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Using an in-vehicle data recorder to calculate risk driving indices among novice drivers

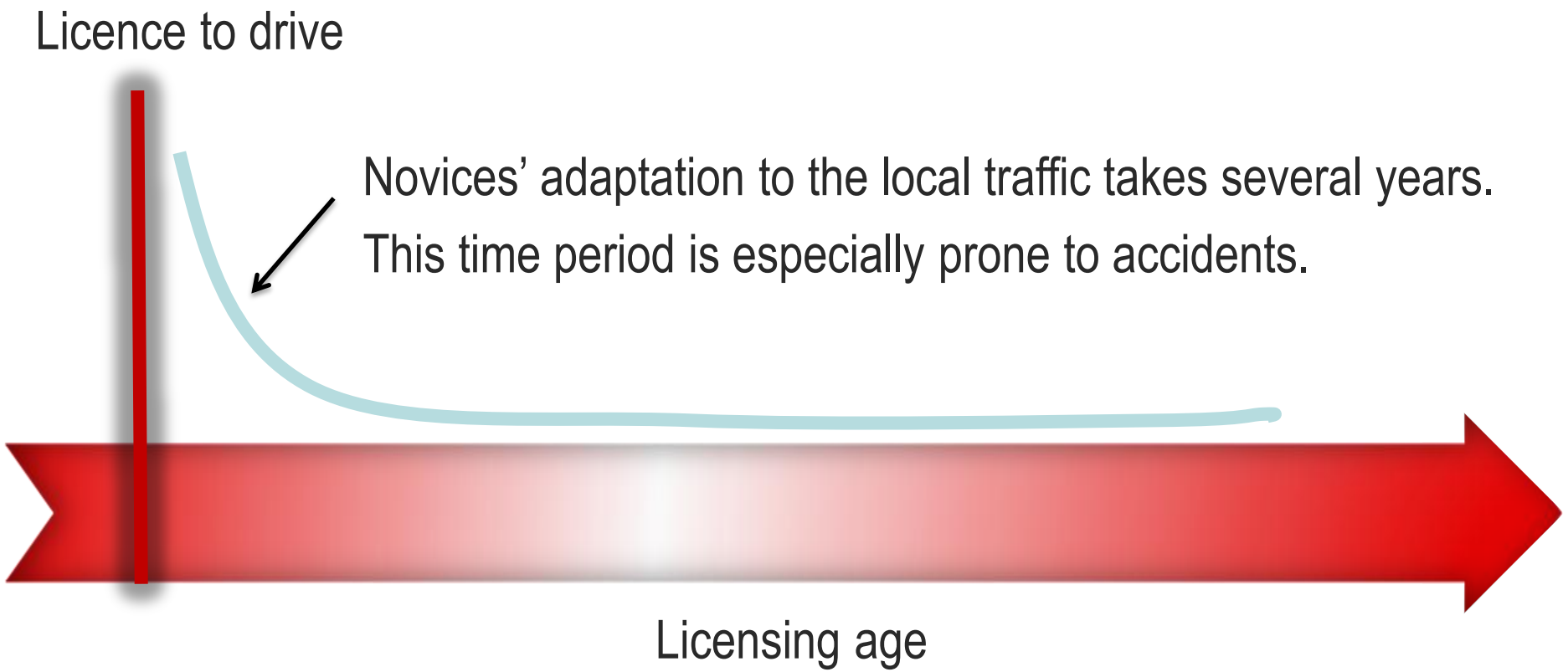
cieca
The International Commission for Driver Testing

