



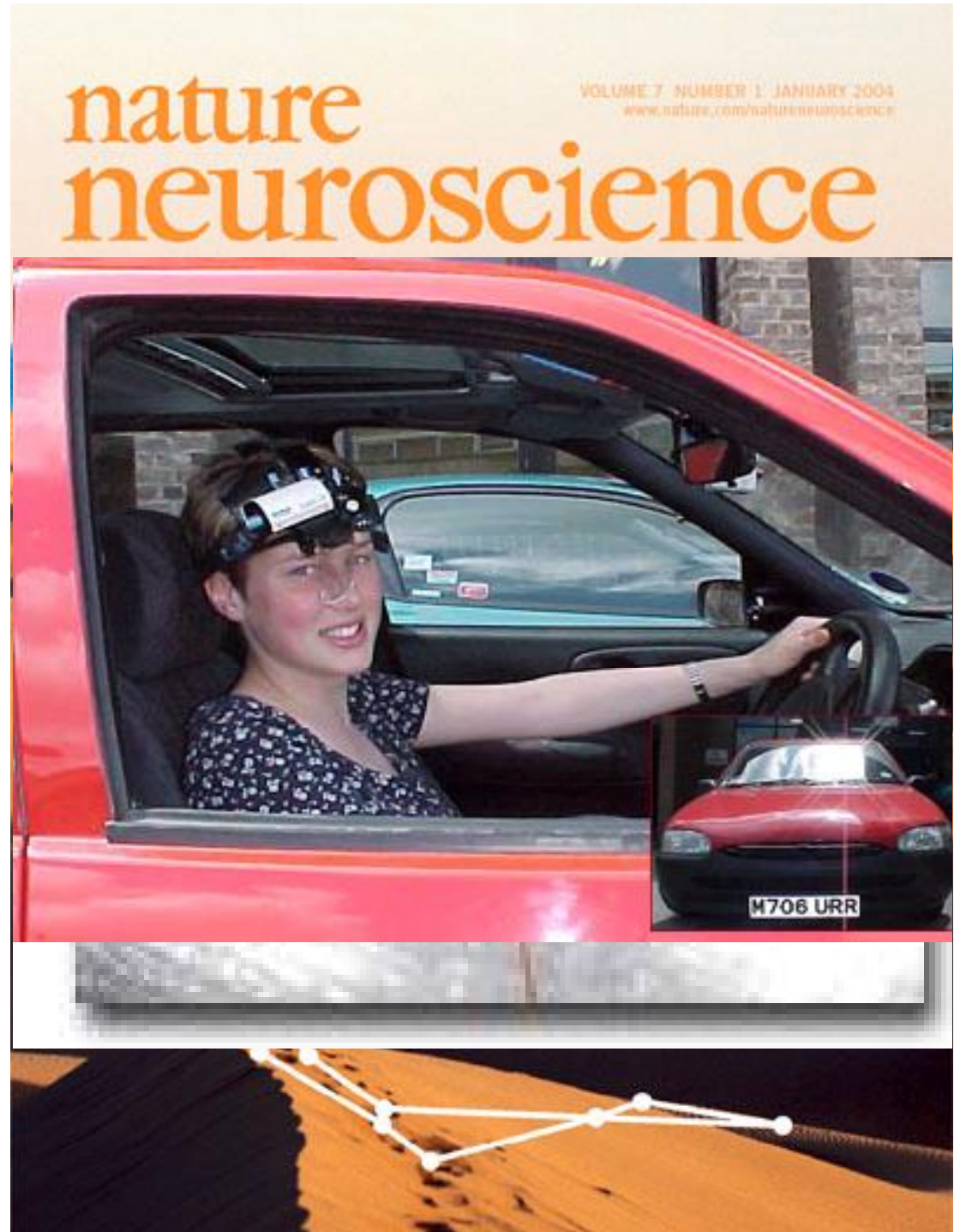
Visual search in hazardous driving situations:

