

EFFECTS OF TALKING VERSUS TEXTING ON COGNITIVE TASKS: IMPLICATIONS FOR TEXTING AND DRIVING

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Previous Literature



- Prevalence of cellular telephone usage
- Cellular telephone use while driving
 - ▣ Dual-task and competition of resources
- Degradation of performance
 - ▣ Hands-free vs. hands-held
 - Nowatka, Bopp, Cook, Gothberg, Richardson, & Styles, 2013

Previous Literature (cont.)



- Simulated driving studies
 - Strayer & Johnston, 2001
 - 2 dual-task conditions: easy vs difficult cognitive demands
 - Easy vs difficult driving tasks
 - Results
 - Hosking, Young, & Regan, 2009
 - Increased attentional demands of texting
 - Compensatory efforts

Big Question



- Does texting while driving impair performance more than talking on a cellular telephone while driving?
- Hosking, Young, & Regan (2009) found that texting impairs driving performance more than talking

Hypotheses



- Better performance on one-series task compared to two-series task
- Decreased performance as distractor difficulty increases
- Better performance in talking condition than texting condition

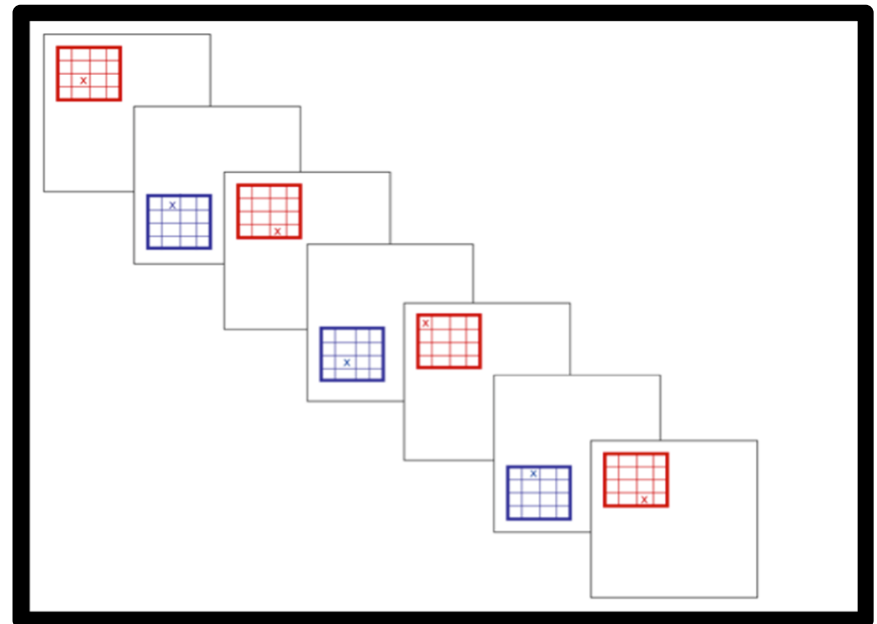
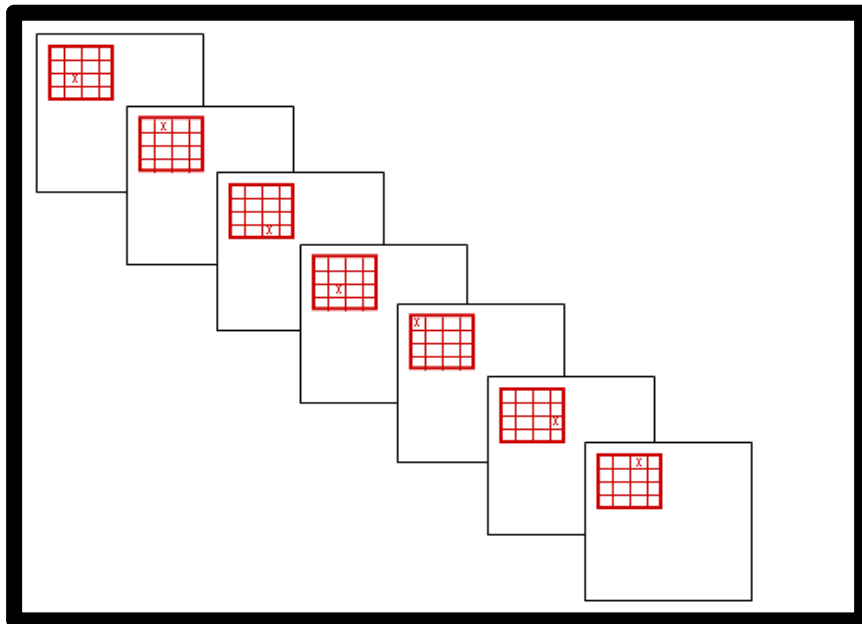
Method