TÜV SÜD

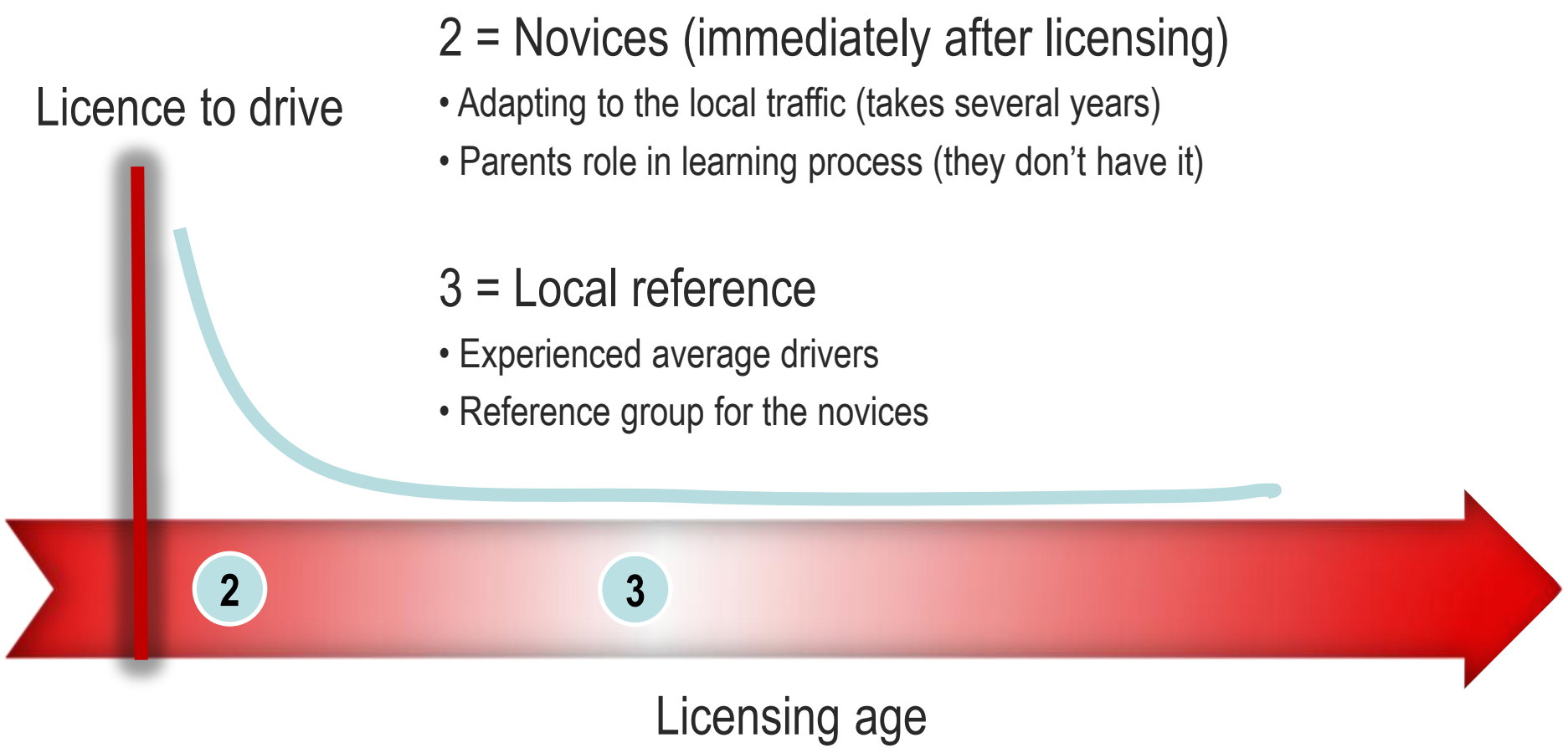
About 'TrafiSafe'

- 'TrafiSafe' is a work name, for a two-years Finnish-Austrian research and development project
- It aims to reduce the traffic accident risk (novices)
  - By increasing the quantity (and quality) of the **feedback**:
    - Motivates new interest groups (parents)
    - Uses the available ITS-technology (easy, mobile feedback)
- Two experiments (one in Finland and the other in Austria)
- Two expected main results:
  1. The use of the feedback-system enhances learning to drive
  2. The product itself is interesting enough for the interest groups (parents) to buy it