The relevance of visual skills for blue-light users

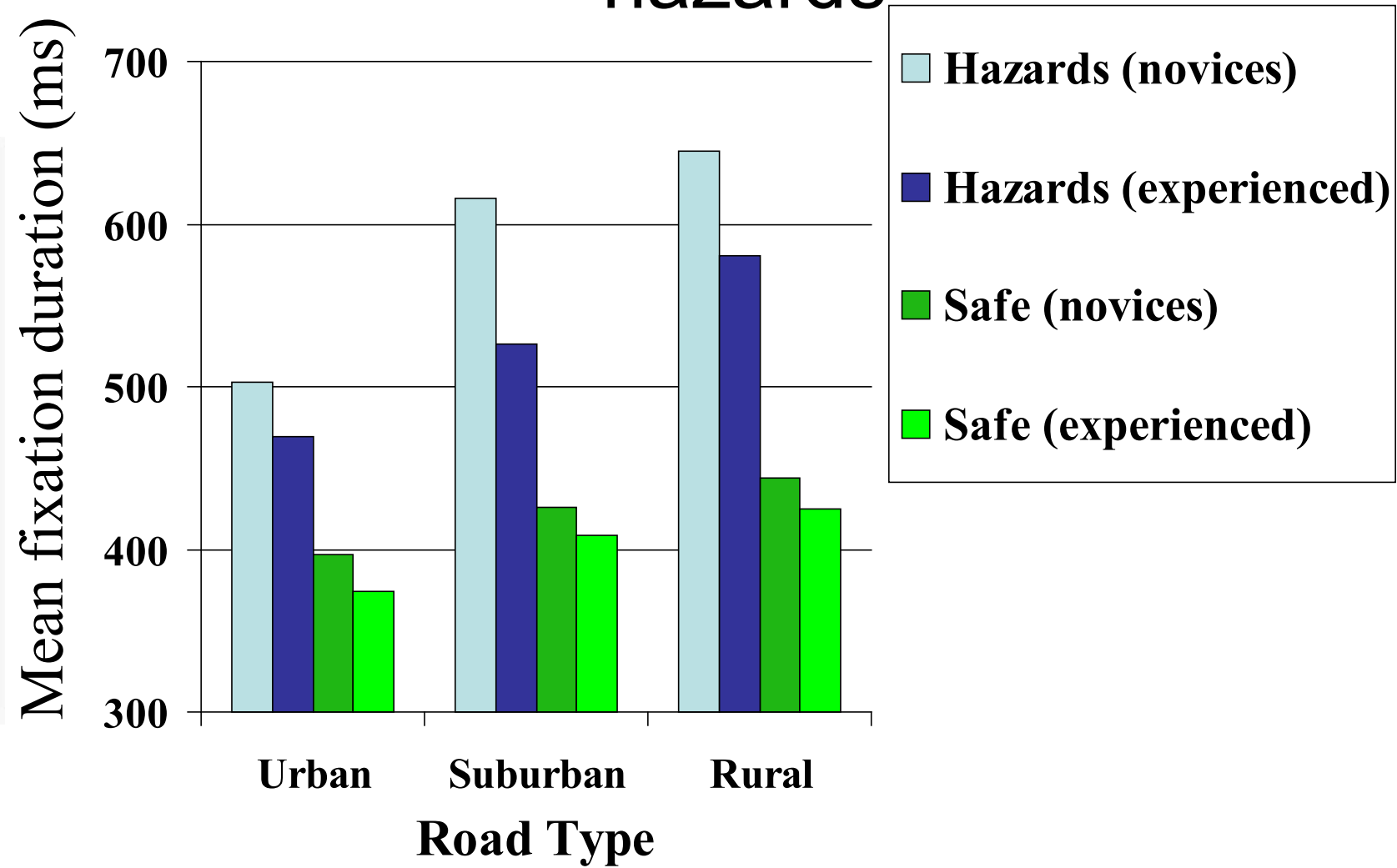
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Accident Research Unit
University of Nottingham

A brief introduction to visual search

- Primarily concerned with eye movements
- Measured via an eye tracker
- Fixations and saccades

