56TH CIECA CONGRESS
DUBAI 2024

RTA

Three innovations in hazard perception research

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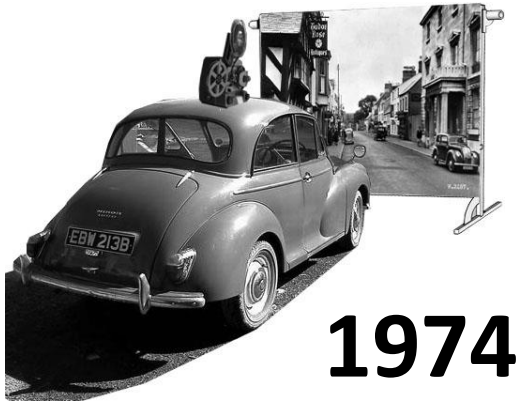
What is hazard perception?

- Hazard perception is a *skill.*
- A hazard perception test is a *measure* of that skill

A Brief History of Hazard Perception



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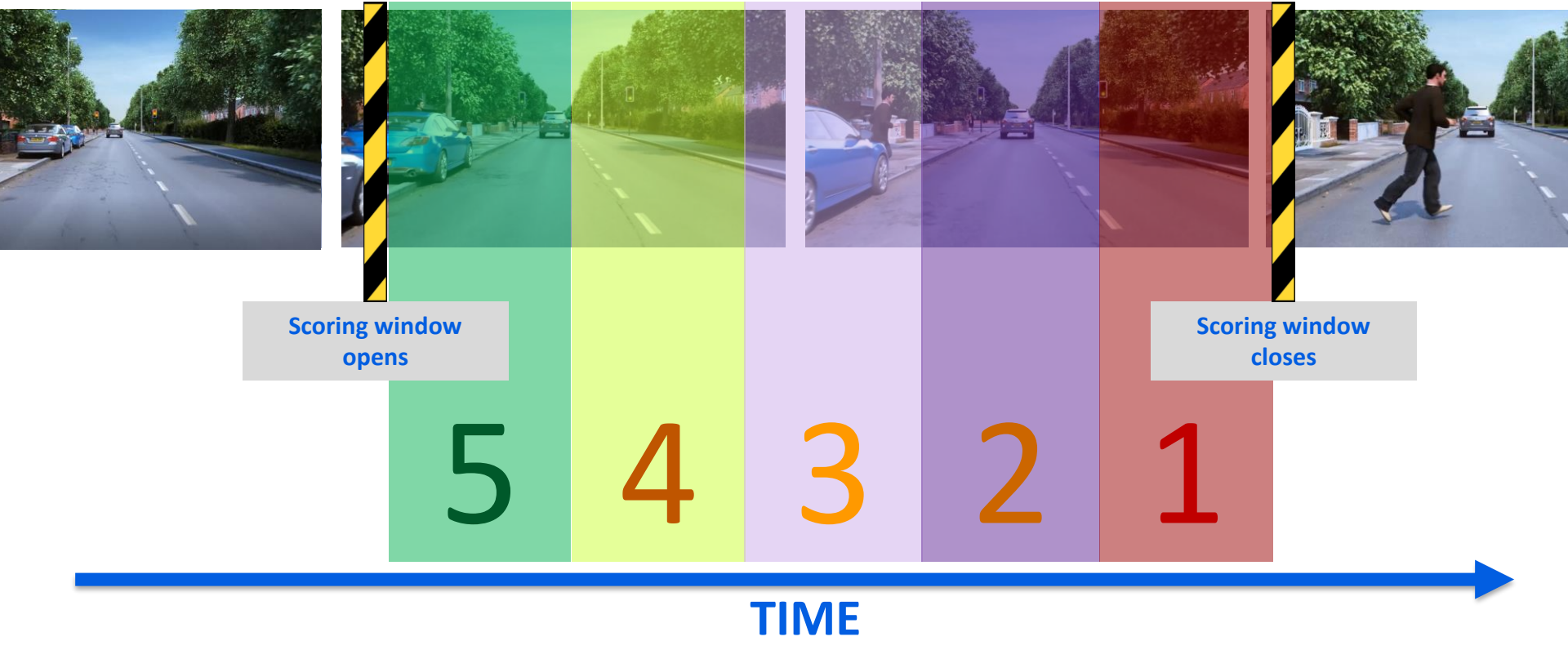
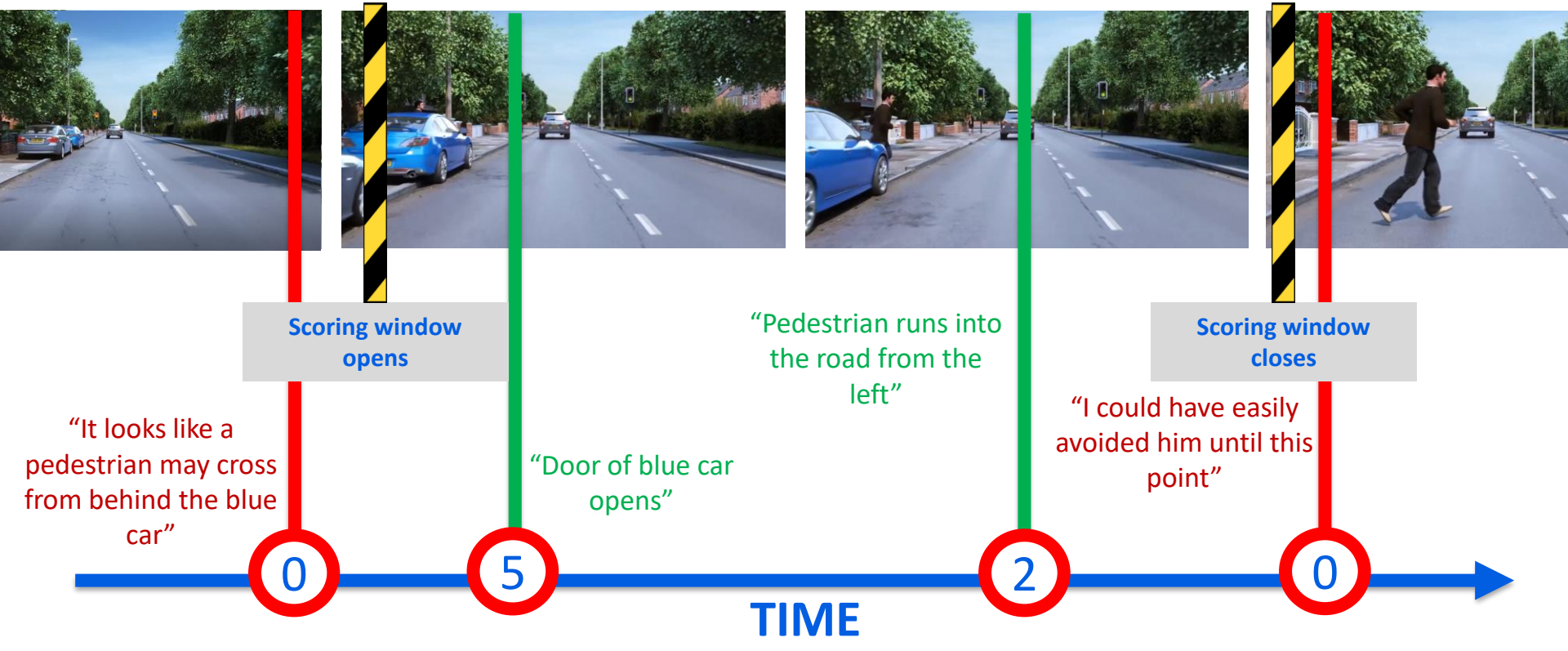
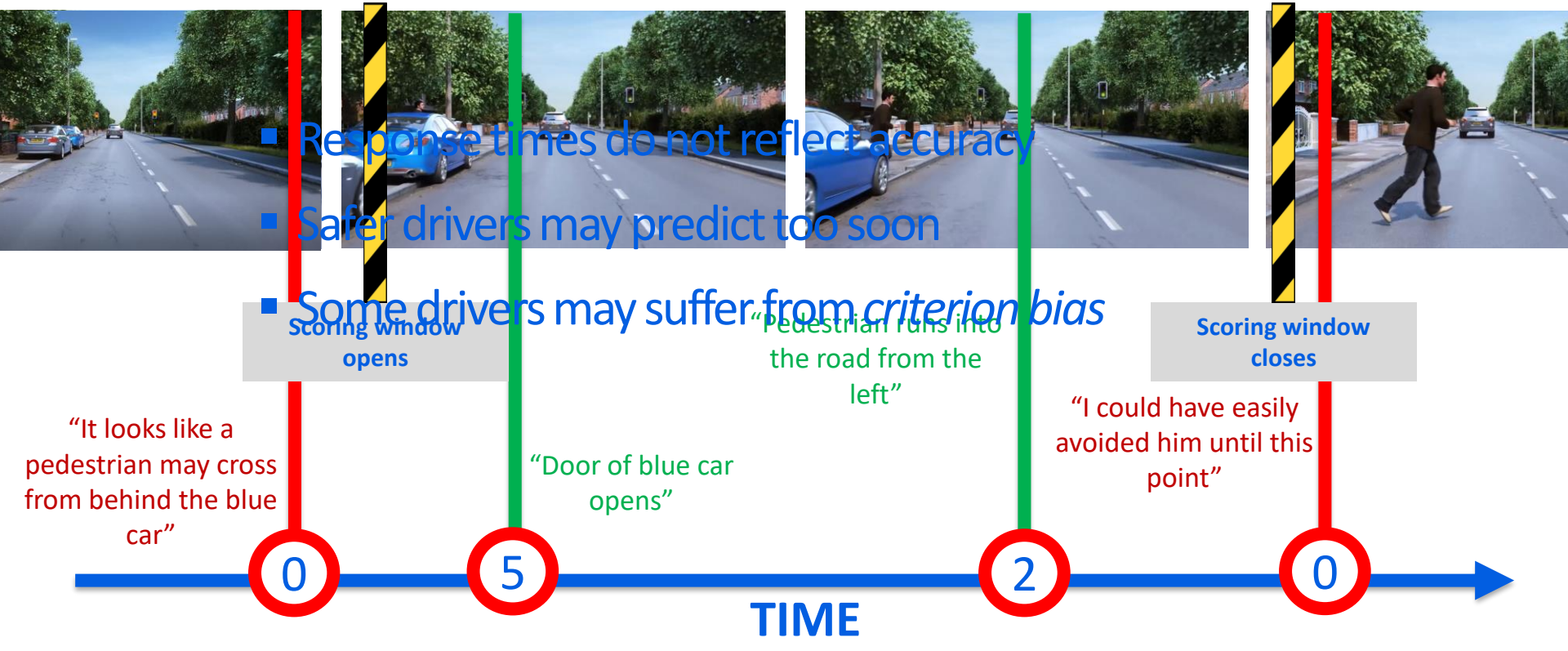
Innovation 1: Hazard prediction