Licencing challenge = accident curve



The first TrafiSafe experiment - focus is on the novices



Interesting driver groups for the ITS-feedback

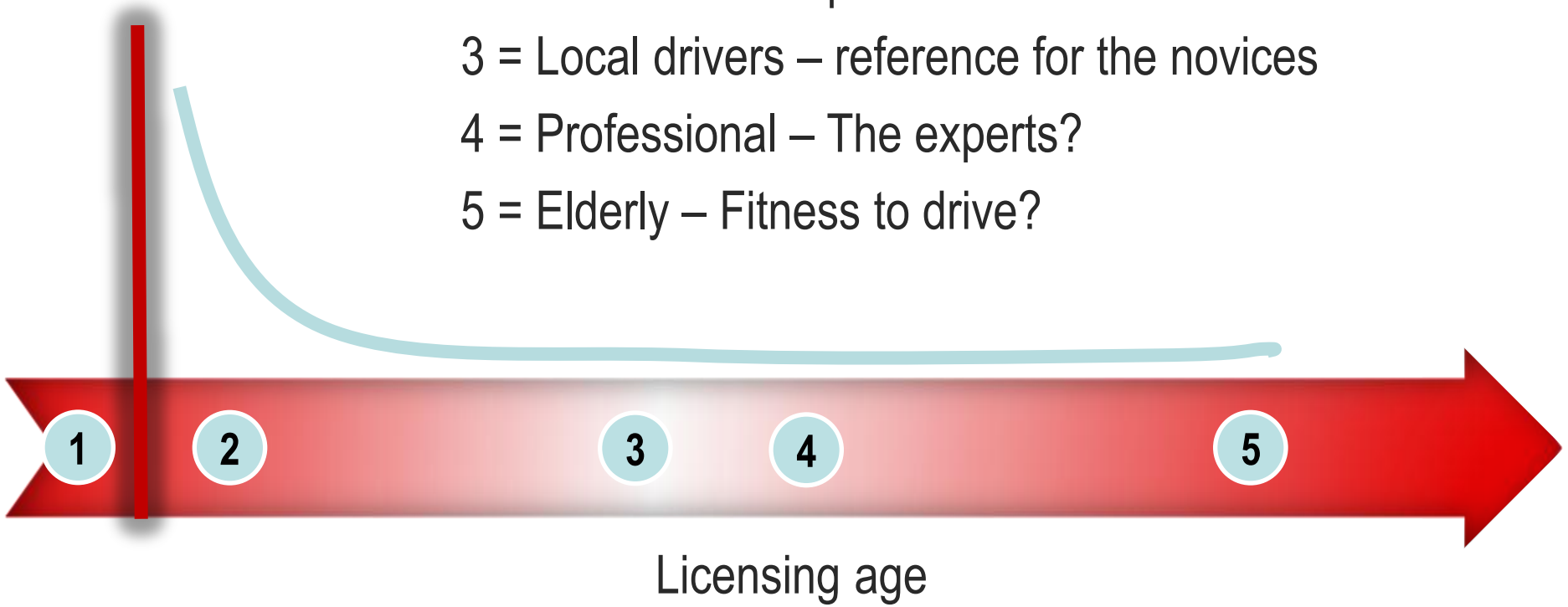
1 = Learners – learn/practice for licensing

2 = Novices – adapt to the local traffic

3 = Local drivers – reference for the novices

4 = Professional – The experts?

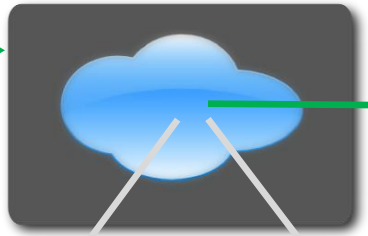
5 = Elderly – Fitness to drive?