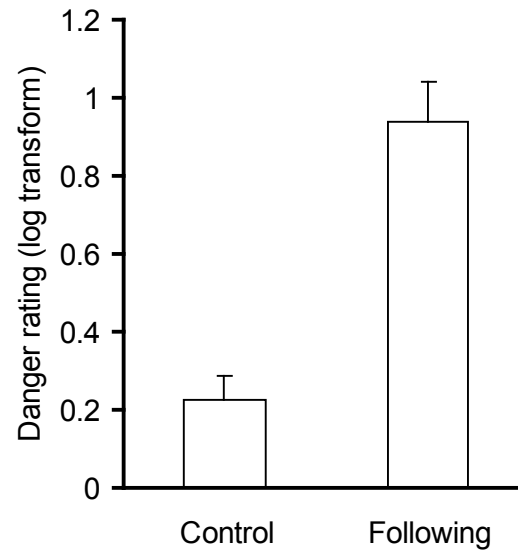
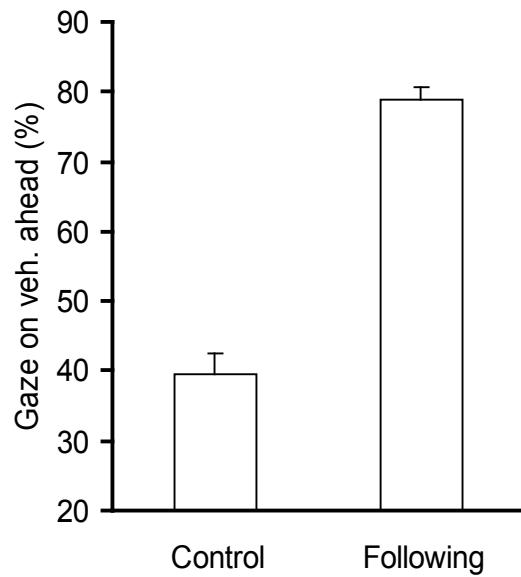
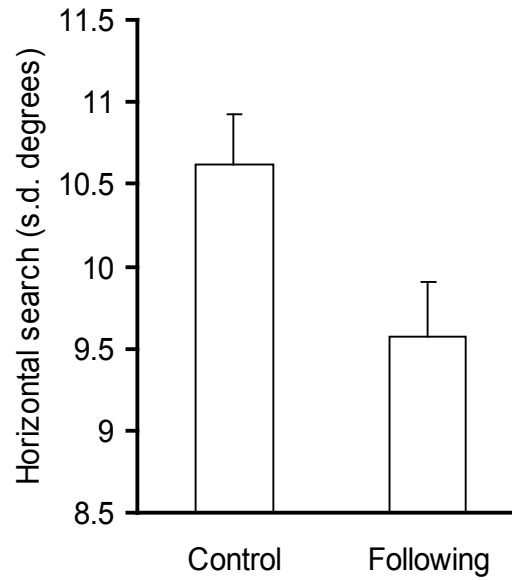
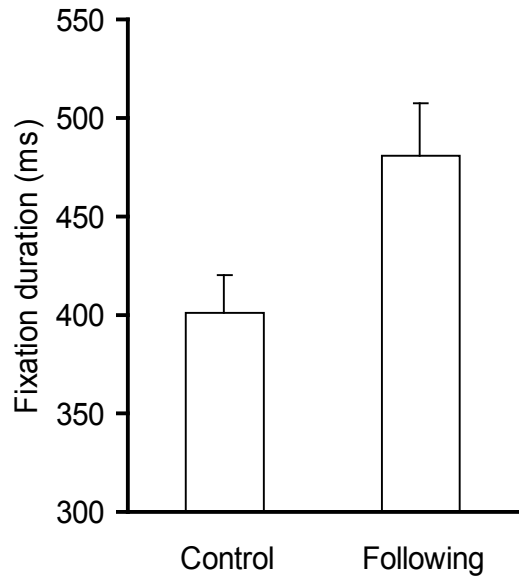


Visual search is captured by localised hazards



Conclusions

- Abrupt hazards cause *attentional focusing*
- Context experience tends to reduce this focusing effect
- but what about prolonged hazards in the form of police pursuits (for example)?



Crundall, Shenton, & Underwood, 2004

How do drivers cope with the prolonged hazardous driving situations encountered during a pursuit?

Do police drivers' training and experience ameliorate the degradation of visual attention noted with hazardous stimuli?

