



Evaluation of an Collision-Involved Driver Improvement Scheme.

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MANUSCRIPT DETAILS

TITLE: Evaluation of an Collision-Involved Driver Improvement Scheme.

ABSTRACT:

The purpose of this study was to compare driver knowledge, attitudes and perceptions (in terms of hazard, risk, accident, offence detection and driving skill perceptions) and self-reported driving style in a sample of 461 drivers before and after attending a UK Driver Improvement Scheme for culpable collision-involved drivers, in order to inform future directions in the design of driver retraining programmes.

Participants were a sample of 461 drivers attending a UK 1.5 day Driver Improvement Scheme course for culpable collision-involved drivers. The course contained classroom-based training and a practical driving component. Participants completed a Driver Improvement Scheme Questionnaire (DISQ) before and immediately after attending the 1.5 day course, and again 3 months later.

Results indicated significant pre and post course effects in terms of increased driving safety with respect to driving knowledge, perceptions of control, perceived likelihood of accident-involvement, hazard perception and reported risk-taking. Key positive effects of reduced risk-taking and near-misses persisted three months after course completion.

One limitation of this study is that at the 3-month follow-up there was a reduction in the response rate (44.69%) which included significantly fewer young drivers.

Results indicate positive behavioural, perceptual and behavioural changes, along with specific age, gender and driving experience effects which have implications for the design of future driving courses.

This study has implications for community safety through enhanced road safety training measures.

The analysis of age, gender and driving experience effects of the impact of this Driver Improvement Scheme will allow targeted training methods for specific groups of drivers.

Evaluation of a Collision-Involved Driver Improvement Scheme.

Abstract

Purpose

The purpose of this study was to compare driver knowledge, attitudes and perceptions (in terms of hazard, risk, collision, offence detection and driving skill perceptions) and self-reported driving style in a sample of 461 drivers before and after attending a UK Driver Improvement Scheme for culpable collision-involved drivers, in order to inform future directions in the design of driver retraining programmes.

Method

Participants were a sample of 461 drivers attending a UK 1.5 day Driver Improvement Scheme course for culpable collision-involved drivers. **Drivers were deemed culpable if they were found to be at fault by the police for the causation of the collision.** The course contained classroom-based training and a practical driving component. Participants completed a Driver Improvement Scheme Questionnaire (DISQ) before and immediately after attending the 1.5 day course, and again 3 months later.

Findings

Results indicated significant pre and post course effects in terms of increased driving safety with respect to driving knowledge, perceptions of control, perceived likelihood of collision-involvement, hazard perception and reported risk-taking. Key positive effects of reduced risk-taking and near-misses persisted three months after course completion.

Research limitations / implications

One limitation of this study is that at the 3-month follow-up there was a reduction in the response rate (44.69%) which included significantly fewer young drivers.

Practical implications

Results indicate positive behavioural, perceptual and behavioural changes, along with specific age, gender and driving experience effects which have implications for the design of future driving courses.

Social implications

This study has implications for community safety through enhanced road safety training measures.

Originality / value

The analysis of age, gender and driving experience effects of the impact of this Driver Improvement Scheme allow targeted training methods for specific groups of drivers.

Introduction

Road traffic collisions are still one of the most common forms of premature death in the developed world, particularly for young males (Ward & Christie, 2000; OECD, 2006; Lazano et al, 2012; WHO 2020). Research has long demonstrated that human factors contribute significantly to all road traffic accidents/collisions (Petridou and Moustaki, 2001; Shinar, 2007). Much of the intervention activity designed to reduce driver **blameworthy** collision involvement has focused on the twin tracks of education/training and deterrence through legislation (Guppy, 1994; WHO, 2013; Factor, 2014). In particular, research has indicated the importance of perceptions and attitudes in the commission of risk-taking and offending behaviour, **such as speeding and drink-driving** (Matthews and Moran, 1986; Lund and Williams, 1985) and this has been a key area of focus for driver education.

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3 Research which has evaluated driver education/training programmes has been
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5 fraught with methodological problems (Ker et al, 2003), and generally, studies have
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7 produced inconsistent findings, with no clear-cut answer as to their effectiveness
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9 (Beanland et al, 2013; Rosenbloom and Eldor, 2014). Some studies have found
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11 training and education to have a positive effect (Conger et al, 1966; McKenna, 2007;
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13 Brijs et al, 2014), while some have found no measurable effects (McGuire and Kersh,
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15 1969), and others have found negative effects (Dreyer and Janke, 1979; Wahlberg,
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17 2010). Gender differences also come into play as some positive effects have been
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19 found for females, but not for males (Zhang et al., 2011).
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25 Significant steps in the area of driver retraining and rehabilitation occurred within the
26
27 **United Kingdom (UK)** as a result of the Road Traffic Law Review (1988). This review
28
29 recommended that a pilot study of one day retraining in basic driving skills, **offered to**
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31 **blameworthy collision-involved drivers as an alternative to prosecution under traffic**
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33 **offence legislation**, should be undertaken to determine whether such retraining
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35 produces a lasting improvement in the driving skills of the drivers on the course.
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37 Devon & Cornwall Constabulary and Devon County Council's Road Safety Unit
38
39 established a **trial** intervention for drivers involved in blame-worthy collisions.
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41 Following this pilot study, many similar Driver Improvement Schemes were rolled out
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43 across areas of the UK. Several such schemes were evaluated by Burgess & Webley
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45 (1999) using pre and post-course attitude, perception and skill measures. Results
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47 indicated that course attendance was associated with an improvement in attitudes
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49 towards offending, a particular increase in the perceived seriousness of speeding,
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51 reduced reported risk-taking, but no reliable differences in reported near-miss or
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53 **collision** experiences. Conner and Lai's (2005) evaluation of Driver Improvement
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55 Schemes across England and Wales found that there were some improvements in
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3 reported driving behaviours, but not in driver attitudes. Hazard perception, a driver's
4 ability to detect developing situations that require them to take some action, is one
5 area where novice drivers perform worse than experienced drivers and this lower skill
6 may be related to their higher risk of collision involvement (Elander et al, 1993). Isler
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12 *et al's* research (2009) demonstrated that differences in the level of hazard perception
13 skills between novice and experienced drivers could be eliminated by hazard
14 perception training. Other research into hazard perception training has also yielded
15 positive findings (Crundall et al, 2010; McKenna et al, 2006; and Wang et al, 2010).
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22 McKenna (2007) reported positive impacts of speed awareness courses with respect
23 to attitudes towards speeding and risk-related knowledge. In particular, there were
24 positive attitude changes in relation to speeding, the perceptions of the dangerousness
25 of speeding in urban areas and intentions to control their speeding in the future. These
26 outcomes may be used to predict future driving behaviour according to Fishbein &
27 Ajzen's (1975) Theory of Reasoned Action which proposed that a person's intention
28 to perform a behaviour is a key predictor of behavioural performance. Further,
29 research has identified the role of perceived behavioural control in the prediction of
30 driving intentions and behaviours (Clayton et al, 1982; Guppy 1987), a relationship
31 which has theoretical foundations in Ajzen's (1985,1988) Theory of Planned
32 Behaviour, where the element of perceived behavioural control is identified as a
33 predictor of both intention and behaviour. Similarly, Sheeran et al (1999) found that
34 intentions based on attitudes are reliable predictors of future behaviour, highlighting
35 the importance of attitude change in driver retraining courses.
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57 Perceptions of risk are subjective judgements that people make about the likelihood
58 and severity of a risk, while perceptions of risk utility are judgements that people make
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3 about the usefulness of accepting a risk. Models of driver behaviour that highlight
4 perceptions of risk and utility (Mathews and Moran, 1986) as explanatory factors in
5 risk-taking behaviour also provide a focus for education and retraining programmes to
6 increase drivers' awareness of the objective levels of risk associated with certain
7 dangerous driving behaviours. Brijs *et al's* (2014) study reported that a classroom and
8 practical based education program for young drivers in Belgium resulted in an
9 improvement in risk-related knowledge. Many studies have emphasised the
10 importance of perceived risk and utility in contributing to the decision-making process
11 that leads to driver risk-taking (Botticher and van der Molen, 1988; Fuller, 1988; Wilde,
12 1988; Summala and Naatanen, 1988; Adams-Guppy and Guppy, 1995; Styles et al,
13 2005), while several studies suggest that perceptions of skill and driving style have a
14 role in the development of risk-perception and risk-taking (Guppy et al, 1990; McKenna
15 et al, 1991; Guppy, 1993; French, 1993; Adams-Guppy & Guppy, 1995; Freund et al,
16 2005). It can be seen from the literature that perceptions of hazards, risk, utility and
17 control, as well as views on driving skills and motivations, are an integral part of the
18 risk-related decision-making process, and thus an area that should be included in
19 driver education. The present study builds upon the existing literature by evaluating
20 changes in driving attitudes, perceptions of hazards, risks and control before and after
21 attendance on a driver retraining programme with a large group of culpable collision-
22 involved drivers.