A picture of the TrafiSafe experiment

via 3G

Internet/
Server
Data crushing



Automated , simple
mobile reports
(for parents)

Automated,
direct
driver
Feedback

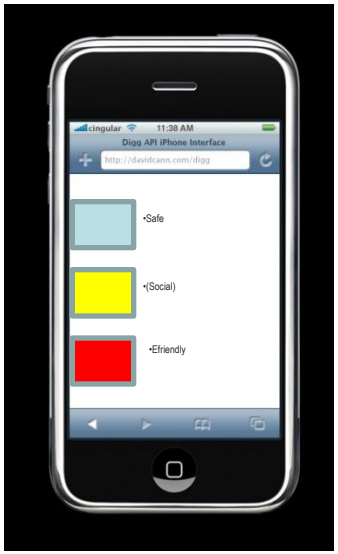
Comparable
Driver data
Experienced
(reference group)

Individual
driver data
Novices
(test group)

Individual
driver data
Novices
(control group)

Automated,
detailed
Web-reports

Calculating driving risk indices



Risk Indices will be based on a mix of "risk scores" of

- speeding behaviour (e.g. % of obeying speed limits)
- acceleration behaviour (e.g. harsh braking, accelerating, cornering)
- proxies of economical, smooth driving

(e.g. "Jerk": $\vec{j}(t) = \dot{\vec{a}}(t) = \ddot{\vec{v}}(t) = \dddot{\vec{x}}(t) = \frac{\mathrm{d}^3\vec{x}(t)}{\mathrm{d}t^3}$ = the 1st derivative of acceleration with respect to time)

A risk index for e.g. a novice driver is generated by comparing the teens´ driving style (by means of risk scores) against a safe norm of local average drivers - just like psychological testing procedures work.

Conclusions

- Adaptation period to the local traffic is risky. Novice males!
- The challenges aren't technical anymore. They are behavioural.
- The role of the feedback in any learning is crucial. How to increase the amount/quality of the feedback?
- The parents should have a role in their children's learning process. Now they don't have (any) role after the licensing.
  - They can decide if their children drive or not
  - ITS-possibilities may be a tool to persuade/motivate parents to participate in learning process ?
  - But, the ITS-product must be easy to use and low-cost for parents to buy it (voluntarily)
- The role of the local drivers in learning to drive
  - Learning to drive process is different in different countries, because the local traffic/driving is different
  - Local drivers = a reference model for the novices
- Needed = a model/models for safe/economical/social driving!

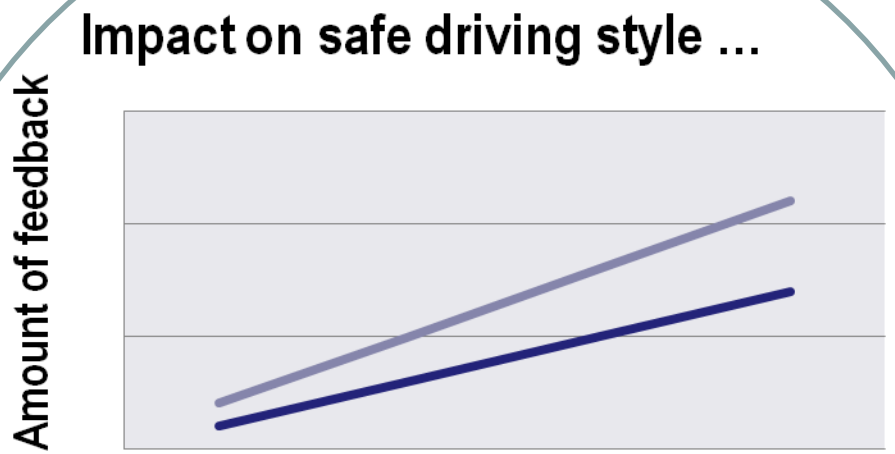
Conclusions

The Goals for Driver Education (GDE- model)

