

The accident history and behaviours of new drivers who pass their first practical driving test

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The accident history and behaviours of new drivers who pass their first practical driving test.

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Executive Summary

The Cohort II study of learner and novice drivers was a major six-year study, funded by the Department for Transport, that set out to provide an up-to-date picture of how learner drivers in Great Britain undertake driver training and testing, and of their subsequent experiences as new drivers.

Every three months, from November 2001 to August 2005, a random sample of 8,000 practical test candidates was drawn by the Driving Standards Agency (DSA) from candidates in a given week (this was approximately one-third of those taking their test in that week). These candidates were sent a Learning to Drive Questionnaire (LTDQ) shortly after taking their practical test. This included questions about preparation for both the theory and practical elements of the driving test, time spent in different types of driving environment, and also some basic attitude questions.

The second element of the project was to follow the experiences of new drivers in the early part of their driving careers. Candidates who successfully passed the practical test were sent Driving Experience Questionnaires (DEQs) at intervals of six, 12, 24 and 36 months after passing the test. The DEQs collected information on driving experience, accidents, offences, as well as attitudes and self-reported behaviours. Because of the timescale of the project, not all of the cohorts received all four follow-up questionnaires. In addition, DSA provided information on theory test scores and on the DL25 forms used by examiners in the practical test for all candidates in the sample.

The findings from the Cohort II study are reported in Wells et al. (2008). The present report describes further analyses of the accidents, attitudes and self-reported behaviours of drivers who passed their practical test on the first occasion that they took it. It also examines their performance on the theory test and the practical driving test, and compares them with drivers who took more than one practical driving test.

The main findings from the study may be summarised as follows.

- Those taking the practical test for the first time were predominantly young (the majority being less than 19 years of age), and a high proportion were males.
- First-time takers took fewer theory tests than did those who had failed a previous practical, and achieved higher scores on both the multiple choice and the hazard perception components. However, their pass rate was lower than that of those taking a second, third, or fourth test
- First-time passers as a group are even younger, with nearly 50% being 17 years of age, and again with a high proportion of males. The first-time taking 17 year olds have the highest pass rate of 59%, as compared to 49% of all first-time takers.
- Male first-time passers tend to drive more miles in the first three years of driving than either females or non first-time taking males, and have a slightly higher rate of public road accidents, even after adjusting for mileage.
- Accident models for the first year of driving, once adjusted for age, experience, and mileage, showed that first-time passers had a lower accident liability than did those who took more than one test. The accident rate reduction was as much as 15% for 'active' accidents on public roads.
- Models for driving styles, driving behaviours and driving attitudes were produced such that differences between the age, sex and mileage driven in the first six months of driving could be taken into account. Some of the differences between adjusted average values for first-time passers and others were statistically significant.

- First-time passers had a higher score for a driving style that has been negatively associated with safety (decisive, experienced, confident, and fast).
- First-time passers were on average more confident about their driving abilities. They reported making fewer inexperience errors, but more violations and more aggressive violations when driving.

While some of these findings may at first sight seem to be at variance with previous studies, it is suggested that first-time passers are a sub-group with special characteristics, and that further analysis would be desirable to gain a better understanding of the complex mechanisms that are at work.

1 Introduction

1.1 Background

The Cohort II study of learner and novice drivers was a major six-year study, funded by the Department for Transport, that set out to provide an up-to-date picture of how learner drivers in Great Britain undertake driver training and testing, and of their subsequent experiences as new drivers.

Every three months, from November 2001 to August 2005, a random sample of 8,000 practical test candidates was drawn by the Driving Standards Agency (DSA) from candidates in a given week (this was approximately one-third of those taking their test in that week). These candidates were sent a Learning to Drive Questionnaire (LTDQ) shortly after taking their practical test. This included questions about preparation for both the theory and practical elements of the driving test, time spent in different types of driving environment, and also some basic attitude questions.

The second element of the project was to follow the experiences of new drivers in the early part of their driving careers. Candidates who successfully passed the practical test were sent Driving Experience Questionnaires (DEQs) at intervals of six, 12, 24 and 36 months after passing the test. The DEQs collected information on driving experience, accidents, offences, as well as attitudes and self-reported behaviours. Because of the timescale of the project, not all of the cohorts received all four follow-up questionnaires. In addition, DSA provided information on theory test scores and on the DL25 forms used by examiners in the practical test for all candidates in the sample.

The findings from the Cohort II study are reported in Wells et al. (2008). The present report describes further analyses of the accidents, attitudes and self-reported behaviours of drivers who passed their practical test on the first occasion that they took it. It also examines their performance on the theory test and the practical driving test, and compares them with drivers who took more than one practical driving test.

1.2 First-time takers – learning to drive

An interim analysis was conducted during the course of the Cohort II study that examined the learning experiences of those taking the practical test for the first time. The analysis considered whether first-time takers and passers displayed different characteristics to those who failed, and also made comparisons with those candidates who had taken more than one test.

This report extends that interim analysis by considering driver's early experiences after passing the practical test, and compares the accident liability and self-reported driving behaviours of those drivers who were first time passers and those who were not.

The interim analysis was based on data from the Learning to Drive Questionnaires for the first nine cohorts, i.e. from November 2001 to November 2003, and the main findings are summarised below:

- Over 99% of those taking the practical driving test for the first time had received some professional driving tuition. On average, first-time takers had about 38 hours of professional instruction before taking their practical driving test. The number of hours of instruction increased with age, and females had more hours of professional instruction than did males. Those who passed the first practical driving test had fewer hours of professional instruction than did those who failed.
- Two-thirds of the first-time takers had only one professional driving instructor when learning to drive; females were more likely than males to have had more than one professional instructor.

- On average, first-time takers of the practical driving test had about 18 hours of driving practice with friends or relations, and just over half of all first-time takers (55%) had practised their driving with friends or relations. Males spent on average slightly more hours practising with friends or relations than did females. Those who passed the first practical driving test were more likely to have had driving practice with friends or relations than were those who failed.
- First-time takers who passed the practical driving test had slightly more driving experience (professional tuition plus practice with friends or relations) than had those who failed (57 hours compared to 53.5 hours on average). This was made up of less instruction but more practice for passers than those who failed.
- Overall, first-time takers were actively learning to drive for about 10 months on average. This compares with an almost 13 month 'active' learning period for those taking a second practical driving test and a 15.8 month learning period before a third test was taken. Those first-time takers who did not take a break longer than six months from learning to drive reported learning to drive for about 9 months before taking their practical test. Overall, those that passed the test took slightly fewer months than those that failed (8.6 months compared to 9.7 months).
- The average self-reported mileage driven prior to taking the first practical driving test was 630 miles, though the median was 400 miles. The average was skewed by a relatively small number who reported very high mileages.
- Those taking the driving test for the first time committed slightly more driving faults on the test than did those taking a subsequent test. For first-time takers, the total number of driving faults increased with age, and there were only small differences between males and females in the number of driving faults. Those who passed their first practical driving test made, on average, 3.2 fewer driving faults than did those who failed.
- First-time takers were slightly more confident in their driving ability when learning to drive than were subsequent takers. However, subsequent takers were more confident that they would pass their practical driving test and that they were good enough to drive on the road unsupervised.
- No differences in confidence when learning to drive were found between first-time and subsequent takers who passed their practical driving test. However, those that failed their first test had lower confidence in their driving than did those who failed subsequent tests, though these differences are all quite small.

2 Sample

The analysis reported here takes into account all sixteen cohort samples, from November 2001 to August 2005 inclusive. Overall, about 33% of those sent the Learning to Drive Questionnaire (LTDQ) returned it. This response rate was achieved after a single reminder was sent to people who had not replied three weeks after the original mailing. This gave a base of 42,851 respondents from all cohorts. Of these, 18,519 stated that the driving test they had recently taken was their first. This represents 46% of valid responses after taking account of those who did not provide information about the number of practical driving tests taken. Most of the following analyses have been conducted on the 18,519 respondents who took their driving test for the first time. However, while the focus of this report is on first-time takers of the practical driving test, it is also important to make comparisons between these people and those who have taken more than one driving test.

Table 2.1 shows the distribution of the number of practical driving tests that respondents had taken. It shows that a higher proportion of male than female respondents were taking their test for the first time, and higher proportions of female than male respondents were taking the practical driving test for the second, third, fourth or more times.

Table 2.1: Number of practical driving tests taken

No. of practical driving tests taken	Females %	Males %	Total %
One	43.3	50.9	46.1
Two	26.3	25.6	26.0
Three	14.9	12.6	14.0
Four	8.0	5.8	7.2
Four +	7.5	5.1	6.6
BASE	25395	14782	40177

The mean age of the respondents, by sex and number of practical driving tests taken, is shown in Table 2.2. Male respondents were, on average, younger than female respondents. This was true overall and within each 'number of tests' group.

Table 2.2: Mean age of respondents by sex and number of practical driving tests taken

No. of practical driving tests taken	Females years	Males years	Total
One	22.6	21.0	21.9
Two	24.0	22.3	23.4
Three	25.6	23.5	24.9
Four	27.3	24.6	26.5
Four +	29.9	27.1	29.1
Total	24.3	22.2	23.5

Table 2.3 examines the age distribution of first-time test takers, and it can be seen that just over 46% of males and 32% of females were aged 17 years. In total, 56% of first-time takers were aged 18 or under, and 38% were 17 years old. In comparison, 36% of those taking a subsequent practical driving test were aged 18 or under, and 18% were aged 17 (see Table 2.4).

