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Driving exposure and distraction: A comparison of three in-vehicle tasks

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BACKGROUND

- An estimated 21% of fatal collisions in 2016 involved distracted driving[1]
- Carrying out a secondary task while driving can impair performance in one or both tasks, known as dual-task interference[2]
- Although handheld cellular phone usage while driving is strictly prohibited in all Canadian provinces and most territories, the laws regarding handsfree devices and touchscreen entertainment systems vary
- Despite the laws, almost 10% of Canadian drivers admitted to texting while driving in 2019[3]

AIMS

1. Assess real-world driving exposure and frequency of driving while engaging in a handsfree conversation, texting, and using an Mp3 player
2. Measure the objective and subjective dual-task interference produced by having a handsfree conversation, texting, and using a touchscreen Mp3 player while driving
3. Investigate whether real-world driving exposure and frequency of dual-tasking while driving affect the amount of dual-task interference

METHODS

- 40 young adults with a minimum G2 license were surveyed about their driving history and experience owning and using a cell phone, texting, and using a touchscreen Mp3 player while driving and walking
- Participants completed three unique 20-minute drives in a fixed based high-fidelity driving simulator

Fig 1: Oktal driving simulator with 300º wrap-around display.

- Each drive included stretches of single task driving (driving alone) and dual task driving (driving while carrying out a secondary task)

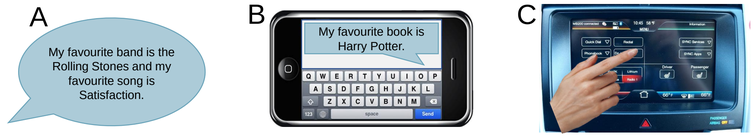


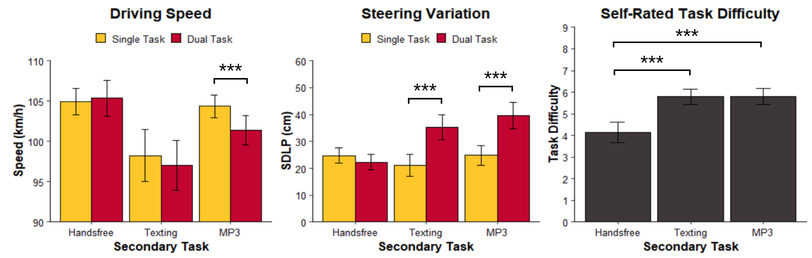
Fig 2: A schematic of the secondary tasks. Handsfree task - verbally respond to auditorily presented questions (A). Texting task - read text messages and compose responses (B). Touchscreen Mp3 task - locate songs using console (C).

- Participants experienced all secondary task conditions
- Objective driving performance was measured by average speed (km/h) and standard deviation of lateral position (SDLP) (cm)
- Subjective driving performance was measured by self-reported perceptions of task difficulty after each drive

RESULTS

Item	*M*	*SD*	Range
How often do you use a cellphone to make calls while driving?*	2.5	1.4	1–6
How often do you text while driving?*	2.0	1.0	1–5
How often do you use your Mp3 player while driving?*	3.7	1.6	1–6

Table 1: Participant information reported using a 6-point Likert scale; 1 = never, 6 = several times a day.



Note: *** indicates $p < .001$.

- Driving experience was correlated with speed compensation in the texting task, $r = .58$, $p = < .01$
- Texting experience was correlated with SDLP in the texting task, $r = -.36$, $p = < .05$
- Mp3 experience was correlated with SDLP in the touchscreen Mp3 task, $r = -.48$, $p = <.05$

DISCUSSION/CONCLUSIONS

- Carrying out a secondary task while driving impairs driving performance and drivers with less driving experience are at a higher risk
- This study was limited in that the sample was small and performance was measured in a driving simulator

ACKNOWLEDGEMENTS

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