



MONASH University

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Are children more distracting than technology? Using naturalistic data to explore rear seat child occupants as a source of driver distraction

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Background

- 🚗 **Mobile phones can distract drivers and impair driving performance**
- 🚗 **Prevalence: 3.4% of Melbourne drivers illegally use phone in hand-held mode** (Young et al., 2010), **self-reported even higher (\cong 25% of drivers)** (Young & Lenné, 2010)
- 🚗 **May be other sources of distraction that have been overlooked**
- 🚗 **Anecdotaly, child passengers are reported to cause driver distraction**
- 🚗 **Benefit to quantify and describe nature of this distraction → develop realistic, effective countermeasures**




Introduction

- 🚗 Only one published account of potential for driver distraction from child passengers → children \cong 4x, babies \cong 8x more likely source of distraction than adult passengers (Stutts et al., 2003)
- 🚗 Children less 'disruptive' when seated in child restraint system (CRS) (Christopherson, 1977)
- 🚗 Possible that behaviour would be better in *well-designed* CRS that are comfortable and secure
- 🚗 New international collaborative project "Children in Vehicles" with partners from Australia (MUARC), Sweden (Chalmers, AutoLiv), and U.S. (UMTRI, CHoP) → evaluate positioning of child passengers within the vehicle, their CRS, and their interactions with drivers
- 🚗 Pilot data (Koppel et al., 2011) → nature and prevalence of driver interactions with child passengers and comparison with in-vehicle technology use

Method:

-  12 families, at least 1 licensed driver per family aged 25 to 39, 25 children aged 1-8 years
-  Drove study vehicle for 3 weeks
-  Study vehicle equipped with 4 discrete cameras: driver and front seat passenger, rear seat passengers, and road ahead
-  40-item demographics and driving questionnaire
-  Children used their own CRS; fitted by fitting specialist
-  Data analysis: video data divided into pre-journey, journey, and post-journey segments

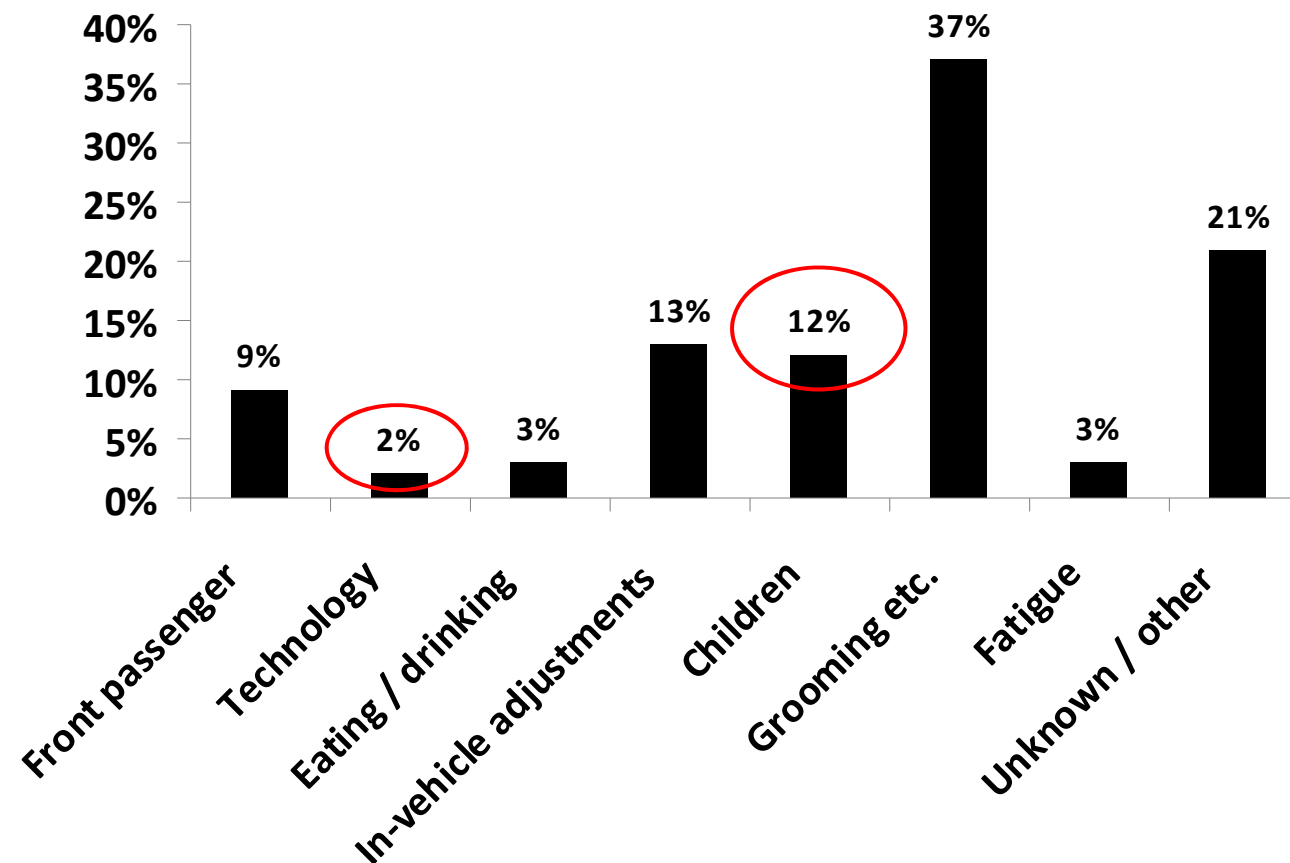
Method:

-  **Key journey variables coded (inter-rater agreement of 88%):**
 - 1. Trip duration**
 - 2. Time-of-day**
 - 3. Driver ID**
 - 4. Front seat passenger**
 - 5. Number of child occupants**
 - 6. Road & traffic conditions**
 - 7. Child activities (e.g., talking, crying, fighting, eating etc.)**
 - 8. All activities with potential to “divert attention away from activities critical for safe driving” (Lee et al., 2009)**
 - 9. All activities that involved driver looking away from roadway for >2s**
-  **Dependent variables: frequency and duration of driver engaging in potentially distracting activities**
-  **Data from 8 journeys per family analysed; total of 25 hours of video data**

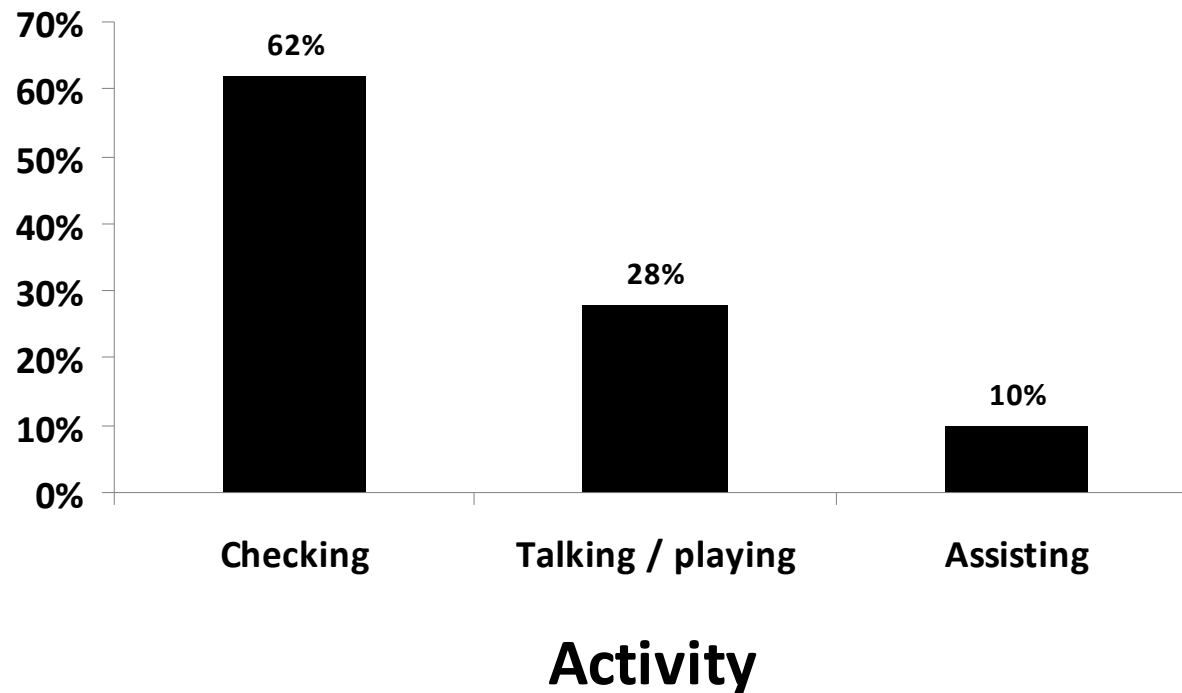
Results:

- 🚗 Drivers engaged in at least one potentially distracting activity in over 98% of journeys
- 🚗 Male drivers (fathers) significantly more likely to engage in distracting activity than mothers, and to be distracted for longer duration

