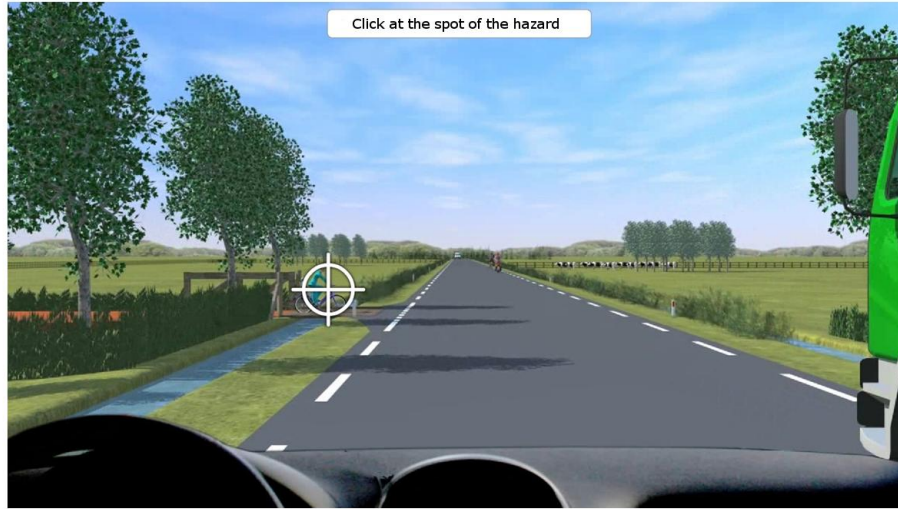


Willem Vlakveld

Testing of Hazard Perception skills  
and not of the tricks to pass the test



## Testing of Hazard Perception skills and not of the tricks to pass the test

# Content

- **Background**
- **What is Hazard Perception (HP)?**
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- **Criteria for a new test**
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- **Study 2: Two different response methods**
- **What has to be done before the new test can be implemented?**



**SWOV**  
INSTITUTE FOR  
ROAD SAFETY RESEARCH

**cbr** 

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**c/ieca**  
The International Commission  
for Driver Testing

# What is Hazard Perception?

## *Hazard Perception*

The ability to *detect* and *recognize* latent hazards and to *predict* how these latent hazards can develop into situations in which a crash would be very likely.

## *Risk Awareness*

The *feelings of risk* that are evoked by these predictions and the execution of *actions* that ensure a safety margin that is large enough to avert a crash should the latent hazard materialize.

## *Hazard Anticipation*

Hazard anticipation is a combination of hazard perception and risk awareness and has cognitive, emotional and motivational aspects.

# Types of Hazards

## Covert latent hazards

*Possible other road users on collision course that are hidden from view*

## Overt latent hazards

*Visible other road users who due to the circumstances may start to act dangerously*

## Precursors of hazards

*Signs (both official and unofficial) that warn for hazards ahead*

## Loss of control hazards

*Circumstances that warn drivers for loss of control*

# Existing Dutch HP-test



1 Brake

2 Release throttle

3 Do nothing

## Disadvantages

Only a small difference between learner drivers and experienced drivers;

Low internal consistency;

Low pass/fail criterion;

Speed of other road users in the traffic scene cannot be assessed;

Candidates can fail when they are very cautious;

Possible to pass the test by applying some simple heuristics which have little to do with hazard perception.



## Criteria for the new test

PC-based and moving images;

Large difference in scores between learner drivers and experienced drivers;

High internal consistency;

Can discriminate between overt and covert latent hazards;

Impossible to pass the test with heuristic which have nothing to do with HP;

Fraud-proof.

# First Study

Animated video clips with either a dominant overt or covert latent hazard that did not materialize;

Participants watched these clips while their gaze directions and fixations were recorded

Directly after each clip: Did you have moments you thought: “I hope this is not going to happen”?



