a road accident. Wallach and Kogan (1961) support this contention arguing that, in general, youth are more confident even when there is little evidence in support of their decisions.

In response to this well-known finding that most drivers assess themselves as better than average, Hatakka, Keskinen, Laapotti, Katila and Kiiski (1992) replaced Spolander's (1983) external reference to the 'average driver' to an internal reference requiring subjects to rate their own driving abilities only over a range of driving manoeuvres. From this Lajunen and Summala (1995) developed a Driver Skills Inventory that successfully measured both the driver's perception of his/her perceptual-motor skills and his/her safety-motives respectfully.

As far as Lajunen and Summala's Driving Skill Inventory (DSI) is concerned, the Skill sub-scale is reported to correlate strongly with personality variables measuring the sense of mastery over one's life. In addition, Lajunen and Summala suggest that this sense is generalised and is manifested generally in traffic behaviour. The DSI was constructed on the assumption that personality characteristics and experience gained in traffic determine the driver's view of himself/herself and that this view influences subsequent behaviour. Moreover, Lajunen and Summala argue that safe driving is composed of two separate components, cognitive skills and motives. Cognitive skills, they argue, include

information processing and motor skills whereas motives include both transient motivational and more permanent personality factors and attitudes toward traffic and safety. However, Lajunen and Summala also argue that the maximum driving performance resulting from this combination of cognitive and motor skills does not necessarily predict an individual's level of accident involvement. Of more importance, they suggest, in accord with Gregersen (1995), are the motivational factors that determine what they are doing or what they must do with their skills. Lajunen and Summala (1995,1997) also postulate that drivers who overestimate their perceptual-motor skills may have a more emotional attitude to driving than do other drivers who emphasise safety. The identification of individual motivational and emotional issues within the driving task widens the discussion on driver behaviour into a whole new area.

3.6. Aggression.

Two recent studies, Finnish research by Lajunen and Summala (1995) (n=113) and a British study by Lajunen, Parker and Stradling (1998) (n=270, age range 22-80 years), have reported that driving aggression is negatively related to safety orientation on the roads. They suggest that the driver's view of his or her driving skills is related to both the intensity of negative emotion evoked by frustration and related attributions. Moreover, they hypothesis that drivers who emphasise safety and have a realistic view of their driving skills may not become so frustrated when traffic conditions do not allow the satisfaction of their driving expectations. Lajunen et al. (1998) also suggest that safety-mindedness may work as a mediator and not let anger influence driving behaviour. In

addition, they suggest that drivers with an unrealistically positive view of their driving skills compared to other drivers may even think that they have the right to express anger and frustration. In recent papers by Johnson (1997) and Willis (1998), it has been suggested that anger, aggression and violent behaviours on the road are on the increase both in Western Europe and in the USA.

3.7. Driving propaganda, education, and classroom-based driver education.

While traffic safety messages are a daily occurrence in the media, very little research has been undertaken to assess the effectiveness of such activity. In defining driving propaganda as 'broad education to the general public about driving issues', Anderson (1978) notes that while hundreds of millions of dollars are spent in the U.S.A on driver handbooks and safety materials there is no conclusive scientific evidence to indicate that these costs are justified. Anderson also argues that numerous mass communication campaigns have been conducted in order to influence or improve the driving performance of the general public. Anderson points out that an important distinction between mass campaigns and traditional (American) driver improvement activity is that of campaign breadth of coverage. This is in contrast to driver improvement courses and warning letter campaigns, which compared to public propaganda, are narrow in breadth only being administered to small groups of drivers. Several reviewers (Fleisher, 1970; Haskins, 1969, 1970; Naatanen and Summala, 1976 and Wilde, L'Hoset, Sheppard and Wind, 1971) have concluded that due to methodological flaws it has not been possible to draw meaningful conclusions about the success or otherwise of these campaigns. These

flaws have included poor research designs invalidating conclusions or assumptions made that all drivers in a geographical area had been exposed to the mass communication intended as an intervention and thereafter reviewing the area's accident statistics. In addition, road safety propaganda seems to have had little effect on young drivers in particular. If this was linked to the very high estimates of their own driving capabilities held by young drivers, then this is hardly surprising.

In a closely controlled and well-managed study using an extremely large (n=92,495) sample, the accident involvement and conviction rate of randomly selected drivers in the American state of California was monitored to assess the effects of specially prepared safety materials (Anderson, 1978). The results indicated that no influence or change had occurred in the accident or convictions rates of the sample in the subsequent six months follow-up period. In addition, even specially tailored materials with regard to age and gender also proved to have no effect. However, McBride and Peck (1970) have argued that for firm conclusions to be drawn from accident data, sample sizes have to be significantly bigger than those used in the Anderson study. However, the Anderson (1978) study did provide important guidance with regard to road safety materials, if the following rationale is accepted; road safety material, either implicitly or explicitly, encourages the reader to make three types of changes; informational, attitudinal and behavioural. It is assumed thereafter that if the driver makes these changes fewer accidents will result. Based upon this Anderson argues that four conditions must be met; (1) the reader must be motivated to read the material; (2) the material must clearly communicate to the reader what informational, attitudinal and behavioural changes are

necessary; (3) the reader must make these changes; and (4) a relationship must exist between each of the types of changes and subsequent accidents and convictions. With regard to item (1), this should be extended further as it would appear that for any type of material, whether written or otherwise, to be effective the recipient must be motivated to engage in that material. This issue is of fundamental importance, as discussed above in the unrealistic optimism section; if drivers have false or unwarranted beliefs in their perceived abilities then any information presented may be regarded as being of low utility or of no particular relevance to them whatsoever (Anderson, 1978).

3.8. Group meetings.

A review by McBride and Peck (1970) into the efficacy of group meetings as a way of modifying driver behaviour and thereby reducing accidents has revealed this technique to be questionable. Some authors have reported limited success in respect of reducing the number of subsequent convictions of those attending both group meetings and individual sessions (Coppin, Marsh and Peck, 1965; and Coppin, Peck, Lew and Marsh, 1965) but other studies have been equivocal or produced negative results (see Chalfant and King, 1960; Toms, Kastle and LeSuer, 1966; and Kaestner, 1968).

3.9. Warning letters.

Another form of intervention that is less labour intensive than group discussion sessions is the use of warning letters dispatched to aberrant drivers from an enforcement body or

agency. However, few evaluations have been conducted, so therefore no accurate conclusion can be drawn. American research by McBride and Peck (1970), using a relatively large sample (n=18,000), reported encouraging results in the short term with accident rates declining to 'low-threat' type warning letters. These effects were apparent for up to seven months post intervention. The effects of the letters, however, seemed to be dependent on the content and recipient.

3.10. Driver improvement courses.

Struckman-Johnson, Lund, William and Osborne (1989) suggest that the general premise of driver improvement courses is that lack of knowledge about safe driving and/or inappropriate attitudes are responsible for motor vehicle crashes. Therefore the aim of these courses is to increase knowledge or improve attitudes based upon the assumption that this will bring about an improvement in driver behaviour and thereby reduce accidents. Struckman-Johnson et al. (1989) after a review of driving improvement courses in America, however, argued that empirical support for the common sense notion that driver improvement courses work is far from unequivocal. This is in line with the findings of an earlier American study by Prothero (1978) (n=432), suggested that most drivers, including problem drivers that had been assigned to driver improvement courses, were not lacking in driving knowledge or skills. Prothero (1978) had explored differences between three groups of drivers that were assessed both before and after an intervention. While an experimental group showed a significant reduction in re-offending rates with regard to traffic violations in the follow-up year, the other two groups had very

similar and non-significant outcomes. The first of these two groups was used simply as a control group while the other group completed the American National Safety Council's Defensive Driving Course. Both these groups had similar pre and post-test knowledge scores measured on the 'Achievement Scale on Motor Vehicle Transportation', a measure of knowledge. In the follow-up year post-intervention, however, both groups re-offended at similar rates with regard to the total number of convictions and moving traffic violations.

A weakness in many driver improvement courses is that, no matter what the specific needs of the individual who attends might be, the course content that is delivered invariably remains the same. This inappropriate mis-match, between the desire of the interventionist to bring about improvements in general driving behaviour and the particular behavioural problems of the individual, is likely to be part of the reason why no firm evidence is available regarding the efficacy of such courses. This situation may arise in part as a result of a desire to maintain a standardization of intervention techniques with regard to outcome measures.

3.11. Pre-driver training courses.

The evidence for the effectiveness of pre-driver training courses is also far from encouraging. American research by Conger, Miller and Rainey (1966) revealed that other factors than driver education itself might be at work. In a study (n=617) that compared the penalty points on driving licences of subjects that were awarded for both moving

traffic violations and at fault or responsible accidents, they assessed the performance of three groups of male students. Subjects in the first group had elected to take and completed formal driver education, including a behind the wheel practical element. The subjects in the second group reported that they had intended to take driver education but for some reason or other had been unable to. The third group of subjects was made up of students who did not want to take formal driving instruction and did not take it. The results showed significant differences between the first group, after the course, and the other two groups with regard to exposure (mileage driven), IQ, socio-economic status, responsible traffic accidents, penalty points on the driving licence and moving traffic violations. However, when the potential effects of these factors were controlled for, through individual matching, the inter-group differences disappeared. In contrast however a previously non-significant category, responsible accidents, became significant at the .05 level, with the formal education group scoring lowest. Conger et al., (1966) concluded that the situation is extremely complex involving far more than the presence or absence of driver training. An obvious methodological weakness in the Conger study is the fact that driver education at this time consisted of two parts, theory and practical. These are two distinctly separate elements of driver education with potentially different outcomes as one aspect deals with driving information and attitudes while the other is concerned exclusively with the acquisition of practical skills.

In further research into the effectiveness of pre-driver training in America, by Asher (1968) investigated whether or not those senior pupils (n=797), who had elected to take driver education, differed in any way from those who chose not to take the training on

any of the variables that had previously been identified as being related to automobile accidents. The results revealed that those pupils who were more academic in nature, 'the brightest', elected to take driver education more frequently. Furthermore, in line with the findings of Conger et al. (1966), socio-economic factors were also found to correlate strongly, with those subjects who reported higher socio-economic status or socio-economic related activities such as earning money being more likely to take driver education. However, the research by Asher surprisingly failed to find any personality variables that could differentiate between those who did and those who did not take driver education. This finding is not in line with the majority of this type of research emanating from America with regard to this subject at this time.

The American, Dekalb County study, of pre-driver education (Stock, Weaver, Ray, Brink, and Sadoff, 1983) in Lund, Williams and Zador (1986) was the largest study of its kind involving over 16,000 students assigned randomly to one of three groups. Lund et al. (1986) in their re-analysis of the study found that drivers selected to the group trained to The Safe Performance Curriculum, considered to be the most advanced and thorough driver education programme in the United States of America at the time, were actually involved in more crashes than a control sample. Lund et al. (1986) also argue that the results from the Dekalb County study show that high school driver education courses do not decrease crashes or violations amongst teenagers but that it simply stimulates earlier licensure.

Harrington (1972), in a review of high school driver education in California, did find significant differences in accident involvement for male drivers in the first year of driving between those drivers who had not received driver training and those who had. In the second and third years, however, the trained group had higher accident means, but not significantly so. Harrington does qualify this finding by concluding that differences in socio-economic class and exposure rates (mileage driven), which were not controlled for, may explain at least some of these differences.

Research by Robertson (1980) (n=43,506), into high school driver education for 16-17 year olds, in the USA, highlighted the fact that, after controlling for miles driven, high school grades and personality characteristics, the difference in crash involvement between those who did and those who did not take a course produced very little effect per licensed driver. Moreover, high school driver education could be seen to have a net harmful effect because it leads to an increased number of licensed drivers.

An explanation of why pre-driver training courses do not succeed may be provided by McKnight (1985). He argues that the education of the new driver is actually wasted until the driver has reached a level of expertise where driving becomes an almost automatic activity. It is only at this time, he argues, that the spare cognitive capacity becomes available to incorporate strategy in the driving task. Using for comparison purposes the strategic differences between safety and fuel-efficient driving, the latter being more amenable to measurement, McKnight quotes the findings of a small un-referenced study in Michigan, USA, where fleet drivers were taught fuel-efficient driving techniques that

resulted in a 20% reduction in fuel savings. The same techniques were taught to learner drivers in different high schools and found that no difference in fuel consumption was forthcoming. McKnight argued that the learner drivers had enough difficulty in trying to negotiate the test route from a driving perspective without deploying the specific fuel-efficient driving strategy. At face value, this stance appears to have merit. Drawing heavily upon sporting analogies, McKnight argues, that the tactical subtleties involved in winning tennis matches are not accomplished by the player until the basics of the game are mastered.

3.12. The importance of speed choice.

After a review of the literature on car licensing systems in Europe, Lynam and Twisk (1995) concluded that, while novice drivers are relatively competent in handling vehicles as far as car control is concerned, there are marked differences between novice drivers and experienced drivers in relation to visual search, safety margins and speed choice in situations that involve a high level of uncertainty.

In order to address these problems there have been various studies ranging from empirical cognitive research, looking at each component part of the driving task individually and in isolation, to more holistic social psychological studies of young driver performance that have described driving amongst the young as an expressive function and an extension to the utility of mere transportation. However, one element above all others that appears to come to the fore in most studies is that of speed. Whether

or not it is the incorrect use of speed for the conditions or apparent hazards, attitudes toward speeding, beliefs about speed, speed-violation-accident links, or simple choice, speeding behaviour as far as the novice driver is concerned seems the most appropriate area for research.

Forsyth (1992b) suggests that the issue of speed choice was one of the key variables that emerged from the analysis of attitudes and opinions recorded in her study. She argues that breaking the speed limit appears to be regarded as relatively unimportant by newly qualified drivers as a cause of accidents, although the respondents in the study did report that driving too fast for the prevailing conditions was seen as an important contributory factor to accident involvement. Newly qualified drivers also reported in her study that in their opinion they were able to assess the appropriate speed for the situation better than the law. Although Forsyth comments that this may be a 'naively high level of confidence which many of these drivers have in their own ability', it could be argued that speed choice is a fundamentally more important issue in the overall accident involvement of newly qualified drivers. Jonah and Dawson (1982) also concluded from their research that young drivers were less likely than older drivers to suggest that speeding was a major cause of road accidents. In addition, Wilde, O'Neill and Cannon (1975) argue that young drivers are less favourably inclined toward supporting a reduction in speed limits in general, and the results of Canadian research by Finn and Bragg (1986) (48 subjects between 18-24 years and 48 between 38-50 years, n=93) also revealed that younger drivers ranked speeding behaviour as involving less risk than did older drivers.

An informative finding from the Harrington and McBride (1970) study has also linked the over involvement of certain high-accident sub-groups of drivers with specific types of offences such as the high incidence of speeding offences among young male drivers. Summala, Naatanen and Vaisanen (1984) suggest that a single observed instance of speeding is likely to be representative of a driver's typical driving behaviour overall. Both questionnaire and experimental studies, in spite of methodological differences, do appear to show that driving fast is associated with greater accident liability (West, Elander and French, 1992). From this position it might also be argued that speed choice is an exemplary operationalization of risk-taking behaviour and hazardous driving style. Elander, West, and French (1993) suggest that the role of speed and driving tempo as indicators of risky driving were of special interest because speed regulation is perhaps the most significant single factor related to safety. Rothengatter (1988) suggests that speed choice could be considered as a risk anticipatory behaviour and a volitional act on behalf of a driver. Johnson, Klein, Levy and Maxwell (1981) also suggest that, in their opinion, there is indeed a relationship between speed choice and accident probability.

From a research perspective it may be that of all the possible driving violations speeding is the easiest to explore, define and understand. In addition, the use of speed is portrayed in the media to involve emotions such as 'thrill', 'pleasure' and 'enjoyment' and many drivers may make an association or connection between speeding and fun. Sabey and Staughton (1975) argue, that, after drinking and driving, driving too fast was the behaviour most likely to result in accidents. Previous research also indicates that speeding behaviour is very common and may be regarded by many as an offence that is

not too serious and, when listed alongside other traffic violations, respondents are most likely to select speeding as the most common violation that they had committed (Brown and Copeman, 1975; Manstead, Parker, Stradling, Reason and Baxter, 1992; Reason, Manstead, Stradling, Baxter and Campbell, 1990). Moreover, Parker (1992) argues that some speeding is now regarded with a degree of tolerance. In addition, at the time of writing, the frequency and social status of speeding as a violation also suggests that unlike other driving violations, such as drinking and driving, very little, if any, social stigma is attached to the behaviour.

Research by Harrington and McBride (1970) also revealed a relationship between speeding behaviour and age. They found that in general speeding behaviour decreases as age increases, with drivers less than 21 years having over twice as many speeding convictions than those drivers between the ages of 26 and 36 years of age. Implicit within this finding is that, as more experience is gained, speeding behaviour declines and conversely most speeding is done while drivers are the least experienced.

Although speeding unwittingly can be construed as an error it can be seen from the studies included above that most speeding behaviour is construed as intentional. It would appear that intending to speed at a time when driving experience is limited is a fundamentally dangerous mix of circumstances that may be leading to higher accident involvement. From the above findings the question that arises is what motivates young drivers to engage so much in speeding behaviour?

3.13. Lifestyle issues, driving in a social context.

Gregersen and Bjurulf (1996) argue that there is a need to consider driving very much as a social activity including the social context in which the driver operates. This view is supported by Quimby and Downing (1991) who also argue that the likely advances in road safety in the future will be achieved only when road safety is seen and treated as a social issue with the focus on the attitudes and beliefs of drivers and how these may be changed. In addition Parker, Reason, Manstead and Stradling (1995) write that the undesirable nature of the attitudes and beliefs held by some drivers lead them to involvement in violations with a subsequent increase in accident involvement.

Many studies report that there are two types of accident that are particularly prevalent to young drivers, the single vehicle accident, and the so-called 'disco' accidents (Klemenjak and Hutter, 1988 in Gregersen and Bjurulf, 1996; Schulze, 1989). This European research reveals young drivers are overly involved in road accidents between 8.00 p.m. and 2.00 a.m. Forsyth (1992) also reported that in the United Kingdom a clear trend appeared between 10.00 p.m. and 2.00 a.m. for this type of accident.

Several authors have researched the lifestyle issues and social behaviours of young drivers. For example, Swedish research by Gregersen and Berg (1994), measured the relationship between lifestyle and accident risk. The study identified through questionnaire response (n=3000) four high-risk and two low risk groups. The results showed a high probability of a relationship between lifestyle and accident risk. It was interesting to note that this study concluded that even the comparatively low risk young drivers are still amongst those most at risk amongst the driving population as a whole.

Rolls, Hall, Ingham and McDonald (1991) also reported that young drivers used the car more for leisure purposes than work purposes with a high percentage of their journeys between 10.00 p.m. and 4.00 a.m. In addition, over 54% of the drivers in their study candidly admitted that their driving had got worse since passing the test. In addition, males placed a higher importance on the type of car they drove than did females, and they also placed more importance on speed, acceleration and engine size. Moreover Rolls et al. (1991) also reported that four types of passenger particularly affected driving style, although the effects were different. The presence of friends seemed to adversely affect the young males more than did other groups. While driving with their parents, however, the young drivers modified their driving style, as they wanted to give the impression that they drove safely.

In a further related study, Rolls and Ingham (1992) extended the traditional approaches to young driver research and gave the young drivers the opportunity to provide their own accounts and explanations of their driving behaviour. Through structured interview (n56) issues such as peer and parental influences, drinking behaviour, perceived ability, perceived risk taking and perceptions of accident probability were explored. What emerged was descriptive data that described a 'car culture' amongst the most at risk young drivers. Those drivers who were identified in the study as the 'safest' had the least additional motives while driving. The safe drivers used the car as little more than a method of transport. This may be descriptive of the 80% of young drivers who manage to gain experience without involvement in an accident. The 'unsafe' drivers reported the need to test themselves and their vehicle. They saw the motor car as a means of expressing themselves both in the way the vehicle was driven and the way it was

modified or accessorised. For the 'unsafe' group, issues such as their 'mood' while driving or the effects of 'up tempo' music that may lead to a more aggressive driving style, were also found to be important. The study argues that the above issues should be recognised and that driving, for the young driver, should not be viewed as merely a physical skill. This important aspect, Rolls and Ingham (1992) argue, has implications for any intervention programmes aimed at young drivers.

A similar point of view is held by Gregersen and Berg (1994) who noted that much of the previous research into young drivers and accident involvement had been conducted into the levels of actual knowledge and skill, the amount of experience gained or the individual level of personal development or maturity. Gregersen and Berg argued that another way in which young driver accidents could be approached was through the study of their social situation and lifestyle, and they suggest that, to date, very little research has been conducted in this most important area.

One study, which has attempted to measure the importance of lifestyle issues with regard to young drivers in Germany, was conducted by Schulze (1989). Schulze argues, that two major social factors, may have be contributing to these young driver accidents. Firstly, the changing nature of the leisure time and fun functions of the car would be at one social level; this would include both the availability of the car and the ability to drive. At another social level, the places of entertainment frequented by youth, Schulze argues, have disappeared from the residential areas or have been established far from the centre of town. Schulze also suggests that, while in the past the places of leisure activity could

be easily reached by simple journeys, perhaps by foot or on public transport, this may be no longer the case. Consequently young drivers are often involved in accidents on their way to or from places of leisure. Schulze conducted a review of all accidents associated with visits to discos within a three-month period in the Federal Republic of Germany between November 1988 and January 1989. This period allowed for 216 so-called 'disco accidents' to be analysed that included 64 fatalities and 484 serious injuries. It was noted that in total 61% of the drivers involved in these accidents were over the drink and drive limit. Also revealed was that many of the accidents seem to involve many of the same types of circumstances, for example, left hand curves with large radii, many people in the car and lack of seat belt use. Schulze concluded that, from a sociopsychological perspective, the accident involvement of the drivers may also be the result of their membership to a specific lifestyle groups.

Further research by Schulze identified characteristics of several types of high-risk groups, including one group that he labelled the 'action-group'. The members of this group differed from other young drivers by the amount of time they spent away from home especially in pubs and discos. 'Action-group' members favoured action films and rejected critical social films. They liked 'rock' and 'punk' types of music and followed football.

Another issue of importance from the Schulze (1989) study was the finding that, amongst the high-risk groups, male adolescents dominated to a percentage range of 70-80%. More than half the members of the group were low achievers in an educational sense (in

line with American findings of Harrington [1972] and Conger, Miller and Rainey [1966]) and belonged to more masculine professions like the metal industry or building trades, for example. The analysis of actual accidents revealed that young drivers belonging to the above professions were three times more likely to have caused 'disco' accidents. A later study in the United Kingdom by West, Elander and French (1992) gives cross-cultural support for these findings.

The results of the Gregersen and Berg (1994) study also showed a relationship between lifestyle and accident risk. Unfortunately, the findings from this study are weakened by subjective interpretations and decisions made by researchers with regard to the way subjects were classified. However, the results do show a high probability of a relationship between lifestyle and accident risk. Gregersen and Berg concluded, however, that all young drivers do not have the same high accident risk. This implication is obviously of great importance as the nature of the differences between those at high risk and those at a lower risk may be the key to remedial action to reduce the over-involvement of young drivers in road accidents.

Connected to the issues above Preusser, Williams and Lund (1985) conducted a survey in two states within the USA (n=15,864) and showed that obtaining a drivers licence actually contributed to changes in the lifestyles of the subjects. The study, involving 15 and 16 year olds, detected that the increased mobility experienced was associated with doing more family errands, becoming less dependent on other family members for

transportation and less use of bicycles. Surprisingly, it was noted that the holding of a licence reduced the likelihood of attending a party.

Gregersen and Berg (1994) argue, with regard to lifestyle issues, that an approach that has potential benefits is through the understanding of the specific lifestyles of high-risk groups and prescribing suitable remedial measures or controls for that particular group. In addition, according to Gregersen (1995), the individual and social factors contributing to accident involvement should be dealt with through education.

3.14. Broader social issues.

An early American study by Ross (1940) identified social factors that may contribute towards accident involvement. In studying causation factors of road accidents in the state of Michigan over 5 years, he noted that a large percentage of accidents (88.5%) could be attributed to driver error. Ross concluded that poor driver 'attitudes' might have been responsible. Knapper and Cropley (1981), after a review of the social and interpersonal factors believed to be involved in the driving task, argued that driving must be viewed as a social process in which the social interaction with others is of great importance. Knapper and Cropley also suggest that the principles surrounding behaviour in the driving task may well be already established in social psychology and involve well-known concepts like social norms, social status and personal space, for example.

Other aspects of social behaviour have also been connected with driving behaviour. An American study by Sobel and Underhill (1976) (n= 496) reported a relationship between family disequilibria, adolescent driving and involvement in road accidents. A further American study by Jessor (1987) (n=1800) found a relationship between risky-driving and other problem behaviours. Beirness and Simpson (1988) (n=1986), in a Canadian study, identified further psychosocial factors that provided a distinction between young drivers who became involved in driving accidents and those who did not.

Other negative relationships have been found between behavioural dispositions and performance in the driving task. These studies have identified that some drivers have more interest in the use of the car and the road than the mere utility of transportation and that includes opportunities for drivers to exercise feelings of competence, control and mastery (Reser, 1980; Marsh and Collett, 1986; and Lewis, 1991). Roberts, Thompson and Sutton Smith (1966) suggest that driving for some was a method of self-testing, and constructed a self-testing scale measuring attitudes towards powerful automobiles, driving enjoyment, speed and overtaking, while other researchers have identified other patterns such as extra motives, thrill, power display, self-testing, smooth driving and piloting (Bliersbach and Dellen, 1980).

A more recent British study also identified the importance of social influences on driving. Rolls, Hall, Ingham and McDonald (1991) (n=56), using structured interviews and questionnaires designed to investigate the additional motives of young drivers, showed that a substantial minority (about 35%) of young male drivers could be

categorised as 'unsafe'. The study suggests that 'Safe' drivers were likely to have regular girlfriends or partners with whom they spent a considerable amount of time and, as a result, felt more mature. 'safe' drivers, in their study, also had more debts and subsequently spent less on cars and going out. They were also more likely to rate themselves as safe rather than skilled. In contrast to this, the 'unsafe' drivers reported having a higher exposure rate to unsafe driving by both parents and peers. Moreover, the 'unsafe' drivers rated themselves as more skilled than the safe, and were more interested than 'safe' drivers in testing their skills both off and on road. Furthermore, Rolls et al. (1991) argue that the social context in which the young driver uses the motor car is as important as the data that are provided by demographic information, such as vehicle type and mileage driven. In their interviews, they also noted that many of the 'unsafe' drivers in their study saw driving as more of an expressive activity than a practical activity. These 'additional motives' as suggested by Rolls and colleagues (1991) may be crucial to the understanding of why novice drivers engage in the driving task as they do and may also be important in understanding and placing in context the effects of the attitudes and beliefs held by young drivers; and furthermore, from a social perspective, why they adopt the socially interactive driving styles that they do and the choices with regard to risk that they make.

3.15. Summary.

- Young drivers are overly involved in road traffic accidents, especially within the first years driving.

- Accidents statistics do not give a clear measure of 'at fault' accidents.
- Several authors report the inadequacy of driver training and the driving test in preparing young drivers attitudinally for their responsibilities on the road.
- Driving is a highly automated mental process that may be difficult to modify.
- The most appropriate time for driving related interventions may be immediately after the practical driving test, before driving becomes too automated.
- Young and novice drivers do not perceive driving related risks as much as older drivers
- Non-volitional risk-taking is an issue of special relevance for young drivers
- Young drivers are prepared to take on high levels of risk and have feelings of immunity from risk and high levels of unrealistic optimism.
- Hazard perception training is little understood from a psychological perspective and may be too strategic an issue for pre-driving test learner drivers.
- Young drivers, in some cases, are involved in specific types of accident.
- Young drivers have additional motives while driving.
- Lifestyle and social issues are important in understanding driving from a holistic perspective.

Chapter Four.

Social cognition models and driving behaviour.

4.1. Introduction.

Social cognition models play a key role in health psychology in that they assist in highlighting the behaviours that influence health and determine which individuals will and those who will not perform such behaviours. According to Conner and Norman (1996), social cognition models start from the assumption that an individual's behaviour is best understood in terms of his or her perceptions of their social environment. To date social cognition models have been successfully used by psychologists to understand a wide range of human behaviours, particularly those that involve benefits or threats to health or personal well-being.

Stroebe and Stroebe (1995) suggest that the study of health behaviours, in modern industrialised countries, is based upon two assumptions; (1) that a substantial proportion of the mortality from the leading causes of death is due to particular patterns of behaviour, and (2) that these behaviour patterns are modifiable. The behaviours that underlie the avoidance of particular health threats appear to be increasingly adopted in modern health conscious societies as some individuals respond to research and medical advice in order to remain as healthy as possible. As a result of the plethora of advice and strategies for better health behaviour, many factors or variables have been proposed.

Many of these variables have been reviewed by Cummings, Becker and Maile (1980) and, on the basis of non-metric multidimensional scaling, they argue that just six distinct factors are derived; (1) the accessibility of health care services; (2) attitudes to health care (individual beliefs about perceived quality and benefits of treatment); (3) personal perceptions of the threat of the disease; (4) knowledge about the disease; (5) social network characteristics; and (6) demographic factors. The factors from 2 to 5 represent social cognitive factors that are central to a number of models of the determinants of health behaviours. Conner and Norman (1996) also argue that these are enduring characteristics of the individual, which shape behaviour and are acquired through socialization processes.

With regard to social cognitions, Fiske and Taylor (1984) suggest that these are concerned with how individuals make sense of social interactions and focus on individual cognitions or thoughts that intervene between stimuli and responses in specific real world situations. What is unclear at this time is whether or not people see particular driving behaviours or the use of the car in general as a particular health threat. If either is the case then there may be a role for social cognition models to be used to bring about desirable change.

Social cognition models have been used before in research into driver behaviour; for example, intentions to commit driving violations (Parker, Manstead, Stradling, Reason and Baxter, 1992); determinants of intention to commit driving violations (Parker, Manstead, Stradling and Reason, 1992); driving errors and accident involvement (Parker,

Reason, Manstead and Stradling, 1995). This focus, however, has been on specific links between lapses, errors or violations and accident involvement, not in regard to the general threat that driving behaviour may pose to health.

The previous research mentioned above has, however, resulted in the additional suggestion that social cognition models may have a two fold role within the realm of driver behaviour in that not only can they be used as a framework to understand specific behaviours under review but that they may also provide a framework for describing and developing remedial strategies. A study by Parker et al. (1995), for example, made a comparison of their results with those from an earlier study by Beck and Ajzen (1991) to illustrate the importance of the internalised notions of right and wrong, the personal norm (a proposed extension to the Theory of Planned Behaviour), and the resultant emotional consequences. Parker et al. argue that in practical terms the importance of the personal norms in this instance should provide a clue as to how the problems of irresponsible driving could be tackled in the future by road safety education campaigns that might attempt to foster among pre-drivers, a sense of inherent wrongness of exposing oneself and others unnecessarily to danger.

4.2. Theory of Reasoned Action and Planned Behaviour.

Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA) and Ajzen's (1985, 1988) Theory of Planned Behaviour (TPB) are social cognition models that can be used to predict both intention and behaviour. In essence, the difference between the two

models is that the TRA can be used to predict volitional behaviours while the TPB can be used to predict behaviours that are not entirely under the volitional control of the individual (for a full description of both the TRA and TPB see both Chapter Six and Chapter Nine herein). The attraction of these particular social cognition models to psychologists is their ease of operationalization and that they allow for behavioural intentions of an individual to be broken down into two or three component parts each of which can then be evaluated to give a description of the effect that each construct may have on the behaviour under review. Along with attitudes and beliefs, of particular relevance to the study of driving behaviour is the notion of the 'subjective norm', a construct of both the TRA and TPB. This determinant of behaviour consists of a person's beliefs about whether significant others think he or she should engage in the behaviour. Parker et al. (1992), in a study into traffic violations, have suggested a possible explanation for the importance of the subjective norm is that a person's driving behaviour is very much a social performance, carried out in the public domain, and is likely to involve consequences for other people. The Parker study found differences between the normative beliefs and motivations to comply of young drivers and those of older drivers. These analyses revealed that, compared with older drivers, younger drivers perceived less pressure from others to abstain from committing driving violations and were more highly motivated to comply with the perceived wishes of their referents.

The TRA and TPB, while being useful in understanding and predicting behaviours, do not give much assistance in describing ways in which their constructs or determinants

might be modified. For a better explanation of this aspect of health related behaviours other social cognition models are more informative.

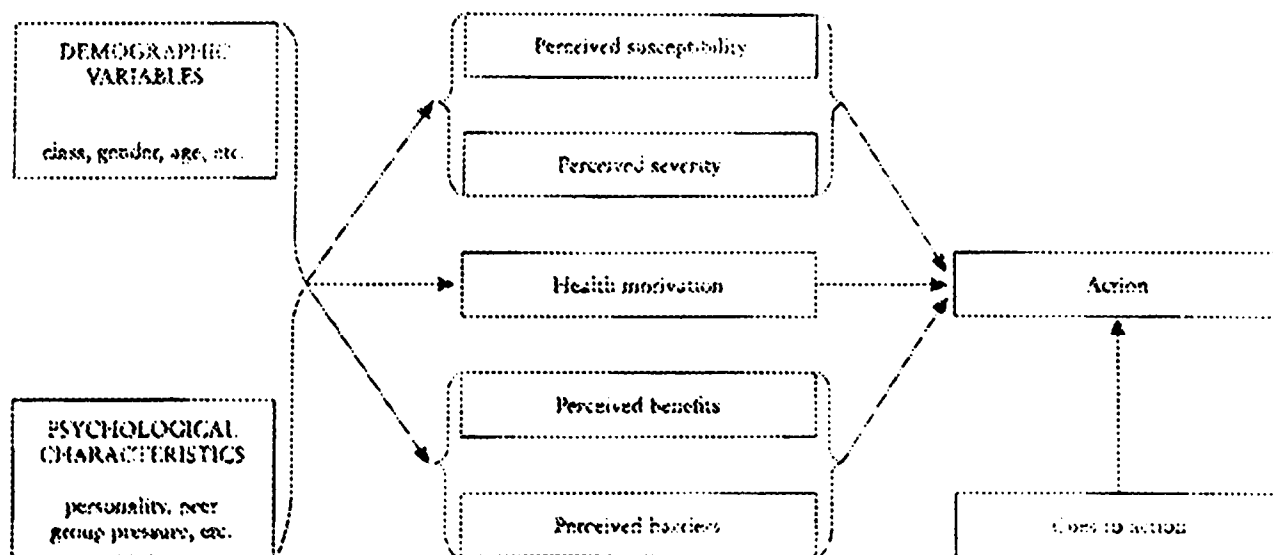
4.3. The Health Belief Model.

The Health Belief Model (HBM) has also been found to predict behaviour in health psychology (Rosenstock, 1966; Becker, Drachman and Kirscht, 1974). In the HBM two aspects of an individual's representations are identified in response to a threat. The threat of such an occurrence and the evaluation of the behaviours deployed to counteract this threat. The threat perceptions in this case are mediated by two further beliefs, perceived susceptibility to the threat and the perceived consequences of such involvement. Together, these two beliefs are believed to determine the likelihood of following a protective or health-related action. Conner and Sparks (1996) suggest that 'individuals are likely to follow a particular health action if they believe themselves to be susceptible to a particular condition which they also consider to be serious and believe that the benefits taken to counteract the threat outweigh the costs'. In relation to the driving behaviour of novice drivers, a health threat does exist at this particular time in their life, but it is unclear whether or not these young drivers actually know of the existence of this threat. Furthermore, if novice drivers do know of the health threat, would they necessarily choose to exercise preventative behaviours?

The HBM consists of four main components (see Figure 4.1): (1) 'perceived susceptibility or vulnerability', which refers to the subjective perception of risk or

vulnerability to a health threat; (2) 'perceived severity', which refers to one's perception of the seriousness of the health threat; (3) 'perceived benefits', which consists of the efficacy of an action designed the threat of illness; and (4) 'perceived barriers', which refers to the assessment of negative consequences that might be associated with the preventative behaviour. A further two interrelated components: (1) 'cues to action', a diverse range of triggers such as perception of symptoms, social influences and education campaigns that may stimulate action; and (2) 'health motivation', a readiness to be concerned about health issues, were also included in later versions of the model (e.g. Becker, Haefner and Maiman, 1977). However, no clear operationalization instructions linking perceived susceptibility and severity to threat and action were developed.

Fig 4.1. The Health Belief Model.



Conner and Sparks (1996) observe that the HBM suffers from a number of weaknesses; for example, while other social cognition models give descriptions of intentions to

perform a behaviour, attendant social pressures or control over performance of the behaviour, the HBM offers no explanation. The aforementioned are key components of the theory of reasoned action/planned behaviour that do not appear in the HBM.

However as suggest by Parker et al. (1995) above, social cognition models can also be used to inform countermeasures to behavioural intentions and in this respect the HBM gives good guidance. For example in Bandura's (1977 in Conner and Norman, 1996) Theory of Self-efficacy, a linked model to the HBM, three other important variables are described; situation-outcome, action-outcome and perceived self-efficacy. These variables could be used alongside those already described by the HBM, perceived susceptibility, perceived threat, perceived barriers and perceived benefits to create a driving related intervention that addresses all these dichotomies in turn increasing the perceived threat of accident, death or injury while at the same time the intervention procedure could give advice on how these perceived threats may be actively avoided.

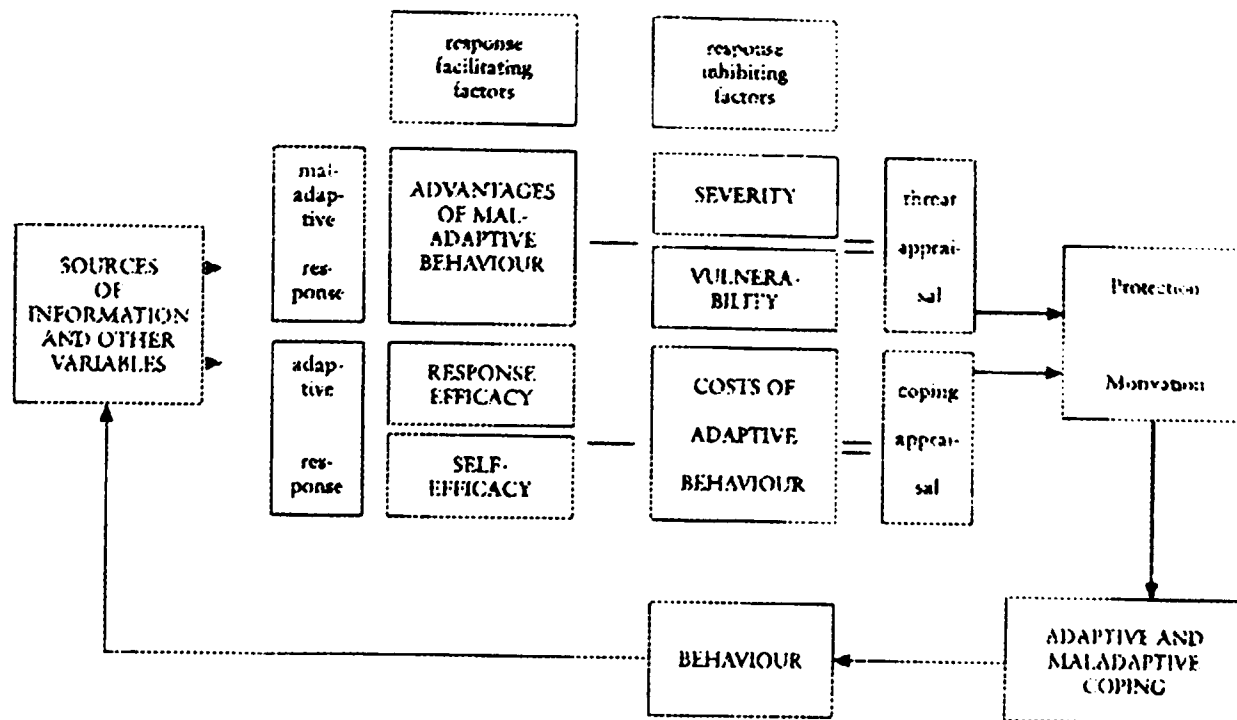
4.4. Protection Motivation Theory.

In contrast to the HBM, a more detailed model of preventative health behaviour, originally developed to provide perceptual clarity to the understanding of fear appeals (e.g. Don't Drink and Drive'), is Protection Motivation Theory (PMT) (Rogers, 1975) see Figure 4.2. The PMT, outlined by Prentice-Dunn and Rogers (1986), assumes that protection is maximised when: (1) the threat to health is severe; (2) the individual feels vulnerable; (3) the adaptive response is believed to be effective in averting the threat; (4)

the individual is confident in his/her ability to successfully complete the adaptive response; (5) the rewards associated with maladaptive behaviour are small; (6) and the costs associated with the adaptive response are small.

Although PMT appears as a more detailed model of health preventative behaviour than the HBM there are nonetheless apparent similarities between the models. Both emphasise the cognitive processes mediating attitudinal and behaviour change and both emphasise the central role of self-perceived susceptibility or vulnerability. With regard to young drivers, the suggestion is that if individuals do not perceive themselves to be particularly at risk, or if they are willing to accept an unduly high level of risk, then they will lack motivation to adopt risk reduction strategies. However, those drivers who perceive their level of risk to be high, or who perceive the cost of risk behaviours to be high, will be more likely to act to reduce this risk. An accurate perception of one's self-perceived risk and personal vulnerability may therefore be seen as desirable in order to provide the basis for rational decisions concerning behavioural risk reduction.

Fig 4.2. Protection Motivation Theory.



In line with the HBM, the importance of PMT is in the description it provides for use in the operationalization of possible intervention strategies. For example, PMT describes that in predicting health behaviour issues of self-efficacy and efficacy of the response are important to the behaviour under review. These factors are easily incorporated along with the costs of adaptive behaviour alongside the other dichotomies from the HBM described above.

4.5. Summary.

In summary, the Theory of Planned Behaviour is a social cognition model that through ease of operationalization is both useful and successful in predicting specific future behaviours. The loose association of variables of the Health Belief Model and the more

structured approach offered by Protection Motivation Theory, however, provide a better guide to the modification of behaviour in describing a wider range of specific constructs that may be important in the driving task.

Chapter Five.

Methodological issues and an overview of the measures used.

5.1. Introduction.

This chapter will explore the issues surrounding methodological issues; research design, the recruitment of the subjects, pre and post driver training programmes and the drop out rates for the study.

5.2. Methodological issues.

There are four main ways to investigate driver behaviour; (a) Monitoring actual driving behaviour using specially prepared vehicles; (b) through the use of driving simulators; (c) reviewing accident data; or (d) through self-report questionnaire studies. Each of these methods has derivatives and each has its strengths and weaknesses.

Monitoring actual driving can be accomplished in different ways. The most comprehensive way is to prepare a vehicle with recording devices so that its position, speed and all driver inputs are being recorded for later analysis. At the present time, video cameras can be used in conjunction with this technology that also record the traffic environment around the vehicle and driver. This technology is changing rapidly and each technological advance brings fresh opportunities for researchers. At face value an

instrumented vehicle therefore would appear to be the most accurate way of recording actual driver behaviour; unfortunately, this methodology is not without its drawbacks. An instrumented vehicle is still subject to environmental variables and fluctuations. For example, a vehicle being used on a pre-determined test route would still be subjected to the effects of variable traffic flow and density that result from daily or perhaps seasonal fluctuations in traffic volumes. Moreover, weather differentials can create differing road hazards and, in addition, the often unpredictable driving behaviour of other proximal drivers cannot be controlled for. Moreover, as a result, the considerable realism of the data drawn from studies of this type, important issues, for example occasional distractions from the driving task, may be lost in the 'noise' from these extraneous incalculables. In addition the drivers themselves may adopt different driving behaviours as a result of their driving being monitored, or through driving a vehicle with which they are not familiar.

At the other end of the technological scale, and therefore less expensive, are observational or driver monitoring studies that use in-car observers, driving experts such as driving instructors, who observe and assess actual driving ability or classify the driver's reaction to various hazards encountered on pre-determined test routes and award a rating or score to represent levels of driver skill. This method cannot be used without a certain element of subjectivity. In addition, these experts or observers can be either identified as such to the subject or some cover story invented to mask their true purpose (Rolls, Hall, Ingham and McDonald, 1991). A finding by Lajunen and Summala (1997) however lends some support to observed drives as a method of data collection suggesting

that even in a supervised test drive, accident-involved drivers show higher local speed and lateral accelerations, which are related to shorter safety margins and higher accident risk.

Observational studies can also be conducted by observing driving from outwith the vehicle (Baxter, Manstead, Stradling, Campbell, Reason and Parker, 1990). A difficulty encountered with observations from outside of the vehicle is that in some cases the age or indeed sex of the driver may have to be guessed and subsequent follow-up enquiry is difficult as vehicles are registered in most cases to owners rather than drivers.

Driving simulators can reduce a large amount of the environmental variability mentioned above, but at the cost of ecological validity. Driving simulators used in driving research range from computer monitors which portray simple computer generated graphics (Desmond and Matthews, 1996) to fully interactive systems based on actual vehicles with movement and changes in direction being simulated through graphics being projected throughout 360 degrees from the driver's perspective. The range of road situations displayed can range again from simple computer generated graphics to video or film views from the driving position through in-car cameras (McKenna and Crick, 1994). Various measures can be taken in driving simulators including small control inputs to vehicle controls, reaction times, hazard detection, vehicle following distances or, indeed, research into the driver's actual eye movements (Mourant and Rockwell, 1972). Simulators have proved useful in that they seem to be able to differentiate reliably between the performances of drivers with differing levels of experience (McKenna and

Crick, 1994). In addition Quimby, Maycock, Carter, Dixon and Wall (1986) found a relationship between hazard perception and accident involvement. However a major drawback in simulator studies is that compared to the actual driving task there is no exposure to risk. Where a driver makes a catastrophic driving error on the road, as could be the case in the event of an overtaking manoeuvre, for example, there may be serious repercussions. These consequences are obviously not present in the simulator. Of further concern is the visual quality of the driving scene portrayed by the simulator. The level of realism produced within simulators at this time is far from ideal and, therefore, the ecological validity of such experiments is again reduced. Moreover, other issues such as individual driving style, which would include personal driving motives and aspects of interpersonal social interactions involved in the driving task, are also removed. These socially based aspects are most prevalent, as they are not present, when respondents are asked to make judgements on pre-recorded video or film footage of driving scenes, such as used in hazard perception testing. A further drawback is that subjects in the simulated environment have little experience of that particular type of environment and are again aware that their performance is being evaluated and once again may adopt a different type of driving style much like those involved in observed drives. In addition, as motivational aspects are reduced or eliminated in simulators so is the scope for measuring personality factors or issues. If, for example, a driver uses driving at speed to obtain and experience the 'thrill' of driving, this thrill, which may be linked to being exposed to risk, would not be available within the simulated environment. In addition, as Parker, Reason, Manstead and Stradling (1995) point out, a driving simulator takes little or no account of the social context within which the simulated driving takes place. Parker

and colleagues also suggest that in recent years there has been increasing appreciation of the importance of social influences in the driving task that are likely to have an important role in the formulation of possible intervention strategies with regard to the attitudes and motives of drivers. Moreover, a key element in the provision and development of driving simulators, even at the crudest level of sophistication, is one of cost. At the time of writing, even if a driving simulator is based upon a stand-alone personal computer the cost of developing the necessary software to run a study may well be above the costs of obtaining the appropriate data by other means.

