



Comparison of naturalistic driver behaviour on approach to a road-rail level crossing *vs.* a signalised intersection

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Background

- **Crashes at level crossings uncommon; however, can be very severe**
- **Jan '06 to June '09 → 219 collisions in Australia (0.34 / million train kms travelled)** (ATSB, 2009)
- **Lack of research on behavioural sequelae of drivers' approaches to road-rail level crossings**
- **Worthwhile to compare driver behaviour at intersections and level crossings**
- **Instrumented vehicles allow study of driver behaviour in naturalistic settings**





Method

- **25 experienced drivers (15 male) aged 19-59 years**
- **21 km urban route incorporating 29 intersections and four ‘active’ (lights & boom barrier) level crossings**
- **DVs: speed, speed variability, accelerator / brake application, lane position, lane position variability**
- **Systematic comparison: Only data from ‘unimpeded’ approaches to level crossing / traffic lights on 50 km/h urban roads**
- **Within-subjects design**
- **7 of 25 drivers’ approaches to both settings met criteria and were included in analysis**





Method

- Approach to ‘unimpeded’ level crossing:





Method

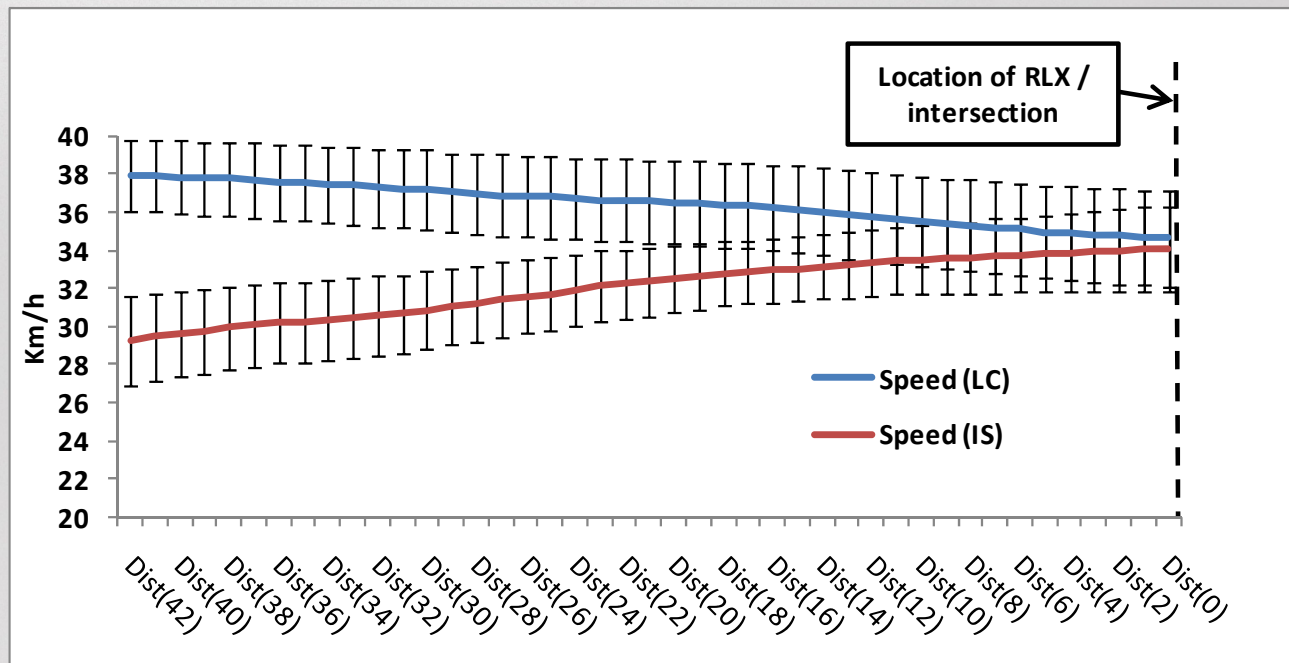
- Approach to ‘unimpeded’ intersection:





Results

- Average speed on approach to level crossing / intersection:

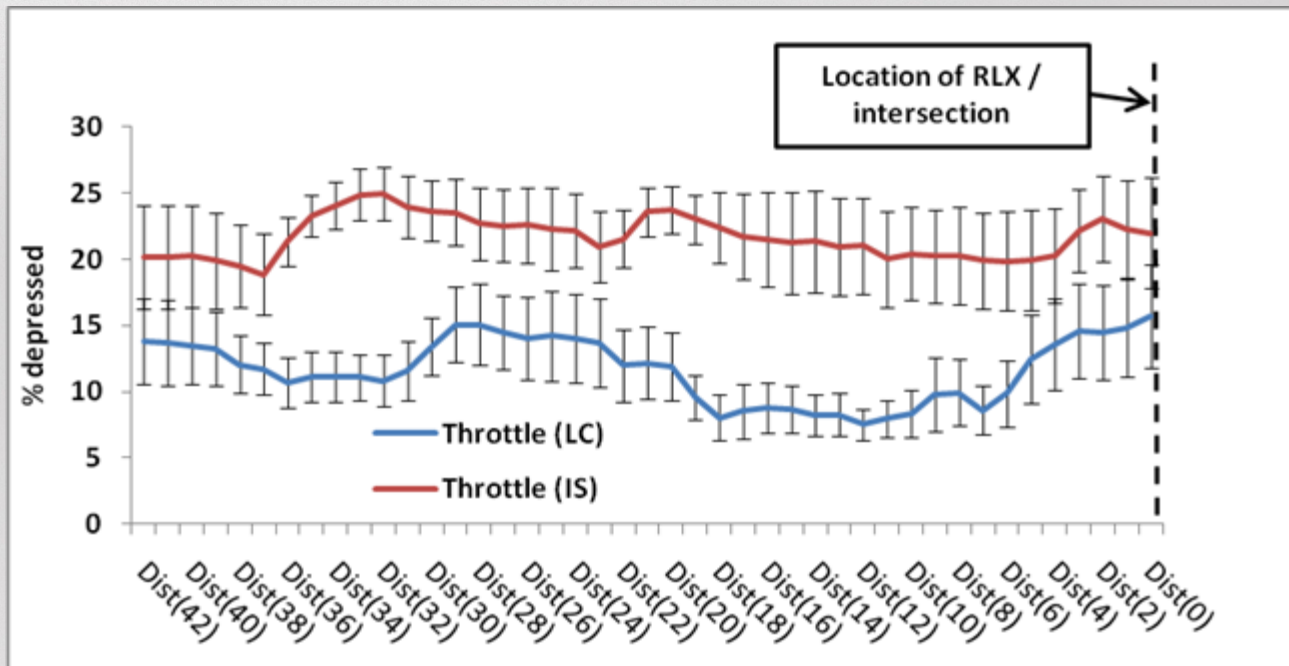


$p < .001$



Results

- Average throttle application on approach to level crossing / intersection:

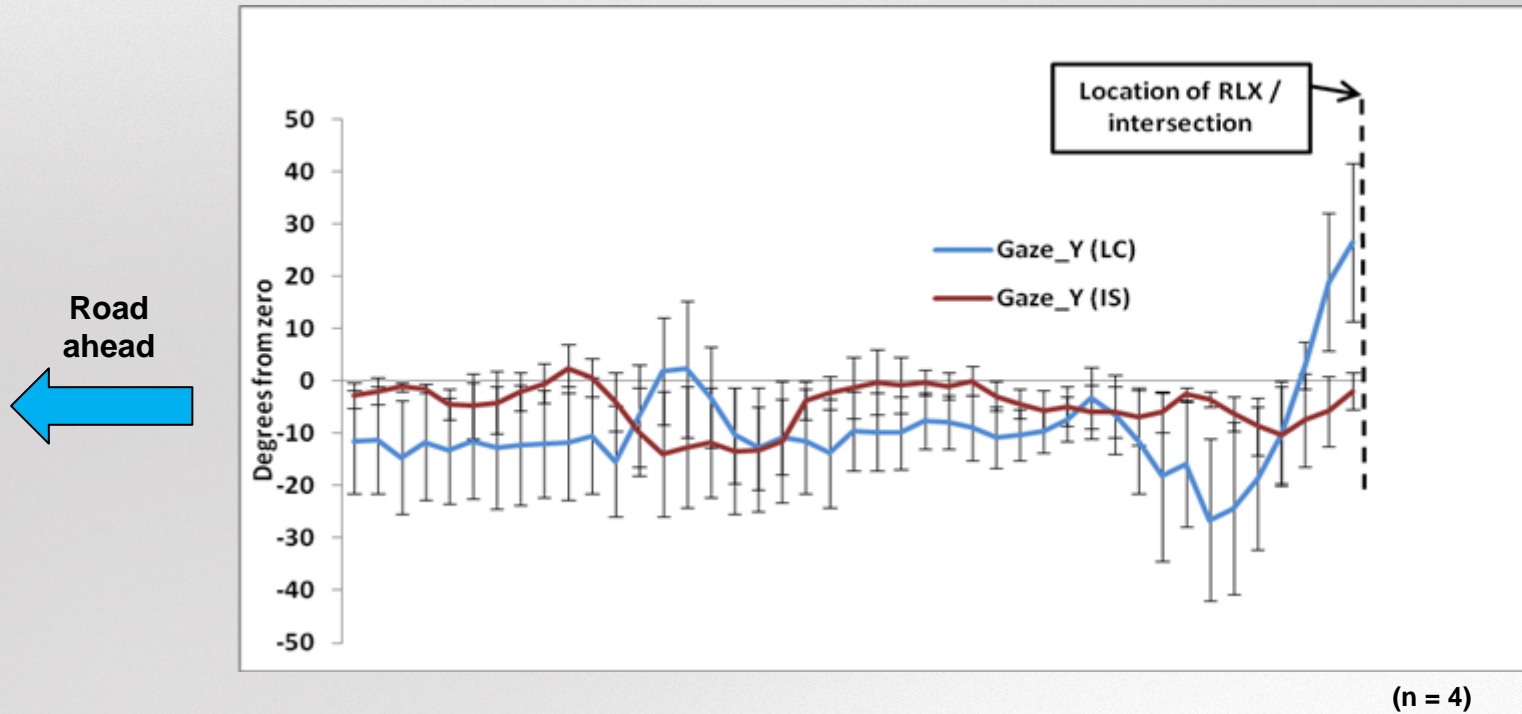


$p < .001$



Results

- Eye-tracking (horizontal axis) on approach to level crossing / intersection:





Discussion

- 🚗 **Approach speed to level crossing slower than intersection**
 - **Raised pavement / train tracks at level crossing → improved decision-making at level crossings?**
 - **Potential countermeasure at level crossings / intersections with ↑ crash risk**
 - **Supports continued use of raised intersections as traffic calming measure**

- 🚗 **Gaze focused on centre of intersection; right on approach to crossing**
 - **Checking position of boom gates / looking for trains?**





Conclusion

- 🚗 Results support utility of naturalistic (instrumented vehicle) study method to investigate driver behaviour on approach to level crossings *and* intersections**
- 🚗 Limitation → only one level crossing / intersection; other features important?**
- 🚗 Only complex, urban environment → need to study other environments (e.g., rural)**
- 🚗 Current team research aims to provide in-depth understanding of the factors that influence safety and performance at rail level crossings**
 - To develop a world-first model of the level crossing system to develop innovative countermeasures to improve safety.**



Thank you.

Questions?



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