



# Driver training and testing for novices and professionals

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Road Safety Event

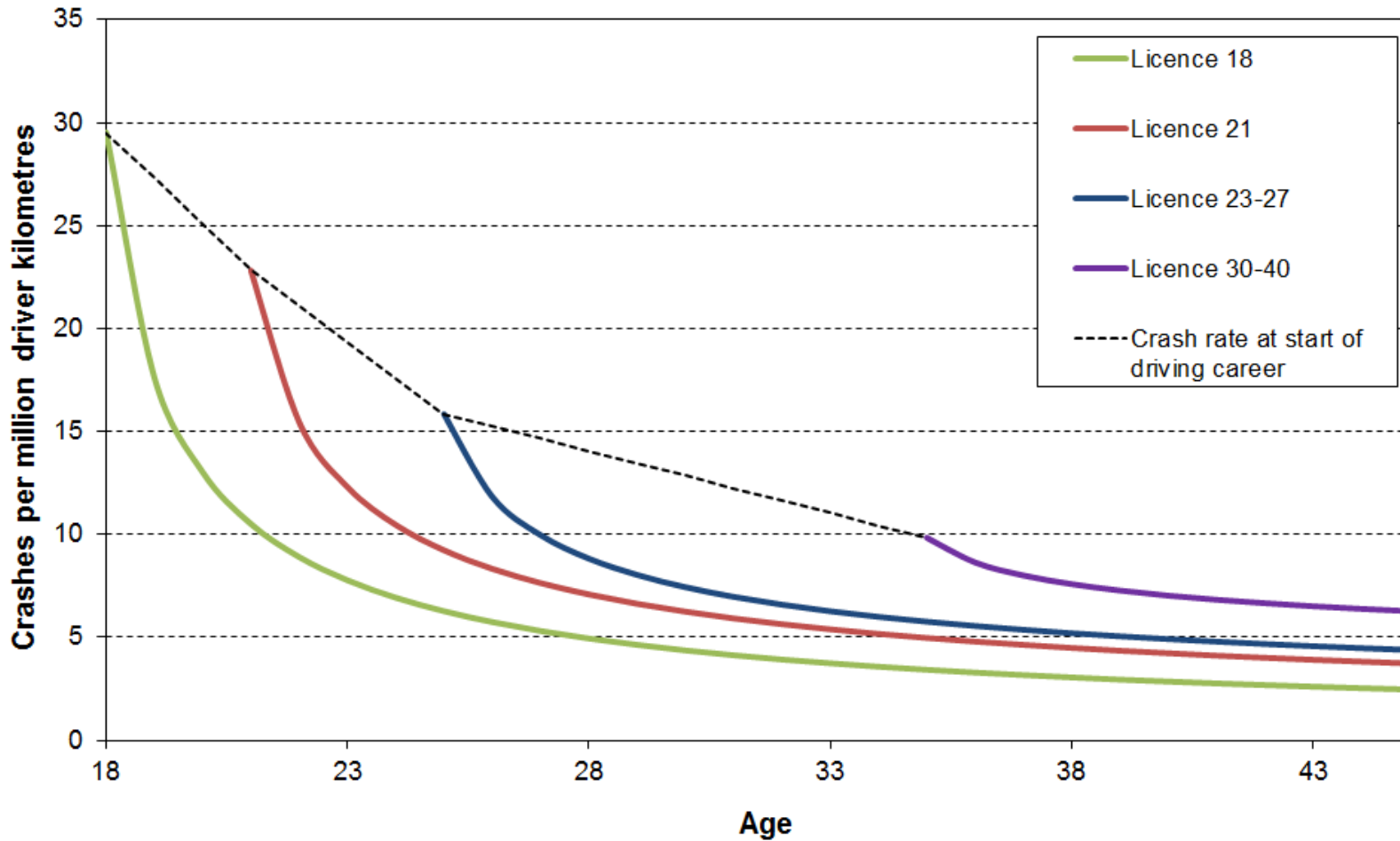
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# Content

