

Original citation:

Hawley, Carol, Smith, Robert A. and Goodwin, Lacey (2017) *Road safety education for older drivers : evaluation of a classroom-based training initiative*. Transportation Research Part F: Traffic Psychology and Behaviour .doi:[10.1016/j.trf.2017.11.009](https://doi.org/10.1016/j.trf.2017.11.009)

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1 **Road safety education for older drivers: Evaluation of a classroom-based**
2 **training initiative**

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15

16 **Key words (up to 6)**

17 Driving

18 Training

19 Older drivers

20 Knowledge

21 Fitness to drive

22 Confidence

1 Abstract

2

3 Around the world, a growing proportion of drivers are aged 70 or over. Although
4 accident rates for older drivers are lower than for young or novice drivers, increased
5 frailty and slowed reactions mean that older drivers are at higher risk of death or
6 serious injury when involved in a road collision. The objectives of this study were to:
7 a) identify driving knowledge and self-regulatory strategies among a group of older
8 drivers with a view to planning future on-road training; b) measure driver self-
9 assessments of ability and confidence before and after classroom training delivered
10 by driving instructors; c) evaluate the utility and acceptability of training courses for
11 older drivers using questionnaires and focus groups; d) examine the characteristics
12 of course participants.

13 142 drivers aged ≥ 75 completed a two-hour classroom-based driving course and
14 took part in the evaluation: 94 aged 75-79, 48 aged ≥ 80 , 68% male. Main reasons
15 for taking part were to update knowledge, improve driving and check they were safe
16 to drive. Results showed that females were more likely than males to avoid driving
17 in difficult conditions (at night, in bad weather, unfamiliar roads). More drivers aged
18 75-79 said they did not restrict their driving (52, 57%) compared to drivers aged ≥ 80
19 (19, 43%). Pre-course, males rated their driving confidence and ability significantly
20 higher than females. Post-course, self-ratings of confidence and ability were
21 unchanged for 76 (60%) drivers. However, two-thirds reported improved knowledge
22 and 80% said they would change their driving behaviour as a result of the course.
23 Focus group results suggest that competent drivers are more likely to attend
24 educational courses than unsafe drivers. This study provides preliminary evidence

- 1 that classroom-based training can initiate behaviour change among older drivers.
- 2 Future research will examine the effectiveness of on-road training in this age group.
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Highlights

1. 142 drivers aged ≥ 75 completed a two-hour classroom-based driving course
2. Participants wished to improve their knowledge and confirm or improve driving skills
3. Pre- and post-course confidence and driving ability ratings were unchanged for 60% of drivers
4. Eighty percent said they would definitely or probably change the way they drive
5. Ninety-four percent would recommend the course to others

1. Introduction

2

3 Around the developed world, driving is an important part of everyday life for many
4 people. Driving provides independence, mobility, and freedom to travel whenever
5 and wherever the driver chooses. Once a driving test is passed, many drivers wish
6 to continue driving for as long as possible. However, as drivers grow older, they may
7 experience a decline in cognitive, perceptual and physiological functions which can
8 affect their ability to drive (Anstey, Wood, Lord & Walker, 2005). These impairments
9 may cause driving errors such as failing to yield right of way at road junctions or
10 when merging into moving traffic (AGILE, 2003). With advancing age there is also an
11 increasing risk of visual and medical conditions which may impair fitness to drive
12 (Whelan, Langford, Oxley, Koppel & Charlton, 2006; Tuokko, Rhodes & Dean,
13 2007).

14

15 In many countries, older drivers are required to have a visual or medical assessment
16 to ensure they meet current standards for fitness to drive. For example, in
17 Netherlands, Denmark, Cyprus and Ireland drivers aged 70 are required to have a
18 sight test. In the UK, when drivers reach the age of 70 they must make a self-
19 declaration of their medical and visual fitness in order to renew their driving licence,
20 but there is no formal assessment (Driver and Vehicle Licensing Agency (DVLA),
21 2015).

22

23 In common with many countries, the UK has an ageing population. There are
24 currently 8 million people aged ≥ 70 , with 5.3 million aged ≥ 75 , representing 8% of
25 the UK population (Office for National Statistics (ONS), 2016). Nearly three-quarters

1 (74%) of UK adults hold a valid driving licence, and there are approximately 38.6
2 million licence holders (Department for Transport, 2016a). The proportion of drivers
3 aged ≥ 70 holding a driving licence has increased from 15% in 1975 to 64% in 2015
4 (Department for Transport, 2016b). The ONS estimates that the number of people
5 aged ≥ 75 will rise to over 9 million by 2035 and will represent 12.5% of the UK
6 population. Consequently, the number of older drivers on the road will continue to
7 rise. Although older drivers are generally safe, the reduction in health and functional
8 ability that comes with advancing age puts them at increased risk of crash
9 involvement (Langford and Koppel, 2006). The accident involvement rate for older
10 drivers begins to increase after the age of 75 (Mitchell, 2013). Similar findings have
11 been reported in the United States (Guohua, Braver & Hui Chen, 2003). The
12 National Highway Traffic Safety Administration (2009) found that drivers 80 and older
13 were overrepresented in crashes, particularly when negotiating complex situations
14 such as intersections or turning across oncoming traffic. However, access to a car
15 and the ability to drive is important to continuing mobility and quality of life for older
16 drivers (Whelan et al., 2006, Ragland, Satariano & MacLeod, 2005). It is therefore
17 important to ensure that older drivers remain safe on the road.

18

19 In recognition of the importance of driving into later life, road safety for older drivers
20 has been the focus of considerable research during the twenty-first century. In
21 Canada, and latterly Australia and New Zealand, the Candrive, Candrive II and
22 OzCandrive longitudinal projects have prospectively recruited over a thousand
23 drivers aged 70 and over with the aim of keeping older drivers safely on the road by
24 studying driving behaviour, assessments, medical fitness to drive and screening
25 tools (Langford, Charlton, Koppel, Myers, Tuokko, Marshall, et al, 2013; Marshall,

1 Man-Son-Hing, Bédard, et al., 2013; and Marshall, Man-Son-Hing, Charlton, et al.,
2 2013). These projects and others have provided insights into the behaviour of older
3 drivers and how it may be modified to improve road safety.

4

5 An important concept is that of self-awareness of driving abilities. Older drivers often
6 regulate their driving and take fewer risks than younger drivers (Lang, Parkes &
7 Fernandez Medina, 2013). Gwyther and Holland (2012) found that self-regulation
8 increased with age, and that women were significantly more likely than men to
9 regulate their driving. Driving self-regulation is the driver's behavioural adaptation to
10 maintain safe driving despite the decline in functioning with advancing age (Donorfio,
11 D'Ambrosio, Coughlin & Mohyde, 2008). Some older drivers use compensatory
12 strategies such as avoiding difficult situations (e.g. driving at night, in bad weather, or
13 during rush hours), or by increasing safety distances or reducing speed (Ball et al.,
14 1998, Donorfio, D'Ambrosio, Coughlin & Mohyde., 2009, Gabaude et al., 2010,
15 Holland & Rabbitt, 1992, Molnar & Eby, 2008). However, driving adaptation to a
16 specific situation depends on the self-awareness of abilities and limitations (Anstey
17 et al., 2005).

18

19 The provision of specialised training can give drivers insights into their abilities and
20 limitations, and there is evidence that training and refresher courses help older
21 people to continue driving safely for longer. Jones and colleagues (2012) examined
22 in-class training for drivers aged 60 and over, comparing an intensive taught course
23 to a lower-resource self-guided course, following-up attendees six months later by
24 questionnaire. They found the intensive programme to be most effective, concluding
25 that driving safety programmes which focus on behaviours to self-evaluate driving

1 abilities help older drivers to remain safe on the road. Owsley and colleagues (2003
2 and 2004) examined the effectiveness of an educational programme for visually
3 impaired drivers aged 60 and over. They concluded that although it did not alter
4 crash risk, the training improved self-regulation and avoidance of challenging driving
5 situations. In a review of eighteen older driver refresher programmes in Canada,
6 Korner-Bitensky, et al., (2010) found that both classroom-based and on-road training
7 courses improve driver performance, but concluded that there is a need for better
8 evaluation of their effectiveness.

