Hazard perception training: does it need to be complicated?

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Context – driver training and education

On-road experience reduces crash risk[1]

Training (as done in the past) does not[2]

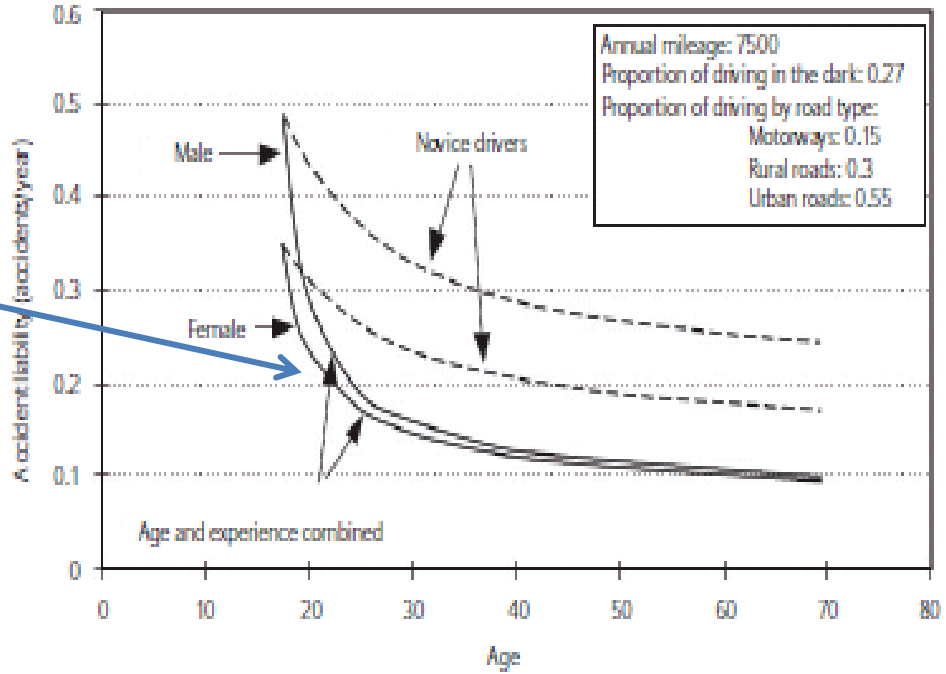


Figure 2.1 The effects of age and experience on collision risk, from Maycock *et al.* (1991; figure reproduced from Maycock, 2002)

Hazard perception – a special skill?

Hazard perception…

- …discriminates between high- and low-risk groups (e.g. inexperienced and experienced drivers)[3, 4]
- …is related to collision risk [1, 5, 6, 7]
- …can be trained[7]

Driver performance versus driver behaviour

- **Evans (1991; 2008)[9,10]**
  - Driver performance (what the driver CAN do)
  - Driver behaviour (what the driver DOES do)
- **In 'normal driving' driver behaviour seems to be more important than driver performance in determining risk**
- **Is hazard perception the exception?**

Hazard perception testing

- Some evidence that it has reduced some new driver collisions by around 17% in GB[5]
- Higher performance on video hazard perception test is associated with lower crash risk in GB and in Australia[5,11]

Figure 4.1 In Great Britain, learner drivers need to pass a video-based hazard-perception test as part of their driving theory test. Hazard perception refers to the ability to anticipate road hazards and respond to them early in their development.

How has hazard perception been trained?