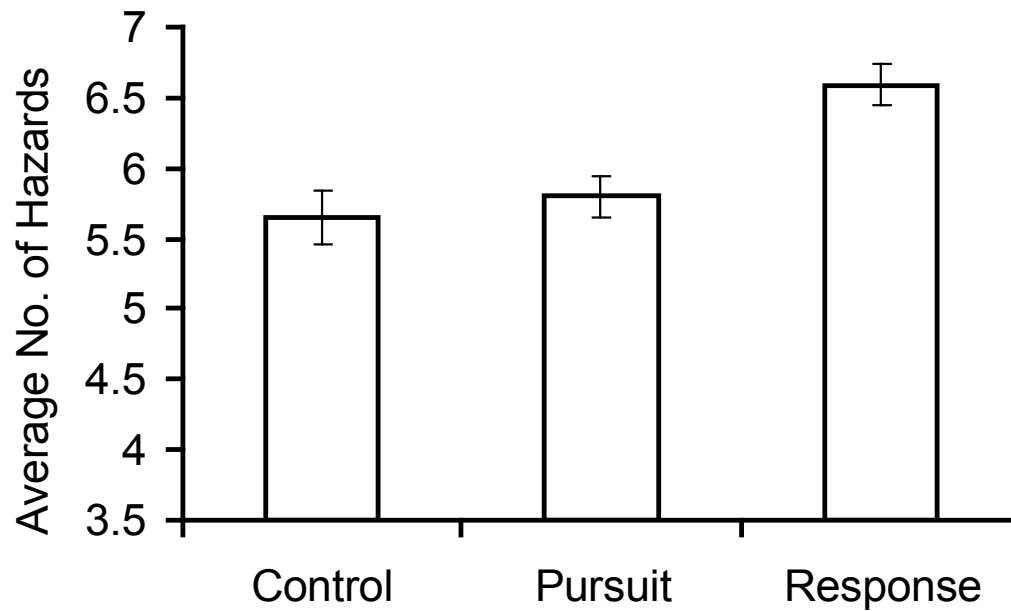
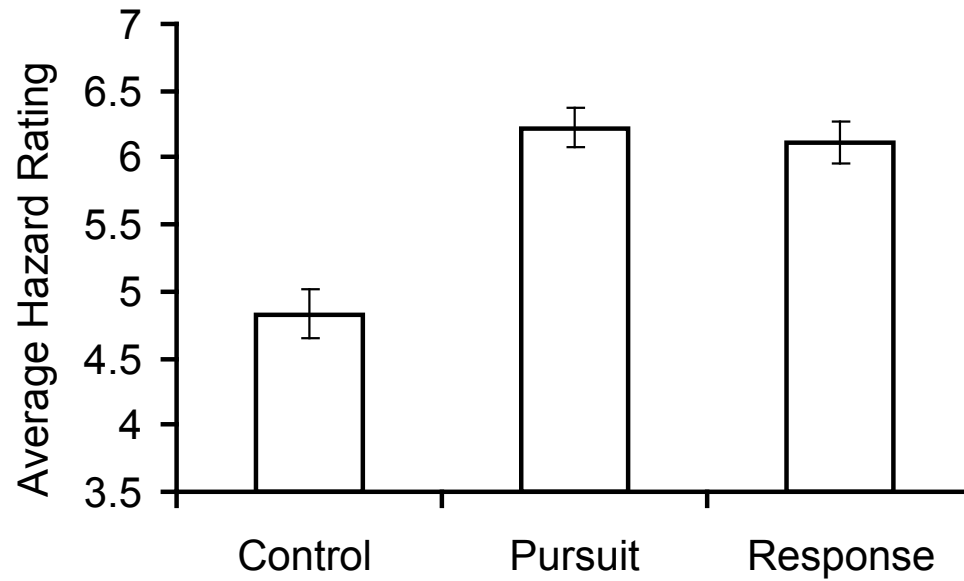
Methodology

- Three groups of drivers: novices, police and matched-control drivers
- Presented with video clips of pursuit drives, emergency response drives, and control drives
- Eye movements, hazard perception, and physiological measures were recorded