9

10 Nasvadi and Vavrik (2007) reported a self-selection bias among drivers attending a
11 mature driver education programme for drivers aged 55 and over in Canada.

12 However, they found that male volunteers aged 75 and over had an increased post-
13 course crash risk compared to women and men aged 55 – 74. They concluded that
14 understanding the behaviour and characteristics of those who attend mature driver
15 training is essential for the design and delivery of effective courses on road safety.

16

17 In view of the above evidence, we designed a training course for older drivers which
18 would educate them in self-evaluation, self-regulation and how to cope with or avoid
19 difficult driving situations. The course would also update their knowledge of driving
20 rules as this has been linked to driving performance (Wolming and Wiberg, 2004). A
21 novel aspect of our course is that it was tailored to drivers aged 75 and over, as this
22 is the group most at risk of crash involvement (Mitchell, 2013), and drivers aged ≥ 75
23 have been found to be more likely to fail an on-road test (Classen et al, 2013).

24 Studies of mature driver courses included in recent literature reviews were aimed at

1 drivers aged 60 or 70 plus, with none specific to drivers aged 75 plus (Kua et al.,
2 2007, Korner-Bitensky et al., 2009).

3

4 The Dorset Road Safe Partnership created a driver training course specifically aimed
5 at older drivers, called Dorset Driver Gold (DDG). It was initially offered free to older
6 residents pending evaluation of the course. The objectives of the DDG course were
7 to update older drivers regarding their knowledge and awareness of road safety
8 issues and improve driving skills and confidence. The aims of the evaluation were to
9 measure the acceptability of the course to older drivers and demonstrate the
10 effectiveness and utility of the DDG initiative. We also sought to study the behaviour
11 and characteristics of those who attended the course.

12

13 The objectives of the study were to:

14

15 1. identify driving knowledge (road safety and rules of the road), reasons for
16 driving, and self-regulatory strategies among a group of older drivers with a
17 view to planning future on-road training.

18

19 2. measure self-assessments of driving ability and confidence as a driver before
20 and after classroom training delivered by driving instructors.

21

22 3. evaluate the utility and acceptability of classroom training courses for older
23 drivers using questionnaires and focus groups.

24

1 4. examine the characteristics of course participants, including comparison of
2 differences between male and female and youngest-old and oldest-old
3 drivers.

6 **2. Methods**

8 2.1 Study location

9
10 The County of Dorset in Southern England has over 54,000 residents aged 75 years
11 and over (ONS, 2014). The county is popular with older people wishing to move to
12 the South Coast after retirement from work. Many of these retirees are drivers who
13 wish to remain mobile and travel independently in their own cars. Much of the
14 county is rural with limited public transport. Consequently, there are significant
15 numbers of older drivers on the roads.

17 *2.2. Participants*

18
19 Recruitment to the DDG courses was by advertisements placed by Dorset County
20 Council (DCC) in hospitals, local newspapers, local community groups, council
21 mailing lists, and on the DCC website and social media sites (Facebook and Twitter).
22 The advertisement stated: “We are looking for volunteers for a new free pilot project
23 aimed at updating and improving your driving skills and confidence on the road.”
24 Additionally, publicity material was promoted by our road safety partners (Fire and
25 Rescue, Police) and general practitioner surgeries.

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Inclusion criteria: Drivers aged 75 and over, living in Dorset, with a valid driving licence, own car.

Exclusion criteria: drivers not meeting above inclusion criteria.

In Great Britain, approximately 45% of persons aged 75+ are drivers (ONS, 2014; Department for Transport, 2016b). In Dorset, this equates to approximately 24,700 drivers aged 75+. Funding was provided by DCC to train approximately 150 participants. We performed a sample size calculation which suggests that this number is adequate to reasonably represent the wider local population of drivers aged 75 years and over. The confidence level was set at 95% and the proportion at 50% to produce a conservative estimate of variance. For a sample of 150 drivers the confidence interval was 0.08 and the relative standard error was 8.17.

One hundred and fifty-three older drivers volunteered to take part and were invited to book a place on one of the courses via telephone, email or through the DCC website.

Ethical approval was not required because participants were members of the general public volunteering for a free training course and no personal details were available to the research team. Volunteers agreeing to participate in the focus groups did so anonymously and gave their informed consent for the group discussions to be recorded.

2.3 Procedure

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A classroom-based training course was developed for older drivers by DCC. Course content was devised from a) a review of evidence including published systematic reviews (e.g. Berry, 2011; Baster, 2012; Cornwall Council, 2012; Lang, Parks & Fernandez Medina, 2013) and utilising the UK Road Safety Observatory which provides web-based road safety resources; b) published UK crash statistics, and c) experience from over 20 years of running refresher driving sessions for older drivers. Feedback from older drivers undertaking these previous courses also informed the programme content. Topics covered were developed and finalised following lengthy discussion with the DCC's Approved Driving Instructors (ADIs) who had delivered our previous older driver programme.

The course consisted of a two-hour presentation given by one of DCC's ADIs and topics covered were:

1. What makes a good driver? (Discussion about relevant experience, having patience, being confident, courteous, having good all round observation and awareness, driving to the prevailing conditions, passenger empathy (smooth acceleration and braking) awareness of fitness to drive, forward planning).
2. Are you concentrating? (Discussion about how to focus attention for longer on the task of driving and sifting out distractions. What should we be concentrating on? Road signs, markings, speed, road position. Looking for clues in the environment as to potential hazards ahead. Use of static and video images).

- 1 3. Distractions (Illustrations of potential distractions inside and outside the
2 vehicle. Use of static and video images).
- 3 4. Health and vehicle checks (Medical conditions and medications which may
4 affect driving, maintaining your vehicle, checking tyres and keeping
5 windscreen clean. Use of static images).
- 6 5. Highway code (UK guide to driving which forms the basis of the driving test.
7 Short quiz session. Use of static images).
- 8 6. Motorway driving (Approaching, lane discipline, avoidance of fatigue, planning
9 well ahead, overtaking, following other vehicles, meanings of signs/markings.
10 Use of static and video images).
- 11 7. Roundabouts (Approaching, lane positioning, leaving and indicating. Use of
12 static and video images).
- 13 8. Road markings (Illustrations of the meaning of different road markings. Using
14 local road network as examples. Use of static images).
- 15 9. Safety margins (An explanation of the two-second rule in good driving
16 conditions and lengthening this in adverse weather conditions. Use of static
17 images).
- 18 10. What is a hazard? (Group discussion sharing ideas on what constitutes a
19 driving hazard. Use of static and video images to highlight potential hazards).
- 20 11. Observation (Showing real local scenes, both static and video, for a few
21 seconds and asking what they remember. Also used in the session on
22 “concentration”).
- 23 12. Collisions (How and why they happen and how to avoid being involved in
24 someone else’s crash. Use of static images to illustrate causes of collisions).

25

1 The driver training course was delivered at a range of locations in Dorset, easily
2 accessible by the older drivers who expressed an interest, as well as ensuring
3 county-wide coverage. Courses were held in five different locations (three locations
4 had one course, and two locations had two courses due to popular demand). Five
5 individual ADIs presented the course, one at each location, all using the same
6 PowerPoint slideshow which was specifically designed for drivers aged 75 and over.
7 To ensure consistency, one ADI took responsibility for briefing the other ADIs on
8 presentation delivery and content.

