

Driven to Distraction: Effects of visual distraction and eyes-off-road (EOR) warnings on driver gaze behaviour and hazard detection accuracy

Background

- Distraction** impairs drivers' ability to detect and respond to hazards^{1,2}, **increasing collision risk.**
- Eyes-off-road (EOR) warnings** change drivers' gaze behaviour^{3,4} and may help them **attend** to the road.

Expt 1: How does visual distraction impact drivers' hazard localization performance?

Expt 2: Do EOR warnings help distracted drivers detect hazards?



Experiment 1 - Methods

Hazard Detection Task

180 videos with noise mask (2 to 8s), 50% contain hazards



Meter Task

Press spacebar when meter enters red zone



Meter moves randomly

Dual task

Hazard detection task + meter task



20 drivers
Bonus payments based on overall meter task accuracy

Experiment 2 - Methods

Dual task with EOR Warnings (1s or 1.5s)



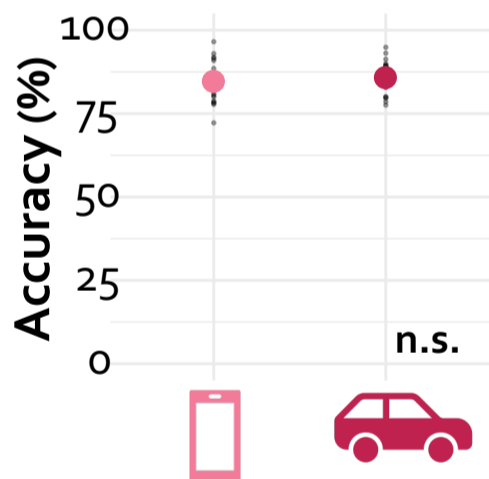
2 blocks: warning present and absent
36 drivers

Stimuli



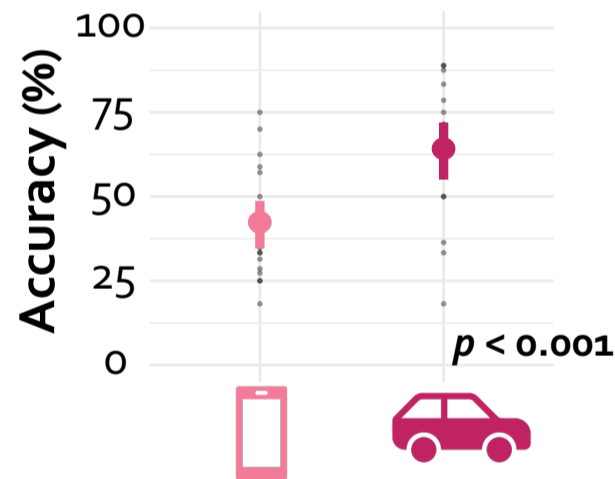
Experiment 1 – Effects of distraction

Hazard fixated 1s before response



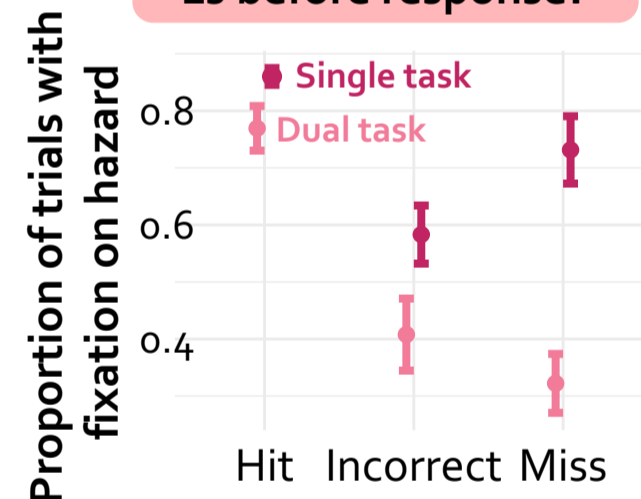
If they **fixated** on a hazard, they tended to **detect** it

Hazard NOT fixated 1s before response



Distraction **worsens hazard detection** in visual periphery

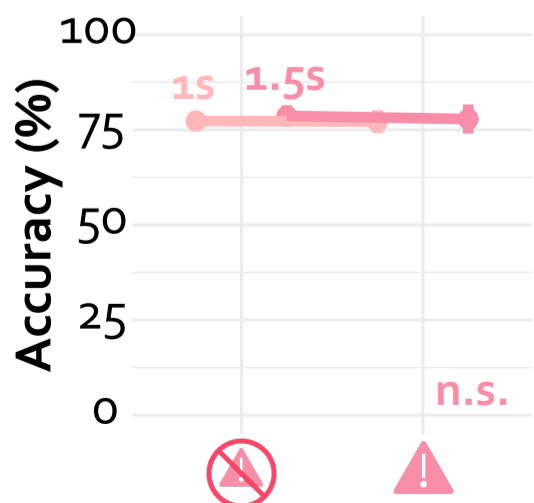
Where do drivers look 1s before response?



Distracted drivers **rely** more on **peripheral vision**

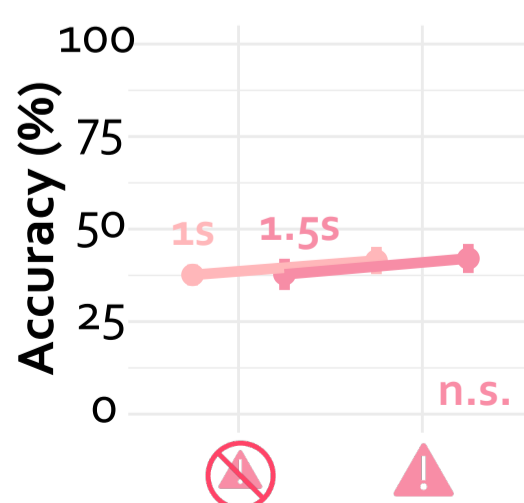
Experiment 2 – Do warnings help?

Hazard fixated 1s before response

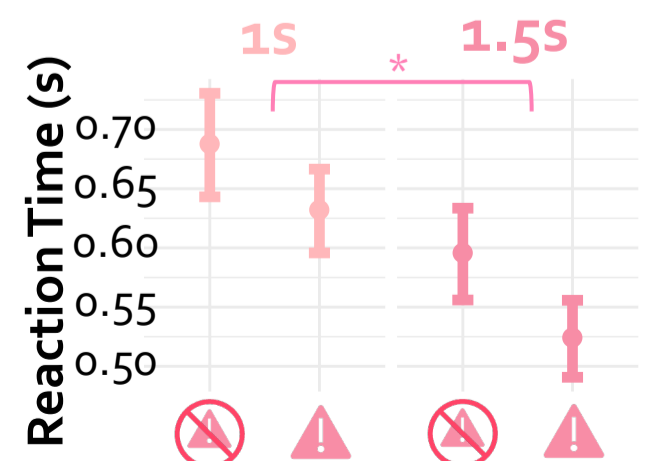


Warnings **did not help** regardless of where drivers fixated

Hazard NOT fixated 1s before response



Did drivers respond more quickly?



Drivers responded **more quickly** with warnings

Dual task
Single task

Visual distraction causes drivers to look away from the road, increasing likelihood of misses.

Warning absent
Warning present

Warnings **speed reaction time**, but do not improve hazard detection accuracy.

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