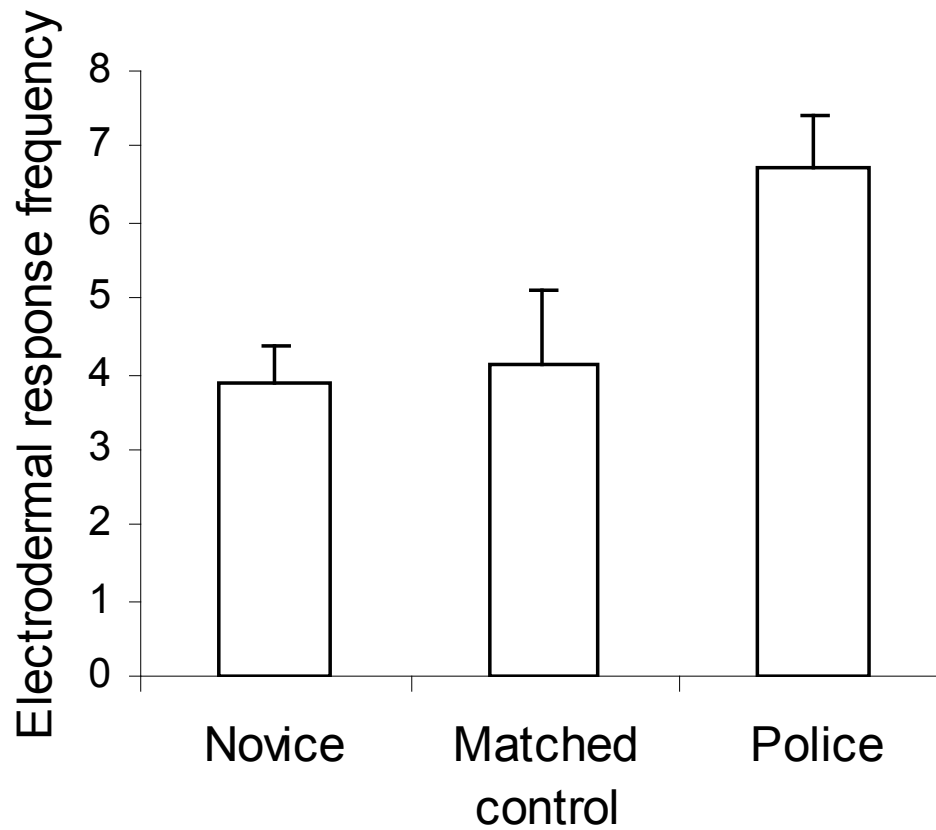


**Pursuit driving with
eye movements**

Results: hazard perception

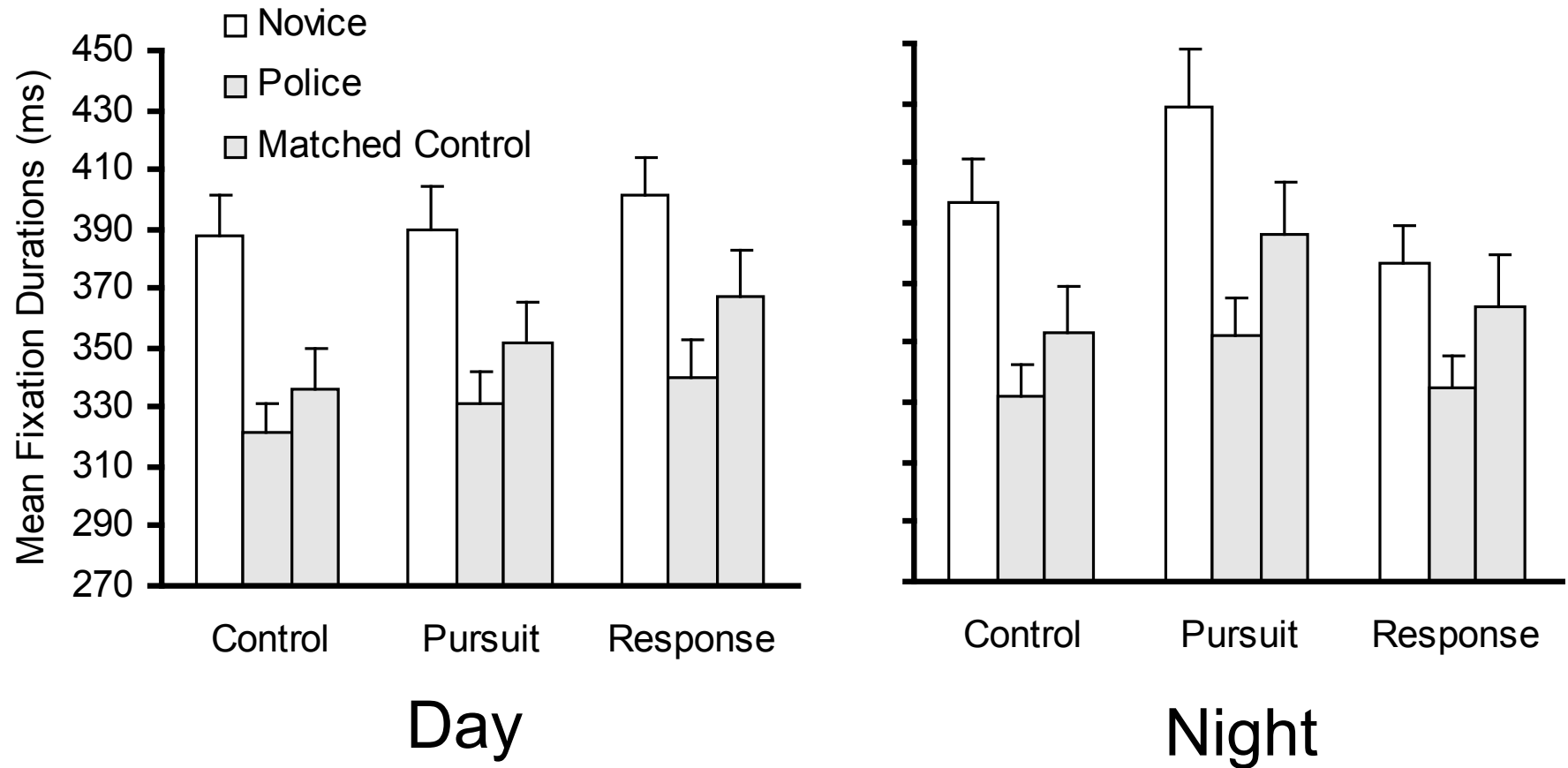