9

10 *2.4 Methodology*

11

12 A mixed-method approach was taken, whereby quantitative data were collected via
13 questionnaires and results of these data and related topics were discussed in focus
14 groups with a sub-group of course participants. The focus group data were analysed
15 qualitatively.

16

17 *2.4.1 Pre and Post-course Questionnaires*

18

19 Prior to this evaluation, pre and post-course questions were developed and piloted
20 with a group of ten older drivers. Questionnaire content was devised using a
21 combination of questions used in evaluations of our previous courses and in the
22 literature on older drivers. Questionnaires were brief and mainly contained tick-box
23 responses, taking approximately fifteen minutes to complete.

24

1 Before the training presentation, each participant completed a pre-course
2 questionnaire (Appendix I) which collected demographic data and driving history,
3 knowledge of the Highway Code, expectations of the course and which areas of
4 driving they wished to improve. Drivers were also asked to rate their confidence and
5 ability as a driver on a scale of one to ten (1 being lowest and 10 being highest).

6

7 After the presentation, each participant was given a post-course questionnaire
8 (Appendix II) which collected data on how useful participants found the course,
9 whether they intended to alter their driving behaviour, and what other areas they
10 would like to see covered in the course. They were also asked to re-rate their
11 confidence and ability as a driver.

12

13 The questionnaires were anonymised by DCC and participants were known to the
14 researchers only by a number.

15

16 *2.4.2 Focus Groups*

17

18 Fifteen older drivers who attended the courses were invited by DCC to take part in
19 one of two focus groups to provide feedback and insights on course content and
20 usefulness. Participants were selected to ensure men and women of different ages
21 took part and that they lived within easy access of the focus group venue. All gave
22 their informed consent. Focus Group 1 (FG1) had nine participants: seven men and
23 two women. Focus Group 2 (FG2) had six participants: three men and three women.
24 The focus groups lasted approximately 90 minutes each and were led by two
25 researchers using a structured topic guide based on issues affecting older drivers,

1 the course content and results of the questionnaires. Focus group discussions were
2 audio-recorded and transcribed verbatim.

3

4 2.5 *Data analysis*

5

6 Quantitative analysis was carried out using the Statistical Package for the Social
7 Sciences (SPSS) version 21 (IBM Corporation 2012). Continuous data were
8 analysed using comparison of means (independent samples t-test). Relationships
9 between categorical data were analysed using Chi-squared cross-tabulations. For
10 multiple comparisons, p-values were adjusted using the Bonferroni procedure in
11 SPSS. Responses to open-ended questionnaire questions such as 'What made you
12 decide to come on this course?' were grouped into categories to aid analysis.

13

14 Road safety research suggests that drivers in their 80s have a high incidence of at-
15 fault motor vehicle collisions (Ichikawa et al, 2015) and motor insurance is both
16 expensive and difficult to get for drivers aged 80 and over. Therefore, for the
17 purposes of comparative analyses drivers were divided into two age groups: 75 to 79
18 years (youngest-old drivers), and ≥ 80 years of age (oldest-old drivers). Drivers were
19 also compared by gender. For different questions, totals may vary due to missing
20 data (missing values were excluded from statistical analyses).

21

22 Qualitative data were analysed using content analysis. The focus group transcripts
23 were read independently by two researchers and the topic guide used to order the
24 content. The resulting data are presented topic by topic with illustrative verbatim
25 quotations.

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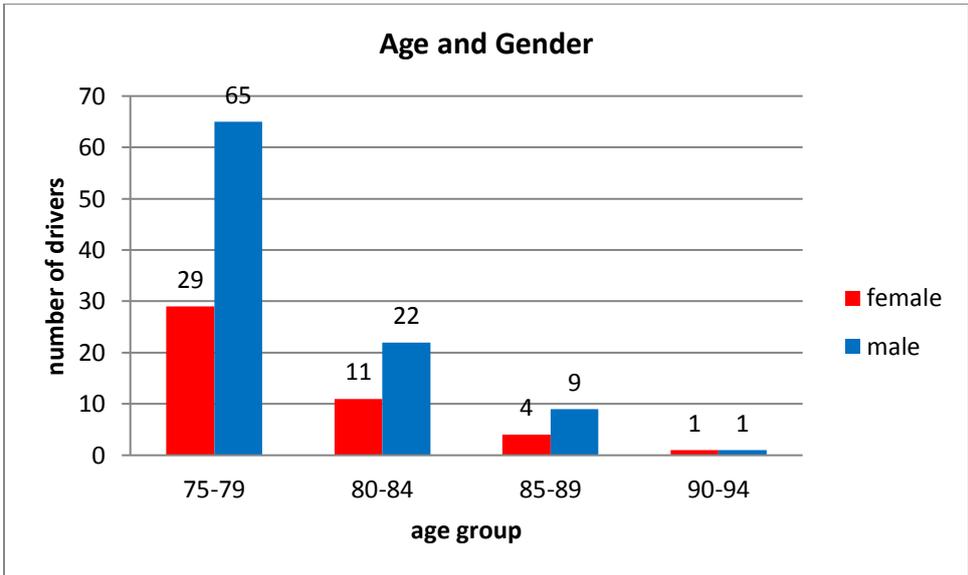
3. Results

3.1 Study participants

One hundred and fifty-three older drivers attended one of the classroom training courses. On average there were 22 participants at each course location (range 19 – 27). Most people heard about the DDG course from a newspaper or magazine advertisement (86, 56%). Most booked by telephone (72, 47%), 28% (43) through the website and 25% (38) via email.

Of the attendees, 142 (93%) completed a pre-course questionnaire and provided demographic information, subsequent analyses are based on this group. The 142 drivers were aged between 75 and 91 years (mean = 79.2 years, median = 78 years, SD = 3.88). Two-thirds were male (98, 68%). There was no significant age difference between males and females. Figure 1 shows a breakdown of age and gender. There were 94 participants in the 75 to 79 age group and 48 participants in the ≥ 80 years group.

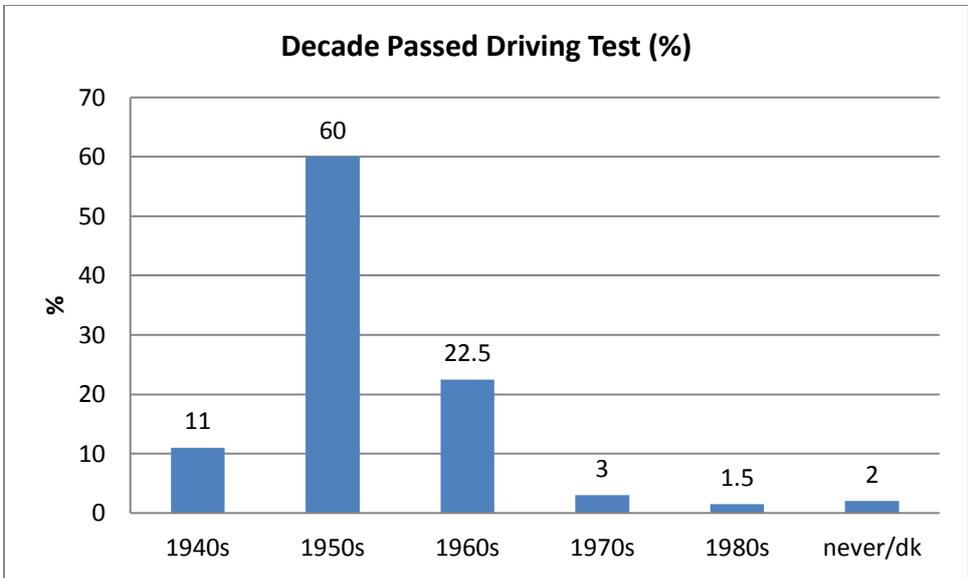
Most respondents had passed their driving test in the 1950s (85 people, 60%). Two had never taken a driving test (the test was suspended during World War II between the years of 1939 and 1946, (DVSA, 2015)), and one person could not recall when they had passed the test (Figure 2).