Table 2.3: Age and sex of first-time takers of the practical driving test

Age	Females %	Males %	Total %	Cumulative %
17	32.4	46.4	38.1	38.1
18	18.8	16.6	17.9	56.0
19	8.1	6.7	7.5	63.6
20	5.2	3.6	4.6	68.1
21-24	13.1	10.4	12.0	80.1
25-34	13.8	11.3	12.8	92.9
35-44	5.5	3.8	4.8	97.7
45-54	2.1	1.0	1.6	99.4
55+	0.8	0.3	0.6	100.0
BASE	10993	7510	18503	

Table 2.4: Age and sex of those taking a subsequent driving test

Age	Females %	Males %	Total %	Cumulative %
17	13.9	25.5	17.8	17.8
18	17.9	20.1	18.6	36.4
19	9.2	8.5	9.0	45.4
20	6.4	5.1	5.9	51.3
21-24	16.6	12.8	15.3	66.6
25-34	20.0	17.8	19.3	85.9
35-44	10.1	7.4	9.2	95.1
45-54	4.0	2.1	3.4	98.5
55+	2.0	0.6	1.5	100.0
BASE	14401	7251	21652	

The findings that respondents' age increased with the number of practical driving test taken is not surprising. However, this does have implications for comparisons of first-time and subsequent takers in that differences between them could be confounded by age.

3 Performance on the practical driving test

Table 2.1 showed that 51% of male respondents to the LTDQ were taking their practical driving test for the first time, compared with 43% of females, thus indicating that females have a higher first-time failure rate than males. Figure 3.1 shows that in all age groups male respondents to the LTDQ who took the practical driving test for the first time had a higher pass rate than did female respondents. Overall, 54% of males passed their first practical driving test compared with 44% of females. Figure 3.1 also shows that for both males and females, the first-time pass rate tended to decrease with age. Respondents aged 17 years old had the highest first-time pass rate (59%), much higher than the average pass rate for first-time takers (49%). These age effects were almost identical for those respondents taking a second or subsequent practical driving test. However, as shown in Table 3.1 the pass rate for the first test was slightly lower than that for second, third or fourth tests. In fact, only those respondents who had taken more than four driving tests had a lower pass rate than did the first-time takers.

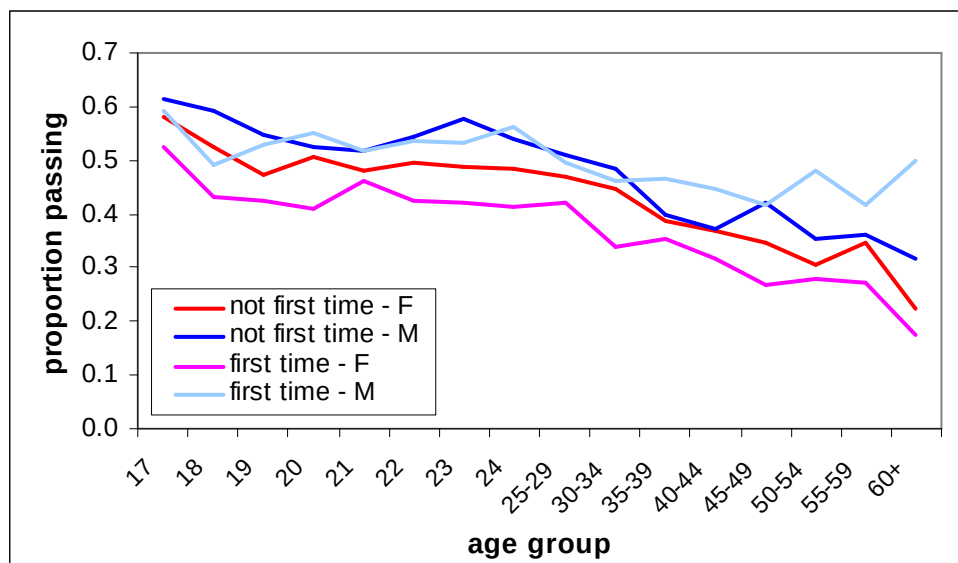


Figure 3.1: First-time v subsequent pass rates

Table 3.1: Pass rate by number of practical driving tests taken

No. of practical driving tests taken	Pass %	Pass %	Pass %
	Females	Males	
One	44.4	54.5	48.5
Two	48.2	55.1	50.7
Three	47.5	56.5	50.5
Four	51.3	54.5	52.2
More than four	44.9	47.9	45.8
All	46.5	54.6	49.4
Base	25395	14782	40177

Figure 3.2 indicates that a very high proportion of first-time passers were aged 17 years when they passed their practical driving test.

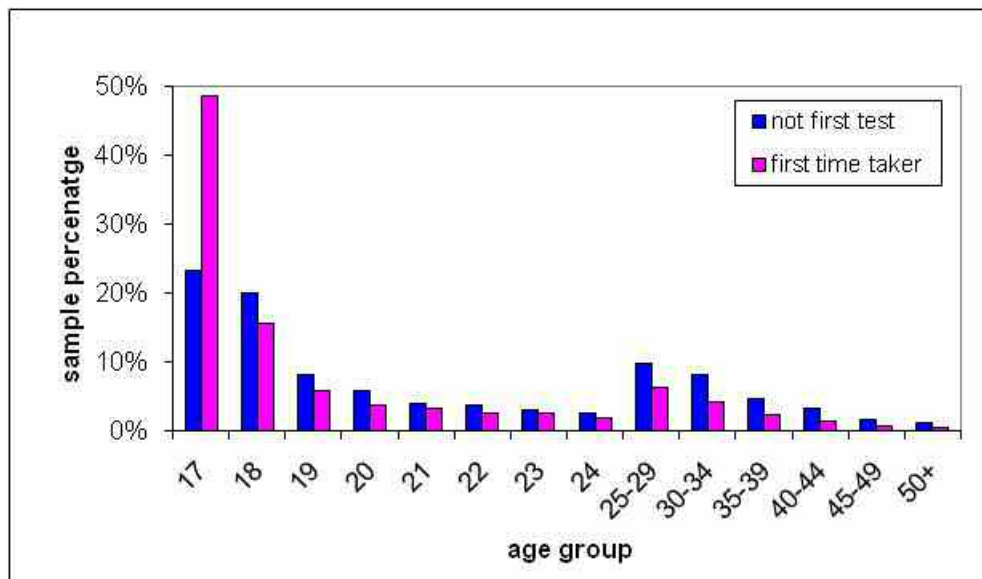


Figure 3.2: Distribution by age group for first- time and subsequent passers

4 The theory test

The theory test must have been passed before a driver can apply to take the practical driving test. Thus all the respondents to the LTDQ will have passed their theory test, though it may have taken them more than one attempt. In terms of the mean number of theory tests taken, there was a difference between respondents who passed the first practical driving test (mean = 1.38) and those who failed (mean = 1.44). Figure 4.1 shows how the number of theory tests taken by respondents taking the practical driving test for the first time varied with sex and age. It can be seen that males tended to take more theory tests than did females. Overall for those taking their first practical test, males took, on average, 1.38 theory tests compared with 1.32 theory tests for females. There was also an age effect; Figure 4.1 shows that the number of theory tests taken increased with age up to about age 20 and then showed a general decline.

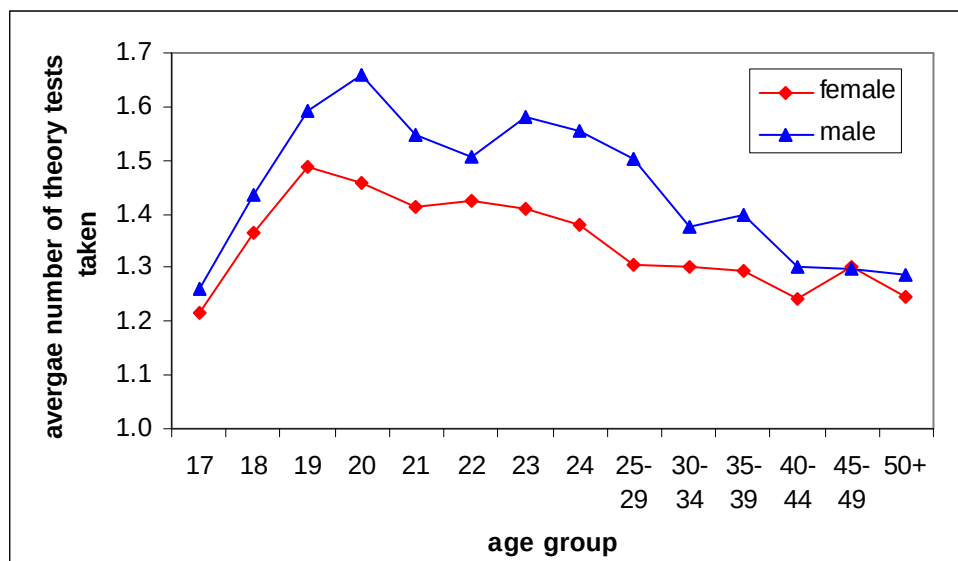


Figure 4.1: Number of theory tests taken by first-time takers of the practical driving test, by age and sex

Table 4.1 shows that 77% of respondents taking their driving test for the first time had passed their theory test at the first attempt. It also shows that those taking the practical driving test for the first time took, on average, 1.34 theory tests. This number steadily increased with the number of practical tests taken, meaning that respondents who failed the practical driving test more often also failed the theory test more often (it should be noted that the theory test certificate is only valid for 24 months from the date of the test, so some of the multiple theory tests will have occurred for this reason, rather than because a theory test was failed).

Table 4.1: Number of theory tests taken by number of practical driving tests taken

No. of theory tests taken	No of practical driving tests taken				
	One %	Two %	Three %	Four or more %	Total %
1	77	73	70	59	73
2	16	19	22	28	19
3	5	5	6	9	6
4	1	1	1	3	2
5+	1	1	1	2	1
BASE	18369	10367	5589	5478	39803
Average number of theory tests taken	1.34	1.39	1.45	1.63	1.41

The theory test consists of two parts: a multiple choice component, and a hazard perception component that was introduced in November 2002. Virtually all drivers in the November 2002 cohort will only have taken the multiple choice part of the theory test, but the fact that drivers have only 24 months in which to take their practical driving test once they have passed their theory test means that those in the last four cohorts should all have also taken the hazard perception part. The average theory test scores for first-time and subsequent takers of the practical test are shown for cohorts F to P (i.e. February 2003 to August 2005) in Figure 4.2 for the multiple choice component and Figure 4.3 for the hazard perception component of the test.