Results: Electrodermal responses

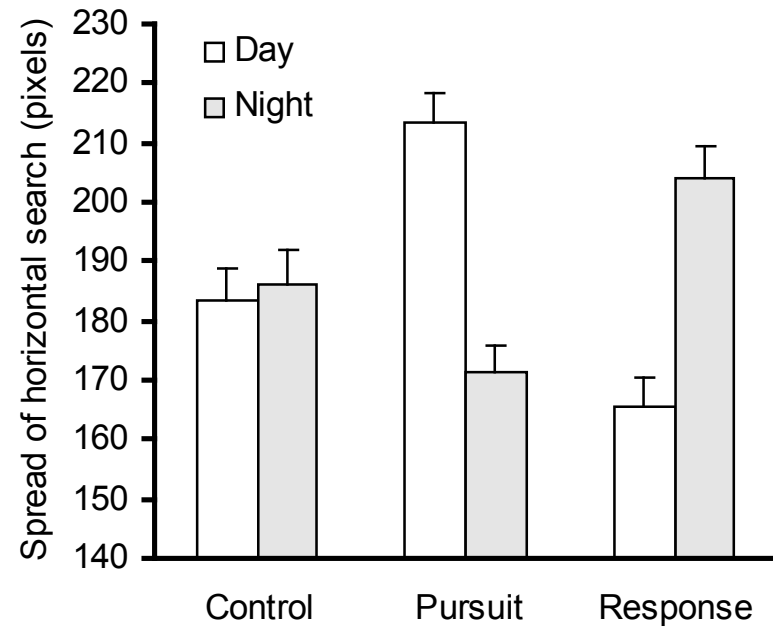
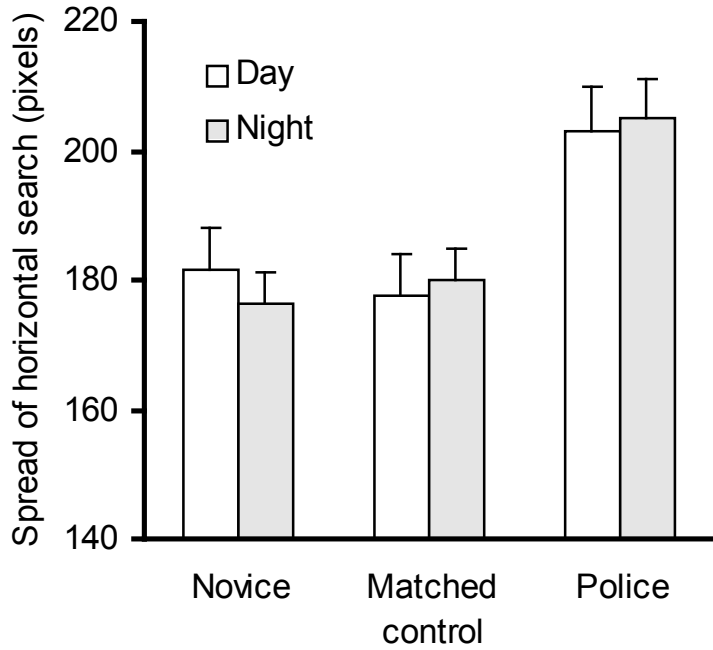