1

2 Figure 1: Age and gender of questionnaire respondents (n = 142)

3



4

5 Figure 2: Decade in which driving test passed (n = 142)

6

7 Most (118, 83%) said they were the main driver in their household, 23 (16%) were
 8 not, and one person did not say. Seventy-four drivers in the 75 to 79 group (79%),

9 and 44 drivers in the ≥ 80 group (92%) were the main driver. The annual number of

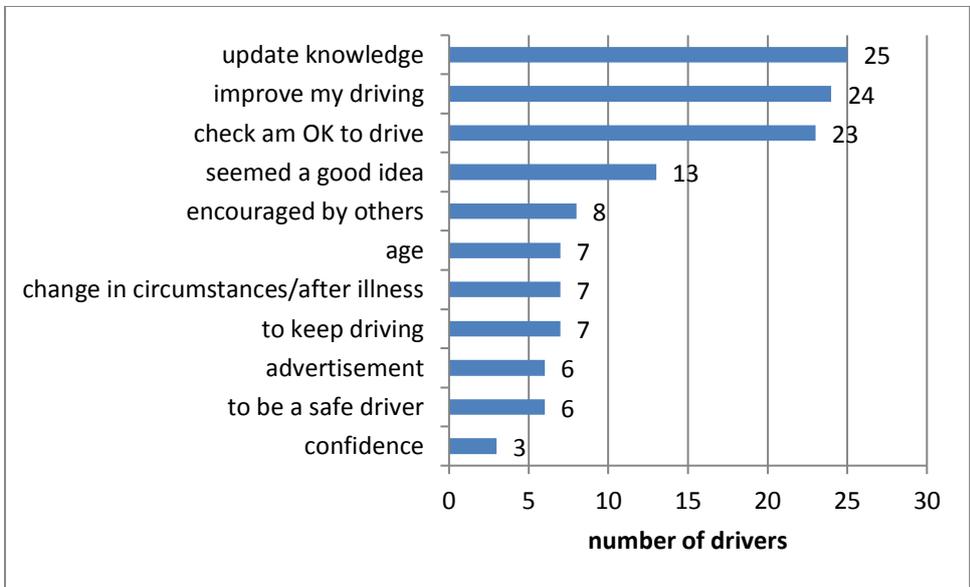
10 miles driven by respondents ranged from 800 to 15000 miles per year, the mean was

11 5996 miles (median = 6000, SD = 2951.7).

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3.2 Reasons for taking course

Participants were asked to give their main reason for taking the course. These free-text responses were summarised into eleven categories (Figure 3). Most took part voluntarily, only eight (6%) were encouraged by others (e.g. 'my son bullied me into it'). Seven (5%) said it was because of increasing age, and a further seven came because of changed circumstances such as absence from driving due to illness or a bereavement.



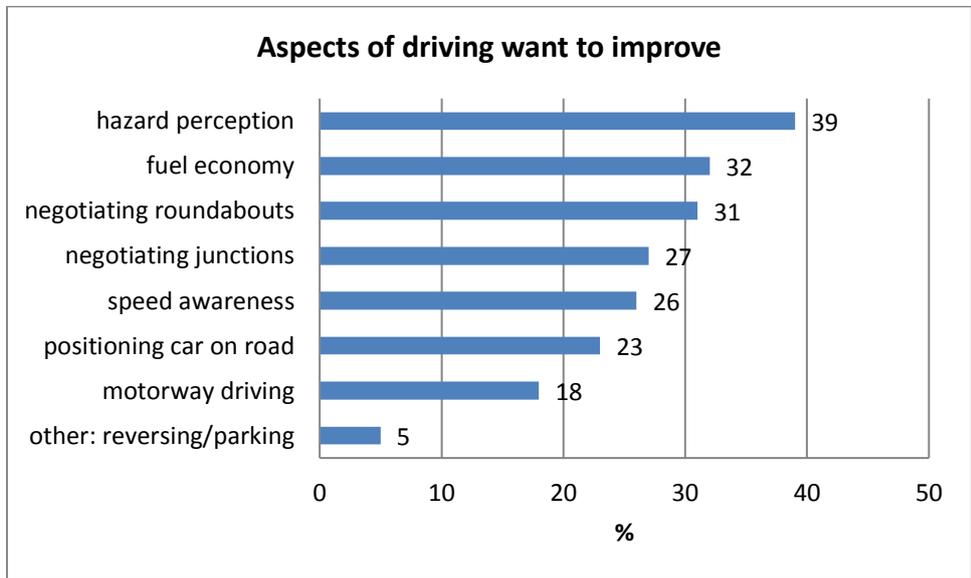
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Figure 3: Main reason for attending course (n = 129)

3.3 Aspects of driving respondents wish to improve

Respondents indicated the areas of their driving they wanted to improve from a list of options (Figure 4). More oldest-old drivers (18, 39%) than youngest-old drivers (19,

1 21%) wanted to improve negotiation of junctions ($p = 0.023$, $X^2 = 5.16$). More
 2 females wanted to improve motorway driving (13, 29%) compared to males (11,
 3 12%), ($p = 0.014$, $X^2 = 6.00$).



5
 6 Figure 4: Aspects of driving respondents wished to improve (n = 137)

7
 8 The following results are organised according to the first three research objectives.
 9 Within each section results are compared by gender and age (fourth objective).

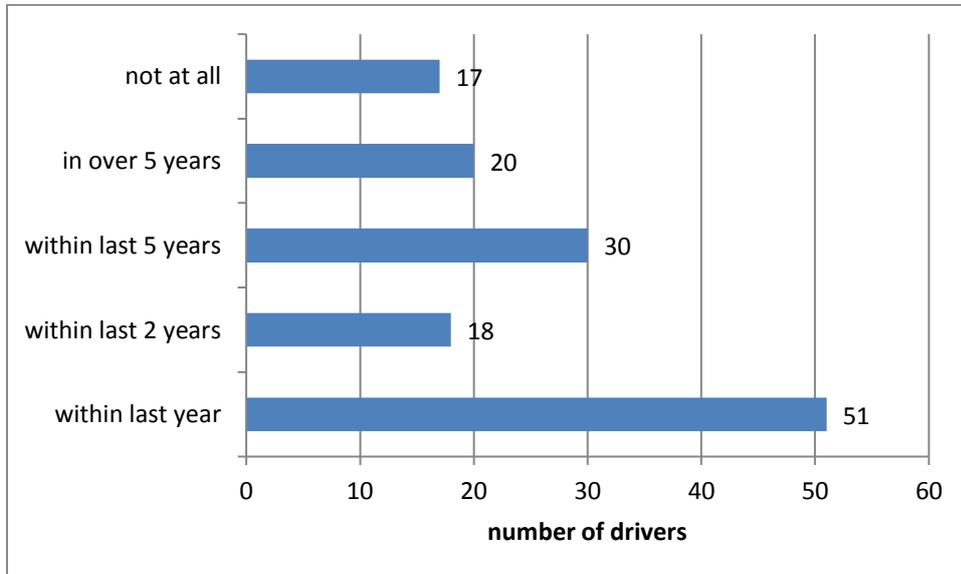
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 11 *3.5 Objective 1: Driving knowledge, reasons for driving, and self-regulatory*
 12 *strategies*

13
 14 *3.5.1 Driving knowledge*

15
 16 Respondents were asked how up-to-date they were with current driving regulations.
 17 Over a third of drivers (51, 37.5%) had checked within the last year, but 12.5% (17)
 18 said they were not at all up-to-date (Figure 5). There were no significant differences

1 between male and female drivers or those in the youngest-old and oldest-old age
2 groups.