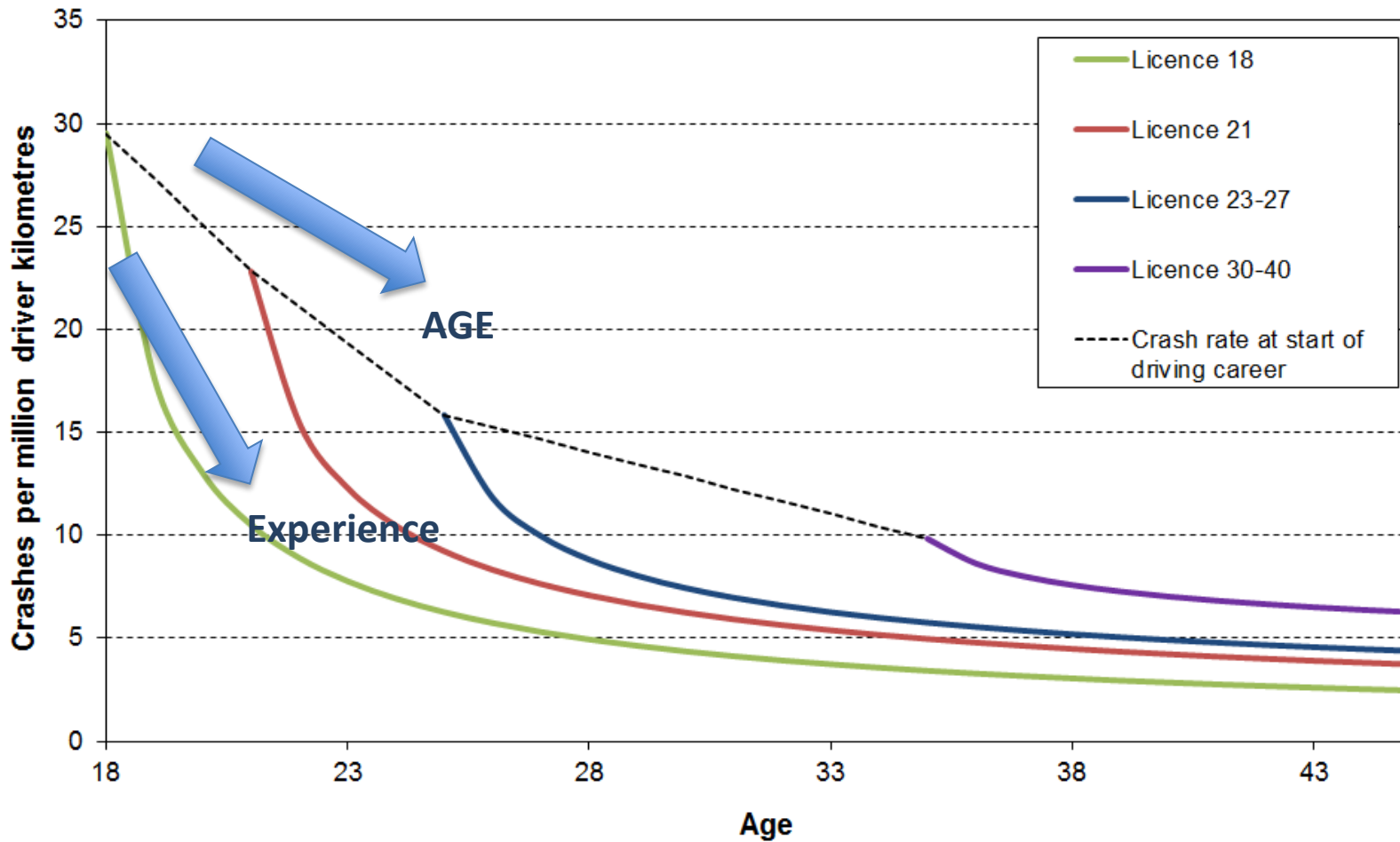
- Newly licenced drivers (both novices and professionals) are overrepresented in crashes. Why?
- What is the effect of driver training on crash rate?
- Good driver training and testing practices.