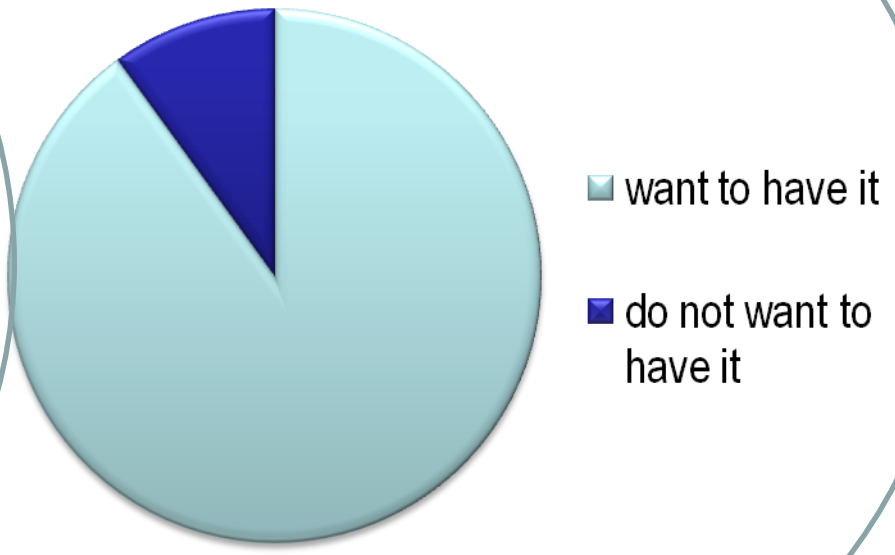
Hierarchical level of behaviour	Essential contents (examples)		
	Knowledge and skills	Risk-increasing factors	Self-evaluation
		Cultural, sub-cultural and societal requirements	
Goals for life and skills for living (general)	Knowledge of/control over how life-goals and personal tendencies affect driving behaviour - lifestyle / life situation - [illegible] - motives - self-control, other personality characteristics - personal values	Risky tendencies - acceptance of risks - self-enhancement through driving - high level of sensation seeking - complying with social pressure - [illegible] - values, attitudes towards society	Self-evaluation/ awareness of - personal skills for impulse control - risky tendencies - safety-negative motives - personal risky habits
Goals and context of driving (trip-related)	Knowledge and skills concerning - effects of trip goals on driving - [illegible] - evaluation of [illegible] driving time - effects of social pressure in car - evaluation of necessity of trip	Risks connected with: - driver's condition (mood, BAC, etc.) - purpose of driving - driving environment (rural/urban) - social context and company - extra motives (competing, etc.)	Self-evaluation / awareness of - personal planning skills - typical goals of driving - typical risky driving motives
Mastery of traffic situations	Knowledge and skills concerning - [illegible]les - observation/selection of signals - anticipation of courses of situations - speed adjustment - communication - driving path - driving order - distance to others / safety margins	Risks caused by - [illegible] situations - risk-increasing driving style (e.g. aggressive) - unsuitable speed adjustment - vulnerable road users - not obeying rules / unpredictable behaviour - information overload - difficult conditions (darkness, etc.) - insufficient automatism/skills	Self-evaluation / awareness of - [illegible] and weak points of basic traffic skills - personal driving style - personal safety margins - strong and weak points for hazard situations - realistic self-evaluation
Vehicle manoeuvring	Knowledge and skills concerning - control of direction and position - tyre grip and friction - vehicle properties - physical phenomena	Risks connected with - insufficient automatism/skills - unsuitable speed adjustment - difficult conditions (low friction, etc.)	Awareness of weaknesses - strong and weak points of basic manoeuvring skills - strong and weak points of skills for hazard situations - realistic self-evaluation

Possibilities of the automatic (ITS) feedback with parents in this ?

Examples of the expected results



Result 1.



Result 2.

Teşekkür ederim!
Thank you!

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