The review of actual accident data provides a retrospective method for studying driver behaviour. Studies of this type have revealed a great deal about those who become 'accident involved'; for example, Broughton (1988), in examining accident statistics, found differences in male and female crash involvement as well as being able to identify particular types of accidents in which certain classes of drivers were most likely to be involved. This is important information for those who are developing appropriate countermeasures. A benefit of this type of data collection is that it covers most serious accidents including fatalities where obviously no self-report data would be available. It is also the case that, in general, fatal accidents are extensively investigated. In contrast to this, a problem does exist with accident data covering the minor accidents. These types of accident often go unreported to the police or insurance company for a variety of reasons and therefore the causation factors responsible for these accidents is lost. Official accident data, such as data collected by the police or traffic authorities, is also restrictive because it is collected primarily for administrative or prosecution purposes and therefore

may limit itself to actualities. In the United Kingdom, most accident data is collected by the police service. This data are likely to be more objective than self-reported driver accounts but it is again of limited use for research purposes because of the absence of certain key aspects in relation to the driver. For example, although the drivers' age is recorded on most occasions, from the perspective of psychological research, this information is of limited value unless additional information regarding the number of years driving, annual mileage and the type of driving undertaken becomes available to establish the level of driving experience of the driver. These factors coupled with further personal information in relation to the drivers' attitudes to driving, level of driving skill and/or personal motives at the time of the accident would also be required for these data to be of greater explanatory value.

Insurance companies also collect accident data. These data may be of more use for research purposes as it contains, in addition to the data collected in police reports, further driver information including, within certain limitations, the number of previous accidents in which their insured driver has been involved. Unfortunately, insurance company accident data are generally not available due to commercial restrictions and are, in any case, limited only to those accidents in which the company in question has an interest. Commercial interests may confound this factor further in that insurance companies select certain sub-groups within the driving population which they believe to be the most commercially attractive to them and the very real possibility exists here that they 'select out' what they consider to be high risk categories of driver. Insurance accident data also have the potential to be unreliable due to reporting bias as accounts of accidents by

claimants may involve the potential for personal financial loss. Due to the nature, the purpose and the availability of funding for the present study it was impractical to use any of the research methodologies cited above. In addition, the aim of the study, to evaluate three methods of driving licence acquisition, was more suited to a series of linked questionnaire based self-report studies.

Another potential method used to research driver behaviour is to simply ask them about their experiences through self-reports (Parker et al., 1995). The most serious drawback of using self-report measures is that of response bias. The most important of response biases may be that as described by Nederhof (1985) as social desirability, which was defined as the tendency to deny socially undesirable traits and claim social desirable ones, or the tendency to say things which place the speaker in a favourable light; therefore, measures of self-reported driving behaviour may correlate with measures of social desirability. As a consequence of this behaviour it is useful to have a measure of social desirability incorporated in self-report studies (for example, Crowne and Marlowe, 1960; see social desirability later in this Chapter). This allows for the identification of subjects who may be prone to this tendency and thereafter decisions can be taken as to whether or not they should be excluded from the overall analysis. Another form of response bias is that of acquiescence, which is the tendency to agree or disagree systematically irrespective of the content of the question posed. However Spector (1987), has suggested that this type of response bias may not be as serious a problem as previously suggested and that the counterbalancing of both negatively and positively phrased items may reduce much of the effect. As a result of this finding, where possible, this counterbalancing of items was

employed in this study. In addition to this, previous studies into driving behaviour have reported the successful use of self-report measures. Studies by Ingham (1991) and West, French, Kemp and Elander (1993), have managed to cross validate self-reports of driving behaviour with other methods and have reported, for example, correlations of 0.65 between observed driving speed and a self-report measure.

5.3. Controlling for exposure.

The variability of individual accident involvement is confounded by the amount of actual driving that is done. All drivers differ in the amount of time they spend driving, the types of road they use and the traffic conditions they encounter, all of which lead to a variable rate of exposure to the risk of an accident. Exposure is a term that could be used to encompass the amount of time spent driving or the mileage covered while driving. The concept of exposure in research on driving behaviour is poorly developed and needs to take account of the differences mentioned above. Lester (1991) argues that it is most important for studies to include a procedure for controlling for exposure. The present series of studies uses self-reported driving measures in percentage terms for types and classes of road, days of the week and times of the day, as well as passenger types, rather than a self-report of miles driven. This allows for a direct comparison between groups and individuals with regard to journey types, percentage times on those journeys and the passengers carried. The present study is too small in size for any meaningful comparisons to be drawn from accident involvement or near-miss review; therefore, the measures used concentrate on recording differences between groups on other factors.

5.4. Research design.

This pragmatic research work takes the form of a rolling programme with each subject joining at the start of their driving career and leaving the study after progressing at his/her own pace through to a point at nine months post-test. No time limit was set for subjects to pass either the theory or practical driving test. This was done to ensure that the learning to drive process was as representative as possible.

5.5. Aims of the study.

The studies presented in this thesis consist of four cross-sectional and two inter-linked longitudinal studies that were designed to assess the impact of two classroom-based interventions aimed at modifying driving related attitudes and behaviour of new drivers in comparison to the normal process of driving licence acquisition.

5.6. Subjects.

In all 219 male and 232 female subjects (n=451) were recruited to the study. The mean age of the subjects as they started the project was 17.3 years (SD = 0.8). The subjects were divided into one of three groups. The subjects in Group 1, after joining the study learned to drive and pass the driving test in the manner that was most suitable for them. The subjects in Group 1 were used for comparison purposes, representing a standard method of learning to drive. Group 1 subjects also completed the questionnaire schedule

as detailed below. The subjects in Group 2, the pre-driver training group, in addition to the questionnaire schedule, were required to attend a classroom-based pre-driver training programme while learning to drive. The subjects in Group 3, the post-driver training group, had the same questionnaire schedule as groups 1 and 2 but in addition were required to attend a classroom-based post-test intervention within three months of passing their driving test.

The subjects were mostly recruited through Approved Driving Instructors (ADIs). (On some occasions subjects had heard about the project through the press and approached the researcher themselves or were recommended to the study by their friends.) Both the subjects and the ADIs were paid for their participation. Differential rates of payment were made to both ADIs and subjects depending on their involvement with the study. (Details of the payments are given Paragraph 5.9 entitled Payments)

5.7. Criteria for entry.

Only subjects that met the following criteria were allowed into the study*. At the time of entry to the study the subject was to be between 17 and 21 years of age (both ages

*(Note: the present study was funded by the Scottish Road Safety Campaign, which is a Department of the Scottish Executive, a Government body. The Department of the Environment Transport and the Regions make stipulations that research of this type must not cause people to start to learn to drive. Therefore only current holders of provisional driving licences were admitted.)

inclusive). Subjects were to be the holders of a valid provisional driving licence for a motor car prior to the date that application was made to the study. Subjects also had to give an assurance that they would have access to a motor car after they had passed the practical driving the test so they could continue driving.

Subjects also had to give a further undertaking that they would not participate in any other form of formal driver training in their first year post-test. This measure was necessary to stop any effects of other driver training schemes, such as the 'Pass Plus' initiative, that had the potential of confounding the longitudinal aspects of the study.

As most of the subjects were being recruited through ADIs, both the subject and ADI had to affirm that the subject had received no more than two professional driving lessons prior to making an application to join the study. This last criterion was necessary because the maximum time spent on a first driving lesson is generally no more than two hours. (In practise this would allow the ADI to recruit the subject to the study at the conclusion of the first driving lesson.)

5.8. Recruitment procedure, group allocation and learning to drive.

As previously stated the majority of subjects were recruited to the study by ADIs using forms provided by the study (See Appendix E). For each subject recruited the ADI received a payment of £10. This was an incentive payment to ADIs for recruiting

subjects and for the administration work involving introducing the subject to the study, form filling and examining the subject's provisional driving licence.

A rolling system was put in place whereby as one subject was recruited further recruitment forms were dispatched to the ADI. Most subjects were recruited from ADIs working in the 'central belt' of Scotland, consisting of the following regions; Central Scotland; Lothian and Borders Region; Strathclyde Region; and Tayside. The recruitment system for the study spread over thirteen months (from December 1997 to December 1998 both months inclusive). As subjects joined the study they were randomly allocated to one of three groups, Group 1 (standard), Group 2 (pre-driver training) and Group 3 (post-driver training). A system of block randomisation was used to facilitate group numbers for intervention purposes. Block randomisation was accomplished by grouping together subjects that were close together both in terms of the time of registration and geographical area. This was necessary because of the rolling nature of the recruitment procedure and the need to form sufficient numbers within two of the groups for training purposes. The subjects in Group 2, for example, were formed into a series of sub-groups to make up sufficient numbers for the classroom-based interventions to be cost effective.

All the subjects in each group learned to drive through a mixture of professional lessons and private practise. No stipulation was made on the number of professional lessons taken or the number of hours of private practise gained. This was left entirely to the discretion of the subject.

Four questionnaire sets were used in the study (see Appendices A to D). The first of these, Questionnaire 'A', was designed for use as the subject started to learn to drive. Questionnaire 'B' was issued on confirmation that the subject had passed the practical driving test. Questionnaires 'C' and 'D' were issued three and nine months post test respectively (See Fig 5.1).

All four questionnaires used in the research were entitled New Driver Research. A brief introductory paragraph on each questionnaire also gave simple instructions on how the questionnaires should be completed. A statement regarding confidentiality was also given.

Subjects created a log number for themselves using the six digits of their date of birth and their first and last initials e.g. 230667FM. This log number was used to identify the group to which the subject belonged and allowed for the questionnaires to be linked. Subjects thereafter gave their gender, age and occupational status.

Figure 5.1.

Schematic representation of study design. Subjects entered the study at Time 1 and progressed left to right to Time 4.

<u>Time 1</u>	Learning to drive period.	<u>Time 2</u>	3 month driving period.	<u>Time 3</u>	6 Month driving period	<u>Time 4</u>
Q'aire A		Q'aire B		Q'aire C		Q'aire D
Group 1		On driving test pass		Test pass plus 3 months		Test pass plus nine months
Group 2	Pre-driver education.					
Group 3			Post-driving test intervention			
<u>Time 1</u> April 1997		<u>Time 2</u>		<u>Time 3</u>		<u>Time 4</u> March 2000

5.9. Payments.

The amount paid to the subject was determined by the group to which they were randomly allocated. Subjects in Group 1 received £25 in staged amounts. A first payment of £10 was paid on receipt of the first two questionnaires, with a second payment of £15 made on receipt of the last questionnaire. Subjects in Groups 2 and 3 received £50 for their participation again in staged amounts. For subjects in Group 2 a first payment of £20 was made after attendance at the pre-driver education course, the subjects having already completed the first questionnaire. A final payment of £30 was paid following receipt of the project's three other questionnaires. Subjects in Group 3 received payment of £25 at their attendance at the post-test driver training intervention; the subjects in this group had already completed the study's first two questionnaires. A second payment of £25 was paid after receipt of both questionnaires 'C' and 'D'. The rationale behind the

payment schedules was that subjects in Groups 2 and 3 had a greater time involvement with the study than those subjects in Group 1. The payment schedules were also end-loaded as an incentive to the subjects to complete the project. While subjects were left to report their own driving test pass, as an additional measure the subject's ADI was paid an additional £10 by the study to report to the author on his/her pupil's success in the practical driving test.

5.10. Subjects in Group 1.

After completing a registration process and Questionnaire A the subjects in Group 1 started learning to drive. Unlike the other two groups in the study the subjects in Group 1 were dealt with individually and only by post. After notification of a driving test pass was received Questionnaires B, C and D were sent by post as per the research schedule (Table 5.1).

5.11. Subjects in Group 2.

In addition to the registration process and completion of Questionnaire A, the subjects in Group 2 were required to attend a classroom-based pre-driver education course (see below) prior to sitting their practical driving test. After the author had received notification that the driving test had been successfully passed, Questionnaires B, C and D were sent by post as per the research schedule (Table 5.1).

5.12. Group 2, pre-driver education.

The subjects in Group 2 had the same questionnaire schedule as Group 1. In addition, however, while this group was actively in the process of learning to drive they were required to attend a pre-driver education course. Through a system of 'block randomisation' small sub-groups of subjects were formed from all new applications received. By this method seven sub-groups of approximately 25 subjects were formed to make the entire study sample for Group 2. When this number of applications was reached the subjects were asked to attend at a local venue on one afternoon for the classroom-based driver education course involving a 'standardised' pre-driver training programme.

5.13. Group 2, pre-driver education delivery.

The seven pre-driver training sessions were held between May 1988 and December 1988. Pre-driver training sessions were always held on a Sunday afternoon. The pre-driver training programme was delivered on each occasion by the same police sergeant and police constable from the Accident Prevention Unit of the local police force, Central Scotland Police. The presentation was kept as uniform as possible by use of a computer generated presentation slide show and script. Six of the pre-driver training sessions were held at local conference facilities in Police Force Headquarters, Stirling, and one session was held at a police training facility in Dundee. The researcher for the project was also in attendance for these training sessions.

Prior to constructing a pre-driver education course the following persons, all experts in the field of road safety, were consulted (by personal interview) to establish what, in their opinion, were the major issues surrounding the education of young drivers at the time of the study, how these issues are dealt with by the road safety profession in general and to identify examples of best practise (Ms Fiona Murray, Director, Scottish Road Safety Campaign; Mr Michael McDonnell, RoSPA; Sgt John Eggo, PC James Chalmers, and PC Patricia Grant, all of the Accident Prevention Unit, Central Scotland Police; Sgt William Milven, Dumfries and Galloway Constabulary; Mr Paul Richardson, Road Safety Manager, Lothian and Borders Police; Mr Donald Yard, Road Safety Organiser, Fife Constabulary Road Safety Unit; Mr Alastair Joss, Road Safety Supervisor, Tayside Police; Sgt John Copland, Strathclyde Police Young Driver Project; Mr Bill Smith, Senior Road Safety Officer, Glasgow City Council; Mr Mark Williams, BSM-Ignition Programme; and Dr Michelle Meadows, Division of Psychology, Staffordshire University). The issues identified as important by these professionals suggested that lack of knowledge about the driving task was the important issue and therefore an educational background formed the theoretical perspective for pre-driver training.

After the interviews above and visits to a selection of pre-driver education courses a 'generic' type of pre-driver training course was constructed for use in the study. The course content for the present study gave comprehensive coverage to all the major issues that were raised through the consultation and review process. The resultant pre-driver

training course lasted approximately three hours. It was delivered as two one and a half hour modules by police officers with experience in road safety and public presentations.

5.14. Description of classroom-based pre-driver training course.

The presentation was broken down into two major parts with several sub-subsections in each part. Part 1 had the following sections; (1) why the need for pre-driver education; (2) the effects of road accidents; (3) driver education, issues in general; (4) the driving licence; (5) insurance issues; (6) vehicle testing and learning to drive.

Throughout the presentation 14 video clips, drawn from materials widely available, were shown to illustrate and reinforce the topics under discussion. For example, the opening video clip was used to show that young people do get injured and killed in road accidents and how some elements of society even have a flippant attitude towards the issue (Scottish Road Safety Campaign Advert; 'What a waste of a good motor').

5.14.1. Section (1). Why the need for pre-driver education.

The aim of this section was to raise awareness within the group with regard to the dangers associated with the improper use of the motor car. This section also explored the reasons surrounding why pre-driver training courses may be necessary. Furthermore, this section reviewed road accident statistics with regard to the over involvement of new drivers in road traffic accidents.

In addition to a review of national statistics for the United Kingdom, more relevant Scottish young driver accident statistics were explored including, for example, the numbers of new drivers that are killed, on average, every week in Scotland and how many are seriously injured. The use of accident statistics was expanded further in the first section of the presentation to include information on the specific types of accidents that new drivers were likely to be involved in, for example, single vehicle accidents, accidents involving loss of control of the vehicle and accidents during the hours of darkness.

The content of this section also included the information tested for in Part 6, Questionnaire B (specific knowledge items, see Chapter Seven). As part of this first section discussions were initiated with regard to why these specific types of accidents occur amongst new drivers, what were the possible causes of these accidents and why some young drivers become accident involved and others do not. Some solutions were also put forward by the presenters to simulate debate; for example, were new driver accidents (described above) due to lack of experience, effects of peer pressure, the result of showing off or was it because the new drivers did not recognise dangerous situations early enough?

Through the exploration of road accident statistics in this manner it was thought by road safety professionals that a heightened sense of awareness of the possibility for a road accident might result and thereby the respondents may modify their subsequent behaviour.

5.14.2. Section (2). The effects of road accidents.

In the second section of the education programme issues were explored surrounding what types of people could be affected as a result of a road traffic accident. The rationale for this section was that being a driver involved in a road traffic accident may involve a number of people who may make judgements as to their driving capabilities. Moreover, other issues such as non-financial personal costs may be involved such as personal embarrassment, remorse and/or shame.

This section also included a discussion and the respondents were asked to explore who were the people and services that would be most likely involved in the aftermath of a road accident. Examples of the issues to be covered by the presenter included; the victim, the police, ambulance and fire service, hospital staff, general practitioners, an undertaker, the courts, insurance companies, employers, recovery vehicles, utility companies, the media, the local roads department and witnesses. The role these people and services played with regard to road accidents was discussed. In addition further issues were explored in this section such as feelings of personal remorse, grief, blame, the effects of injuries, recovery time, possible disfigurement or disability.

The discussions in this section also explored other effects such as financial costs, insurance costs, compensation costs, loss of vehicle costs, criminal convictions, fines, other punishments, imprisonment, points on licence, loss of employment, loss of mobility and loss of friendships.

The intention of this section of the education course, as far as road safety professionals were concerned, was that through the exploration of the likely consequences of road accidents the respondents would have a fuller appreciation of the potential results of their actions and therefore they would be less likely to engage in aberrant driving behaviours.

5.14.3. Section (3). Driving and educational issues.

The purpose of this section was to bring together the issues raised in the two previous sections and for the subjects to discuss what role they thought pre-driver education had, if any, in attempting to address the problems of new drivers. This section was designed to allow the subjects to propose their own solutions and by working through the issues involved, they would obtain a better understanding of the significant accident problem posed by new drivers. To stimulate debate a series of questions were posed to the subjects; for example; how could the problem of young drivers best be tackled? Is education the main issue, if so who needs to be educated and how might this be done?

5.14.4. Section (4). The driving licence.

In this section the driving licence, its requirements and purpose were discussed. The subjects were informed that a driving licence is a screening device for age, illness and/or disability, that it provides a central driver record and it gives each person a unique driver number for life. The subjects were invited to comment on various topics regarding driving licences; for example, what does a driving licence mean to them? Issues of

freedom of travel, employment opportunities, independence and choice were the anticipated responses. The respondents were also asked to imagine their feelings when they successfully pass their driving test, how valuable the driving licence would be and to imagine issues surrounding how a driving licence may be lost.

By discussing the topics in this section it was intended that the subjects would appreciate more that a driving licence had to be gained and could be lost. In relation to losing a driving licence the provisions of the New Drivers Act (1997) were also discussed. (These provisions placed tighter restrictions on new drivers. From 1 June 1997, new drivers, regardless of age, who accumulate 6 or more penalty points as a result of tickets issued for traffic offences or imposed by a court, in the first two years after passing the driving test, return to the status of a learner driver. This is half the normal quota of 12 penalty points.) The ways of being awarded penalty points, such as being caught for speeding, careless and inconsiderate driving or failing to report a road accident, were discussed in relation to the safety benefits this legislation provided and why it was deemed necessary to enact legislation of this type.

5.14.5. Section (5). Motor vehicle insurance.

The loading of insurance premiums for new drivers was used as an illustration of how the insurance industry viewed the performance of new drivers with regard to risk.

This section of the pre-driver education programme evaluated the benefits and pitfalls of different types of insurance cover that were generally available at the time and the establishment of a no claims bonus. From a road safety perspective the issue of third party insurance and how this placed most of the onus of trying to avoid accidents on the holder was discussed. The difference with regard to fully comprehensive insurance was discussed including the issue of added cost.

Discussion also took place on additional insurance implications for new drivers; for example, the determinants of the costs of motor insurance and the impact on insurance premiums after being involved in an accident or motoring offence. Further discussions took place surrounding the issues of age, gender issues, driving experience, effects of vehicle choice and the implications resulting from previous accidents and/or convictions.

This section was also linked to section 2 above with regard to the essential elements of compensation for loss of life/injury, damage to property, damage to other vehicles and payment of emergency treatment or ongoing medical care. Parallels were drawn throughout this section with the cost of premiums being linked to experience and how, as this grows, premiums fall. The rationale for this section was that if new drivers were more cautious at the start of driving on their own the costs of insurance premiums might fall more quickly. This financial aspect of driving, the possibility of financial penalty for aberrant driving, is seen by road safety professionals, along with issues of enforcement, to be a core part of a working strategy to reduce road accidents.

5.14.6. Section (6). Vehicle testing, vehicle purchase and learning to drive.

The important issues surrounding the proper care and maintenance of vehicles were also raised. Basic information regarding the annual testing of vehicles over three years old and the resultant safety benefits were examined. The purpose of this section of the presentation was to reinforce the responsibility placed on drivers to keep their vehicles in road-worthy condition. In describing the requirements of the Ministry of Transport Test (MOT), further information was provided such as when a MOT test is required and how the certificate is obtained including the costs, what vehicle parts are tested, how long a test takes and how long the MOT certificate is valid for.

Also included in this section were issues surrounding the Vehicle Excise Licence, purchasing vehicles and making the final preparations before starting to drive.

In the final part of this section issues regarding learning to drive were discussed: for example, advice on the theory test, the content, how to prepare for the theory test and the current pass mark. The requirements of a practical driving test were also covered along with information on those people who are permitted to accompany learner drivers and those who were allowed by law to charge money for driving lessons.

At the conclusion of this section of the course a summary was given that included a reiteration of the information tested for in Part 6, Questionnaire B (specific knowledge items, see Chapter Seven).

The second part of the pre-driver education course concentrated on aspects of driving post driving test and consisted of a further 7 sections; (7) peer pressure; (8) HO/RT procedures; (9) The Vehicle Defect Rectification Scheme; (10) fixed penalties and conditional offers; (11) what to do if you are involved in an accident; (12) hazard perception skills; (13) attitudes and behaviour; (14) The New Drivers Act; and (15) a guide to better driving.

5.14.7. Section (7). Peer pressure.

It was felt by those consulted in road safety that peer pressure was a major issue facing the new driver. Through a discussion with the subjects, peer pressure was clearly identified and how it might affect them as the driver of a vehicle. The major issue involved in peer pressure, how to say no, was explored through group discussion. The key factor in this section that was reinforced was that legal responsibility for safety lies with the driver.

5.14.8. Section (8). Producing driving documents.

Police officers in the United Kingdom have the power to require the driver of a vehicle on the road to produce the relevant documents regarding the use of that vehicle on the road. For this section of the course it was noted that a constant threat to new drivers was the possibility that they could be stopped at any time and asked to produce documents. This was seen as an important issue. Failure to produce the required documentation may

result in prosecution and any subsequent punishment may result in changes to the status of their driving licence and may also result in an increase in insurance premiums.

The rationale behind this section of the course was that from a road safety perspective the police powers to stop and check drivers were mostly applied (through experience from a police perspective) to the young drivers as a direct result of the major costs involved in buying and operating a vehicle. This placed a greater emphasis on the young driver to ensure that he or she was fully legal as far as documentation was concerned and that the vehicle was in a road worthy condition because the threat of a police stop was greater to them. This section was linked to the previous section on insurance, Section (5).

5.14.9. Section (9). The Vehicle Defect Rectification Scheme.

Also with regard to the potential effects of legislation, in the United Kingdom an official scheme exists for the correction of minor vehicle defects found by police. Repairs must be carried out, the vehicle presented to any MOT testing station and the defect repair form returned to the police within 21 days, or a prosecution may result. A discussion surrounding the financial implications of having sufficient funds to keep a vehicle roadworthy and the resultant safety benefits was used to explain the rationale behind this scheme. The issue of obtaining penalty points for driving a defective vehicle and the resultant implications as far as the New Drivers Act, 1997, was concerned, were also fully explained.

5.14.10. Section (10). Conditional Offers.

A 'Conditional Offer' is a conditional offer to pay a fixed penalty in lieu of prosecution for certain road traffic offences. The implications of this legislation is that motoring offences are more easily dealt with by the police service and do not require complicated court procedures. From a road safety perspective this means that drivers are more likely to be stopped and processed for road traffic offences. Awareness of this issue was seen as a controlling factor for new drivers in combination with the New Drivers Act, (1997), in carrying an increased threat for new drivers with the halving of the required number of penalty points for disqualification (see section 4). The offences involved in the conditional offer scheme and a description of how the scheme worked was given.

5.14.11. Section (11). What to do if you are involved in a road traffic accident.

Advice was given to the subjects with regard to the safety and legal issues that result from becoming involved in a road traffic accident, including anecdotal evidence from the presenters. This section helped in illustrating to the subjects that road accidents are in fact relatively common occurrences as far as the police were concerned and that people were actually being killed and injured.

5.14.12. Section (12). Hazard perception skills.

Two video clips were used for this section (The Five Habits, British School of Motoring, 1994). On each occasion the subjects were asked to look well ahead on the video and try to anticipate any hazards that may arise. The purpose of this part of the training course was to illustrate that safer driving does result from better observations, anticipating possible occurrences and being prepared to react. This section allowed for more interactivity with the subjects as they were challenged to list possible hazards appearing on the videotape. The point was also made by the presenter that the basis of police driver training is built around better forward observations. The use of this type of information is built around the suggestion that the subjects thereafter have the opportunity to emulate police drivers and that this could be accomplished by better observation techniques.

5.14.13. Section (13). Attitudes and behaviour.

To illustrate and attempt to modify attitudes and driving behaviours several specific examples of driving were explored. Issues like impatience in traffic were covered by video clips illustrating that speeding in town does not actually shorten journey times and that the controlling factors in this instance is the time spent sitting at traffic lights. Speeding away from traffic lights was also discussed along with the concept of timed sequential traffic lights to illustrate the futility of this behaviour. Questions were posed to the subjects with regard to aberrant driving behaviours; for example, if you do manage to save 20 seconds in a journey across town, what are you going to do with that time?

A broad discussion took place in this section surrounding many post-test issues; for example, the subjects were asked to describe the factors that people used in the identification of boy racers. The specific behaviours forthcoming were then explored. The rationale from a road safety perspective of this section was to identify and discuss socially unacceptable driving behaviours.

5.14.14. Section (14). Special issues for new drivers.

The specific problems that may affect new drivers just after test pass were explored. The subjects were asked to discuss if it was likely that they would still drive in the style they had been taught by their driving instructor and, if they would not, why not? Discussions also took place about the issues of the self-perceived faster reaction times of youth and any resultant implications of this issue. This issue was discussed in relation to the inexperience of new drivers and their apparent inability to react to situations that were both dangerous and new to them.

5.14.15. Section (15). A guide to better driving.

In this final section advice was given to the subjects on how to become a better driver. For example, it was suggested that if passengers can relax in the car while they are driving this might be positive sign that they are respected as a driver. Advice was given to be patient after passing the driving test and allow time to gain experience before

thinking of changing driving styles from that taught by family, friends or driving instructor.

Further discussions took place with regard to how the subjects could assess themselves as to whether or not they were more or less likely to become accident involved. For example, it was explained that those drivers who chose to speed, close follow or generally commit driving violations, were more likely to be involved in accidents than others.

Before the presentation was concluded a summary was given once again including the information tested for in Part 6 of Questionnaire B (specific knowledge items, see Chapter Seven).

While the classroom-based pre-driver education programme concentrated on the major issues, that were identified by the experts consulted as being of particular relevance new drivers, no particular scientific theory or structure was apparent, other than simple education. It would appear that if any rationale were being applied then it would be that, through the identification of specific problems highlighted by experience in road safety, and, providing specific information and guidance on these topics, the new drivers would modify their subsequent behaviour accordingly. In contrast to this the post-driver intervention was more theoretically based.

5.15. Subjects in Group 3.

In addition to the registration process and completion of Questionnaire A the subjects in Group 3 were required to attend a classroom-based post-driving test education course (see below) within three calendar months. After the author had received notification of a successful driving test pass, the post-test intervention was organised and Questionnaires B, C and D sent out by post as per the research schedule (Table 5.1).

5.16. Group 3. Post-driving test intervention.

Subjects in Group 3 had the same questionnaire schedule as Groups 1 and 2. In addition to this they were required to attend a post-test intervention during the three-month period between the date the subjects had passed their practical driving test and a date three calendar months thereafter. As subjects reported to the author on having passed the practical driving test they were formed into sub-groups of between 15 and 25 and required to attend at a local venue for the post-test intervention.

5.17. Group 3. Post-driving test, delivery.

Between November 1998 and January 2000 a series of six new driver awareness presentations were given to Group 3 subjects. To correspond with the classroom-based pre-driver education training, each session lasted three hours, which was split between two, one and a half hour sessions. The sessions were always held on a Sunday afternoon, in all cases at conference facilities in a local hotel. The author facilitated this training and

was the only person present other than the subjects. The presentation was kept as uniform as possible by means of a computer generated presentation slide show and script.

5.18. Group 3. Post-driving test content.

5.18.1. Introduction.

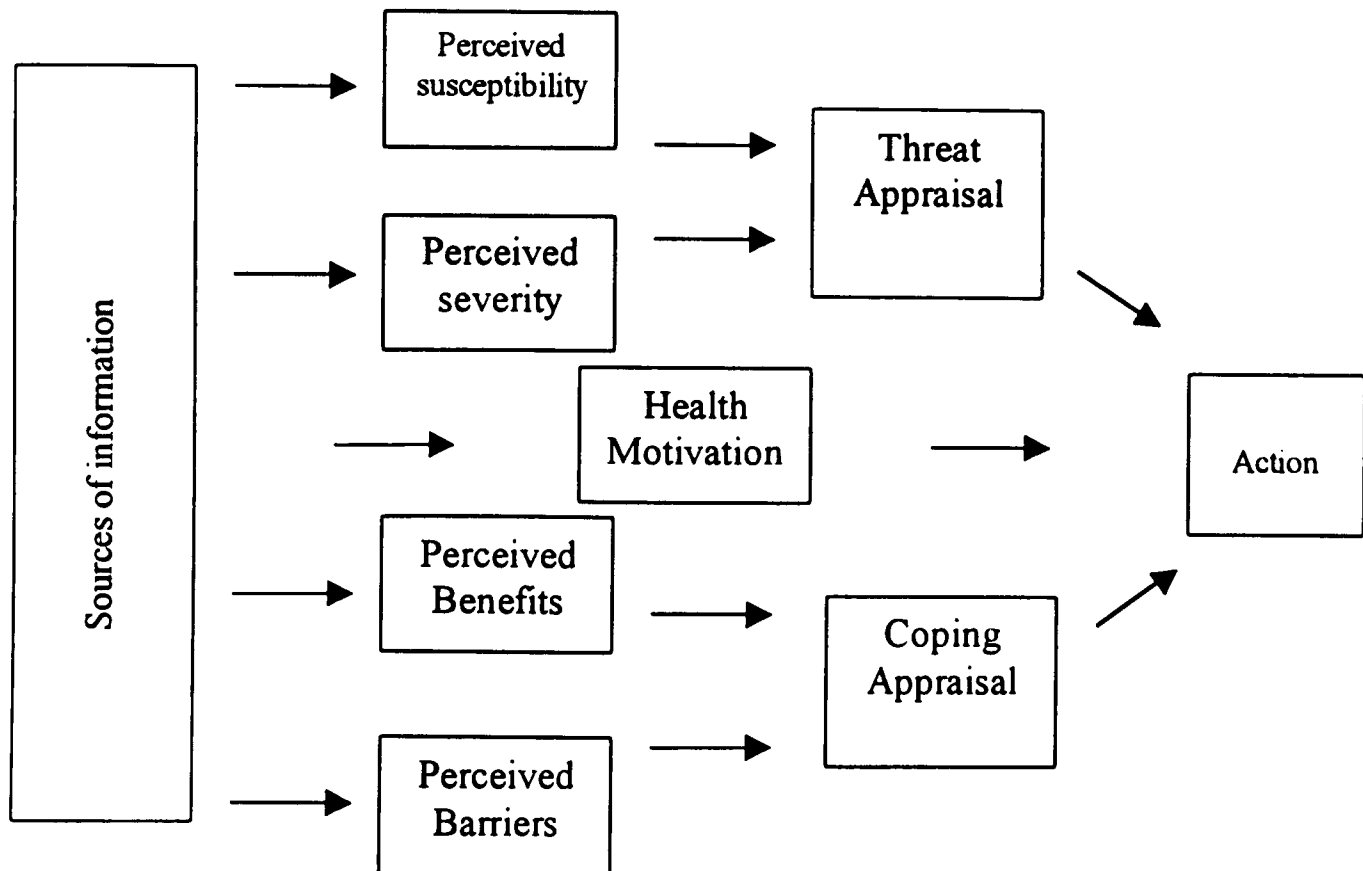
The classroom-based post driver intervention programme was informed by a combination of constructs from two social cognition models the Health Belief Model (HBM) (Rosenstock, 1974) and Protection Motivation Theory (PMT) (Rogers, 1975, 1983) (see Figure 5.1, Figure 5.2 and Chapter Four).

The constructs of both these models were combined and operationalised with the aim of increasing the sense of personal vulnerability and personal threat felt by the subjects as a result of their status as new drivers.

The intervention used videotaped material that was generally available to road safety practitioners, computer graphics and peer discussion groups to explore topics such as; personal vulnerability; risk taking behaviours; benefits and barriers to risk taking; volitional and non-volitional risk taking; personal beliefs about driving issues; false beliefs, unrealistic optimism; additional motives while driving; errors, lapses and

violations while driving; subjective norms; significant others; perceived behavioural control; peer pressure; responsibility and social expectation.

Figure 5.2. Combined model of HBM and PMT.



In dealing with issues designed to increase the 'perceived personal threat' for the subjects the definition of threat within the model comprised three components. Firstly, the perceived threat to the subject is that of death or serious injury to themselves or others resulting from their potential driving actions; secondly, the threat of damage to their vehicle or a financial penalty involved in their aberrant driving; and thirdly, a threat of some other action such as prosecution or personal embarrassment that would be likely to arise through their personal maladaptive driving choices. The model (Figure 5.2) would therefore prescribe; (1) that the post-test intervention should increase the

perception of personal vulnerability and susceptibility to the threat; (2) increase the perceived severity and outcome of the threat; (3) increase the benefits of behaviour designed to avoid the threat; and (4) reduce the perceived barriers to changing the maladaptive behaviour. It would follow that a greater level of perceived threat and threat appraisal, in conjunction with an increased expectation of the perceived benefits resulting from the information received during the post-test intervention, would increase the prospect of the success of avoidance measures at the coping appraisal stage, and thereafter lead to the action stage being seen by the respondents as being more easily achieved and beneficial.

In practical terms the intervention was designed to work around peer group discussions, practical examples illustrating salient points and video excerpts. A video clip relative to the topic under discussion punctuated each workgroup and section.

5.18.2. Workgroup 1. Beliefs.

For workgroup 1 the subjects were asked to assess their current beliefs about their own driving ability and how these abilities would compare against the abilities of drivers that had started driving when they were 17 and were now 25, 35 or 45 years of age. The subjects were asked to note the factors that arose in their discussions in relating their current ability in relation to these other groups.

The target issues to be discussed included; differences in level of skill, driving knowledge, differences in reaction times, experience, personal maturity and any benefits that may have accrued from additional training that may have been undertaken by older drivers (advanced driving, for example).

Under review in this section were the beliefs held by the subjects with regard to their driving ability at this time. This section allowed the three constructs; perceived susceptibility, perceived severity and threat appraisal in relation to road accidents to be explored. The issues identified were discussed by the facilitator within the group in such a way that subtly lowered the level of skill claimed by the subjects while at the same time slightly exaggerating the values attributed to the more mature drivers. Where perceived benefits of age were identified in the discussion these would also be highlighted.

5.18.3. Workgroup 2. Car control.

The subjects were asked to describe in workgroup 2 what they understood by the term 'car control'. The purpose of this workgroup was to explore and undermine the feeling of unrealistic optimism held by most drivers with regard to their own driving ability (Svenson, 1981). For example the subjects were informed that 95% of all accidents in the United Kingdom result from human error, yet most drivers consider themselves to be above average drivers; this, of course, cannot possibly be the case. Again, the rationale for this workgroup was to undermine feelings of perceived high levels of driving skill.

5.18.4. Section 1. A review of young driver accident statistics.

For this section a series of graphics highlighted, through a review of the road accident statistics, the number of casualties both globally and locally that result, on average, from the use of the motor car. Special care was taken to describe the local statistics in a meaningful way that would create additional impact. For example, the rate of those killed on the road in the United Kingdom at the time of the presentation was approximately 450 persons each month. In the presentation this was described as the equivalent of a 'Jumbo jet' crashing each month. This allowed for rhetorical questions to be posed, such as if a 'Jumbo jet' was crashing every month back to back would you have any concerns with regard to the safety of this aircraft? By this technique, it was thought possible to increase the level of perceived threat and their susceptibility to that threat as new drivers.

5.18.5. Workgroup 3. The process of learning to drive.

In this section of the presentation the process of learning to drive, as described by Fitts and Posner (1967) (in Evans, 1991), was explored. Questions were posed in this workgroup that included; how do we learn to drive? What do we mean by driving? Is driving just physical car control? Is driving more a mental skill than a physical skill? And, what new skills, if any, do we need to learn?

The ensuing discussion was used to explore issues, such as; how can we measure our own driving skills? How can we increase our skills? And, how can we be sure that we are

maintaining a high level of driving skill? The same rationale was applied to this workgroup with the skills of the new driver being undermined, and thereby the accident threat increased, while at the same time the perceived benefits of gaining driving experience and adopting the correct driving protocols were enhanced. Also discussed under this topic were the constructs of 'perceived barriers' and 'coping appraisal'; for example, could having to drive slower to be safer reduce the amount of driving enjoyment, and what were the 'trade off' positions?

5.18.6. Section 2. Automatic processing.

The issue of automatic (cognitive) processing was introduced and a link was made to Workgroup 3. As an example of automatic processing the following passage of text was used with the subjects being asked to count how many times the letter 'f' appeared. 'French fireworks are the result of years of scientific investigation combined with the desires of many children'. (Reading being a well established and automatic process it was likely that the smaller words containing the letter 'f', such as 'of', may be missed – which was nearly always the case). The subjects were informed that it was unlikely that they could class themselves as accomplished drivers until most of their driving activities were done at the automatic level.

To reinforce this concept a practical demonstration was given with large empty glass jar and small sweets. Using overtaking as an example, the small sweets were placed one by one in the large glass jar to represent the experience gained from each overtaking

manoeuvre. It was represented to the subjects that several hundred overtaking manoeuvres had to be successfully completed for the jar of experience to begin to fill substantially. It was also represented to the subjects that driving was made up of a large collection of these glass jars, each of which represent a sub-skill within the driving task and, through experience in executing these sub-skills, the jars slowly fill up. It was represented to the subjects at this time that their jars, at least in relation to driving experience, were nearly all empty at this very early stage of their driving career.

This technique was used to illustrate how the learning process takes time, with thousands of small sweets needed to fill up one large jar, and how, for example, there was no particular way this process could be hurried. It was intended through this procedure to explore the concept of threat appraisal and that the threat was greatest when the jars were empty but the potential threat receded through experience, the jars filling up.

5.18.7. Workgroup 4. Risk.

Workgroup 4 was used to explore the concept of risk. A hill-walking example was used to explain differences between novice and expert hill walkers. The subjects were asked to prepare a list of factors that could be used to explain the differences. Through discussion it was facilitated that the many deaths that occur on the hill were due to lack of experience, poor equipment, poor planning or a combination of these factors. The lack of planning issue was used to parallel judgement issues in the driving task. It was explained that the major difference was that the expert hill-walker had past experiences to draw

upon in situations that required decisions to be made with regard to safety. It was postulated that inexperienced hill-walkers were thought to be more likely to make inappropriate decisions through not recognising the circumstances that combined to become exposed on the hill. The parallels of this were again drawn to the driving task. The hill-walking example was also used to bring out issues regarding non-volitional risk-taking, which was introduced as an additional threat in the driving task to which new drivers may be particularly susceptible. It was pointed out that many people often took to the hills and were simply lucky that the weather or other circumstances did not conspire to put them at risk. The links to driving related decision-making were also made with regard to this issue.

The benefits to risk taking were also discussed in relation to sport where risks are often taken to bring tangible benefits to results. The subjects were asked to describe tangible benefits to risk taking in the driving task. If any benefits were suggested these would be reframed by the facilitator arguing that no decisions in the driving task are worth the potential of personal injury or worse. Also explored in this section was society's attitude to risk taking in the driving task, such as personal embarrassment or punishments.

At this point the presentation was summarised with the following emphasis. Road accident statistics revealed that new drivers are especially at risk. New drivers have an overoptimistic view of their own abilities. Driving skills take a good length of time to develop. Younger people appear to take more risks whether they realise it or not.

5.18.8. Section 3. Social responsibility.

In this section driving was described to the subjects as a very social activity involving interactions with other drivers. To raise feelings of personal threat or vulnerability in this section the subjects were informed that society in general, and other drivers in particular, had expectations about their driving that they were duty bound to fulfil. However, this section emphasised that the personal threat or vulnerability in this case was social ineptitude. Driving was described to the respondents as the first overtly adult behaviour in which young people are seen to be engaging. It was explained that other drivers depend on their capabilities and driving performance. The subjects were asked to define how 'boy racers' could be identified. The subjects were also asked to describe benefits of driving in a way that were more socially acceptable.

An additional part of this section was a discussion on the effects of peer pressure and the effect other individuals might have on the way they drive. The subjects were asked to prepare a list of who they thought might affect their driving and what would be the issues that were most likely to arise. This section was geared to explore further the constructs of perceived susceptibility and threat appraisal.

5.18.9. Workgroup 4. Passenger types.

The subjects were given a list of passenger types and asked to provide a score on a scale of 1 to 10 of how important their potential influence could be and how this would

become manifest. Examples of passenger types listed were; parents/carers; your partner; close friends same sex; close friends opposite sex; children and work colleagues such as your boss or subordinates.

Discussions took place on how different passenger types had the potential to affect driving style. A series of questions were posed to the group with regard to driving style; for example; do you drive differently when your are with your partner? Have you an image to maintain? What other motives could affect your driving? What other elements could affect your driving style? What are the affects of close friends same sex? Women - do women drive differently when they are with other women? Men - do men drive differently when they are with other men? In addition, the subjects were asked to determine what differences, within these groups, would occur as a result of changes in age, for example, young men getting older - what changes?

The subjects were informed that driving style is subject to change, not only as a result of the passenger types carried, but also as a result of the specific purpose of individual journeys being undertaken. The rationale for this workgroup was that changing driving style is in itself dangerous especially when very little driving experience is currently available. Personal vulnerability will be increased if deviations from the normal driving behaviour are being made. This section was built around the constructs of perceived benefits, perceived barriers and coping appraisal.

5.18.10. Workgroup 5. Gender effects.

For Workgroup 5 the subjects were asked to try and determine what possible differences could result with regard to gender. Do aspects in the driving task change as a result of being a new female driver as opposed to being a new male driver?

Examples were given to stimulate debate with regard to the types of accidents new drivers are involved in, namely, single vehicle accidents, so called 'disco' accidents (accidents that occur on Friday and Saturday evenings between 8.00 p.m. and 2.00 a.m.) and loss of control accidents. Evidence was presented to the group that new male drivers are more likely to be involved in the above types of accidents than are new female drivers. The question for discussion was then posed as to why this might be.

5.18.11. Workgroup 6. Control.

In this section the subjects were asked to list up to five situations where they might feel the need to drive faster than they normally would. The responses were divided into internal and external influences. An example of external influences discussed was the effect of the engine size of the motor car that makes it difficult to drive at a particular speed limit or where the influence of following drivers 'pushing' from behind is felt.

Discussions focused on the issue that the ultimate control of the vehicle actually lies, internally, with the driver, and that was the basis of road traffic law. Internal influences such as choosing to speed were also discussed. This section was used to illustrate that

road traffic law was a threat to their driving licence and that conformity was a strong incentive through the New Drivers Act, (1997). The constructs of Perceived susceptibility, perceived severity and threat appraisal were also introduced through this perspective.

5.18.12. Workgroup 7. Coping techniques.

Demonstrations were given with regard to three advanced driving techniques that could be deployed to reduce risks and increase the chances of avoiding road accidents. An illustration and a practical demonstration was given that identified the 'normal safety position' in the carriageway, the extended safety position to the offside and the extended safety position to the nearside (The Police Drivers Manual) while driving. This was done through creating a makeshift pretend road within the classroom.

Also within the classroom environment an upturned table and tape were used to illustrate the forward view of a subject sitting in a chair. The subject sat in the chair with two tapes held in one hand on his or her lap. A table was up ended in front of this subject about six feet in front of where he/she was sitting. The tapes were extended out from the subject's lap so they touched the side of the upturned table but continued in a straight line. These tapes represented the sight lines of where the subject could see. The table was then slid away from the seated subject until it was at a point about twelve feet in front of where he/she was sitting. The tapes were then moved inward to touch the sides of the table again. The sight lines at this second part of the demonstration illustrated how a forward

view could be increased by standing off from an object (table). The demonstration was linked to the driving behaviour of close following and how by keeping back from the vehicle in front a better and therefore safer forward view could be obtained. This demonstration was linked to the 'perceived benefits' and 'coping appraisal' constructs as a demonstration of a practical step that can be taken to reduce the chance of accident involvement.

