

# **Are interventions effective at improving skills in older drivers?**

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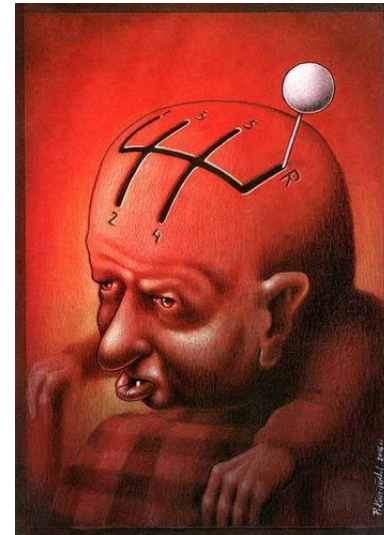
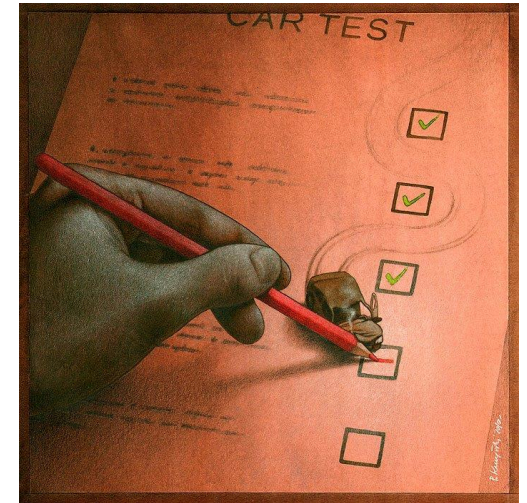
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# Background

- Aging population
  - Challenges
  - Opportunity
- Screening tools
- Training programs
- Driving cessation



# Aim

- Conduct a systematic review to synopsise the literature on programs or interventions in older drivers, to identify gaps and provide recommendations for future research.

# Methods

- Relevant databases such as MEDLINE/PUDMED, CINAHL, PsychInfo, Ageline and Scopus were searched for primary articles published in between January, 1995 and December, 2014.
- Articles were identified using MeSH search terms (in English only): older drivers, self-evaluation, driving courses, interventions, driver improvement, skills training, speed of processing training and cognitive training.
- All retrieved abstracts were reviewed, and full-texts printed if deemed relevant. Articles were also searched via footnote chasing (secondary sourcing).

# Methods

- Extraction of data from each article (N=20)
  - Classroom;
  - Computer based and cognitive and/or visual processing;
  - Physical training;
  - On-road training;
  - In-simulator training
- What might benefit or not the appropriation of good driving skills (i.e. car handling and maneuvers) and behaviours (i.e. respect of traffic regulations and other road users) at short and long term ?
- N.B. Articles on driving and specific health conditions such as post-stroke or Parkinson were not included in the actual study

# Michon's model

- Strategic (ex. route used, time of day)
  - ?
- Tactical (ex. lane positioning)
  - ?
- Operational (ex. braking, steering)
  - ?

# Results: Classroom settings

- Owsley et al., 2004
  - KEYS, Knowledge Enhances Your Safety
    - 176 Baseline vs 227 Education
    - Reduced mileage, no difference in the RR of crash
- Porter 2013
  - **Increase in Road Safety Knowledge**
- Jones on.
  - **Self-Regulation of drivers: less trip, reduced distance**
- Nasir
  - **No clear effect on the reduction of collisions**
- Owsley
  - KEYS, Knowledge Enhances Your Safety
    - 171 Baseline vs 194 Education
    - Self regulation higher in the education group, no effect on both group for perception of road safety
- Bédard et al. 2004
  - Control vs 55 Alive; 65 participants total (age 55–86)
    - an increase in the driving scores of participants between the first and second evaluations, no group effect

# Results: Computer based training for cognitive or visual processing

- Roenker et al. 2003
  - Speed of processing vs simulator vs control
- **Increased performance in related task (when >8sessions)**
- E
  - Positive transfer for event detection in-simulator**
- **Better SoP is a protective factor of driving cessation**
- (
- **No clear effect on the reduction of collisions**
- Cassavaugh & Kramer, 2005
  - 11 male, 10 female, trained on visual processing and cognitive task
    - Regression analyses demonstrated that performance on the single and dual cognitive tasks and improvements in these computer-based tasks with training were predictive of improvements in driving simulator performance across the course of the study.
- Rogé et al. 2014
  - 16 controls, 15 trained on
    - Higher % of detection for trained vs untrained, and further distance of detection



# Results: Physical training

- Marottoli et al. 2007
  - 90 control, 84 program, mean age 77, 33% female
    - 2.43pts at 3 months on 72-pts scale of performance, comparing
  - **Increased health status following the program: ROM, etc.**
- Sa
  - **Some driving tasks are improved**
  - **No clear effect on the reduction of collisions**
    - No RT effect, HSPT 15.3% and SSST 2.7% faster, Control 2.2% slower
- Marmeleira et al. 2009
  - Exercise+cog (60–81 years,  $n=16$ ) vs. control (60–82 years,  $n=16$ ).
    - Improvement in RT & CRT, visual attention, and lower limb mobility.