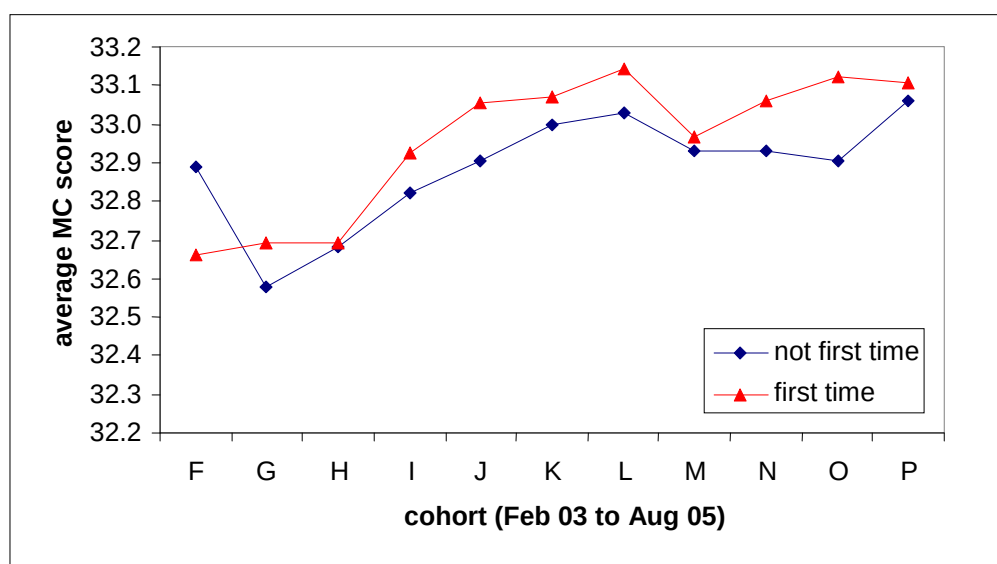


Figure 4.2: Average multiple choice theory test score by cohort and practical test status

First-time takers of the practical driving test generally achieved a slightly higher multiple choice test score than those drivers who failed at least one previous practical test, with a small general upward trend of test scores in the later cohorts.

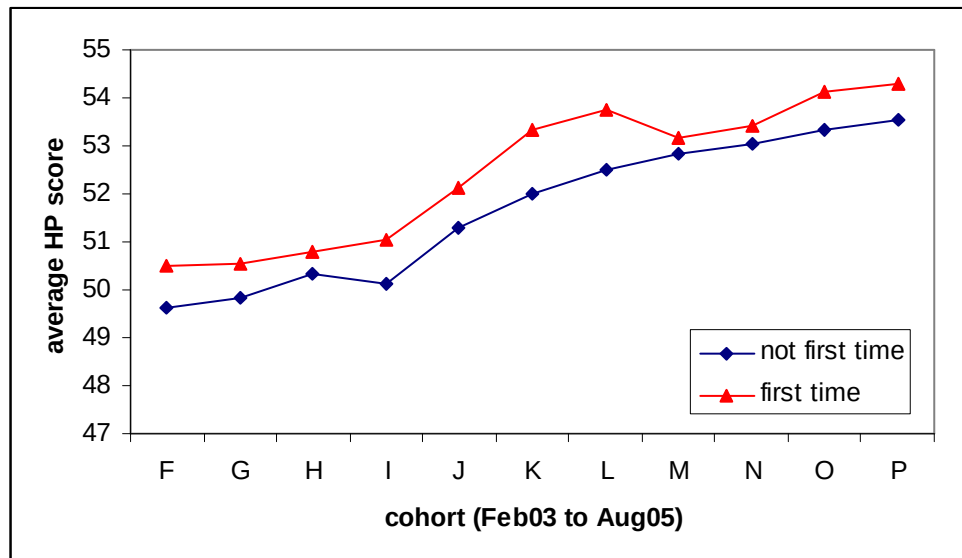


Figure 4.3: Average hazard perception test score by cohort and practical test status

Those who took their practical driving test for the first time generally achieved a higher hazard perception test score than those drivers who failed at least one practical test. As with the multiple choice test, there was a small general upward trend in test scores in the later cohorts.

5 Accidents

Drivers in the cohort study who passed their practical driving test were sent a Driving Experience Questionnaire (DEQ) after six months, 12 months, 24 months and 36 months of driving. The implication of this is that all first-time takers who were followed up in the study were, by definition, first-time passers as well.

The DEQ asked respondents about their experiences during the most recent period of driving, either six months or 12 months. The requested data included miles driven, frequency of driving, and information about any accident in which they may have been involved. The data from the first two DEQs were based on only six months of driving, so in order to compare results on an annual basis the data from these two DEQs was doubled where appropriate.

Figure 5.1 shows annualised mileage by sex, driving period over the duration of the study, and test-taking status, i.e. whether the respondent had passed their first test, or had only passed a subsequent test. It can be seen from the figure that annualised mileage tends to increase over time. This is particularly noticeable for males and for those who passed their test the first time. Interestingly, females who are not first-time passers do not seem to increase their average annual mileage very much between their first six months and their second year of driving.

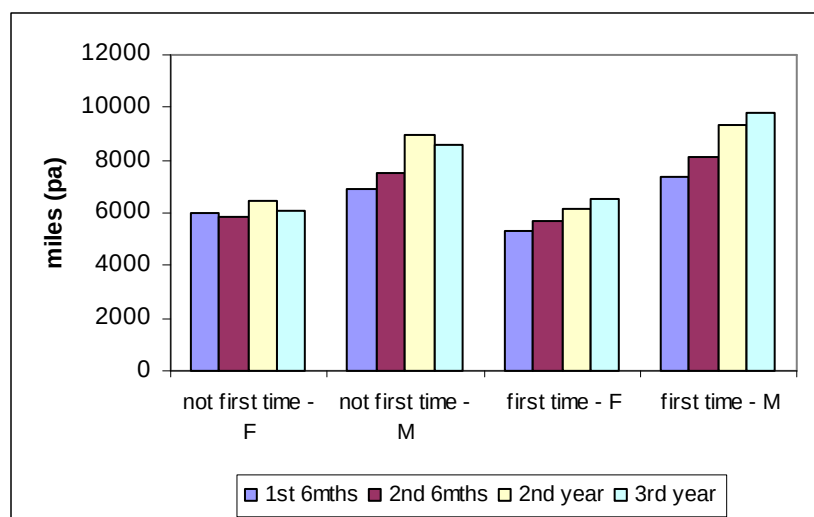


Figure 5.1: Annualised mileage by driving period, sex, and test-taking status

In each DEQ, drivers were asked: ‘How many accidents were you actually involved in when driving a car or van in the last six months (or 12 months)?’ The questionnaire specifically asked drivers to include all accidents regardless of how they were caused, and regardless of how slight they were or where they happened. Further questions enabled various categories of accident to be identified. The present analysis looks first at ‘public road accidents’, which excludes those that happened in a car park, or on a private road or drive.

The average number of public road accidents is shown in Figure 5.2 for different driving periods, sex and test-taking status. It indicates that there is a higher annualised accident rate during the first six months of driving, regardless of which group drivers belong to. The figure also shows that generally, males in their first six months of driving have a higher accident rate than females.

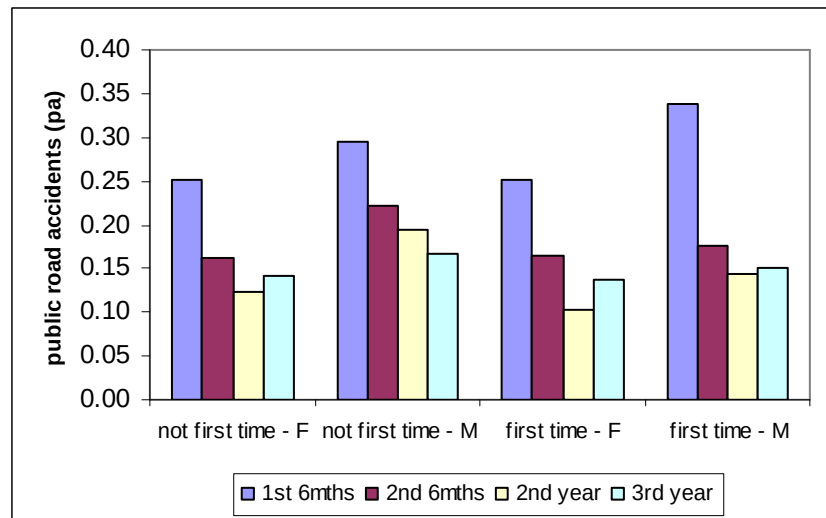


Figure 5.2: Annualised public road accidents by driving period, sex, and test-taking status

Mileage is a measure of exposure, in that the higher the mileage the greater the likelihood of becoming accident involved. To take this into account, an accident rate adjusted by the average miles driven raised to the power of 0.4 was computed. This value was used because studies of accident liability over many years have shown that the relationship between mileage and accidents is not a simple linear one (see, for example, Maycock et al., 1991), and that the power of 0.4 fits many datasets. The adjusted values are shown in Figure 5.3.

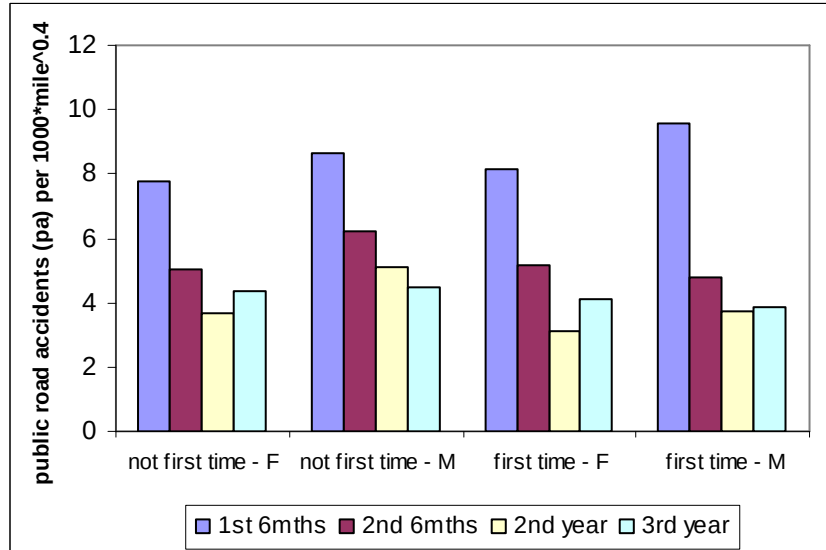


Figure 5.3: Public road accidents adjusted for average mileage by driving period, sex, and test-taking status

6 Accident modelling

The relationship between accidents, mileage and first-time takers has been investigated using generalised linear models. This approach takes into account the distributional function of accidents and generates a predictive model which includes factors such as the reporting period length, the experience of the driver (in years), a measure of exposure, and the age of the driver.