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50 The main objectives of this study are to (1) assess the impact of the Driver
51 Improvement Scheme on participants' driving knowledge, self-reported driving style
52 and risk-taking behaviours, perceptions of risks, hazards, control, and collision and
53 detection likelihood (2) to identify successful outcomes of this driver retraining
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3 programme in order to inform future directions in the design of driver retraining
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5 programmes.
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8 **It is hypothesised that:**
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- 10 • (1) there will be significant differences between driver knowledge, self-reported
11 driving style, risk-taking behaviours and perceptions of hazards, risks, control
12 and collision and detection likelihood before and after completing the Driver
13 Improvement Scheme and
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- 16 • (2) these differences will persist at the three month follow up period.
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- 18 • (3) there will be significant attitudinal and perceptual differences between
19 younger and older drivers and between males and females, with possible
20 interaction effects.
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33 **Method**

34 **Participants**

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39 The participants in this study were 461 culpable collision-involved drivers in a county
40 in the North of England who had agreed to attend a one and a half-day Driver
41 Improvement Scheme course. The majority of participants were male (67.5%), with
42 37% aged under 30, 34% aged between 30 and 49, and 29% aged 50 and over, with
43 the median age being 36. The driving experience of the sample ranged from 1 to 65
44 years (mean 16.7yrs, **standard deviation** 13.7).
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54 Of the 461 participants who attended the course, **458** (99.35%) completed the pre-
55 course Driver Improvement Scheme Questionnaire (Time 1) and **439** (95.23%)
56 completed the post-course **Driver** Improvement Scheme Questionnaire (Time 2). At
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3 the 3 month follow-up after completion of the course, 206 (44.69%) completed the
4 follow-up Diver Improvement Scheme Questionnaire (Time 3). The self-reported
5 gender breakdown was 67.5% male and 32.5% female at Time 1, 66.7% male and
6 33.3% female at Time 2 and 64.6% male and 35.4% female at Time 3. At Time 1
7 36.8% of the sample were aged under 30 years, for Times 2 and 3 the figures were
8 37.3% and 30.5% respectively. At Time 1 33.1% of the sample were aged 30-49 years
9 and the figures were 33.8% and 35.7% for Times 2 and 3. For participants aged 50
10 and over, the figures for Times 1, 2 and 3 were 31.1%, 28.9% and 33.5% respectively.
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26 Analysis of sample attrition across the three sample time periods demonstrated that
27 while there were no significant differences with respect to gender across the three
28 samples, there was a significant age effect ($t=2.38$, $df 716$, $p<.05$), with fewer young
29 participants in the Time 3 follow-up.
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39 **Materials**

40 **Overview of the Driver Improvement Scheme**

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42 The Driver Improvement Scheme (DIS) evaluated in this study was set up to provide
43 retraining for culpable collision-involved drivers within a county in the north of England
44 and was based upon the early Devon and Cornwall model developed in the 1990's.
45 The scheme had two components of driver training incorporating both the theoretical
46 issues underlying safe driving behaviours as well as a practical training session. The
47 purpose of the scheme was to reduce the likelihood of future collision-involvement of
48 these drivers. The first day of the course covered material which encouraged self-
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3 awareness as a driver especially in relation to stress and interactions with other road
4 users, followed by a session of hazard recognition and avoidance. These emphasized
5 increasing awareness of road signs and markings indicating hazards as well as
6 focusing on maintaining control of the vehicle and its position in relation to the road
7 and other road users. This was followed up by a three hour practical driving session
8 with a driving instructor, with particular focus on identifying and dealing with hazards.
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10 There was also a 3 hour practical driving session with a Driving Instructor. The second
11 day (which was only a half-day session) included a Highway Code session, another
12 practical session and a final feedback and discussion session.
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24 The scheme was evaluated using the Driver Improvement Scheme Questionnaire
25 (DISQ), a measurement tool developed specifically for this evaluation, but containing
26 core driving attitude and perception scales used in previous published research.
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38 **Design and Content of the Driver Improvement Scheme Questionnaire**