On-road training and classroom lectures

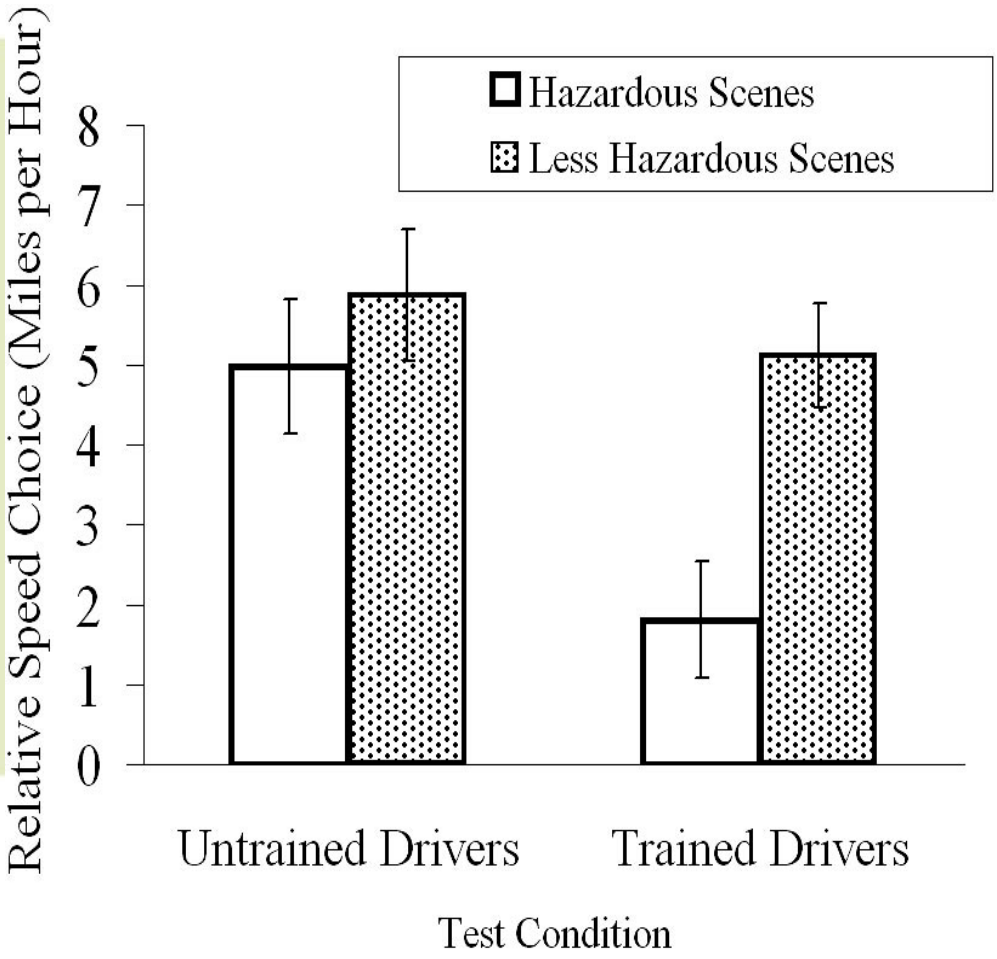
- McKenna and Crick (1994)[4]
- Only trained group (RoSPA course) showed improvement over nine month period (video HP test)

TABLE 3: Group means for overall hazard perception score (ms) in Session 1 and Session 2

	Session 1	Session 2
Trained Group n = 12	4312	3902
Control Group n = 14	4337	4404