# A matter of inexperience and age



Vlakoveld, 2011

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Vlakoveld, 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*

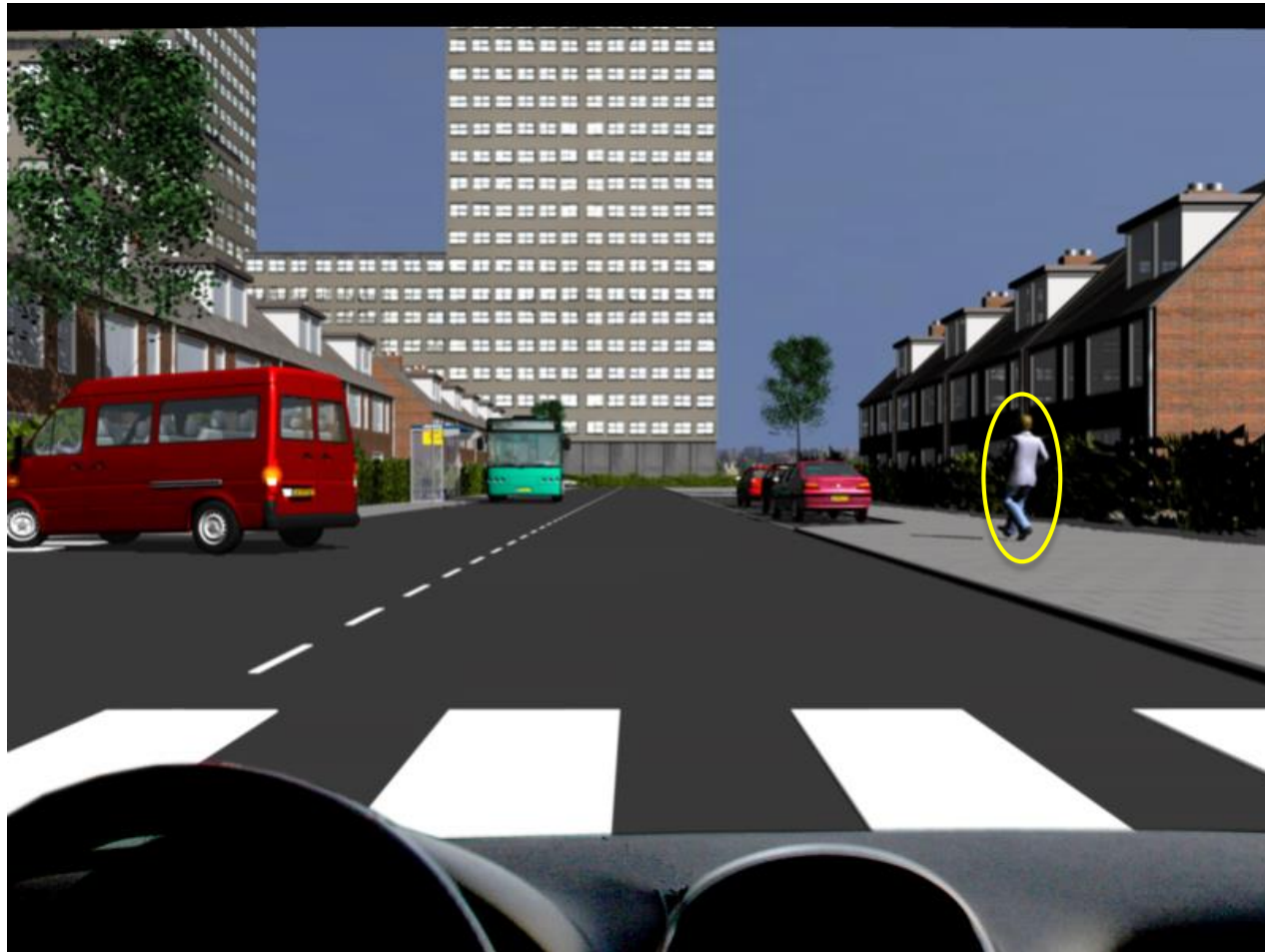
- Covert potential hazards

*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