# Results: On-road training

- Bédard et al. 2008
  - Intervention (class + on-road) n=38 • Control n=37

## Gain in knowledge

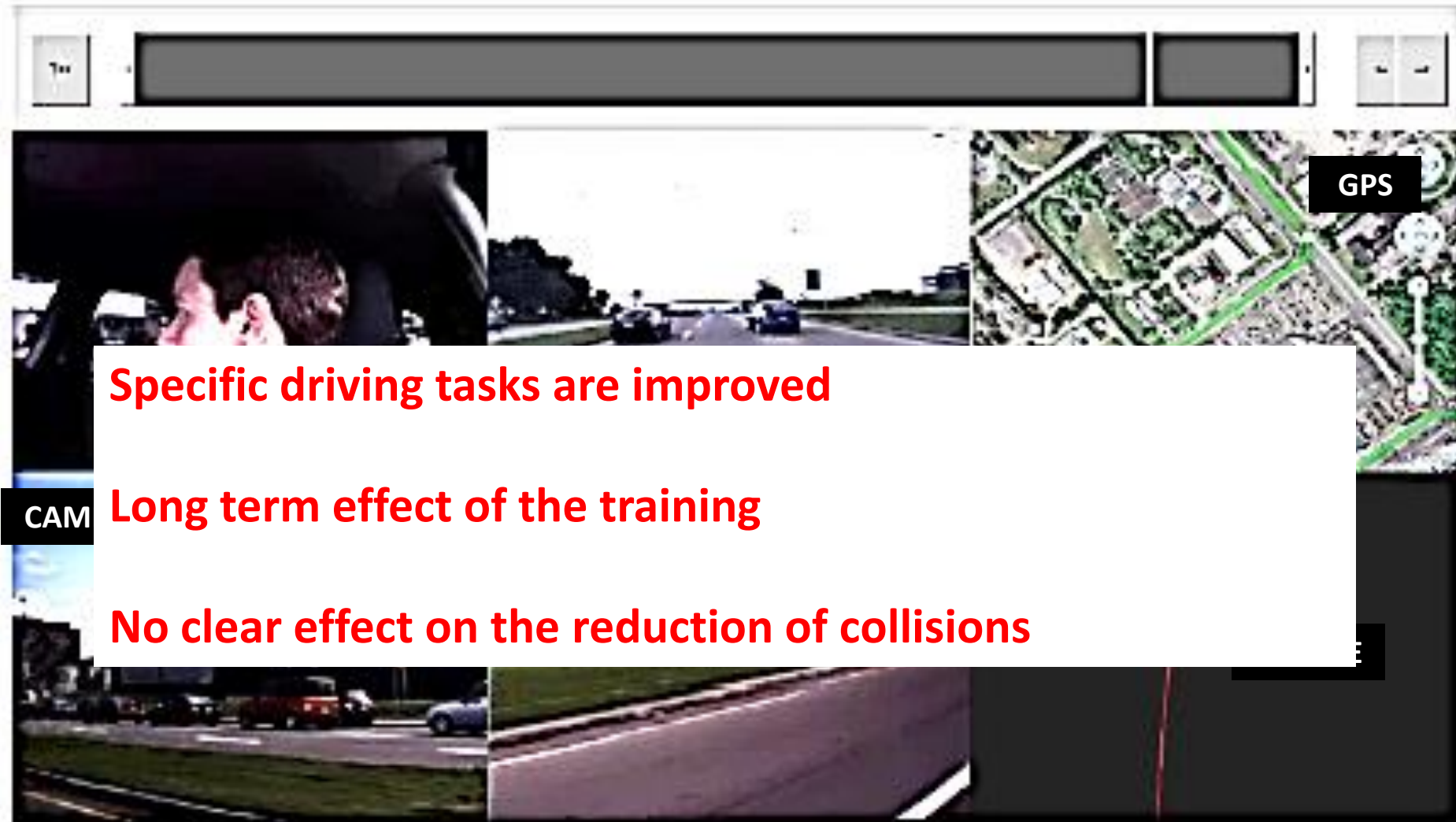
**Some driving tasks are improved when compared to Control**