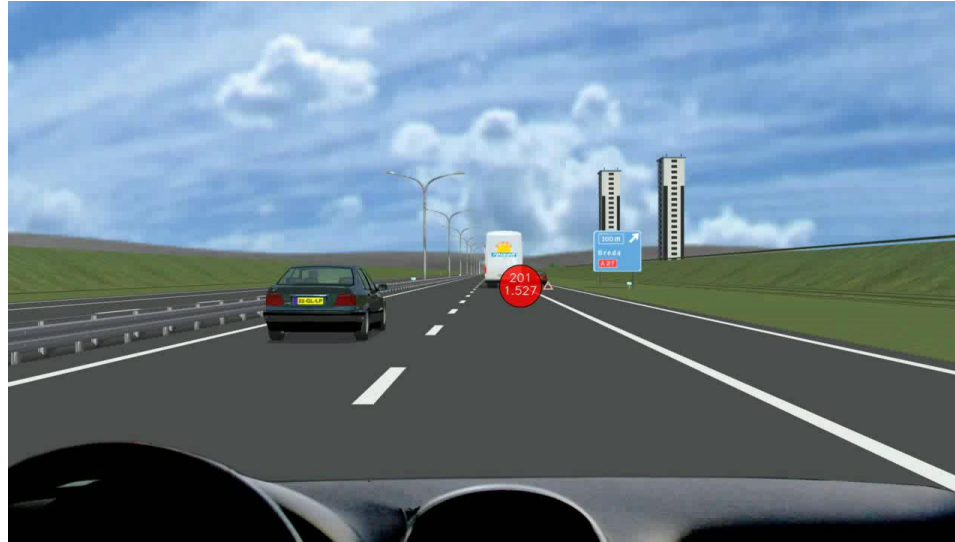
## Three Groups

**Young learner drivers** (18-19 years of age)

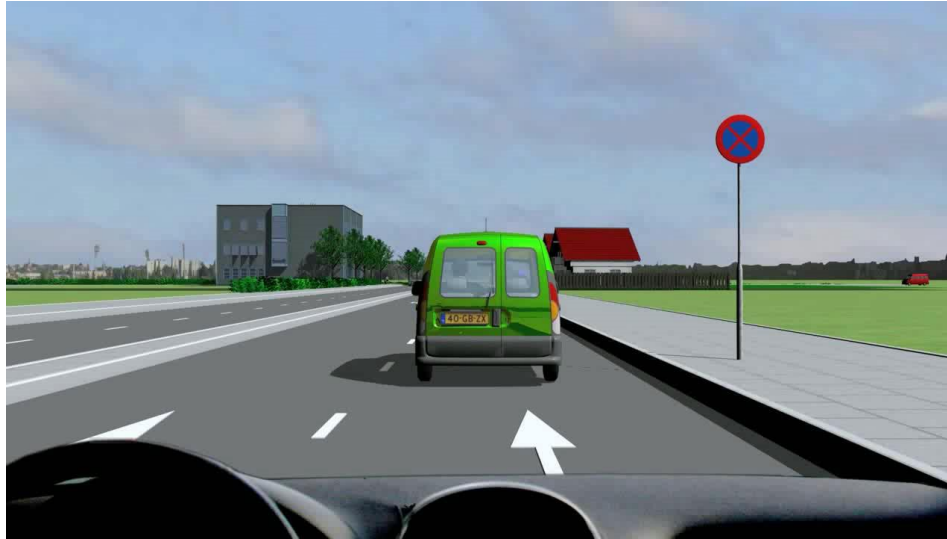
**Older learner drivers** (> 25 years of age)