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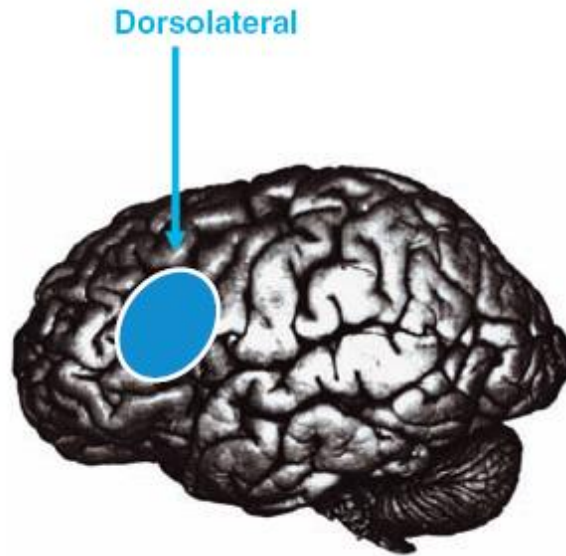
# Contributing factors

- Immaturity (brain development)
- Peer pressure
- Poor calibration skills

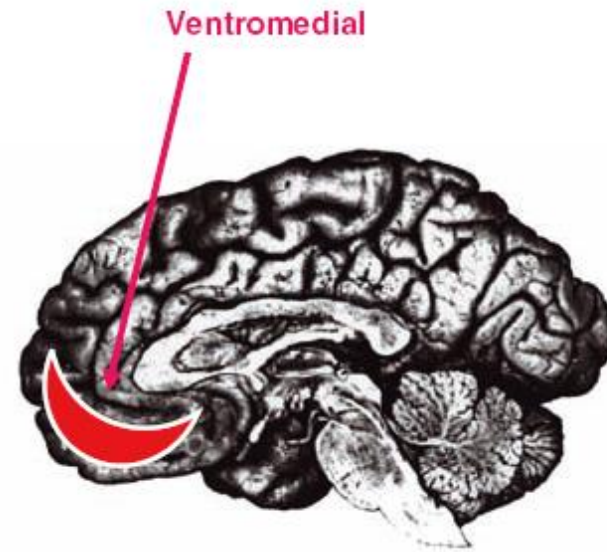
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# Brain development