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41 Previous research has identified the potential for driver attitudes and perceptions to
42 differentiate between drivers based on their violation behaviour (Parker et al, 1992a;
43 Guppy, 1993; Vardaki and Yannis, 2013) and their collision involvement (Guppy et al,
44 1990; Clay 1995; Iversen and Rundmo, 2004). Similarly, driver attitudes and
45 perceptions of risk and utility have been previously identified as key components of
46 risk-taking behaviour (Adams-Guppy and Guppy, 1995; Adams-Guppy and Guppy,
47 2003; Ivers et al, 2009). Thus, the Driver Improvement Scheme Questionnaire
48 contained some established core driving attitude and risk perception scales used in
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3 previous published research (Guppy et al, 1990; Clay, 1995; Adams-Guppy and
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5 Guppy, 1995; Adams-Guppy and Guppy, 2003).
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8 The pre-course (Time 1) and post-course (Time 2) Driver Improvement Scheme
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10 Questionnaires were identical in content, question order and format, except for
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12 variations on the introductory page and a final section asking details about drivers'
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14 experiences on the course which was included in the post-course Driver Improvement
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16 Scheme Questionnaire (Time 3).
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20 The Driver Improvement Scheme Questionnaire (DISQ) contained the following
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22 sections:
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25 26 *Driver biographical and driving history information*

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28 This section contained biographical and driving history items, such as age, gender and
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30 driving experience.
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33 34 *Driver Views on the Course*

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36 This section was included in the post-course DISQ and contained items measuring
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38 perceptions of knowledge gain from course attendance and intentions to change
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40 driving behaviours in the future. The specific items were: 'Overall, how much did you
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42 learn from this course?' with responses reported on a five-point scale from 1 (nothing
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44 at all) to 5 (a great deal) and 'How different will your future driving be after attending
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46 this course?' with responses reported on a five-point scale from 1 (no different at all)
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48 to 5 (very different).
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52 53 *Driving Knowledge*

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55 This section included three driver knowledge items relating to close-following and
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57 drink-driving. The first item asked 'When following a vehicle at 55mph on a busy dual
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3 carriageway, how much of a gap would you leave between yourself and the vehicle in
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5 front?' with responses to this item recorded in the time measurement of seconds. The
6
7 second and third items asked 'what do you think is the largest number of half pint
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9 glasses of standard strength beer or lager you could drink and still be under the legal
10
11 limit?' and 'What do you think is the largest number of half pint glasses of standard
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13 strength beer or lager you could drink and still be able to drive safely?'. Responses to
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15 the second and third items in this section were measured in terms of number of half
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17 pints, and then were scored as the number of units of alcohol.

22 *Perceptions of Control, Risk of Collision-involvement & Offence Detection*

25 Items in this section included drivers' perceptions of their risk of collision involvement,
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27 risk of offence detection and perceived control. A series of risk-taking items that have
28
29 been associated with predicting culpable collision-involved drivers (Clay, 1994) were
30
31 also included.

35 Two variables measured drivers' perceptions of control: 'I feel my safety is mainly in
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37 the hands of other road users' and 'I feel that the problems I encounter while driving
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39 are beyond my control', both of which were scored on a five-point scale, but reversed
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41 so that high scores reflected higher levels of perceived control.

45 The two variables measuring perceptions of likelihood of collision-involvement and
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47 offence detection were included ('I am likely to have a minor accident in the coming
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49 year' and 'I am likely to be stopped by the police for a traffic offence in the coming
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51 year'). A third variable was added to capture the consequences element of collision
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53 risk perception ('If I have an accident in my car, it is unlikely that I would be badly hurt').
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55 These variables were scored on a five-point scale where 1 = strongly disagree and 5
56
57 = strongly agree.
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Perceived Driving Style

Items in this section contained a series of driver self-rating driving style semantic differentials, closely based on items in previous research that have identified collision-involved drivers (Guppy et al, 1990) and risk-taking drivers (Adams-Guppy and Guppy, 1995), to produce a shortened driver self-rating scale. The driving style semantic differentials were: attentive-inattentive, careful-careless, patient-impatient, reckless-cautious, responsible-irresponsible, safe-risky, anxious-relaxed, irritable-calm, and exciting-boring. Responses were reported on a five-point scale with each pair of semantic differentials as the end anchor points. Principal components analysis identified two main factors, the first factor reflecting higher scores on careless, risky, irresponsible, inattentive and reckless driving style, and the second factor indicating higher scores on calm, relaxed and patient driving style.

Perceived Driving Skills and Hazard Perception

In order to capture changes in skill and hazard perception, two scenarios were described and drivers were asked to rate hazard and collision risk for each scenario. The two scenarios were: speeding in an urban setting and close-following on a motorway. For each variable, participants were asked 'how hazardous is this situation?' and 'how likely are you to have an accident?' with responses scored between 1 (not very) to 5 (very).

Reported Risk-Taking and Near-Misses

Items in this section included a series of questions about drivers' self-reported risk-taking behaviours, including speeding, drink-driving, close following, dangerous overtaking, driving through red traffic lights, racing with other drivers, seat-belt wearing and the incidence of near-misses. Participants were asked 'how often' they engaged

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3 in the following driving behaviours, and reported their answers on a five-point scale
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5 (from never to very often): (i) Drive especially close to the car in front as a signal to its
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7 driver to go faster or get out of the way? (ii) Drive through red traffic lights? (iii) Get
8
9 involved in unofficial races with other drivers? (iv) Wear a seatbelt when driving? (v)
10
11 Exceed the speed limit in built-up areas by more than 10 mph? (vi) Exceed the speed
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13 limit on the motorway by more than 20 mph? (vii) Closely follow the vehicle in front?
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15 (viii) Take chances when overtaking? Participants were also asked 'How often in the
16
17 last 12 months have you driven when you thought you might have drunk over the legal
18
19 limit?', and provided with the following answer scale: 'Never/ Once or twice / 3-5 times
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21 / 6-10 times / About once a month / About once a week / More often.' In order to
22
23 assess the incidence of near-misses participants were asked 'Approximately how
24
25 many near-miss accidents have you been involved in while driving during the last three
26
27 months?', with a response scale of 'None / One or two / About one a month / About
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29 one a week / More often'. Near-misses were defined as 'a near-miss accident is when
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31 you are very nearly involved in an accident.'
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41 Procedure