**Experienced drivers** (> 10 year driving licence and annual mileage > 15.000 km)

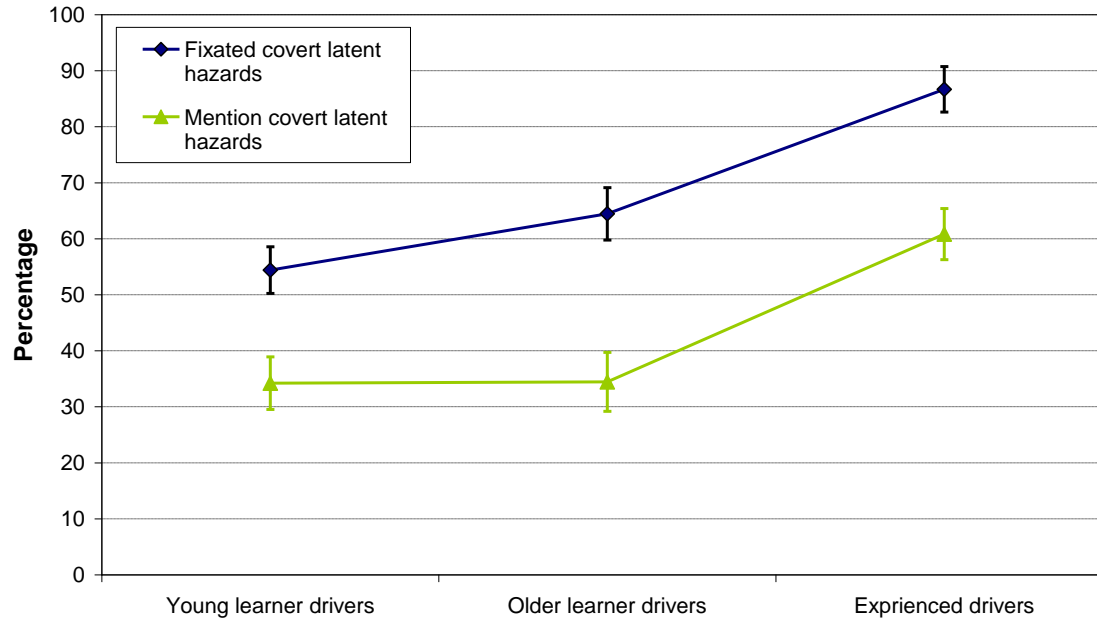
# Clip with overt latent hazard



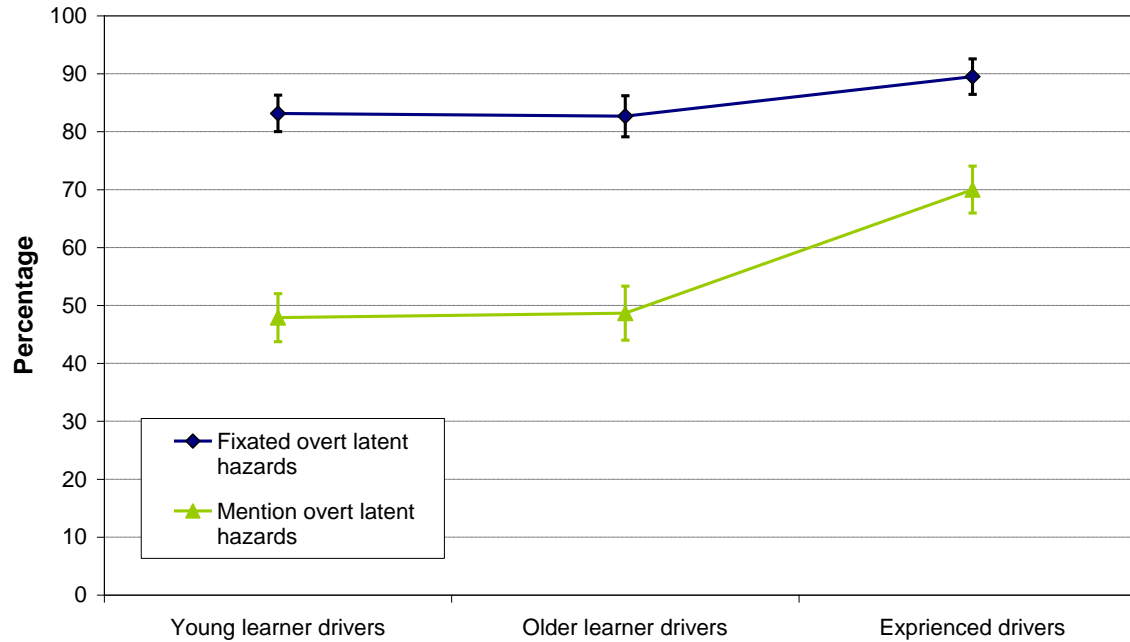
# Clip with covert latent hazard



# Results I



## Results II



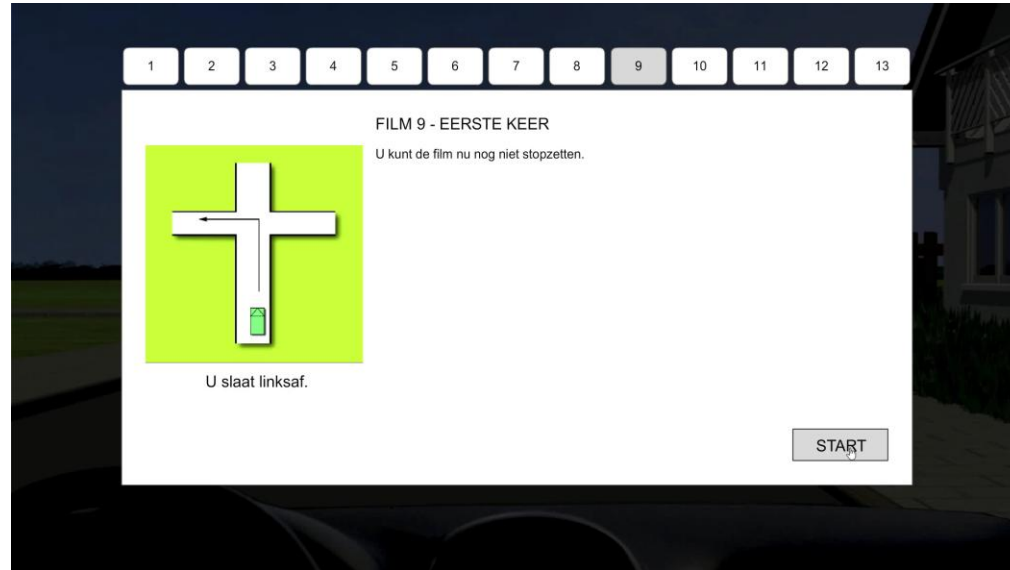
## Second study

### Task 1

- Watch a video clip;
- Take in mind the moment you most strongly felt ‘I hope this is not going to happen’ while you watched the clip;
- Watch the clip for the second time and hold the clip at the moment you had taken in mind;
- Point and click at the potential hazard in the frozen screen.



# Example of Task 1



The screenshot shows a driving task interface. At the top, there is a row of 13 numbered buttons (1-13), with button 9 highlighted in grey. Below this, the text "FILM 9 - EERSTE KEER" is displayed, followed by the instruction "U kunt de film nu nog niet stopzetten." To the left of the text is a white crossroad sign on a green background, with an arrow pointing left on the horizontal bar and a small green car icon at the bottom of the vertical bar. Below the sign, the instruction "U slaat linksaf." is shown. In the bottom right corner, there is a grey button labeled "START".

## Second study

### Task 2


- While you watch a clip press the space bar when you think that a hazardous situation could develop;
- You can press the space bar no more than four times per clip;
- Directly after a clip the screen captures of the moments you have pressed appear on the screen;
- Select the screen capture with the most urgent potential hazard;
- Point and click at the potential hazard.

## Example of Task 2

1 2 3 4 5 6 7 8 9 10 11 12 13

FILM 4

U kunt maximaal vier gevaarlijke momenten aangeven. Kies van die momenten het moment met het grootste gevaar. Klik vervolgens met uw muis op de plek van het gevaar.