5.18.13. Workgroup 8. The correct following distance.

The importance of following and stopping distances were discussed. A question was posed asking the subjects to describe a technique that they could use in order to be sure that they had adopted the correct following position whilst driving. A practical and participative demonstration followed where the subjects were asked to walk round in a circle following the person in front. When the subject in front passed between two traffic cones that had been positioned on the floor, the subject had to shout out 'one pink elephant two pink elephants' before they were allowed to pass between the two cones. The subject following them, in turn, was required to do the same procedure. This was a practical demonstration of how to apply the two-second following rule from the Highway Code. This practical demonstration was followed up by descriptions of how this technique could be applied while driving on the road. This section had links to all the constructs within the combined model.

5.19. Methodology.

The main differences between the three methods of driving licence acquisition reported in the following series of studies are; Group 1, a standard method of learning to drive; Group 2, a standard method of learning to drive plus the addition of a classroom-based pre-driver training course, this intervention is based on expert opinion from an educational rationale, and Group 3, a standard method of learning to drive plus a classroom-based post-driver intervention designed to increase the perception of vulnerability through the use of altering social cognitions.

5.20. Self-report measures.

Several self-report measures were used in each of the studies presented in Chapters Six to Nine. For ease of reference a detailed description of each measure is given within each of the chapters. These self-report measures were for both the cross-sectional and longitudinal aspects of the study and their frequency of use is shown in Table 5.1.

Table 5.1.

Demographics items, measures and repeated measures used within the series of studies through Times 1 to 4.

Time 1. (See Chapter 6.)	Time 2. (See Chapter 7.)	Time 3. (See Chapter 8.)	Time 4. (See Chapter 9.)
Age and occupational status	Age and occupational status	Age and occupational status	Age and occupational status
Additional Motives	Additional Motives (1 st repeat.)		Additional Motives (2 nd repeat.)
Attitude to Driving Violations	Attitude to Driving Violations (1 st repeat.)		Attitude to Driving Violations (2 nd repeat.)
Driving Intentions		Driving Intentions (modified)	Driving Intentions (modified) (2 nd repeat.)
	Driving Time Estimates	Driving Time Estimates	Driving Time Estimates
	Driver Knowledge Questionnaire		
	Driving Style		
	Driver Skills Inventory	Driver Skills Inventory	
		Police stops and offences	
		Social Desirability Scale	
			Self-reported driving speeds.

(For full details of each measure copies of Questionnaires used are shown in Appendix A (Time 1), Appendix B (Time 2), Appendix C (Time 3) and Appendix D (Time 4).

At Time 1, the subjects had little or no knowledge of the driving task. This allowed little scope for recording driving related information. The age of each subject and their current occupational status however, was recorded. This was important, as drivers still at school, may have different driving patterns to those at work. Thereafter, the formation of a baseline of scores, used for the repeated measures, was desirable. This was necessary in order to establish whether or not the process of learning to drive generated any differences in the measures used. The last measure used at Time 1, a measure of

behavioural intentions in the driving task, was used for predictive purposes (see Chapter 6).

The measures used at Time 2 allowed for any changes in occupational status to be monitored and allowed for the first repeat measure of the Additional Motives and Attitude to Driving Violations Scale. Also at Time 2, a Driver Knowledge Questionnaire and a Driving Style measure were used. These measures were used to detect any self-reported changes that may have resulted from the pre-driver training programme (see Chapter 7). The Driver Skills Inventory (DSI) (Lajunen and Summala, 1995, see Chapter 8) was used at both Time 2 and Time 3. This measure was used to establish any effects of the post-driver intervention, for those subjects in Group 3, which had occurred between Time 2 and Time 3, and, to allow for further comparison between all three groups in the study. Also included at Time 2, was a measure of Anticipated Driving that could highlight differences between groups.

At Time 3, the DSI was used for the first repeated measures analysis (see Chapter 8). With the subjects having three months driving experience at Time 3, the Driving Time Estimates measure given at this time allowed for between group comparisons to be made. Also used on this occasion was a measure that recorded the number of times the subjects had been stopped by the police whilst driving, as this was thought to be another measure that could differentiate between groups. The Social Desirability Scale (Crowne and Marlow, 1960) was used at Time 3 to test for subject's response biases (see Section 5.2 in this Chapter). A modified measure of Behavioural Intentions was introduced at this

point in the study as it was thought that subjects, at this point in their driving career, would have a good understanding of the driving task. This measure was repeated at Time 4, six months later.

At Time 4, nine months post-test, was the third and final repeat of the Additional Motives measure and the Attitude to Driving Violations measure (see Chapter 9). In addition, there was a second repeat of Driving Time estimates and the modified Driving Intentions measure. Moreover, a further measure, Self-Reported Driving Speeds, was also introduced at Time 4. This allowed for comparison between all three groups on self-reported speed selection on various road types.

5.21. Pilot and preparatory work.

A measure of Additional Motives in driving task and a measure of Driving Intentions were developed especially for use within the study. These measures were piloted using a small sample of post-graduate university students (n=40), age range 22-30 years, to test for the clarity of the questions or statements used and to assess the reliability of the measures. The student subjects, as well as completing the questionnaires, were asked to comment on the design of the questionnaire and the formulation of both the questions and statements as developed. No adverse comments were received. The pilot study also indicated that both measures had good internal reliability, with alpha values of .68 for Additional Motives and .71 for Driving Intentions, using the Cronbach Alpha test (Cronbach, 1951).

5.22. Merging of groups for Chapter Seven.

The results presented in Chapter Seven refer to only two groups Group 1 and Group 2. This chapter reports primarily on any effects that resulted from attendance at the classroom-based pre-driver training course. For comparison purposes only the subjects in Group 1 and Group 3, those subjects who did not attend the training, were combined to make a one single control group, Group 1 for this study only. The integrity of Group 2, those subjects who did attend the training, remained the same throughout the series of studies.

5.23. Social desirability

Social desirability was controlled for in the present series of studies through the use of the Marlowe-Crowne Scale (Crowne and Marlowe, 1960). This scale consists of 33 items that are rated true or false as they relate to the respondent. The scale is interpreted through the resultant mean score for each subject. The responses underlined in the next paragraph are scored and summed to provide a total score (between 0 and 33). The Scale was included in Questionnaire C (Time 3) and was used in conjunction with checking of data for normality, outliers, skewness, kurtosis and multicollinearity. Previously, the mean score on the scale for a sample of 120 students was 13.72 (SD 5.78) (Crowne and Marlowe, 1960) and for 608 undergraduates 15.00 (SD 5.91) (Reynolds, 1982). For the present series of studies the mean scores of the subjects were 16.31 (SD 5.18). The mean

scores of all the subjects were plotted on a 'box plot' type graph (SPSS 10), to identify outliers. As none were found no subjects were excluded.

The items are as follows 1. Before voting I thoroughly investigate the qualifications of all the candidates. True or False. 2. I never hesitate to go out of my way to help someone in trouble. True or False. 3. It is sometimes hard for me to go on with work if I am not encouraged. True or False. 4. I have never intensely disliked someone. True or False. 5. On occasion I have had doubts about my ability to succeed in life. True or False. 6. I sometimes feel resentful when I don't get my way. True or False. 7. I am always careful about my manner of dress. True or False. 8. My table manners at home are as good as when I eat out in a restaurant. True or False. 9. If I could get into a movie without paying and be sure I was not seen I would probably do it. True or False. 10. On a few occasions, I have given up doing something because I thought too little of my ability. True or False. 11. I like to gossip at times. True or False. 12 There have been times when I felt like rebelling against people in authority even though I knew they were right. True or False. 13. No matter who I am talking to, I'm always a good listener. True or False. 14. I can remember 'playing sick' to get out of something. True or False. 15 there have been occasions when I took advantage of someone. True or False. 16. I'm always willing to admit when I make a mistake. True or False. 17. I always try to practise what I preach. True or False. 18. I don't find it particularly difficult to get along with loud-mouthed, obnoxious people. True or False. 19. I sometimes try to get even rather than forgive and forget. True or False. 20. When I don't know something I don't mind at all admitting it. True or False. 21. I am always courteous, even to people that are disagreeable. True or

False. 22. At times I have really insisted on having things my own way. True or False. 23. There have been occasions when I felt like smashing things. True or False. 24. I would never think of letting someone else be punished for my wrong-doing. True or False. 25. I never resent being asked to return a favour. True or False. 26. I have never been irked when people expressed ideas very different from my own. True or False. 27. I never make a long trip without checking the safety of my car. True or False. 28. There have been times when I was quite jealous of the good fortune of others. True or False. 29. I have almost never felt the urge to tell someone off. True or False. 30. I am sometimes irritated by people who ask favours of me. True or False. 31. I have never felt that I was punished without cause. True or False. 32. I sometimes think when people have a misfortune they only get what they deserve. True or False. 33. I have never deliberately said something to hurt someone's feelings. True or False.

5.24. Drop out rates.

Chapters Six to Nine report the major findings from this research. The sample size for each of the four individual studies is shown in the Method section of each chapter. It will be noted that the samples reduce as subjects drop out of the research for various reasons. The recruitment period for the study was from 1 January 1998 until 1 April 2000 during which time the cohort was formed (n=451). In total 174 subjects completed all aspects of the study. At the time the study concluded in April 2000 a total of 95 (21%) subjects were considered to still be actively involved in the study but had not yet had been successful in passing the practical driving test. In addition a further 148 (32%) subjects

failed to complete the research schedule for various reasons. Table 5.2 shows details and the group membership of those subjects who completed the research and those who were non-completers.

Table 5.2, Subjects and the attrition rate for the study.

Subjects	Group 1	Group 2	Group 3	Totals
Entered	176	123	152	451
No test on time	38	24	33	95
Dropped out before Time 2	35	31	53	119
Dropped out before Time 3	10	5	14	29
Dropped out before Time 4	13	13	8	34
Completed	80	50	44	174

Subjects were deemed to have dropped out of the study for a variety reasons. Subjects in all groups were disqualified from the study if they failed to notify the author of the study within 14 days of passing the practical driving test. Subjects in Group 2 and Group 3 were disqualified from the study if they failed to attend the pre-driver training or the post-driving test interventions respectively. Subjects were also deemed to have dropped out of the study if they did not return the questionnaires issued to them within the required time scale. A comparison of subjects who dropped out of the study and those who completed is assessed in both Chapter Eight and Chapter Ten.

Chapter Six.

Keeping to the speed limit: the intentions of learner drivers to adhere to the legal and social conventions of driving. An application of the Theory of Planned Behaviour.

6.1. Abstract.

This study was designed to test the ability of the Theory of Planned Behaviour (TPB) to predict the intentions of new drivers to conform to the social and legal conventions of driving behaviour with regard to speeding. According to the TPB model, behavioural intentions are the immediate precursor to actual behaviour and are formed through an interaction of three determinants, attitudes, subjective norms and perceived behavioural control. A sample of novice drivers with less than 2 hours professional driving instruction (n=449) was surveyed with a questionnaire designed to measure these constructs. The results showed that the TPB accounted for 34% of the variance of behavioural intentions with regard to speed choice and rule compliance using the above constructs and gender as predictor variables.

6.2. Introduction.

Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA) describes a model that can be used to predict intention and behaviour. The TRA suggests that behavioural intentions are likely to be the best predictors and immediate precursors of subsequent

behaviour. In the model behavioural intentions are seen as being formed through two determinants, the individual's attitudes or beliefs towards the behaviour in question and his or her subjective norm, which is the approval of the actor's important referents with regard to the consequences or outcomes of performing the behaviour, weighted by his or her motivation to comply.

A shortcoming in the TRA is that its applicability is limited only to behaviours that are under volitional control. Unfortunately, many types of social behaviour cannot be described as being completely volitional. As Parker et al. (1992) point out, the non-volitional aspects of driving behaviour and driving violations arise in the driving task as a result of both internal and external non-volitional factors such as knowledge of the speed limit, pressure from other traffic and the performance capabilities of the vehicle being driven.

To allow for the inclusion and prediction of behaviours that are not entirely under the control of the individual Ajzen (1985, 1988), proposed an extension to the TRA by suggesting a third determinant of behavioural intentions, perceived behavioural control.

Perceived behavioural control is the degree to which an individual feels that his or her performance or non-performance of a behaviour is under his or her own volitional control. The essence of this factor is the ease or difficulty for the actor in the performance of the desired behaviour in terms of time, action, target and context. Unlike Rotter's (1954, 1966) internal-external locus of control scale where attention is focused,

at least in part, on control over health at a general level, perceived behavioural control may be directly targeted toward specific behaviours.

The inclusion of this third determinant into the TRA formed The Theory of Planned Behaviour (TPB). The TPB has since attracted much attention and has been used in a variety of areas of interest including research into ecstasy use (Conner and Sherlock, 1993), aberrant driver behaviour (Parker et al., 1992), dental behaviour (Beale and Manstead, 1991), intention to exercise (Godin and Gionet, 1991) testicular self-examination (Brubaker and Wickersham, 1990) and cigarette use (Budd, 1986). This widespread use of the theory may result from the ability of the TPB to provide a parsimonious account of the attitude – behaviour link. In addition, not only does the theory give a clear and tightly specified account of how the determinants are linked but also, as noted by Parker et al. (1996), it can be used to identify the variables which are important predictors of intentions and behaviour and offer pointers as to how effective attitude and behaviour change interventions should be formulated. Moreover, the TPB is also attractive to applied social psychologists because of its ease of operationalization. However, the TPB is not without its limitations.

Drivers between 17 and 21 years of age are the most accident involved. However, in Great Britain during 1998, statistics reveal that of the 526 fatalities that occurred in this age group as a result of road traffic accidents, 433 were male and only 93 were female (Road Accidents Great Britain 1998). This is a ratio of nearly five to one. Research by Maycock et al. (1991) also reveals that, even after controlling for mileage driven, males

are still twice as likely to be involved in a road traffic accident than are female drivers. Moreover, the same research indicates that this accident liability is at its highest in the first year post-test. It may be that these male/female differences result from differing behavioural intentions as far as driving task is concerned. Therefore, in the present study, the inclusion of gender as an additional construct in the analysis of TPB model seems justified. However, the predictive power of the TPB in driving task may also be limited by other factors.

Naatanen and Summala (1976) describe driving behaviour as 'an extremely complicated process'. Research by Reason et al. (1990) also recognised this and found from their research a distinction between different kinds of aberrant driving behaviours. Errors and lapses, they argued, were non-motivated types of action while violations appeared to be intentional behaviours. Reason et al. (1990) suggest that these two forms of aberration appear to have different psychological origins and therefore demanded different models of remediation. Errors, for example, were defined as involving the failure of planned actions to achieve their intended consequences and, although these errors could be embarrassing and potentially dangerous to the perpetrator, no systematic connection was found with accident involvement. However, violations, recently defined more broadly as 'the deliberate infringement of some regulated or socially accepted code of behaviour' (Lawton et al., 1997) have been shown to predict accident involvement see (Parker et al., 1995 and West et al., 1993). A study conducted by Parker et al. (1992) in the exploration of the violation – accident link used a series of violations including speeding; close following, drinking and driving and dangerous overtaking. It appears from this line of

research that intentional violations have the strongest link to the prediction of accident involvement and, therefore, even though TPB is limited in scope due to the complexities of the driving task it still may have strong potential to provide an account of the mediators of such behavioural intentions.

Other studies using the TPB (see Parker et al., 1995 and Lawton et al., 1997) have explored the link between choosing to violate traffic law and accident involvement, but little or no attention has been paid to the prediction of good intentions or positive beliefs which would include the intention and desire to abide by the social and legal conventions of good driving behaviour and law.

In pursuit of this goal the easiest driving violation to explore, define and understand may be speeding. It would be relatively simple for even non-drivers to list the pros and cons of deliberately exceeding the speed limit. Previous research into causal factors of road accidents in the United Kingdom conducted by Sabey and Taylor (1980) and Lewin (1982) has indicated that over 90% of road traffic accidents are in some way attributable to human error, including incorrect speed choice. Moreover, Sabey and Staughton (1975) (in Lawton et al., 1997), concluded after an in depth review, that after drinking and driving, driving too fast was the behaviour most likely to result in accidents. A study by Manstead et al. (1992) also suggests that of all the violations that had been reviewed speeding was the most prevalent. Furthermore, research by other authors has also indicated that speeding may be the most common violation of all. In a study by Brown and Copeman (1975), speeding was reported by the respondents to be the least serious of

the traffic offences listed. In line with this, Reason et al. (1990) also reported that speeding was the most frequently reported violation from a list of twenty. Moreover, research by Parker et al. (1992), found that, for some, speeding is regarded with a degree of tolerance.

Speeding has also been found to be related to age. Research by Harrington and McBride (1970), using a large American sample exploring driving violations in general, found that unlike other types of violation, speeding actually decreases with age. Those drivers under twenty-one years of age were found to have over twice as many speeding violations than those aged between twenty-six and thirty years. This figure rises to nearly four fold when a comparison is made between those under twenty-one and those between thirty-six and forty. In addition, the study also revealed that males are likely to have approximately three times the violation rate than females for speeding violations.

Although speeding unwittingly can be construed as an error it can be seen from the studies included above that most speeding behaviour is construed as intentional. It would appear that being male and intending to speed at a time when driving experience is limited, is a fundamentally dangerous mix of circumstances that could lead to higher accident involvement.

In addition, the frequency and social status of speeding as a violation also suggests that unlike other driving violations, such as drinking and driving, very little, if any, social stigma is attached to the behaviour. In the present study, which is based on self-reports, it

was anticipated that more accurate and less social desirability weighted responses might also be forthcoming from the respondents if speeding was selected as the main focus of their future driving intentions.

The use in the present study of a sample of new drivers, in a closely specified age and selection procedure, was able to avoid the major methodological difficulties previously identified by other studies involving the driving task where age, experience and exposure were found to be inextricably confounded (for reviews of this issue see Brown, 1982 and Broughton, 1988).

The key issue in the present study was to assess the applicability of the TPB to predict and explain the variance arising from the intentions of new drivers to adhere to the rules and social conventions of driving with regard to speed limit observation. In addition, obtaining a measure of the respondent's behavioural intentions at this very early stage of driving would allow for later comparisons. From a road safety perspective, any change in any of the constructs of the TPB that occur over time has implications as far as possible intervention strategies are concerned. Whether or not changes occur as a result of familiarity, experience or skill acquisition within the driving task, the formulation of a baseline of behavioural intentions, at the very start of learning to drive, seems a valid step.

In summary, the present study aims to fill a gap in the literature by testing the ability of the TPB to predict positive and/or negative driving behaviours towards traffic rules in

general and speed use in particular amongst a cohort of young drivers at the very start of their driving career.

6.3. Method.

The subjects for this study were 218 males and 231 females (n=449) and were recruited through Approved Driving Instructors. All the subjects were learner drivers between the ages 17 and 21 years (mean age 17.3, SD=0.8) who had received no more than 2 hours of professional driving instruction.

The subjects were asked to complete a questionnaire, constructed around the model of the TPB that explored behavioural intentions, attitudes, subjective norms and perceived behavioural control with regard to speed limit adherence and social conventions in the driving task. The 13 item self-report questionnaire was based upon a template produced by Conner and Sparks (1996) designed for the operationalization of the TPB. In formulating a clear conceptualisation of the behaviour to be predicted the principle of compatibility (see Fishbein and Ajzen, 1975 and Ajzen and Fishbein, 1977; previously called the principle of correspondence) required that the variables used should be formulated at the same level of specificity with regard to action, target, context and time. Therefore in the present study the action under review is the conformity to specific rules and the legal and social conventions of driving; the target behaviour reviewed is speeding and speed limit observance; the context is decisions made while driving; and

the time frame is driving after the practical driving test is passed. All the items were measured on a seven point Likert type scale between semantically opposing constructs.

All the variables used in the study are shown in Table 6.1 in the results section. Behavioural Intentions (BI) were measured directly by asking the respondents to identify their intentions on the four items used. The first two items were related to conformity with the road traffic law and the Highway Code respectively while the other two items were concerned with speeding intentions directly. All the items in the sub-scale were summed to give a direct measure of behavioural intention.

Three items in the questionnaire measured attitude and outcome evaluations. The Attitude (A) items used only one statement but had three numbered responses. The attitude items were developed and used again in the format suggested by Conner and Sparks (1996). The speed chosen for use in the variables was selected using the following rationale. The target figure constituted an offence in the United Kingdom, where the speed limit a single carriageway road, with one lane for traffic either way, is 60 m.p.h.; the addition of a further 10 m.p.h. in practical terms would possibly generate a fixed penalty traffic ticket if the offence was detected and yet was not fast enough to imply recklessness. The variable was also worded in such a way to avoid any suggestion of any other hazard being anticipated by the respondent. For example, scenarios involving urban streets may imply the presence of children, pedestrians in general, pet animals or other vulnerable road users that may have had a particular effect on the respondent. After these considerations the selection and wording of the variables

thereafter was restricted by the novice nature of the respondents. Therefore, a simple scenario was designed with at least face validity from which measures of the three attitudinal dimensions could be derived. These items formed the attitude sub-scale and were summed. The same limitations were applicable for items designed to give a measure of the subjective norm (SN). Parents, close friends and partner/girlfriend/boyfriend were selected as being the most relevant and important personal referents to the subject regarding speed choice while driving in the specific time context. The SN items had three numbered responses that were again summed to form the subjective norm sub-scale. Perceived behavioural control (PBC) was measured using three items. The first item in the PBC sub-scale is in essence a direct modal control belief with regard to whether or not the respondent feels able to modify his/her speeding behaviour in response to the wishes of significant others and took the form of a simple question. This could be described as an internal control variable. The second and third items of the PBC sub-scale took the form of brief imaginary scenarios leading to a question. These scenarios were designed to explore control beliefs with regard to external sources from two differing perspectives. The product of all three variables was summed.

The 13 items from the scale, together with their means and standard deviations by gender are shown in Table 6.1.

6.4. Results.

Referring to the means shown in Table 6.1, at the start of their driving careers the respondents' behavioural intentions seem to be strongly in favour of abiding by the law and following the advice given in the Highway Code. In regard to general speed limit observance, a strong intention to drive within the speed limit seems apparent suggesting at this early stage of driving that the respondents are intent on rule and speed limit observance although they appear to accept the inevitability of exceeding the speed limit on some occasions. Very strong mean scores were evident with regard to conformity with law and this was especially prevalent for females.

As far as attitudes toward speeding behaviour in particular was concerned, speeding by more than 10 mph on a country road was seen to be a foolish, dangerous and an unpleasant activity. The means on the three variables indicated that foolishness was by far the dominant attitude.

Table 6.1. Table of mean scores and standard deviations for the variables used in the Theory of Planned Behaviour constructs.

Item	Male Mean (SD)	Female Mean (SD)	t.
BI1. After I pass my driving test I intend to keep to all the advice in the Highway Code (definitely do not to definitely do).	5.46 (1.20)	5.77 (1.15)	7.89**
BI2. I would like to ensure that I always drive within the law (definitely no to definitely yes).	5.91 (1.23)	6.44 (0.90)	26.70***
BI3. I want to drive within the speed limit at all times (strongly disagree to strongly agree).	5.08 (1.57)	5.86 (1.28)	33.72***
BI4. I expect that it is inevitable that I will drive over the speed limit sometimes (untrue to true).	2.30 (1.58)	3.27 (1.94)	33.58***
A1. After passing my test, exceeding the speed limit by more than 10 mph on a country road outside the built up area would be (unpleasant to pleasant).	4.02 (1.36)	4.64 (1.42)	21.99***
A2. After passing my test, exceeding the speed limit by more than 10 mph on a country road outside the built up area would be (safe to dangerous).	5.37 (1.38)	5.74 (1.35)	8.18**
A3. After passing my test, exceeding the speed limit by more than 10 mph on a country road outside the built up area would be (foolish to wise).	5.64 (1.06)	6.02 (1.05)	14.29***
SN1. My parent(s)/people who are important to me think I (should not to should) exceed the speed limits.	6.15 (1.18)	6.41 (1.22)	5.08*
SN2. My close friends (approve to disapprove) of me keeping to the speed limits.	4.56 (1.70)	5.52 (1.64)	37.64***
SN3. My partner/girlfriend/boyfriend (approves to disapproves) of me driving fast.	5.17 (1.47)	5.34 (1.60)	1.264
PBC1. With regard to your driving how much do you want to do what your friends think you should? (not at all to very much).	5.48 (1.32)	5.87 (1.38)	9.46**
PBC2. Again imagine that you have passed your test. You are driving along a road where it is difficult to overtake. You are travelling at a speed that is just on the maximum allowed and there is a long queue of traffic behind you. You know you are holding everybody up. Do you feel you can still stick to the speed limit? (definitely no to definitely yes).	4.91 (1.73)	5.29 (1.64)	5.70*
PBC3. After you have passed your test you are out driving in your car with some friends, they want you to drive faster. Are you confident that you can resist their persuasion? (definitely no to definitely yes).	5.65 (1.47)	6.00 (1.29)	6.91**

Key: BI = Behavioural Intention item; A = Attitude item; SN = Subjective Norm item; PBC = Perceived Behavioural Control item. * = $P < 0.05$, ** = $P < 0.01$, *** = $P < 0.001$. Items BI4, A1, A3, SN2 and PBC1 in the questionnaire were recoded in the opposite direction in line with positive compliance to traffic rules and socially acceptable behaviours.

With regard to the effects of significant others, the strongest effect for observing the speed limits came from parental influence and partner/girlfriend/boyfriend with close

friends also seen as disapproving but not as strongly. The perceived behavioural control items suggest that personal driving behaviour may be mainly a matter of personal choice but that behaviour may also be tempered by social pressures from others.

A review of each of the variables by gender also reveals that twelve items of the thirteen-item scale showed significant differences with female respondents scoring higher on every variable in the scale. The scale was designed so that higher scores were indicative of a stronger compliance to social values and the data may be interpreted to indicate that females may be both more in tune with social values and more likely to abide by the rule of law than their male counterparts. These results also go some way to theoretically justify the inclusion of gender as an additional variable in the subsequent analyses for this paper. Moreover, this may shed some additional light in explaining the differences in accident involvement of young male and female drivers.

6.5. Analysis of the TPB sub-scales by factor.

In order to ensure that the components of the TPB were separate determinants all the responses in the scale were submitted to a principle components factor analysis with varimax rotation with Kaiser Normalization (SPSS version 9.0) to ensure that, as far as possible, each variable appeared only in one factor grouping. Only those items that loaded higher than, or equal to 0.40 were included in the analysis. The four resultant factors accounted for 58% of the total variance. Table 6.2 shows the four extracted

factors along with their loadings. Broadly the same interpretation of the data is possible as given in the descriptive analysis above.

Factor 1, the Behavioural Intention variables accounted for 17% of the variance. The items loading most highly in this factor were adherence to advice in the Highway Code (0.80) and driving within the law (0.74).

Factor 2, the attitude variables accounted for 16% of the variance suggesting that exceeding the speed limit by over 10 mph outside the built up area is seen as both foolish (0.80) and dangerous (0.78).

Factor 3, the subjective norm variables accounted for 13% of the variance with the items loading most highly on this variable being the importance of the disapproval from partner/girlfriend/boyfriend of driving fast (0.73) and parental influence in not exceeding the speed limit (0.68).

Factor 4, The perceived behavioural control variables accounted for (11%) of the variance in the analysis with a measure of control being exercised by the actor without necessarily the need for peer approval (0.76).

Table 6.2. Four factor solution of the TPB sub-scales.

Item	Factor 1	Factor 2	Factor 3	Factor 4
Behavioural Intention item 1	0.80			
Behavioural Intention item 2	0.74			
Behavioural Intention item 3	0.73			
Behavioural Intention item 4	0.46			
Attitude item 3		0.80		
Attitude item 2		0.78		
Attitude item 1		0.66		
Subjective Norm item 3			0.73	
Subjective Norm item 1			0.68	
Subjective Norm item 2			0.49	
Perceived Behavioural Control item 1				0.76
Perceived Behavioural Control Item 2				0.63
Perceived Behavioural Control item 3				0.61

Note: Factor loadings of less than 0.4 are omitted for the sake of clarity.

6.6. Prediction of Behavioural Intentions.

To investigate the predictive power of the TPB constructs, with the addition of gender as a variable, each sub-scale was tested firstly for reliability. Table 6.3 shows the alpha coefficients for reliability of each of the four sub-scales.

Table 6.3. Reliability of the theory of planned behaviour constructs.

Construct	Number of Items	Alpha reliability Coefficient
Behavioural intentions	4	0.71
Attitude	3	0.69
Subjective norm	3	0.56
Perceived behavioural control	3	0.52

As can be seen from Table 6.3 each sub-scale had adequate reliability.

Correlations were calculated between behavioural intentions, attitudes, subjective norms and perceived behavioural control and are shown in Table 6.4. It can be seen from the table that behavioural intentions correlate well with each of the other constructs. The strongest correlation is between behavioural intention and attitudes indicating that these two constructs are conceptually the closest in this study.

Table 6.4. Correlations between the Theory of Planned Behaviour constructs.

	BI	A	SN	PBC
BI	1.00			
A	0.468**	1.00		
SN	0.238**	0.186**	1.00	
PBC	0.397**	0.256**	0.087	1.00

** =P<0.05. Note BI = Behavioural Intentions, A = Attitude, SN = Subjective Norm and PBC = Perceived Behavioural Control.

In order to predict the amount of variance accounted for by the TPB, a linear regression analysis was undertaken after the data were checked for normality, multicollinearity, linearity and the presence of outliers. This was done to assess the contribution of attitude towards the behaviour, subjective norm, perceived behavioural control and gender to the explanation of behavioural intention. Each of the constructs was entered into the regression in separate steps in the order given (see Table 6.5). Attitude toward the behaviour was entered in the first step as this variable has been often found to be the strongest correlate of behavioural intention, see Ajzen (1988). Subjective norms were entered at the second step. Perceived behavioural control was entered at the third step as the respondents had little or no actual experience with regard to the specific behaviour under review as noted in the introduction. Gender was entered in the fourth and last step.

Table 6.5. Prediction of behavioural intentions from attitudes, subjective norms, perceived behavioural control and gender.

Step	Predictor	R square	F	Beta
1	Attitude	0.21	111.99	0.46***
2	Subjective Norm	0.24	65.04	0.16***
3	Perceived Behavioural Control	0.30	60.19	0.26***
4	Gender	0.34	53.41	0.20***

***=P<0.001.

Table 6.5. shows that attitude toward the behaviour accounted for 21% of the variance in intentions to conform to speed limits and rules of the road. With the subjective norm, perceived behavioural control and gender accounting for a further 3%, 6% and 4% respectively. The relatively low levels of variance accounted for by subjective norms and perceived behavioural control may be a result of inexperience with regard to the specific behaviour under review at this stage of their driving careers.

6.7. Discussion.

This study applied the TPB to a group of novice drivers with regard to their intentions to abide by road traffic law, the Highway Code and the specific behaviour of speed limit observance. The cohort of young drivers were at the very start of the driving career with less than two hours professional driving tuition. The aim of the study was not only to identify their behavioural intentions toward the target behaviours but also to test the rigour of these intentions through the application of the TPB. The performance of the theory in the prediction of intentions was found to be reasonable with a good amount of the variance being explained. The results in the present study compare well with those found by the Parker et al. (1992) study where the variance predicted by the TPB over four violation variables ranged from 47.2% of the explained variance of intentions to

speed to 27.4% of the explained variance for intentions to close follow. The analytical technique employed in the Parker study combined attitude and the subjective norm in the first step of their regression analysis accounting for 32.8% of the explained variance with perceived behavioural control being entered at a second step and accounting for a further 14.5% of the explained variance. Although both studies are approaching the issue of speeding from different perspectives the amount of variance explained by the determinants of the TPB seem comparable in that the combination of attitude and the subjective norm in the present study did also amount to the largest slice of the explained variance. The two studies also differ markedly in the age range of the subjects. In the Parker study the age range was from 17 to over 55. These were more experienced drivers than those in the present study. This experience of the behaviour under review may account for the better performance of the TPB especially with regard to the perceived behavioural control construct.

The results of the present study do illustrate however, in line with the Parker et al. (1992) study, the effectiveness of the addition of perceived behavioural control being added to the TRA, although in this instance it only explained a further 6% of the variance. In addition, the strongly reported affirmations by the respondents also indicate, at least as far as attitudes toward the behaviour in question are concerned, that they are intent on conformity to the rules on speeding and the observance of rules at least at this early stage of their driving career. This is confirmed by the results with over 21% of the variance being explained by the attitude items alone.

Research by Ajzen (1988) also suggests that the strongest correlation found in many studies of this type is the relationship between behavioural intentions and attitudes. This finding was replicated in this study. It seemed appropriate therefore to include a factor analysis of the data to clearly determine the existence of the four separate components described by the TPB. It could be argued that after the emergent factors were found to be identical to the four sub-scales as anticipated this, coupled with the addition of moderate to good reliability scores on each of the four sub-scales, could imply good statistical rigour.

The subjective norm and perceived behavioural control constructs in tandem accounted for a further 9% of the variance. It must be borne in mind however that these must be collectively regarded simply as estimates of future influences. In this regard the behaviour in question in the present study differs from relatively simple behaviours with widely held beneficial outcomes like brushing one's teeth; for example, asking the question to an adult respondent "will you brush your teeth tomorrow"? It is reasonable to assume that most people have at least engaged in the behaviour at sometime, know its requirements, be able to assess the benefits and barriers of engaging in the behaviour and report accordingly. In this study, however, the target behaviours are still a good time in the future (future behavioural intentions could also be described as behavioural expectancies; for a review see Warshaw and Davis, 1985a) with, in most cases, little or no previous experience being available for the respondent to draw upon. Notwithstanding this limitation, it could be argued that the amount of variance explained by these two

constructs at this stage is sufficient to suggest that they may be of greater value as more driving experience is gained.

However, this procedure in itself invoked a further known theoretical limitation as far as the predictive ability of perceived behavioural control element of the TPB is concerned, in that the subjects recruited for the present study had less than two hours experience of the behaviour in question. Furthermore the novice nature of the subjects also obviously nullified any potential of using past behaviour as a determinant of future behavioural intentions, a successful technique used by previous researchers (see Budd et al. (1984)).

Another possible explanation for the relative weakness of performance of the subjective norm in the present study may result from the fact that driving is more of a socially interactive activity than the respondents are aware of at this time. As Parker et al. (1992) point out, driving is very much a social performance, carried out in the public domain, and is likely to involve consequences for other people.

As noted in the introduction male accident involvement in the first year post-test is significantly higher than that of females. The present study again highlights differences in self reported behaviour between males and females, in the driving task, with significant differences found in all the variables used in the constructs of the TPB except one. Previous research indicates that these differences extend into other age groups and have an effect on accident involvement. For a brief review see McKenna et al. (1998), Lester (1991) and Broughton (1988). The results of the present study suggest that while

overall males report a strong regard for the legal and social driving conventions it is not as strong as that reported by females. This might indicate, even at this early stage in the subject's driving career, that males are less likely to be restrained by speed limits.

The present study, however, did reveal an added dimension to these self-reported differences. In the Parker et al. (1996) study, it is acknowledged that many studies have utilised the TRA/TPB in an attempt to shed light on the beliefs underpinning those behaviours it is thought desirable to promote or change. In the present study the biggest contribution to the explained variance was the attitude sub-scale. Although comprising only three items, speeding above the speed limit on a country road was described as unpleasant, dangerous and foolish. However, with the addition of the gender construct a further dimension becomes apparent. While both males and females reported higher than the midpoint on all three variables of the attitude sub-scale, females also reported a significantly stronger positive attitude toward the issue than males. This would indicate that it is not only the attitude or belief that may be important but also the depth or vigour to which that belief or attitude is held by the respondent. This is an important additional factor that should be taken into account by interventionists attempting to bring about change, perhaps necessitating investigation of the motivational aspects of the beliefs and attitudes held. This differential is repeated across all but one of the variables in the study consistently indicating that males overall are not so committed as females to speed limit observance.

These are important implications for road safety professionals as the differentials may help to identify appropriate areas for interventions. It also raises the question of whether or not interventions should be more male orientated or indeed in the first instance be specifically aimed at novice male driving behaviour. Moreover, it appears that through prior social processes males and females initially approach the driving task from differing perspectives and these pre-determined perspectives are in place before engagement in any form of driver training. This could lead to the conclusion that the behavioural intentions and attitudes reported in the present study are simply social responses based upon the learned views of significant others. Whether this is the case or not what is clear is that males may be more eager to engage in speeding behaviour and, in terms of road safety, a possibility does exist to address the problem even before learning to drive takes place.

In summary, the results of this study indicate that the TPB performed reasonably well in the prediction of the respondent's behavioural intentions. It appears from the results that drivers initially intend to conform to the law, advice in the Highway Code and abide by the speed limit. As experience in the driving task increases behavioural intentions may change. It is likely therefore that the amount of variance accounted for by each of the TPB constructs will also change over time with the possibility of the subjective norm and perceived behavioural control determinants playing a larger role. Also of importance as far as road safety is concerned is the salience of the beliefs held by the respondents over the range of constructs forming the TPB.

Chapter Seven.

New drivers; an exploration of driving licence acquisition, anticipated driving in the first year post-test and the effects of a pre-driver education programme.

7.1. Abstract.

This study was designed to explore the driving related knowledge and self-expectancies of young drivers (n=236) immediately after passing their practical driving test in relation to specific knowledge items and driving choices. Demographic information was obtained to form a driving history of each subject including the amount of professional instruction obtained and private practise taken while learning to drive. Thereafter the subjects were asked to estimate how much driving they would do in the coming twelve months, the frequency and type of journeys they were likely to undertake and which people were most likely to be their passengers. The subjects in the sample were randomly allocated to one of two groups. Group 1 consisted of 162 subjects that were used for comparison purposes while the remaining 74 subjects were formed into a second group, Group 2, who were required to undertake a pre-driver training course while driver training was being undertaken. The two groups were compared on three measures to assess the effectiveness of the classroom-based pre-driver training course; driving demographics and anticipated driving; a measure of driving knowledge that was linked to the classroom-based pre-driver training course; and a series of driving scenarios with multiple responses to assess self-expectant driving choices. The results of this pre-driver

training intervention in relation to these three measures used was equivocal with no significant differences being found between the groups. This study does not present evidence in support of classroom based pre-driver education.

7.2. Introduction.

In 1998, 3581 people were killed on the road in Great Britain and 335,033 people were injured (Road Accidents Great Britain, 1997). Intervention strategies aimed at improving driver behaviour and reducing this annual carnage therefore have considerable potential. During the process of learning to drive is an obvious time to intervene in an attempt to raise the standard of driving performance either by better education, legislation or by increasing the stringency of the driving test. While legislative changes and the format of the driving test are constantly under review, research into measurable intervention strategies, designed to reduce casualties, are rare. The present study aims to add to the literature on this subject by reviewing the procedures used by the subjects to acquire a driving licence and assess the impact of a pre-driver education programme undertaken by a sub-sample of the cohort with specific regard to the effect of knowledge acquisition and attitude in the driving task.

7.3. Background.

To obtain a driving licence in the United Kingdom potential candidates have to successfully pass a theory test and a practical driving test. The Driving Standards Agency

(DSA) theory test is used to assess knowledge in areas that cannot be easily be tested during a practical driving test such as how to deal with dangerous or infrequent driving conditions such as fog or ice, an understanding of the main causes of accidents and provides a thorough test of the Highway Code (New Driver Safety, 1993).

In addition to the requirements of the theory test and practical driving test road safety professionals have invested significant resources in trying to formulate better social awareness and attitudes towards the driving task and have consistently pursued education courses, mainly pre-driver education courses, in order to supplement driver training in an attempt to reduce accidents and casualties. These courses are designed to increase knowledge, create the formation of positive attitudes towards the driving task and create awareness of dangers.

7.4. Pre-driver education, knowledge acquisition.

American research by Struckman-Johnson, Lund, Williams and Osborne (1989) noted that the general premise of most interventions designed to bring about a change in driver behaviour focus upon lack of knowledge about safe driving and/or inappropriate attitudes that are responsible for motor vehicle crashes. Research into high school driver education and driver training from America does provide literature but a crucial aspect of this type of pre-driver education is that its participants often used it as a process to achieve licensure at an earlier age than would have otherwise been possible.

Harrington (1972), in an early review of pre-driver educational activities in America, explored the many interacting issues that were thought to act as mediators in new driver behaviour.

While varied claims have been made regarding the success or otherwise of driver education courses, Harrington (1972) noted that those who had taken driver education courses had usually volunteered for the course, had a higher IQ, were academically superior, had higher socio-economic status, started work at a later age, had more favourable and socially desired characteristics, drove fewer miles and smoked less. Furthermore, when driver education courses were over-subscribed, the teachers selected participants for inclusion in the course as a function of the above personal characteristics. These issues of social bias and other methodological flaws discovered by Harrington, in relation to previous studies, in conjunction with the confounding of age and exposure, suggest that great care should be taken in this particular research area due to the possibility of perverse outcomes.

Typical of the type of findings reported by Harrington can be found in a later review of the performance of pre-driver education courses, again from America, that was conducted by Robertson and Zador (1978). They found that some states would not allow the licensing of young drivers under the age of 18 years unless they had attended an approved high school driver education programme. The existence of these programmes allowed for young people to obtain driving licences at 16 or 17 years of age when they would have been otherwise unable to drive. The research by Robertson and Zador (1978)

suggested that the way these types of programme were structured could be positively contributing to motor vehicle injuries and death amongst their participants. As a result of this research many of these types of programme were eliminated from the school curriculum. In a follow-up study by Robertson (1980), a comparison was conducted between two demographically similar counties in the American state of Connecticut. In one county pre-driver education was dropped while it was continued in another (dropped for 18,200 students and continued for 16,950 students); the comparison revealed that there was a substantial reduction in crashes in the 16 – 17 year old age group amongst those who attended schools where the programme had been dropped. Robertson concluded that the main effect therefore of pre-driver education was to attract students to the driving task earlier than otherwise would have happened.

The present study rectifies the above methodological flaws in three ways. Firstly, in the United Kingdom there are no issues surrounding chronological age and early licensure, as the minimum age limit for driving is an absolute requirement; secondly, the subjects in the present study had already decided to learn to drive and had engaged a driving instructor prior to being involved in the research and thirdly, thereafter they were randomly assigned to one of two groups.

Another significant methodological difficulty surrounding the effectiveness or otherwise of driver education courses is the outcome measure. In a review of well-controlled driver improvement courses in America that are designed to rehabilitate driving offenders, Struckman-Johnson, Lund, Williams and Osborne (1989) found that there is considerable

evidence to support the contention that the outcomes of these courses result in fewer subsequent driving violations but any reduction in actual crash rates has not yet been proven. However, this may be simply because road traffic accidents are relatively rare. In regard to this issue McBride and Peck (1970) argue that a sample size of 16,000 drivers, 8000 in an intervention group and 8000 used for control purposes, would be required to have a statistical power of 0.50 to detect a 10% intervention effect at a $P < 0.01$. It is clear, therefore, that some form of surrogate measure is needed to measure intervention outcomes in smaller groups. Moreover, it seems inappropriate for driver improvement courses to try and increase knowledge and/or form better or improved driver attitudes and thereafter measure the outcome in terms of violations and crashes.

Methodological flaws are, however, not the only problems in research into driver behaviour. In order to assess whether differences exist between drivers who have become accident involved and those who have not researchers have explored the many aspects of attitudinal, emotional or social factors believed to be involved in driving behaviour e.g., socio-psychological conditions (Ross, 1940); family disorganisation (Sobel and Underhill, 1976); interactional patterns in traffic situations (Bliersbach and Dellen, 1980); automobile addiction (Reser, 1980); social and interpersonal factors (Knapper and Cropley, 1981); accidents and their relation to problem behaviour theory (Jessor, 1987); lifestyle correlates (Beirness and Simpson, 1988); and behavioural patterns (Rolls, Hall, Ingham and McDonald, 1991). More recently Lajunen and Summala (1995) have suggested that driving is composed of two separate components, cognitive skills and motives. The cognitive skills component includes information processing and motor

skills while the motive component, they suggest, can be deconstructed further into transient motivational factors resulting from more permanent personality factors and attitudes toward traffic and safety. Related to this is the position of Manstead and Parker (1995) who argue that the affective response to a specific driving behaviour, such as the 'thrill' that a driver might expect to experience while driving in a risky fashion, may be involved in shaping driver behaviour. Corbett and Simon (1992) looked at the motivations of drivers for breaking or adhering to traffic laws. Among the explanations for committing traffic offences was a wish to 'decide driving actions for oneself rather than to be bound by rigid rules', 'the expression of moods, frustration and impatience' and 'the enjoyment of skill, speed, risks and rule breaking'. Meadows (1994) supports this position, having collected information from young male drivers indicating that while driving they liked to express individuality; rebelliousness; identification with a peer group; masculinity; one-up-manship; equality with other road users; to demonstrate skill or courage; to impress or please passengers; to live dangerously; to express freedom or independence, or to relieve frustration and impatience. It could be hypothesised therefore that driving for some could involve other additional behavioural components that may play a role in their driving behaviour. This engagement of other factors whilst driving may be detrimental to performance of the task as issues of safety are replaced by an individual's additional motives. Naatanen and Summala (1976) argue that while driving may be primarily about mobility they suggest a definition for what they refer to as 'extra motives' as including 'any excitatory motives such as search for excitation and thrill, pleasure, optimal arousal or emotional outlet'.

In summary, notwithstanding the complexity suggested by all the above factors, common threads do appear that describe driving as at least a two-fold activity; at the first level are the simple motor-skills required in physically driving the vehicle and, at a broader level, an expressive level where an individual's driving style emerges that includes any additional or extra motives that may be deployed through individual choice in the actual driving task, and used in the social interaction with others on the road.

The present study therefore has three aims; firstly to record demographic information in relation to driving licence acquisition from the study sample; secondly, to ascertain whether or not differences in specific items of knowledge delivered through driver education can be detected at post-test and; thirdly, to record any differences in the self-expectant driving choices, attitudes or driving style resulting from the classroom based pre-driver training course that could be detected post-test. This information may lead to a clearer understanding as to the effectiveness or otherwise of pre-driver education programmes and fill a gap in the literature.

7.5. Method.

7.6. Subjects.

The subjects for this study (n=236) were recruited through Approved Driving Instructors (ADIs). All the subjects were learner drivers between the ages of 17 and 22 (Mean age 17.4 SD= 0.85) and were recruited as part of a rolling recruitment programme. The

subjects were drawn from an initial sample of 451 participants who had registered with the study shortly after they had started to learn to drive. At the point of registration each subject had received less than two hours professional instruction. Due to many factors such as the availability of money to buy lessons, time, theory test failures and those who abandoned learning for other reasons, the sample was reduced.