This section describes statistical models that allow the effects on accidents of age, sex, experience, and exposure to risk to be established. The models (the 'base models') are then used to control for the effects of these variable while investigating the relation between accidents and whether drivers had passed their first practical driving test or not – the 'first-time taker' effect.

For this purpose public road accidents and 'active' public road accidents will mainly be used in the analyses. Public road accidents are clearly the accidents of central interest to DfT policy, and the 'active' subset of these – i.e. accidents in which the driver's vehicle took the most active role, rather than simply being hit by another vehicle - are considered to be the ones most likely to be influenced by the processes of learning to drive.

6.1 The modelling method

The modelling reported uses a multivariate regression method known as Generalised Linear Modelling (GLM). Multivariate regression is designed to explore the relationship between a 'dependent' or 'response' variable (the y-variable) and any number of 'independent' or 'explanatory' variables (the x-variables) upon which the y-variable is assumed to depend, and which are correlated with one another to varying degrees. In the present analysis the y-variable to be modelled is the predicted annualised accident rate in a given period – i.e. predicted number of accidents in the period divided by the duration of the period in years or fractions of a year.

The choice of the model form and the choice of the variables included were based on the work carried out in the Cohort I study. The modelling process involved:

- (i) establishing, statistically, the extent to which drivers' accidents are related to age, sex, experience, and exposure – this results in a 'base' model, and
- (ii) determining the influence of passing the practical driving test the first time on drivers' accident liability

6.2 The model variables and form

6.2.1 The general form of the accident model

The form of the model used is:

$$\log_e(\text{ACCR}) = \text{intercept} + b_1 \cdot \log_e(\text{exposure}) + b_2 \cdot \text{sex} + b_3 / \text{AGE} + b_4 \cdot \text{experience} + b_5 \cdot \text{sex} / \text{AGE} + c_n \cdot V_n \dots (1)$$

which is equivalent to:

$$\text{ACCR} = \exp(\text{intercept}) \cdot \text{exposure}^{b_1} \cdot \exp \{ b_2 \cdot \text{sex} + b_3 / \text{AGE} + b_4 \cdot \text{experience} + b_5 \cdot \text{sex} / \text{AGE} + c_n \cdot V_n \} \dots (2)$$

where:

ACCR is the predicted annualised accident rate in the reporting period as estimated by the model – that is, the predicted number of accidents in the survey reporting period being analysed, divided by the duration of the period in years or fractions of a year. ACCR is also known as accident liability. For most of the modelling work ACCR was based on either public road accidents (PRACCR) or active public road accidents (ACACCR)

$\log_e(\text{ACC}/\text{period})$ is the natural logarithm of accidents per year – this in effect, is the dependent variable used in the modelling process.

exposure is the annualised number of miles driven + 10 times the annualised number of days on which the driver has driven. This composite measure of driving exposure proved to provide the best statistical explanation of the variation in the data. The natural logarithm of exposure is used in the model.

AGE is the respondent's age when he or she passed the test. Based on previous work, the model uses $1/\text{AGE}$ as the most appropriate functional form for this term.

V_n is the variable of interest (first-time passer or not) that is added to the 'base' model in order to determine the strength of its association with accidents.

experience is the average number of years driving since passing, i.e. 0.25 for the first six month period

sex is the sex of the driver, where sex=0 if female and sex=1 if male

first is an indicator if the period is the first 6 months of driving, ('first'=1 if the period is the first 6-months of driving, otherwise=0; it is used in models considering all four DEQ reporting periods)

b_n are parameter coefficients estimated by the modelling process. c_n is the parameter coefficient estimated by the modelling process when the additional variable is added to the 'base' model. The size and statistical significance of the coefficient is a measure of the influence of the added variable.

Equation 1, but without the $c_n V_n$ term, is the 'base' accident model fitted to the various accident data sets.

1.3 Modelling accidents

6.3.1 Base models

The 'public road accidents' base model and 'active public road accident' base model for the first year of driving (i.e. DEQ1 and DEQ2 data combined) are as follows:

$$\text{PRACCR} = \exp(-5.63) \cdot (\text{exposure})^{0.428} \exp\{(14.72/\text{AGE}) - 0.56 \cdot \text{sex} - 0.929 \cdot \text{experience} + 12.67 \cdot \text{sex}/\text{AGE}\} \dots \quad (3)$$

$$\text{ACACCR} = \exp(-6.34) \cdot (\text{exposure})^{0.423} \exp\{(18.58/\text{AGE}) - 0.86 \cdot \text{sex} - 1.040 \cdot \text{experience} + 18.46 \cdot \text{sex}/\text{AGE}\} \dots \quad (4)$$

The all periods base models based on the first three years of driving (DEQs1, 2, 3 and 4) for 'public road accidents' and 'active public road accidents' are very similar:

$$\text{PRACCR} = \exp(-5.89) \cdot (\text{exposure})^{0.414} \exp\{(8.95/\text{AGE}) - 0.33 \cdot \text{sex} - 0.206 \cdot \text{experience} + 8.60 \cdot \text{sex}/\text{AGE} + 5.00 \cdot \text{first}/\text{AGE}\} \dots \quad (5)$$

$$\text{ACACCR} = \exp(-6.55) \cdot (\text{exposure})^{0.409} \exp\{(11.70/\text{AGE}) - 0.65 \cdot \text{sex} - 0.217 \cdot \text{experience} + 16.47 \cdot \text{sex}/\text{AGE} + 5.81 \cdot \text{first}/\text{AGE}\} \dots \quad (6)$$

The models for the first year and for the first three years of driving show that:

- Exposure statistically significantly influences accident liability but not in a linear fashion – a finding that is familiar from previous TRL research
- The age at which people passed the test had a statistically significant effect on accident liability
- The duration of driving experience since passing the test had a statistically significant effect on accident liability; there is also an interaction effect in the first period of driving with the age of driver
- The sex of the driver has an overall effect on the accident liability which varies by the age of the driver

The main difference between the first year of driving model and the three years of driving model is in the size of the experience parameter (comparing equation (3) with (5) and equation (4) with (6)), i.e. the experience effect is much stronger during the first year of driving than in subsequent years. Figure 5.3 in the previous section indicated that the major difference in annualised accident rate was in the first six months where it was somewhat larger, even after adjusting for exposure. This is not surprising because most new drivers in their first six months of driving are still ‘learning’, even though they have reached a sufficiently competent level of driving to gain a full licence. Because of the importance of early experience the following analysis focuses on just the first year of driving, i.e. using data from DEQ1 and DEQ2 with base models as given in equations (3) and (4).

The base models (3) and (4) were extended to include a factor for first-time passers. The parameters for first-time passers are shown in Table 6.1 (coded as 1 for first-time passers and zero for subsequent passers). The associated probability that the parameter is zero is also given, and shows that this factor contributed significantly to the model. Further, the parameter values are both negative, which indicates that, after adjusting for the effects of sex, age, experience and exposure, those drivers who pass the their first practical driving test tend to have, on average, a lower accident liability in their first year of driving than those who take more than one test.

Table 6.1: First-time taker parameter estimates for models of first year accident probability

Type of accident	First-time taker factor		
	parameter	standard error	probability that parameter is zero
Public road	-0.116	0.051	<0.05
‘Active’ public road	-0.162	0.069	<0.05

Table 6.2 shows the estimated probability of being accident-involved in the first year of driving for those drivers aged 20 years when passing, who drive 10,000 miles per year and have six months of driving experience since passing their driving test. The accident probabilities are calculated for those who passed their first test and those who did not. First-time passers had a reduced probability of accident involvement, with the greatest effect for both males and females being on ‘active’ public road accidents.

Table 6.2: Estimated probability of accident involvement in first year of driving by test-taking status

Type of accident	Estimated accident probability for drivers doing 10,000miles pa, aged 20yrs with six months of driving experience		
	not first-time taker	first -time taker	reduction
Females - Public road	0.202	0.180	11%
Females - 'Active' public road	0.108	0.092	15%
Males - Public road	0.216	0.193	11%
Males - 'Active' public road	0.116	0.099	15%

Figures 6.1 and 6.2 show the relationship, for female and male drivers respectively, between estimated probability of accident involvement (for pracc=public road accidents and for acacc= 'active' public road accidents), and age of passing the practical test. These curves were computed for drivers who are in their second six months of driving and drive 10,000 miles per year, and for those who were first-time passers and those who were not. The figure clearly shows that the estimated accident probability drops as test passing age increases. It also shows that first-time passers have a lower accident probability than those who took more than one practical driving test.

