The Effects of Text Messaging On the Driving Performance of Young Novice Drivers

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International Conference on Driver Distraction, Sydney, 2-3 June 2005
Overview

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Acknowledgements

• Ashley Verdoorn and Nebojsa Tomasevic from MUARC for programming the simulator drives.
• Karen Stephan and Tom Triggs from MUARC for their design input.
Background

• Approximately 80% of Australians own a mobile phone.

• 2% of drivers observed using a hand-held phone in Melbourne (Taylor et al., 2003)

• Survey found that one in six drivers admit to regularly sending text messages while driving (Telstra, 2003).

• But…..

• Very little research has examined the effects on driving performance of text messaging.
Previous Research

• Survey of 2000 UK drivers found that text messaging viewed as most distracting activity a driver can perform.

• Swedish simulator study found that retrieving and reading text messages reduced reaction times to hazards and increased driver workload (Kircher et al., 2004).

• However, Swedish study only examined effects of receiving text messages, used experienced drivers and sample size was small (n = 10).
Study Aims

• Aimed to evaluate, using an advanced driving simulator, the effects of text messaging on the driving performance of young novice drivers.

• Examined effects of both retrieving and sending text messages.

• Focused on young novice drivers aged 18 to 21 years who had held drivers licence for 6 months or less.
Method

• Participants
  – 20 drivers aged 18 to 21 yrs (mean age: 19.1 yrs).
  – All had held their driver’s licence for 6 months or less.
  – All were familiar with how to send text messages on a Nokia mobile phone.

• Materials
  – Advanced Driving Simulator located at MUARC
  – FaceLab eye tracking equipment
  – Nokia 6210 mobile phone
Method

• Drives
  – 2 identical test drives containing:
    • 3 car following tasks
    • Pedestrian and other traffic hazards
    • Lane Change Task
    • 4 text message episodes per drive

• Instructions
  – Drive as close as possible to speed limit
  – Stay in right hand lane unless indicated to do otherwise
  – Obey road rules
Method

• Procedure
  – 5 minute practice drive
  – Completed test drive twice
  – On one drive text messages were received at events 1,3,4 and 6.
  – On other drive text messages were received at events 2,5,7 and 8.
  – Above two event orders were designed to minimise practice effects
  – Order of drives counterbalanced across participants
Driving Scene Footage
Questionnaire – subjective results

Pre Drive Questionnaire revealed

• Seven of the 20 participants said they talk on a hand held mobile - 5 times per week

• Nine of the 20 participants said they read text messages – four times per week

• Six of the 20 participants said they send text messages – two per week
Post Drive Questionnaire

• Participant’s subjective mental load was assessed by the NASA-RTLX scoring system.

• Participants rated the task 61/100 on the scale – moderately high mental workload.

...19 out of the 20 participants believed their driving performance was worse when receiving messages.

...all participants believed their driving performance was worse when sending text messages.
Results

Definitions: Retrieving – retrieving message and reading it, Sending – writing message and sending

• Driving Speeds
  – No significant differences in mean, maximum & standard deviation of speed across all driving events

• 3 Car Following Events
  – Average gap between driver and lead vehicle was 50% larger when text messaging
  – The average gap between driver and lead vehicle was 138% more variable when text messaging.
  – Minimum gap between the driver and the lead vehicle was 32% larger when text messaging.
Mean & SD Time Headway
Results – Eyes off Road Time

- The amount of time drivers spent with their eyes off the road increased by up to 400% when retrieving and sending text messages.

![Graph showing the proportion of time spent engaged in various driving events with and without text messages.]
Results – Lane Keeping Ability

- Lateral position deviation increased by up to 70% when sending texts during the traffic light, pedestrian and 2nd car following events.
Results – Lane Excursion & Changes

- Drivers made 28% and 63% more lane excursions when retrieving and sending texts, respectively.

- Number of incorrect lanes changes made increased by 140% when retrieving and sending texts.
Discussion

• Drivers did not attempt to compensate for being distracted by reducing speed – may be a result of instructions.

• But, they did compensate by increasing their following distance.

• Drivers spent a greater amount of time with their eyes off the road when text messaging.
• Drivers’ lane keeping ability and ability to detect traffic signs and hazards reduced when text messaging.

• Sending text messages appeared to be more distracting than reading texts – generating a response is more cognitively and physically demanding.
Conclusions

• Retrieving and, in particular, sending text messages has a detrimental effect on driving performance.

• Text messaging affected drivers’ lane keeping ability, ability to detect signs and hazards and increases the amount of time spent not looking at the road.

• Drivers did attempt to compensate for this degradation in driving performance by increasing following distance, but not by reducing speed.

• These degradations are likely to greatly increase crash risk.
Next Steps

• Further research to determine how frequently drivers are engaging in texting while driving.

• Further research to understand the effect of text messaging on the driving performance of other age groups.

• Determine what countermeasures will deter this risky driver behaviour.