Listening to expert commentary

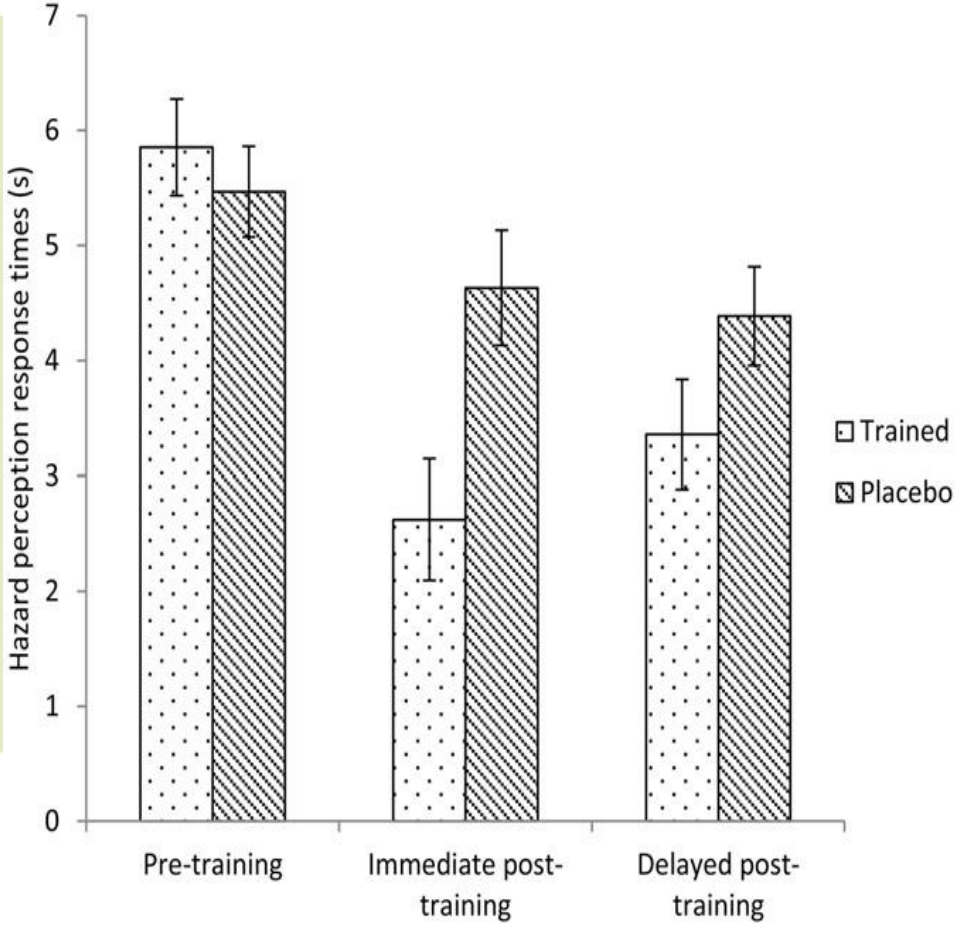
- McKenna, Horswill and Alexander (2006)[12]
- Specific reduction in speed for trained group (video speed test)



Producing and listening to commentary

- Horswill et al. (2013)[13]

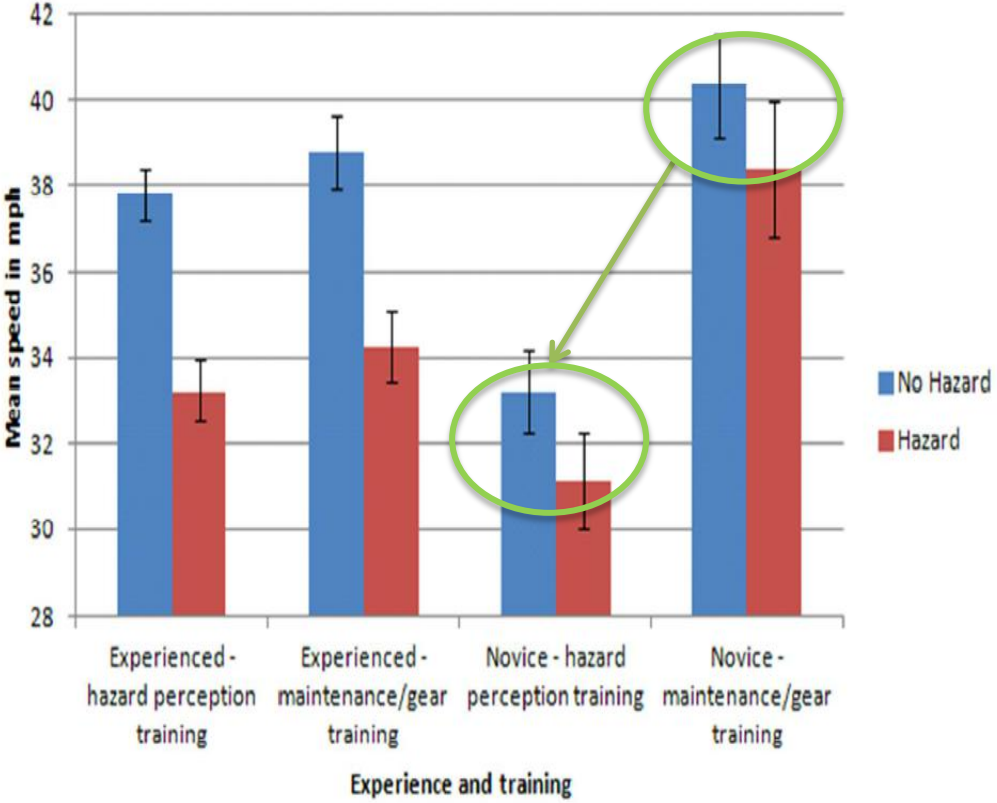
- Experienced drivers retain HP advantage over placebo-trained group 1 week later (video HP test)