The subjects were randomly assigned, using a form of block randomisation, to one of two groups, a control group, Group 1 (n=162) and a pre-driver training group, Group 2 (n=74). (The reason for this apparent imbalance between groups is that this study formed part of a larger longitudinal study into new driver behaviour and the control group had to be divided again later.) Subjects in the pre-driver group attended locally held pre-driver training courses as soon as possible after joining the study. A total of seven pre-driver courses were held to obtain the sample. Other than the pre-driver course all the subjects in the study learned to drive in the way that was most suitable for them. The subjects were required to report to the author of the study immediately the driving test had been successfully passed. At this point in time the subjects were sent a questionnaire containing a number of measures, if the questionnaire was not returned within two weeks a reminder was sent. A second reminder was sent after a further two weeks. If no response was forthcoming at this point subjects were eliminated from the study.

7.7. Pre-driver training course.

As far as purely educational issues are concerned the difficulty facing research in this domain is finding an appropriate measure that can assess the effect of pre-driver training at a time when knowledge is actively being sought and unconsciously being acquired by the participants in order to pass a theory test and a practical driving test. Therefore, to assess any knowledge gain through an additional pre-driver education programme specific test variables had to be developed. This necessitates teaching additional knowledge to that required by the theory and practical tests and, moreover, if attempts are being made to change attitudes toward the driving task a method of measuring change in this domain is also required.

Experience in the construction of pre-driver education courses was gained by visiting four Scottish regions, Fife, Strathclyde, Central Scotland, and Dumfries and Galloway. The course content and resources used in pre-driver education programmes in these regions was explored and recorded. Those involved in the creation and presentation of the courses were interviewed. A review of other video taped, presentational and promotional materials available freely was also conducted. This type of material included public information pamphlets and video materials commissioned by the Government, local government, private companies and other road safety organisations. The rationale (see Chapter Five) of all the material produced and used was to highlight the dangers of inappropriate driving styles and, through these educational materials, show the subjects the correct behaviours and attitudes to adopt whilst driving.

With the co-operation of the Accident Prevention Unit of Central Scotland Police a 'generic' type of pre-driver programme was produced which included the major and most frequently discussed issues and topics from all the other courses reviewed. The specific topics covered in the pre-driver training programme were a mixture of educational instruction; with regard to topics including vehicle purchase, ownership, legal requirements and documentation, vehicle maintenance and aspects of the theory test and practical driving test held in the United Kingdom, enforcement issues; the need for traffic regulation and laws; attitudinal topics; the social and moral implications of aberrant driving behaviour (see Chapter 5).

A computer-generated presentation was created along with a written script in order to maintain a uniformity of presentation. A compilation video was also produced using the materials reviewed. This video supplemented the main presentation. The entire pre-driver education course consisted of two, one and a half hour sessions held during the course of a single afternoon.

Subjects in this study completed a single questionnaire which included the following self-reported descriptive measures of; the number of hours of professional driving instruction taken; the number of hours of additional private practise; the number of different car types driven while learning to drive; the number of times the theory test was failed; the theory test score and the number of times the driving test was failed. In addition the subjects were asked to estimate the following; the number of hours driven since test pass; how many hours of driving did they anticipate driving per week; what

type of journeys would they be likely to be; what types of passengers would they likely have in the main.

7.8. Measures.

As noted by Struckman-Johnson et al. (1989), one important element in driver improvement courses is the desire to increase knowledge. In order to test for knowledge acquisition within the pre-driver sub-group of this study, five multi-choice questions about driving matters were included on the questionnaire. These items related to learning to drive and were considered to be directly relevant to the subjects at this point in their driving career as they illustrated the vulnerability to accident involvement and the potential risks facing all new drivers. The items used also had to be outwith the remit of the knowledge required for the Driving Standards Agency Theory Test and the information published in the Highway Code in order to have the potential to differentiate between groups. The subjects in the pre-driver group were given specific instruction, with both recaps and an additional summary, in regard to these five items. Using this method it was hypothesised that a difference in knowledge scores could be obtained between those who attended the classroom based pre-driver education course and those subjects who did not and to provide evidence of the effectiveness of pre-driver education courses. The items were as follows (The correct response is underlined).

1. Drivers between the ages of 17 and 25 years of age hold about 10% of the driving licences in the UK but are involved in (X) amount of accidents. What percentage figures

do you think (X) falls between? (A) 0-10%; (B) 10-20%; (C) 20-30%; (D) 30-40%; (E) 50-60%.

2. Who is more likely to be involved in a car accident as a new driver? (A) A new male driver; (B) A new female driver; (C) Both represented about the same; (D) It's just a matter of luck or fate.

3. On average how many new drivers are involved in car accidents each day in Scotland? (A) 0-5; (B) 5-10; (C) 10-15; (D) 15-20; (E) 20-25; (F) 25-30; (G) 30-35; (F) Over 35.

4. What is the most common type of accident for a new driver to be involved in? (A) Colliding with another vehicle at a junction; (B) A single vehicle accident; (C) An accident while going to work; (D) A reversing accident.

5. According to the New Drivers Act (1997), how many points do you need to get on your licence, in the first two years after passing your test, to return to the status of a learner driver? (A) Three; (B) Six; (C) Nine; (D) Twelve.

The items were scored as 1 for a correct answer and 0 for an incorrect answer.

Driving Scenarios.

As a surrogate measure for driving violations and crashes seven driving scenarios were included on the questionnaire. These scenarios were used to detect the presence of 'extra

motives' in the driving task. As outlined in the introduction, 'extra motives' can originate from many sources; what is of importance in the present study, however, is whether or not the training given in the classroom-based pre-driver training affected the self-reported driving choices of the subjects.

Each scenario had five different responses from which to choose and were graded from 5 to 1. Items with a value of 3 were seen as broadly the correct or normal driving response to the scenario presented. Items rated with values of 4 and 5 were progressively deemed to be less appropriate driving responses indicating that some other extra or additional motives were being invoked by the respondent. Responses with the lower values of 2 and 1 were deemed to be from subjects that were more utilitarian in outlook as far as driving was concerned or were the least engaged drivers in the driving task from the perspective of extra or additional motives. The scenarios are listed below with the responses presented in each case with the least appropriate response (value 5) listed first and least engaged (value 1) listed last.

Driving scenario 1. Speed choice. In regard to your choice of speed when driving in a built up area where the speed limit is thirty miles per hour which statement best describes your thoughts? (A) Generally I use the thirty miles per hour limit only as a loose guide. (B) I would take account of all the circumstances and select my own speed accordingly. (C) I always stick as close as I can to the thirty miles per hour limit. (D) I always err on the safer side of thirty miles per hour. (E) I think that thirty miles per hour in a built up area is still too fast.

Driving scenario 2. Following behaviour. If you have been driving on a dual carriageway following a vehicle that has been sitting in the outside lane for a long time and refuses to move over, what would you do? (A) Overtake on the nearside; (B) Move up closer behind to put on more pressure; (C) Give a headlamp flash; (D) Move to the inside lane and close up on the nearside; (E) Wait patiently.

Driving scenario 3. Gap acceptance. When following another vehicle along a dual carriageway how do you decide how much space to allow between vehicles? (A) As well as keeping a good distance from the car in front you have to make sure that nobody 'nips' into your space. (B) Generally the gap sorts itself out. (C) I constantly adjust the gap with the vehicle in front. (D) I always leave as big a gap as possible between my car and the vehicle in front. (E) I usually travel slower than most others so I don't have to worry about the gap.

Driving scenario 4. Driving disputes. When driving do you ever get involved in disputes with other drivers? Which statement best summarises your attitude. (A) I think drivers should be told in no uncertain terms if they have done something dangerous or stupid, even if it means following them till they stop. (B) If a driver makes a dangerous or foolish error it is likely that I would give him more than a loud blast on the horn. (C) I would try and keep my feelings in check and forget about the situation as soon as possible. I would sound my horn if necessary. (D) I would just mind my own business

and get away from the scene as quickly as possible. (E) I am never sure whether or not I am partly to blame so I don't get involved.

Driving scenario 5. Driving style. Which of the following statements best describes your driving style? (A) A very alert driver that drives just over the speed limits at all times. Spots opportunities and generally likes to get one over on the other less 'crafty' drivers; (B) A conscientious driver who occasionally bends the rules of the road in order to enjoy the whole driving experience; (C) A polite non-aggressive driver who willingly gives way to others. A driver who sees dangerous situations early and slows down to minimise risks; (D) A driver who is fairly interested in driving but is quite happy if someone else does the driving; (E) A driver who drives only because a motor car is a convenient mode of transport and has no other interests other than mobility.

Driving scenario 6. Driving with Close Friends. If you are driving with close friends does this make a difference to the way you drive the car? (A) I would enjoy the opportunity to show off just a little; (B) I enjoy having passengers in the car and take pleasure if they see me driving well; (C) Passengers make no difference to the way I drive; (D) Passengers in the car make me nervous in case I make mistakes; (E) I worry about being seriously distracted by passengers.

Driving scenario 7. Driving with Significant Others. What driving style would you adopt if your parents, relatives or other significant people to you were in the car? (A) My parents or significant others wouldn't dare comment on the way I drive; (B) I always try

and demonstrate to my parents or significant others what a careful driver I am; (C) My driving style is the same no matter who is in the car; (D) I always drive much slower than normal when my parents or significant others are in the car to make them feel more comfortable; (E) I always drive very slowly and smoothly when my parents or significant others are in the car to make a good impression.

7.9. Results.

7.10. Demographics.

A breakdown of the gender, occupational status and group status membership of the sample is shown in Table 7.1. Those subjects in Group 1 were used as a control group while the subjects in Group 2 attended the classroom-based pre-driver education training.

Table 7.1. Gender, occupational status and group membership.

Occupational status	Group 1		Group 2	
	Male	Female	Male	Female
School pupil	38	33	12	9
College student	18	24	9	12
Unemployed	1			2
At work	19	12	9	11
Training Scheme	3		3	2
Other (not specified)	7	7	3	2
Totals	86	76	36	38

Table 7.1 shows that the majority of the sample (66.8%) was still at school or college at the time of the study with further 20.1% at work. The remaining 13.1% of the sample reported that they were either unemployed (1.3%), on a training scheme (3.5%) or were engaged in some other (not specified) activity (8.3%).

There was a significant difference in age between the two groups with the subjects in Group 1 (n=162) mean age 17.4, (SD 0.7), being on average nearly three months younger than those in Group 2 (n=74). mean age 17.6 years, (SD 1.0), df 234, $t = -2.4$, $P < 0.05$. The results in Table 7.2 revealed a significant difference between the groups with regard to the amount of professional instruction used. Notwithstanding the fact that there is no significant gender difference between groups, the presence of extra males in Group 1 is likely to account for this variation in scores. (Chi-square analysis revealed Group 1, male 86, [53.1%], female, 76, [46.9%], Group 2 male 36, [48.6%], female 38, [51.4%], $X^2 =$ Not Significant, $P = 0.57$). If the number of hours of professional instruction is analysed by gender males (n=122) used 24.4 hours, (SD 9.4), of professional instruction while females (n=109) used 29.0 hours, (SD 9.7), df 229, $t = -3.6$, $P < 0.001$. This is in line with the findings of a previous study by Forsyth (1993), which surveyed 29500 learner drivers and found that 72% of males had used 30 or fewer hours professional instruction while 59% of females had obtained more than 30 hours of professional instruction. The mean number of hours of professional tuition in the Forsyth study was 31.2 hours, while in the present study the mean was 26.5 hours. No other significant differences were apparent between groups.

Table 7.2 Differences and similarities between Group 1 and Group 2.

	Group	N	Means	SD	Df	T	P
Hours of professional instruction	1	159	25.5	9.9	230	-2.2	0.023*
	2	73	28.7	9.1			
Hours of private practice	1	158	18.1	20.6	230	0.1	0.882
	2	74	17.7	20.4			
Number of vehicle types driven while learning	1	158	2.2	1.0	230	-1.2	0.195
	2	74	2.4	.99			
Number of hours driven since test pass	1	160	8.9	10.9	231	-0.4	0.672
	2	73	9.5	9.5			
Number of theory test failures	1	162	.14	.42	234	-0.8	0.411
	2	74	.19	.39			
Number of driving test failures	1	162	.34	.62	234	-1.5	0.112
	2	74	.49	.73			

*=P<0.05.

The data shown in table 7.3 are the estimates from the respondents of their anticipated driving and types of vehicle journeys over an average week in the coming twelve months. The subjects were asked to respond in terms of percentage time to the five variables collectively to a total 100% for example, 'please estimate in percentage terms how much time you anticipate driving in an average week for shopping purposes?' With the exception of driving to and from work there were no significant differences between groups. The significant difference shown in vehicle usage in the variable 'To and from work' may result from an imbalance between the groups with 19% of Group 1 reporting that they are already at work while the number of working participants in Group 2 is 27%.

Table 7.3 Estimated vehicle usage and anticipated driving, in percentage terms, for each category per week?

	Group	N	Mean	SD	df	T	P
To and from work	1	159	25.3	24.6	231	-2.6	0.008*
	2	74	34.5	23.7			
As part of job or employers business	1	159	4.4	11.9	231	1.3	0.175
	2	74	2.3	7.1			
Shopping	1	159	14.9	12.3	231	-0.3	0.975
	2	74	14.9	11.6			
Leisure	1	159	40.2	23.7	231	1.4	0.150
	2	74	35.6	19.4			
Other	1	159	14.6	17.8	231	1.3	0.193
	2	74	11.4	16.0			

*=P<0.01

Table 7.4 shows the means of the percentage time the subjects expected to drive on their own in the coming twelve months and the mean percentage time driving with other passengers. Only the analysis of the variable 'with children only' resulted in a significant difference between groups. This may be the result of a small gender imbalance between the two groups with Group 1 having 46.9% female content with Group 2 being comprised of 51.4% females and females perhaps being more orientated towards children than males.

Table 7.4. Estimates in percentage terms of time driving alone and with passenger types.

	Group	N	Mean	SD	df	T	P
Alone	1	159	37.6	20.2	230	-0.9	.346
	2	73	40.3	21.5			
With partner/spouse	1	158	6.4	12.1	229	-1.4	.146
	2	73	9.0	14.3			
With partner spouse and children	1	158	.4	2.2	229	-1.7	.080
	2	73	1.3	5.3			
With children only*	1	158	1.0	2.9	229	-2.7	.006*
	2	73	2.5	5.3			
With parents	1	158	16.0	14.1	229	1.0	.274
	2	73	13.8	13.1			
With friends	1	158	33.1	17.7	229	1.3	.177
	2	73	29.6	19.0			
With others	1	158	4.8	9.1	229	1.1	.248
	2	73	3.4	7.1			

*=P<0.01.

As a total of 18 between group comparisons were made consideration was given to the presence of both Type 1 (α) and Type 2 (β) errors (Bonferroni adjustments). However in adopting tighter control for Type 1 errors by imposing a more stringent level of significance resulting from issues surrounding multiple comparisons this may, in turn, induce Type 2 errors, i.e. the suppressing of other valid significant differences. In viewing the data presented in Tables 7.2, 7.3 and 7.4 therefore it should be noted that a possibility exists of significant differences occurring between groups that might simply be an effect of running multiple comparisons.

The results shown in Table 7.5 show differences in the knowledge levels between subjects in Group 1, the control group, and Group 2 the pre-driver training group. The five items in the table were part of the pre-driver training course and those subjects in Group 2 had received training with regard to these items. A non-parametric Chi-square test was used after the data had been recoded as 1 for a correct answer and 0 for an

incorrect answer. The first three of the variables show no significant differences between groups.

Items 1 and 3 in the table 'what percentage of new drivers are involved in accidents' and 'how many new drivers are involved in accidents in Scotland each day' revealed that a large percentage of both groups answered incorrectly. As far as items 1 and 3 are concerned these findings are disappointing as every effort was made to convey this information to the subjects in the classroom-based pre-driver training group. Three major possibilities exist to explain this finding; firstly; it may be a result of the way the information was delivered to the pre-driver training group, i.e., ineffectually taught or conveyed, secondly, it could be a result of the way the question or multi-choice answer was constructed, or thirdly, the information may not have been salient enough to stimulate the respondents sufficiently to remember it. In contrast to this, the question posed in item 2 'who is more likely to be involved in a car accident', a large percentage of both groups gave a correct answer. Unlike items 1 and 3 it would appear that this variable suffered from a 'ceiling' effect with both groups scoring highly.

The item, 'most common type of accident for a new driver' revealed a significant difference between groups, with subjects in Group 2 showing an increased percentage correct answer gain on Group 1 ($P < 0.05$). However, as nearly half of the subjects in Group 2 still gave the wrong answer, any conclusions drawn from this variable with regard to the effectiveness of pre-driver training may be unreliable. The last item in Table 7.5 'points for disqualification in the New Drivers Act' did show a significant

group effect ($P < 0.05$) with subjects in Group 2 scoring significantly more correct answers than those in Group 1. In addition, on this item, a high percentage of correct answers 82.2% were also forthcoming. This would appear to be a positive effect of the pre-driver training programme.

Table 7.5. Chi-square analysis of group x knowledge responses.

	Group	N	Incorrect (%)	Correct (%)	df	X ²
1. What percentage of new drivers are involved in accidents	1	161	143 (88.8)	18 (11.2)	1	.1
	2	73	66 (90.4)	7 (9.6)		
2. Who is more likely to be involved in a car accident	1	162	30 (18.5)	132 (81.5)	1	.9
	2	74	14 (18.9)	60 (81.6)		
3. How many new drivers are involved in accidents in Scotland each day	1	159	125 (78.6)	34 (21.4)	1	.0
	2	74	58 (78.4)	16 (21.6)		
4. Most common type of accident for new driver.	1	162	109 (67.3)	53 (32.7)	1	8.5*
	2	74	35 (47.3)	39 (52.7)		
5. Points required for disqualification under the New Drivers Act	1	159	48 (30.2)	111 (69.8)	1	3.9*
	2	73	13 (17.8)	60 (82.2)		

*= $P < 0.05$.

The results from the seven driving scenarios are shown in Table 7.6. The responses to these driving scenarios were subjected to a non-parametric Chi-square analysis. Variables with response values of 4 and 5, which were regarded as those involving 'extra motives' were recoded as 1 while responses by subjects to the variables with values ranging from 1 to 3 were recoded as 0. No statistically significant results between groups were found. The items from the driving scenarios 'driving disputes', 'following but blocked' and speed choice in a built up area indicate relatively low levels of extra motives. In contrast to this between 33% and 40% of the subjects from both groups indicated extra motives when driving with close friends or driving with parents or

significant others. This indicates that, as far as close friends are concerned, for example, the subjects may be inclined to 'show off' a little or 'take pleasure from being seen driving well'. In combination, these findings suggest that the new drivers have a fairly passive driving style at this time although impressing passengers is an issue.

Table 7.6 Chi-square analysis of driving scenario x group responses.

	Group	N	No extra motives (%)	Extra motives (%)	Df	X ²
Speed choice built up area.	1	159	130 (81.8)	29 (18.2)	1	1.9
	2	73	57 (89.0)	16 (11.0)		
Following but blocked.	1	162	150 (92.6)	12 (7.4)	1	.9
	2	74	71 (95.6)	3 (4.1)*		
Gap acceptance.	1	162	114 (70.4)	48 (29.6)	1	.0
	2	72	51 (70.8)	21 (29.2)		
Driving disputes.	1	160	145 (90.6)	15 (9.4)	1	.0
	2	74	68 (91.9)	6 (8.1)		
Individual driving style.	1	162	106 (65.4)	56 (34.6)	1	1.8
	2	74	55 (74.3)	19 (25.7)		
Driving with close friends	1	162	96 (59.3)	66 (40.7)	1	1.0
	2	74	49 (66.2)	25 (33.8)		
Driving with parents or significant others.	1	162	104 (64.2)	58 (35.8)	1	.0
	2	74	49 (66.2)	25 (33.8)		

* It is acknowledged that the minimum this cell contains less than the minimum expected count of 5.

7.11. Discussion.

The demographic results obtained are on first inspection remarkably consistent with both groups reporting much the same experiences while learning to drive. This is of relevance with regard to establishing the homogeneity of the groups at the outset. In all, 18 variables were used to draw retrospective and prospective data from the subjects with only 4 of these variables showing significant differences between the two groups. These

differences consisted mainly of issues surrounding age and gender. Due to the recruiting procedure for this study it proved to be too difficult to balance the subject numbers between groups. The difference between the two groups of most importance however is the hours of professional instruction taken. If those subjects in Group 1 were of substantially higher calibre than those in Group 2, which resulted in the need for fewer professional driving lessons, then it could be argued that the whole study may be flawed through this anomaly. The issues surrounding professional instruction and gender have been previously reported by Forsyth (1992). Her findings revealed a disparity between males and females in the amount of professional instruction taken with male subjects on average receiving significantly fewer professional driving lessons. The Forsyth study collected data from all who presented themselves for a driving test in the United Kingdom on four selected dates in 1988 and 1989 no matter what learning procedure had been adopted while learning to drive. In contrast to this, the present study was formed entirely by subjects recruited through ADIs, which may prohibit any direct comparison between the findings of the two studies, as the principle method of learning in the present study was through professional driving instructors and paid driving lessons. However, a likely outcome is that as the sample comes from those receiving professional instruction in the present study, the gender balance between the two groups may have had a more profound effect leading to the significant differences found between the two groups with regard to this method of learning. It is also the case that the group means for professional instruction in the present study were more than twice that for private practice indicating that the subjects in this study used professional instruction as the primary source of learning to drive. The data reported by Forsyth (1993), from her original 1988/89 study,

indicated that the average number of hours of professional instruction obtained was just over one hour more than those in the present study. The Forsyth study was also slightly more imbalanced with respect to gender with 45% of the subjects being male and 55% female. This ratio was reversed in the present study with the overall balance being 52% male 48% female. Therefore, the significance difference between groups discovered as far as professional instruction taken is likely to be a combination of the known issue that males appear to require less professional instruction and the gender bias between the groups; Group 1, having 53% male 47% female subjects and Group 2, comprising of 48% male and 52% female subjects.

Again with regard to professional instruction, a study by Groeger and Brady (1999) reported that among successful learners those pupils who, overall, drove less with professional instructors, showed greater progress. They found that where a pupil is making good progress, practice with other drivers might be substituted for professional instruction without detriment to the learning process. So, while professional instruction would appear to be a factor in driving licence acquisition it could be the case in the present study that the gender balance of the groups may have been the more important factor of the two.

The results of the present study do not provide much support for the concept of classroom-based pre-driver education. The variables used in the study to test for an education effect were built around the information conveyed in the pre-driver education course. The rationale behind the five items chosen was to do with the vulnerability of

new drivers as a result of their inexperience at the start of their driving career. It was hypothesised that this information presented during the classroom-based pre-driver education course carried an implicit personal threat and therefore would have more impact and have greater likelihood of having an influence on the subjects and therefore be more amenable to recall. On reviewing the results of the knowledge items it would appear that the way the information was presented to the subjects in pre-driver training group, Group 2, may have been ineffective. The use of accident statistics as a method of presenting a compelling case to the subjects in Group 2 appears not to have been successful. The results obtained from the first knowledge question revealed no evidence of enhanced knowledge of the topic from those subjects who were in the education group, Group 2. The outcome from the second item measuring driving related knowledge between groups was unexpected in that the majority of subjects in both groups selected the correct answer. An issue with multi-choice questions is that the correct answer has to be supplied amongst the list of possible alternatives. The question posed to the subjects in the questionnaire was, 'who is more likely to be involved in a car accident as a new driver?' There were four possible responses supplied; (A) A new male driver; (B) A new female driver; (C) Both are represented about the same; and (D) It's just a matter of luck or fate. It is possible that this question was naively constructed or that the information was more generally known than was realized. However, if there was an education effect present in this variable then the percentage of correct answers from those subjects in Group 2 should have been higher. This was not the case.

The third knowledge question, 'On average how many new drivers are involved in car accidents each day in Scotland?', also revealed no differences between groups. For this question the number of incorrect and correct answers, for both groups, was very similar in percentage terms indicating no effect of pre-driver education course. This is a disappointing result as the presenters of the pre-driver training programme were fastidious in imparting this information, on several occasions, to the subjects in Group 2.

In contrast to this, the responses given to the fourth knowledge question 'What is the most common type of accident for a new driver to be involved in?' did show a significant difference between the groups indicating a positive and significant education effect, with more than half of the subjects in Group 2 getting the answer correct compared to approximately one third of the control group, Group 1.

The fifth and last knowledge question used 'According to the New Drivers Act (1997), how many points do you need to get on your licence, in the first two years after passing your test, to return to the status of a learner driver?' was different from the previous questions in that it was not concerned with the accident involvement of new drivers but new plans for legal enforcement that carried a different type of perceived threat to the respondents. While the first four questions were concerned with a statistically based accident threat arising as a result of inexperience the final question selected for use was concerned with the threat of a mandatory return to learner status and the re-sitting of the driving test. At the time the study was being conducted this issue was an impending change in the law in relation to new drivers. The road traffic law in the United Kingdom

was about to be brought into line that in other European countries, with the additional provision that points acquired, commensurate with the severity of road traffic violations, could be placed on the driving licences of violators. When a pre-determined number of points is reached an opportunity then exists for the violator to be disqualified from driving. In the case of the new driver these new regulations halved the number of points required for action to be taken and to return the new driver to learner status. It would seem that this legal proposal carried sufficient threat to have some impact on the subjects with both groups recording a high level of correct scores with regard to this question. In addition to this, a significant difference between groups was found with those in the education sub-group recording significantly more correct answers.

The results from the last education question posed may also provide evidence that the way information is presented to subjects attending pre-driver training courses may be of importance. It would appear that information drawn from previous accident statistics, i.e. data from past events, is either not understood, unimpressive or easily forgotten. The issue surrounding the possibility of a future threat, returning to learner status, on the other hand seems to have a greater impact.

Of further relevance is that the information for all the knowledge variables was conveyed to the subjects in three different ways during training in order to maximise the likelihood of their understanding and recall. This was done verbally, early in the programme; verbally, supported by a computer generated graphic illustration; and on the third

occasion, by a specially produced video presentation made in the format of television commercial that was used for summary purposes.

The results from the knowledge items are equivocal with neither a case for classroom based pre-driver education being supported or clear evidence forthcoming that this technique is invalid. The results suggest that the type of information presented has an impact on the recall capabilities of the subjects attending. From a road safety or interventionist perspective this has implications. Related to this is the position of McKnight (1985), who argues simply that driving education is wasted on the unskilled driver. McKnight suggests that those who have yet to master the basic driving skills are unprepared to absorb much of the strategic safety information presented until they have gained experience in driving a car. In addition, McKnight suggests that the superimposition of a safety strategy fails at this stage because the novice driver has no 'spare (cognitive) capacity' while driving to adopt a strategic driving policy while struggling to cope with the basic vehicle handling skills in traffic. If this is indeed the case then it may be that the subjects are filtering the information given in classroom-based education courses and absorbing that which only has immediate relevance. Of more concern, however, may be whether or not attitudes and extra motives are being effected or being shaped in a positive manner. Also of relevance may be the position held by Struckman-Johnson et al. (1989) with regard to driver education courses, in that the differing individual needs of the subjects are not being addressed and that the pre-driver training course is engaged in providing information and describing driving attitudes and behaviours that the subjects are already aware of.

The driving scenarios used in the study were designed to measure differences between the groups with regard to the formation of positive attitudes and awareness of dangers created through the content of the pre-driver education programme. The seven variables presented to the subjects produced no significant differences between the groups. What the driving scenarios may show is that majority of new drivers are more concerned with the reaction of others within their vehicle to their driving than other driving issues at this time. This may be linked to the fact that having just passed their driving test complete mastery of the vehicle is still to be accomplished.

Taking a holistic view of the percentage totals of the responses from both groups on all driving scenarios, the subjects in Group 2 consistently reported fewer extra motives throughout although none of these differences approached significance. Whether or not this is sufficient to indicate a trend is a matter for debate. The responses may of course be an artefact of social bias with the subjects in the pre-driver education group recognising the issues described in each scenario and giving a 'more appropriate' social response (see Nederhof, 1985, for a full description of response bias). It may be case that the pre-driver education programme failed to deliver the required information to be effective or that the content of the training was simply forgotten by the subjects. In addition, it may be that the scenarios selected for the detection of additional motives within the driving task and the choices presented to the sample were too narrow in focus to adequately account for the diverse forms in which additional motives can manifest themselves. It is also the case that, on three of the driving scenarios used, 'speed choice', 'following but blocked' and 'driving disputes', approximately 90% of the subjects in both groups reported no

additional motives. It may again be the case that the level of driving skill is as yet insufficient for the new drivers in question to use the vehicle they are driving for an expressive purpose. The additional motives suggested by Meadows (1994), for example, all require the driver be very much in control of the vehicle.

7.12. Conclusions.

The demographic variables suggested that the subjects in each group were remarkably similar with regard to driving history and anticipated driving. Very little support for knowledge gain through specific classroom-based pre-driver education courses was found. Knowledge questions measuring items of direct relevance to the subjects appeared to differentiate better between the groups. The driving scenarios did not reveal significant differences between groups indicating no effect from pre-driver training. It would appear from the results, however, that additional motives in the driving task may take time to become manifest perhaps as a result of growing confidence and competence. Overall, however, the effects of pre-driver education appear to be barely minimal in this study.

Chapter Eight.

Post-test driver education, social cognition modelling and the Driver Skills Inventory.

8.1. Abstract.

This cross-sectional and longitudinal study was designed to explore the effect of an intervention procedure informed by the two social cognition models; the Health Belief Model (HBM) (Rosenstock, 1974), and Protection Motivation Theory (PMT) (Rogers, 1975, 1983). A cohort of new drivers (n=207) was split into three groups. Group 1 acted as a control group and were used for comparison purposes completing two questionnaires, one immediately on passing the practical driving test and a second questionnaire at three months post-test. The subjects in Group 2 completed the same questionnaire schedule but in addition these subjects had participated in a classroom-based pre-driver education course prior to passing their practical driving test. The subjects that formed Group 3, the experimental group, in addition to the questionnaire schedule also participated in a classroom-based post-driving test intervention based upon applicable elements of both the HBM and PMT. This post-test intervention occurred within three months of the subjects in Group 3 passing their practical driving test. To control for exposure effects and differences between groups arising from vehicle usage, driving demographics were drawn from all three groups that investigated the average hours of driving per week, the time of day and day of the week of vehicle usage, the types of passenger carried and the general purposes of vehicle journeys. Lajunen and

Summala's (1995) Driver Skills Inventory (DSI) was used to measure differences between the groups over time with all three groups also completing the inventory on test pass and at three months post-test. The results showed significant differences for Group 3 subjects in comparison with the other two groups with regard to the Motive sub-scale of the DSI and on the DSI as a whole indicating that they perceived themselves to have lower levels of perceived skill and safety motives. These differences indicate an intervention effect.

8.2. Introduction.

An implicit aim in all driver education courses is to modify attitudes and behaviour. Although such courses are generally not structured around any specific scientific theory of behaviour change the materials used are aimed at enlightening the recipient as to the dangers on the roads. Through this subtle type of fear appeal the aims are to bring about a better attitude and a safer driving performance. However, rarely, has there been any attempt to measure such outcomes.

After a review of driver improvement courses in America, Struckman-Johnson, Lund, Williams and Osborne (1989) argue that the general premise from which driver improvement courses seem to operate is that lack of knowledge about safe driving and/or inappropriate attitudes held by drivers are responsible for motor vehicle crashes. Therefore the resultant aim of these courses is to increase knowledge and improve attitudes based upon the assumption that this will bring about an improvement in driver

behaviour and reduce accidents. In addition, the same review also suggests that empirical support for the common sense notion that driver improvement courses work is far from unequivocal.

However, none of the driver improvement courses reviewed by Struckman-Johnson et al. (1989) explored issues surrounding motivational factors that may affect driving behaviour or the question of what motivated drivers to adopt inappropriate attitudes and behaviours. Gregersen (1995) differentiates between two different types of driving motives, why we drive and how we drive. Gregersen argues that both these kinds of motives influence our driving behaviour. He argues that motives can range from the mere utility of the driving task in driving from one place to another where satisfaction is gained simply through driving, to other more socially motivated driving influenced by subjective norms, role expectations and group pressure. In addition, Gregersen argues that these motives are governed by reinforcements connected to the behaviour; e.g. driving fast and not being stopped, not being accident involved and arriving at the destination quicker. Furthermore Gregersen (1995) also suggests that certain aspects of education could be used to address the individual preconditions and the social influences affecting the driver. Gregersen argues further that pre-driver education courses should not focus attention on trying to change behavioural outcomes of personality traits but they should attempt to increase the cognitive skills with regard to driving awareness along with an explanation that it is these factors that may contribute most to accident involvement. Moreover, Gregersen suggests that this has not been done in the past

because no suitable methods for improving risk awareness and/or other cognitive skills relating to driving ability amongst new drivers have been developed.

Furthermore, Gregersen (1995) argues, from a theoretical perspective, that it is important for awareness training to distinguish between skill acquisition and risk awareness, and its importance, in line with skill acquisition theory (see Rasmussen, 1984). Moreover, he also suggests that through this process it may be possible to influence the way in which drivers use the car, such as reducing the motives for using the car as an instrument of liberation or as a toy.

To illustrate this point, a practical study by Gregersen (1996) showed the effects of training and the overestimation of skill. Using a 'skill' group and an 'insight' group subjects were asked to estimate how many times they could successfully avoid an obstacle during a skid training exercise. The 'skill' group had received practical feedback about car control in practise a week earlier while the 'insight' group received only information about how suddenly and unexpectedly situations could occur. Compared to the 'insight' group, members of the 'skill' group significantly overestimated the number of successful passes they would make. Objectively, however, no significant differences in performance between the two groups was found. These findings support the notion that there is a relationship between training and perceived skill level. Gregersen also points out that, from tradition and common sense, it has been assumed that increased skill is equivalent to increased safety and this assumption is deeply anchored in people's minds and has influenced the design of driver training over many years.

As far as new drivers specifically are concerned, other important factors have been identified in relation to driver training. McKnight (1985), for example, raised the issue of cognitive overload in new drivers. McKnight argues that such are the cognitive demands on the learner drivers in dealing with the control of the vehicle and traffic situations, they cannot deploy the additional strategic safety style proposed by driver safety educationalists. McKnight suggests that post-test interventions would be more appropriate but concedes that difficulties exist in getting anyone to attend for the delayed instruction after the driving test has been passed.

In line with McKnight's argument, Fitts and Posner (1967) (in Evans, 1991) suggest that driving skill acquisition occurs over three phases and that it is not until the third phase, where driving has become almost automatic, that additional cognitive processing abilities become available. The phases proposed by Fitts and Posner are;

1. 'The early', or cognitive phase;
2. 'The intermediate', or associative phase;
3. and, 'The final', or autonomous phase.

The early or cognitive phase is where the learning task is to understand the component parts of the driving task, the location of the vehicle controls and the resultant vehicle responses must be learned. In the intermediate phase, the exploration of different strategies occurs with the learner attending to the immediate feedback. During this stage the learner devotes full attention to the task and skill increases by responding to the

feedback from the consequences of inputs or from direction from the instructor. The skills learned at this stage include knowing what action is required in a specific traffic situation and this is combined with the skill of knowing what input produces the required output. The third and last stage is the autonomous stage where the majority of driving task is completed at a (cognitive) high level with minimal driving effort. In this autonomous phase the task is completed using a small fraction of the driver's attention. In this stage, there is cognitive capacity spare for other tasks. In the autonomous stage the amount of processing assigned to the driving task is still sufficient to monitor any potentially threatening incidents. Should an incident occur all attention could be quickly switched back to the driving task.

If awareness training is to be delayed until driving has become automatic the question is then posed, what should be taught? Trankle, Gelau and Mekter (1990) argue, with respect to countermeasures for risk-taking behaviours, that while attempts could be made to reduce the usually high self-estimation of driving ability among new drivers, a more promising strategy may be to increase the perception of situation-inherent dangers, within any given driving style or specific behaviour, in an attempt to evoke more cautious driving behaviour. Unfortunately, however, Trankle et al. did not give any further guidance on how this might be done.

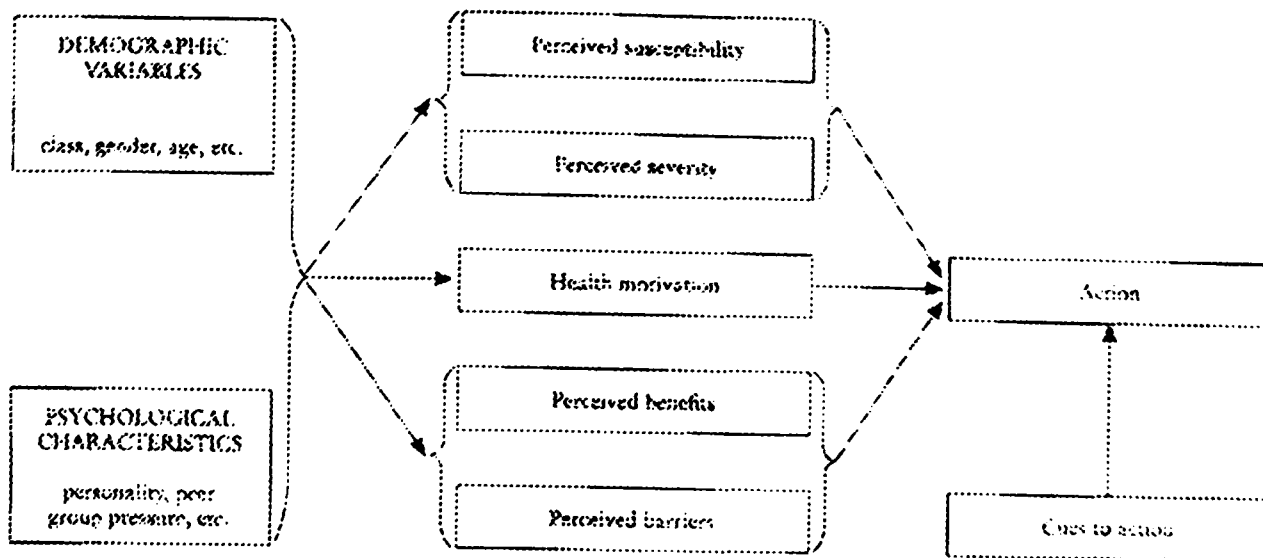
Nevertheless, strategies have been successfully deployed in other areas of research where behaviour modification has been desirable that have resulted in benefits to the individual. With specific reference to preventative health behaviour (for example, reducing weight,

stopping smoking or drug taking) it has been suggested that a sense of personal vulnerability is necessary if a person is to adopt risk reduction strategies. The two most widely recognised models of preventative health behaviour are the Health Belief Model (see Figure 8.1a.) (HBM) (Rosenstock, 1974) and Protection Motivation Theory (see Figure 8.1b.) (PMT) (Rogers 1975, 1983).

(For a more detailed description of the Theory of Planned Behaviour, Protection Motivation Theory, the Health Belief Model and their theoretical use within the present study see Chapter Four.)

The HBM consists of four main components: (1) 'perceived vulnerability', which refers to the subjective perception of risk or vulnerability to a health threat; (2) 'perceived severity', which refers to one's perception of the seriousness of the health threat; (3) 'perceived benefits', which consists of the efficacy of an action designed the threat of illness; and (4) 'perceived barriers', which refers to the assessment of negative consequences that might be associated with the preventative behaviour. A further two interrelated components: (1) 'cues to action', a diverse range of triggers such as perception of symptoms, social influences and education campaigns that may stimulate action; and (2) 'health motivation', a readiness to be concerned about health issues, were also included in later versions of the model (e.g. Becker, Haefner and Maiman, 1977b). However, no clear operationalization instructions linking perceived susceptibility and severity to threat and action were developed. This restriction will not be detrimental to the present study.

Fig 8.1a. The Health Belief Model.

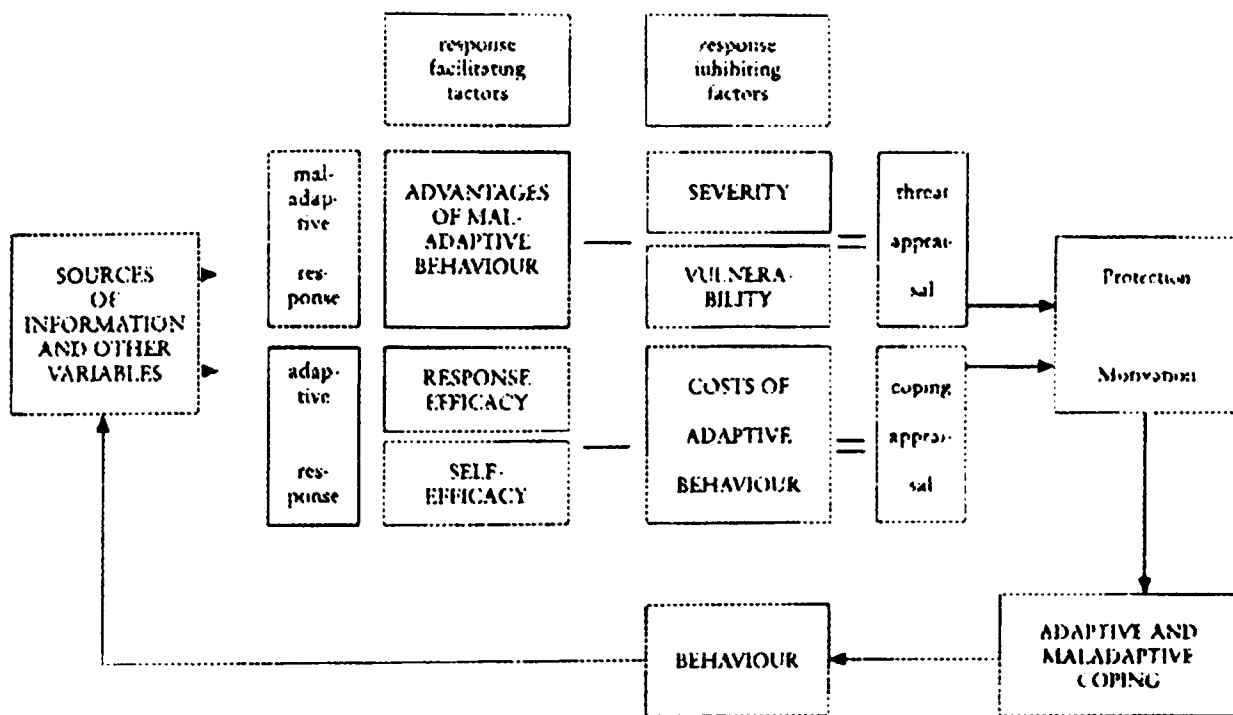


In contrast, a more detailed model of preventative health behaviour, originally developed to provide perceptual clarity to the understanding of fear appeals (e.g. Don't Drink and Drive'), is Protection Motivation Theory (PMT). The PMT, outlined by Prentice-Dunn and Rogers (1986), assumes that protection is maximised when: (1) the threat to health is severe; (2) the individual feels vulnerable; (3) the adaptive response is believed to be effective in averting the threat; (4) the individual is confident in his/her ability to successfully complete the adaptive response; (5) the rewards associated with maladaptive behaviour are small; (6) and the costs associated with the adaptive response are small.

Although PMT appears as a more detailed model of health preventative behaviour than the HBM there are nonetheless apparent similarities between the models. Both emphasise the cognitive processes mediating attitudinal and behaviour change and both emphasise the central role of self-perceived susceptibility or vulnerability. With regard to young drivers, the suggestion is that if individuals do not perceive themselves to be particularly

at risk, or if they are willing to accept an unduly high level of risk, then they will lack motivation to adopt risk reduction strategies. However, those drivers who perceive their level of risk to be high, or who perceive the cost of risk behaviours to be high, will be more likely to act to reduce this risk. An accurate perception of one's self-perceived risk and personal vulnerability may therefore be seen as desirable in order to provide the basis for rational decisions concerning behavioural risk reduction.

Fig 8.1b. Protection Motivation Theory.



In order to measure any effects induced by the HBM and PMT an appropriate measure was required. The Driver Skills Inventory (DSI) Lajunen and Summala (1995) was developed by its authors to measure both the driver's perception of his/her perceptual-motor skills and his/her safety-motives respectively. The inventory consists of statements that give respondents an opportunity to report on their perceived level of skill and safety

motives over a broad range of driving situations that included many of the major issues that are especially appropriate to young drivers. It was hypothesised therefore that if the post-test intervention procedure was effective and the constructs described by HBM and PMT had been influenced, the respondents would report lower mean scores on the Driver Skills Inventory as a result of their own self-perceptions that they were at special risk from their driving behaviour at that time.

With regard to the DSI itself, the Skill sub-scale is reported to correlate strongly with personality variables measuring the sense of mastery over one's life. Furthermore, Lajunen and Summala suggest that this sense is generalised and is manifested in traffic behaviour also. The DSI was constructed on the assumption that personality characteristics and experience gained in traffic determine the driver's view of himself/herself and that this view influences subsequent behaviour.

Lajunen and Summala (1995) argue that safe driving is composed of two separate components, cognitive skills and motives. Cognitive skills include information processing and motor skills whereas motives include both transient motivational and more permanent personality factors and attitudes toward traffic and safety. In addition, Lajunen and Summala argue that the maximum driving performance resulting from this combination of cognitive and motor skills does not necessarily predict the individual's level of accident involvement. Of more importance, they argue in accord with Gregersen (1995), are the motivational factors that determine what they are doing or what they must do with their skills. In addition, Lajunen and Summala (1995, 1997) postulate that

drivers who overestimate their perceptual-motor skills have a more emotional attitude to driving than do other drivers who emphasise safety.

In summary, the present study aims to measure changes over time, using the DSI, in the risk perceptions of new drivers with regard to the driving task brought about through an intervention procedure informed, designed and operationalised by a combination model formed from both the HBM and PMT.

8.3. Method.

8.4. Procedure.

The subjects were drawn from an initial sample of 451 participants that were recruited through approved driving instructors and who had registered with the study shortly after they had started to learn to drive. The subjects at that time had been randomly assigned, using a form of block randomisation, to one of three groups. Block randomisation was accomplished by grouping together subjects that were close together both in terms of the time of registration and geographical area. This was necessary because of the rolling nature of the recruitment procedure and the need to form sufficient numbers within two of the groups for training purposes. The subjects in Group 2, for example, were formed into a series of sub-groups to make up sufficient numbers for the classroom-based interventions to be cost effective. To control for any possible geographical effects several areas were used. All the subjects in the present study completed two questionnaires one

immediately on passing their practical driving test and a second questionnaire three months later. For those subjects in Group 1, the control group, this was their only commitment. In addition to this questionnaire schedule the subjects in Groups 2 were required to attend classroom-based education course prior to taking their practical driving test.