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44 The pre-course Driver Improvement Scheme Questionnaire was posted out to drivers
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46 in the week before they attended the driver training course and was collected by
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48 administrative staff upon arrival at the course centre. The post-course Driver
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50 Improvement Scheme Questionnaire was given to participants by administrative staff
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52 at the end of the second day of training and was completed and handed back to
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54 administrative staff (i.e., staff not involved in the delivery of the training). These two
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56 administrations of the question were labelled Time 1 and Time 2. The follow-up Driver
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3 Improvement Scheme Questionnaire was posted out to participants three months after
4 they had completed of the course and participants posted the completed
5 questionnaires back. This third administration of the questionnaire was labelled Time
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10 3. Each questionnaire took approximately 10-15 minutes to complete.
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16 **Analysis of Data**

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19 The information contained in the Pre and Post Driver Improvement Scheme
20 Questionnaires was coded and analysed using SPSS. A number of univariate and
21 multivariate statistical procedures were employed in the analysis of the data. Principal
22 Components Analysis was performed to identify key driving styles. Repeated
23 measures ANOVA were performed on Changes to Knowledge, Perceived Likelihood
24 of Collision and Detection and Perceived Control, controlling for age, gender and Time
25 effects (Time 1, Time 2 and Time 3). Repeated Measures ANOVAs were conducted
26 on Driver Self Ratings, Hazard Ratings and Collision Likelihood were performed
27 analysing age, gender and time effects. Repeated Measures ANOVAs on Reported
28 Risk-Taking and Near-Miss Experience were also performed. Qualitative analyses
29 were also undertaken on the participants' responses to open-ended questions and key
30 themes were identified.
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50 **Results**

51 *Drivers' ratings of the course*

52 *Quantitative data*

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3 The post course follow-up DISQ (Time 2) asked drivers two questions to assess (i)
4 how much they felt they had learned and (ii) how different they felt their future driving
5 would be. As Table 1 shows, overall drivers were positive on both items. There were
6 strong significant gender differences on both items, with females being more positive.
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8 Significant age differences were also found with older drivers demonstrating more
9 positive attitudes.
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Safer Communities

Table 1. Sample Breakdown and Satisfaction with Course

	Age 17 - 30		Age 31 - 50		Age > 50		Significant effects
	Male	Female	Male	Female	Male	Female	
	N = 118	N = 56	N = 87	N = 59	N = 88	N = 34	
Overall, how much did you learn from this course? (1 nothing, 5 a great deal)	4.34	4.57	4.32	4.55	4.53	4.80	F (sex) = 12.29, df 1, 431 *** $\eta^2=.03$
	.69	.64	.69	.69	.71	.47	F (age) = 4.01, df 2,431 * $\eta^2=.02$
2. How different will your future driving be after attending this course? (1 not different, 5 very different)	3.80	4.24	3.95	4.27	4.20	4.43	F (sex) = 15.21, df 1, 431 *** $\eta^2=.03$
	.78	.62	.88	.81	.89	.88	F (age) = 3.86, df 2, 431 * $\eta^2=.02$

*** p<0.001

* p<0.05

Qualitative data

In terms of how different future driving would be, 365 participants provided comments in an open-ended section of the DISQ (Time 2). These were coded into main themes. Around 37% of the comments reflected improved awareness, with 12% indicating they would be slower or more cautious, and a further 12% indicating that their hazard identification would be improved. Nearly 8% of those responding indicated their driving would be more confident or relaxed. Just over 7% indicated they would be using gears better and gaining more control on corners. Around 6% of the sample indicated they would read road signs and lines better and a further 5% indicated improved use of mirrors in the future. When these comments were analysed against driver characteristics, there were no significant associations with gender, but the analysis by age groups suggested that younger drivers were more likely to indicate their future driving would be slower and more cautious (Adjusted Standardised Residual = 4.0, $p < .001$).

Changes to knowledge

As Table 2 indicates, there was a significant pre and post course effect in terms of drivers' estimates of how much alcohol they could drink and still be within the UK legal drink-drive limit; post course drivers provided lower estimates. There was also a significant sex effect, with females providing lower estimates of the amount of alcohol they could drink within the legal limit. These results were also mirrored in their estimates of how much alcohol they could drink and still be able to drive safely. There were significant time, age and sex effects, with lower estimates provided by females, younger drivers and after the course.

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3 There were also significant time and age-sex interaction effects for drivers' reports of
4 how many seconds time gap they would leave between them and the car in front, when
5 travelling at 55mph. The estimates dropped significantly after the course and fell more
6 closely to the '2 second rule'. With respect to the age-sex interaction effect, women
7 reported higher time intervals than men, except for those in the 50 years+ age group,
8 where men provided higher estimates than women. The time estimates also increase
9 with age, across both sexes, except for the females aged 50 years plus.
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Table 2. Repeated measures ANOVA on changes to knowledge, perceived likelihood of collision and detection and perceived control

Gender	Males						Females						Significant effects
	17 - 30		31 - 50		> 50		17 - 30		31 - 50		> 50		
Age	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Time													
Gap following at 55 mph (90 kph) in seconds	4.36	2.34	4.82	2.79	6.17	3.83	4.90	3.11	5.72	3.09	4.88	2.34	F (time) = 91.33, df 1, 407 *** η²=.13
Estimate of legal Drink-driving limit (in drinks)	2.21	2.23	2.49	2.30	2.49	2.47	2.07	1.98	2.26	2.07	2.33	2.06	F (time) = 7.00, df 1, 414 **
Estimate of safe drink-driving limit (drinks)	1.00	1.01	1.06	1.09	1.08	1.25	1.04	0.99	0.94	1.00	1.86	1.28	F (time) = 26.04, df 1, 407 ***
	1.68	1.31	1.93	1.29	2.01	1.83	0.69	0.65	1.21	0.77	1.00	0.90	F (age) = 5.05, df 1, 407 **
	1.42	1.40	1.49	1.44	1.71	1.72	0.91	0.85	1.17	0.97	0.96	0.91	F (sex) = 32.59, df 1, 407 ***
Perceived Collision-Involvement	2.45	2.33	2.48	2.23	2.34	2.17	2.48	2.14	2.38	2.11	2.21	2.18	F(time)=23.03, df 1, 424***
Perceived Likelihood Of Detection	.81	.78	.89	.98	.92	.91	.79	.76	.71	.75	.74	.85	F(sex)=16.98, df 1, 436***
Perceived Control 1	2.18	2.25	2.11	2.12	2.04	2.04	1.88	1.90	1.70	1.77	1.97	1.83	
	.96	.85	.87	.88	.84	.85	.79	.78	.72	.80	.84	.89	
Perceived Control 2	3.71	4.09	3.43	3.84	3.75	3.86	3.45	3.78	3.85	4.07	3.64	4.24	F(Time) = 41.83, df 1, 434 ***
	.99	.87	1.03	1.09	1.04	1.16	.86	.90	.88	.82	1.22	.87	F(Age x Sex) = 4.76, df2, 434**
	3.76	3.86	3.39	3.77	3.63	3.66	3.75	3.83	3.52	3.63	3.53	3.65	F(Time) = 7.25, df 1, 424**
	.95	.79	.89	.80	.93	.93	.94	.79	.79	.82	.90	.98	