## **No clear effect on the reduction of collisions**

- Training (class + on-road), n=34, Control, n=34

- On-road: 2.87pts higher for training
- Knowledge: 3.45 pts higher for training

# Results: In simulator training



- Increase of on-road performance for in-simulator
- Increase of cognitive performance for Simulator and Cognitive

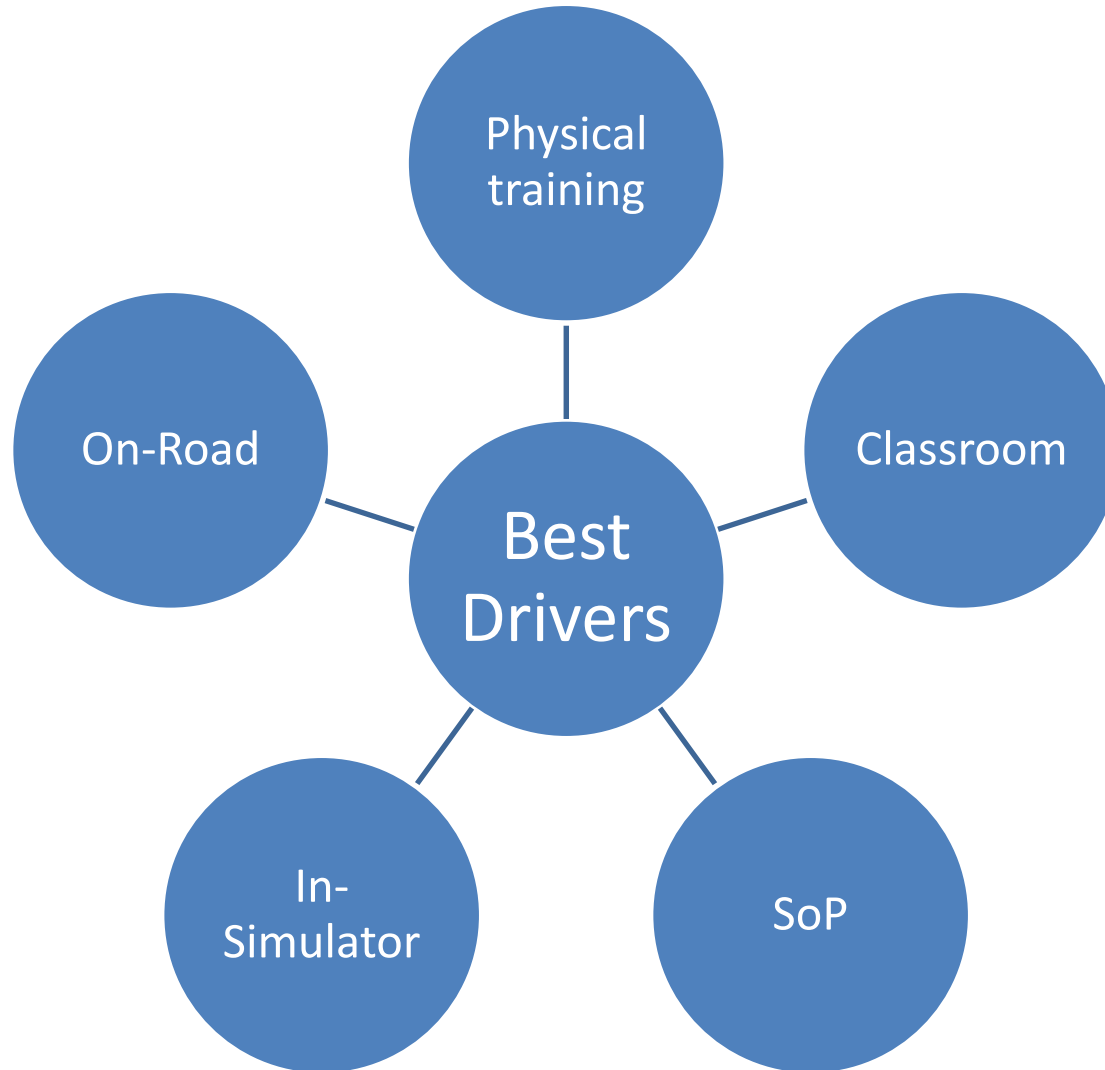
# Discussion

- Different types of approaches have been successful at improving specific driving skills and / or behaviours
- Discrepancies in how driving is evaluated
  - direct comparisons are difficult
- No clear effect on the reduction of collisions

# Best practices

- Drivers' own car
- Education
  - ...older men... were motivated to attend driver education **not because they were actually seeking optimization coping, but for other reasons, namely to appease their wives.**
    - Nasvadi 2007
- Video feedback
  - Driving involves a skill set that is habitual, overlearned, and viewed as a basic life necessity regardless of adult age.
    - Owsley 2004
- Practice « makes perfect »

# Michon's model



# Conclusion

- This review highlighted potential interventions that can be used to maintain or improve driving performance in older drivers.
- Future studies need to further test these interventions to evaluate their combination or their long term effect.