The subjects learned to drive and pass the practical driving test in the way it was most suitable for them. Within a three-month post-test period the subjects that formed Group 3 were required to attend for a classroom-based intervention programme. The post-test intervention programme, like the pre-test education course, lasted for approximately three hours and consisted of two, one and a half hour sessions held during the course of a single afternoon. Both interventions comprised of a computer-generated presentation that was supplement by selected video materials and group discussion.

At the time of the present study all the subjects had three months driving experience. Due to many factors, including not having enough money for driving lessons, insufficient time, theory test failures and those who abandoned learning to drive for other reasons, the sample had reduced from its original size.

All the subjects in the present study were required to inform the study's main researcher on passing their practical driving test. As soon as possible thereafter a questionnaire was sent by first class post. Should the questionnaire not be returned within two weeks a

reminder was sent. A second reminder was sent after a further two weeks. If no response was forthcoming at this point the subjects were eliminated from the study.

About one week before the anniversary of the third calendar month from the date the subjects had passed their driving test they were sent a second questionnaire. Again should this second questionnaire not be returned within two weeks a reminder was sent. A second reminder was sent after a further two weeks. If no response was forthcoming at this point subjects again the subjects were eliminated from the study. Subjects in all three groups completed and returned both questionnaires using the same schedule.

8.5. Classroom-based post-driving test intervention.

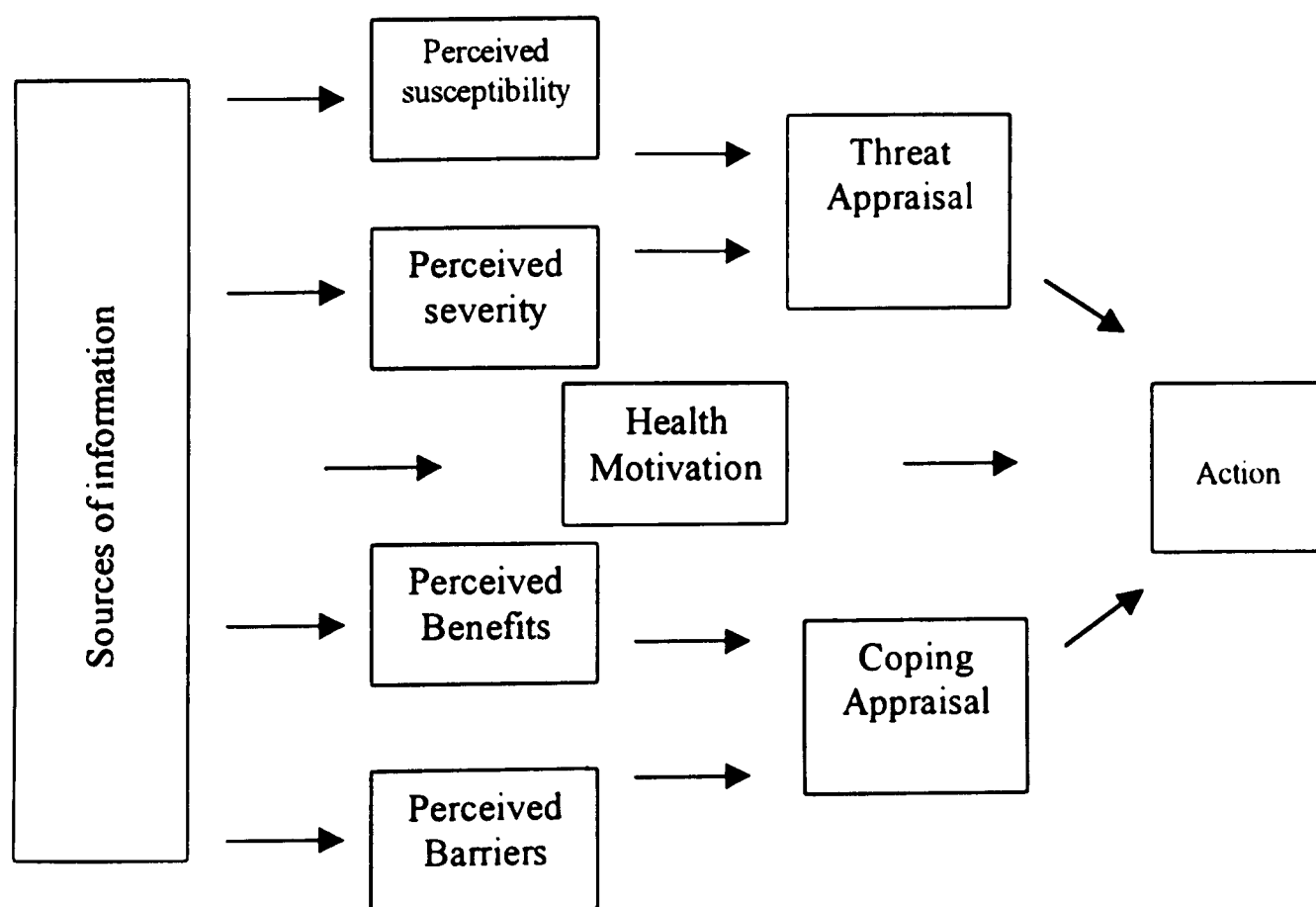
The main focus of the post-driver intervention was the perceived levels of driving skill the subjects were likely to have with only a maximum of three months driving experience and how it could be easily overestimated. In addition, the ability of the subjects to identify risky driving situations with limited experience was thought to be another key factor.

To create a sense of vulnerability within the subjects and explain how potentially vulnerable they were at this stage of their driving career, age related accident statistics were reviewed to illustrate the high number of new drivers that were becoming accident involved. Thereafter, secondary issues surrounding the further acquisition of driving

skills, the gaining of driving experience and identifying and handling risk within the driving task were also explored.

Overall, the post-driving test classroom-based intervention was informed and designed around a hybrid social cognition model based upon common constructs within both the Health Belief Model (HBM) (Rosenstock, 1974), and Protection Motivation Theory (PMT) (Rogers, 1975, 1983), as illustrated in Figure 8.1c.

Figure 8.1c. Combined model of HBM and PMT.



(For a more detailed description of the theoretical basis for the use of this model and for the full content of the classroom-based post-driver intervention course see Chapter Five.)

In dealing with issues that could be regarded as increasing the 'perceived personal threat' for the respondents the definition of threat within the model comprised of three components. First, the perceived threat to the subject is that of death or serious injury to themselves or others resulting from their potential driving actions; second is the threat of damage to their vehicle or a financial penalty involved in their aberrant driving; and third, a threat of some other action such as prosecution or personal embarrassment that would be likely to arise through personal maladaptive driving choices. The model would indicate that the post-test intervention should increase the perception of personal susceptibility to the threat; increase the perceived severity and outcome of the threat; increase the benefits of behaviour designed to avoid the threat; and reduce the perceived barriers to changing the maladaptive behaviour. It would follow that a greater level of perceived threat and threat appraisal in conjunction with an increased expectation of the perceived benefits, resulting from the information received during the post-test intervention would increase the prospect of the success of avoidance measures at the coping appraisal stage and thereafter lead to the action stage being seen by the respondents as being more easily achieved and beneficial.

The rationale of the present study was to determine whether or not any differences in the self-reports of subjects amounting to differences between groups at time 2 was the result of the post-test driving intervention and not other driving related factors. Therefore, a series of driving related variables were used to establish if there were any fundamental differences between groups with regard to driving habits and to control for the effects of driving experience.

8.6. Subjects.

Out of the original sample (n=451) of new drivers between the ages of 17 and 21 years those remaining in the study (n=208) had a mean age of 17.5 years (SD=0.8) at three-months post-test. (A table showing group membership and drop out rates is shown in the results section.)

8.7. Measures.

Two questionnaires were completed for this study. The first questionnaire was completed on test pass (Time 1). The data drawn in this questionnaire included the age and current occupational status of the subjects along with assessments of the amount and type of driving anticipated weekly with regard to time, purpose and passengers carried that included specifically; driving to and from work; driving as part of a job or on employers business; driving for shopping purposes; and driving for leisure or for other purposes. Also at Time 1, subjects were asked to anticipate the amount of driving they would do alone; with their partner/spouse; with partner/spouse/children; with children only; with their parents; or driving with friends or other types of passengers. Lajunen and Summala's (1975) Driving Skills Inventory (DSI) was also completed for the first time. This scale comprises 29 items and the subjects had to estimate their abilities with regard to the items on a seven point Likert type scale with end points ranging from 'much worse' to 'much better'. The items were as follows; (1) fluent driving; (2) performance in a critical situation; (3) perceiving hazards in traffic; (4) driving in a strange city; (5)

paying attention to pedestrians and cyclists; (6) driving on a slippery road; (7) conforming to traffic rules; (8) managing the car through a slide; (9) predicting traffic situations ahead; (10) driving carefully; (11) knowing how to act in particular traffic situations; (12) fluent lane changing in heavy traffic; (13) fast reactions; (14) making firm decisions; (15) paying attention to other road users; (16) driving fast if necessary; (17) driving in the dark; (18) controlling the vehicle; (19) avoiding competition in traffic; (20) keeping sufficient following distances; (21) adjusting your speed to the conditions; (22) overtaking; (23) cleaning car windows on winter mornings; (24) giving up right of way if necessary; (25) keeping to the speed limits; (26) avoiding unnecessary risks; (27) tolerating other drivers' blunders calmly; (28) obeying traffic lights carefully; and (29) parking in legal places only.

The second questionnaire in the study was completed at three months post-test (Time 2). The measures used at Time 1 were repeated to monitor any changes over time and differences between groups. In addition the following information was obtained; (1) how many hours do you drive on average each week? (2) how many different types of vehicle have you driven since you passed your driving test? (3) approximately how much time have you spent driving on your own since passing your driving test? (4) in your opinion has your driving got better or worse since passing your driving test. Variables 1 and 3 used an incremental scale ranging from 0 to over 40 hours in 5-hour steps. Variable 2 was an incremental scale from one to 'more than five'. Variable 4 used a seven point Likert type scale ranging from 'got a lot worse' to 'got a lot better'.

To control further for the amount and type driving exposure, the following measures were used that supplied results in percentage terms. What percentage of your time do you spend driving on the following types of road? (1) City/town/village roads. (2) Country roads. (3) Dual carriageway roads. (4) Motorway driving. Thereafter, again in percentage terms, driving exposure was measured on days of the week and time periods of the day. Lajunen and Summala's (1975) Driving Skills Inventory was again completed at Time 2.

8.8. Results.

Table 8.2, Subjects and the attrition rate for the study.

Subjects	Group 1	Group 2	Group 3	Totals
Entered	176	123	152	451
No test on time	38	24	33	95
Dropped out before or at Time 1	35	31	53	119
Dropped out before or at Time 2	10	5	14	29
Completed	93	63	52	208

The drop out rate for the study between the assessment measures on test pass and assessments measures at three months post test for each group is shown in Table 8.2. Subjects were eliminated from the study if they failed to return questionnaires within the postal schedule or failed to attend for the intervention procedure for their group. The row labelled 'No test on time' refers to subjects who had failed to pass their practical driving test before the cut-off date for the present study. A Chi Square analysis revealed that there were significant differences in the drop out rate between groups (Group 1, completers [52.8%], non-completers [47.2%], Group 2, completers [51.2%], non-completers [48.8%], Group 3, completers [34.2%], non-completers [65.8%], $X^2=9.29$, $P=0.01$), with the highest drop out rate applying to Group 3 (62.7%). It is difficult to

speculate how this imbalance in dropout rate between groups may have occurred. It may be that the commitment of Group 3 subjects was affected by the fact that they had more to do in the study prior to their first payment, and that they also had the longest wait before this payment was made.

Table 8.3. General purposes of car journeys in the average week, in mean percentage terms and standard deviations, comparison between Time 1 reports and Time 2 self-reports.

	Group	N	Time 1 Means	SD	N	Time 2 Means	SD
To and from work.	1	87	27.7	26.4	91	30.9	28.8
	2	61	30.3	23.6	60	33.2	29.0
	3	52	20.2	21.4	53	27.5	26.3
As part of job / on employers business	1	87	4.4	13.0	91	3.3	8.8
	2	61	2.3	7.2	60	4.4	9.7
	3	52	3.1	10.0	53	2.9	9.0
Shopping	1	87	14.7	12.1	91	14.5	13.8
	2	61	16.4	11.9	60	14.0	12.6
	3	52	16.3	13.0	53	15.7	12.4
Leisure	1	87	40.3	25.5	91	41.8	25.7
	2	61	35.7	20.4	60	35.8	26.3
	3	52	41.2	21.3	53	39.6	24.1
Other	1	87	12.7	15.1	91	8.4	14.4
	2	61	13.9	19.2	60	11.0	16.8
	3	52	17.2	19.7	53	13.5	18.0

The means and standard deviations for the self-reported percentage estimates of the subject's anticipated driving at Time 1 are shown in Table 8.3. Also shown in the table are means and standard deviations of self-reported driving time at Time 2 (note; subjects who supplied incomplete data were excluded from this analysis). A series of one-way analysis of variance (ANOVAs) was conducted on all variables in Table 8.3 at Time 1, no significant differences were found between groups.

The results presented in Table 8.3 also indicate that at Time 2, three months post test, approximately 30% of all driving time for the subjects at this time was spent travelling to and from work with less than 5% of driving time done while at work. The largest single amount, between 35% and 41%, of all driving time reported at Time 2 was for leisure purposes. A series of ANOVAs was also conducted on the variables at Time 2; again no significant differences between groups were found. This further analysis reveals that as far as driving for specific purposes was concerned no differences were found between groups at Time 1 or Time 2, indicating that the group were driving much the same amount of time and broadly on the same type of journeys.

Table 8.3a. Analysis of Variance of Time (Time 1 and Time 2), General purposes of car journeys (mean percentage times per group in an average weeks driving), a comparison between Time 1 self-reported anticipated driving times and Time 2 reports self-reported current driving times.

Variable	Time		Time x Group		Group		Scheffe
	(df 1)		(df 2)		(df 2)		
	F	P<	F	P<	F	P<	
To and from work	6.5	0.05*	.4	n.s.	1.3	n.s.	n.s.
As part of job/ employers business	.0	n.s.	2.3	n.s.	.0	n.s.	n.s.
Shopping	.8	n.s.	.4	n.s.	.2	n.s.	n.s.
Leisure	.0	n.s.	.2	n.s.	1.4	n.s.	n.s.
Other	7.9	0.01**	.0	n.s.	1.6	n.s.	n.s.

Key: *=P<0.05 **=P<0.01; Post-hoc Scheffe test revealed no significant differences between groups.

Repeated measures analysis were carried out on the means of the self-reported percentage times of anticipated driving time at Time 1 and the reported means of actual driving time at Time 2. Table 8.3a illustrates the results of a 2 x 3 ANOVA, Time (Time 1, Time 2) x Group (Group 1, Group 2, Group 3), for anticipated and actual self-reported driving. A small but significant difference was found on the variables 'to and from work'

and 'other' as a function of time, this would indicate that with the passage of time more of the subjects were using the car for travelling to and from work. Unfortunately the variable 'other' was not further defined. A post-hoc Scheffe test revealed no significant between group differences.

In addition to the repeated measures analysis shown in Table 8.3a, a series of Time 1 to Time 2 pairwise comparisons were conducted on all the variables shown in Table 8.3. For the first variable, driving to and from work, it was found that for Group 1 (df 85, $t=2.1$, $P<0.05$) and Group 3 (df 51, $t=2.0$, $P<0.05$) there was a significant increase in the amount of driving anticipated at Time 1, to the self-report of actual driving being undertaken at Time 2. For the variable, driving as part of job/employers business, there was also a significant increase in driving time for Group 2 (df 56, $t=2.2$, $p<0.05$), indicating that more subjects in Group 2 were driving while at work.

Table 8.4. Estimated weekly anticipated and self-reported driving time while alone and with others (in mean percentage terms of total driving) at Time 1 and Time 2.

	Group	N	Time 1 Means	SD	N	Time 2 Means	SD
Alone	1	87	38.7	20.7	91	41.0	20.8
	2	59	39.3	22.5	59	48.3	20.2
	3	52	36.2	18.8	53	40.2	21.5
With partner/spouse	1	87	5.5	10.2	91	6.9	12.3
	2	59	8.5	14.2	59	7.8	13.2
	3	52	8.4	15.8	53	8.4	17.2
With partner spouse and children	1	87	0.2	1.0	91	0.2	1.8
	2	59	1.6	5.9	59	1.4	5.1
	3	52	0.2	1.1	53	0.2	1.1
With children only	1	87	0.8	2.6	91	1.4	4.2
	2	59	1.9	4.6	59	1.8	3.8
	3	52	0.9	3.2	53	1.8	5.7
With parents	1	87	16.6	13.2	91	15.4	15.0
	2	59	14.7	13.9	59	13.5	14.1
	3	52	16.7	16.3	53	15.3	15.5
With friends	1	87	32.4	19.2	91	31.9	18.9

	2	59	30.9	20.1	59	22.1	16.5
	3	52	32.6	16.5	53	30.0	19.4
With others	1	87	4.4	7.1	91	2.7	5.3
	2	59	3.2	7.0	59	3.7	6.9
	3	52	4.6	11.6	53	3.8	9.5

Note: as a total of 39 pairwise comparisons were made in this study consideration was given to the presence of both Type 1 (α) and Type 2 (β) errors (Bonferroni adjustments). However in adopting tighter control for Type 1 errors by imposing a more stringent level of significance resulting from issues surrounding multiple comparisons this may, in turn, induce Type 2 errors, i.e. the suppressing of other valid significant differences. In viewing the data presented in Tables 8.3 and 8.4 therefore it should be noted that a possibility exists of significant differences occurring between groups that might simply be an effect of running multiple comparisons.

Table 8.4 shows the means and standard deviations of anticipated driving time while alone and with other passenger types at both Time 1 and Time 2. One-way analysis of variance at Time 1 for this set of variables indicated a significant difference between groups with the variable 'driving with partner/spouse and children' ($F=3.3$, $P<0.05$) indicating a higher amount of driving time involving these types of passenger for Group 2. However, as can be seen from the means in the table, both at Time 1 and Time 2, this amounted to a very small total of actual driving time. No other between group differences were found on any of the other variables at Time 1. The series of one-way ANOVAs was also repeated on the variables at Time 2. At this time a significant difference was found in the amount of driving with partner/spouse and children between groups ($df\ 2$, $F=3.1$ $P<0.05$) and on the variable driving with friends ($df\ 2$, $F=5.2$, $P<0.01$) with post-hoc Scheffe producing differences for this variable between Group 1 v Group 2 ($P<0.05$).

Table 8.4a. Analysis of variance of time (Time 1 and Time 2) x Group (Group 1, Group 2, Group 3) in the estimates in mean percentage times of an average weeks driving; a comparison between Time 1, self-reported anticipated driving time alone and with various passenger types, and Time 2, self-reported current driving time alone and with various passenger types.

Variable	Time		Time x Group		Group		Scheffe
	(df 1)		(df 2)		(df 2)		
	F	P<	F	P<	F	P<	
Alone	8.6	0.01**	.8	n.s.	1.3	n.s.	n.s.
Partner/spouse	.0	n.s.	.2	n.s.	.8	n.s.	n.s.
Partner/spouse/children	.4	n.s.	.2	n.s.	3.0	n.s.	n.s.
Children only	2.1	n.s.	.8	n.s.	.9	n.s.	n.s.
Parents	1.5	n.s.	.0	n.s.	.3	n.s.	n.s.
Friends	9.5	0.01**	3.4	0.05*	2.1	n.s.	n.s.
Other	.8	n.s.	1.8	n.s.	.2	n.s.	n.s.

Key: **= $p < 0.01$; *= $p < 0.05$; Post-hoc Scheffe test revealed no significant differences between groups.

Table 8.4a shows the results of the repeated measures analysis. As can be seen from the means at Time 1 and Time 2, there is a general and significant increase in driving alone as a function of time. In contrast to this there is a significant decrease in the amount of driving time with friends. Furthermore there is a small but significant time x group interaction. Pairwise comparisons of all variables also showed that for Group 1 there was a significant decrease ($df\ 85, t=2.0, P<0.05$) in driving time spent with 'others' between Time 1 and Time 2, and for those subjects in Group 2 it revealed a significant increase in driving 'alone' ($df\ 55, t=-2.5, P<0.05$) and a significant decrease in driving with 'friends' ($df\ 55, t=3.5, P<0.001$). There were no significant pairwise differences for those subjects in Group 3.

Table 8.4b. Occupation by category in percentage terms.

	Group 1		Group 2		Group 3	
	Time 1	Time 2	Time 1	Time 2	Time 1	Time 2
School pupil	37.0	25.0	32.7	20.9	64.1	56.6
College student	26.9	39.1	24.5	30.6	24.5	28.3
Unemployed	1.1	2.1	1.6	0	1.8	1.8
At work	23.5	28.2	22.9	29.0	7.5	11.3
Training	2.2	1.0	8.1	4.8	1.8	1.8
Other	8.9	4.3	9.8	14.5	0	0

The results in Table 8.4b reveal that the subjects in the sample appear to be in a transition period with, for example, 37.0% of Group 1 still being at school at Time 1 while only three months later this has fallen to only 25.0% at Time 2. Of relevance at this point are the mean ages for the three groups, Group 1, 17.6 years, Group 2, 17.6 years and Group 3, 17.3 years. . A between-groups one-way analysis of variance revealed a significant age difference (df, 2, $F=3.537$, $P<0.05$). A post-hoc Scheffe test revealed a significant difference between Groups 1 and 3 only, again at the $P<0.05$ level. This small difference in the lower mean age of those subjects in Group 3 may account for the imbalance with regard to the high percentage of subjects in that group shown to be still at school. The subjects in the present study were not matched for age between groups and this will be the result simply of random allocation

Table 8.5. Weekly driving by hours, number of vehicle types driven, time driven alone since passing the practical driving test and self-perceived driving improvement by group at Time 2.

	Group	N	Means	Standard Deviation	F	P
On average how many hours do you drive each week?	1	84	9.2*	8.3	.316	.726
	2	58	10.2*	8.0		
	3	50	9.1*	8.9		
How many types of vehicles have you driven since passing your test	1	92	2.0	1.32	.805	.805
	2	62	2.0	1.37		
	3	51	2.3	1.60		
Approximately how much time have you spent driving on your own since passing your test?	1	84	23.6*	15.2	.238	.788
	2	60	24.2*	15.0		
	3	51	22.2*	15.1		
In your opinion has your driving got better or worse since passing your test.**	1	91	5.4	1.37	2.119	.123
	2	56	5.5	1.08		
	3	48	5.0	1.58		

Key, the variables *=hours. ** =Measured on a seven point Likert type scale from 0, 'got a lot worse' to 7, 'got a lot better'.

One-way analysis of variance revealed no significant differences between the three groups as far as weekly amounts of driving, number of vehicles driven or driving time was concerned (see Table 8.5). The subjects in all groups reported that, in their opinion, their driving had improved since passing their driving test. The results show that for all three groups the mean scores are higher than the mid-point of the variable 3.5. Again, there were no significant differences between groups on this variable.

Table 8.6. Percentage time spent driving on road types at Time 2.

	Group	N	Means	Standard Deviation	F	P
City/Town/Village Roads	1	91	49.6	22.7	.526	.592
	2	60	50.0	22.1		
	3	53	53.6	26.0		
Country roads	1	91	21.6	16.2	.351	.705
	2	60	20.5	17.7		
	3	53	19.2	16.1		
Dual carriageway roads	1	91	17.1	12.1	2.622	.075
	2	60	19.0	10.8		
	3	53	14.1	10.8		
Motorway driving	1	91	8.0	12.1	.702	.497
	2	60	10.3	11.9		
	3	53	9.0	9.8		

The Time 2 only data shown in Table 8.6 reveals no significant between group differences existed with regard to driving on different types of road or carriageway types and that the subjects in each group appeared to have gained similar types of driving experience since test pass. The means are derived from the percentage of driving time reported by each subject in each group. It is interesting to note that approximately 50% of driving appears to occur on rural roads with only around 10% being spent driving on motorways.

Table 8.7. Driving by days of the week by percentage of time at Time 2.

	Group	N	Means	Standard Deviation	F	P
Monday	1	91	10.8	11.4	2.770	.065
	2	58	12.1	8.2		
	3	53	8.0	5.5		
Tuesday	1	91	10.3	7.1	.822	.441
	2	58	11.1	5.7		
	3	53	12.0	9.1		
Wednesday	1	91	11.1	7.3	.038	.963
	2	58	10.7	6.1		
	3	53	10.9	9.6		
Thursday	1	91	10.2	7.2	1.432	.241
	2	58	11.5	6.2		
	3	53	9.4	6.1		
Friday	1	91	15.8	9.8	.639	.529
	2	58	14.2	8.7		
	3	53	14.4	9.9		
Saturday	1	91	22.4	14.7	.048	.953
	2	58	22.1	14.7		
	3	53	22.9	13.3		
Sunday	1	91	17.6	13.0	1.432	.241
	2	58	16.7	10.2		
	3	53	20.6	14.7		

The results in Table 8.7 indicate, after one-way analysis of variance, that no significant difference between groups was found as far as driving on days of the week are concerned. However, it can be seen from the table that a large proportion of the driving by the subjects, between 30% and 40%, occurs at the weekends.

Table 8.8. Driving time by hours of the day in percentage terms at Time 2.

	Group	N	Means	Standard Deviation	F	P
Early morning, (5.00 - 7.00 a.m.)	1	91	2.9	9.4	.058	.944
	2	61	2.4	7.3		
	3	53	2.8	8.6		
Morning, (7.00 – 12.00 p.m.)	1	91	19.0	15.8	.424	.655
	2	61	20.5	14.3		
	3	53	17.9	15.3		
Afternoon, (12.00 – 6.00 p.m.)	1	91	23.3	14.8	.974	.379
	2	61	25.1	16.3		
	3	53	21.1	14.9		
Evening, (6.00 – 10.00 p.m.)	1	91	38.8	20.1	1.247	.287
	2	61	34.0	19.2		
	3	53	38.0	16.1		
Late evening / night (10.00 – 2.00 a.m.)	1	91	13.5	13.3	.873	.419
	2	61	16.2	15.0		
	3	53	16.2	14.6		
Overnight (2.00 – 5.00 a.m.)	1	91	1.0	3.3	.998	.371
	2	61	2.0	6.0		
	3	53	1.5	4.3		

The results shown in Table 8.8, again after a one-way analysis of variance, show that no significant differences were apparent between groups as far as driving is concerned on time periods of the day. Again all three groups reporting that between 30% and 40% of their driving is done in the evening hours, leisure time, between 6.00 p.m. and 10.00 p.m. This is much in-line with previous findings (Hodgdon, Bragg and Finn, 1981; Bragg and Finn, 1985; Williams 1985; Karpf and Williams, 1983; Robertson, 1981). These findings combine, along with the results shown in Tables 8.5 and 8.7, to show that on average one third of the driving time of the entire sample is used for leisure purposes.

The findings presented in the preceding tables establish a broad uniformity between the groups on many aspects of driving exposure. Notwithstanding the differences as noted it appears that groups appear relatively uniform in composition and appeared to have experienced the same amount and type of driving exposure. The results in the following paragraphs, however, show how the groups differ.

The present study replicated an earlier study using the Driver Skills Inventory (DSI) by Lajunen and Summala (1995). The variables in the scale were submitted to a factor analysis by the maximum-likelihood method with varimax rotation (SPSS version 9.0). In line with the earlier Lajunen and Summala study only two factors were extracted because the two sub-scales were considered not to be related. In the present study, 3 of the 29 items factored differently from the earlier study. The subsequent analysis of change over time for the two sub-scales and the DSI was based on the factored items in the present study. The items concerned were; item 5 (Paying attention to pedestrians and bicyclists); item 15 (Paying attention to other road users) and item 23 (Cleaning car windows on winter mornings); these items in the present study were factored into the skill sub-scale. On each occasion the Eigen values were close. There were however, differences between study populations. The Lajunen and Summala (1995) study used a sample of Finnish University students (n=113) with an average age of 23.9 years (SD 4.3) and on average 5.2 years driving experience. In addition to any cultural differences that may apply, the subjects in the present study were considerably younger with an average age of 17.6 years (SD 0.8), and with just three months driving experience. The

small differences between studies therefore may just simply be the result of driving inexperience.

Table 8.9. The Driver Skill Inventory, factor loadings and communalities (Comm.) This solution was taken from the Time 2 data.

Item	Motive	Skill	Comm.
1. Fluent driving	0.13	<u>0.62</u>	0.41
2. Performance in a critical situation	-0.03	<u>0.74</u>	0.55
3. Perceiving hazards in traffic	0.15	<u>0.66</u>	0.47
4. Driving in a strange city	0.17	<u>0.54</u>	0.32
5. Paying attention to pedestrians and bicyclists	<u>0.44</u>	0.39	0.36
6. Driving on a slippery road	0.31	<u>0.48</u>	0.33
7. Conforming to traffic rules	<u>0.73</u>	-0.05	0.54
8. Managing the car through a slide	0.01	<u>0.68</u>	0.46
9. Predicting traffic situations ahead	0.19	<u>0.66</u>	0.48
10. Driving carefully	<u>0.63</u>	0.24	0.46
11. Knowing how to act in particular traffic situations	0.32	<u>0.68</u>	0.57
12. Fluent lane-changing in heavy traffic	0.08	<u>0.70</u>	0.49
13. Fast reactions	0.07	<u>0.62</u>	0.39
14. Making firm decisions	0.10	<u>0.69</u>	0.49
15. Paying attention to other road users	0.48	<u>0.55</u>	0.53
16. Driving fast if necessary	0.03	<u>0.59</u>	0.35
17. Driving in the dark	0.12	<u>0.60</u>	0.38
18. Controlling the vehicle	0.21	<u>0.74</u>	0.59
19. Avoiding competition in traffic	<u>0.62</u>	0.17	0.42
20. Keeping sufficient following distances	<u>0.66</u>	0.14	0.46
21. Adjusting your speed to the conditions	<u>0.63</u>	0.33	0.50
22. Overtaking	0.02	<u>0.73</u>	0.54
23. Cleaning the car windows on winter mornings	0.28	<u>0.34</u>	0.19
24. Giving up right of way when necessary	<u>0.44</u>	0.38	0.35
25. Keeping to speed limits	<u>0.76</u>	-0.03	0.59
26. Avoiding unnecessary risks	<u>0.69</u>	0.15	0.51
27. Tolerating other drivers' blunders calmly	<u>0.49</u>	-0.04	0.24
28. Obeying the traffic lights carefully	<u>0.60</u>	0.24	0.42
29. Parking in legal places only	<u>0.52</u>	0.01	0.28

The scoring of items in sub-scales is shown by underlining of the corresponding scale. Items 1 through 18 as well as items 25 and 27 have been adopted originally from (Spolander, 1983; and Hatakka et al., 1991, 1993) as in Lajunen and Summala, (1995).

The results of the factor analysis are shown in Table 8.9. All items had loadings over .30 and 24 items had loadings over .50 so none was omitted from the solution. This is much

in line with the earlier study. The two-factor solution explained 44.11% of the total variance with the motive sub-scale explaining 18.17% and the skills sub-scale explaining 25.95% of the variance.

Reliability analysis revealed that the two sub-scales and the whole scale had good to very good internal consistencies (Cronbach, 1951) both at Time 1 and Time 2. The alpha values were as follows; Time 1, Motive sub-scale .86, Skill sub-scale .80 and whole scale .85. At Time 2; Motive sub-scale .88, Skill sub-scale, .92 and whole scale .92.

Table 8.10 presents means and standard deviations for all three groups at both Time 1 and Time 2. One-way analysis of variance between the group means at Time 1 revealed no significant differences. At Time 2 a significant difference was found (df 2, F=3.566, P<0.05) as far as the whole DSI was concerned with subjects in Group 3 recording lower mean scores indicating that they saw their driving as being less accomplished at this point in time.

Table 8.10. Showing the Groups Mean Values and Standard Deviations at Time 1 and Time 2, for the two sub-scales and DSI scale as a whole.

Variable	Group	N	Time 1		Time 2	
			Mean	SD	Mean	SD
Motive sub-scale	1	76	63.1	7.1	61.5	8.8
	2	50	62.8	8.1	63.2	8.8
	3	48	62.8	8.9	58.2	8.7
Skill sub -scale	1	71	67.7	9.1	69.4	11.1
	2	53	67.9	10.1	69.2	11.6
	3	48	68.7	8.6	64.7	9.5
Whole scale	1	68	131.1	13.4	132.1	15.7
	2	49	131.4	16.5	132.7	18.7
	3	46	131.5	15.5	123.2	14.7

Table 8.11. Analysis of Variance of Time (Time 1, Time 2) x Group (Group 1, Group 2, Group 3) for the DSI and its two Sub-scales, Safety Motive and Skill.

Variable	Time		Time x Group		Group		Scheffe
	(df 1)		(df 2)		(df 2)		
	F	P<	F	P<	F	P<	
Motive sub-scale	11.819	.001	5.870	.01	1.438	n.s.	n.s.
Skills sub-scale	.249	n.s.	7.737	.001	.683	n.s.	n.s.
Whole scale	5.472	.05	8.465	.001	1.435	n.s.	n.s.

Table 8.11 illustrates the results of 2 x 3 ANOVAs, Time (Time 1, Time 2) and Group (Group1, Group 2, Group 3) for the two DSI sub-scales and the DSI as a whole. For the Motive sub-scale ($P < 0.001$) and the whole DSI ($P < 0.05$) there was a significant effect of time. The table also reveals that a significant time x group interaction for the Motive sub-scale ($P < 0.01$), the Skill sub-scale ($P < 0.001$) and the DSI ($P < 0.001$). There were no significant differences for group alone. Time 1 – Time 2 pairwise comparisons revealed significance in the Motive sub-scale scores (df 185, $t = -2.557$, $P < 0.05$) with subjects in Group 3 again recording lower mean scores.

Figure 8.12. Change over time for motive sub-scale.

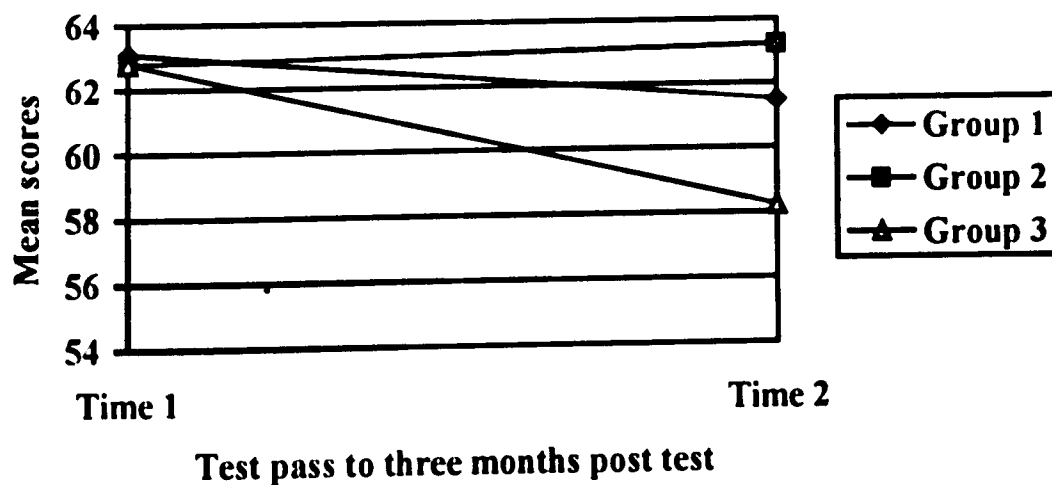


Figure 8.13. Change over time for skills sub-scale.

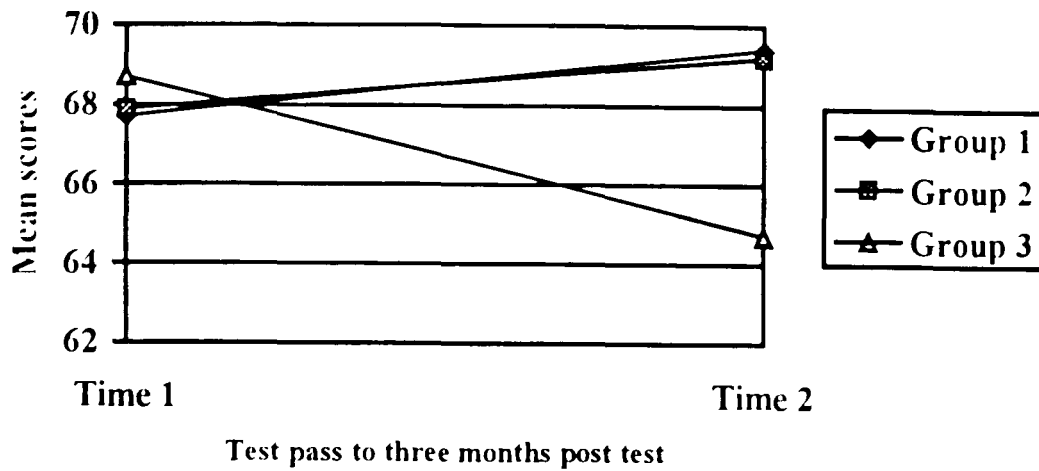
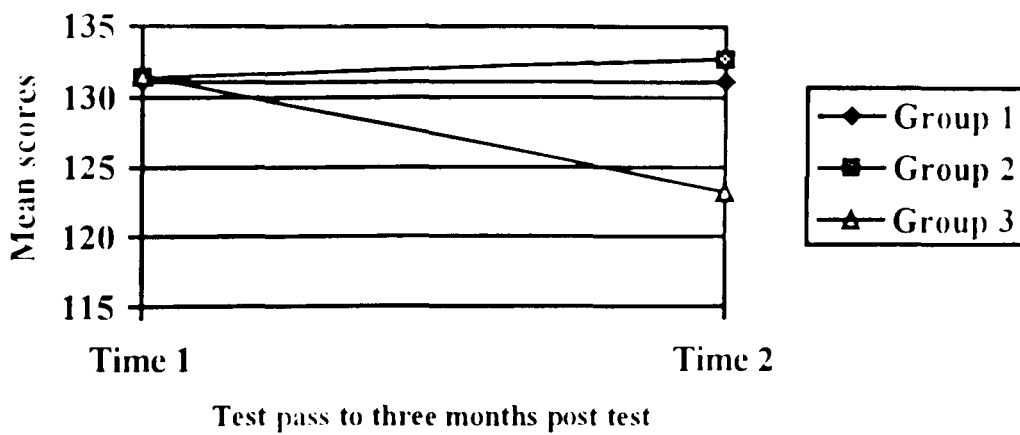


Figure 8.14. Change over time for the whole DSI.



Figures 8.12, 8.13 and 8.14 show graphically the changes in mean scores occurring between groups over time. It can be seen that only minor differences existed between the groups at Time 1. Figure 8.14 reveals that for the DSI scale as a whole the perceived level of driving skill and safety motives for Group 2 remained stable over time while a small but insignificant increase in perceived skill and safety motive is apparent for those

subjects in Group 1. In contrast to this, the results from the data for subjects in Group 3 shown a significant downward trend.

8.9. Discussion.

At Time 2, three months post-test, the subjects in Group 3 had significantly lower mean scores on the motive sub-scale of the DSI and on the DSI scale as a whole in comparison with the other two groups in the study. This would indicate that at this time the subjects in Group 3 appeared to be less confident in their self-perceived driving abilities; this might be associated with more caution when driving. It would appear therefore that the intervention informed by the Health Belief Model (HBM) and Protection Motivation Theory (PMT) appears to have been successful, at least within the limitations of self-report procedures, in reducing the reported levels of perceived skill and safety motive for the subjects in Group 3 as measured by the DSI. This reduction implies that Group 3 subjects are more likely to recognise their shortcomings in driving experience at this time and may, as a consequence, modify their driving style. In any case, the reduction of mean scores on both the skill and motive scale, at least at face value, is to be welcomed. It must be noted, however, that the findings presented here are self-reported and not actual driving behaviour as to date there is little evidence to suggest that these are one and the same thing.

The intention of the post-test intervention was to modify the perceived driving skills and risk assessment capabilities of the respondents in such a way that this procedure would

be robust enough to have an effect over time and on the items of the DSI. The intervention schedule that the subjects in Group 3 were subjected to meant that a potential existed for the subjects to have between as little as two days driving experience or as much as 90 days driving experience prior to attending the intervention ($n=51$, Min 2 days, Max 90 days, Mean 47.6, SD 26.2). This issue has the potential to confound the data being drawn at Time 3 for this group, as at least some of its members were likely to have been sampled relatively quickly after their particular intervention had taken place. However, there is a counterbalancing effect in the research design, as some subjects in Group 3 would have had to wait up to 90 days before completing the Time 3 questionnaire. With the relative infrequency of driving test passes, it is difficult to see how this confounding issue may be avoided. There was approximately 118 days (depending on the number of days in the three particular calendar months) possible between test pass and the completion of the questionnaire at Time 3. With the mean of number of days between test pass and the intervention being 47.6, it follows that 70.4 days were left between the intervention and the assessment measure at Time 3. Overall, this time period may be an indication of the effectiveness of the classroom-based post-driver intervention.

In addition to the robust nature of the intervention, as detected by the DSI, an additional dimension that becomes evident through the research design is the apparent longevity of the effects of the classroom-based post-test intervention.

The content of the post-test intervention had no specific reference to any of the items contained within either sub-scale of the DSI. This would be self-defeating, as tutoring towards a specific scale would not give a true reflection of any change in self-reported behaviour. While elements of the combined HBM/PMT model post-driver give clear indications as to how an intervention programme could be structured and what aspects within the driving task may be manipulated to increase the perceived threat and vulnerability felt by a novice driver, other issues will have a lesser effect. For example, neither sub-scale of the DSI would detect any effects of the determinants to 'action' involved in the route from 'sources of information to action' through 'perceived benefits' and 'perceived barriers' to 'coping appraisal'. As a result, these factors are unlikely to have any impact on the reduced means found in the scores in Group 3 due to the nature of the variables used within the DSI. This mis-match between the design of the intervention technique and a scale on which effects can be measured could actually be argued as a strength demonstrating the robustness of the intervention and the sensitivity to change of the DSI.

The mean scores at Time 1 reveal, at least as far as the DSI is concerned, that no discernable effect of pre-driver education intervention was evident, from the respondents in Group 2, over the broad range of the DSI items. This is in line with the argument proposed by McKnight (1985), that strategic driving information is wasted on pre-drivers as the basic skills of driving have yet to be acquired. In addition this finding indicates some support to the position of Fitts and Posner (1967) in that even at a point where the driving test has been passed, driving, decision making and interacting with other traffic

could hardly be considered at this stage of the subject's driving career to be an automatic process so therefore no spare cognitive capacity would be available to deploy any of the strategic information if retained.

An additional issue to that of cognitive capacity and automatic processing is that of the content of the interventions themselves. While pre-driver interventions are aimed at modifying driver behaviour they are also constrained to an extent by the extreme novice nature of the recipients and are therefore self-limiting in scope. In contrast to this, post-test interventions are able to address topics that may be of direct and immediate concern to the recipients. Moreover, it is likely that the recipients in post-test interventions may have gained personal experience of a particular driving topic under review. Furthermore, many of the topics reviewed in the post-test intervention may have already been identified by the post-test drivers as having a potential threat to their personal well-being. If this is the case the respondents may perceive a greater persuasive weight embedded within the intervention argument.

In replicating the earlier study of Lajunen and Summala (1995), the variables numbered 5 and 15, which are concerned with relationships with other road users, pedestrians and bicyclists, factored differently from the Motive sub-scale into the Skill sub-scale. It is likely that this ambiguity may result from the inexperience of the sample population used. New drivers may focus on their own particular driving practices as they develop both new skills and gain in experience. Other road users, especially those who do not carry much of a threat to the respondent's personal safety, may not be uppermost in their

mind at this stage of their driving career. As Parker, Manstead, Stradling and Reason (1992) point out, driving is more of a socially interactive activity than the respondents may be aware of at this time. Moreover, Parker et al. (1992) argue that driving is very much a social performance, carried out in the public domain, and is likely to involve consequences for other people and again this may not be clearly apparent at this early stage of the subject's driving career. The third item (item 23), 'Cleaning the car windows in winter mornings', was not particularly relevant to the present study but was retained in the DSI to maintain the integrity and consistency of the scale. It is entirely possible that subjects in the present study would have had no experience whatsoever of that particular behaviour. This item also factored in the Skill sub-scale. The present study proceeded using the scales as factored from the current results. Exploratory analysis was conducted on the original sub-scales produced by Lajunen and Summala but differences in outcome were found to be unimportant.

The present study has been pragmatic in its approach to the collection of a comprehensive set of data that reflects as much as possible the actual driving habits of the subjects in the sample. The rationale for this is that changes in perceived level of driving skill will result from exposure, practise and variation within the driving task. Therefore as wide a range of demographic and driving behaviour variables was used.

The demographic information drawn with regard to vehicle usage, experience gained, journey or passenger types and driving times failed to differentiate substantially between any of the three groups. The exception to this was found in variables measuring

passenger types carried. It would appear that subjects in Group 2 appeared to spend more driving time on their own compared to subjects in Group 3 at Time 1 and the time they report in driving with friends at Time 2. From all the data available in the present study it has proved impossible to suggest why this difference occurs. A third variable in this section 'driving time with partner/spouse/child' also shows a significant difference. In this instance the percentage time it amounts to, was between 1% and 2% of total driving time, so it is not of the same importance.

The means recorded for average weekly driving and the amount of driving time completed since test pass are remarkably similar between all three groups. This may be a result of the social situation of the new drivers especially with regard to financial constraints, education and employment issues. It is interesting to note from this section of the questionnaire that those subjects in Group 3 also reported a lower mean score when asked about how they perceived their own driving standard to be. This would be as expected for this group as a further indication of the effect of the post-test intervention strategy.

The subjects in the sample also appeared to have gained a uniform spread of driving experience over the various different road types. This could be considered to be a surprising finding, as certain areas of Scotland still do not have much dual carriageway or motorway provision. This is again an important finding as those drivers who spend most of their driving in towns or cities are more likely to have gained more experience in dealing with traffic at close proximity and as a consequence may feel more comfortable

with their level of skill or safety motives. The variables measuring the purposes of car journeys undertaken, again, revealed no significant differences between the groups. It is acknowledged, however, that a weakness does exist through the use of the variable labelled 'shopping' in that shopping can be seen as both an essential part of household maintenance or very much as a leisure activity. As a result of these potentially diverse activities different types of journey may be required with the former involving many short local trips while the latter may involve longer inter-city journeys, for example. Whilst shopping must be regarded as an essential activity supported by the use of the car, leisure driving appears to occupy a large amount of driving time within this age group of drivers with between 35% and 41% of all reported driving time being used for this activity.