Changes to perceptions of control

Table 2 provides details of time, age and sex effects across two variables measuring drivers' perceptions of control (nb: high scores reflect greater perceived control). Age-sex interaction effects were demonstrated on the first variable (Perceived Control 1) measuring perceptions of control variable ('I feel my safety is mainly in the hands of other road users'), with the youngest and oldest female groups scoring significantly higher than age-matched males. It was only the middle-aged males who scored more highly on this variable than the middle-aged females. Highly significant time effects were also shown, with significantly higher perceptions of control across all groups after attending the course.

Younger drivers (<30 years) reported significantly higher perceptions of control on the variable Perceived Control 2 ('I feel that the problems I encounter while driving are beyond my control') than drivers in the two older age groups. This held for both males and females. Highly significant effects were also found between pre and post course measures, with all groups reporting higher perceived control after attending the course.

Perceived likelihood of collision-involvement and police detection

Table 2 shows that drivers were significantly less likely to perceive that they would be involved in a minor collision in the coming year at the post course follow-up DISQ survey ($F=23.03$, $df 1, 424$, $p<.001$). There was no statistically significant change over time in terms of perceived likelihood of detection by the police; however, there was a significant gender effect ($F=16.98$, $df 1, 436$, $p<.001$), with males perceiving a significantly higher likelihood that they would be stopped by the police for a traffic offence in the coming year. There were no significant age effects, although there was a definite trend in a lowering of this perception among males as age increased.

Driver self-ratings

The shortened Driver Self Rating scale items from Time 1 were subjected to a Principal Components Analysis with varimax rotation. The resulting factor loadings are shown in Table 3. As can be seen, two factors accounting for 66% of the original variance were produced. Higher scores on Factor 1 reflected higher self-ratings of careless, risky, irresponsible, inattentive and reckless driving (labelled Risky). Higher scores on Factor 2 reflected self-ratings of calm, relaxed and patient driving (labelled Relaxed). Simple factor scores were calculated for both Time 1 and Time 2 by summing higher loading items on the two factors.

Table 3. Factor Loadings for Driver Self Rating Factors

Items and scoring	Factor 1 (Risky driver)	Factor 2 (Relaxed driver)
Careful (1) – careless (5)	.858	-.100
Safe (1) – risky (5)	.819	-.252
Responsible (1) –irresponsible (5)	.802	-.149
Attentive (1) – inattentive (5)	.761	-.156
Reckless (1) – cautious (5)	-.652	.276
Irritable (1) – calm (5)	-.262	.856
Anxious (1) – relaxed (5)	-.037	.845
Patient (1) – impatient (5)	.454	-.568

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Table 4. Summary of Repeated Measures ANOVAs on Driver Self Ratings, Hazard Ratings and Collision Likelihood.

Gender	Males						Females						Significant effects
	17 - 30		31 - 50		> 50		17 - 30		31 - 50		> 50		
Age													
Time	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Driver Self Rating (Risky)	3.11	3.10	3.13	3.24	3.43	3.29	3.36	3.28	3.39	3.36	3.43	3.13	F(time)=7.94, df 1, 386** F(time x age)=6.76, df 2, 386*** F(time x sex)=5.06, df 1, 386*
	.54	.50	.58	.56	.59	.70	.45	.45	.55	.53	.54	.49	
Driver Self Rating (Relaxed)	3.98	4.12	3.89	4.19	4.14	4.28	3.75	3.95	3.90	4.18	4.02	4.00	F(time)=25.78, df 1, 396*** F(time x age)=3.67, df 2, 396*
	.73	.65	.69	.62	.78	.73	.66	.68	.68	.62	.59	.67	
Scenario 1: hazard rating	4.30	3.99	4.53	4.29	4.72	4.67	4.73	4.31	4.74	4.39	4.76	4.50	F(time)= 34.90, df 1, 435*** F(age)=5.96, df 2, 435***
	.92	1.03	.78	1.06	.74	.69	.53	.81	.60	.94	.82	1.08	F(age)=6.09, df 2, 436*
Scenario 2: hazard rating	4.56	4.57	4.64	4.60	4.73	4.56	4.45	4.47	4.68	4.68	4.82	4.85	
	.79	.53	.59	.69	.63	.89	.58	.58	.65	.57	.39	.36	
Scenario 1: self-collision likelihood	3.22	3.28	3.34	3.31	3.53	3.49	3.77	3.65	4.00	3.54	3.81	3.55	F(time)=4.25, df1, 420* F(time x sex)=3.96, df 2, 420* F(sex)=10.95, df 1, 420***
	1.14	1.08	1.10	1.15	1.48	1.31	1.09	1.02	1.08	1.21	1.40	1.48	
Scenario 2: self-collision likelihood	3.41	3.68	3.60	3.64	3.45	3.60	3.45	3.78	3.82	3.77	3.65	3.55	No sig. effects
	1.14	.92	1.11	1.04	1.44	1.34	.94	.77	.97	1.15	1.33	1.39	

*** p < 0.001; ** p < 0.01; * p < 0.05

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3 Results in Table 4 show that there was a significant difference on Factor 1 (where a
4 high score indicates careless, risky, irresponsible, inattentive and reckless) between
5 before and after the course, with drivers reporting being less careless, risky,
6 irresponsible, inattentive and careless after the course. A time–age interaction
7 indicates that drivers scored higher on Factor 1 after the course, but with scores
8 generally increasing with driver age. There are also time-sex interaction effects with
9 scores on Factor 1 increasing post course, but with female drivers generally scoring
10 higher both pre and post-test.
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25 Significant differences can also be seen in Table 4 on Factor 2 (where a high score
26 indicates calm, relaxed and patient) in terms of time and time-age interaction effects.
27 There is a significant trend for higher scores post course, and a significant time-age
28 interaction effect where scores increase post course, but generally higher scores are
29 reported by the older drivers.
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41 *Hazard Perception & Perceived Likelihood of Collision*