3



4

5 Figure 5: Number of drivers keeping up-to-date with current driving regulations (n =
6 136)

7

8

9 *3.5.2 Main reasons for driving*

10

11 Most respondents said their main reasons for driving were for shopping or running
12 errands, for leisure, to visit friends or relatives, or to attend appointments. There
13 were no significant differences between men and women. Nearly half said a main
14 reason for driving was to give lifts to other people. Table 1 compares results for
15 oldest-old and youngest-old age groups.

16

17 **Table 1: Main reasons for driving**

Activity	Age 75-79 N = 94	Age 80+ N = 48	All Ages N = 142	Significant difference between age groups (df=1)
Shopping or errands	85 (90%)	43 (90%)	128 (90%)	p = 0.87 X ² = 0.03
Leisure	90 (96%)	41 (85%)	131 (92%)	p = 0.03* X ² = 4.74
Work/voluntary work related	10 (11%)	2 (4%)	12 (8.5%)	p = 0.19 X ² = 1.72
Visit friends or relatives	78 (83%)	46 (96%)	124 (87%)	p = 0.03* X ² = 4.74
Appointments	76 (81%)	40 (83%)	116 (82%)	p = 0.72 X ² = 0.13
Giving lifts to others	44 (47%)	19 (40%)	63 (44%)	p = 0.41 X ² = 0.67
Other	4 (4%)	2 (4%)	6 (4%)	p = 0.98 X ² = 0.001

1 * = significant at the 0.05 level.

2

3 3.5.3 Driving self-regulation

4

5 Respondents were asked if they avoided driving in certain conditions or on certain

6 types of road. Of the 136 responders, 52% (71) said they would not restrict their

7 driving. Comparisons were made between oldest-old and youngest-old drivers and

1 between males and females (Table 2). This question was answered by 43 women
 2 (15 oldest-old drivers and 28 youngest-old) and 93 men (29 oldest-old drivers and 64
 3 youngest-old). For both men and women a higher proportion of oldest-old drivers
 4 restricted their driving (men:13, 45%; women: 12, 80%) than youngest-old drivers
 5 (men: 21, 33%; women: 19, 68%) but results were not statistically significant.

6

7 **Table 2: Avoids driving in certain conditions – by age and gender (n=136)**

Avoids driving	Age 75-79 N = 92	Age 80+ N = 44	Significance between age groups (df=1)	Females N = 43	Males N = 93	Significance between gender (df=1)
In the dark	19 (21%)	11 (25%)	p = 0.57 X ² = 0.33	17 (40%)	13 (14%)	p = 0.001** X ² = 11.17
In morning or evening rush hour	13 (14%)	11 (25%)	p = 0.12 X ² = 2.42	9 (21%)	15 (16%)	p = 0.50 X ² = 0.47
In bad weather	16 (17%)	14 (32%)	p = 0.06 X ² = 3.60	15 (35%)	15 (16%)	p = 0.01* X ² = 6.02
On busy roads	2 (2%)	4 (9%)	p = 0.07 X ² = 3.38	2 (5%)	4 (4%)	p = 0.93 X ² = 0.09
On unfamiliar roads	6 (7%)	12 (27%)	p = 0.002* X ² = 11.16	12 (28%)	6 (6%)	p = 0.001** X ² = 11.79
On motorways	5 (5%)	6 (14%)	p = 0.10 X ² = 2.69	5 (12%)	6 (7%)	p = 0.30 X ² = 1.06

No, I drive anywhere	52 (57%)	19 (43%)	p = 0.15 X ² = 2.12	12 (28%)	59 (63%)	p = 0.001** X ² = 14.88
-------------------------	-------------	-------------	-----------------------------------	-------------	-------------	---------------------------------------

1 * = significant at the 0.05 level.

2 ** = significant at the 0.01 level.

3

4

5 *3.6 Objective 2: Driver self-ratings of ability and confidence before and after*
6 *classroom training*

7

8 *3.6.1 Pre-course self-ratings*

9

10 Before the classroom training drivers rated their confidence as a driver and their
11 general driving ability on a scale of one to ten where 1 is low and 10 is high. The
12 mean rating for confidence was 7.99 (range: 3-10, median = 8, SD = 1.36). The
13 mean rating for driving ability was 7.74 (range: 4-10, median = 8, SD = 1.24). Males
14 rated their confidence significantly higher than females (means: males = 8.2, females
15 = 7.6, t = 2.11, p = 0.04). Males rated their driving ability significantly higher than
16 females (means: males = 7.9, females = 7.4, t = 2.21, p = 0.03). There were no
17 significant differences in ratings between oldest-old and youngest-old drivers.

18

19 *3.6.2 Post-course self-ratings*

20

21 After the course, 128 drivers (84%) completed the post-course questionnaire, 70%
22 (90) were male. Drivers again rated their confidence and their general driving ability.

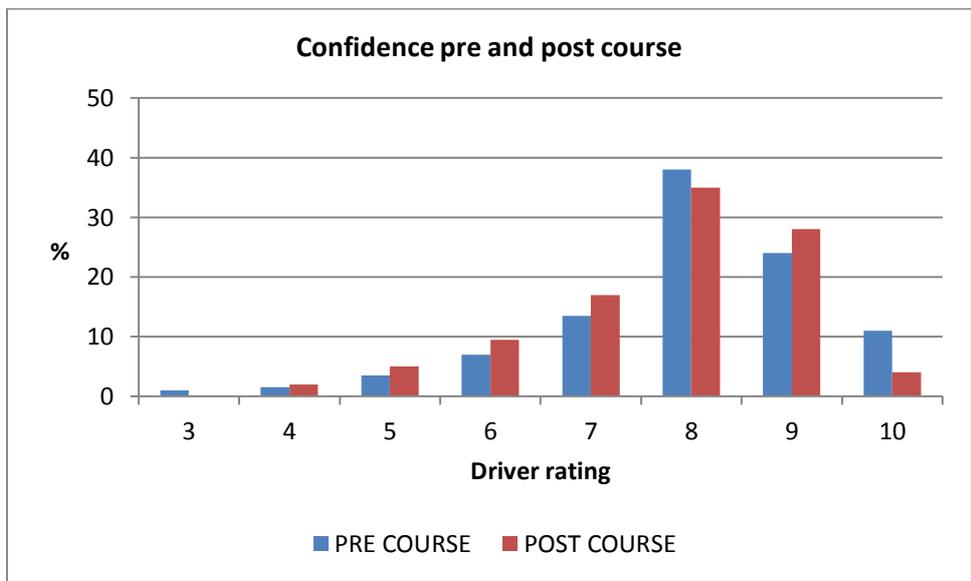
23 Figure 6 shows ratings before and after the course for confidence, and Figure 7 for

1 ability. Post-course, the mean rating for confidence was 7.76 (median = 8, SD =
2 1.32), and for driving ability was 7.85 (median = 8, SD = 1.17). For most drivers (76,
3 60%), confidence levels remained unchanged. However, 37 (29%) drivers were
4 more confident and 14 (11%) were less confident. For driving ability, 73 drivers
5 (60%) did not alter their self-ratings, 25 (20%) rated their driving ability higher and 25
6 (20%) rated it lower.