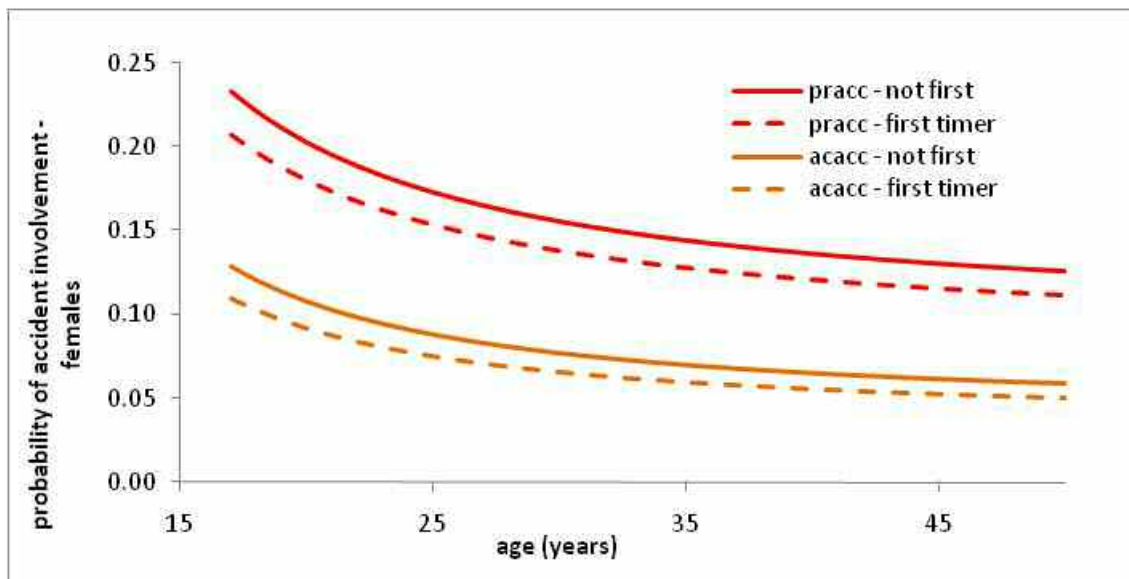


Figure 6.1: Estimated first-year accident involvement for people driving 10,000 miles pa and with six months of driving experience (female drivers)

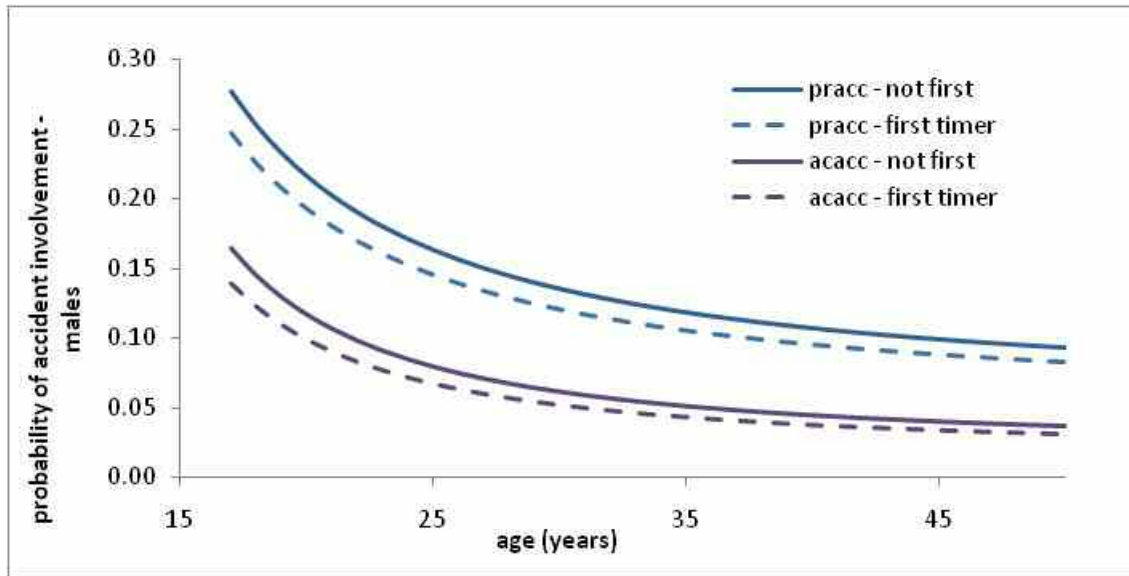


Figure 6.2: Estimated first-year accident involvement for people driving 10,000 miles pa and with six months of driving experience (male drivers)

The models show that when age of driver, experience and miles driven are taken into account those who pass their practical test on the first time of taking tend to be safer drivers. Possible reasons for this effect may lie in the behaviours of the drivers concerned, and this is explored in the next section.

7 Behavioural measures

7.1 Introduction

This section examines the self-reported assessments and behaviours of new drivers in their first six months of driving. The analyses to be reported in this section are of data from the first Driving Experience Questionnaires (DEQ1), and break down the responses to questions about behavioural measures by sex and by test status, i.e. first-time passer with or subsequent test passer.

7.2 Comparison of own and others' driving

After six months of driving, respondents were asked to compare different aspects of their driving with that of other drivers of their own age and sex. The results are summarised in Table 7.1.

It can be seen that very few new drivers rate themselves as being 'worse' than their peers in terms of being more likely to be accident-involved, less cautious, and less likely to avoid risky situations, but rather more were prepared to rate themselves as less skilled and as faster drivers than others.

Compared with those respondents who did not pass their first practical test, more first-time passers (especially males) believed that they were less likely to be accident-involved, were more skilled, and were faster drivers than their peers. Differences between males and females tended to be greater than those between first-time takers and others.

Table 7.1: Comparisons of own and others' driving, by sex and test status

		Female		Male	
		First-time passer		First-time passer	
		No %	Yes %	No %	Yes %
How likely are you to be involved in an accident?	More likely than others	5	4	5	3
	As likely as others	69	67	54	52
	Less likely than others	27	29	42	45
	Total	100	100	100	100
	BASE	3556	2643	1652	1811
How skilled a driver are you?	More skilled than others	7	11	20	29
	As skilled as others	76	77	73	65
	Less skilled than others	17	12	7	6
	Total	100	100	100	100
	BASE	3558	2646	1666	1814
How cautious a driver are you?	More cautious than others	48	43	38	35
	As cautious as others	50	55	59	61
	Less cautious than others	2	2	4	4
	Total	100	100	100	100
	BASE	3560	2646	1664	1816
How likely are you to avoid risky driving situations?	More likely than others	46	41	38	38
	As likely as others	49	54	55	54
	Less likely than others	5	5	7	8
	Total	100	100	100	100
	BASE	3562	2649	1660	1809
How fast do you drive?	A little faster than others	6	10	17	20
	About the same speed as others	68	69	62	64
	A little slower than others	25	21	21	15
	Much slower than others	1	0	0	1
	Total	100	100	100	100
	BASE	3544	2639	1659	1813

In addition to asking about how they felt they compared with their peers, respondents to the DEQ were asked how they considered that their driving compared with that of drivers in general. The results are shown in Table 7.2.

Table 7.2: Comparisons with drivers in general, by sex and test status

		Female		Male	
		First-time passer		First-time passer	
		No %	Yes %	No %	Yes %
How do you compare your driving with other drivers generally?	Much better than average	4	4	10	11
	A bit better than average	31	36	45	49
	About average	60	56	42	37
	A bit worse than average	5	4	3	2
	Much worse than average	0	0	0	0
	Total	100	100	100	100
	BASE	3577	2651	1669	1817

The table shows a similar pattern to the previous one, with males having a much higher opinion of their relative ability than do females, and a smaller effect in the same direction for first-time takers.

7.3 Confidence

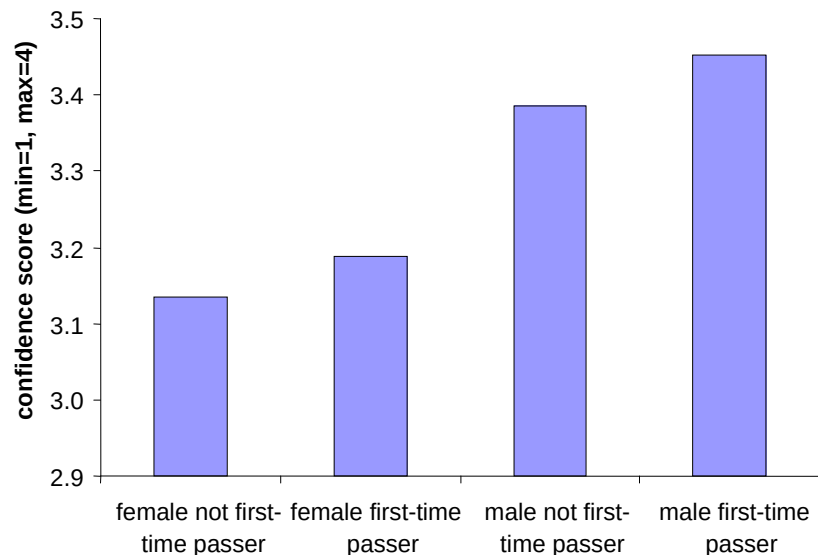
Respondents were asked to rate whether they felt very confident, fairly confident, not very confident, or not at all confident in their driving ability. The results are shown in Table 7.3 below.

Table 7.3: Confidence in driving ability, by sex and test status

How much confidence	Female		Male	
	First-time passer		First-time passer	
	No %	Yes %	No %	Yes %
Very confident	22	25	41	47
Confident	70	69	56	52
Not very confident	8	6	3	1
Not at all confident	0	0	0	0
Total	100	100	100	100
BASE	3576	2652	1669	1818

The table shows clearly that there were very few respondents who reported they were not confident in their driving ability, with nearly all of the new drivers saying that they felt confident or very confident. There are also differences between first-time passers

and non first-time passers, with the former being more confident. This is best illustrated by scoring the responses of 'very confident', 'fairly confident', 'not very confident', or 'not at all confident' as 4, 3, 2, and 1 respectively to give mean confidence scores, as shown in 7.1 below.



Note: Higher mean scores = greater confidence in driving ability

Figure 7.1: Confidence scores by sex and test status

7.2 shows that first-time passers who were aged less than 25 years when they passed their test tended to be slightly more confident than those who took more than one practical driving test. However, the differences between first-time and subsequent passers are very small, and only statistically significant for 18 to 24 year old males.