Leisure time driving is an important issue within this group of drivers. Research by Schulze (1990, in Gregersen and Berg, 1994) reported associations between evening and weekend driving and accidents. The data in the present study reveal large percentage times of evening and weekend driving with on average 22% of all driving time taking place on Saturdays, 17% to 20% on Sundays and evening driving ranging from 34% to 38%. Of more importance to the present study, however, is that no significant differences were found between the groups on these variables.

In contrast to the positive findings above the present study failed to provide any evidence of effects of the classroom-based pre-driver education programme. Of all the variables used at Time 1 and, as detailed in the discussion above, no systematic differences

between the groups were found. It could be postulated that the greater time difference between the delivery of either intervention and the timing of the measures was in this instance sufficient for the effects of the pre-driver training to have decayed completely. It may also be an issue of the relevance of the information given by each intervention, with attitudinal and behavioural issues being discussed in pre-driver training, prior to the driving task being fully mastered. It could also be the case that the DSI was an inappropriate measure in respect to pre-driver training. Whatever is the case, the performance of the pre-driver training course must be seen as disappointing.

In relation to this, some previous researchers Trankle, Gelau and Mekter (1990), Gregersen (1995) and McKnight (1985) have all proposed that post-test would be a more relevant time for intervention procedures for new drivers for a variety of reasons. The evidence gathered in the present study supports this view. However, even though evidence of positive effects of a post-driving test intervention has been found it could be argued that this may be an irrelevant solution as it is not possible at this time in the United Kingdom to mandate new drivers to return post-test for additional training unless, as in the present study, by payment.

In summary, while the present study does not provide support for classroom-based pre-driver training courses it does indicate effects of a post-driver intervention. This may result from the differing methodologies used by the interventions themselves with pre-driver training concentrating on driving issues and the post-test intervention

concentrating on personal threat or vulnerability in regard to driving outcomes and personal risk.

Chapter Nine.

New drivers and their intentions: A comparison of three methods of driving licence acquisition and changes over time in self-reported driving behaviour until nine months post-driving test.

9.1. Abstract

This cross-sectional and longitudinal study was designed to review the performance of two classroom-based interventions aimed at modifying driving related attitudes and self-reported behaviour of new drivers in comparison to a strategy of non-intervention. A sample of novice drivers (n=174), all with less than two hours professional driving instruction, were randomly allocated to one of three groups and followed till nine months post-driving test. All the subjects were required to complete a set of four questionnaires at four specific times, as they started driver training, Time 1; on test pass, Time 2; three months post-test, Time 3; and nine months post-test, Time 4. The subjects in Group 1 (n=80) were used as a control group who learned to drive and completed the questionnaire schedule. Subjects in Group 2 (n=50), in addition to the questionnaire schedule, were also required to attend a classroom-based pre-driving test education programme prior to Time 2. The subjects in Group 3 (n=44), in addition to the questionnaire schedule, attended a classroom-based post-driving test intervention between Time 2 and Time 3. To control for exposure effects and differences between groups arising from vehicle usage, driving demographics were drawn from all three

groups that investigated the average hours of driving per week, the time of day and day of the week of vehicle usage, the types of passenger carried and the general purposes of vehicle journeys. Furthermore the subjects' attitudes to driving violations (Attitude to Driving Violation Scale, West and Hall, 1994) (ADVS) and additional motives in the driving task were measured and incorporated into a model of intentional speeding behaviour based upon Ajzen's (1985, 1988) Theory of Planned Behaviour. The design of the study also allowed for a series of repeated measures analyses to be undertaken investigating changes over time. The results of the study revealed no differences between the groups as far as vehicle usage or passenger types was concerned. With regard to the intentional model of speeding behaviour, the results showed that 43% of the total variance could be accounted for with regard to self-reports of actual speeding behaviour. In addition the subjects in the post-test intervention group, Group 3, reported significantly better behavioural intentions with regard to speeding behaviour indicating some effect for the post-driving test intervention at both Time 3 and Time 4. Separate analyses of the repeated measures for the ADVS and additional motives indicated that both these factors significantly increased as a function of time indicating a worsening of attitude and self-reported behaviour for all three groups with regard to these factors. There were no intervention effects evident for those subjects in the pre-driving test education group, Group 2.

9.2. Introduction.

A study by West, Elander, and French (1992) suggests that there is a consistent relationship between self-reported faster driving and increased accident risk. The study also indicated that self-reports of speed could be used as a successful surrogate for direct observations of speeding behaviour and that both self-reported and observed speeding behaviour are significantly associated with self-reported accident involvement. As a result of the findings from their study West et al. (1992) specifically identified the significant relationship between speed choice and accident risk as an important target for road safety interventions. In addition West, et al. (1992) also concluded from their review of the literature that a faster driving style is associated with being male, being young and belonging to lower socio-economic groups. They also argue that the association between demographic factors and accident risk are mediated by these variables.

The results of the West et al. (1992) study supported the findings of a previous study by Wilson and Greensmith (1983) who, using an instrumented vehicle to study speeding behaviour, found that drivers who had previously been accident involved recorded higher speeds when driving on a clear and open road and participated in more overtaking manoeuvres and were overtaken less often than those drivers who had not been accident involved. In addition the results of research conducted by Manstead, Parker, Stradling, Reason and Baxter (1992) also indicates that speeding may be the most prevalent of all driving violations. Moreover research by Brown and Copeman (1975) revealed that the

respondents in their study suggested that speeding was also seen to be the least serious in a series of traffic offences listed. This finding again emerged in a study by Reason, Manstead, Stradling, Baxter and Campbell (1990). The social status of speeding as a behaviour and as a common violation is confounded further, as for some motorists speeding behaviour is regarded with a degree of tolerance Parker, Manstead, Stradling and Reason (1992).

Related findings from an American study by Harrington and McBride (1970) notes, in line with the findings of West et al. (1992), that speeding violations appear to be a function of youth and the behaviour actually decreases with age, with drivers under twenty one years of age having nearly four times the violation rate, in comparison to males aged between thirty six and forty years. Harrington and McBride also found that male drivers are also likely to have approximately three times the violation rate than females for speeding violations.

The results of a further study by West and Hall (1994) into the accident liability of novice drivers also broadens our understanding of speeding behaviour, and argues that there is clear support for the idea that speeding and accident risk stems in part from personality factors that extend beyond the driving situation. The West and Hall (1994) study suggests that a 'constellation' of factors is responsible for the way a driver habitually drives or chooses to drive, which would include the tendency to commit violations or speed excessively and would also incorporate such behaviours as

carelessness, impatience and aggressive driving, all of which may be involved in motivated bad driving, driving style and driving performance.

With regard to describing driving performance, Evans (1991) suggests, by referring to both a driver's perceptual and motor skills, that it is not only what the driver can do but also what the driver actually does which is of importance. This is directly related to the fact that most accidents are caused by human error rather than mechanical, or traffic systems failure. This is confirmed in research by Lewin (1982), which indicated that over 90% of road traffic accidents are in some way attributable to human error, including incorrect speed choice.

9.3. Social issues.

(For a more detailed review of social issues in the driving task see Chapter Three.)

An American study by Ross (1940) reviewed the causation factors of all road traffic accidents in the state of Michigan over a five-year period. He concluded that, overall, 88.5% of the accidents were attributable to driver error. Ross concluded at that time that the major cause of this error appeared to be driver 'attitude' suggesting further that the pioneering and laissez-faire nature of the American citizen's attitude to rules and regulations were a primary cause of road accidents. Although this appears to be a 'sweeping' statement its value is not diminished as an early scientific acknowledgement that social factors may have a large part to play in driving behaviour. Knapper and Cropley (1981), in a review of the social and interpersonal factors in driving, also give a

strong and persuasive argument that driving must be viewed more as a social behaviour in which interpersonal interactions are of great importance. They argue that some general principles that are well established in social psychology are involved, including social norms, social modelling, social status, interpersonal attraction, personal space, and so on, and that these factors have theoretical implications for fully understanding driver behaviour.

Several other authors have since explored specific aspects of social behaviour in relation to accident involvement. Sobel and Underhill (1976) found a relationship between family disequilibria, adolescent driving and increased accident involvement. This study revealed that family dysfunction and social stress seemed to be important in the causation of accidents in adolescent males but not females. In another study, Jessor (1987) found consistent relationships between risky-driving and other measures of problem behaviour. Jessor concluded that risky-driving was likely to be part of a more general adolescent lifestyle associated with the same set of social, psychological and behavioural variables as other problem behaviours. Beirness and Simpson (1988) extended this focus on problem or deviant behaviour in a further study to identify psychosocial factors that distinguish between youths who become involved in motor vehicle accidents and those who do not. These studies combine to give clear evidence of a link between negative social behaviours and accident involvement.

In addition to negative dispositions toward the driving task, previous studies have also identified that some drivers have more interest in the use of the road and car than the

mere utility of transportation. Reser (1980), Marsh and Collett (1986) and Lewis (1991) all argue that the automobile also gives an opportunity for drivers to exercise feelings of competence, control and mastery. Roberts, Thompson and Sutton Smith (1966) described the use of the car for some as a method of self-testing and constructed a self-testing scale measuring attitudes towards powerful automobiles, driving enjoyment, speed and overtaking. Bliersbach and Dellen (1980) identified five driving patterns, which they labelled as extra motives; thrill, power display, self-testing, smooth driving and piloting. These driving patterns, they argue, determine how drivers interact with others on the road.

A more recent study also identified the importance of social influences on driving. Rolls, Hall, Ingham and McDonald (1991) using structured interviews designed to investigate the additional motives of young drivers, showed that a substantial minority (about 35%) of young male drivers could be categorised as 'unsafe'. The study suggests that 'safe' drivers were likely to have regular girlfriends or partners with whom they spent a considerable amount of time and as a result felt more mature. 'Safe' drivers in their study also had more debts and subsequently spent less on cars and going out. They were also more likely to rate themselves as safe rather than skilled. In contrast to this, the 'unsafe' drivers in their study reported having a higher exposure rate to unsafe driving by both parents and peers. Moreover, the 'unsafe' drivers rated themselves as more skilled than safe and were more interested than 'safe' drivers in testing their skills both off and on road. Furthermore, Rolls et al. (1991) go on to argue that the social context in which the young driver uses the motor car is as important as the data that are provided by

demographic information such as vehicle type and mileage driven. From their interviews, they also noted that many of the 'unsafe' drivers in their study saw driving as more of an expressive activity than a practical activity.

These 'additional motives' as suggested by Rolls and colleagues are revisited in this study but this time in the form of a self-report questionnaire. Unlike the psychosocial studies mentioned above these items were intended to identify at the very broadest level those drivers who have 'additional motives' through their use of the motor car and those who do not.

Previous intervention strategies, held either pre or post driving test, appear to have been aimed at curbing either inappropriate attitudes or motives and have been mainly educationally based. Struckman-Johnson, Lund, Williams and Osborne (1989) observed that the general premise of these courses is to change driver behaviour by attempting to modify an assumed lack of knowledge about safe driving and/or the inappropriate attitudes held by the recipients. However, research into the efficacy of such programmes has been dogged by methodological flaws involving the selection procedures for candidates on the courses along with their socio-economic status, academic ability and other items of social bias (for a review see Harrington, 1972). In addition the methodology deployed for measuring the success or otherwise of education courses has usually focused upon re-offending violation rates or actual accident involvement. This methodology may be inappropriate as it is likely that the numbers involved in the

educational courses would be far too small to allow for any meaningful statistics to be drawn, such is the relatively infrequent nature of traffic accidents.

However, the Theory of Planned Behaviour (TPB) (Ajzen 1985, 1988, 1991), which is an extension of the earlier Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980), provides a parsimonious explanatory framework for exploring behavioural intentions. Both these models of behaviour could be considered as modelling the deliberate plans for individual action as they imply that behavioural decisions are based upon careful consideration of appropriate and relevant information. The TPB also provides a model for understanding volitional behaviour in terms of a small number of linked concepts (Parker et al., 1992).

The TRA suggests that the immediate precursor of volitional behaviour is the intention to engage in that behaviour. Intention is seen to be represented by the combination of motives, a conscious plan and a decision to perform a behaviour. Attitudes towards a specific behaviour are seen to impact upon intentions. In the TRA attitudes are seen as one determinant of behavioural intentions. Another determinant within the model is the Subjective Norm. Subjective Norms consist of a set of beliefs about what significant others think about the actor's engagement in the behaviour. Subjective norms are assumed to assess the social pressures surrounding the performance or non-performance of a particular behaviour. These two determinants, related directly to behavioural intentions, may be of particular relevance when applied to the driving task. However, a limitation of the TRA is that it is not applicable to behaviours that require skills, resources or

opportunities that are not freely available. The TRA is also not applicable for behaviours that are likely to be outwith the volitional control of the actor.

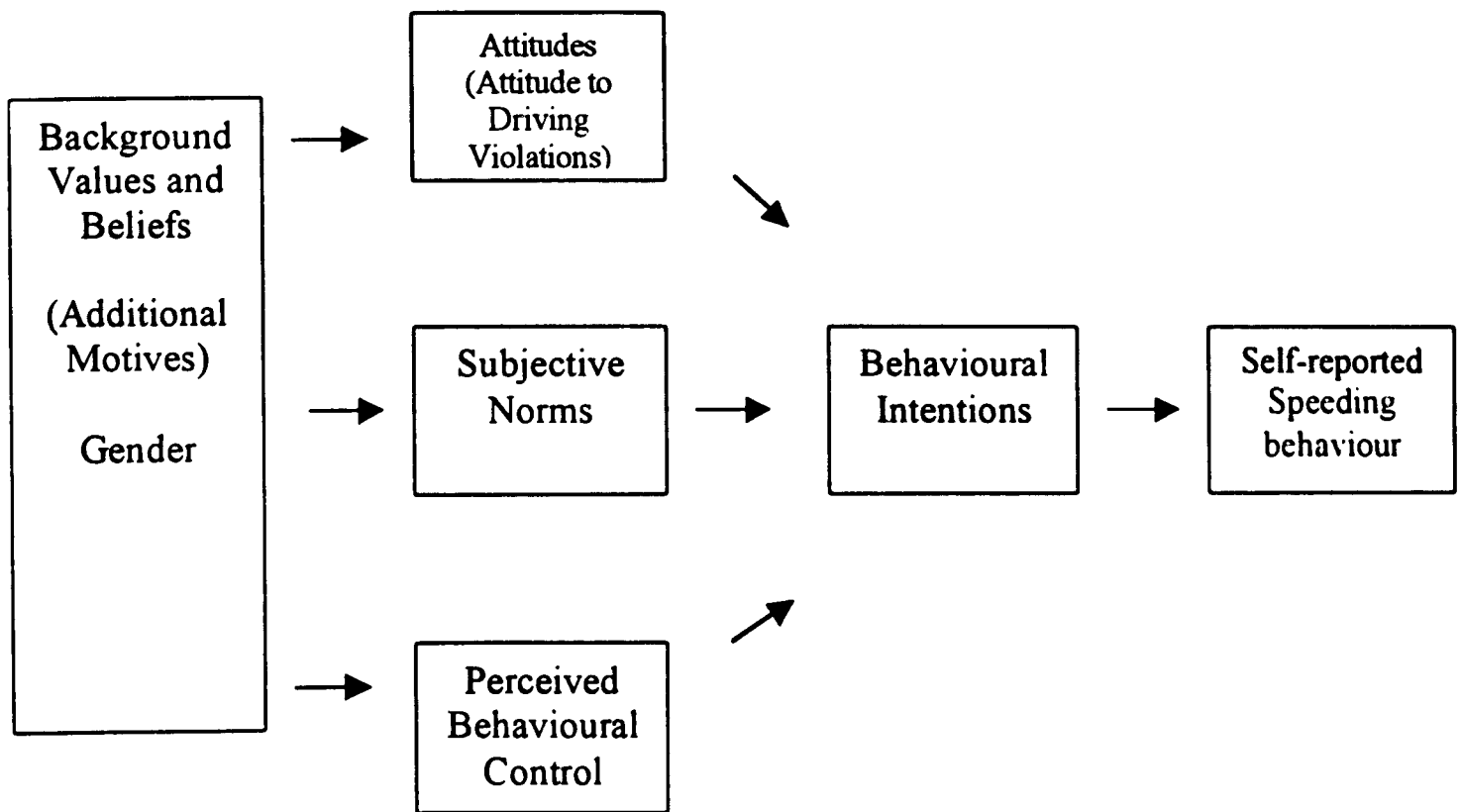
The TPB was specifically developed to broaden the applicability of the TRA to include behaviours that have non-volitional elements. To achieve this, a third construct, Perceived Behavioural Control was included in the TRA model. Perceived Behavioural Control is seen to impact upon behavioural intentions through behaviours the actor intends to perform. Ajzen (1988) suggests that we are more likely to engage in a behaviour that is attractive or desirable and over which some control can be exercised. Actual control is seen as crucially important in this determinant as there is a tendency to perform, and extra effort is made to perform, desirable behaviours over which control is exercised. However, it should be noted with regard to driver behaviour that 'desirable' behaviours might include specific instances where, for example, drivers choose to violate in circumstances that they consider as being advantageous to them. The Perceived Behavioural control construct is also seen to include personal perceptions of the extent of ease of execution or the difficulty involved in the performance or non-performance of a behaviour.

The present study therefore proposes to model self-reported speeding behaviour using the Theory of Planned Behaviour as a template (see Figure 9.1). The Attitude component of the TPB is constructed by salient beliefs regarding the perceived consequences of the behaviour under review held by the respondent. For predictive purposes the TPB is designed to allow measures of attitudes towards certain behaviours to be determined by

questionnaire. In the proposed speeding model the attitude construct of the TPB will be replaced by a scale developed by West and Hall (1994), the Attitude to Driving Violations Scale (ADVS), which was designed as a broad measure of attitudes towards violating behaviour particularly centred towards speeding. The inclusion of the ADVS therefore allowed for a more focused and robust measure of attitudes towards this particular behaviour. The inter-linking of determinants within the TPB also provides for the inclusion of external variables such as socio-economic status, religion, personality traits and education, for example. The rationale of including additional motives in the driving task along with the effects of gender as background variables seemed particularly justified in order to account for some of the social aspects involved in driving behaviour. In addition, the ADVS and the additional motives items also provided measures that could be investigated independently over time along with the driving demographics drawn within the present study's design.

In summary, the aim of the present study was to investigate the outcome of two intervention strategies aimed at modifying the self-reported driving behaviour of new drivers. To facilitate this aim a model of speeding behaviour based upon the Theory of Planned Behaviour was developed that was supplemented with additional driving related measures. It was hypothesised that these additional measures would give both breadth and sensitivity to the model and assist in determining any changes occurring over time. This model is tested with regard to its explanatory power.

Figure 9.1. Speeding model.



9.4. Method.

9.5. Subjects.

The subjects for this study (n=174) (90 male and 84 female) had been recruited through Approved Driving Instructors (ADIs). All the subjects at the time of the present study had nine months driving experience. The mean age of the subjects at nine months post-test was (18.1 years SD= 0.7).

(The subjects were from an original sample of 451 new drivers who had registered with the study shortly after they had started to learn to drive (219 male and 232 female: mean age 17.3 years, SD= 0.85. On initial registration with the study the subjects, who all had less than two hours professional driving instruction, were randomly assigned using a form of block randomisation, to one of three groups see Chapter Five.)

For the present study the subjects in Group 1 (n=80) were used as a control group and completed a schedule of four questionnaires at pre-determined times (see Figure 9.2). Subjects in Group 2 (n=50), in addition to the same questionnaire schedule as Group 1, were also required to attend a classroom-based pre-driving test education programme prior to passing their practical driving test (Time 2). The subjects in Group 3 (n=44), in addition to the questionnaires, attended a classroom-based post-driving test intervention within three months of passing the practical driving test (between Time 2 and Time 3). All the subjects received payment for their participation in the study that was dependent on questionnaire return and attendance at a pre-driver education or post-driver intervention courses. The payments for those subjects in Group 1 totalled £25. These payments were made retrospectively in end loaded staged amounts; £10 was paid on receipt of the second questionnaire of the four, with a further £15 paid on the return of the fourth and last questionnaire. Subjects in Groups 2 were paid a total of £50 for their participation; £20 was payable after attending a classroom-based pre-driver education course and £30 was paid on receipt of the fourth questionnaire. The subjects in Group 3 were paid £25 after completing the first two questionnaires and attending the classroom post-driving test intervention, with a further £25 being paid after returning the fourth

questionnaire. The payments made to those in groups 2 and 3 were higher because of the additional time involvement with the study. A schematic representation of the study design is shown in Table 9.2.

Figure 9.2. Schematic representation of study design. Subjects entered the study at Time 1 and progressed left to right to Time 4.

<u>Time 1</u>	Learning to drive period.	<u>Time 2</u>	3 month driving period.	<u>Time 3</u>	6 Month driving period	<u>Time 4</u>
Q'aire 1		Q'aire 2		Q'aire 3		Q'aire 4
Group 1		On driving test pass		Test pass plus 3 months		Test pass plus nine months
Group 2	Pre-driver education.					
Group 3			Post-driving test intervention			
<u>Time 1</u> April 1997		<u>Time 2</u>		<u>Time 3</u>		<u>Time 4</u> March 2000

Subjects were required to inform the main researcher when they passed their practical driving test. The date of passing the practical driving test pass was a central issue to the timing of the remaining questionnaire schedule and for the post driver intervention for those in Group 3. At the time of the present study, Time 4, the subjects had nine months driving experience.

The questionnaire schedule required that Questionnaire A was completed on joining the study. On notification of driving test pass, Questionnaire B was sent by post to the subject. At a date exactly three calendar months from the date the subjects reported passing their driving test the subjects were sent Questionnaire C, with Questionnaire D following exactly nine months from the date of test pass. Procedurally, Questionnaires C

and D were dispatched one week prior to the due date with a first reminder following, if no reply was received, after two weeks. Should no reply be received within a further two weeks a second and final reminder was sent. If the subject failed to respond to the second reminder they were removed from the study. Subjects in all three groups completed and returned all questionnaires using the same posting and reminder schedule as described.

Due to a combination of factors including financial constraints, time, theory test failures that resulted in subjects stopping to learn to drive and those who abandoned for other reasons, the sample was reduced from its original size (see Table 9.2). The main reason for subjects dropping out was the non-return of questionnaires within the time limit set by the study, or failing to attend either of the training elements required dependent on group membership. Those subjects who had joined but had not passed their driving test by the time the study closed are classified as 'no test on time'. Other subjects withdrew from the study for a diverse variety of reasons that included overseas travel, illness or moving away from home to university, for example.

Table 9.2. Subjects and the attrition rate for the study.

Subjects	Group 1	Group 2	Group 3	Totals
Entered	176	123	152	451
No test on time	38	24	33	95
Dropped out before Time 2	35	31	53	119
Dropped out before Time 3	10	5	14	29
Dropped out before Time 4	13	13	8	34
Completed	80	50	44	174

While in the process of learning to drive the subjects in Group 2 were required to attend a pre-driver education course (For a full description of the pre-driver education course see Chapter Five). For the present study experience in the design and delivery of pre-driver education courses was gained by the author consultation with four Scottish regions, Fife, Strathclyde, Central Scotland, and Dumfries and Galloway. The course content and resources used in pre-driver education programmes in these regions was explored and recorded. Those involved in the creation and presentation of the courses were interviewed. A review of other video taped, presentational and promotional materials available was also conducted. This type of material included both Government and local government produced public information pamphlets and video, materials commissioned by private companies and materials developed by smaller road safety organisations. The rationale of most of the material generally produced and used within the intervention was designed to highlight, in an educational way, the dangers of inappropriate driving styles and to show the correct behaviours and attitudes to adopt whilst driving.

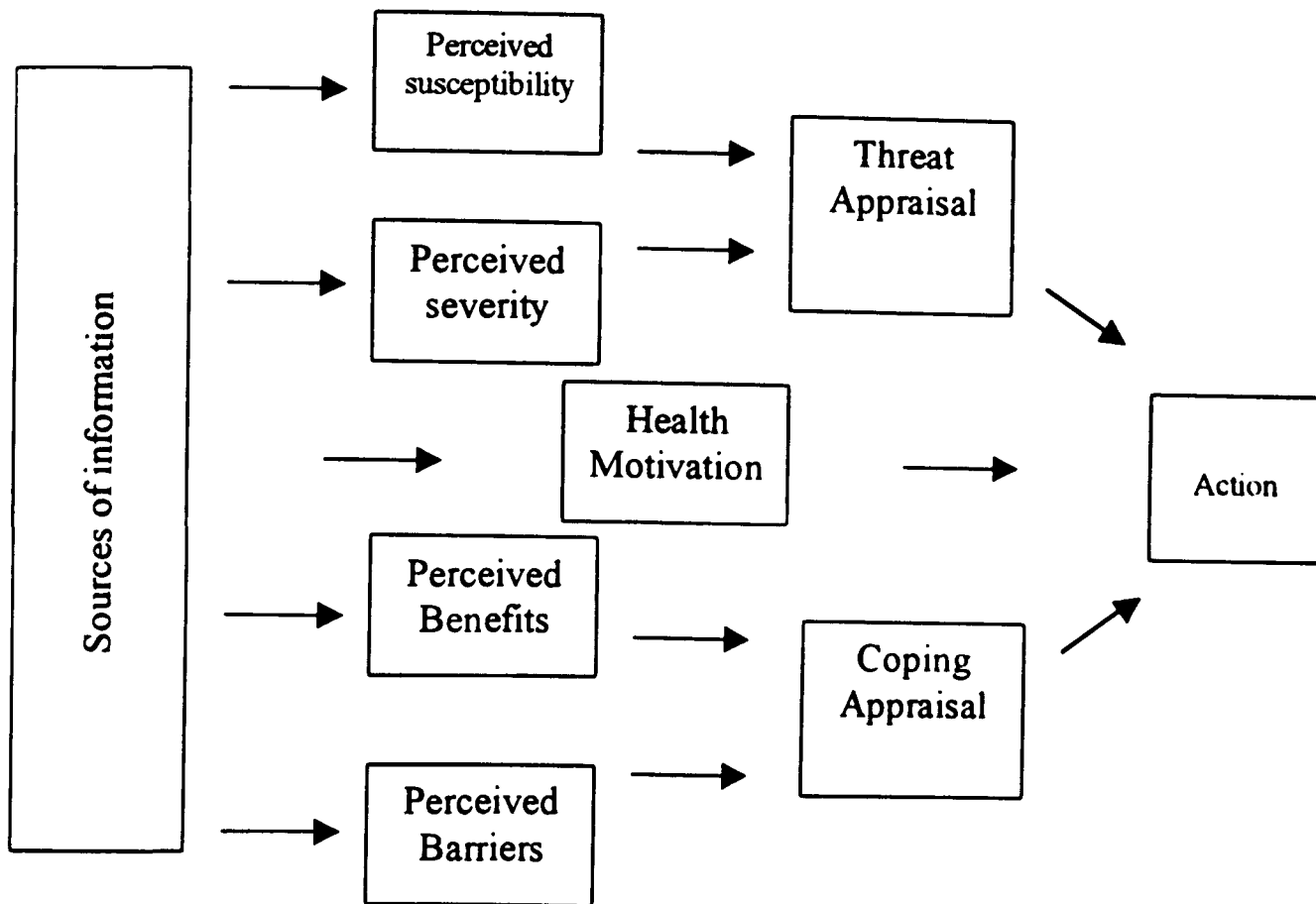
The classroom-based pre-driver education course consisted of two parts, both lasting for approximately one and a half hours, which were delivered during one single afternoon to form the course. In all, seven pre-driver training courses were held to obtain the required sample. There were fourteen specific topics covered in the pre-driver training course. (1) Why there is a need for pre-driver training and its aims and objectives; road accident statistics and what information they provide with regard to new drivers. (2) The effects of road accidents; who may be affected as a result of road accidents. (3) Driving and

educational issues; what role education might have in bringing about changes. (4) The driving licence; regulations surrounding the issue and retention of. (5) Motor vehicle insurance; the different types and cover offered. (6) Vehicle testing, vehicle purchase and methods of learning to drive. (7) Peer pressure and effects; how to successfully counteract these pressures (8) Correct driving documentation and when driving documents may have to be produced. (9) The vehicle Defect Rectification Scheme; vehicles found by police with minor defects must be repaired within 21 days. (10) Conditional Offers; offers to pay a fixed penalty in lieu of court proceedings. (11) What to do if you are involved in a road traffic accident; the correct procedure to follow. (12) Hazard Perception Skills; a comparison of two video clips and an explanation of the benefits of forward observation. (13) Attitudes and Behaviour; driving behaviour as a social activity, expected behaviours and why. (14) New drivers; the potential benefits and pitfalls. (15) Guide to better driving; advice from the police for safer driving.

(For a full description of the post-driving test intervention see Chapter Five)

The subjects in Group 3 attended a post-driver education course within the period between passing their practical driving test and the third month anniversary of that date. This intervention was informed and designed around a combination of constructs drawn from two social cognition models, the Health Belief Model (HBM) and Protection Motivation Theory PMT, see Figure 9.3.

Figure 9.3. Combined model of HBM and PMT.



The 'sources of information' regarding the use of the vehicles for new and young drivers was assumed to come from exposure to the influences of others including significant others, television and the press. In dealing with issues with regard to increasing the 'perceived personal threat' for the respondents the definition of threat within the model comprised three components. Firstly, the perceived threat to the subject is that of death or serious injury to themselves or others resulting from their driving actions; secondly is the threat of damage to their vehicle or a financial penalty involved in their aberrant driving, and thirdly, a threat of some other action such as prosecution or personal embarrassment that would be likely to arise through personal maladaptive driving actions. The model

would therefore prescribe; (1) that the intervention should increase the perception of personal susceptibility to the threat; (2) increase the perceived severity and outcome of the threat; (3) increase the benefits of behaviour designed to avoid the threat; and (4) reduce the perceived barriers to changing the maladaptive behaviour. It would follow that a greater level of perceived threat and threat appraisal in conjunction with an increased expectation of the success avoidance measures at the coping appraisal stage should lead to the action stage as being seen by the respondents as being more beneficial.

The main focus of the post-driver intervention was on the actual levels of driving skill the subjects were likely to have with only a maximum of three months driving experience and how these could be easily overestimated. In addition, the ability of the subjects to identify risky driving situations with limited experience was another key factor.

To create a sense of vulnerability within the subjects and explain how potentially susceptible to accident involvement the subjects were at this stage of their driving career, statistical tables were reviewed to illustrate the relatively high number of new drivers that were accident involved. Thereafter, secondary issues surrounding the further acquisition of driving skills, the gaining of driving experience and identifying and handling risk within the driving task were also explored.

The post driver intervention consisted of eleven sections on the following topics. (1) Beliefs; what new drivers felt their current level of driving expertise to be. (2) Car

control; what was meant by the term car control and what good driving actually meant (3) Statistical review; a review of the information provided by accident statistics regarding new drivers. (4) The process of learning to drive; what was taught and how this could be extended. (5) Automatic processing; the role of automatic processing in the driving task. (6), Risk; Volitional and non-volitional risk taking while driving. (7) Social responsibility; the expectations of others and where responsibility for decision making lies. (8) Passenger types; the effects of different passengers in the car. (9) Gender effects; why more males are involved in accidents than females. (10), Drinking and driving; issues surrounding this practise. (11) Control; who is actually in control while driving.

To correspond in length with the pre-driver education programme the post-driver intervention was split into two one and a half hour sessions and again presented during the course of one afternoon.

In practical terms the intervention was designed to work around peer group discussions, practical examples illustrating salient points and video excerpts. In all, five post-test interventions courses were held in order to obtain the sample.

As a result of the design of the present study a time difference between interventions for the subjects in Groups 2 and 3 existed. The minimum time period between a subject in Group 2 attending the pre-driver education training and completing the final questionnaire at Time 4 was, at the absolute minimum, nine months, with a maximum period that could extend to not more than 19 months. In contrast to this, the minimum

possible time between attending the post-driving test intervention and completing the final questionnaire for subjects in Group 3 is six months with the maximum possible of 9 months. As a result of this design, the measures taken at Time 3, for example, were testing for intervention effects for subjects in Group 3 who would have a maximum time of three months since intervention while it is entirely possible that subjects in Group 2 could have attended for the pre-driving test education programme 13 months earlier. While this aspect of research design may be seen as a weakness it is difficult to imagine how this may be overcome.

9.6. Measures.

Demographic information, drawn from questionnaires three and four, was used to create a driving history of the subjects. For example, the amount of time, in percentage terms, the subjects had been involved in driving on city roads, driving in town, village roads, country roads, dual carriageway roads and motorways was recorded. In addition, the purposes of the driving journeys undertaken by the subjects were categorised, again in percentage terms; these included, for example driving to and from work; as part of a job or their employment; on shopping trips and for leisure or other purposes. Moreover, data recording the amount of time spent alone; with a partner/spouse; with children; parents and friends was also deemed to be of importance because of potential passenger effects.

9.7. Driving undertaken by day and time.

Further data was drawn to investigate any difference in driving practices that may exist between the groups with regard to the amount of driving that they were involved in at various different times of the day or on different days of the week. Research by Marthiens and Schultze (1989, in Gregersen, 1996) indicates that young drivers appear to be involved in accidents, predominantly on Friday and Saturday, between the hours of 10.00 p.m. and 02.00 a.m., the so-called 'Disco Accidents'.

9.8. Recording of reported driving speeds.

Nine variables were used as a measure to record the reported speed choice of subjects driving on three classes of road at three different times of the day. Variables 1 to 3 recorded reported speeds; (1) In town between the hours of 7.00 a.m. and 7.00 p.m.; (2) In town between the hours of 7.00 p.m. and midnight; (3) In town between the hours of midnight and 3.00 a.m. The possible responses for each of these items were (a) Below 23 mph, (b) 23 – 26 mph, (c) 27 - 30 mph, (d) 30 mph, (e) 30 – 33 mph, (f) 34 – 37 mph, (g) 38 – 41 mph, (h) 42- 45 mph, (i) 46 – 49 mph, and (j) 50 + mph. Variables 4 to 6 recorded reported speeds; (4) out of town but not on dual carriageway or motorway between 7.00 a.m. and 7.00 p.m.; (5) out of town but not on the dual carriageway or motorway between 7.00 p.m. and midnight; (6) out of town but not on the dual carriageway or motorway between midnight and 3.00 a.m. The possible responses for each of these items were (a) below 53, (b) 53 – 56 mph, (c) 57 – 60, (d) 60 mph, (e) 60 –

63 mph, (f) 64 – 67 mph, (g) 68 – 71 mph, (h) 72 – 75 mph, (i) 76 – 79 mph and (j) 80 – mph. Variables 7 to 9 were used to record reported speeds; (7) in good conditions on the motorway between 7.00 a.m. and 7.00 p.m.; (8) in good conditions on the motorway between 7.00 p.m. and midnight; (9) in good conditions on the motorway between midnight and 7.00 a.m.; The possible responses for each of these items were (a) below 63 mph, (b) 63 – 66 mph, (c) 67 – 70 mph, (d) 70 mph, (e) 70 – 73 mph, (f) 74 – 77 mph, (g) 78 – 81 mph, (h) 82 – 85 mph, (i) 86 – 89 mph, (j) 90 + mph. The ten possible responses for each variable were coded as follows; responses (a), (b), (c), (d) and (e) were coded as 0, as the issue of non-speeding behaviour is a different question to that under review. The responses (f) to (j) were coded 1 to 5 respectively to give a measure of self-reported speeding behaviour. The variables were then summed to give a measure of self-reported speeding behaviour, i.e. how fast they actually drive.

9.9. Additional motives.

A measure of additional motives was developed for the study based upon the work of Rolls et al. (1991). Eleven items were used. The response for each item was measured on a 7-point Likert type scale. The items were as follows; (1) When you passed your test did owning a car become a real ambition? (Not really – Very Much); (2) If you have bought or when you do buy a car how important is it to have a good sound system? (Not important – Very important). The subjects were then asked how much they agreed with the following statements. (3) A car owned by me has got to look good: (Untrue – True). (4) A car to me is more than just a mode of transport: (Disagree – Agree); (5) Learning to

drive has changed my life; (Untrue – True); (6) I will use my new driving skills to impress my friends; (Not likely – Very likely); (7) A person of the opposite sex will find me more attractive now I can drive; (Disagree – Agree); (8) If I had a car I would want to find out how fast it went. (Untrue - True); (9) When I get the chance I will probably try out my driving skills on a quiet road; (Untrue – True); (10) Being a good driver can make up for not being good at school or good at sports; (Untrue – True); (11) The more driving skill you have the less accidents you have; (Untrue – True). The wording from time 1 and times 2 and 4 was changed from future tense to present tense.

9.10. Attitude to driving violations.

The West and Hall (1994) Attitude to Driving Violations Scale (ADVS) has been shown in adult drivers to be associated with fast drivers and accident risk. The ADVS consists of seven items to which the respondents indicate their level of agreement or disagreement. The statements are: (1) Decreasing the speed limit on motorways is a good idea; (2) Even at night time on quiet roads it is important to keep to the speed limit; (3) Drivers who cause accidents by reckless driving should be banned from driving for life; (4) People should drive slower than the limit when it is raining; (5) Cars should never overtake on the inside lane even if a slow driver is blocking the outside lane; (6) In towns where there are a lot of pedestrians, the speed limit should be 20 mph; (7) Penalties for speeding should be more severe. The responses to each item were given by the respondents on a five point scale labelled (a) Strongly agree; (b) Agree; (c) Neither agree

nor disagree; (d) Disagree and (e) Strongly disagree. The ratings were summed to produce a single score that could range between 7 and 35.

9.11. Theory of Planned Behaviour constructs.

9.12. Subjective Norms.

A measure of the influence of subjective norms was obtained through the use of the following four variables; (1) It is important to me that I drive in a style that people in general would approve of; (2) It is important to me that I drive in a style that my mother/father/carer would approve of; (3) It is important to me that I drive in a style that my closest male friend would approve of, and (4) It is important to me that I drive in a style that my closest female friend would approve of. The responses to these four items were recorded on a seven point scale ranging from Strongly disagree to Strongly Agree. A high score on the scale reflected a strong compliance to the expectations of others. An issue with this determinant of the TPB is that subjects may be more motivated to comply with the expectancies of one significant other at a different level of compliance than for another. For example, a new male driver may want to conform and drive in a style that gains approval by an important close male friend and give little credence to what people in general think of his driving style. The construct in the present study was designed to operate in a composite manner that reflected an overall value for the effects of compliance to the wishes of significant others in general rather than to one type in particular. Therefore if a high value was given for the influence of the closest male

friend, for example, the possibility existed for it to be moderated by a lower score from another significant other, the resultant figure being more a balanced view of the effects of the construct. It is also the case that the subjective norm construct could be confounded in other ways, with subjects not having parents or carers or close enough friends for their views to become significant and/or spending varying amounts of driving time with others.

9.13. Perceived Behavioural Control.

Three variables were used to obtain a measure of external factors within the TPB construct Perceived Behavioural Control. The measures in the study (1) Sometimes the size and the performance of the car make it difficult to keep to the speed limits; (2) Sometimes you have to exceed the speed limits just to keep up with the flow of traffic; (3) Sometimes while driving you have to take into account the needs of your passengers e.g. they could be late. Again, the responses to these three items were recorded on a seven point scale ranging from Strongly disagree to Strongly Agree. Lower scores on the variables were deemed to indicate higher levels of perceived behavioural control and more personal control. These three external items were then summed. One variable was used as a measure of internal perceived behavioural control 'I can always keep to the speed limit'. This item was used as a direct modal control belief with regard to whether or not the respondent felt that speeding behaviour was under his or her direct control. For this variable a higher score indicates a higher level of perceived control.

9.14. Behavioural Intentions.

Four variables were used to form a measure of behavioural intentions. (1) During the next twelve months I intend to keep to the rules of the road absolutely; (2) It is possible that I will break some of the rules of the road when I think it is OK to do so; (3) During the next twelve months I intend to have some excitement while driving. (4) I think it is inevitable that you have to take some risks while driving. The items were again measured on a seven-point scale between the end points 'Strongly disagree to Strongly agree'. Items 2 to 4 were recoded in the opposite direction to be consistent with social desirability and to maintain the uniformity of the measure. The four items were then summed. A higher score on these variables indicated stronger behavioural intentions to conform to the rules of the road.

9.15. Results.

The variables used to draw demographic information had a dual purpose of creating a driving history of the subjects within the three groups and establishing that no significant differences in the groups existed with regard everyday vehicle usage. By controlling for exposure in this way any resultant differences between the groups is more likely to be the result of dispositional or motivational factors. The demographic results indicated that no significant differences existed between the groups with regard to driving and vehicle usage; type and frequency of passengers carried. On the contrary the three groups showed remarkably similar driving habits.

This consistency also seems robust over time as can be seen from the results shown in Table 9.3. Two separate one-way analysis of variance (ANOVA) indicated that no significant differences were apparent between the groups with regard to the average hours driven per week at Time 3 (df 2, $F=.047$, $P=.954$) and Time 4 (df 2, $F=.116$, $P=.891$). In addition, there is little evidence to suggest that the amount of driving being undertaken increased as a function of time.

Table 9.3. Number of hours driven per week at 3 months post-test (Time 3) and 9 months post-test (Time 4).

In an average week approximately how many hours do you drive?	Time 3			Time 4		
	N	Mean (hours)	SD	N	Mean (hours)	SD
Group 1	73	8.8	8.3	79	9.3	8.7
Group 2	50	9.3	7.8	48	9.8	8.2
Group 3	42	9.2	8.8	44	9.0	9.1

No significant between group differences.

It was to be expected that the respondents would report driving more vehicle types between Time 3 and 4 but again no significant differences in the number of vehicles between groups was found. The results of two one-way ANOVAs shown in Table 9.4 revealed that on average drivers with between 3 months (Time 3) (df 2, $F=.526$, $P=.592$) and 9 months (Time 4) (df 2, $F=.236$, $P=.790$) driving have relatively little experience in driving different types of vehicles.

Table 9.4. Experience with driving different vehicles at Time 3 and Time 4.

How many types of vehicle have you Driven since passing your test?	Time 3			Time 4		
	N	Mean	SD	N	Mean	SD
Group 1	72	2.0	1.3	78	3.0	1.7
Group 2	50	2.2	1.4	50	2.8	1.6
Group 3	42	2.1	1.4	44	2.8	1.5

No significant differences.

The results shown in Table 9.5 were drawn from a single variable at both Time 3 and Time 4. Using a seven point Likert type scale between the end points 'got a lot worse' and 'got a lot better' this variable was designed to assess whether or not the subjects felt their driving was getting better or worse since they began driving on their own. The mid-point of the scale was 3.5. A one-way ANOVA between groups at Time 3 (df 2, $F=2.594$, $P=.078$) revealed no differences between groups while at Time 4 (df 2, $F=3.093$, $P<0.05$) a significant difference was found between groups. A post-hoc Scheffe test revealed a significant difference between Group 1 and Group 3, with subjects in Group 3 recording a significantly lower perception of their driving skills.

Table 9.5. Means and standard deviations of Self-assessed driving skill at Time 3 and Time 4.

In your opinion has your driving got better or got worse since passing your test?	N	Time 3 Mean (SD)	N	Time 4 Mean (SD)
Group 1	72	5.3 (1.3)	79	5.5 (1.2)
Group 2	46	5.3 (1.3)	49	5.3 (1.4)
Group 3	39	4.7 (1.6)	40	4.9 (1.3)

One variable was used to record the average number of times the subjects had been stopped by the police between Time 3 and Time 4, the mean and standard deviations shown in Table 9.6.

Table 9.6. Mean number and standard deviations of police stops between Time 3 and Time 4 by group.

Police Stops	N	Time 3 Mean (SD)	N	Time 4 Mean (SD)
Group 1	72	.1 (.6)	72	.4 (1.2)
Group 2	49	.1 (.4)	49	.4 (1.0)
Group 3	41	.1 (.4)	41	.3 (1.0)

Repeated measures analysis showed a significant ($p < 0.001$) increase for all groups as a function of time. This would be as expected and can simply be interpreted as a function of time or more importantly, increased driving exposure. However, no significant differences between groups on police stops were found (see Table 9.7).

Table 9.7. Repeat measures of Time (Time 3 and Time 4) x Group (Group 1, Group 2 and Group 3) in the number of police stops while driving.

Variable	Time		Time x Group		Group		Scheffe
	(df 1)		(df 2)		(df 2)		
	F	P<	F	P<	F	P<	
'Police stops'	18.4	.001	.0	.9	.0	.9	n.s.

All the measures in the study were tested for reliability and internal consistency (Cronbach, 1951) and are shown in Table 9.8. As can be seen from the table the reliability of the measures used ranged from sufficient to very good.

Table 9.8. Reliability of the theory of planned behaviour constructs, additional motives, attitude to driving violations scale and self-reported speeding.

Construct/measure	Number of items	Alpha reliability coefficient			
		Time 1	Time 2	Time 3	Time 4
Self reported speeding	9				.90
Behavioural intentions	3			.79	.78
Subjective norm	4			.71	.74
Perceived behavioural control (external)	3			.62	.66
Attitude to driving violations	7	.65	.65		.67
Additional motives	11	.72	.76		.80

Table 9.9 illustrates the means and standard deviations for all three groups for seven measures. A one-way ANOVA revealed no significant difference between groups on the measure of self-reported speeding (df 2, $F = 0.030$, $P = .970$).

Table 9.9: Mean and (SDs) of Self-report measures by Group at Times 1 to 4 (Group 1 n=80, Group 2; n=50 and Group 3 n=44.)