- Random and convenience sample of 84 college students
- Random assignment to talk vs. text

Method (cont.)

Computerized repetition-detection task (Bopp & Verhaegen, 2009)



Method (cont.)



- Three levels of distractor randomly presented
 - No distractor
 - Word repetition
 - Word generation
 - Strayer & Johnston, 2001

- Experimenter in another room

- Operation span (OSPAN)

Independent Variables



- Within-subjects
 - ▣ Computer task (one-series vs two-series)
 - ▣ Distractor level (no distractor, word repetition, word generating)

- Between-subjects
 - ▣ Condition (talking vs texting)

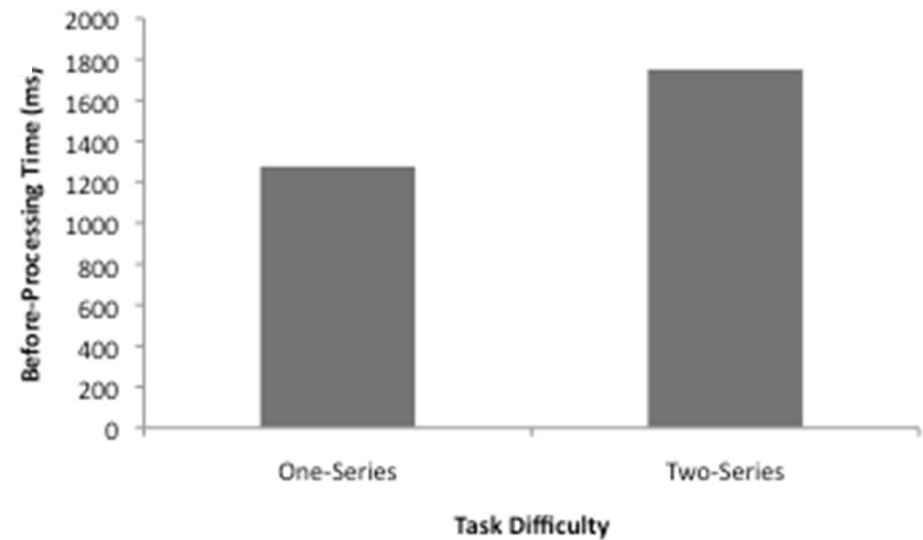
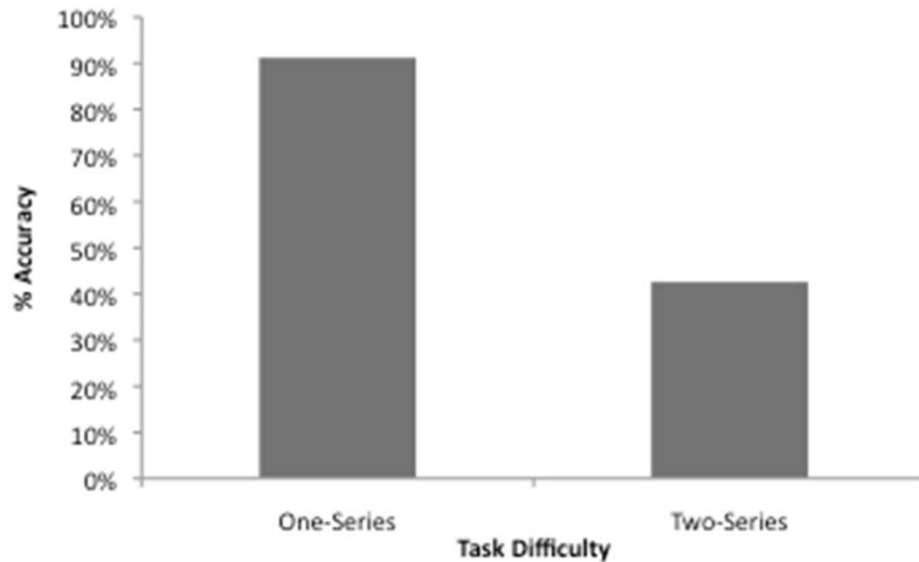
Dependent Variables