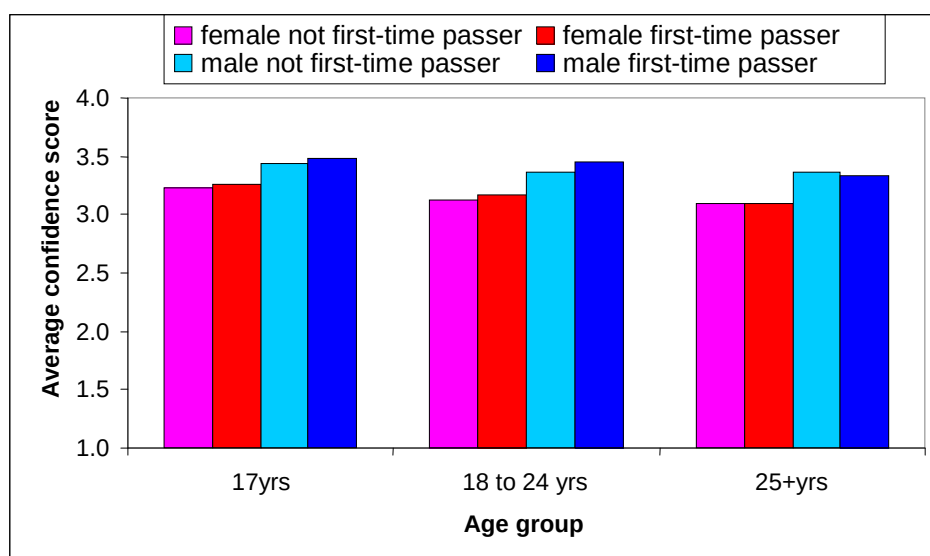


Figure 7.2: Confidence in driving ability by age group, sex and test status

7.4 Self-reported driving style

On five occasions during the course of the Cohort II study, respondents were asked to describe 'what kind of driver' they thought they were by ticking one of seven points on 12 bipolar scales, such as 'Attentive – Inattentive' and 'Patient – Impatient'. These scales are a subset of those originally proposed by Guppy et al. (1990) for use as a measure of driver style, and are usually referred to as the 'Guppy scales'. Factor analysis of these scales has consistently produced three factors that have been found to be related to accident liability in varying degrees in a number of studies (e.g. Maycock and Forsyth, 1997; Quimby et al., 1999).

The factors are shown below in Table 7.4.

Table 7.4: Driving style scales

Factor 1	Factor 2	Factor 3
Inattentive/Attentive	Irritable/Placid	Indecisive/Decisive
Careless/Careful	Impatient/Patient	Inexperienced/Experienced
Irresponsible/Responsible	Selfish/Considerate	Nervous/Confident
Risky/Safe	Intolerant/Tolerant	Slow/Fast

A high score on the scales in Factor 1 indicates a self-reported driving style that is more 'attentive, careful, responsible, and safe'. A high score on Factor 2 indicates a style that is more 'placid, patient, considerate, and tolerant', while a high score on Factor 3 indicates a more 'decisive, experienced, confident, and fast' style. The mean scores for these scales after six months of driving are shown in 7.3 below for first-time passers and subsequent passers and for males and females.

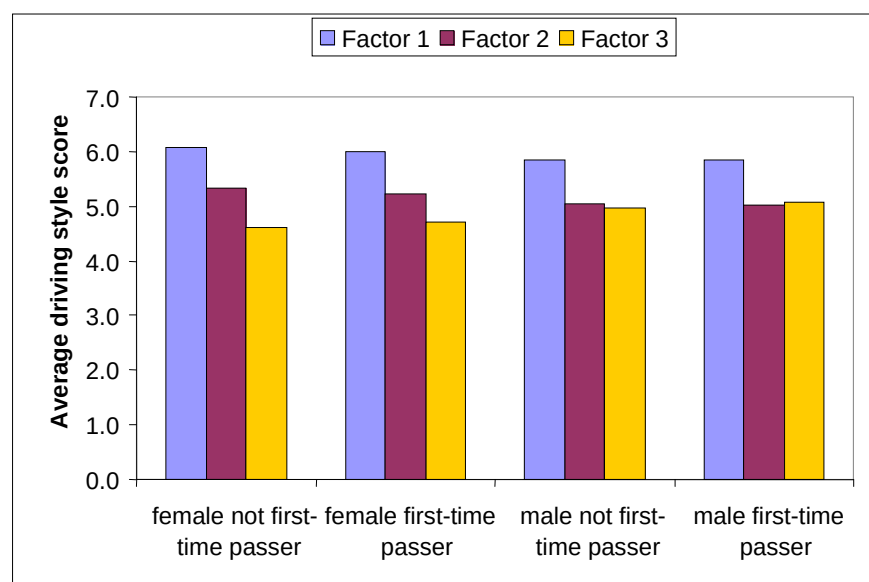


Figure 7.3: Self-reported driving style by sex and test status

First-time passers (female and male) had statistically significantly, albeit slightly, higher scores than subsequent passers on factor three. First-time passing female drivers had statistically significantly lower scores than non first-time passers on factors one and two though again the differences were small. Males had a slightly higher score on Factor 3

than females, but a lower score on Factor 2, i.e. males tend to regard themselves as more 'decisive experienced, confident and fast' than females, whereas females tend to regard themselves as more 'placid, patient, considerate, and tolerant' than males.

7.5 Self-reported driving behaviours

Information about self-reported driving behaviour was collected in the DEQ questionnaires using a version of the Driver Behaviour Questionnaire (DBQ) using a 34-item scale derived from work by Åberg and Rimmö (1998), and which seemed particularly appropriate as it had been developed for use with new drivers. Respondents were asked how often they carried out each of 34 specified behaviours, and the answers were scored 'never' = 1, 'hardly ever' = 2, 'occasionally' = 3, 'quite often' = 4, 'frequently' = 5, and 'nearly all the time' = 6. This version of the DBQ measured the frequency with which respondents carried out five types of behaviour: slips, errors, inexperience errors, violations, and aggressive violations.

The figures that follow illustrate the mean scores of these five behaviours after six months of driving by age group (where age is the age at which the practical test was passed), sex, and test status, i.e. first-time passer or subsequent passers.

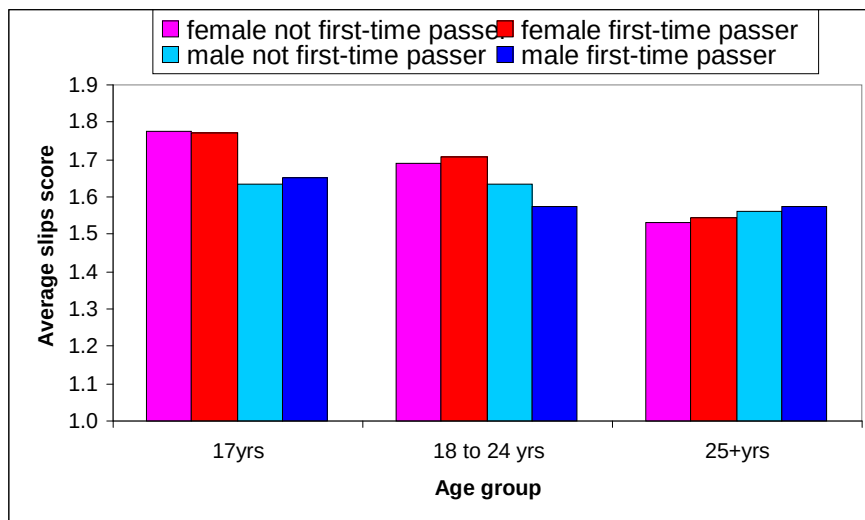


Figure 7.4: DBQ slips by age group, sex and test status

Slips were reported more by the younger age group than by the older, and in general more by females than by males. Overall, however, there was no consistent pattern of differences in the number of reported slips among the age, sex and test status groups. There was a statistically significant difference for 18 to 24 year old males between first-time and non first-time passers.

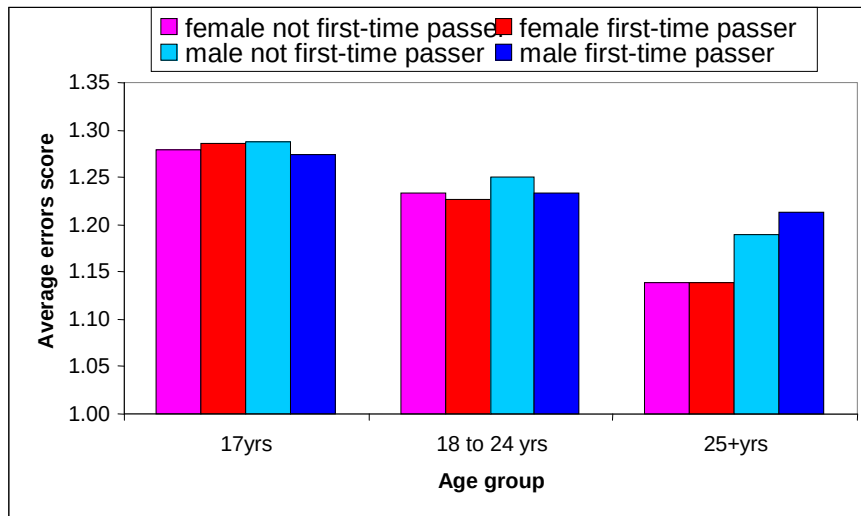


Figure 7.5: DBQ errors by age group, sex and test status

There was a reduction in reported errors as age increased, and males generally reported committing more errors than did females. There was no consistent test status effect.