Results: Potentially distracting activities



Results: Child-related activities



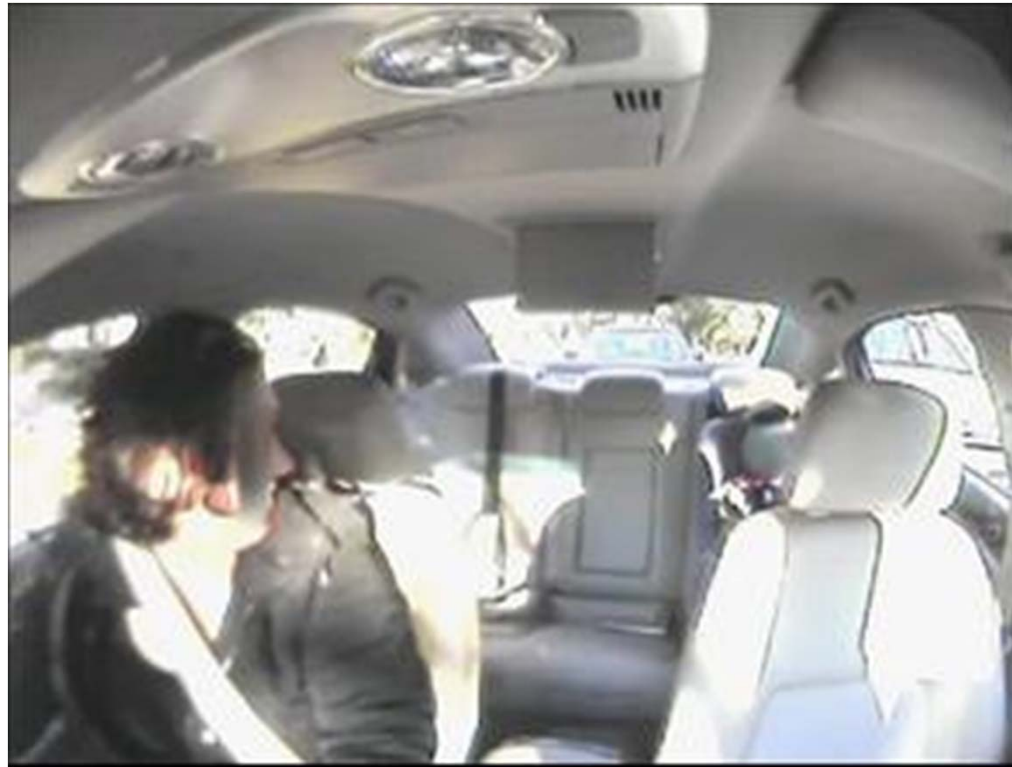
Results: Example of interactions with rear seat child passengers

Passing food or drinks: ('assisting')



Results: Example of interactions with rear seat child passengers

Looking at child: ('talking/playing')



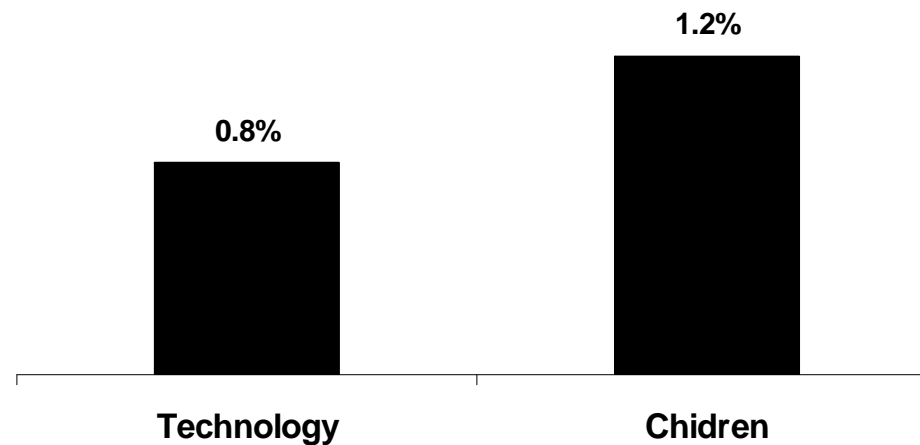
Results: Example of interactions with rear seat child passengers

Interacting with DVD: ('assisting')