Measure.	Time 1	Time 2	Time 3	Time 4
Self-reported Speeding				
Group 1				9.4 (9.6)
Group 2				9.8 (11.0)
Group 3				9.7 (10.0)
Behavioural Intentions				
Group 1			17.6 (5.0)	16.9 (5.4)
Group 2			18.2 (5.0)	17.5 (4.6)
Group 3			14.9 (5.2)	14.7 (4.3)
Perceived Behavioural Control External				
Group 1			9.3 (3.7)	9.1 (3.8)
Group 2			8.9 (3.9)	9.7 (4.6)
Group 3			8.9 (4.1)	7.9 (3.1)
Perceived Behavioural Control Internal				
Group 1			4.4 (1.5)	4.3 (1.6)
Group 2			4.6 (1.7)	4.1 (1.4)
Group 3			4.2 (1.8)	4.3 (1.8)
Subjective Norm				
Group 1			16.9 (4.2)	17.2 (5.1)
Group 2			16.2 (5.1)	16.4 (4.1)
Group 3			17.5 (4.9)	17.4 (4.1)
Attitude to Driving Violations				
Group 1	17.1 (3.7)	17.0 (3.7)		17.8 (3.9)
Group 2	16.1 (3.6)	17.6 (4.1)		18.1 (4.5)
Group 3	16.9 (2.8)	17.4 (3.5)		18.1 (3.9)
Additional Motives				
Group 1	38.5 (10.5)	38.8 (11.0)		39.0 (11.7)
Group 2	38.7 (10.4)	38.8 (10.1)		40.5 (10.1)
Group 3	37.7 (9.0)	37.7 (10.6)		40.2 (10.6)

Key, The variables are scored as detailed in the Method section. Lower scores are in the direction of 'goodness' of behaviour.

Table 9.10 illustrates the results of a 2 x 3 ANOVA (using data from Time 3 and Time 4) x Group (Group 1, Group 2 and Group 3) with repeated measures. Behavioural Intentions were found to differ significantly as a result of group membership. These

effects were also apparent in the more conservative post-hoc, Scheffe analysis. The lower scores indicate less intention to engage in speeding behaviour.

The other constructs of the TPB appear to be relatively stable over time with the exception of a group effect in the Perceived Behavioural Control construct as shown in Table 9.10. It would appear that, while the mean scores for subjects in Groups 1 and 3 remain relatively stable, a significant reduction in perceived behavioural control occurred for the subjects in Group 2 between Time 3 and Time 4, the lower mean indicating less perceived behavioural control.

Table 9.10 Analysis of Variance of Time (Time 3 and Time 4)

Variable	Time		Time x Group		Group		Scheffe
	(df 1)		(df 2)		(df 2)		
	F	P<	F	P<	F	P<	
Behavioural Intentions	3.6	n.s.	.4	n.s.	5.5	.05	1-3*, 2-3*
Subjective Norms	.0	n.s.	.0	n.s.	.01	n.s.	n. s.
Perceived Behavioural Control External	.2	n.s.	3.4	.05	.8	n.s.	n. s.
Perceived behavioural Control Internal	1.8	n.s.	2.5	n.s.	2.5	n.s.	n. s.

Key: *= $p < 0.05$; Post-hoc Scheffe test, groups separated by a hyphen differ significantly from each other.

Tables 9.11 shows the results of a 3 x 3 ANOVA (Time 1, Time 2 and Time 4) x Group (Group 1, Group 2 and Group 3) with repeated measures. The results for the West et al. Attitude to Violations Scale (ADVS), ($F = 11.7$, d.f. 2, $P < 0.001$) and the measure of additional motives ($F = 3.0$ d.f. 2, $P < 0.05$) reveal that for all three groups in the study, change is occurring as a function of time. The increasing scores on these measures over time is an indication of a worsening of attitudes towards speeding as far as both the

ADVS and additional motives measures are concerned and that the use of the car may be taking on a greater importance.

Table 9.11 Analysis of Variance of (Time 1, Time 2 and Time 4) x Group.

Variable	Time		Time x Group		Group		Scheffe
	(df 2)		(df 4)		(df 2)		
	F	p<	F	p<	F	p<	
Attitude to Driving Violations	11.7	.001	11.4	n.s.	.0	n.s.	n.s.
Additional Motives	3.0	.05	1.1	n.s.	.0	n.s.	n.s.

In order to predict the amount of variance accounted for by the speeding model a linear regression analysis was undertaken after the data were checked for normality, multicollinearity, linearity and the presence of outliers. This was done to assess the contribution of the proposed factors in the explanation of self-reported speeding. Items were entered into the regression analysis in three steps. Additional motives and gender were entered into the analysis at the first step as external or background variables. Attitudes to driving violations, subjective norms and perceived behavioural control were entered in the second step as it is argued by Ajzen that these constructs are pre-determinants to the formation of behavioural intentions. Behavioural intentions were entered as the last step as it was anticipated that this construct would occupy a significant amount of the explained variance and therefore reduce the explanatory power of the model.

Table 9.12 shows that for the whole cohort of the present study the speeding model accounted for a total of 45% of the explained variance with additional motives having a significant contribution ($p < 0.001$) accounting for 21% of the variance in self-reported

speeding. The ADVS scale was also found to be a significant factor ($p < 0.001$) accounting for a further 24% of the variance along with the internal variable of Perceived Behavioural Control construct. The Behavioural Intentions and the Subjective Norm constructs were found to make no significant contribution to the model.

The dependent variable in the regression analysis, self-reported speeding behaviour, could be seen as both a measure of self-reported speeding behaviour or a measure of offending behaviour with higher scores reflecting higher rates of speeding or offending. Both the measure of additional motives and the Attitudes to Driving Motivations Scale record behaviour in the same way and this is reflected in the Beta figures presented in the results tables. Those Beta values with negative values indicate that the items affected the regression analysis in the opposite direction than that of positive social conformity. Therefore the effects of the constructs of Gender, Perceived Behavioural Control and Behavioural Intentions can be seen in the model to be acting in the opposite direction to that of offending behaviour.

Table 9.12. Prediction of Self-reported speeding from Additional Motives, Gender, Attitude to Driving Violations, Subjective Norms, Perceived Behavioural Control and Behavioural Intentions, whole sample.

Step	Predictor	Adj. R square	F	Beta
1	Additional Motives (AM) Gender	.21	22.8	.442** -.062
2	Attitude to Driving Violations (ADVS) Subjective Norm (SN) Perceived Behavioural Control External (PBCe) Perceived Behavioural Control Internal (PBCi)	.45	23.1	.439** -.067 .32 -.212**
3	Behavioural Intentions (BI)	.45	20.0	-.088

**= $P < 0.001$. *= $P < 0.05$.

Table 9.13 shows further regression analyses by group. The table shows that the total amount of explained variance between each group differs ranging from 38% in Group 3 to 60% in Group 2 with Group 1 showing 43%. In addition, the additional motives measure made significant contribution to explained variance throughout all three groups. The ADVS contributed to the explained variance in Groups 1 and 2 only. It is hard to speculate why the ADVS did not contribute significantly to the explained variance for group 3.

Table 9.13. Prediction of Self-reported speeding from additional motives, Gender, Attitude to Driving Violations, Subjective Norms, Perceived Behavioural Control and Behavioural Intentions, by group.

Step	Predictor Variables	Group 1			Group 2			Group 3		
		Adj. R Square	F	Beta	Adj. R Square	F	Beta	Adj. R Square	F	Beta
1	AM Gender	.26	14.1	.450*** -.183	.10	3.7	.365* -.151	.24	7.4	.575*** -.113
2	ADVS SN PBCe PBCi	.44	10.5	.415*** .050 .068 -.198	.61	13.6	.600*** -.266** .967 -3.997***	.33	4.3	.290 -.204 .180 -.031
3	BI	.43	8.9	-.059	.60	11.4	-.278	.38	4.5	-.450

**=P<0.001. *=P<0.05.

9.16. Discussion.

The aim of the present study was to identify any apparent effects resulting from either of the two classroom-based intervention strategies by the use of a model of speeding based upon the Theory of Planned Behaviour. Of additional interest were changes in self-reported driving behaviour that had occurred over time that could be attributed to these interventions. The performance of the model of speeding was good with a total of 45% of the total variance being explained. For Group 3 alone, significant effects of group

membership were found over time in the behavioural intention construct of the Theory of Planned Behaviour that would indicate, in terms of the present study, a greater conformity from the respondents in that group to speeding or traffic regulations. This singular difference may have been as a result of effects of the post-driving test intervention.

As the subjects in the present study all had nine months driving experience when the final questionnaire was completed it was possible to obtain data about their past and current driving exposure. This demographic information indicated that no significant differences existed between the groups with regard to vehicle usage; the types of road used; journey types; differences in usage by day of the week; differences in usage by time of the day or differences in the frequency and type of passengers carried. Previous research by West, Elander and French (1992) reported that respondents found it difficult to estimate accurately the amount of mileage driven on particular classes of road. In addition, an artefact of mileage travelled also confounds driving experience and accident involvement as those drivers who drive high mileages tend to do so on motorway or dual carriageway types of road while those with lower mileages tend to do so on urban roads where the likelihood of accident involvement is higher (for a review of the issues surrounding mileage and exposure see Broughton, 1988).

The subjects' self-reports of driving time and journey type provided a remarkably consistent picture, in terms of the variables used in the present study, for driving exposure across all three groups. Repeated measures analysis, reviewing driving

demographics between Times 3 and 4 revealed that the levels of weekly driving hours, passenger types and road types actually being undertaken, were also broadly similar across all three groups. The importance of establishing this homogeneity between the three groups in the present study was that any resultant differences between groups found was more likely to result from the effects of either intervention.

In line with the ethos of past driver education courses as described by Struckman-Johnson et al. (1989), the aim of both classroom-based interventions in the present study was to curb inappropriate behaviours, intentions or attitudes and promote better ones. A secondary but related issue to any intervention is the durability of any changes that may occur. Through the effects of time the possibility exists that any intervention effects may weaken or decay entirely. It is also possible through time for an interaction to occur between, in this instance, other driving related knowledge learned post intervention and any resultant changes in behaviours, intentions or attitudes that occurred as a result of either intervention. Therefore, a broadly based model that could encompass as wide a range of salient constructs as possible, with regard to the behaviour under review, was required to differentiate between groups. This model also had to be sensitive enough to detect differences between groups.

The model of self-reported speeding developed performed reasonably well in predicting a good amount of explained variance. The inclusion in the model of additional motives, attitudes to driving violations and gender did improve the predictive ability of the TPB. The measure of additional motives in combination with gender explained 21% of the

variance. As noted in the introduction, many authors have argued that social factors and extra motives in the driving task are a major element in driving behaviour. This seems to be borne out in the present study. The West and Hall (1994) Attitude to Driving Violations Scale also played a significant role in explaining, along with the internal perceived behavioural control construct a further 24% of the variance, again in combination with the subjective norm and the external element of perceived behavioural control. Of interest is that the Beta values show effects in opposite directions. The subjective norm could be considered with regard to speeding behaviour to be a determinant of the TPB that gives a measure of social approval. It could be argued that the respondents' significant others would prefer that speed limits were adhered to for safety purposes and to avoid conflict with the law. Relative to the additional motives measure and attitudes to driving violations, the Beta values for the subjective norm appear in negative form in the analysis. If the Beta value of the subjective norm is acting in the direction of social 'goodness' it would therefore follow that the positive Beta values of additional motives and attitude to violations are an explanation of social behaviour of a less desirable nature. From a social perspective this rationale seems correct.

No significant effect was found for external perceived behavioural control in any of the regression analyses conducted. From a theoretical perspective this is a disappointing outcome as it was this additional determinant of behavioural intentions that was added by Ajzen (1985) to account for behaviours that were not entirely under the volitional control of the actor. Perceived behavioural control did not add significantly to the explanatory

power of the model. This may be simply a result of the way the construct was operationalised within the present study or that the situations as described in the variables had not yet occurred to the respondent (opportunity or dependence on others as described by Ajzen (1991)). In contrast to this, the variable used as a measure of internal perceived behavioural control made a significant contribution to the explained variance for the predictive model for the entire sample. The beta value, being negative, indicates that the effects of the variable are also acting in the direction of 'social goodness'.

In contrast to this, no significant contribution to the total of variance explained was made by behavioural intentions. However, the negative Beta value here again may imply, using the same rationale as above, that drivers have the intention to remain within the confines of the speed limits but they appear to be influenced by the other factors not to do so.

Further regression analyses were carried out individually on each sub-group within the study and revealed that additional motives accounted for a range of explained variance by group (Group 1, 26%, $P < 0.001$; Group 2, 10%, $P < 0.01$ and Group 3, 24%, $P < 0.001$). The difference in significance values implies that, for those subjects in Group 2, additional motives are much less of a factor than for those subjects in the other two groups.

In addition, with regard to Group 3, the ADVS did not add significantly to the explained variance. This was unlike the findings in relation to the other two groups where, for Group 1, the ADVS contributed significantly ($P < 0.001$) to a further 18% of the variance

and, for Group 2, along with the subjective norm and internal perceived behavioural control factor, a significant ($P < 0.001$) and further 51% of the total variance was explained. Behavioural intentions, in contrast, did not add significantly to the explained variance.

In relation to the repeated measures analysis of the Attitudes to Driving Violations Scale, the results show that for all groups their attitudes to violations degrades significantly ($P < 0.001$) as a function of time. This may be as a result of increased familiarity with the driving task with the subjects reaching a more advanced stage in their driving career. Fitts and Posner (1967) postulate that new drivers pass through three stages of learning to drive. In the early or cognitive phase, the person concentrates on learning the component parts of task at hand and what responses accrue from the various inputs to the controls. In the second phase, the intermediate phase, it is argued that different strategies are explored with the learner devoting his or her entire attention to the task. It is likely during these two early phases, that may well straddle the practical driving test, that issues regarding speeding remain relatively remote as the new drivers attempt to simply master the driving task. It is in the final autonomous stage, where less consciously directed attention is required for driving, that issues regarding speed choice may become more relevant to the driver and, with growing levels of perceived driving skill resulting through practise within the driving task, the relevancy of certain speed limits may start to be questioned [for a review of skill acquisition see Welford (1968)]. The results also revealed that the same pattern of change occurred over time in relation to additional motives, again with a significant effect of time ($P < 0.05$). However, no group differences

were apparent indicating that neither classroom-based intervention had had any effect on the outcomes of these measures.

A small but significant group and time effect was found in regard to the perceived behavioural control variables. The difference found indicated that perceived behavioural control increased for those subjects in Group 2 between Time 3 and Time 4 but this difference disappeared on application of the more conservative post-hoc Scheffe test.

The variables measuring behavioural intentions showed a significant effect of both time and group membership at the $P < 0.05$ level. Post-hoc Scheffe analysis revealed that the subjects in Group 3 differed significantly from the subjects in the other two sub-groups, with the mean values being lower indicating more social acceptable behaviour. This is an encouraging finding in that an inference may be drawn that this may have been a result of the post-driving test intervention. It is important to note, however, that both measures of behavioural intention were taken after the post-test intervention. The assumption is at this point that this difference in the behavioural intentions of those subjects in Group 3 in comparison to the other two groups may have resulted from the post-test intervention. If this is not the case, then as far as the measures and intervention techniques used in the present study are concerned, it would appear that little or no difference between groups exists at nine months post-test.

In summary, the findings from the present study indicate that the proposed self-report model of speeding was useful in explaining a good amount of total variance explained

The repeated measures analysis revealed that attitude to driving violations and additional motives in the driving task increase, that is to say move in the direction of less social acceptability, as a function of time.

Chapter Ten.

Discussion.

10.1. Reliability and validity of the findings.

The findings of the present series of studies relied entirely on the use of self-reports. As previously noted in Chapter Five there are concerns and problems associated with research solely of this kind. While it is unequivocally preferable to use research methods that are based upon the direct observations of the behaviours in question, the problems associated with covering such a diverse range of variables as used in the present series of studies across such a wide variety of contexts and times are obvious. The use of self-reports provided the most suitable methodology. A limitation arises in relation to this method of research in that self-reported driving behaviour may not be the same as actual driving behaviour. With regard to this issue there is some previous research into driver behaviour that has reported strong correlations between self-reports and actual observed driving behaviour (e.g. West, Elander and French, 1992; West, French, Kemp and Elander, 1993), and there is no apparent reason to believe that the results from this series of studies is likely to be different. In addition, as one of the main issues within the present series of studies was related to self-reported speeding behaviour, in line with the West et al. (1992) study, this may be additional grounds for confidence. With regard to other methodological issues it is also hard to image that a systematic response bias has been consistently maintained by subjects throughout a series of questionnaires issued

over such a lengthy period of time and, in addition, steps were taken where possible to counterbalance positive and negative responses to variables within each of the questionnaires. Furthermore, as previously noted, the frequency and social status of speeding suggests that, unlike other motoring offences, very little social stigma may be associated with the behaviour and therefore the likelihood of social bias in the self-reporting of this particular aspect of driving may be minimal.

However, in reviewing the results obtained there are many other reasons to suppose that the data may be reliable. In the first study, reported in Chapter Six, the consistent and systematic gender differences that were revealed over a range of variables is very much in line with many previous studies (e.g. Panek and Reardon, 1987; DeJoy, 1991; McKenna, Waylen and Burkes, 1998) into driving behaviour. Furthermore, the results obtained from the third study, reported in Chapter Seven, using Lajunen and Summala's (1995) Driver Skills Inventory, reflected an almost identical factor structure as the original study that may also give positive support that these measures were both viable and valid. Moreover, the findings with regard to anticipated driving exposure; vehicle use, road types and passenger types carried gave further evidence of a consistency within the self-reports over time that give some grounds for confidence in the findings.

10.2. Limitations of the study sample.

Although the research was open to all new drivers who were between the ages of 17 and 21 years who held a provisional driving licence, the mean age of the sample at the time

of the first study, reported in Chapter Six, was 17.3 years ($SD=0.8$). In total, 81% of the sample was 17 years old and, although it was intended to attract subjects throughout the whole age range, the way the subjects were recruited, on a 'first come first served' basis to a total of 450 subjects, meant that an even spread ages range was not achieved. The recruitment procedure was conducted with the assistance of the members and organisation of Motor Schools Association (MSA) in Scotland, which is a major organisation that assists Approved Driving Instructors (ADIs) and provides resources, training and represents the interests of driving schools of all sizes. Through their assistance the subjects took eighteen months to recruit. It is likely, therefore, that the age mix of the subjects in the sample is fairly representative at least in the age frequency of those obtaining professional driving lessons at that time. However, the narrowness of the breadth of ages expected may have provided an unforeseen methodological bonus in that it has been argued (Cameron, 1982) that new drivers aged 17 years are likely to be socially, psychologically and behavioural different from new drivers aged 21 years. Therefore arranging for 90 subjects to be 17 years, 90 to be 18 years, etc., up to the age of 21 years to a sample size of 450, for example, may just be adding unnecessary complexity and at the same time be more unrepresentative of the ages and numbers presenting themselves to driving instructors for tuition. However, as no records were kept by the ADIs with regard to those persons who declined to join the study or, more importantly the reasons why they declined, it was impossible to make a definitive assessment on how representative the age range actually was in regard to the research project's criteria. However, with the reasonable incentive payments that were on offer (see Chapter Five), it is likely that the sample was as representative as could have been

expected for this type of research in regard to when most young people are starting to learn to drive. This is, of course, accepting the normal limitations that are applicable to questionnaire studies in that there are always likely to be a division between those people who are prepared to answer questionnaires and those who are not.

From Table 10.1, it can be seen that a relatively large percentage of drivers (21%) started to learn to drive within the time frame of the present study but still had not successfully passed the driving test when the study closed (the last subject was recruited to the research in December 1998 and the study closed for test pass notifications in December 1999). This would indicate that for those drivers in particular the learning process occupied a protracted period of time. This implies that for some subjects the process of learning to drive is pursued in a more leisurely manner while for others it is more urgent. The above, however, does at least suggest that those subjects who are the keenest drivers, and/or have the greatest need to acquire a driving licence are likely to be overly represented in the sample and this may be a weakness. This weakness may manifest itself by the sample being more biased towards subjects who have higher additional motives in the driving task and/or who place more social value on the acquisition of a driving licence, with all the motives inherent in holding these attitudinal or behavioural positions. In addition, however, another aspect that may lead to early success in the driving test or otherwise is the issue of financial and/or socio-economic status of the subject. The ability to undertake and pay for driving instruction at a time when many young drivers are still in the educational system and may not be earning other than through part-time employment, is at best likely to have an influence on how the study

sample is composed and, further, how those subjects in the study progress. It may mean, for example, that a subject is dependent on parental financial support, for the number and frequency of driving lessons that can be taken and, conversely, if this support is not available find themselves restricted and unable to progress at the same rate as others. Having money or access to financial support, in whatever form, is likely to have a large effect in restricting potential learner drivers and those who desire to start to learn to drive along with other issues, such as access to a vehicle to drive post-test for example. It perhaps should also be noted that for a two-year period, in years 1998 and 1999, within the time span of the study (1997 – 2000), the United Kingdom Government introduced a fee of £1000 per-year for those who were attending university or colleges for undergraduate education (the average wage in the United Kingdom at this time is approximately £20,000 (July 1999, Incomesdata.co.uk)). It is likely that the financial effects mentioned above would have had an additional knock on effect on subjects presenting themselves for professional tuition during this period.

In further assessing the representative nature of the sample used it is useful to make comparison with previous American studies. Harrington (1972), in his review of high school education, made several criticisms with regard to the selection procedures used. The first and major difference is that in the American research all the subjects involved would have been in full-time and continuous education up to age of 18 years while the present sample is composed of subjects that are both in the educational system and those that have left to seek or have already gained employment (pupils are allowed to leave school at 16 years in the United Kingdom). Besides the socio-economic issues noted

above, by recruiting through ADIs this avoids the issue of volunteer bias (to some extent, see above in regard to questionnaire completion) that may have affected many studies in that the subject had already decided to learn to drive, applied for and obtained a provisional driving licence, arranged for professional driving instruction prior to being introduced to the present study and, in most cases, had already received their first driving lesson. Furthermore, the recruitment procedure adopted avoids the further criticisms of the selection procedures adopted in American studies that were affected by such diverse issues such as the personality of the subject, their intelligence quotient or their school grade scores. Furthermore, the subjects in the present study may be more representative than previous studies in that they were recruited throughout several major cities in Scotland; this restricts the influence of attitudes or beliefs that may arise or result from place of residence.

10.3. Drop out rate of subjects.

The original number of subjects recruited to the study was 451. In total 174 subjects completed all aspects of the study. At the time the study concluded in April 2000 a total of 95 (21%) subjects were still considered to be actively involved in the study but had not yet had been successful in passing the practical driving test (categorised as 'no test on time' see Table 10.1). In addition a further 148 (32%) of subjects dropped out at various stages during the research schedule. When it is taken into account that the present series of studies had four related cross-sectional elements for which the subjects had to complete in total four comprehensive questionnaires (see Appendices A to D),

with the associated time commitment within this task, this is a relatively small drop out rate, especially when it is considered that the majority of the research was conducted by post and the opportunity did not exist to repeatedly motivate subjects in regard to questionnaire completion. This may be in part due to the incentive payments, as described in Chapter Five. Table 10.1 shows details of group membership of those subjects who completed the research and those who had dropped out.

Table 10.1, Subjects and the attrition rate for the study.

Subjects	Group 1	Group 2	Group 3	Totals
Entered	176	123	152	451
No test on time	38	24	33	95
Dropped out before or at Time 2	35	31	53	119
Dropped out before or at Time 3	10	5	14	29
Dropped out before or at Time 4	13	13	8	34
Completed	80	50	44	174

Subjects were deemed to have dropped out of the study for a variety reasons. Subjects in all groups were disqualified from the study if they failed to notify the author of the study with 14 days of passing the practical driving test. Subjects in Group 2 and Group 3 were disqualified from the study if they failed to attend the pre-driver training or the post-driving test interventions respectively. (Note; subjects were given 1 months notice of the requirement to attend for either of their respective interventions with an additional reminder sent 7 days prior to the event.) In applying these rules of attendance at both pre and post training it is accepted that the potential did exist for the sample to be skewed by including in the study only those who attended and disqualifying those who did not attend.

Undoubtedly several other factors conspired to cause subjects to withdraw or drop out of the study. One of the main issues that arose as the study progressed, and conveyed to the author through discussions with ADIs involved with the study, was the frequency of driving lessons being taken by the subjects. It appeared to be the case that many subjects were short of money to continue and often only returned to their ADI for more professional instruction after they had saved money or started to work. Lack of time was also cited as another issue with several subjects contacting the author explaining that they had to stop driving lessons as a result of commitments to other activities such as school examinations and study which is an inherent part of being within the age range of the study. Some subjects repeatedly failed to pass the theory test requirement of the United Kingdom licensing system and actually quit driving altogether. This might also affect to a degree the representative nature of the subsequent data in that this recent addition to licensing requirements confounds possible comparison with earlier studies. Other subjects were forced to drop out of the study due to illness or moving away from the area. Several subjects notified the author of impending moves away from Scotland to other parts of the United Kingdom, This was not seen to be an issue provided the mandatory attendance elements of the research had been completed and the data from the questionnaires from these subjects were successfully incorporated into the findings presented. However, the major reason for subjects dropping out of the study was the non-return of one of the study's four questionnaires. With regard to the methodology for questionnaires used in the study it is hard to imagine a postal system that could have been more reasonable or fair than the one employed. One technique that was employed in order to maintain contact with the subjects who were still to register a driving test pass

was through the use of a regular newsletter that was circulated at approximately four months intervals.

10.4. Differences between completers and non-completers in attitudes to driving violations.

An analysis of the summed scores of West and Hall's (1992) Attitude to Driving Violations Scale, taken from data at Time 1 (Questionnaire A), revealed no differences between those subjects who successfully completed the study ($n=174$, [38.5%], Mean Score 16.8, SD 3.5) and those who failed to complete ($n=273$, [61.5%], Mean Score 16.3 SD 3.5) ($t=1.43$, $df\ 445$, $p=0.15$).

10.5. Differences in the length of time taken to pass the driving test.

The subjects in the study learned to drive in the way it was most suitable to them. In all, 260 driving test passes were recorded as part of the study ($n=260$, minimum number of days driver training 14, maximum number of days driver training 767, mean 215.7, SD 120.16). To establish whether or not differences existed between those who passed their driving test earlier as opposed to later, the number of days training taken was split at the mean and those subjects taking less than 215 days were compared to those drivers who took longer. Both sets of drivers were compared on two measures, West and Hall's (1994) Attitude to Driving Violations Scale (ADVS) and a measure of additional motives in the driving task. Both these measures were repeated measures used in the study. The

comparison was taken from results obtained at Time 2. On both measures no significant differences were found (ADVS, early group n=140, mean 17.6, SD 3.7, later group n=93, mean 16.9, SD 3.6, $t=1.45$, $df\ 231$ $P=.575$. Additional motives, early group n=137, mean 38.1, SD 10.8, later group n=92, mean 38.3, SD 10.3, $t=-.1$, $df\ 227$, $P=.9$).

10.6. The relevance of speeding behaviour.

One area of research that appears to have been neglected in the literature and in the study of new driver behaviour is the attitudes and beliefs of new drivers as they start learning to drive. One of the benefits from research at this very early stage is that as all the subjects were at the same point in their driving career and issues surrounding the confounding of variables previously reported (e.g. Brown, 1982) such as age, experience and exposure are kept to an absolute minimum. It could be argued that the study presented in Chapter Six was largely a review of the effects of background variables or external variables, in terms of social cognition modelling, for example demographics; age, sex, occupation, socio-economic status, religion, education; personality traits, extraversion, agreeableness, conscientiousness, neuroticism and openness (Conner and Sparks, 1996), and the impact that these variables may have on the three constructs of the Theory of Planned Behaviour (TPB), as in most cases no actual experience of the behaviour under review had been obtained. The importance of these background variables is their effect on the three constructs that Ajzen (1985, 1988) proposes combine to form the TPB. Inasmuch as the TPB is considered to be a deliberative processing model, with regard to the attitudes and behavioural intentions that are involved in the

driving task, it is likely that these aspects are involved at a more strategic level of driving behaviour that can incorporate the social and more interactive aspects of driving. For example, it is unlikely that these effects filter down to split second individual driving decisions, which are more likely to be realistically based upon the consideration of all the available information presented to the driver at the time when an action is required. The TPB is more likely to affect the overall or general driving style of an individual, with pre-determined beliefs about speed regulation, the behaviour he or she wants to demonstrate to others and the amount of control that is perceived to be felt over the skill of driving. These are likely to be positions held by an individual with regard to his or her interpretation of what driving behaviour requires, for example. In turn, the cause of volitional behaviour is the intention to engage in that behaviour. The issue at this juncture may be twofold, the inappropriate use of speed, which may be known to the actor to be involved in accident causation, coupled with the intention to engage in that behaviour. Again related to volitional behaviours is the third predictor of behavioural intentions in the TPB, perceived behavioural control, which is the extent to which the performance of the behaviour, as seen by the individual, is seen to be difficult or easy. With regard to speeding behaviour this is, of course, a very easy behaviour in which to engage and has attractions for many with regard to the thrill and excitement that for some may be involved. The important issue with regard to the foregoing, from a road safety perspective, is that if a measure of attitudes, beliefs and behavioural intentions, taken before driver training has commenced, reveals that individuals may be predisposed to this style of driving, and if it were possible to establish a link between pre-driving and post-driving behavioural intentions, then an opportunity may exist to intervene early.

perhaps while at school, in an attempt to modify behavioural intentions as they are being formed. This of course poses further questions, in that should this link exist then what is the earliest stage it can be detected, how are the intentions being formed and can they be modified? If, for example, speeding behaviour is being learned through driving behaviours being demonstrated on a daily basis by the driving style of parents, for example, it may be possible to enlist their help and co-operation for educational purposes; this of course may be a double benefit to road safety professionals. If, however, intentions are being formed through exposure to the media or other sources of social information then perhaps 'driving citizenship' courses may be a more appropriate type of intervention to be used in schools rather than any type of early driver training that is currently used. (Note; Citizenship is defined by Collins English Dictionary, 1995, as: 1. 'The condition or status of a citizen, with its rights and duties'. 2. 'A person's conduct as a citizen'.)

A weakness of the present study is that it did not repeat the measure of behavioural intentions towards speeding, used at Time 1, later in the study. However, similar evidence is available from another measure used within the study that was repeated at Time 1, Time 2 and Time 4; West and Hall's (1994) Attitude to Driving Violations Scale (ADVS) (reported in Chapter Nine). The measure revealed that there was a significant increase in relation to the mean scores of the subjects as a function of time, indicating a worsening in attitudes towards speeding and driving violations by all three groups. However, the band in which those mean scores moved was relatively narrow, for example, the scores for the control group, Group 1, were; Mean at Time 1 = 17.1

(SD=3.7), Mean at Time 2 = 17.0 (SD=3.7), Mean at Time 4 17.8 (SD=3.9) (the means for the other two groups are shown in Table 9.6 in Chapter Nine). While the possible scores for the ADVS could have ranged from 7 to 35, these findings may suggest that attitudes and beliefs may indeed be relatively stable. One question that arises from this finding is while it is obviously possible to track the development of attitudes towards speeding by re-testing the subjects using the same scale at various time in the future and plotting trends, is it possible to test earlier in time, while the subjects were at 15 years of age, for example? The issue is again how and when are these predispositions formed? A secondary issue, of some importance to road safety interventionists, is that one of the biggest problems that faces the profession, and one which limits the effectiveness of many potential mass interventions, is access to the required population. If realistic benefits could be accrued from any remedial action taken at the age of 15 years, that population would still be in the school environment. The school system is of course the last opportunity that is open to interventionists to reach large sections of the population. To have young drivers approaching the driving task with the appropriate predisposition, rather than change attitudes and behaviours after the task is learned, appears to make much more sense.

Looking at broader issues in support of the above, the mean scores of behavioural intentions towards speeding reported by the study that are presented in Chapter Six, it can be noted that gender differences begin to systematically appear in all but one of the variables used. This suggests that broader social influences are at work in formulating attitudes to the driving task. In general, the findings revealed that, while all the subjects

felt it necessary to conform to the rules and social conventions of the road, it was the female subjects that recorded the higher scores on the majority of variables used, indicating that they were already more in tune with social values and subsequently more inclined to abide by the rules of the road. In addition, with regard to the effects of significant others, the study also revealed that the most important controlling effect was from parental influence.

10.7. Review of the pre and post classroom based interventions.

The first of the interventions to be evaluated in the present series of studies was the classroom-based pre-driver training course. The results of the second study, presented in Chapter Seven, investigated the efficacy of this type of education programme. After a review of American driving courses, Struckman-Johnson, Lund, Williams and Osborne (1989) noted that the general premise of most interventions designed to change driver behaviour focused upon the assumption that it is lack of knowledge regarding safe driving practises or that the inappropriate attitudes held by some drivers were responsible for road traffic accidents. In interviewing professionals in this field of expertise and reviewing materials for use in the pre-driver education course for the present study this assumption was still found to be apparent. Road safety professionals interpret cause and effect from road accident information and form conclusions about causation. The countermeasures designed in response, however, may be wholly inappropriate; for example, it could be confidently asserted that the majority of road accidents involve an element of the inappropriate use of speed, an assertion that is validated by research

findings (see Sabey and Taylor, 1980; Lewin, 1982); the response from the road safety profession, however, is often to campaign, to teach, create information packs, television adverts, etcetera, to inform the driving public that speeding is dangerous. In returning to the position argued by Struckman-Johnson and colleagues it is likely that they would affirm that the drivers involved in the accidents may already be aware of this fact.

In reviewing the literature it is also apparent that a gap exists with regard to structured reviews of classroom-based pre-driver education in the United Kingdom. While the American literature suggests that this method may not be successful it is nevertheless appropriate that it should be tested in the United Kingdom. Therefore with the assistance and guidance from both police and civilian road safety officers throughout Scotland and, on the basis of the information, guidance and experience provided by them with regard to the major issues facing young drivers and their over involvement in road accidents, a representative pre-driver training programme was created for use in the study. As described in Chapter Five the materials used in support of the pre-driver training programme were taken from materials that were generally available to all road safety professionals at the time. However, in general, the characteristics of the materials used could again be criticised as being pedagogical in nature making the same cause and effect relationships as described above in terms of their structure. For example, while it is widely known amongst drivers that it is inappropriate behaviour to drink alcohol and drive a car, and this issue is tested for in the theory test, the information is often presented to the driver time and again by way of public information. The issue is of

course not the knowledge per se but a failure to understand why drivers still choose to engage in the behaviour when they know it to be wrong.

The pre-driver training was reviewed initially in Chapter Seven with the focus upon driving knowledge acquisition with regard to nominated items and to assess if specific driving choices were affected by the training. Very little support for this method of training was forthcoming reinforcing previous American findings (see Harrington, 1972). However, the results presented in Chapter Eight and Chapter Nine also reviewed the possible effects of pre-driver training through the use of different variables, again with no success.

Fitts and Posner (1967) propose that learning to drive consists of three separate stages (see Chapter Three). The essence of their argument is that, in the early stages of driving, attention is focused on basic tasks within the car and relationships between driving control inputs and vehicle outcomes. It is likely that when the pre-driver training was taking place the subjects in Group 2 were still within this first stage. McKnight (1985) suggests that at this point strategic information such as safety procedures may be wasted on new drivers as they struggle simply to gain mastery over the controls of the vehicle. However, the possibility does exist that information provided during pre-driver training may lay dormant until the further stages of expertise in driving are accomplished. The Driver Skills Inventory (DSI) (Lajunen and Summala, 1995) provides a mechanism for subjects to express the level of driving skills they perceive themselves to have in particular driving situations and how much they are pre-disposed towards the issues of

safety motives, for example. While differences were found between those subjects in Group 3 and the control Group 1 no evidence was forthcoming on the DSI to suggest differences existed between Group 2, the pre-driver training group, and Group 1. In fact the outcomes for both Group 1 and Group 2 were very similar. This was the first indication that the post-test intervention appeared to be better than the pre-driving test intervention. However, the two classroom-based interventions were not designed with regard to the items on the DSI in particular but dealt with general driving issues in two separate ways; general safety and driving related information as provided in the pre-driver course and the threats or risks inherent within the driving task as described in the post-test intervention. This is again a positive indication of the effects of the post-test intervention procedure. The relevance of this finding may be that the content of the post-test intervention, in concentrating on issues of risk taking in the driving task, and, how certain driving behaviours may involve unforeseen threats to life or injury, the subjects may perceive themselves to be vulnerable simply through the driving style they have adopted. However, given the findings from the study it is likely that a full explanation of the effects of classroom-based interventions is not simply found in the methodology, content or strategy used within the intervention but additionally the timing of the intervention. Related to this issue is that new drivers appear to be at their most vulnerable within the three-month period immediately post-test (Broughton 1988). Also related to this issue is that within this period the driver's skills are still likely to be at a stage of simple competence and open to change rather than being fixed through becoming an automatic process resulting from repetition (see Fitts and Posner, 1967; in Evans 1991; and Lewin, 1982) so that the respondents may be in a position to make a

choice to modify their driving style in relation to the skills that still have to be learned. However the triple nature of these circumstances may have provided for differences to be detected in self-reported driving behaviour between groups at Time 3, giving evidence of an intervention effect, although two important issues ensue. Firstly, as previously discussed, self-reported driving behaviour is one thing whilst actual driving behaviour is another, and, secondly, if the intervention is effective, how long does that effect last? One answer to the first part of the question is that the results presented in Chapter Nine report no differences between groups on self-reports of actual speeding behaviour while data drawn at the same time indicates that the subjects in Group 3 had significant lower mean scores in behavioural intentions towards speeding behaviour. An answer to the second question posed, however, may be more promising. Broadly speaking, it could be argued that the results reported in Chapters Eight and Nine (Time 3 and Time 4) show greater and more pronounced differences between groups at Time 3 than they do at Time 4. This may indicate that the effects of the post-test intervention found at Time 3 have decayed through time. A weakness in the study is that the Lajunen and Summala's (1995) Driving Skills Inventory was not used at Time 4.

In the last study reported in the series (Chapter Nine), differences again existed between subjects in Group 3 in comparison to the other two groups with regard to behavioural intentions toward speeding but no differences between groups were found on West and Hall's (1994) Attitude to Driving Violation Scale, nor on the measure of additional motives. With regard to these two measures in particular it may be that they were inappropriate for use in this series of studies because of the novice nature of the

respondents. It may also be the case that the interventions were ineffective in bringing about a change in the self-reports of the subjects who attended, or, that the attitudes, beliefs and intentions in question are difficult to change. These issues are complex. While the subjects in Group 1 (standard) had no intervention procedure and acquired their driving licences in normal fashion, the mean scores from this group on the ADVS and additional motive repeated measures remained relatively stable, increasing slightly but not significantly, as a function of time, within very narrow bands. These findings are replicated for the subjects that formed both Group 2 (pre-driver training) and Group 3 (post-driver training) on these two measures. This is disappointing in that if both attitudes and intentions toward driving violations and additional motives are predictors in differentiating between those who become accident involved and those who do not, the interventions used in this series of studies appear to have had little or no effect, at least on the subject's self-reports with regard to these particular measures. However, it may be the case that learning to drive is a more broadly based activity than is being measured within the series of studies presented here, and the relatively narrow focus of the measures and comparisons used and that the major issues linked to learner driver behaviour have been missed. However, the cumulative evidence that has amassed over the years makes this unlikely (see Struckman-Johnson, et al., 1969; Robertson, 1980; Harrington, 1972). Furthermore, as can be seen from the literature review, links can be found to accident involvement that range from simple eye movements (Mourant and Rockwell, 1972) to adolescent delinquency (Jessor, 1986). Therefore, potential interventions have to select out specific areas to target. This was done in two ways in the present series of studies. Firstly, speeding behaviour was identified as the behaviour that

is most closely associated with accident involvement (Sabey and Staughton, 1975; Parker, Manstead, Stradling and Reason, 1992) and, secondly, from a behavioural perspective the association between risk-taking and speeding behaviour was seen as a suitable methodology for an intervention especially in regard to the operationalization of social cognition models as a methodology of both portraying the behaviour as a serious threat to health and using techniques already developed within the field.

10.8. Conclusions

It appears likely that prior to coming to the driving task the behavioural intentions of new drivers may have already be formed with regard to their attitudes toward the rules of the road and social conventions of driving. One area worthy of pursuit would be to establish at what particular age these intentions are beginning to be formed and design appropriate countermeasures. In relation to this issue it may be that 'driving citizenship' courses, rather than driver training, is more appropriate in this respect. The important issue may be to assist in the formation of the appropriate attitudes and behaviours at a time when these are merely embryonic thoughts, rather than trying to modify them when it is perhaps too late. In this regard, consideration should also be given to the involvement of parents or carers in this process, as it appears that they may have a significant role in how these attitudes and behaviours are formed.

It is implied in the driving literature that it takes some time for total mastery over many of the elements involved in the driving task to be accomplished. It is also suggested that

mastery is achieved some time after the practical driving test is passed. A further argument proposes that many aspects of the driving task become, through time, cognitively automatic through repetition and become almost impervious to change. The literature also proposes that previous interventions have had inappropriate content and that the strategic nature of the content is often delivered either too early or too late.

It also appears to be the case, as far as young drivers are concerned, that the major issue is how can younger drivers be helped to think like older drivers? For example, through maturity, most of us acquire a greater sense of vulnerability and modify our behaviours accordingly, to minimise our exposure to risk. If advances are to be made in accident reduction for young drivers it may be that theoretically based interventions should attempt to describe low-risk thinking as high-risk thinking and focus attention on these driving behaviours. However, if we cannot prepare our new drivers to approach the driving task with the appropriate disposition, then the last opportunity to effectively bring about change may only exist, and then only briefly, shortly after the practical driving test has been passed.

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New Driver Research (A)

This questionnaire includes a variety of questions in different formats which ask you about your experiences and what it may be like in the coming year when you will be taking to the road as a driver. We recognise that this may not be easy but we ask you to do your best. Please answer every question. There are no right or wrong answers. It is important to answer the questions as truthfully as you can. Do not dwell too long on any particular question.

This questionnaire will be treated in the strictest confidence.

Log number (This comprises of the six digits of your date of birth and your first and last initials e.g. 230667FM).

Gender Male Female

Age.
Years.....

Section 1. (Please respond to questions in this section by placing a ✓ in the appropriate box.)

What is your current status?

- School pupil
College student
Unemployed
At work
Training scheme

Other please specify

Part 1. In anticipating what it may be like after you have passed your driving test how do you think you will compare with others. (Circle one number.)

1. Compared to others of your own age, how would you rate your need for a car after you have passed the driving test?

No great need	1	2	3	4	5	6	7	Essential
---------------	---	---	---	---	---	---	---	-----------

2. Compared to others of your own age, how do you think you will get on with learning to drive?

Worse than most	1	2	3	4	5	6	7	Better than most
-----------------	---	---	---	---	---	---	---	------------------

3. Compared to others of your own age, how good a driver do you think you will eventually become?

Below average	1	2	3	4	5	6	7	Better than average
---------------	---	---	---	---	---	---	---	---------------------

4. How interested are you in road safety matters?

Not really interested	1	2	3	4	5	6	7	Very interested
-----------------------	---	---	---	---	---	---	---	-----------------

Part 2. Owning a vehicle and learning to drive can mean different things to different people. Again, we understand the difficulties, but would ask you to look forward and respond the best you can. (Circle one number.)

1. Owning my own car has been a real ambition.

Not really	1	2	3	4	5	6	7	Very much
------------	---	---	---	---	---	---	---	-----------

2. A good radio and sound system in the car is really important.

Not really	1	2	3	4	5	6	7	Very much
------------	---	---	---	---	---	---	---	-----------

3. A car owned by me has really got to look good or it wouldn't be worth having.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

4. A car is more than just a mode of transport.

Disagree	1	2	3	4	5	6	7	Agree
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5. I think learning to drive and owning a car will change my life.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

6. I would use my driving skills to impress my friends.

Not likely	1	2	3	4	5	6	7	Very likely
------------	---	---	---	---	---	---	---	-------------

7. A person of the opposite sex would find me more attractive if I had a car.

Disagree	1	2	3	4	5	6	7	Agree
----------	---	---	---	---	---	---	---	-------

8. Even if I did not need a car for work, or to get to work, I would buy one anyway.

Disagree	1	2	3	4	5	6	7	Agree
----------	---	---	---	---	---	---	---	-------

9. If I had a car I would want to find out how fast it went.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

10. If I had a car I would go out late at night on a quiet road and try out my driving skills.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

11. Being a good driver can make up for not being good at school or good at sports

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

12. The more driving skill you have the less accidents you have.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

Part 3 is over the page.

Part 3. Listed below are some statements about driving. For each one show how far you agree or disagree with it by putting a circle around the appropriate number. For example circling 1 means that you strongly agree with the statement.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Decreasing the speed limit on motorways is a good idea	1	2	3	4	5
Even at night time on quiet roads it is important to keep within the speed limit	1	2	3	4	5
Drivers who cause accidents by reckless driving should be banned from driving for life	1	2	3	4	5
People should drive slower than the limit when it is raining	1	2	3	4	5
Cars should never overtake on the inside lane even if a slow driver is blocking the outside lane	1	2	3	4	5
Penalties for speeding should be more severe	1	2	3	4	5
In towns where there are a lot of pedestrians, the speed limit should be 20 mph	1	2	3	4	5

Part 4. What kind of driver do you think you will be? We all have expectations on how we will perform certain activities. Listed below are issues you will have to deal with as a driver. Please answer as truthfully as you can and do not dwell too long on any item. (Circle one number.)

1. After I pass my driving test I intend to keep to all the advice given in the Highway Code.

Definitely do not	1	2	3	4	5	6	7	Definitely do
-------------------	---	---	---	---	---	---	---	---------------

2. I plan only to observe the rules of the road that are important to me.

Strongly disagree	1	2	3	4	5	6	7	Strongly agree
-------------------	---	---	---	---	---	---	---	----------------

3. I would like to ensure that I always drive within the Law.

Definitely no	1	2	3	4	5	6	7	Definitely yes
---------------	---	---	---	---	---	---	---	----------------

4. I want to drive within the speed limit at all times.

Strongly disagree	1	2	3	4	5	6	7	Strongly agree
-------------------	---	---	---	---	---	---	---	----------------

Continue over...

5. I expect that it is inevitable that I will drive over the speed limit sometimes.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

6. How likely is it that you will drive faster than the speed limit on the motorway?

Unlikely	1	2	3	4	5	6	7	Likely
----------	---	---	---	---	---	---	---	--------

7. After passing my test, exceeding the speed limit by more than 10 mph on a country road outside a built up area would be: (circle one number in each row.)

Unpleasant	1	2	3	4	5	6	7	Pleasant
Safe	1	2	3	4	5	6	7	Dangerous
Boring	1	2	3	4	5	6	7	Exciting
Foolish	1	2	3	4	5	6	7	Wise

8. Outside the built up area driving within the speed limits would be... (circle one number in each row.)

Safe	1	2	3	4	5	6	7	Dangerous
Boring	1	2	3	4	5	6	7	Exciting

9. My parent(s)/People who are important to me think I:

Should	1	2	3	4	5	6	7	Should not
--------	---	---	---	---	---	---	---	------------

exceed the speed limits.

10. My close friends:

Approve	1	2	3	4	5	6	7	Disapprove
---------	---	---	---	---	---	---	---	------------

of me keeping to the speed limits.