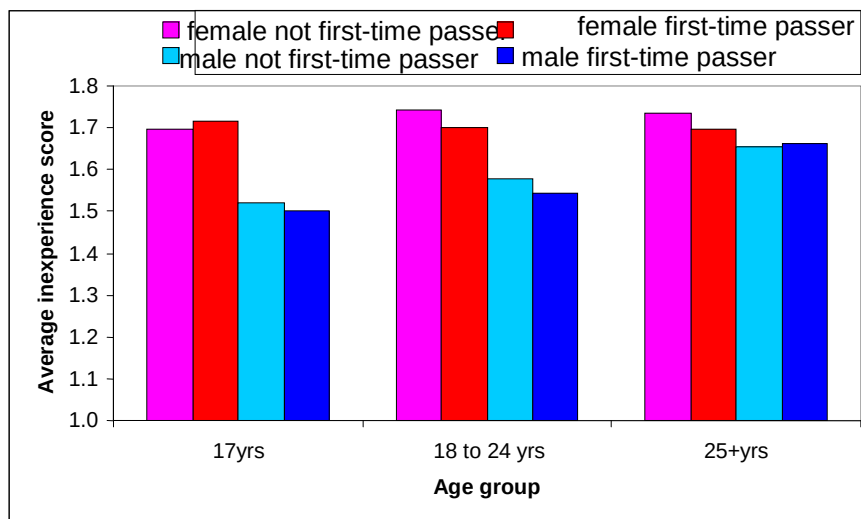


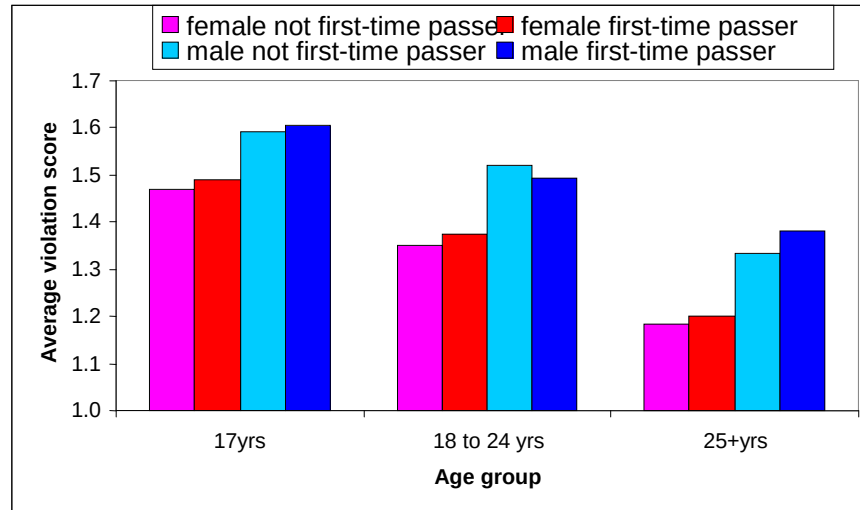
Figure 7.6: DBQ inexperience errors by age group, sex and test status

Åberg and Rimmö (1998) have suggested that in studies of new drivers, the category of 'errors' as used by Reason et al. (1990) can be described better by using the two sub-groups of 'driving errors', and 'inexperience errors', the distinction being that the former derive from more stable aspects of cognition, while the latter are more transient and are related to the amount (or more specifically, the lack) of experience that the driver has gained.

The frequency of reported inexperience errors (Figure 7.6) is lower for males than for females, especially for the younger age groups. Older female drivers who passed their test the first-time reported committing slightly fewer inexperience errors than those who

took more than one test (statistically significant for 18 to 24 year old females), whereas younger male drivers who passed their first test reported slightly fewer inexperience errors than those who took more than one test.

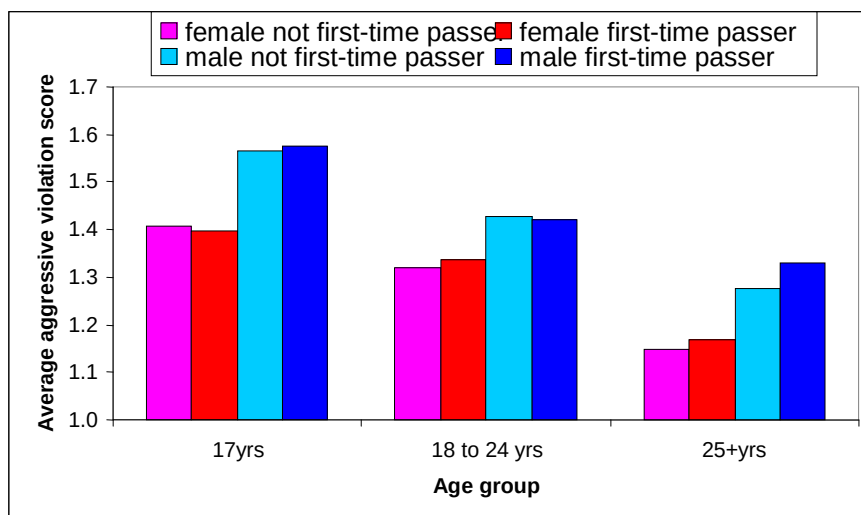
Figure 7.7: DBQ violations by age group, sex and test status



According to Reason et al., (1990), violations differ from slips and errors in that they have a motivational base and are ‘actions of choice’, rather than resulting from some form of cognitive failure. They have also been shown to be positively associated with accident liability in a number of studies.

It can be seen from Figure 7.7 that the frequency of reported violations decreased with age, and that males in all age groups reported more violations than did females. Although female report fewer violations, the first-time passer females consistently reported slightly more violations than those who took more than one driving test.

Figure 7.8: DBQ aggressive violations by age group, sex and test status



The category of aggressive violations was introduced by Parker et al. (1995). They held that, while all violations could be seen as being motivated by a need to make progress, aggressive violations also had a social component. Thus, ‘Cross a junction knowing that

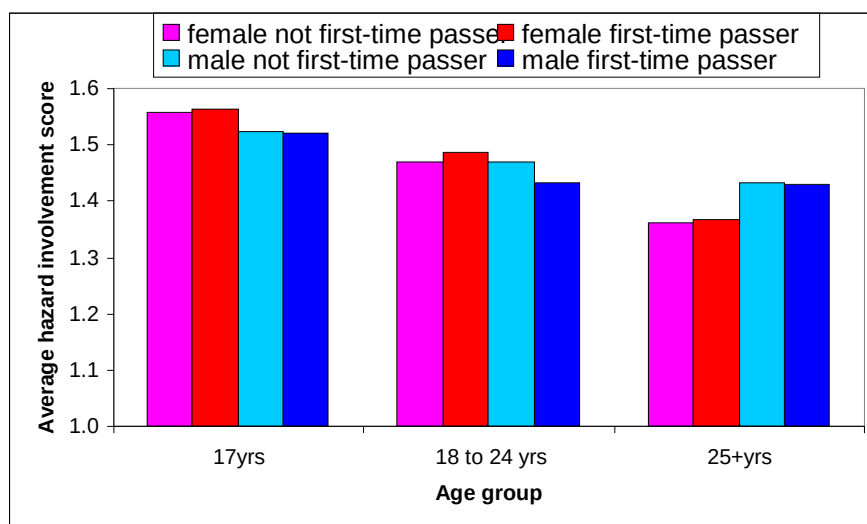
the traffic lights had turned' is a violation, while 'Race away from traffic lights with the intention of beating other drivers' is regarded as an aggressive violation.

Figure 7.8 shows a very similar pattern to that shown in the preceding figure. Aggressive violations decrease with age and reported by males than females. There are only very small differences between first-time and subsequent passers, the main exception being for the 25 year plus age group where the first-time passers report making more aggressive violations.

7.6 Hazard involvement

A further measure of self-reported driving behaviour data was collected in the DEQ questionnaires using the seven-item hazard involvement scale developed by Quimby et al. (1999). The instrument was designed to measure the frequency with which drivers become involved in hazardous situations through a lack of awareness on a six-point scale ranging from 'never' to 'nearly all the time'. The higher the score, the more often drivers report being involved in potentially hazardous situations.

Figure 7.9: Hazard involvement scores by age group, sex and test status



Overall, respondents reported being involved in hazardous situations only infrequently when driving, but the scores were greater for the younger than for the older age group. Within sex and age group, there was little difference in average scores between those who were first-time passers and those who were not.

In this section, the average behaviour measure scores between first-time passers non first-time passers were compared, for each sex group and (for most) within an age group. A number of statistically significant differences, albeit not demonstrating a consistent pattern, were found, with first time passers:

- Having more confidence in their driver ability (female and male drivers all and the 18-24yr old males)
- Having a slightly more 'decisive, experienced, confident & fast' driving style (males and females)
- Making fewer inexperience errors (females aged 18-24yrs)
- Making fewer slips (males aged 18-24yrs)

- Having a slightly less ‘attentive, careful, responsible, and safe’ driving style (females)
- Having a slightly less ‘placid, patient, considerate, and tolerant’ driving style (females).

8 Behavioural measures – allowing for age and mileage

8.1 Age and mileage

The previous section explored whether the ‘first-time passer’ effect on accident liability established in Section 6 might be explained in terms of differences in behavioural measures. While such differences were generally small, there were larger differences between groups of drivers who passed the test at different ages. As an example, Figure 8.1 shows a decrease in aberrant self-reported driving behaviours for female drivers as age increases. A similar relationship also exists for male drivers.

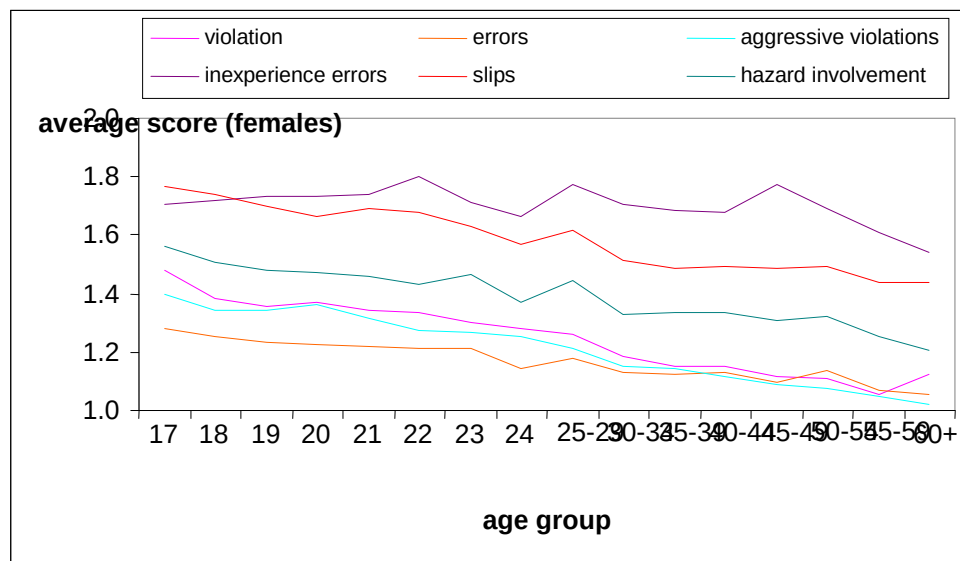


Figure 8.1: Female driver behaviour - average scores by age

As well as age at which the test is passed, it is well established that mileage must also be taken into account when attempting any explanatory analysis. The following table shows that there are statistically significant correlations between a number of behavioural measures and age and mileage driven in the first six months.