Discussion group using videos

- Helman et al. (2012)[14]

- Novices (motorcyclists) trained in HP showed non-specific reduction in risk taking (video speed test)



Still photos and plan-views of scenarios

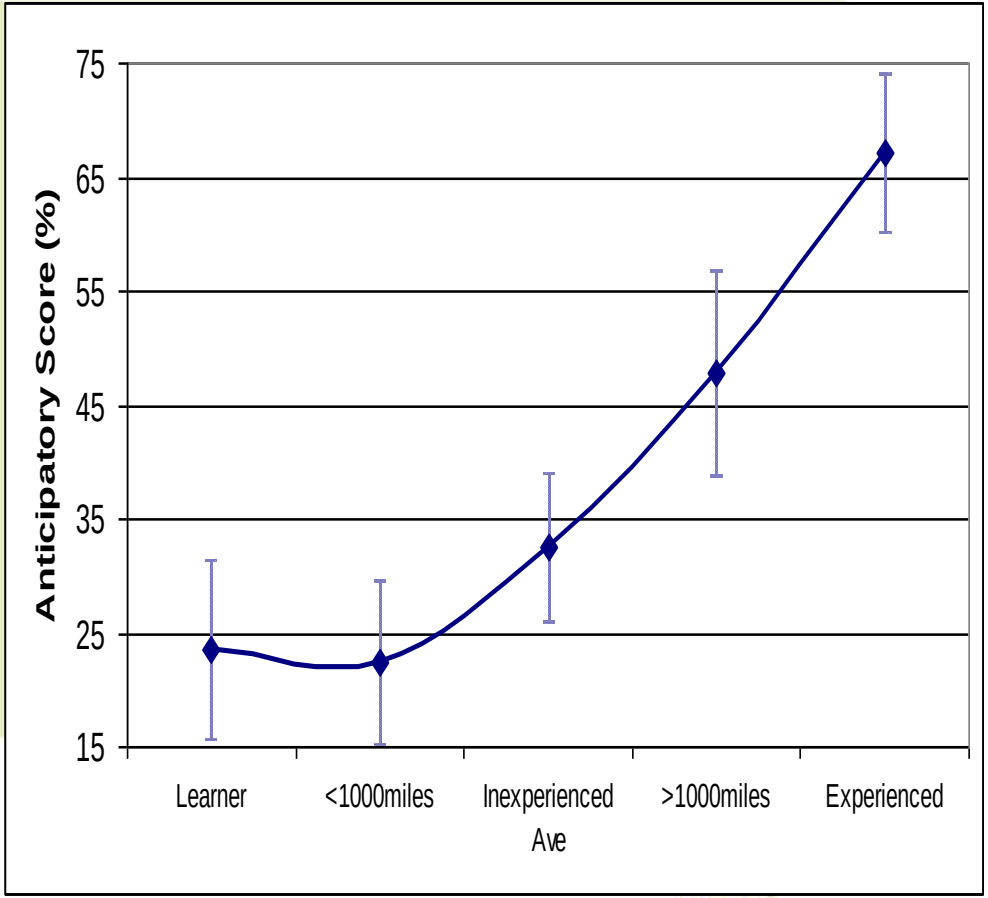
- Pradhan et al. (2009)[15]
- Trained 'where to look' so as to be aware of potential hazards
- Trained drivers more likely to look in correct places (on-road drive)