Crundall, Chapman, Phelps & Underwood, 2003

Results: Mean Fixation Durations



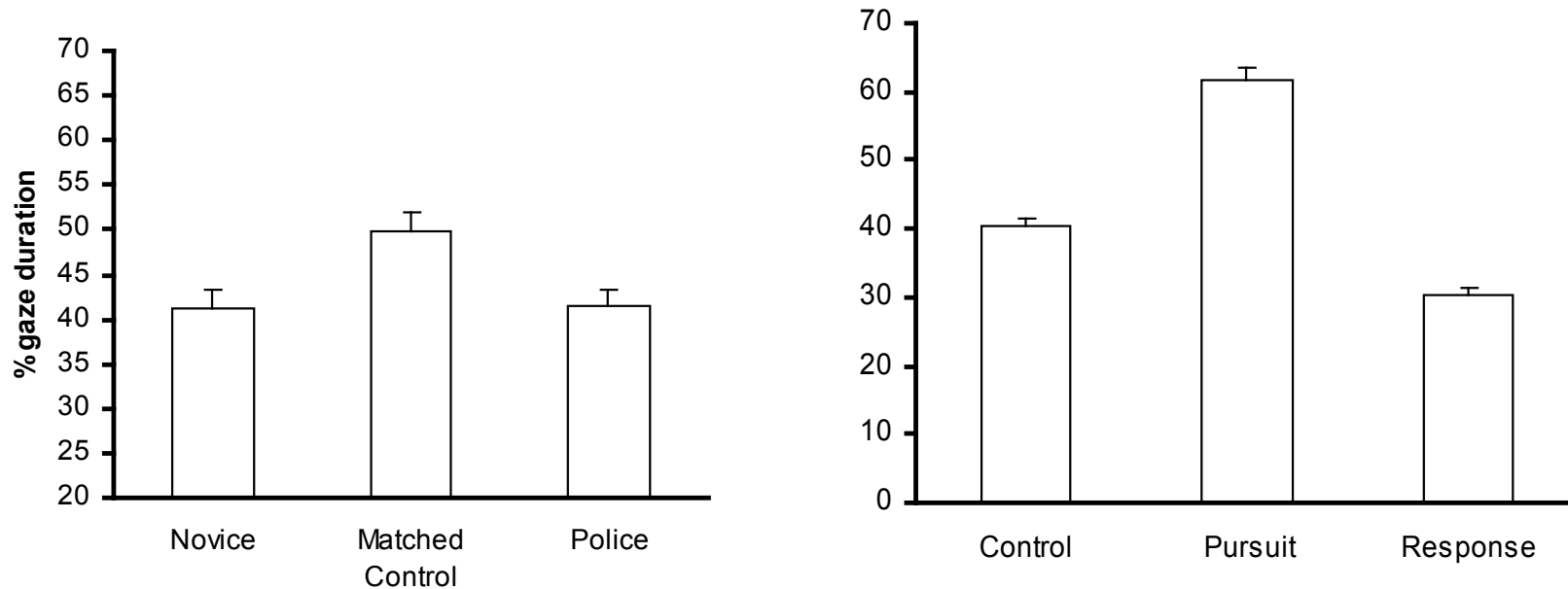
Results: Horizontal search



Summary so far...