Table 8.1: Correlations between behavioural measures and age and mileage

1st six months data	Miles driven in 1st six months	Age at time of test
Driving style, factor 1 (higher scores = more attentive, etc)	-0.011	0.229
Driving style, factor 2 (higher scores = more placid, etc)	-0.032	0.284
Driving style, factor 3 (higher scores = more decisive, etc)	0.081	-0.123
Confidence (higher score = more confident) score	0.069	-0.102
Slips (higher scores = commit more slips)	0.013	-0.150
Errors (higher scores = commit more errors)	0.006	-0.173
Inexperience errors (higher scores = commit more inexperience errors)	-0.038	0.032
Violation score (higher scores = commit more violations)	0.043	-0.239
Aggressive violations (higher scores = commit more aggressive violations)	0.067	-0.229
Hazard involvement(high score = more involved)	0.003	-0.161

Note: shaded correlations are statistically significant at the 5% level or better, i.e. the probability that the correlation is zero is <5%

8.2 Covariate analysis –behavioural measures

In order to allow for age differences and mileage differences between those passing their test the first time and those taking a subsequent test, an analysis of covariance was used. This analysis makes an adjustment for covariates, i.e. age at which the test was passed and miles driven in the first six months, and then compares the adjusted mean values for the behavioural measure of interest (the adjusted means relate to drivers aged 20 years, who drive 5,000 miles in the first six months of driving and are female). Table 8.2 summarises the results.

Table 8.2: First-time passer factor after accounting for age and mileage

DEQ data for 1st six months	Probability that factor for first-time passer is zero	Adjusted mean value, for age = 20yrs, miles = 5000 and female	
		First-time passer?	
		No	Yes
Driving style, factor 1 (higher scores = more attentive, etc)	ns	5.784	5.799
Driving style, factor 2 (higher scores = more placid, etc)	ns	4.934	4.963
Driving style, factor 3 (higher scores = more decisive, etc)	<0.001	5.047	5.123
Confidence (higher score = more confident) score	<0.001	3.430	3.475
Slips (higher scores = commit more slips)	ns	1.630	1.636
Errors (higher scores = commit more errors)	ns	1.261	1.264
Inexperience errors (higher scores = commit more inexperience errors)	<0.001	1.562	1.528
Violation score (higher scores = commit more violations)	<0.02	1.554	1.580
Aggressive violations (higher scores = commit more aggressive violations)	<0.01	1.507	1.530
Hazard involvement (high score = more involved)	ns	1.490	1.498

Note: shaded cells indicate where the first-time taker factor is statistically significant at the 5% level or better, i.e. the probability that the factor effect is zero is <5%

While the analyses in Section 7 did not reveal a consistent pattern of differences between first-time and subsequent passers, once differences due to age and miles driven had been taken in to account a statistically significant first-time passer effect was seen in five of the behavioural measures investigated.

Compared with those drivers who had taken two or more attempts to pass their practical driving test, first-time passers reported:

- Having a more decisive, experienced, confident & fast driving style,
- Having more confidence in their driver ability,
- Making fewer inexperience errors
- Making more driving violations, and
- Making more aggressive violations.

9 Discussion

The Cohort II study looked at the learning experiences of all candidates taking their practical driving test in selected weeks, and followed up their accidents, attitudes, and behaviours in the three years after test. The investigation reported here has, for what is believed to be the first time, focused on a particular sub-group of these candidates, those who took and passed their practical test at the first attempt, to investigate how they differed from candidates who had previously failed one or more tests.

In this country, there is no minimum period of instruction that must be undertaken before attempting the practical test. Indeed, there is no formal requirement to have any instruction, although the vast majority of candidates do have some professional tuition when learning. Because of this, it has sometimes been suggested that some drivers may come to test without adequate preparation, put up a good performance on the day, and then enter the driving population without the experience necessary to ensure that they will be safe drivers in the longer term. The evidence from the present investigation provides little support for such a view.

Those taking the practical test for the first time were predominantly young (the majority being younger than 19 years), and a high proportion were males. First-time takers took fewer theory tests than did those who had failed a previous practical, and achieved higher scores on both the multiple choice and the hazard perception components. However, their pass rate was lower than that of those taking a second, third, or fourth test, which may provide some support for the ‘unprepared’ hypothesis – although the differences were not large, and failing the test means there are no potential safety issues.

First-time passers as a group are even younger, with nearly 50% being 17 years of age, and again with a high proportion of males. Multivariate analysis of accident data showed that there was a significant first-time passer effect on accident liability. After controlling for age, sex, experience, and exposure, those new drivers who passed their first practical driving test had a lower accident liability in the first year of driving than did those who needed to take more than one test. The difference was non-trivial; the analysis showed that the probability of being involved in an ‘active’ accident in the first year was some 15% lower for first-time passers

Examining the possibility that the behaviours or driving style of first-time passers could explain these findings produced results that seem at first sight to be at variance with conventional wisdom in this field. After controlling for age and mileage, first-time passers were found to differ significantly from subsequent passers in that they reported a driving style that has been negatively associated with safety (decisive, experienced, confident, and fast), and reported making more driving violations and aggressive violations, both of which have been associated with higher levels of accident involvement in the past.

These findings might appear at first sight to be inconsistent. After adjusting for age, sex and experience, first-time passers have been shown to have a significantly lower accident liability than those who take more tests, yet they also report engaging significantly more often in behaviours that have regularly been linked with enhanced accident liability. To resolve these apparent contradictions, it is necessary to return to the point made at the outset that this study is concerned with a specific sub-set of the Cohort II sample.

It is argued that first-time passers differ from other respondents to the surveys in a number of important ways. They learn to drive quickly, they have few problems with the theory test, they have good control skills, and they are confident about their driving ability. Having passed the practical test, they adapt readily to the road system and to interacting with other drivers (the higher scores they achieve on the hazard perception test are relevant in this context).

Accident studies have regularly shown that young drivers have a high accident liability. However, it is important to recognise that this only applies to young drivers in general, and within this group there will be some who have accident liabilities that are below average. The present study indicates that the ability to pass the practical test at the first attempt is one characteristic that is associated with such a sub-group. Similarly, while Parker and Stradling (2001) refer to violators, and male violators in particular as being 'crash magnets', this only describes the association for violators in general; there will be some who do not 'attract' accidents in this way, and will have below average accident liabilities. Again, first-time passers would seem to be such a sub-group.

The issue of violations is a complex one. Wells et al. (2008) showed that the frequency of reported violations and aggressive violations increased over the three year duration of the Cohort II study, but that during this time there was an overall decrease in accident liability. In an earlier study in Norway, Bjørnskau and Sagberg (2005) showed that new drivers reported significantly more violations with increasing experience in the first nine months of driving, which was also a time of marked reduction in accident risk. The authors suggest that as new drivers gain experience, they adapt their behaviours to what they perceive as 'normal' practice, and this enhances their ability to interact with other road users, and to predict their actions. The authors go on to argue that, in so far as violations are, or are perceived to be, part of normal driving behaviour, then they could be seen as conferring some safety benefit. Against this, however, must be set the fact that the violation-accident relationship is strongly established – albeit at the general level.

It is clear that the underlying mechanisms are more complex than has been assumed in the past. Procedures such as path analysis could be of benefit in clarifying these issues, and possibly identifying ways in which the special characteristics of first-time passers could aid in the more effective formulation and targeting of remedial measures.

10 Summary

This report has examined the accidents, attitudes and self-reported behaviours of drivers who passed their practical test on the first occasion that they took it. It has also looked at their performance on the theory test and the practical driving test, and compared them with drivers who took more than one practical driving test. The main findings from the study may be summarised as follows.

- Those taking the practical test for the first time were predominantly young (the majority being less than 19 years of age), and a high proportion were males.
- First-time takers took fewer theory tests than did those who had failed a previous practical, and achieved higher scores on both the multiple choice and the hazard perception components. However, their pass rate was lower than that of those taking a second, third, or fourth test
- First-time passers as a group are even younger, with nearly 50% being 17 years of age, and again with a high proportion of males. The first-time taking 17 year olds have the highest pass rate of 59%, as compared to 49% of all first-time takers.
- Male first-time passers tend to drive more miles in the first three years of driving than either females or non first-time taking males, and have a slightly higher rate of public road accidents, even after adjusting for mileage.
- Accident models for the first year of driving, once adjusted for age, experience, and mileage, showed that first-time passers had a lower accident liability than did those who took more than one test. The accident rate reduction was as much as 15% for 'active' accidents on public roads.
- Models for driving styles, driving behaviours and driving attitudes were produced such that differences between the age and mileage driven in the first six months of driving could be taken into account. Some of the differences between adjusted average values for first-time passers and others were statistically significant.
- First-time passers had a higher score for a driving style that has been negatively associated with safety (decisive, experienced, confident, and fast).
- First-time passers were on average more confident about their driving abilities. They reported making fewer inexperience errors, but more violations and more aggressive violations when driving.

While some of these findings may at first sight seem to be at variance with previous studies, it is suggested that first-time passers are a sub-group with special characteristics, and that further analysis would be desirable to gain a better understanding of the complex mechanisms that are at work.

11 References

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The accident history and behaviours of new drivers who pass their first practical driving test



The report describes further analyses of the data collected in the Cohort II study (Wells *et al.*, 2008). In this investigation, the focus was on the accidents, attitudes and self-reported behaviours of drivers who passed their practical test on the first occasion that they took it. It also examines their performance on the theory test and the practical driving test, and compares drivers who passed their practical test on the first occasion with drivers who took more than one practical driving test. While some of the findings may at first sight seem to be at variance with previous studies, it is suggested that first-time passers are a sub-group with special characteristics.

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