Table 1. Comparison of trained and untrained groups on individual scenarios: Field study*.

	Scenario†	Name	Performance in Trained Group	Performance in Untrained Group	Difference Between Trained and Untrained
Near Transfer	1	Left Fork	50.0%	18.2%	31.8%
	3	Right Turn (Reveal)	75.0%	58.3%	16.7%
	4	Left Turn (Reveal)	100.0%	41.7%	58.3%
	8	Abrupt Lane Change	55.0%	25.0%	30.0%
	9	Hidden Sidewalk	75.0%	25.0%	50.0%
Far Transfer	2	Blind Driveway	36.4%	8.3%	28.0%
	5	Truck Blocking Crosswalk	28.8%	4.2%	24.6%
	6	Hidden Drive	20.0%	36.4%	−16.4%
	7	Curve Stop Ahead	62.5%	57.1%	5.4%
	10	Truck Blocking Travel	90.0%	62.5%	27.5%

Simply driving

- Kinnear et al. (2007)[16]
- Novice drivers with more than 1000 miles of driving showed similar physiological anticipatory response to hazards as experienced drivers (video HP test)



Summary of literature

- Large literature (1990-2014: 2,343 hits for “Hazard AND Perception AND Training AND Driving” in ScienceDirect; 186 hits in TRID)
- Wide range of training methods (and wide range of outcome measures)
- No coherent understanding of which is best training approach (on any outcome measure)

What is the mechanism by which HP might reduce risk?