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43 As can be seen from Table 4, the hazard ratings for the fast following on a motorway
44 (Scenario 1) were significantly different over time, with drivers consistently rating the
45 scenario as less hazardous after the course. There was also a significant age effect,
46 with older drivers rating the scenario as more hazardous than younger drivers. There
47 was a trend towards significance in terms of sex differences, with females rating the
48 scenario as more hazardous.
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3 There was no significant difference in the hazard ratings for the urban speeding
4 scenario (Scenario 2) over time, although significant age effects showed that younger
5 drivers rated this scenario as less hazardous than older drivers.
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10 Interestingly, drivers' ratings of the perceived likelihood of themselves being involved
11 in a collision in Scenario 1 (fast following on the motorway), went down after the
12 course. It may be that the course increased drivers' perceptions of their own driving
13 ability. Significant time-sex effects were also found, with both males and females
14 showing lower ratings after the course, but higher ratings by females at each point in
15 time. Significant differences were apparent between male and female drivers with
16 females reporting a higher perceived likelihood of a collision for themselves, than male
17 drivers. There were no significant time, age, sex or interaction effects for the perceived
18 likelihood of a collision in the second scenario (speeding in an urban area).
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35 *Reported Risk-Taking & Near-Miss Experience*

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38 In order to explore changes in reported risk-taking behaviour and near miss
39 experience, a series of repeated measures ANOVAs were performed between the
40 responses obtained at Time 2 (post course survey) and Time 3 (the 3 month follow-up
41 survey). The mean responses over time are shown in Table 5, grouped by age and
42 sex along with a summary of significant effects.
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Table 5. Summary of Repeated Measures ANOVAs on Reported Risk-Taking and Near-Miss Experience on Post-Course and 3 Month Follow-Up.

Gender Age (N)	Males						Females						Significant effects
	17 – 30 (41)		31 – 50 (44)		> 50 (48)		17 – 30 (22)		31 – 50 (30)		> 50 (21)		
Time	Post	3m	Post	3m	Post	3m	Post	3m	Post	3m	Post	3m	
Near misses reported	1.80 .81	1.54 .74	1.59 .66	1.36 .53	1.40 .67	1.32 .62	1.45 .51	1.41 .59	1.32 .48	1.29 .46	1.13 .34	1.04 .21	F (time)= 7.36, df 1, 202 ** F (sex) = 9.10, df 1,202 ** F (age) = 5.99, df 2, 202 **
Aggressive close following	1.37 .58	1.56 .55	1.70 .76	1.55 .76	1.45 .65	1.31 .47	1.45 .67	1.32 .65	1.23 .50	1.13 .43	1.09 .29	1.14 .35	F (time x sex x age)= 4.00, df 2, 202 * F (sex) = 11.28, df 1,202 ***
Racing other drivers	1.20 .46	1.12 .33	1.09 .29	1.14 .35	1.04 .20	1.00 .00	1.05 .22	1.05 .22	1.07 .25	1.00 .00	1.00 .00	1.00 .00	No significant effects
Driving through red lights	1.34 .53	1.17 .38	1.18 .39	1.20 .46	1.19 .45	1.19 .39	1.05 .21	1.36 .49	1.10 .31	1.10 .31	1.14 .36	1.10 .30	F (time x sex) = 4.68, df 1, 200* F (time x sex x age) = 7.07, df 2 ,200***
Wearing seat belts	4.78 .65	4.88 .33	4.86 .63	4.89 .32	4.92 .40	4.94 .43	4.95 .21	4.91 .29	4.97 .18	4.97 .18	4.91 .43	4.95 .21	No significant effects
Urban speeding	1.98 .57	1.85 .61	2.00 .86	1.89 .72	1.82 .81	1.69 .74	2.05 .72	1.95 .72	1.90 .80	1.87 .73	2.14 .64	1.64 .85	F (time) = 8.17, df 1, 202 **
Motorway Speeding	1.80 .75	1.73 .78	2.05 1.16	1.70 .82	1.58 .79	1.38 .61	1.82 .91	1.86 .77	1.50 .73	1.43 .68	1.64 1.05	1.45 .67	F(time)= 4.99, df 1, 201*
Drink-driving over limit	1.07 .23	1.15 .36	1.12 .32	1.09 .29	1.19 .58	1.15 .42	1.18 .50	1.00 .00	1.03 .18	1.03 .18	1.14 .64	1.09 .43	No significant effects
Take chances when overtaking	1.39 .54	1.24 .43	1.66 .78	1.45 .63	1.37 .57	1.27 .53	1.41 .59	1.50 .67	1.27 .52	1.13 .35	1.41 .59	1.27 .46	F (time) = 5.63, df 1, 202 * F (sex x age) = 4.77, df 2, 202 **
Close following	1.83 .70	1.71 .64	2.00 .75	1.50 .66	1.71 .79	1.29 .50	1.59 .59	1.73 .63	1.53 .68	1.37 .49	1.45 .67	1.14 .35	F(time)=22.19, df 1, 202***; F (time x sex) = 5.59, df 1, 202 *; F(time x age) = 5.65, df 2, 202 **; F (sex) = 6.45 df 1, 202 *; F (age) = 5.01 df 2, 202 **

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3 There were no significant changes to risk-taking over time involving racing other
4 drivers, seat belt wearing or drink-driving. These items showed noticeable ceiling and
5 floor effects, where virtually all drivers reported wearing seat-belts and very few drivers
6 reported either racing or drink-driving. However, there were significant reductions over
7 time in relation to the other reported risk-taking behaviours. Taking chances when
8 overtaking and both urban and motorway speeding significantly reduced over time.
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10 Reported close following also significantly reduced over time, though significant
11 interaction effects suggested that this was more noticeable in older drivers and
12 females. Aggressive close following also reduced over time, though increased for
13 younger males and older females. Driving through red lights was reported less over
14 time by males, but slightly more over time by females. Reported near-misses also
15 reduced significantly over time. Female drivers reported significantly less near-misses
16 than males, as did older drivers compared to younger drivers.
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37 Discussion