Innovation 1: Hazard prediction



Innovation 1: Hazard prediction

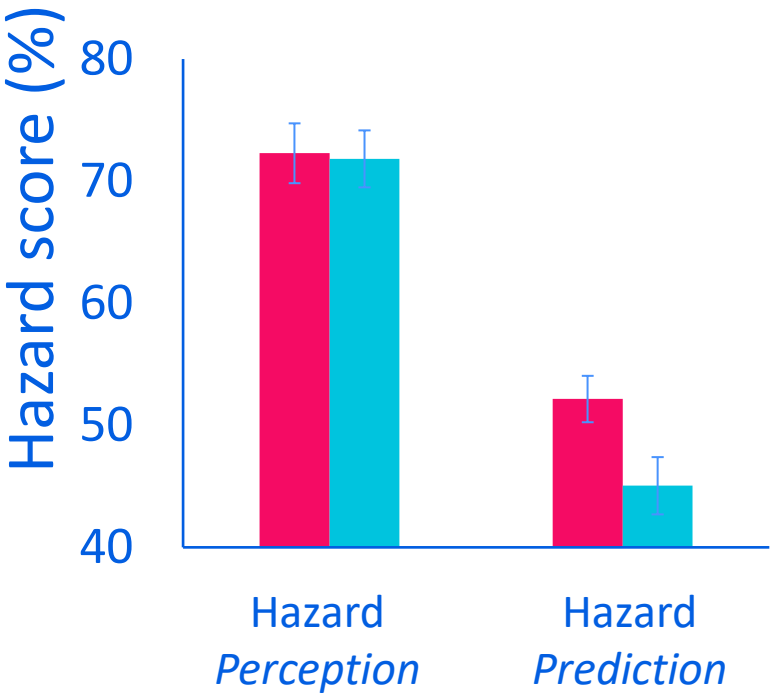


- Response times do not reflect accuracy
- Safer drivers may predict too soon
- Some drivers may suffer from *criterion bias*

Innovation 1: Hazard prediction

- Instead, we can use a *Hazard Prediction* test
- The clip stops just as the hazard develops
- We then ask, “What happens next?”
- You choose from 4 options

Innovation 1: Hazard prediction



- Hazard *prediction* can better separate the safer drivers from less safe drivers.
- Hazard *prediction* is harder, but fairer.
- It's also great for training hazard skills.
- Some countries are looking at this as a national test

Crundall et al., 2016; Crundall & Kroll, 2018; Ventsislavova et al., 2019, Crundall et al., 2021

