Is there a case for driver training?
Re-evaluating the evidence

Vanessa Beanland
Researcher
Curtin - Monash Accident Research Centre, Curtin University

RAC Driver Training Launch
Wednesday 11th April 2012
Outline

- Background: the problem
- What is driver training?
- Evaluations of driver training:
  - School-based driver training
  - Driver training “time discounts”
  - Procedural skills training
  - Cognitive skills training
- Conclusions
  - Implications for driver training programs
  - Implications for program evaluations

The problem

- Young novice drivers are over-represented in road crashes
- People aged 17-25 years:
  - 12% of WA population (Australian Bureau of Statistics, 2010)
  - Over 20% of WA road deaths (Western Australia Police, 2010)
- Crash risk highest during first 6 months of solo driving – especially for teenaged drivers (Mayhew et al., 2003)
- After 18 months' solo driving, teenagers’ crash risk remains 3x that of their parents (Lee et al., 2011; Simons-Morton et al., 2011)
- Crash rates of young novice drivers are often attributed to inexperience, risk-taking and overconfidence (Jonah, 1986)
What is driver training?

- **Driver training** – develops *skill sets* required for driving
  - **Procedural skills**: executing a sequence of actions, which may become automated with extensive practice
    - e.g., vehicle manoeuvring and handling
  - **Higher-order cognitive skills**: situation monitoring, assessment, response planning and execution
    - e.g., hazard perception

- **Driver education** – acquisition of *knowledge* about driving
  - Usually broader, longer-term than driver training
  - Some driver education programs encompass driver training

- Most jurisdictions do not have compulsory training requirements for novice drivers

**School-based driver training**

- School-run or school-based “driver ed” courses
  - Were particularly popular in North America

- Primarily involve classroom instruction plus driving range and simulation training; usually minimal on-road instruction

- Largest, most comprehensive evaluation of driver training ($N > 16,000$): DeKalb County, Georgia, USA – 1970s-80s, school-based driver ed

- Three groups:
  - SPC: Safe Performance Curriculum – 70h total (3h 20m on-road)
  - PDL: Pre-Driver Licensing training – 21h total (1h on-road)
  - Control – no formal training

(Lund et al., 1986; Stock et al., 1983)
School-based driver training: results

DeKalb Study Results
- On-road performance
  - SPC > PDL > controls
- Driving knowledge
  - SPC > PDL
- Crashes
  - Not controlling for sample differences: control > SPC & PDL during first six months only
  - Controlling for differences: SPC > PDL & control
- Violations
  - Not controlling for sample differences: control > SPC & PDL during first 12 months only
  - Controlling for differences: SPC > PDL & control

School based driver training: limitations

Limitations and issues of the DeKalb Study:
- Both programs (SPC & PDL) led to accelerated licensure and increased driving exposure, which affect crash risk
- Curriculum details are unknown
- Program was not properly piloted
- Amount of on-road training was low

Conclusion:
Positive effects of the program (improved driving knowledge & skills) were offset by early licensure

(Lund et al., 1986; Stock et al., 1983)
Graduated driver licensing (GDL) systems initially restrict novice drivers’ exposure to high-risk driving situations:
- Supervised learner driver stage
- Restricted solo driver stage
- Unrestricted full licence

This progressive skill development reduces crash risk (Russell et al., 2011)

Some jurisdictions allow drivers to accelerate the GDL process – time discounts granted range from 3 months to 24 months (Hirsch et al., 2006)

Some have evaluated the effects of these time discounts:
- Reduced learner period: Canada (Nova Scotia, Ontario, Quebec)
- Reduced provisional licence period: New Zealand

- Nova Scotia: min. learner period reduced from 6 months to 3 months
  - Drivers accepting time discount had 27% higher crash rates during first 6 months of solo driving
  - 2% of drivers accepted time discount (Mayhew et al., 2003)

- Ontario: min. learner period reduced from 12 months to 8 months
  - Two-thirds of drivers accepted time discount
  - Drivers accepting time discount had 44% higher crash risk during provisional licence stage (Boase & Tasca, 1998)
  - After controlling for driving exposure, SES and behavioural risk factors, there was no difference (Zhao et al., 2006)
Driver training “time discounts”

- **Quebec**: driver training graduates (85% of total):
  - Obtained provisional licence ~6 months earlier
  - Had less supervised practice during learner phase
  - Disproportionately female, younger
  - Motivations for attending training predicted safety
    - Higher crash rates and violations among those who wanted to accelerated licensure or obtain insurance discounts

- **New Zealand**: provisional license reduced from 18 months to 12 months (or 6 to 3 months for drivers over 25 years) (Begg & Langley, 2009)
  - Crash risk 2.9 times higher for drivers who received time discount, after controlling for age, sex and licence duration (Lewis-Evans, 2010)
  - Proportion of drivers receiving time discount unknown

Procedural skills training

- Post-licence procedural skills training is usually referred to as “advanced driver training” or “defensive driver training”

