Driver training and testing for novices and professionals

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Content

• Newly licenced drivers (both novices and professionals) are overrepresented in crashes. Why?

• What is the effect of driver training on crash rate?

• Good driver training and testing practices.
A matter of inexperience and age

Vlakveld, 2011
A matter of inexperience and age

Vlakveld, 2011
Newly licenced drivers are overrepresented in:

• Single vehicle crashes

• Vehicle-vehicle crashes
  – Head-on collisions
  – Rear-end collisions

• Crashes at intersections

• Crashes in bends
Causes

• Poor hazard detection skills (Do not know what to expect and where to look)

• Inattention/distraction (e.g. use of smartphones while driving)

• Driving too fast for the circumstances (e.g. in bends)

• Somewhat later in driving career: deliberate risk taking (e.g. speeding)
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Hazard perception

- The ability to detect and recognize potential hazards and to predict how these potential hazards can develop into situations in which a crash is very likely.
At least two types of potential hazards

• Overt potential hazards
  *Visible other road users who due to the circumstances may start to act dangerously*

• Covert potential hazards
  *Possible other road users on collision course that are hidden from view*
Example of an overt potential hazard
Example of an overt potential hazard
Example of a covert potential hazard
Example of a covert potential hazard
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Distraction

Young novice drivers have more crashes due to distraction than older, more experienced drivers because:

- They more often use electronic equipment (e.g. smart phones) while they drive;
- Other activities not related to driving interfere strongly with the driving task because the driving task is not yet fully automated;
- They have difficulties in assessing if the conditions are safe enough to engage in a secondary task;
- When engaged in a secondary task, the off road glances are substantially longer.
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Contributing factors

• Immaturity (brain development)

• Peer pressure

• Poor calibration skills
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Brain development

Dorsolateral

Thinking ahead and inhibition of impulsive responses

Ventromedial

Regulation of emotions; learning from experience; weighing risks and rewards
Groups particular at risk due to biological aspects

• Young males (testosterone);

• Young drivers that score high on sensation seeking (dopamine);

• Young drivers with (untreated) ADHD.
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Peer influences

• Young male driver with young male passenger → highest crash rate

• Young male drive with young female passenger → high crash rate

• Young female drive with young male or female passenger → high crash rate

• Young female or male driver with older passenger → low crash rate
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Contributing factors

- Immaturity (brain development)
- Peer pressure
- Poor calibration skills
Skillful drivers not necessarily are also safe drivers. Drivers with rather poor vehicle control skills can be safe drivers and for instance rally drivers can be unsafe drivers.

How can this be?

- Driving is mainly a self-paced task.
- Balancing of capabilities and task demands based on self-assessment and risk assessment
- Or: being in control while not overestimating your own capabilities and underestimating the risks
Risk regulation / Calibration

Motives / Risk acceptance → comparator → Behavioural adaptation

Real task capabilities → Perceived task difficulties → Real task demands/ Risks

Perceived task capabilities → Risk awareness

Self awareness
Knowing the causes and contributing factors of the high crash rate of newly licenced drivers, can driver education lower the crash rate of newly licenced drivers (both novices and professionals)?
What is driver training/education?

- Driver training is any kind of effort by teaching and learning aimed at increasing driving skills and the motivation to use these skills in safety-enhancing ways.

- Formal and informal training
How effective is formal driver training?

- No evidence that driver training programs that are intended to pass the driving test results in a lower crash rate after licencing.

- Evidence that so called specific ‘higher order skill training’ programs reduce crash rate (hazard anticipation training, risk-awareness and self-awareness training)

- Short training programs to enhance the skills in emergency situations (e.g. skid training) have no effect on crash risk and can even increase crash risk.
How effective is informal driver training?

• Driving with an older, and more experienced driver in the passenger seat is safe.

• Indications that after around 4000 km of supervised driving, there is a reduced crash risk in the first two years of independent driving (e.g. Gregersen et al., 2000)
Two different approaches

- Emphasis on informal training in USA, Canada, Australia, and New Zealand (Graduate Driver Licencing Systems)

- Emphasis on ‘higher order’ skill training (hazard perception, risk-awareness, self-awareness) in Europe (GDE-Matrix)
Graduate Driver Licencing System

Novices should drive for a time only under relatively less dangerous driving conditions while driving skills and judgment develop.

• Learner phase (only supervised driving)

• Independent driving phase but with restrictions (no night time driving, not allowed to drive with peers, zero alcohol)

• Provisional licence phase (no restrictions but with a stricter demerit point system)
Is GDLS effective?

[Graph showing crash profile of new drivers over years after obtaining a P Licence. The graph indicates a decrease in the number of crashes involving learners and new drivers in the first year after obtaining a P Licence, with a steady decrease over time.]
## Goals for Driver Education

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How effective is driver training based on the GDE-matrix

We don not know the effect on crash risk (yet).

• Some rather weak indications that GDE-based basic driver training improves higher order skills (Molina et al., 2014)

• Some evidence that GDE-based mandatory post licence training in Austria reduces crash risk (Mynttinen et al., 2010)
Higher order skill training

Two types:

• Cognitively oriented higher order skill training such as hazard anticipation training

• Motivational higher order skill training such as training aimed at improving low risk acceptance, self-awareness, and risk awareness
Hazard anticipation training

• PC-based training programs or simulator based training programs in which error learning is applied (e.g. the Risk Awareness and Perception Training (RAPT)

http://www.ecs.umass.edu/hpl/software.html#RAPT
Trainings to improve self-awareness, risk-awareness, impulse-control and to resist peer pressure (e.g. resilience training)

• Learner centred training styles such as coaching instead of instruction

• Group discussions

• Feedback drives
Good training practices

- A national curriculum that prescribes minimum hours of tuition (behind the wheel and theory lessons) and that prescribes lessons in subjects that are important for safe driving but are difficult to test or even cannot be tested during the driving test

- Inclusion of hazard anticipation training in basic driver training

- Inclusion of higher order skill training in basic driver training that improves the calibration skills and the motivation to drive safely (possibly during post licence training)

- A curriculum that takes into account the changes in the driving task due to technological developments (e.g. driving with adaptive cruise control)

- A learning pathway in which formal training and informal training are intertwined
Good testing practices

• Inclusion of a hazard perception test in the licencing system

• Inclusion of different road types and if possible night time driving in the practical driving test

• Test the ability whether candidate can cope with advanced driver-assistance systems (ADAS) such as Navigation systems, Adaptive Cruise Control (ACC) and Lane Keeping Systems
Recommended literature and video

EU report “Study on driver training, testing and medical Fitness”:

Study “Learning to drive safely: .....”

The video ‘Coaching in driver training’ of the HERMES-project