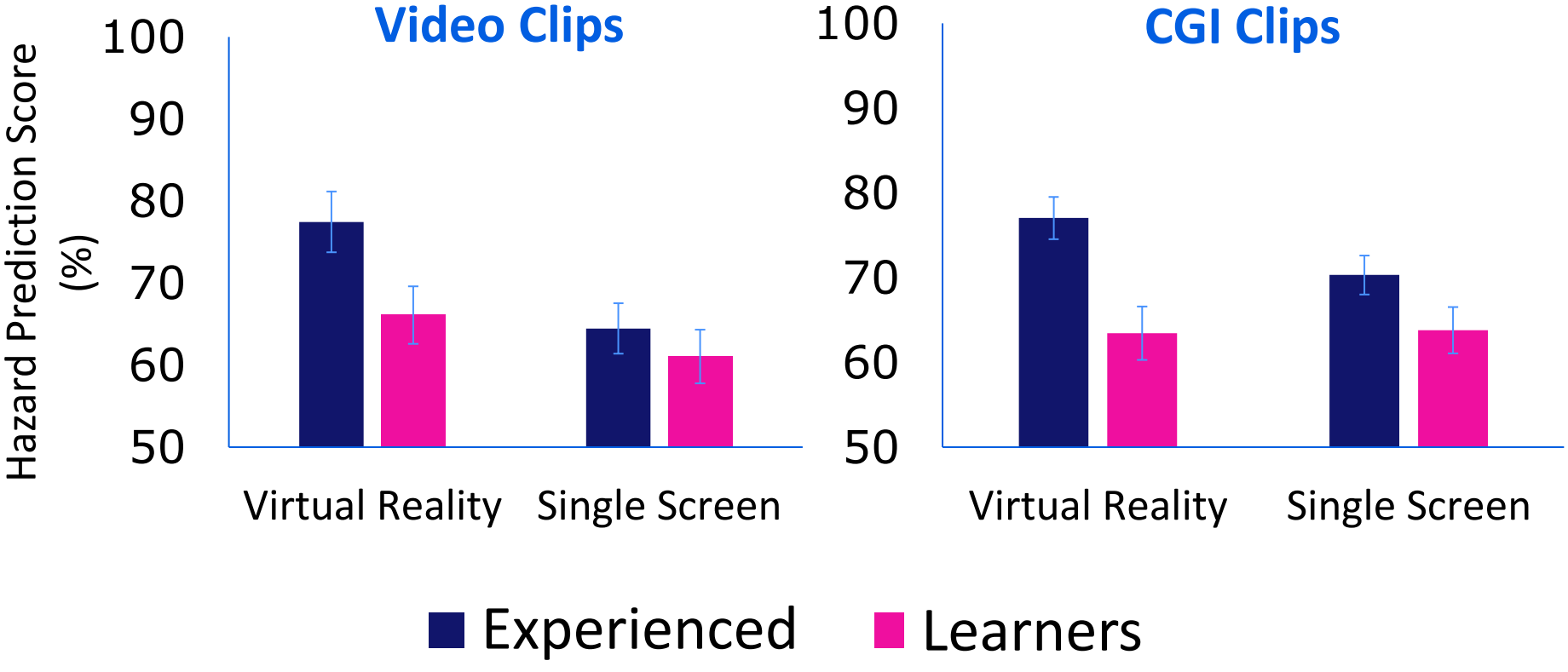
Innovation 2: Virtual Reality

- Current HP is limited by the view
- This limits the hazards you can use
- And may over-estimate drivers' hazard skills