- Some courses target specific skills:
  - Braking training (Petersen et al., 2006)
  - Skid training (Gregersen, 1996; Katila et al., 1996)

- Others incorporate a range of skills

- Length of course varies:
  - One-day defensive driving course (Montana DOT)
  - One-week vehicle skills training course (Isler et al., 2011)

- Length of evaluation also varies – a problem for skill decay (Anderson, 1981)
Procedural skills training – specific

- **Skid training:** (Gregersen, 1996; Katila et al., 1996, 2004)
  - The skill most extensively evaluated in relation to crash risk
  - Most evaluations in Scandinavia (snow, ice, rain)
  - Research in 1990s suggested training increases crash risk
    - Drivers focused on vehicle handling, not avoiding risks
    - Training increases self-assessment of skill, but not actual skill level
  - Courses were re-designed to emphasise anticipation and avoidance of crash risk – do not increase crash risk

- **Braking training:** (Petersen et al., 2006)
  - Trained drivers have smoother braking performance
  - But take longer to stop when driving a car with ABS brakes

Procedural skills training - comprehensive

- **Montana DOT Study:** one-day defensive driving course
  - Covered: vehicle management, manoeuvring, skid control, emergency handling, crash risk factors
  - Four-year follow up of violations, crashes (official records), near-crashes (self-report)
  - No effect of training after controlling for driving exposure
  - Poor evaluation design – possibly poor program design

- **New Zealand Study:** one-week vehicle handling course
  - Covered vehicle manoeuvring, exchanging feedback with peers
  - Short-term improved on-road skills (appropriate speed choices)
  - No effect on hazard perception or driving attitudes
  - No long-term follow-up

(Isler et al., 2011; Kelly, 2005; Stanley & Mueller, 2010)
Cognitive skills training

- Cognitive skills such as hazard perception and situation awareness broadly involve anticipating and avoiding dangerous situations
- Hazard perception scores predict crash risk (Boufous et al., 2011; Wells et al., 2008)
- Procedural skills training can improve these skills
  - Two UK longitudinal studies found driver training graduates have greater situation awareness and use their SA more effectively (Stanton et al., 2007; Walker et al., 2009)
- Recent research has attempted to specifically target cognitive skills involved in driving

Cognitive skills training

- **Commentary training**: Drivers provide and/or receive detailed verbal commentary on a driving scene while driving or watching a driving scene
  - Trained drivers show superior hazard perception, increased visual scanning, and greater speed reductions approaching hazards (Chapman et al., 2002; Crundall et al., 2010; Isler et al., 2009; McKenna et al., 2006; Wang et al., 2010)
- **Part-task training**: Drivers view driving scenes and complete tasks such as identifying potential hazards or indicating appropriate driving actions (e.g., brake, indicate, overtake) – e.g. DriveSmart
  - Trained drivers demonstrate safer driving behaviours, superior visual scanning, and are more likely to fixate potential hazards (Fisher et al., 2006; Poliatsek et al., 2006; Pradhan et al., 2005; Regan et al., 2000)
Summary

- Procedural skills training can improve vehicle handling skill, driving knowledge and situation awareness
  - But does not reduce crash risk in young drivers
  - This may be due to overconfidence

- Cognitive skills training can improve hazard perception, visual scanning and safe driving behaviours
  - No published research has directly assessed the link between this type of training and crash risk

- Some evaluations have found increased crash risk following driver training – usually because driver training was confounded with accelerated licensure and increased driving exposure
Implications: driver training

- Two perspectives for evaluating driver training:
  - Does it improve driving skills?
  - Does it improve on-road safety?

- These can be mutually exclusive

- Vehicle handling should be taught in conjunction with other skills (e.g., hazard perception) so young drivers understand that good driving is more than just vehicle control

- Driver training should not be used as a shortcut to full licensure
  - There may also be little value in offering other incentives (lower insurance premiums) to driver training graduates

Implications: program evaluation

- Many driver training evaluations have been poorly designed:
  - Lack of random assignment
  - Lack of control group (or non-random control group)
  - Only short-term evaluations
  - Failed to measure variables that co-occur with training and/or significantly predict crash risk

- Time-lagged designs may be appropriate – i.e., withhold training from the control group for 1-2 years

- Would also be worthwhile using more sensitive measures of crash involvement – e.g., crash severity, time to first crash
  - Because crashes are relatively rare, very large sample sizes are needed to detect small reductions in crash rates
Conclusion

- Most evaluations have failed to find a relationship between driver training and subsequent crash rates
- This is partly because driver training was historically associated with accelerated licensure and increased driving exposure
- There is evidence that some unsafe driving behaviour by young novice drivers results from factors that can be addressed in driver training – e.g., poor hazard perception, ignorance, overconfidence
- Overall, it appears that the relationship between driver training and crash rates has either not been evaluated, or has not been adequately evaluated