38 Overview

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42 The results from the present study indicated that the Driver Improvement Scheme led
43 to improvements in participants' attitudes towards, and self-reports of, risk-taking
44 behaviours, along with perceptions of hazards, risks, control and collision and
45 detection likelihood and Hypothesis 1 was accepted. However, in relation to
46 Hypothesis 2, only some of the positive outcomes persisted at the three month follow
47 up. Results also showed that there were significant attitudinal and perceptual
48 differences between younger and older drivers and between males and females, along
49 with some interaction effects, and so Hypothesis 3 was accepted.
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3 The response rate for the pre and post training DISQ's was very high (95-99%) and is
4 certainly comparable with the 90-95% reported by Burgess & Webley (1999) for the
5 evaluation of eight UK Driver Improvement Schemes. The response rate for the 3
6 month follow-up was 44.69% which, although disappointing, was noticeably better
7 than the 33% response rate at 3 month follow-up reported by Burgess and Webley
8 (1999). It may well be the case that participants who did not respond at Time 3 may
9 have had more negative views and thus the results observed may be overly optimistic
10 (af Wahlberg and Poom, 2015). Additionally, there were significantly fewer young
11 drivers in the Time 3 sample so some caution in interpreting findings is clearly
12 necessary.
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30 *Drivers' ratings of the course*

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32 As can be seen from Table 1, the general satisfaction with the course was very high,
33 and thus from the perspective of the drivers' reactions, the course was evaluated
34 successfully. The lowest mean rating across all age groups and both sexes in terms
35 of drivers' perceptions of how much they had learnt from the course was 4.32 (on a 5
36 point scale where a response of 5 was 'a great deal'). These findings mirror those
37 from previous research on similar interventions (e.g. Hope et al., 2002; Burgess and
38 Webley, 1999).
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49 Drivers were generally less positive in their views of how different their driving would
50 be after attending the course. On a 5 point scale (1 =no different at all, 5=very different)
51 drivers' rating ranged between 3.80 and 4.43, with young male drivers indicating they
52 would change their driving the least. This corresponds to the wealth of research
53 highlighting the greater propensity of young drivers to engage in risk-taking behaviours
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3 (Mathews and Moran, 1986; Finn and Bragg, 1986; Clarke et al, 2005; Deery, 1999;
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5 Hatfield, 2009; Scott-Parker et al ,2014).
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10 11 *Changes to knowledge* 12

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14 The retraining course had a positive impact upon drivers' knowledge of how much they
15 could drink and still be within the UK's legal drink-driving limit (in this case 80mg
16 alcohol / 100 ml blood or approx. 4 – 6 units of alcohol), and how much they could
17 drink and still be safe to drive. These findings are significant, as previous research has
18 found an association between reported drink-driving behaviour and estimates of
19 personal drinking that would exceed the legal limit (Guppy, 1988). The mean
20 estimates, across all age and gender groups, for how much they could drink and still
21 be within the drink-drive limit, were uniformly higher than mean estimates of how much
22 they could drink and still be safe to drive. This finding reflects the results obtained by
23 Albery and Guppy (1995a) with a sample of 1172 UK drivers (mean age 36.35 yrs).
24 As in Albery and Guppy's (1995b) study, drivers in the retraining sample (across all
25 age and gender groups), provided mean estimates that were less than 3 units for both
26 legal and safe driving. Their estimates declined further following retraining, suggesting
27 that the accuracy of their knowledge had declined immediately after the course, albeit
28 more in line with media campaigns.
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49 Results showed that the retraining course had a significant effect on drivers' close
50 following time-distance gap on motorways, with post course results aligning more
51 closely with the 'two second rule.' Drivers' perceptions prior to the retraining course
52 demonstrated much higher time estimates for a safe following gap on the motorway.
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59 While this result suggests a more standard knowledge base is reflected in the post-
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3 course results, it does contrast with findings reported by Lenne et al. (2011) where
4 drivers adopted longer following distances in a simulator task following a safety
5 training course.
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10 11 12 13 *Changes to perceptions of control*

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16 Results suggest that immediately after the course drivers felt that their safety was
17 more under their control. This positive attitudinal change is in line with what may be
18 expected from such training input. It was the youngest and oldest female drivers who
19 reported the lowest levels of perceived control on the first control variable ('I feel that
20 my safety is mainly in the hands of other road users'). Post training there were
21 significantly higher perceptions of control across all age and gender groups. There is
22 also a significant reduction post training in the frequency that drivers reported that they
23 'feel the problems I encounter while driving are beyond my control.' Again, on this
24 second control variable, it is the younger drivers who report the highest levels of
25 perceived control. It can be seen across both perceptions of control variables that the
26 driver retraining course had a positive impact. Similar positive influences on driver
27 perceived control perceptions were found by Huang and Ford (2012) on participants
28 of a defensive driving course and these changes in control perceptions were also
29 found to be linked with safer driving behaviours.
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52 *Perceived likelihood of collision-involvement and police detection*

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55 There was an immediate impact of the retraining upon drivers' perceptions of the
56 likelihood of future collision-involvement, with perceptions lower for all groups post
57 training. This may be interpreted as the retraining course raising the drivers'
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3 perceptions of their own driving skills, or possibly that after the course they would aim
4 to be safer drivers. This contrasts with the results reported by Glendon et al (2014)
5 where no differences were observed on collision risk ratings before and after a driver
6 education intervention, though this probably reflects the greater intensity of the
7 experience for the drivers in the current study.
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15 There was no post-course impact upon the drivers' perceived likelihood of detection
16 for traffic offences, which contrasts with might be expected from previous research
17 (e.g. Guppy, 1993; Senserrick and Swinburne, 2001). This may result from the broad
18 nature of the item which did not reflect specific risk-taking behaviours. However, the
19 observed gender effect (with male drivers scoring more highly on this variable)
20 suggests some validity for the measure.
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32 *Driver self-ratings*

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36 Principal components analysis produced two main driver self-rating factors accounting
37 for 66% of the original variance. Factor 1 reflected self-ratings of careless, risky,
38 irresponsible, inattentive and reckless driving; Factor 2 reflected self-ratings of a calm,
39 relaxed and patient driving style. Results showed that drivers rated themselves
40 significantly lower on Factor 1 following the retraining course (and so were reporting
41 themselves to be less careless, risky, irresponsible, inattentive and reckless in their
42 driving style), and significantly higher on Factor 2 indicating they were more calm,
43 relaxed and patient after the course.
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55 Overall, these self-rating results possibly suggest an increase in awareness of their
56 previous driver behaviour patterns and relates to findings reported by Guppy et al
57 (1990) in comparing collision-involved and non-collision involved drivers. The utility of
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3 such driver self-ratings has also been reported by Forsyth in relation to novice drivers
4 in the UK (Forsyth, 1992). Changes in self-perception may also be linked to
5 perceptions of control that have been shown to be potentially important in both the
6 creation of unrealistic optimism which may affect risk-taking (McKenna, 1993), as well
7 as being an important factor in planned behaviour models of driver risk-taking (Parker
8 et al, 1992b; Parker et al, 1995).
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21 *Hazard perception and perceived likelihood of collision*