Thinking ahead and inhibition  
of impulsive responses



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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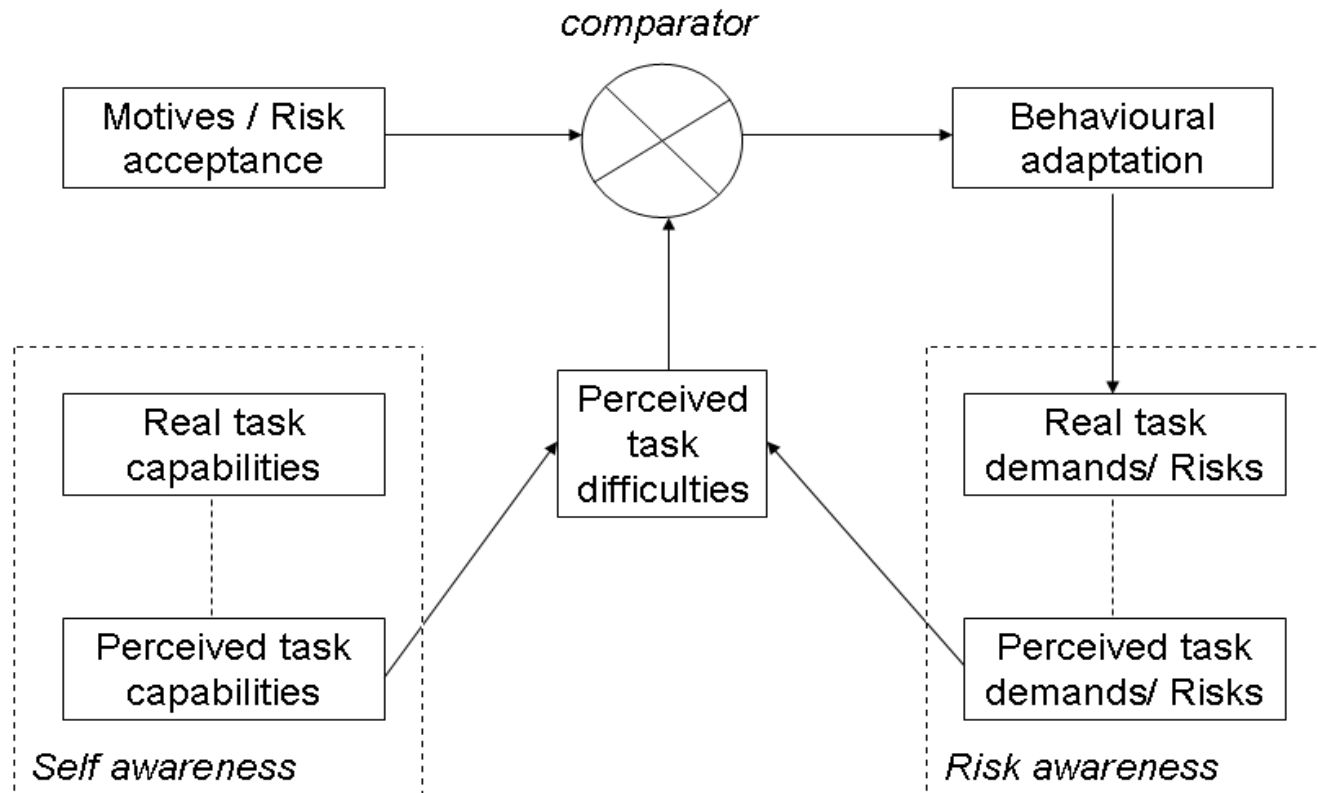
# Calibration