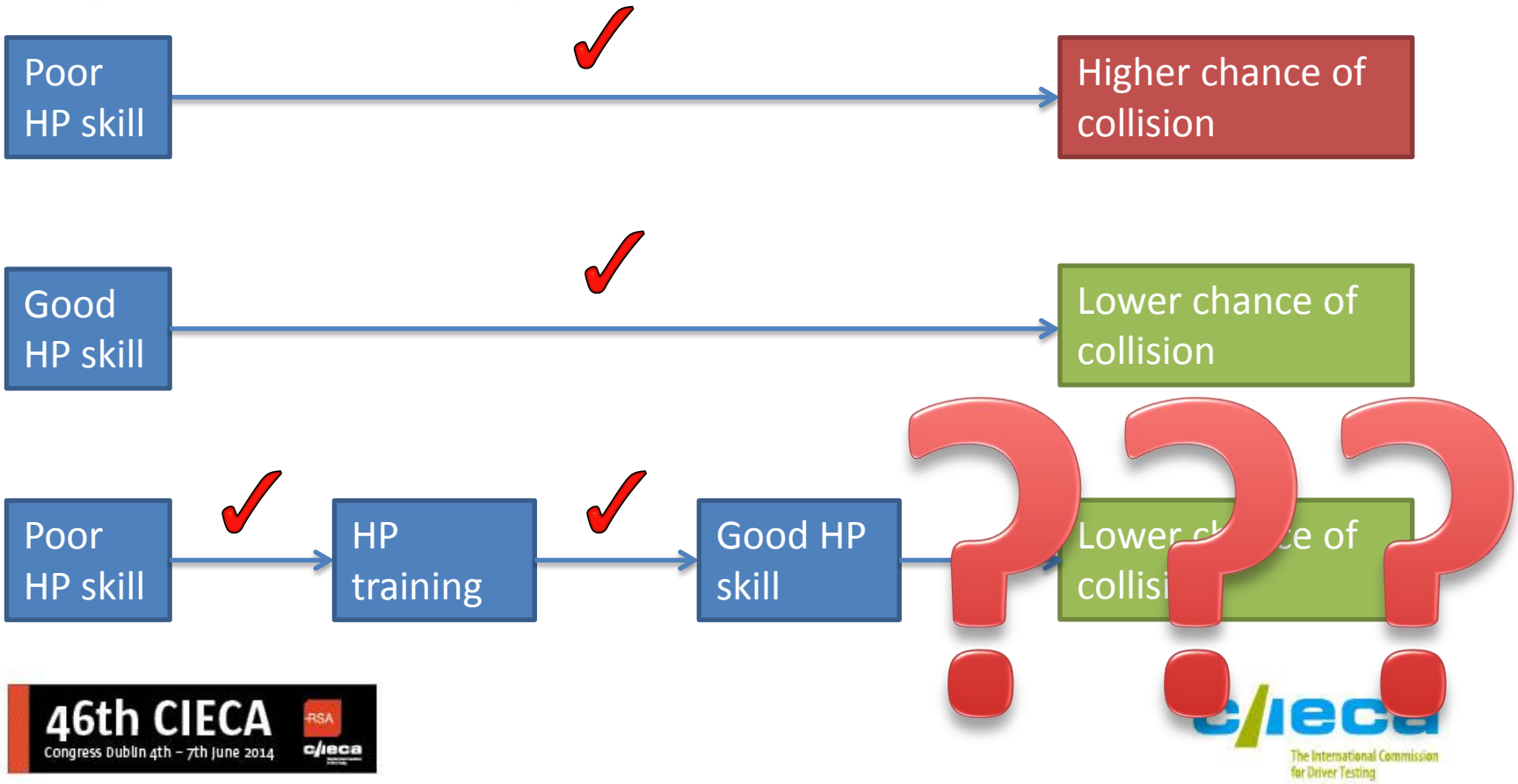
Possible mechanisms

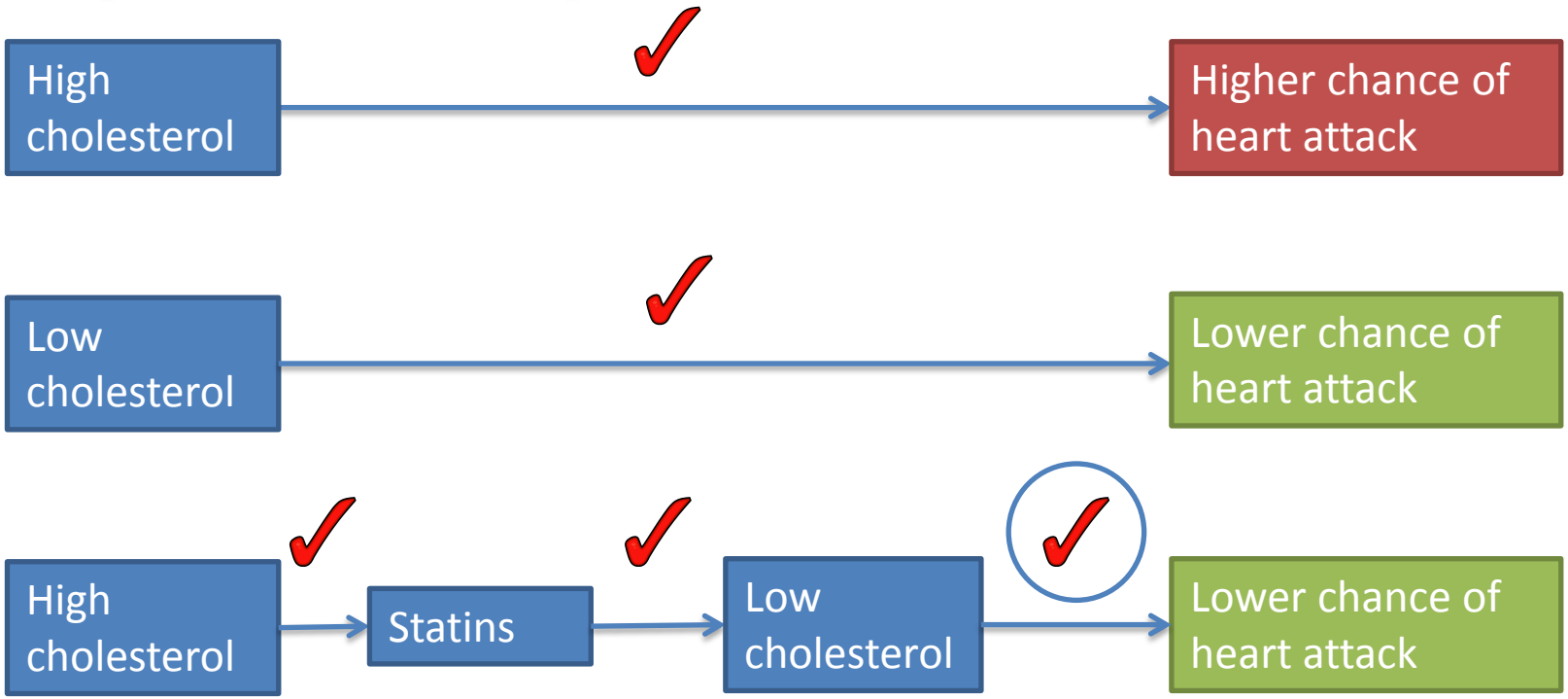
- **Possible mechanisms through which hazard perception might reduce collisions include (at least):**
  - Skill increases leading directly to earlier detection of hazards, allowing earlier response (**PERFORMANCE**)
  - General lower risk (e.g. lower speed) arising from insight into limitations of hazard perception skill (**BEHAVIOUR**)
  - Blocking access to driving (**REMOVING RISK**)

Evidence

- Wells et al. (2008)[5] and Boufous et al. (2009)[11] find links between performance on HP TEST and collisions

- Collision reduction in Wells et al. (2008)[5] attributable to the introduction of the HP TEST


Poor HP skill
Higher chance of collision
Good HP skill
Lower chance of collision
Poor HP skill
HP training
Good HP skill


High cholesterol
Higher chance of heart attack
Low cholesterol
Lower chance of heart attack
High cholesterol
Statins
Low cholesterol
Lower chance of heart attack

Evidence

- No reliable evidence linking HP TRAINING to reduction in collisions

- Some data – for example Allen et al. (2008)[17] showed some differences between higher and lower fidelity simulators – but methodological limitations in such studies prevent firm conclusions

Conclusions

Conclusions (and first steps)

- Training probably does not need to be complicated, but even within the simpler approaches we don't know which is best
- Therefore first step for hazard perception implementation should focus on a TEST that can discriminate low and high-risk groups, and can show a link with collision risk
- This test will at least delay access to those who lack the appropriate level of skill

Next steps

- We need a research programme examining and developing those (hopefully simple) training methods that show the most promise
- We then need Randomised Controlled Trials of the effectiveness of these methods in reducing COLLISIONS or INJURIES or BOTH
- Such trials need not be difficult; they will give us evidence on which we can build ACTUAL EVIDENCE-BASED POLICY

Next steps

- Alongside the development of HP training and testing, interventions that we know work to reduce collisions and injuries (graduated licensing) should be moved up the agenda
- Europe-wide agreement will make it easier to overcome political reluctance in individual states, and will provide a stronger licensing system in which to innovate

Thank you

Hazard perception training: does it need to be complicated?

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