# Quotes

- *Some types of errors were deemed to be ones that are commonly made by all drivers and are unlikely to result in vehicle and pedestrian conflicts or crashes, so drivers could make these and be deemed “safe.”*
  - Porter 2013
- *Scarce resources to identify “high risk” drivers might be better spent in providing interventions to postpone cognitive decline to begin with.*
  - Owsley et al. 2010



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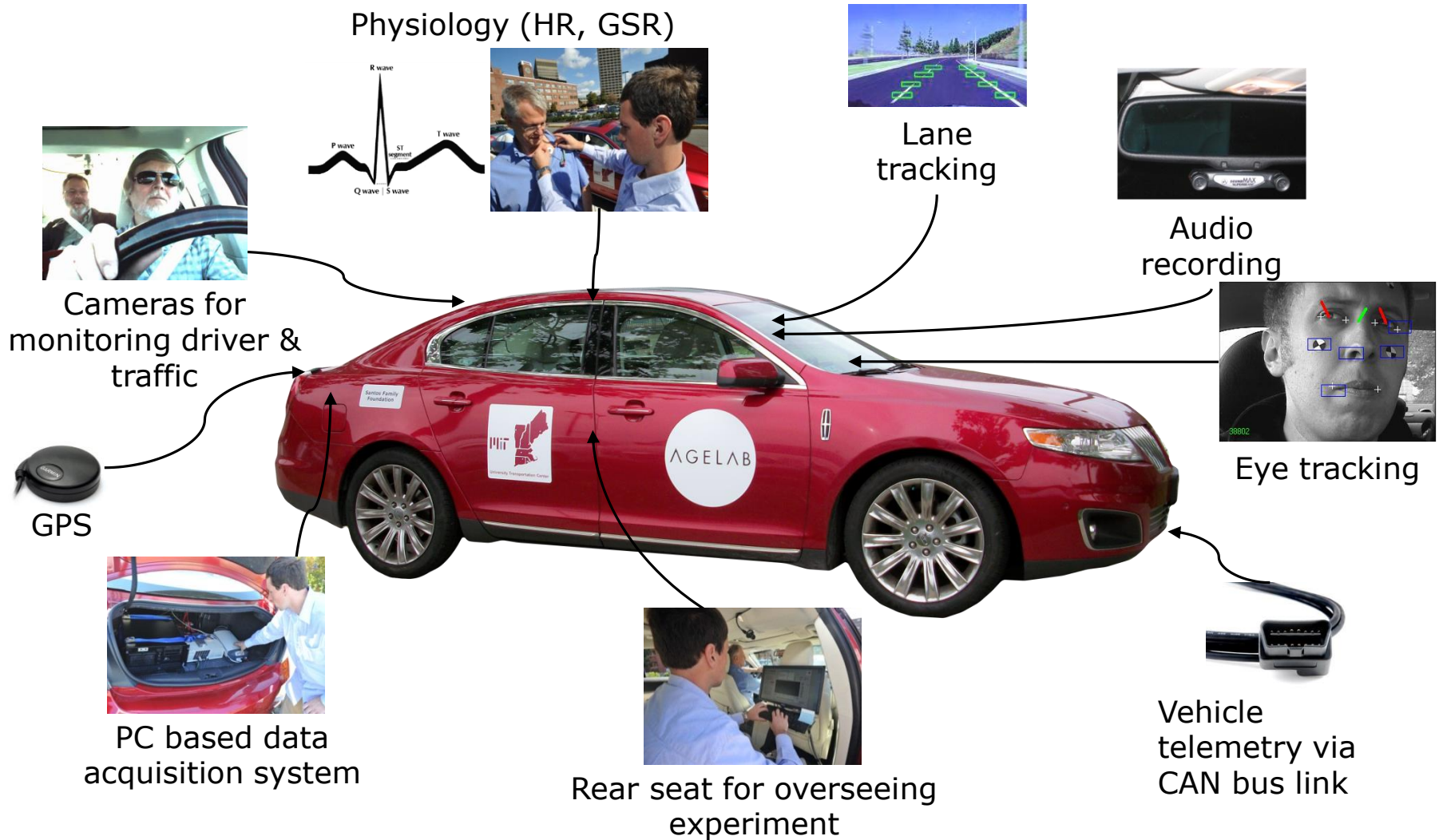
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**THANK YOU**

**MERCI**

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# MIT AgeLab Instrumented vehicle



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