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



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

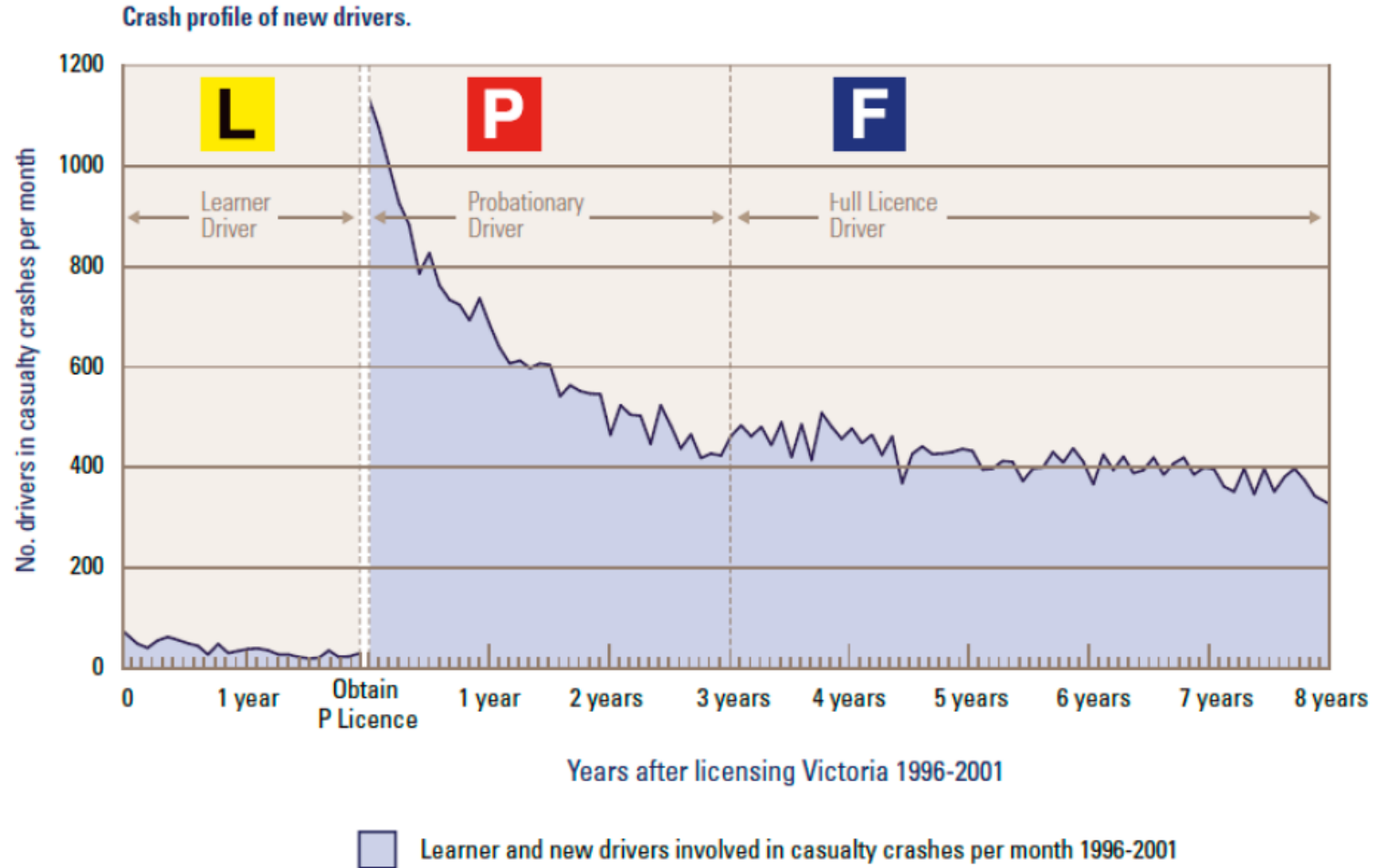
- Emphasis on informal training in USA, Canada, Australia, and New Zealand (Graduate Driver Licencing Systems)
- Emphasis on ‘higher order’ skill training (hazard perception, risk-awareness, self-awareness) in Europe (GDE-Matrix)

# 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?



# Goals for Driver Education

Essential aspects Level of control	Knowledge and skills	Risk-increasing factors	Self-assessment
Norms and values (meta level)	Lifestyle	High risk acceptance/ lack of motivation to drive safely	Be aware of one's own limitations
Decision about when and where to drive (strategical level)	Effect of alcohol, drugs, distraction, fatigue, emotions	Overestimation of skills/underestimation of risks	Impulse control
Mastering traffic situations (tactical level)	Applying the rules of the road	Poor hazard perception skills	Calibration skills
Vehicle control (operational level)	Steering, braking, etc.	No behavioural mastery	Monitor one's own performance

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# How effective is driver training based on the GDE-matrix

We don't 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](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”:

<https://publications.europa.eu/en/publication-detail/-/publication/181c18d0-1e79-11e7-aeb3-01aa75ed71a1/language-en/format-PDF>

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

<http://www.mdpi.com/2313-576X/2/4/20>

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

<http://www.alles-fuehrerschein.at/HERMES/index.php?page=video>