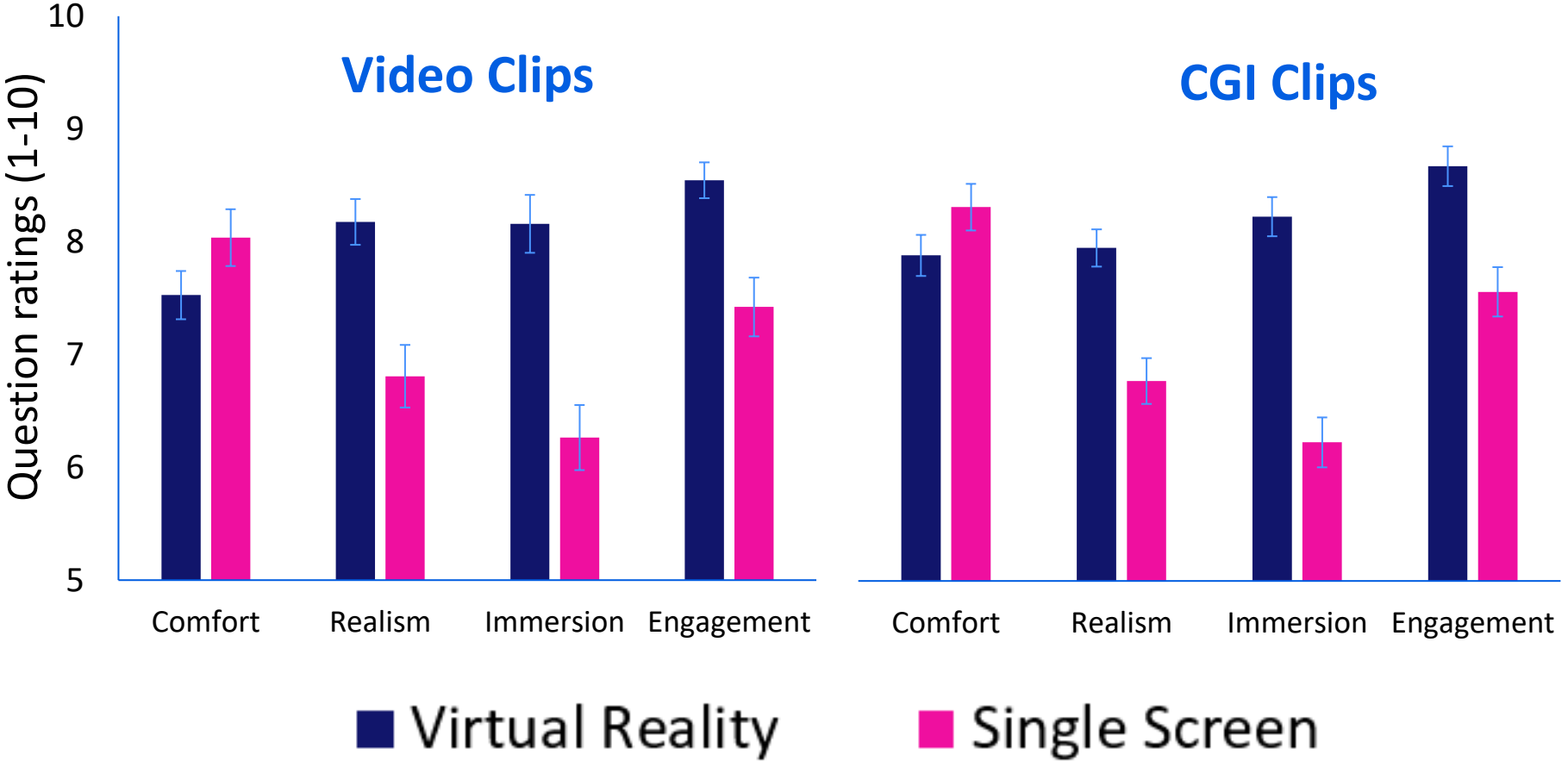
Innovation 2: Virtual Reality

- We created video and CGI 360 hazard tests
- We also created single-screen (SS) versions of the clips
- Then we compared learner drivers and highly experienced drivers on VR and SS

Innovation 2: Virtual Reality



Innovation 2: Virtual Reality



Innovation 3: Risk assessment

- Hazard perception is only half the story!
- The same video techniques can be used to measure risk-taking behaviour
- Our current tests include:
  - The Tailgating Test
  - The Amber Gambler Test
  - T-junction Pull Out Test

Innovation 3: Risk Assessment

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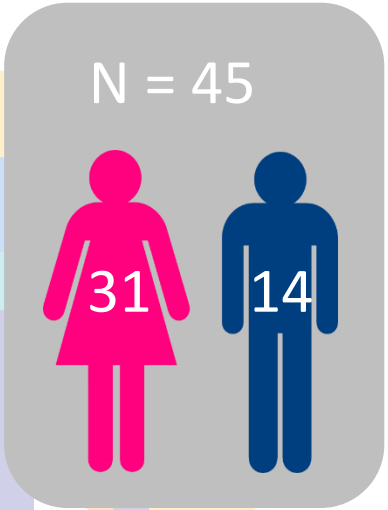
Innovation 3: Risk Assessment

- 15 brief clips of close following
- Each clip is shown twice
- Following each clip we ask 1 of 2 questions:

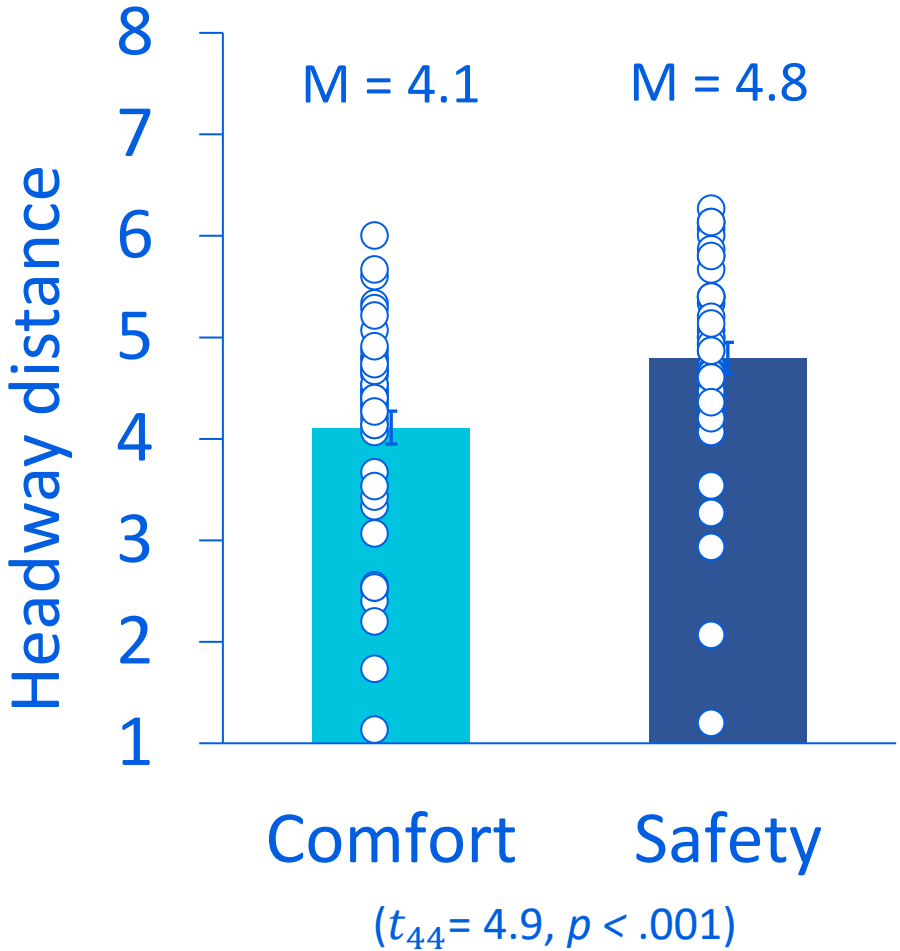
What is the minimum distance from the car ahead that you feel comfortable driving at?

What is the minimum distance from the car to stop safely in an emergency?



Innovation 3: Risk assessment

- 33 out of 45 chose shorter Comfort Headways than Safe Headways
- Do they know their comfort distances are not safe by their own admission?



Innovation 3: Risk assessment

- Predicting Safe Headway scores from the DBQ
- DBQ predicts *Safe Headway* ($F_{5,39}$= 6.2, p < .001)
- As *errors* go up, headway increases!
- As *ordinary violations* go up, headway decreases!

Aggressive violations

Ordinary violations

Errors

Slips and Lapses

Innovation 3: Risk assessment

- Predicting *Comfortable Headway* scores from the DBQ
- DBQ predicts *Comfortable Headway* ($F_{5,39}$= 4.6, p < .005)
- As *ordinary violations* go up, headway decreases!
- As *aggressive violations* go up, headway decreases!