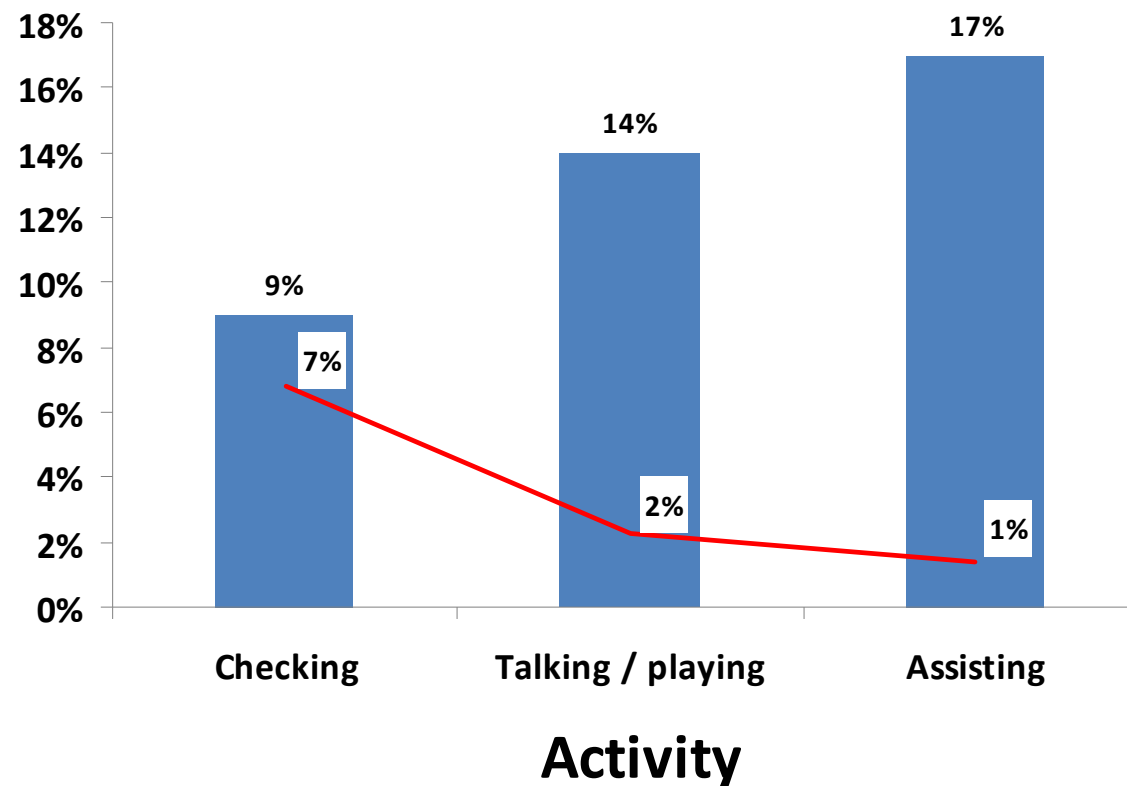


Results: Glances >2s

- 🚗 Interactions with technology (2% total) → 40% involved glances of >2s
- 🚗 Interactions with children (12% total) → 10% involved glances of >2s
- 🚗 Relative proportions:



Results: Child-related activities, glances >2s



Discussion

- 🚗 **Prevalence of drivers engaging in potentially distracting activities similar to another naturalistic study (100-car study) (Klauer et al., 2006)**
- 🚗 **Drivers' interactions with rear seat child passengers have potential to result in distraction**
- 🚗 **May be associated with increased crash risk (Klauer et al., 2006) (however, 100-car study found crash risk of 0.33)**
- 🚗 **Drivers observed to engage in potentially distracting activities with children more often than with technology [*12 times as often as mobile phones*]**
- 🚗 **Interactions with technology associated with larger proportion of glances off roadway >2s; however, relative prevalence still greater for child-related activities**
- 🚗 **Results are likely an underestimate**

Areas for improvement...

- 1. Lack of vehicle data → installation of small data recorder; collect speed and GPS data**
- 2. Limited number of trips → opportunity to analyse more (and two vehicles!)**
- 3. Limited number of child passengers (not possible to analyse for gender, age, or CRS type on driver distraction) → restrict sample to children aged 4 to 10 (booster seat use)**
- 4. Low prevalence of use of DVD player → experimental design**
- 5. Issues with data precision → improve coding of glances to rear-view mirror**

Potential countermeasures:

- 🚗 Improved CRS designs
- 🚗 Effective educational material (for both parents *and* kids)
- 🚗 Well-positioned (accessible to driver) rear seat entertainment technology
- 🚗 'Workload manager'-type warning systems for drivers
- 🚗 Rear seat video monitors for drivers

Conclusion:

 Drivers of young children should...

1. Be prepared...
2. Be patient...
3. Focus on the road!



Thank you.

Tack så mycket.