11. My partner/girlfriend/boyfriend:

Approves	1	2	3	4	5	6	7	Disapproves
----------	---	---	---	---	---	---	---	-------------

of me driving to fast.

12. I feel under social pressure, while out with my friends to drive within the speed limits.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

13. When I am out in the car with my friends they think I should:

Keep to the speed limit	1	2	3	4	5	6	7	Not keep to the speed limit.
-------------------------	---	---	---	---	---	---	---	------------------------------

14. With regard to your driving how much do you want to do what your friends think you should?

Not at all	1	2	3	4	5	6	7	Very much
------------	---	---	---	---	---	---	---	-----------

Continue over...

15. Whether I want to drive fast or not is entirely up to me.

Strongly Disagree	1	2	3	4	5	6	7	Strongly agree
-------------------	---	---	---	---	---	---	---	----------------

16. Imagine that you have passed your driving test and you are driving within the thirty miles per hour limit in town. You know that you should really drive within the speed limit but it is inevitable that you will exceed the speed limit. How much do you agree with this statement?

Strongly disagree	1	2	3	4	5	6	7	Strongly agree
-------------------	---	---	---	---	---	---	---	----------------

17. Again imagine you have passed your test. You are driving along a road where it is difficult to overtake. You are travelling at a speed that is just on the maximum speed allowed and there is a long queue of traffic behind you. You know that you are holding everybody up. Do you feel that you can still stick to the speed limit?

Definitely no	1	2	3	4	5	6	7	Definitely yes
---------------	---	---	---	---	---	---	---	----------------

18. After you have passed your test you are out driving in your car with some friends, they want you to drive faster. Are you confident that you can resist their persuasion?

Definitely no	1	2	3	4	5	6	7	Definitely yes
---------------	---	---	---	---	---	---	---	----------------

19. When driving you just have to go with the flow of traffic.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

End of questionnaire.

New Driver Research (B)

This questionnaire includes a variety of questions in different formats that ask you about your driving experience since you have taken to the road as a driver. We recognise that you have just passed your driving test but would ask you to do your best. Please answer every question. There are no right or wrong answers. It is important to answer the questions as truthfully as you can. Do not dwell too long on any particular question.

This questionnaire will be treated in the strictest confidence.

Log number (This comprises of the six digits of your date of birth and your first and last initials e.g. 230667FM).

Gender Male Female

Age.
Years.....

Section 1. (Please respond to questions in this section by placing a ✓ in the appropriate box.)

What is your current status?

School pupil
College student
Unemployed
At work
Training scheme

Other please specify

On what date did you pass your driving test?.....
(Note. If you cannot remember the exact date put the month and year.)

Part 1.

Please describe the vehicles you are now most likely to use now that you have passed your test.

1. Do you have a car of your own? (circle one) YES NO

If YES go to question 3.

If NO go to question 2.

Question 2. Do you have access to a car that you can drive? If so please give details below.

Make of vehicle (e.g. Ford, VW, etc.).....

Model (e.g. Golf GTI etc.).....

Age of the vehicle in years.

Did you drive this vehicle prior to your driving test? YES NO

2. Now that I have passed my test getting a car of my own is: (please circle one number).

A very low priority for me	1	2	3	4	5	6	7	A very high priority for me
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Question 3. A. Please give details of your car below.

Make of vehicle (e.g. Ford, VW, etc.).....

Model (e.g. Golf GTI etc.).....

Age of the vehicle in years.

Did you drive this vehicle prior to your driving test? YES NO

3. B. Was getting this car: (please circle one number).

A very low priority	1	2	3	4	5	6	7	A very high priority
---------------------	---	---	---	---	---	---	---	----------------------

Part 2.

1. How many hours of paid driving instruction did you receive prior to passing your test? Please circle one.

0 Hours	0 – 5 hours	5 – 10 hours	10 – 15 hours	15 – 20 hours	20 – 25 hours	25 – 30 hours	30 – 35 hours	35 – 40 hours	Over 40 hours
---------	-------------	--------------	---------------	---------------	---------------	---------------	---------------	---------------	---------------

2. Approximately how many hours of additional practise, if any, did you get from family and friends? Please circle one.

0 Hours	0 – 10 hours	10 – 20 Hours	20 – 30 hours	30 – 40 hours	40 – 50 hours	50 – 60 hours	60 – 70 hours	70 – 80 hours	Over 80 hours
---------	--------------	---------------	---------------	---------------	---------------	---------------	---------------	---------------	---------------

3. How many different cars did you drive while learning to drive?

1	2	3	4	5	More than five
---	---	---	---	---	----------------

4. How many hours driving do you think you will do per week, on average, in the coming year?

0 Hours	0 - 5 hours	5 - 10 hours	10 - 15 hours	15 - 20 hours	20 - 25 hours	25 - 30 hours	30 - 35 hours	35 - 40 hours	Over 40 hours
---------	-------------	--------------	---------------	---------------	---------------	---------------	---------------	---------------	---------------

5. Approximately how much time have you spent driving on your own since passing your test?

0 Hours	0 - 5 hours	5 - 10 hours	10 - 15 hours	15 - 20 hours	20 - 25 hours	25 - 30 hours	30 - 35 hours	35 - 40 hours	Over 40 hours
---------	-------------	--------------	---------------	---------------	---------------	---------------	---------------	---------------	---------------

6. Please estimate what you expect to be the general purposes of your car journeys over an average week in the coming 12 months, in terms of the percentage of time spent driving a car. These should add up to 100%.

To and from work%
As part of job / on employers business%
Shopping%
Leisure%
Other%

7. Please estimate what you expect to be the general proportions of your driving time over the coming 12 months when you are likely to be alone and when you will have passengers with you. These should add up to 100%.

Alone%
Partner/spouse%
Partner/spouse and children%
Children only%
Parents%
Friends%
Other%

Part 3.

(Please circle one answer for each question.)

1. How many times did you fail the theory test?	0	1	2	3	More than 3
2. Can you remember your theory test score?	No		Yes		Score =
3. How many times did you fail the driving test?	0	1	2	3	More than 3
4. While learning did you have any accidents?	0	1	2	3	More than 3

Part 4.

1. Compared to others how did you think you got on learning to drive?

Worse than most others	1	2	3	4	5	6	7	Better than most others
------------------------	---	---	---	---	---	---	---	-------------------------

2. After your experiences while learning to drive how good a driver do you think you will eventually become?

Worse than post	1	2	3	4	5	6	7	Better than most
-----------------	---	---	---	---	---	---	---	------------------

Continue over...

3. When you passed your test did owning a car become a real ambition?

Not really	1	2	3	4	5	6	7	Very much
------------	---	---	---	---	---	---	---	-----------

4. If you have bought or when you buy a car how important is it to have a good sound system.

Not important	1	2	3	4	5	6	7	Very important
---------------	---	---	---	---	---	---	---	----------------

How much do you agree with the following statements?

5. A car owned by me has got to look good.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

6. A car to me is more than just a mode of transport.

Disagree	1	2	3	4	5	6	7	Agree
----------	---	---	---	---	---	---	---	-------

7. Learning to drive has changed my life.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

8. I will use my new driving skills to impress my friends

Not likely	1	2	3	4	5	6	7	Very likely
------------	---	---	---	---	---	---	---	-------------

9. A person of the opposite sex will find me more attractive now I can drive.

Disagree	1	2	3	4	5	6	7	Agree
----------	---	---	---	---	---	---	---	-------

10. If I had a car I would want to find out how fast it went.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

11. When I get the chance I will probably try out my driving skills on a quiet road.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

12. Being a good driver can make up for not being good at school or good at sports

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

13. The more driving skill you have the less accidents you have.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

14. Now that I have passed my driving test I feel that the real learning is taking place

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

15. Since passing my test I have modified the way I drive from that taught by my instructor.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

Part 5 is over the page...

Part 5. Listed below are some statements about driving. For each one show how far you agree or disagree with it by putting a circle around the appropriate number for each item. For example circling 1 means that you strongly agree with the statement.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Decreasing the speed limit on motorways is a good idea	1	2	3	4	5
Even at night time on quiet roads it is important to keep within the speed limit	1	2	3	4	5
Drivers who cause accidents by reckless driving should be banned from driving for life	1	2	3	4	5
People should drive slower than the limit when it is raining	1	2	3	4	5
Cars should never overtake on the inside lane even if a slow driver is blocking the outside lane	1	2	3	4	5
Penalties for speeding should be more severe	1	2	3	4	5
In towns where there are a lot of pedestrians, the speed limit should be 20 mph	1	2	3	4	5

Part 6.

This section of the questionnaire looks at your general driving knowledge. Please give an answer for each question.

1. Drivers between the ages of 17 and 25 years of age hold about 10% of the driving licences in the UK but are involved in (X) amount of accidents. What percentage figures do you think (X) falls between? Please circle one.

0-10%	10-20%	20-30%	30-40%	40-50%	50-60%
-------	--------	--------	--------	--------	--------

2. Who is more likely to be involved in a car accident as a new driver? Please tick one.

- A. A new male driver.
- B. A new female driver.
- C. Both are represented about the same.
- D. It's just a matter of luck or fate.

Continue over...

3. On average how many new drivers' are involved in car accidents each day in Scotland? Please circle one.

0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	Over 35
-------	--------	---------	---------	---------	---------	---------	---------

4. What is the most common type of accident for a new driver to be involved in? Please tick one.

- A. Colliding with another vehicle at a junction.
- B. A single vehicle accident
- C. An accident while going to work
- D. A reversing accident

5. According to the New Drivers Act (1997) how many points do you need to get on your licence, in the first two years after passing your test, to return to the status of a learner driver. Please tick one.

- A. Three.
- B. Six.
- C. Nine
- D. Twelve.

Part 7. This part of the questionnaire looks at your driving style. There are no right or wrong answers. Please tick the box against the statement that best describes your style.

1. In regard to your choice of speed when driving in a built up area where the speed limit is thirty miles per hour which statement best describes your thoughts? Please tick one.

- A. I think that thirty miles per hour in the built up areas is still too fast.
- B. I always stick as close as I can to the thirty miles per hour limit.
- C. I would take account of all the circumstances and select my own speed accordingly, even if this speed is above the speed limit
- D. Generally I use the thirty miles per hour limit only as a loose guide.
- E. I always err on the safer side of thirty miles per hour limit.

Continue over...

2. If you have been driving on a dual carriageway following a vehicle who has been sitting in the outside lane for a long time and refuses to move over, what would you do? Please tick one.

- A. Give a headlamp flash.
- B. Overtake on the nearside.
- C. Move up closer behind to put on more pressure.
- D. Wait patiently.
- E. Move to the inside lane and close up on the nearside.

3. When following another vehicle along a dual carriageway how do you decide how much space to allow between vehicles? Please tick one.

- A. Generally the gap sorts itself out.
- B. I usually travel slower than most others so I don't have to worry about the gap.
- C. I always leave as big a gap as possible between my car and the vehicle in front.
- D. I constantly adjust the gap with the vehicle in front.
- E. As well as keeping a good distance from the car in front you have to make sure that nobody 'nips' into to your space.

4. When driving do you ever get involved in disputes with other drivers? Which statement best summarises your attitude. Please tick one.

- A. I am never sure whether or not I have been partly to blame so I don't get involved.
- B. I think that drivers' should be told in no uncertain terms if they have done something dangerous or stupid, even if it means following them till they stop.
- C. If a driver makes a dangerous or foolish error it is likely that I would give him more than a loud blast of the horn.
- D. I would try and keep my feelings in check and forget about the situation as soon as possible. I would sound my horn if necessary.
- E. I would just mind my own business and try and get away from the scene as quickly as possible.

5. Which of the following statements best describes your individual driving style?
Please tick one.

A. A driver who is fairly interested in driving but is quite happy if someone else does the driving.

B. A driver who drives only because a motor car is a convenient mode of transport and has no further interests other than this mobility.

C. A very alert driver that drives just over the speed limits at all times. Spots opportunities and generally likes to get one over on other less 'crafty' drivers.

D. A conscientious driver who occasionally bends the rules of the road in order to enjoy the whole driving experience.

E. A polite non-aggressive driver who willingly gives way to others. A driver who sees dangerous situations early and slows down early to minimise risks.

6. If you are out driving with close friends does this make any difference to the way you drive the car? Please tick one.

A. Passengers make no difference to the way I drive.

B. Passengers in my car make me nervous in case I make a mistake.

C. I worry about being seriously distracted by passengers.

D. I enjoy having passengers in the car and take pleasure if they see me driving well.

E. I would enjoy the opportunity to show off just a little.

Continue over....

7. What driving style would you adopt if your parents, relatives or other significant people to you were in the car? Please tick one.

A. My parents or significant others wouldn't dare comment on the way I drive.

B. My driving style is the same no matter who is in the car.

C. I always try and demonstrate to my parents or significant others what a careful driver I am.

D. I always drive much slower than normal when my parents or significant others are in the car to make them feel more comfortable.

E. I always drive very slowly and smoothly when my parents or significant others are in the car to make a good impression.

Part 8. Driving style.

Compared to the 'average' British driver please estimate how you believe your abilities measure up in the following aspects of driving.

1 = Much worse, 2 = Worse, 3 Slightly worse, 4 = Neither worse nor better, 5 = Slightly better, 6 = Better, 7 = Much better.

	Much worse						Much Better
	1	2	3	4	5	6	7
1. General fluent driving (management of your car in light and heavy traffic).	1	2	3	4	5	6	7
2. Performance in a critical situation.	1	2	3	4	5	6	7
3. Identifying hazards in traffic.	1	2	3	4	5	6	7
4. Driving in a strange city.	1	2	3	4	5	6	7
5. Paying attention to pedestrians and cyclists.	1	2	3	4	5	6	7
6. Driving on a slippery road	1	2	3	4	5	6	7
7. Conforming to the traffic rules.	1	2	3	4	5	6	7
8. Managing the car through a skid.	1	2	3	4	5	6	7
9. Predicting traffic situations ahead.	1	2	3	4	5	6	7
10. Driving carefully.	1	2	3	4	5	6	7
11. Knowing how to act in particular traffic situations.	1	2	3	4	5	6	7
12. Fluent lane changing in heavy traffic.	1	2	3	4	5	6	7
13. Fast reactions.	1	2	3	4	5	6	7
14. Making firm decisions.	1	2	3	4	5	6	7
15. Paying attention to other road users.	1	2	3	4	5	6	7
16. Driving fast if necessary.	1	2	3	4	5	6	7
17. Driving in the dark.	1	2	3	4	5	6	7

Continue over...

Much
worse

Much
Better

18. Controlling the vehicle.	1	2	3	4	5	6	7
19. Avoiding competition in traffic.	1	2	3	4	5	6	7
20. Keeping sufficient following distances.	1	2	3	4	5	6	7
21. Adjusting your speed to the conditions.	1	2	3	4	5	6	7
22. Overtaking.	1	2	3	4	5	6	7
23. Cleaning the car windows on winter mornings	1	2	3	4	5	6	7
24. Giving up right of way when necessary.	1	2	3	4	5	6	7
25. Keeping to speed limits	1	2	3	4	5	6	7
26. Avoiding unnecessary risks.	1	2	3	4	5	6	7
27. Tolerating other drivers' blunders calmly.	1	2	3	4	5	6	7
28. Obeying the traffic lights carefully.	1	2	3	4	5	6	7
29. Parking in legal places only.	1	2	3	4	5	6	7

End of questionnaire.

New Driver Research (C)

This questionnaire includes a variety of questions in different formats which ask you about your experiences and what it may be like in the coming few months when you will be gathering experience as a new driver. Please answer every question. Except for Part 4 there are no right or wrong answers. It is important to answer the questions as truthfully as you can. Do not dwell too long on any particular question.

This questionnaire will be treated in the strictest confidence.

Log number (This comprises of the six digits of your date of birth and your first and last initials e.g. 230667FM).

Gender Male Female

Age.

Years.....

Section 1. (Please respond to questions in this section by placing a ✓ in the appropriate box.)

What is your current status?

School pupil

College student

Unemployed

At work

Training scheme

Other please specify

Part 1.

Please describe the vehicles you are now most likely to use now that you have passed your test.

1. Do you have a car of your own? (circle one) YES NO

If YES go to question 3.

If NO go to question 2.

Question 2. Do you have access to a car that you can drive? If so please give details below.

Make of vehicle (e.g. Ford, VW, etc.).....

Model (e.g. Golf GTI etc.).....

Age of the vehicle in years?.....

Did you drive this vehicle prior to your driving test? YES NO

2A. If you could afford a car how quickly do you think you would get one?

- Immediately
- Within three months
- Within one year
- Never

2B. In reality getting a car is: (please circle one number).

A very low priority for me	1	2	3	4	5	6	7	A very high priority for me
----------------------------	---	---	---	---	---	---	---	-----------------------------

Now go to Part 2.

Question 3. A. Please give details of your car below.

Make of vehicle (e.g. Ford, VW, etc.).....

Model (e.g. Golf GTI etc.).....

Age of the vehicle in years?.....

Did you drive this vehicle prior to your driving test? YES NO

3. B. Was getting this car: (please circle one number).

A very low priority	1	2	3	4	5	6	7	A very high priority
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Now go to Part 2.

Part 2.

1. On average how many hours do you drive per week?

0 Hours	0 – 5 hours	5 – 10 hours	10 – 15 hours	15 – 20 hours	20 – 25 hours	25 – 30 hours	30 – 35 hours	35 – 40 hours	Over 40 hours
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2. How many types of vehicle have you driven since passing your test?

1	2	3	4	5	More than five
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3. Approximately how much time have you spent driving on your own since passing your test?

0 Hours	0 – 5 hours	5 – 10 hours	10 – 15 hours	15 – 20 hours	20 – 25 hours	25 – 30 hours	30 – 35 hours	35 – 40 hours	Over 40 hours
---------	-------------	--------------	---------------	---------------	---------------	---------------	---------------	---------------	---------------

Continue over...

4. Please estimate the amount of experience you have had on the following types of road since passing your test. These should add up to 100%.

City/Town/Village roads%
Country roads%
Dual carriageway roads%
Motorway driving%

5. Please estimate what you expect to be the general purposes of your car journeys over an average week in the coming 12 months, in terms of the percentage of time spent driving a car. These should add up to 100%.

To and from work%
As part of job / on employers business%
Shopping%
Leisure%
Other%

6. Please estimate what you expect to be the general proportions of your driving time over the coming 12 months when you are likely to be alone and when you will have passengers with you. These should add up to 100%.

Alone%
Partner/spouse%
Partner/spouse and children%
Children only%
Parents%
Friends%
Other%

7. On what days do you do the most driving? Please estimate the general proportions of your driving on specific days. These should add up to 100%.

Monday%
Tuesday%
Wednesday%
Thursday%
Friday%
Saturday%
Sunday%

Question 8 is over the page...

8. At what times of the day do you do the most driving? Again this should add up to 100%.

Early morning	(05.00 – 07.00 a.m.)%
Morning	(07.00 – 12.00 p.m.)%
Afternoon	(12.00 – 6.00 p.m.)%
Evening	(6.00 – 10.00 p.m.)%
Late evening / night	(10.00 – 02.00 a.m.)%
Overnight	(02.00 – 05.00 a.m.)%

9. In your opinion has your driving got better or got worse since you passed your test? (Please circle one.)

Got a lot worse	1	2	3	4	5	6	7	Got a lot better
-----------------	---	---	---	---	---	---	---	------------------

10. Have you been reported for a motoring offence, been given fixed penalty ticket for a motoring offence, been issued with a ticket to get a vehicle defect repaired or given a form by the police to produce your vehicle documents and licence? Please one.

YES

NO

If YES please indicate how many;

Reports.....

Fixed penalty tickets.

Vehicle defect tickets.

Produce documents.

11. Have you ever been stopped by the police whilst driving? If so how many times? Please circle one.

0	1	2	3	4	More than 4
---	---	---	---	---	-------------

Part 3 is over the page...

Part 3.

Compared to the 'average' British driver please estimate how you believe your abilities measure up in the following aspects of driving. Please circle one.

1 = Much worse, 2 = Worse, 3 Slightly worse, 4 = Neither worse nor better, 5 = Slightly better, 6 = Better, 7 = Much better.

	Much worse				Much Better		
	1	2	3	4	5	6	7
1. General fluent driving (management of your car in light and heavy traffic).	1	2	3	4	5	6	7
2. Performance in a critical situation.	1	2	3	4	5	6	7
3. Identifying hazards in traffic.	1	2	3	4	5	6	7
4. Driving in a strange city.	1	2	3	4	5	6	7
5. Paying attention to pedestrians and cyclists.	1	2	3	4	5	6	7
6. Driving on a slippery road	1	2	3	4	5	6	7
7. Conforming to the traffic rules.	1	2	3	4	5	6	7
8. Managing the car through a skid.	1	2	3	4	5	6	7
9. Predicting traffic situations ahead.	1	2	3	4	5	6	7
10. Driving carefully.	1	2	3	4	5	6	7
11. Knowing how to act in particular traffic situations.	1	2	3	4	5	6	7
12. Fluent lane changing in heavy traffic.	1	2	3	4	5	6	7
13. Fast reactions.	1	2	3	4	5	6	7
14. Making firm decisions.	1	2	3	4	5	6	7
15. Paying attention to other road users.	1	2	3	4	5	6	7
16. Driving fast if necessary.	1	2	3	4	5	6	7
17. Driving in the dark.	1	2	3	4	5	6	7
18. Controlling the vehicle.	1	2	3	4	5	6	7
19. Avoiding competition in traffic.	1	2	3	4	5	6	7
20. Keeping sufficient following distances.	1	2	3	4	5	6	7
21. Adjusting your speed to the conditions.	1	2	3	4	5	6	7
22. Overtaking.	1	2	3	4	5	6	7
23. Cleaning the car windows on winter mornings	1	2	3	4	5	6	7
24. Giving up right of way when necessary.	1	2	3	4	5	6	7
25. Keeping to speed limits	1	2	3	4	5	6	7
26. Avoiding unnecessary risks.	1	2	3	4	5	6	7
27. Tolerating other drivers' blunders calmly.	1	2	3	4	5	6	7
28. Obeying the traffic lights carefully.	1	2	3	4	5	6	7
29. Parking in legal places only.	1	2	3	4	5	6	7

Part 4 is over...

Part 4.

Please indicate which number from 1 – 7 represents how you agree with each of these statements, by putting a circle around the number which most closely applies to you: for example, if you strongly agree with a statement, put a circle around '1', if you strongly disagree, circle '7', and if you neither agree nor disagree circle '4'.

(1 = strongly disagree, 4 neither agree or disagree, 7 = Strongly agree.)

1. It is important to me that I drive in a style that people in general would approve of.

Strongly disagree	1	2	3	4	5	6	7	Strongly agree
--------------------------	---	---	---	---	---	---	---	-----------------------

2. It is important to me that I drive in a style that my mother/father/carer would approve of.

Strongly disagree	1	2	3	4	5	6	7	Strongly agree
--------------------------	---	---	---	---	---	---	---	-----------------------

3. It is important to me that I drive in a style that my closest male friend would approve of.

Strongly disagree	1	2	3	4	5	6	7	Strongly agree
--------------------------	---	---	---	---	---	---	---	-----------------------

4. It is important to me that I drive in a style that my closest female friend would approve of.

Strongly disagree	1	2	3	4	5	6	7	Strongly agree
--------------------------	---	---	---	---	---	---	---	-----------------------

Part 5.

Please indicate which number from 1 – 7 represents how important each of these statements is to you, by putting a circle around the number which most closely applies: for example, if it is not important to you, put a circle around '1', if it is important to you, circle '7', and if it is neither circle '4'.

Ensuring that my driving style...	Not at all important to me				Very important to me		
	1	2	3	4	5	6	7
1. is smooth and unhurried.	1	2	3	4	5	6	7
2. takes into account as much visual information in the environment as possible.	1	2	3	4	5	6	7
3. is completely safe.	1	2	3	4	5	6	7
4. takes into account the needs of other road users.	1	2	3	4	5	6	7
5. takes into account the expectations of my passengers.	1	2	3	4	5	6	7

Question 6 is over the page...

How much do you agree or disagree with the following speed related statements -

Driving in the city where 30 or 40 M.P.H. limits are in force other factors sometimes come into play... (Please circle one).

	Strongly disagree						Strongly agree
	1	2	3	4	5	6	7
6. Sometimes the size and the performance of the car make it difficult to keep it at the speed limits.							
7. Sometimes you have to exceed the speed limits just to keep up with the flow of traffic.							
8. I can always keep to the speed limits.							
9. Sometimes while driving you have to take into account the needs of your passengers e.g. they could be late.							

How much do you agree or disagree with the following general driving statements. Please circle one.

	Strongly disagree						Strongly agree
	1	2	3	4	5	6	7
10. Driving within the rules of the road reduces danger.							
11. In the long run there are more advantages than disadvantages in driving within the rules of the road.							
12. Safe driving is boring.							
13. My friend's enjoy it if I drive fast.							
14. During the next 12 months I intend to keep to the rules of the road absolutely.							
15. It is possible that I will break some of the rules of the road when I think it is OK to do so.							
16. During the next 12 months I intend to have some excitement while driving.							
17. I think it is inevitable that you have to take some risks while driving.							
18. New drivers are no more at risk than those who have been driving for a few years.							
19. Younger people have fast reactions and this helps avoid dangerous situations.							
20. I am not at particular risk of an accident with the driving style I have adopted.							
21. Driving at speed increases the likelihood of accident involvement.							
22. At this stage of my driving career I can handle most situations.							

Question 23 is over the page...

	Strongly disagree					Strongly agree	
	1	2	3	4	5	6	7
23. I am unlikely to have an accident in the next twelve months.							
24. I have to give myself a little more driving practise before I can start to increase the speeds at which I drive.							
25. Bending the rules a bit while driving allows for a more exciting drive							

Part 6.

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is true or false as it pertains to you personally. Please place a in the true or false column against each item.

	True	False
1. Before voting I thoroughly investigate the qualifications of all the candidates.		
2. I never hesitate to go out of my way to help someone in trouble.		
3. It is sometimes hard for me to go on with my work if I am not encouraged.		
4. I have never intensely disliked someone.		
5. On occasion I have had doubts about my ability to succeed in life.		
6. I sometimes feel resentful when I don't get my way.		
7. I am always careful about my manner of dress.		
8. My table manners at home are as good as when I eat out in a restaurant.		
9. If I could get into a movie without paying and be sure I was not seen I would probably do it.		
10. On a few occasions, I have given up doing something because I thought to little of my ability.		
11. I like to gossip at times.		
12. There have been times when I felt like rebelling against people in authority even though I knew they were right.		
13. No matter who I'm talking to, I'm always a good listener.		
14. I can remember 'playing sick' to get out of something.		
15. There have been occasions when I took advantage of someone.		
16. I'm always willing to admit it when I make a mistake.		
17. I always practise what I preach.		
18. I don't find it particularly difficult to get along with loud-mouthed, obnoxious people.		
19. I sometimes try to get even rather than forgive and forget.		
20. When I don't know something I don't at all mind admitting it.		
21. I am always courteous, even to people who are disagreeable.		

Question 22 is over the page...

	True	False
22. At times I have really insisted on having things my own way.		
23. There have been occasions when I felt like smashing things.		
24. I would never think of letting someone else be punished for my wrong-doing.		
25. I never resent being asked to return a favour.		
26. I have never been irked when people expressed ideas very different from my own.		
27. I never make a long trip without checking the safety of my car.		
28. There have been times when I was quite jealous of the good fortune of others.		
29. I have almost never felt the urge to tell someone off.		
30. I am sometimes irritated by people who ask favours of me.		
31. I have never felt that I was punished without cause.		
32. I sometimes think when people have a misfortune they only get what they deserve.		
33. I have never deliberately said something that hurt someone's feelings.		

Part 7.

Please circle the number that best represents your choice.

1. I intend to keep to all the advice given in the Highway Code.

Definitely do not	1	2	3	4	5	6	7	Definitely do
-------------------	---	---	---	---	---	---	---	---------------

2. I plan only to observe the rules of the road that are important to me.

Strongly disagree	1	2	3	4	5	6	7	Strongly agree
-------------------	---	---	---	---	---	---	---	----------------

3. I would like to ensure that I always drive within the Law.

Definitely no	1	2	3	4	5	6	7	Definitely yes
---------------	---	---	---	---	---	---	---	----------------

4. I want to drive within the speed limit at all times.

Strongly disagree	1	2	3	4	5	6	7	Strongly agree
-------------------	---	---	---	---	---	---	---	----------------

5. I expect that it is inevitable that I will drive over the speed limit sometimes.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

6. How likely is it that you will drive faster than the speed limit on the motorway?

Unlikely	1	2	3	4	5	6	7	Likely
----------	---	---	---	---	---	---	---	--------

7. I feel under social pressure, while out with my friends, to drive within the speed limits.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

8. When I am out in the car with my friends they think I should

Keep to the speed limit	1	2	3	4	5	6	7	Not keep to the speed limit.
-------------------------	---	---	---	---	---	---	---	------------------------------

Question 9 is over the page...

9. With regard to your driving how much do you want to do what your friends think you should do?

Not at all	1	2	3	4	5	6	7	Very much
------------	---	---	---	---	---	---	---	-----------

10. Whether I want to drive fast or not is entirely up to me.

Strongly Disagree	1	2	3	4	5	6	7	Strongly agree
-------------------	---	---	---	---	---	---	---	----------------

End of Questionnaire

New Driver Research (D)

This questionnaire includes a variety of questions in different formats which ask you about your driving experiences. You will have answered some of the questions before this is quite intentional. Please answer every question. There are no right or wrong answers in any of the parts. It is important to answer the questions as truthfully as you can. Do not dwell too long on any particular question.

This questionnaire will be treated in the strictest confidence.

Log number (This comprises of the six digits of your date of birth and your first and last initials e.g. 230667FM).

Gender Male Female

Age.
Years

Section 1. (Please respond to questions in this section by placing a ✓ in the appropriate box.)

What is your current status?

School pupil
College student
Unemployed
At work
Training scheme

Other please specify.....

Part 1.

Please describe the vehicles you are now most likely to use now that you have passed your test.

1. Do you have a car of your own? (circle one) YES NO

If YES go to question 3.

If NO go to question 2.

Question 2 is over the page...

Question 2. Do you have access to a car that you can drive? If so please give details below.

Not important	1	2	3	4	5	6	7	Very important
---------------	---	---	---	---	---	---	---	----------------

How much do you agree with the following statements?

5. A car owned by me has got to look good.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

6. A car to me is more than just a mode of transport.

Disagree	1	2	3	4	5	6	7	Agree
----------	---	---	---	---	---	---	---	-------

7. Learning to drive has changed my life.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

8. I will use my new driving skills to impress my friends

Not likely	1	2	3	4	5	6	7	Very likely
------------	---	---	---	---	---	---	---	-------------

9. A person of the opposite sex will find me more attractive now I can drive.

Disagree	1	2	3	4	5	6	7	Agree
----------	---	---	---	---	---	---	---	-------

10. If I had a car I would want to find out how fast it went.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

11. When I get the chance I will probably try out my driving skills on a quiet road.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

12. Being a good driver can make up for not being good at school or good at sports

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

13. The more driving skill you have the less accidents you have.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

14. Now that I have passed my driving test I feel that the real learning is taking place.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

15. Since passing my test I have modified the way I drive from that taught by my instructor.

Untrue	1	2	3	4	5	6	7	True
--------	---	---	---	---	---	---	---	------

Part 3 is over the page...

Part 3.

1. How many types of vehicle have you driven since passing your test?

1	2	3	4	5	More than five
---	---	---	---	---	----------------

2. In an average week approximately how many hours do you now drive?

0 Hours	0 - 5 hours	5 - 10 hours	10 - 15 hours	15 - 20 hours	20 - 25 hours	25 - 30 hours	30 - 35 hours	35 - 40 hours	Over 40 hours
---------	-------------	--------------	---------------	---------------	---------------	---------------	---------------	---------------	---------------

3. Please estimate the amount of experience you have had on the following types of road since passing your test. These should add up to 100%.

City/Town/Village roads%

Country roads%

Dual carriageway roads%

Motorway driving%

4. Please estimate what you expect to be the general purposes of your car journeys over an average week in the coming 12 months, in terms of the percentage of time spent driving a car. These should add up to 100%.

To and from work%

As part of job / on employers business%

Shopping%

Leisure%

Other%

5. Please estimate what you expect to be the general proportions of your driving time over the coming 12 months when you are likely to be alone and when you will have passengers with you. These should add up to 100%.

Alone%

Partner/spouse%

Partner/spouse and children%

Children only%

Parents%

Friends%

Other%

Continue over...

6. On what days do you do the most driving? Please estimate the general proportions of your driving on specific days. These should add up to 100%.

Monday%

Tuesday%
Wednesday%
Thursday%
Friday%
Saturday%
Sunday%

7. At what times of the day do you do the most driving? Again this should add up to 100%.

Early morning	(05.00 – 07.00 a.m.)%
Morning	(07.00 – 12.00 p.m.)%
Afternoon	(12.00 – 6.00 p.m.)%
Evening	(6.00 – 10.00 p.m.)%
Late evening / night	(10.00 – 02.00 a.m.)%
Overnight	(02.00 – 05.00 a.m.)%

8. In your opinion has your driving got better or got worse since you passed your test? (Please circle one.)

Got a lot worse	1	2	3	4	5	6	7	Got a lot better
-----------------	---	---	---	---	---	---	---	------------------

9. Have you been reported for a motoring offence, been given fixed penalty ticket for a motoring offence, been issued with a ticket to get a vehicle defect repaired or given a form by the police to produce your vehicle documents and licence? Please **T**one.

YES

NO

If YES please indicate how many;

Reports.....

Fixed penalty tickets.....

Vehicle defect tickets.

Produce documents.....

Continue over...

10. Have you ever been stopped by the police whilst driving? If so how many times? Please circle one.

0	1	2	3	4	More than 4
---	---	---	---	---	-------------

Part 4. Listed below are some statements about driving. For each one show how far you agree or disagree with it by **putting a circle around the appropriate number for each item**. For example circling 1 means that you strongly agree with the statement

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Decreasing the speed limit on motorways is a good idea	1	2	3	4	5
Even at night time on quiet roads it is important to keep within the speed limit	1	2	3	4	5
Drivers who cause accidents by reckless driving should be banned from driving for life	1	2	3	4	5
People should drive slower than the limit when it is raining	1	2	3	4	5
Cars should never overtake on the inside lane even if a slow driver is blocking the outside lane	1	2	3	4	5
Penalties for speeding should be more severe	1	2	3	4	5
In towns where there are a lot of pedestrians, the speed limit should be 20 mph	1	2	3	4	5

Part 5.

Please indicate which number from 1 – 7 represents how you agree with each of these statements, by putting a circle around the number which most closely applies to you for example, if you strongly agree with a statement, put a circle around '1', if you strongly disagree, circle '7', and if you neither agree nor disagree circle '4'

(1 = strongly disagree, 4 neither agree or disagree, 7 = Strongly agree)

1. It is important to me that I drive in a style that people in general would approve of

Strongly disagree	1	2	3	4	5	6	7	Strongly agree
-------------------	---	---	---	---	---	---	---	----------------

Continue over...

2. It is important to me that I drive in a style that my mother/father/carer would approve of.

Strongly disagree	1	2	3	4	5	6	7	Strongly agree
-------------------	---	---	---	---	---	---	---	----------------

3. It is important to me that I drive in a style that my closest male friend would approve of.

Strongly disagree	1	2	3	4	5	6	7	Strongly agree
--------------------------	---	---	---	---	---	---	---	-----------------------

4. It is important to me that I drive in a style that my closest female friend would approve of.

Strongly disagree	1	2	3	4	5	6	7	Strongly agree
--------------------------	---	---	---	---	---	---	---	-----------------------

Part 6.

Please indicate which number from 1 – 7 represents **how important** each of these statements is to you, by putting a circle around the number which most closely applies: for example, if it is not important to you, put a circle around '1', if it is important to you, circle '7', and if it is neither circle '4'.

Ensuring that my driving style...	Not at all important to me			Very important to me			
1. is smooth and unhurried.	1	2	3	4	5	6	7
2. takes into account as much visual information in the environment as possible.	1	2	3	4	5	6	7
3. is completely safe.	1	2	3	4	5	6	7
4. takes into account the needs of other road users.	1	2	3	4	5	6	7
5. takes into account the expectations of my passengers.	1	2	3	4	5	6	7

How much do you agree or disagree with the following speed related statements:-

Driving in the city where 30 or 40 M.P.H. limits are in force other factors sometimes come into play... (Please circle one).

	Strongly disagree			Strongly agree			
6. Sometimes the size and the performance of the car make it difficult to keep it at the speed limits.	1	2	3	4	5	6	7
7. Sometimes you have to exceed the speed limits just to keep up with the flow of traffic.	1	2	3	4	5	6	7
8. I can always keep to the speed limits.	1	2	3	4	5	6	7
9. Sometimes while driving you have to take into account the needs of your passengers e.g. they could be late.	1	2	3	4	5	6	7

Continue over...

How much do you agree or disagree with the following general driving statements
Please circle one.

Strongly
disagree

Strongly
agree

10. Driving within the rules of the road reduces danger.	1	2	3	4	5	6	7
11. In the long run there are more advantages than disadvantages in driving within the rules of the road.	1	2	3	4	5	6	7
12. Safe driving is boring.	1	2	3	4	5	6	7
13. My friend's enjoy it if I drive fast.	1	2	3	4	5	6	7
14. During the next 12 months I intend to keep to the rules of the road absolutely.	1	2	3	4	5	6	7
15. It is possible that I will break some of the rules of the road when I think it is OK to do so.	1	2	3	4	5	6	7
16. During the next 12 months I intend to have some excitement while driving.	1	2	3	4	5	6	7
17. I think it is inevitable that you have to take some risks while driving.	1	2	3	4	5	6	7
18. New drivers are no more at risk than those who have been driving for a few years.	1	2	3	4	5	6	7
19. Younger people have fast reactions and this helps avoid dangerous situations.	1	2	3	4	5	6	7
20. I am not at particular risk of an accident with the driving style I have adopted.	1	2	3	4	5	6	7
21. Driving at speed increases the likelihood of accident involvement.	1	2	3	4	5	6	7
22. At this stage of my driving career I can handle most situations.	1	2	3	4	5	6	7
23. I am unlikely to have an accident in the next twelve months.	1	2	3	4	5	6	7
24. I have to give myself a little more driving practise before I can start to increase the speeds at which I drive.	1	2	3	4	5	6	7
25. Bending the rules a bit while driving allows for a more exciting drive	1	2	3	4	5	6	7

Part 7.

Please be completely honest about the driving style that you have developed.

At what speed do you normally drive (when driving conditions are good) between the following times? **Please circle one.**

1. In town between the hours of 7.00 a.m. and 7.00 p.m.

Below 23	23 - 26	27 - 30	30	30 - 33	34 - 37	38 - 41	42 - 45	46 - 49	50 +
----------	---------	---------	----	---------	---------	---------	---------	---------	------

(Speed in M.P.H)

Continue over...

2. In town between the hours of 7.00 p.m. and midnight.

Below 23	23 - 26	27 - 30	30	30 - 33	34 - 37	38 - 41	42 - 45	46 - 49	50 +
----------	---------	---------	----	---------	---------	---------	---------	---------	------

(Speed in M.P.H)

3. In town between the hours of midnight and 3.00 a.m.

Below 23	23 - 26	27 - 30	30	30 - 33	34 - 37	38 - 41	42 - 45	46 - 49	50 +
----------	---------	---------	----	---------	---------	---------	---------	---------	------

(Speed in M.P.H)

4. Out of town but not on the motorway or dual carriageway between 7.00 a.m. and 7.00 p.m.

Below 53	53 - 56	57 - 60	60	60 - 63	64 - 67	68 - 71	72 - 75	76 - 79	80 +
----------	---------	---------	----	---------	---------	---------	---------	---------	------

(Speed in M.P.H)

5. Out of town but not on the motorway or dual carriageway between 7.00 p.m. and Midnight.

Below 53	53 - 56	57 - 60	60	60 - 63	64 - 67	68 - 71	72 - 75	76 - 79	80 +
----------	---------	---------	----	---------	---------	---------	---------	---------	------

(Speed in M.P.H)

6. Out of town but not on the motorway or dual carriageway between midnight and 3.00 a.m.

Below 53	53 - 56	57 - 60	60	60 - 63	64 - 67	68 - 71	72 - 75	76 - 79	80 +
----------	---------	---------	----	---------	---------	---------	---------	---------	------

(Speed in M.P.H)

7. In good conditions on the motorway between 7.00 a.m. and 7.00 p.m.

Below 63	63 - 66	67 - 70	70	70 - 73	74 - 77	78 - 81	82 - 85	86 - 89	90 +
----------	---------	---------	----	---------	---------	---------	---------	---------	------

(Speed in M.P.H)

8. In good conditions on the motorway between 7.00 p.m. and midnight

Below 63	63 - 66	67 - 70	70	70 - 73	74 - 77	78 - 81	82 - 85	86 - 89	90 +
----------	---------	---------	----	---------	---------	---------	---------	---------	------

(Speed in M.P.H)

9. In good conditions on the motorway between midnight and 7.00 a.m.

Below 63	63 - 66	67 - 70	70	70 - 73	74 - 77	78 - 81	82 - 85	86 - 89	90 +
----------	---------	---------	----	---------	---------	---------	---------	---------	------

(Speed in M.P.H)

End of questionnaire.

Client's Project Description, Terms and Conditions.

Introduction.

Each year 850,000 new drivers come on to our roads in the United Kingdom. Of this figure 170,000 (1 in 5) will have an accident in the first year of driving and approximately 11,000 of these accidents will result in injury. New drivers also have a lower than average annual mileage and research shows that their accident liability reduces by 30% during their first year of driving but it is not clear which aspects of the experience gained brings about this change.

The New Driver Project is a research programme aimed at reducing young driver accident involvement.

Entry criteria – what we need from you.

To qualify for entry to the project you will meet the following criteria.

1. You will be between the ages of 17 and 21 years.
2. You will hold a valid provisional licence for a motor car on or before the date of application.
3. Once you have passed your test you will have access to a vehicle so that you are able to continue driving regularly.
4. You will not participate any other type of driver training in the first year after you have passed the driving test.
5. At the time the application is made to the project the applicant will have received no more than two professional driving lessons.

Confidentiality

All the information obtained and recorded in this study will be analysed but any resulting publications will ensure complete confidentiality. You as an individual will not be identifiable. The research data files may be opened for you if you wish.

Your commitment and incentives

If you are accepted to participate in this study you will receive driving lessons from a qualified driving instructor registered with the Driving Standards Agency. The incentives payable are dependent on group allocation and are explained below.

Acceptance.

Only a set number of places are available. If you are accepted you will be randomly allocated to one of three groups. You will be told which group you have been allocated to. If the project is oversubscribed you will be informed accordingly.

Group one.

If you are in group one you will be asked to complete four questionnaires. The first questionnaire will be completed with your application to join the project and before you commence driver training. The second questionnaire will be completed as soon as

possible after you have passed your driving test. At this point you will receive a payment of ten pounds.

Approximately twelve weeks after your driving test the third questionnaire will be sent to you for completion. A final questionnaire will be sent approximately twelve months after the date you passed your driving test. At this point, if you have fulfilled all the projects requirements, you will be paid a further fifteen pounds. The total amount payable in group one is twenty five pounds.

Each questionnaire will take approximately 30 minutes to complete. The questionnaires will be mainly asking you about your driving experiences and expectations

Group two.

If you are allocated to group two you will have the same schedule of questionnaires as group one to complete. In addition you will have to attend a classroom based pre-driver training programme that will be held locally. This will take place on one Sunday afternoon shortly after joining the project. The pre-driver training will last from 1.00 p.m. to 5.00 p.m. Two breaks will be allowed and refreshments provided. After you have attended the pre-driver training programme you will be sent a payment of twenty pounds. If the test pass, three month and twelve month post-test questionnaires are correctly completed you will be sent a further payment of thirty pounds. The total amount payable in group two is fifty pounds.

Group Three.

If you are allocated to group three you will have the same schedule of questionnaires as group one to complete (one questionnaire completed on application and one as soon as you passed your test). Within twelve weeks of passing your driving test you will have to attend a classroom based driver training programme at a local centre. The driver training will last from 1.00 p.m. to 5.00 p.m. Two breaks will be allowed and refreshments provided. After you have attended the driver training programme you will be sent a payment of twenty five pounds. Thereafter, if the three month and twelve month post-test questionnaires are correctly completed you will be sent a further payment of twenty five pounds. The total amount payable in group three is fifty pounds.

Contractual agreement.

It is anticipated that you will be involved with the project for a period of between fifteen and eighteen months.

In order to qualify for the incentive payments you will need to fully complete each item in all questionnaires and attend at the appropriate training sessions. You will be given advanced notice of the dates and venues.

Signed.....

Date

ADI's signature

Please retain this document for your information.

Joint Pupil/ADI Application Form and Agreement.

Pupil Application.

Name.....

Age.....

Date of Birth.....

Gender.....

Occupation.....

Address.....
.....
.....
.....
.....

Postcode.....

Telephone (Including STD code).....

Driver Number _____ / _____ / _____

Provisional licence valid From ____ / ____ / ____ to ____ / ____ / ____

Categories.....

Please tick as appropriate

(1) Do you hold a full driving licence for a motorcycle? Yes No

(2) Have you ever been involved in a road traffic accident as a rider or driver? If yes please give details.....
.....
.....
.....

(3) Have you received any form of driver training prior to this application?
 Yes No

(3a) If no go to question 4.

(3b) If yes please give details.....
.....
.....
.....

(4) Have you had any previous driving experience, including motorcycle use? Have you passed or attempted to pass the separate theory test? Please give details

.....

.....

.....

(5) Have you any penalty points or endorsements on your driving licence? Have you any offences or police reports pending? Have you ever been issued with a 'Conditional Offer' for payment of a fine in lieu of prosecution? Please give details.

.....

.....

.....

Declaration.

I have read and understood the Project Description Terms and Conditions supplied with this document and hereby make application.

Signed

Date

**Driving
Instructors Details**

Name

Address

.....

.....

Postcode.....

Telephone (Including STD).....

FOR OFFICE USE ONLY

Date of Approval.....

Acceptance/Non-acceptance letter sent

Progress Report Form – Driving Test Pass Notification.

ADI's Name

Address

.....

.....

.....

Postcode.....

Telephone (Including STD).....

Clients Name.....

Client's Address

.....

.....

.....

The above candidate successfully passed the driving test
on the:-

Date

Signed

Date

Please despatch immediately in the pre-paid envelope provided.