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23 The results from this study indicate that the level of hazard perception for the fast-
24 following on the motorway scenario (Scenario 1) reduced after drivers had attended
25 the retraining course. Furthermore, young drivers rated this scenario as less
26 hazardous than older drivers; this is in line with earlier findings (Underwood et al,
27 2005), including that of Evans and Wasielewski (1983) that young drivers (and in
28 particular young male drivers) are more likely to exhibit risk-taking behaviours in terms
29 of following distance than other age groups. Closely linked to this was the finding that
30 drivers' ratings of the perceived likelihood of themselves being involved in a collision
31 in this scenario went down after the course. This effect was seen most prominently for
32 young, male drivers. These results seem to suggest that the retraining course has
33 increased drivers' perceptions of their own ability as drivers: the motorway scenario is
34 seen as less hazardous and less likely to result in them having a collision because the
35 course has made them better, more skilful drivers. Such perceptions are an integral
36 part of the risk-related decision-making process (Finn and Bragg, 1986; Elvik et al,
37 1997). These results seem to confirm Brijs et al's (2014) findings that classroom and
38 practical based training had little effect on risk detection.
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3 However, there were no significant differences between pre and post course ratings
4 for the hazardousness of the urban speeding scenario (Scenario 2), or for the
5 perceived likelihood of self collision-involvement. These results are in contrast with
6 McKenna's (2007) who found that perceptions of the dangerousness of speeding in
7 urban areas varied significantly in pre and post course measures.
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12 These findings are of particular significance as research models suggest that risk-
13 taking behaviours are influenced by perceptions of risk and utility (Matthews and
14 Moran, 1986). The implications are that future driver retraining courses should place
15 greater emphasis on hazard perception, perceived likelihood of collision-involvement
16 and the severity of adverse consequences.
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30 *Reported Risk-taking & Near-Miss Experience*

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33 The sample attrition from time 2 to the 3 month follow-up represents an important
34 limitation of the study. However, it can be seen that the 45% response rate compared
35 favourably to the 27% reported by Conner and Lai (2005, p 15). Despite this caveat,
36 promising results from the driver improvement course were suggested by several
37 behavioural outcome measures between immediate post-course follow-up and the 3
38 month post-course follow-up. The significant time effects found in relation to speeding
39 (urban and motorway) held for all age groups and both sexes; drivers reported a lower
40 frequency of speeding 3 months after the retraining course. This behavioural outcome
41 supports previous research (Conner & Lai, 2005), and sits well with the attitudinal
42 findings that drivers rated themselves as significantly less careless, risky,
43 irresponsible, inattentive and reckless in their driving styles, and more calm, relaxed
44 and patient immediately following the retraining course. As speeding is highly related
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3 to collision-involvement, the retraining course can be said to have had a high degree
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5 of success on this outcome measure.
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8 Further evidence of the success that the retraining course had in modifying behaviours
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10 comes from the finding that reported close following also significantly reduced over
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12 time, although significant interaction effects suggested that this was more noticeable
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14 in older drivers and females. This finding supports previous research (Rajalin et al,
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16 1997; Ivers et al, 2009). In addition to this, the significant reduction in taking chances
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18 while overtaking observed over three months demonstrate that key risk-taking
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20 behaviours emphasised during the course seem to have been positively influenced.
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22 This generally supports the findings of Conner and Lai (2005) who observed
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24 reductions in errors, violations and lapses over time.
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30 Perhaps the most important outcome of the study concerned the significant reduction
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32 in the reporting of near-miss collisions between the immediate and 3-month post
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34 course follow-up. The reduction in self-reported frequency of being 'very nearly
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36 involved in a collision' across all groups suggests strongly that drivers had modified
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38 their behaviour in the 3 months after their retraining. This partially supports the
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40 findings of Conner and Lai (2005) who observed near miss reductions at 12 months
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42 but not 6 months after re-training.
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46 While there were no significant changes to risk-taking over time involving racing other
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48 drivers, (not) seat belt wearing or drink-driving, an examination of the group means
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50 does indicate that participants reported very low levels of these behaviours at both
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52 measurement points post retraining (Time 2 & 3).
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56 Overall, the results suggest that the driver retraining course led to improvements in
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58 participants' attitudes towards, and self-reports of, risk-taking behaviours. The
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3 importance of safety attitudes in relation to risk-taking behaviour is well documented
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5 (Lajunen and Summala, 1995; Parker et al, 1995; Iversen and Rundmo, 2004). The
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7 benefit of the course could be seen immediately from the positive post-course follow-
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9 up attitudinal outcomes, and the impact would seem to have been matched by many
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11 positive behavioural outcomes that persisted to at least three months post retraining.
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14 **An additional benefit of this Scheme is the cost effectiveness as all drivers had to pay**
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16 **a fee in order to attend the course.**
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23 **Conclusion.**

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26 The Driver Improvement Scheme was evaluated positively by the participants, and
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28 produced immediate positive knowledge gains with respect to drink-driving and safe
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30 following distances. Positive changes in terms of perceptions of control and collision-
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32 likelihood were also evidenced immediately following the course. The course
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34 significantly diminished drivers' perceptions of themselves as careless, risky,
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36 irresponsible, inattentive and reckless drivers, and increased their self-perceptions as
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38 calm, relaxed and patient drivers. The 3 month follow-up results indicated strong
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40 significant reductions in reported risk-taking behaviours (in terms of speeding, close-
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42 following and overtaking). Finally, there was a significant reduction in reporting of near
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44 misses in all groups of drivers 3 months after the course. **Obviously, caution is advised**
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46 **as these positive findings were based on only those drivers responding to the survey**
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48 **at all three time points and thus probably represents a very optimistic perspective on**
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50 **how course attenders as a whole changed over time. However, based on the results**
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52 **from the survey completers,** this paper demonstrates the success of this driver
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54 retraining programme across the outcome elements of satisfaction, knowledge,
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3 attitudes and risk-taking behaviours and provides support for future driver retraining
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5 schemes as a way to increase safety on the roads.
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11 **Source of Support:** Nil
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14 **Conflict of Interest:** None declared
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