U voegt uit.

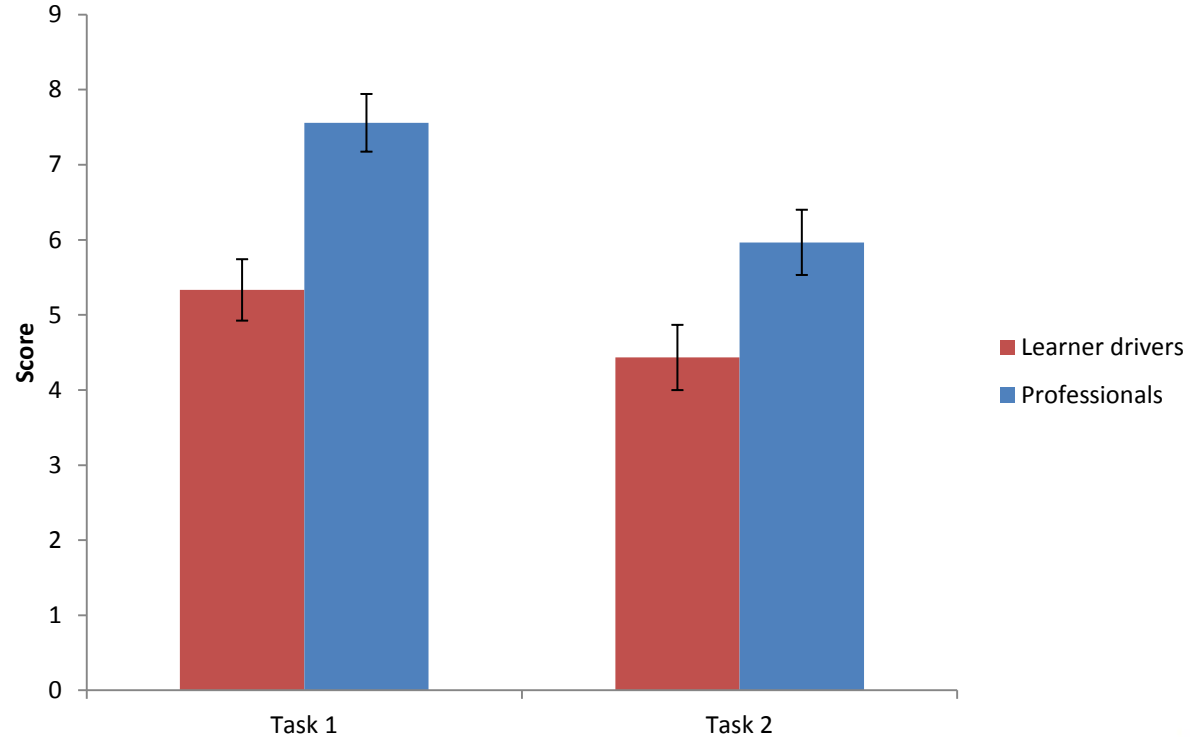
START

## Two Groups

**Learner drivers**

**Professional drivers** (driving instructors and driving examiners)

# Results I



## Results II

**At both tasks professionals scored significantly better than learner drivers but effect size of Task 1 larger than of Task 2;**

**In Task 1: overt latent hazards and covert latent both significant. In Task 2 not;**

**Experienced computer gamers scored better than none gamers in Task2 but not in Task1**

## **Advise SWOV to CBR**

**Continue with Task 1;**

**Improve psychometric qualities of Task 1;**

**Investigate trainability;**

**Determine pass/fail criterion**

Thank you for your attention



Read more in:

**Vlakveld, W. P. (2014).** A comparative study of two desktop hazard perception tasks suitable for mass testing in which scores are not based on response latencies. *Transportation Research Part F: Traffic Psychology and Behaviour*, 22, 218-231.