7

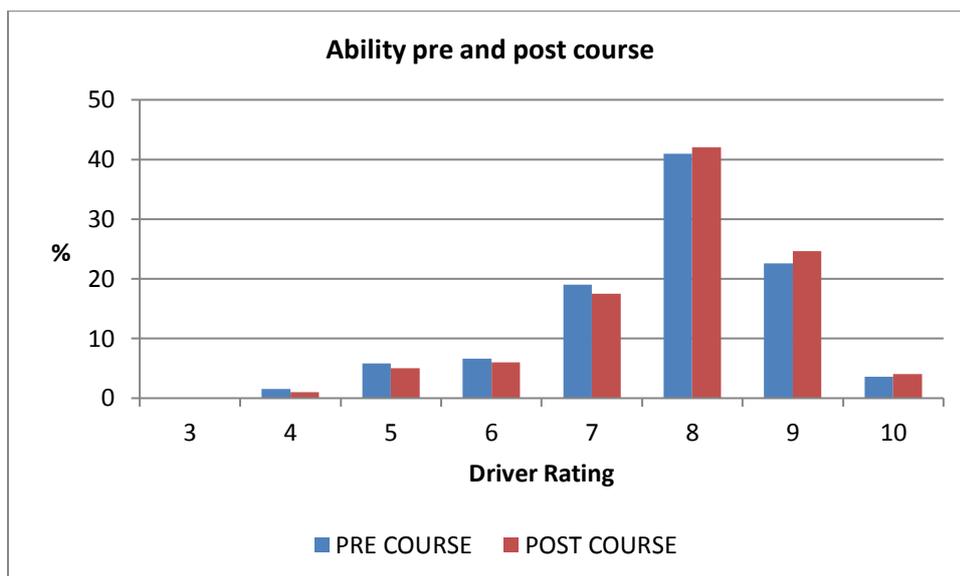
8 The differences between pre-and post-course ratings were categorised as ‘no
9 change’, ‘positive change’, and ‘negative change’. These differences were analysed
10 by age and gender for both confidence and ability. There were no significant
11 differences between youngest-old and oldest-old drivers or between males and
12 females. However, after the course, females showed a tendency to rate their ability
13 more negatively than males (females:11, 31%, males: 14, 16%; $X^2=4.29$, $p=0.12$).

14



15

16 Figure 6: Driver confidence pre- and post-course (n = 126)



1

2 Figure 7: Driving ability pre- and post-course (n = 126)

3

4 3.6.3 Attendance of other driving courses

5

6 Respondents were asked if they had taken part in any other driving courses in the

7 last ten years, and 32% (45 people) said that they had (14 females (31%) and 31

8 males (33%)). Significantly more drivers in the oldest-old group had taken a

9 previous course (21, 46%) compared to the youngest-old (24, 26%) $X^2 = 5.54$,

10 $p=0.02$. Courses included a previous Dorset Driver course aimed 55+ year-olds (17

11 drivers, 12%: 10 youngest-old (11%) and 7 oldest-old (15%)); a 'Driver Awareness'

12 course run by the police for drivers caught exceeding the speed limit (12 people,

13 8.5%: 9 youngest-old (10%) and 3 oldest-old (6%)); an advanced driving course (4,

14 3%: 3 youngest-old (1%) and 3 oldest-old (6%)); and other unspecified courses (12,

15 8.5%). Confidence and ability self-ratings were compared for respondents who had

16 and had not taken a previous driving course. There were no significant differences

17 between groups. Previous course attendees had a mean of 8.00 (SD: 1.26) for

1 confidence ratings and 7.77 (SD: 1.14) for ability ratings compared to 7.97 (SD: 1.41)
2 and 7.73 (SD: 1.29) for those not taking a previous course.

3

4 3.7 Objective 3: Utility and acceptability of classroom training courses for older
5 drivers using questionnaires and focus groups

6

7 All 128 respondents stated that they found the theory course useful. The majority
8 said it was very useful (100, 78%).

9

10 *3.7.1 Intention to change driving behaviour*

11

12 Asked if as a result of the theory course they intended to make changes to the way
13 they drive, 50 people (39%) said they would definitely make changes, and 52 (41%)
14 probably would, 19 (15%) were not sure, three (2%) thought it unlikely and four (3%)
15 did not answer. Seventy-six participants specified the changes they planned to
16 make. These fell into eight categories: increase awareness and concentration (21,
17 28%); use correct approach to roundabouts (17, 22%); general all round
18 improvements to driving (14, 18%); improve observation (7, 9%); take more care at
19 junctions (7, 9%); slow down/watch speed (4, 5%); use mirrors correctly (4, 5%);
20 plan further ahead (2, 3%).

21

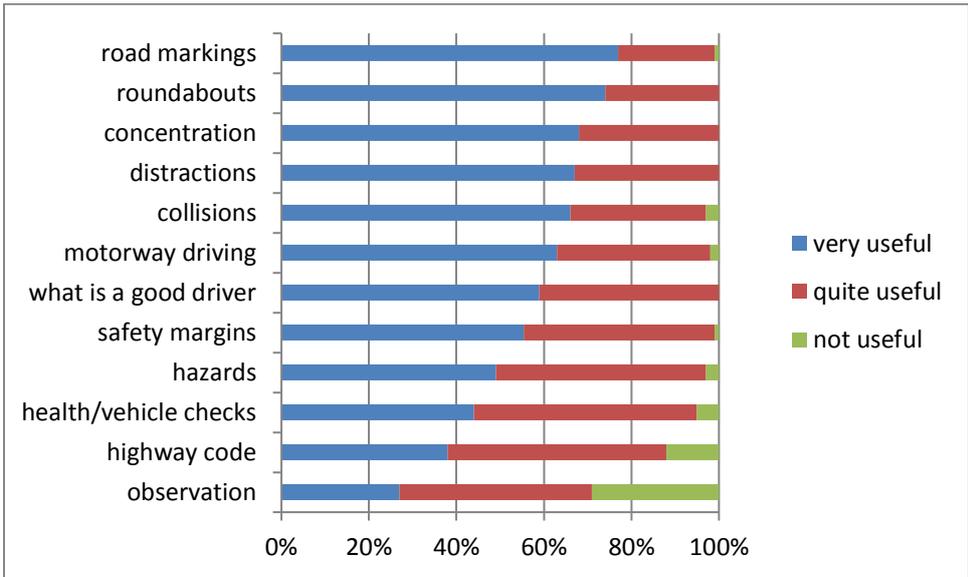
22 *3.7.2 Benefits of the course*

23

24 Participants rated the usefulness of different topics covered in the course (Figure 8).

25 There were no significant differences between the age groups or between males and

1 females. Two-thirds of drivers (85, 66%) said their knowledge of current driving
 2 regulations had improved following the course. Most drivers (121, 95%) said they
 3 had gained all they wanted from the course, three had not (2%), four did not answer.
 4 Those who did not would have liked more thorough coverage of certain topics (for
 5 example road signs). Most respondents (120, 94%) would recommend the course to
 6 others, only two people would not (because they had no-one to recommend it to) and
 7 six did not reply.
 8



9
 10 Figure 8: Usefulness of topics covered in the course (n = 128)

11
 12 **3.7.3 Focus Groups**

13
 14 All participant took part in the discussions. Results are presented in table 3
 15 according to items in the topic guide with verbatim quotations to illustrate each point.
 16 When asked if they had changed their driving behaviour since the course, several
 17 participants said they had, but others felt that an on-road practical course would be
 18 more likely to change behaviour.