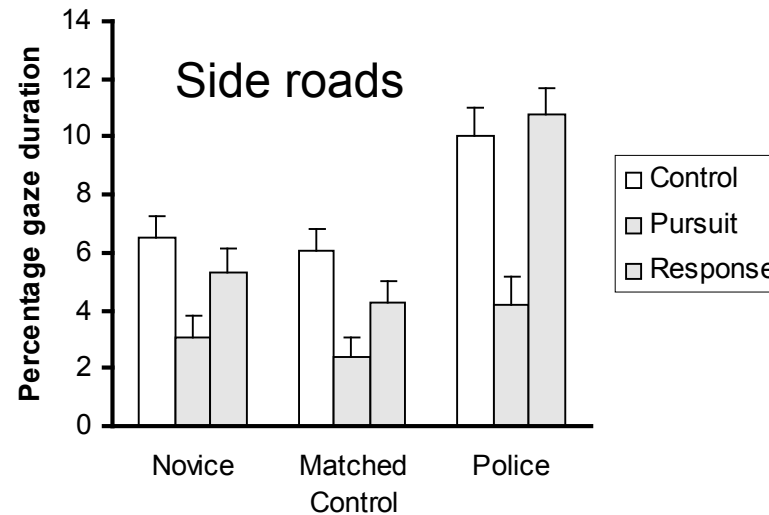
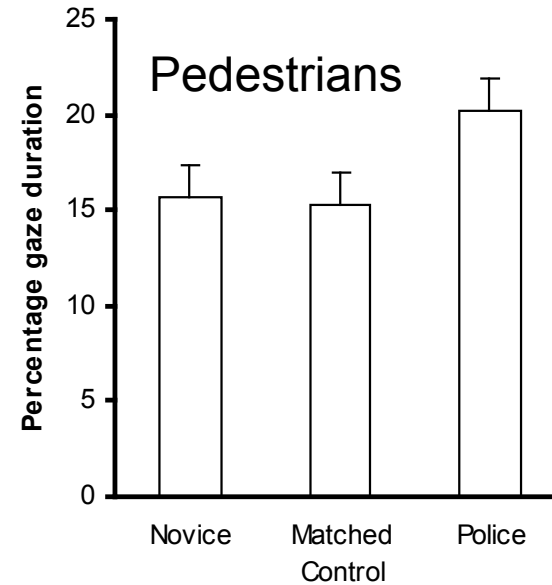
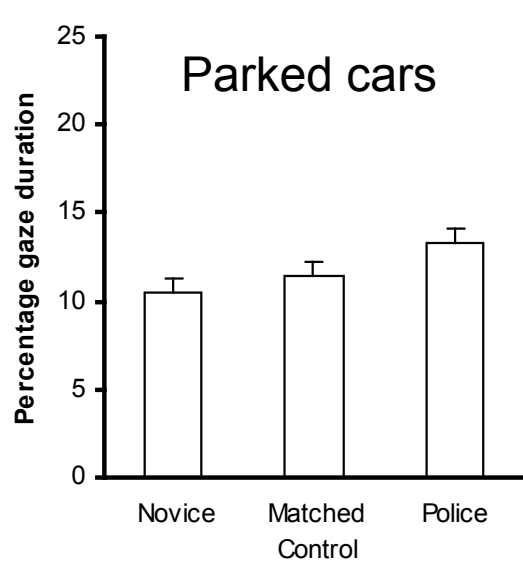
- Novices have the longest fixations
- Fixation durations and spread of search suggest overt focusing in the night-time pursuits (but not in the daytime?) and focusing in daytime response drives
- Police drivers have the widest search pattern and have a greater number of EDRs

Results: Gaze upon 'car ahead'



Crundall, France, Chapman, Underwood & Phelps, 2005

Results: Gaze duration on other categories



Summary

- Novices and police drivers agree on the amount of time they should look at the car ahead
- Matched control drivers show greatest attentional capture (does police training overcome age-related effects on attention?)
- Police drivers' wider search strategies and higher sampling rate allow them to spend more time on other safety related stimuli.

Conclusions

- All drivers suffer from attentional focusing during pursuit clips. This is most obvious during night time clips, but also occurs in daytime clips
- Police training and experience reduces the effects of attentional focusing and allows them to monitor potential sources of secondary hazard
- Response drives also show attentional capture by the Focus of Expansion – wider implications for the blue light user community