Aggressive violations

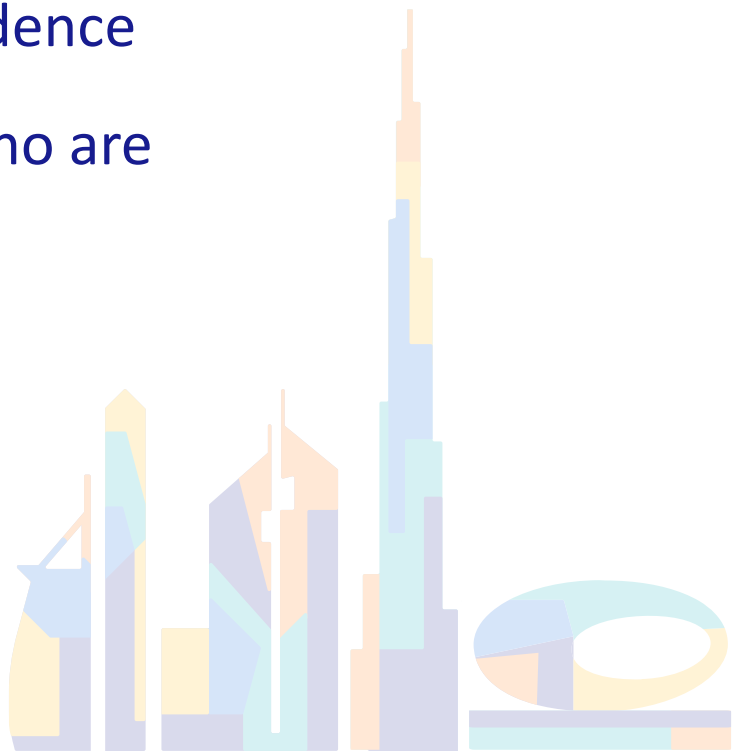
Ordinary violations

Errors

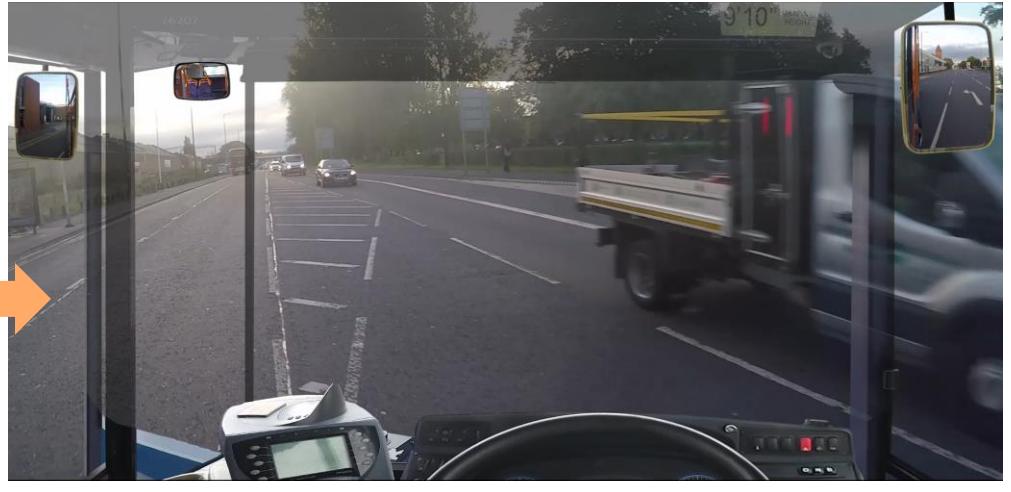
Slips and Lapses

Conclusions

- Three innovations supported by evidence
- Many more innovations for those who are interested…

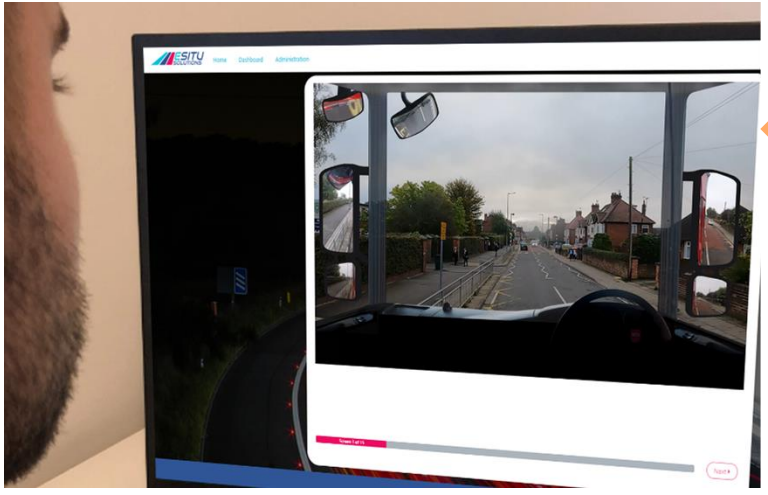


HGV hazard tests



Bus hazard tests

Van hazard tests



Online testing & training

Classroom training

VR training

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THANK YOU

With thanks to:
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