1

2 **Table 2: Focus group topics and responses (n=136)**

Topic Guide Items	Results and illustrative verbatim responses (M = male, F = female)
What are the main issues for older drivers?	<p><i>“Over a period of time you do adopt habits which are not acceptable.” (M)</i></p> <p><i>“There is so much more traffic on the road now than when I started driving” (F)</i></p> <p><i>“Gadgets in the car like SATNAV can be very distracting” (M)</i></p>
What were the main reasons you volunteered for this course?	<p><i>“My wife thought it was time I went along...” (M)</i></p> <p><i>“I just wanted to make sure that I was driving safely.” (F)</i></p> <p><i>“I lost a great deal of confidence after the death of my husband.” (F)</i></p>
What aspects of the course were most useful?	<p><i>“As soon as I was coming on this course, I bought a Highway Code and I haven't looked at the Highway Code for years and that was one of the most important things that came out of it for me.” (M)</i></p>
What was missing from the course?	<p>Some participants thought videos of crashes might reinforce the message:</p> <p><i>“Could you do more ... to make it more hard hitting?” (M)</i></p>
How do health and medications interfere with driving?	<p>There was debate about eyesight and cataract surgery in particular:</p> <p><i>“After having cataracts done ... I find it much more difficult at night because of that and I get a sparkly effect sometimes.” (M)</i></p>
When do you think people should consider giving up driving?	<p>There was debate about renewal of the driving licence at age 70. Several voiced concerns about the system of self-certification for fitness to drive:</p> <p><i>“You fill in this three year renewal. You say everything is OK.” (M)</i></p> <p><i>“I know two people who are giving up driving, they are now in their 90s and they have decided to do it themselves because of various reasons, one because of eyesight - a sign in itself, and the other because he thinks he is getting slower in his mid 90s.” (M)</i></p>
The course you have taken was free because it was a pilot. How much would you be prepared to pay for the course?	<p>After discussion the groups decided £20 would be acceptable to older drivers.</p>

Discussion of Questionnaire results	
Two-thirds of participants were men. Why do you think this is?	<i>"Women don't on the whole think they are the drivers."</i> (F)
90% were aged under 85, we are hoping to reach older drivers. How do you think we might do this?	<p><i>"I think the folk who lack in confidence won't come anyway ... Those who are very confident, ... I am sure we will learn something, but there are those of us of our age who know it all and they wouldn't come on this course."</i> (M)</p> <p><i>"It needs a whole campaign doesn't it? Or write it into the storyline of a long-running TV soap opera."</i> (M)</p> <p>Participants suggested that invitations from those who had taken the course may encourage less confident drivers to attend future training.</p>
What issues do you think there are for drivers aged 85+?	<p>For women, some participants thought that death of a partner would necessitate driving but that they lacked driving experience: <i>"For 20 years I have been driven about by my husband."</i> (F)</p> <p>Complicated road lay-outs and roundabouts were seen as confusing particularly for oldest-old drivers: <i>"There are some big roundabouts now ... you are in the wrong lane, you can't get out of it."</i> (M)</p>
People avoid driving in the dark, bad weather and rush hour. What other conditions might you avoid?	<i>"wet nights I won't go out. The reflections, the lights - it's just too confusing."</i>
80% of those taking the course said they would definitely or probably make changes to the way the drive. What would you change?	<p>Several participants said they were more aware of speed limits and stopping distances: <i>"What it has made me aware of are the speed limits because when I started driving ... you just drove anywhere at any old speed."</i> (M)</p> <p>Some drivers were more aware of danger after the course: <i>"I think I am more frightened at night now."</i> (M)</p>

1

2

3 **4. Discussion**

4

1 The first objective of this study was to identify current driving knowledge, reasons for
2 driving, and self-regulatory strategies among older drivers to aid planning of future
3 on-road training. Most drivers had over 50 years of driving experience and half had
4 checked current driving regulations in the past two years, some did so because they
5 were coming on the course. Main reasons for driving were for shopping and leisure.
6 Half the drivers did not restrict their driving, but women and the oldest-old were
7 significantly more likely to self-regulate.

8

9 The second objective was to measure self-ratings of driving ability and confidence
10 before and after training. Before the course, most volunteers rated both confidence
11 and ability highly, suggesting that many already believed they were good drivers.
12 Consequently, ratings were unchanged for over half the drivers.

13

14 The third objective was to evaluate the utility and acceptability of the training course.
15 All participants found the course useful, and most said their driving knowledge had
16 improved. Most participants (102, 80%) said they would make changes to their
17 driving as a result of the course. Almost all would recommend the course to their
18 peers. Reasons for volunteering were discussed in the focus groups, many said
19 they had volunteered because they wanted confirmation of their driving competence.

20

21 The fourth objective was to examine the characteristics of course participants. There
22 were more volunteers among 75-79 year olds than 80-91 year olds. Most volunteers
23 in both age groups were the main driver in their household. Significantly more
24 oldest-old than youngest-old drivers had attended a previous driving course in the

1 past ten years. This may have affected their self-ratings of confidence and ability. A
2 third of both men and women had attended a previous course.

3

4 4.1 Driving self-regulation

5

6 Half the drivers said they would drive anywhere, and less than a quarter avoided
7 difficult driving situations. This may be partially explained by many of the volunteers
8 being confident drivers. Driving avoidance was more common among women, as
9 found in other studies (Gwyther and Holland, 2012). More drivers in the ≥ 80 group
10 than in the 75-79 group avoided driving in bad weather, on busy roads and on
11 unfamiliar roads. This may be due to awareness of their reduced functional ability,
12 rather than age. This finding is consistent with other studies, which have reported
13 that older drivers voluntarily restrict their driving and drive within their own
14 capabilities (Lang et al., 2013). However, it has been argued that some older drivers
15 may limit their driving not because they are aware of their driving ability, but because
16 of changes in lifestyle or preferences (Molnar, et al., 2013).

17

18 4.2 Self-ratings of confidence and ability

19

20 Before the classroom training, volunteers rated their confidence and driving ability.
21 Most volunteers rated both confidence and ability highly, suggesting that many
22 already believed they were good drivers. However, men rated themselves more
23 highly than women. Marottoli and Richardson (1998) also noted that older drivers
24 tend to rate themselves as being above average compared to others their age, and
25 that high ratings of driver ability are linked with high confidence ratings. In a study of

1 self-rated driving performance among older drivers, Freund and colleagues (2005)
2 concluded that older drivers tend to rate their driving performance highly, even when
3 driving skills are declining. These findings suggest a lack of awareness of limitations
4 among some older drivers.

5

6 After the course, because ratings of confidence and ability were already high, they
7 remained unchanged for over half the drivers. There were no significant differences
8 between the age groups or between males and females. Over a quarter were more
9 confident after the course, but 11% were less confident. In the focus groups this loss
10 of confidence was explained by greater awareness of potential hazards than
11 previously. Similar findings were reported by Nasvadi (2007) in a study of self-
12 reported changes after an educational driving course, where some older drivers
13 reported reduced confidence due to greater awareness of the risks of driving. In our
14 study, 20% of drivers lowered their self-ratings of driving ability after the course,
15 possibly due to a new awareness that their driving was not as good as previously
16 thought.

17

18 4.3 Intention to change driving behaviour after the course

19

20 Most participants said they would make changes to their driving as a result of the
21 course. These included increased awareness of hazards and the need for careful
22 observation and concentration on the driving task. Other studies have also
23 demonstrated effectiveness of educational training for older drivers. In a review of
24 evidence from five randomised controlled trials using an educational intervention,
25 Kua et al (2007) found moderate evidence that educational interventions improve

1 driving awareness and driving behaviour. However they did not reduce crashes in
2 older drivers.

3

4 4.4 Planning future courses for older drivers

5

6 Understanding the characteristics of people who attend mature driver training is
7 necessary for planning such courses (Nasvadi and Vavrik, 2007). This study has
8 found that older drivers who attended the training course were mostly confident
9 drivers seeking to update their knowledge, improve their driving and check that they
10 are still safe to drive. Only three people said that their main reason for attending was
11 to gain confidence. DCC wishes to attract drivers who are less confident in their
12 skills and ability so as to prolong their mobility in the community. The focus group
13 participants suggested that word-of-mouth invitations from those who had taken the
14 course may encourage less confident drivers to attend.

15

16 The course content was designed specifically for older drivers. The aspects of
17 driving participants wanted to improve were hazard perception, fuel economy and
18 negotiating roundabouts and junctions, the latter being a particular issue for drivers
19 in the oldest-old group. The topics rated most useful by respondents were road
20 markings, roundabouts, concentration and distractions. Training on observation was
21 rated least useful, possibly because this is a topic better suited to training in an on-
22 road situation. Observation is an area where older drivers are known to have
23 difficulties. For example, Bao and Boyle (2009) found that older drivers are less
24 observant at highway intersections than middle-aged drivers. Older drivers are more
25 likely than younger drivers to be involved in a road collision where 'failed to look

1 properly' is a contributory factor (Reed et al., 2012). It may be that the training
2 course needs adjustment to make it even more relevant to this group of drivers with
3 more detailed coverage of topics such as observation.

4

5 Drivers aged 75 and over were recruited because this group has a higher accident
6 rate than middle-aged drivers (Mitchell, 2013). Further, due to physical frailty, older
7 road users are more likely to die if involved in a traffic accident (Rolison et al., 2012,
8 Box et al., 2010). In the current study, drivers aged ≥ 80 were under-represented,
9 and recruitment for future courses should be targeted at this older age group.

10

11 4.4 Limitations and future research

12

13 The older drivers who volunteered for the DDG course were a self-selected group.
14 Most already thought themselves to be confident and skilled drivers. Almost one-
15 third of participants had taken part in a previous driving course within the last ten
16 years. Seventeen of these drivers had taken an earlier incarnation of the Dorset
17 Driver course. However, participation in previous courses had no effect on ratings of
18 confidence and ability.

19

20 Confidence measured how confident participants felt as a driver, whilst ability
21 measured their general driving ability. However, ratings of confidence and ability
22 were very similar for many participants and it is likely that these attributes are
23 interlinked. This is an issue to consider in future studies.

24

1 In the focus groups, several drivers said they had checked the regulations and/or
2 read the highway code after they had signed up for the DDG course. This indicates
3 that many of the volunteers were motivated to perform well, and thus may not be
4 representative of all older drivers.

5

6 The questionnaires were developed and piloted to evaluate the training course. As
7 the training session lasted two hours and the questionnaires were administered
8 before and after the course, they were brief so as not to tire the participants.

9 However, it would be useful to use a standardised scale of driving avoidance in
10 future studies to permit clearer comparisons with other studies.

11

12 Although the course had demonstrable benefits in terms of participant satisfaction;
13 stated increased awareness; and intention to change behaviour; it is not possible to
14 determine if these changes will be long lasting or affect road safety. In order to do
15 this, future studies should track participants longitudinally with respect to crash
16 outcomes.

17

18 The intervention was classroom-based, but there is evidence that a combination of
19 classroom and on-road training enhances driver performance (Marottoli, et al., 2007,
20 Korner-Bitensky, et al., 2009). Further research is being carried out with the same
21 group of volunteers whereby they will receive on-road training, and comparisons will
22 be made between driving performance and self-reported ability.

23

24 **5. Conclusion**

25

1 Driving is very important to many older drivers and this is evidenced by the number
2 of older drivers who volunteered for the course. A major motivation for attending was
3 to have confirmation of their driving competence. This study demonstrates the
4 importance of retraining approaches and of understanding who takes mature driver
5 courses and why. Results provide preliminary evidence that a classroom based
6 course can initiate a behaviour change, which is important when developing
7 innovative strategies to keep people safe behind the wheel for as long as possible.

8

9 Results of the survey and focus groups are consistent with previous research on
10 educational training initiatives for older drivers. Additionally, this study provides
11 insights which can inform the development of future courses. Interestingly, a third of
12 participants had taken a previous driving course which may have affected their self-
13 ratings of driving skills. As the majority of participants rated their pre-course
14 confidence and driving ability as high, we were unable to demonstrate significant
15 improvements after training. Classroom training should therefore be linked to on-
16 road training to more accurately assess the driving ability of older drivers.

17

18 **Acknowledgements**

19

20 The authors wish to thank the Dorset Road Safe Partnership, which created the
21 Dorset Gold older driver training course, and provided funding for both the course
22 and the evaluation study. This Partnership comprises representatives from Dorset
23 County Council, Bournemouth Borough Council, Borough of Poole Council, Dorset
24 Police, Dorset Fire and Rescue Service, and the charities Streetwise and Safewise).
25 We thank Emma Selway of DDC for facilitating the courses and the study; the driving

1 instructors (Brian Chidgey, Paul Gowing, Jeff Parsons, David Moyes, Tina Moyes)
2 who delivered the training; and the older drivers who took part. We also thank the
3 reviewers of a previous draft for their helpful suggestions.

4

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1 **Appendix I**

2 **Pre-Course Questionnaire**

3

4 Date of course _____

Venue _____

5 Participant Number:.....

Presenter _____

6

7 1. Age group

8 75 - 79

9 85 - 89

10 80 - 84

11 90 - 94

12 95 +

13

14 2. Gender Male Female

15

16 3. Approximately how many miles do you drive in a year?

17

18 4. When did you pass your driving test?

19

20 5. Are you the main driver in your household? Yes No

21

22 6. What are your main reasons for driving? (tick all that apply)

23 Shopping or errands

24 Visiting friends or relatives

25 Leisure

26 Going to appointments

27 To /from workplace

- 1 Negotiating roundabouts Negotiating junctions Fuel economy
- 2
- 3 Positioning your car on the road Hazard perception Motorway driving
- 4
- 5 Speed awareness Other please specify
- 6
- 7 _____
- 8

9 13. How up to date are you with current driving regulations (e.g. the Highway Code, DVLA website)?

- 10 I checked recently
- 11 Within the last year
- 12 Within the last 2 years
- 13 Within the last 5 years
- 14 In over 5 years
- 15 Not at all

16

17 14. Have you taken part in any driving courses in the last 10 years?

18

19 (e.g. Institute of Advanced Motorists (IAM), RoSPA, Driver Awareness Scheme or refresher course)

- 20 Yes No

21

22 If 'Yes' please state type of training

23

24

1 **Appendix II**

2 **Post-course questionnaire**

3 Participant Number:.....

4 Please complete this section after the presentation and return to the presenter.

5

6 1. Here is a list of the topics covered in the course. Please rate how useful these were to you

7

8

	Very useful	quite useful	not useful
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9 What makes a good driver?

10 Are you concentrating?

11 Distractions

12 Health and vehicle checks

13 Highway code

14 Motorway driving

15 Roundabouts

16 Road markings

17 Safety margins

18 What is a hazard?

19 Observation

20 Collisions

21

22 2. If there any other topics you would have liked us to have covered on this course what are these?

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25 3. In general, how useful was this course to you? (Select one only)

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27 Very useful Quite useful Not useful

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4. Now you have taken this course do you intend to make changes to the way you drive?

Yes definitely Yes probably Not sure Unlikely

If you said yes, what changes do you plan to make?

.....

5. How confident do you now feel as a driver? (Please circle a number below)

Not at all confident 1 2 3 4 5 6 7 8 9 10
Extremely confident

6. How do you now rate your general ability as a driver on a scale of 1 to 10? Please circle a number below

Poor 1 2 3 4 5 6 7 8 9 10 Excellent

7. How much, if at all, do you feel that your knowledge of the Highway Code has improved after taking this course?

Stayed about the same

Not improved at all

Not improved very much

Improved to some extent

Improved a great deal

8. Did you gain all that you hoped to from this course?

Yes No If no, please explain

1 9. Will you recommend the course to other drivers?

2

3 Yes if yes, why is this?.....

4 No if not, why is this?.....

5

6 Thank you for taking the time to complete this feedback form.