- Accuracy: percentage of correctly identified repeated stimuli

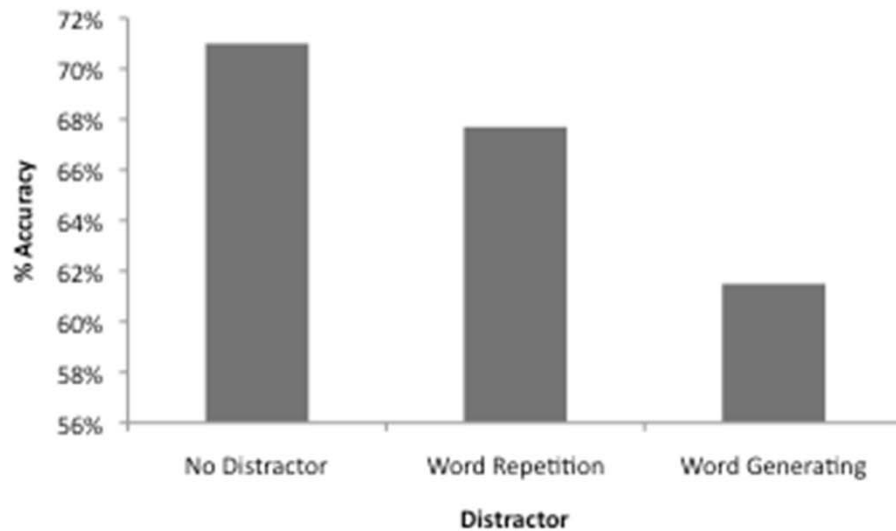
- Before-processing time (BPT): time from when the task began to when the repeated stimulus was presented

Results: Main Effect of Task



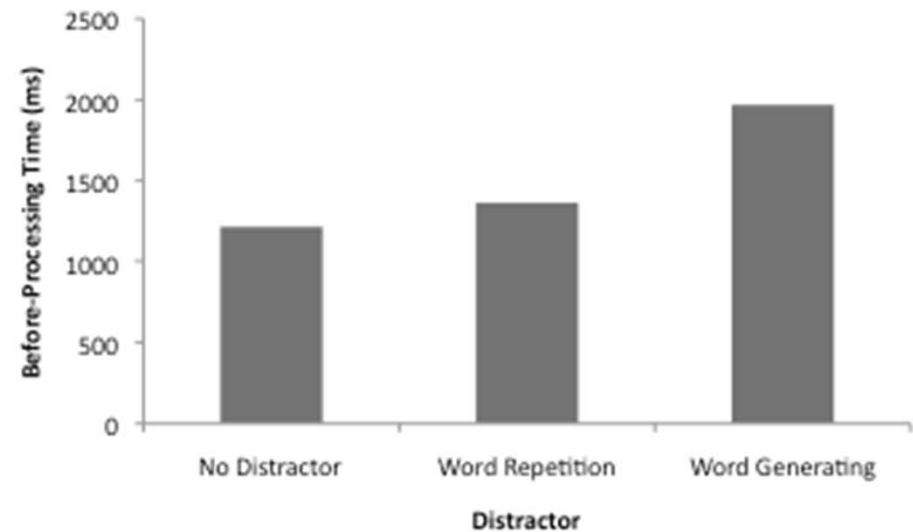
All significant
at $p < .05$

Results: Main Effect of Distractor

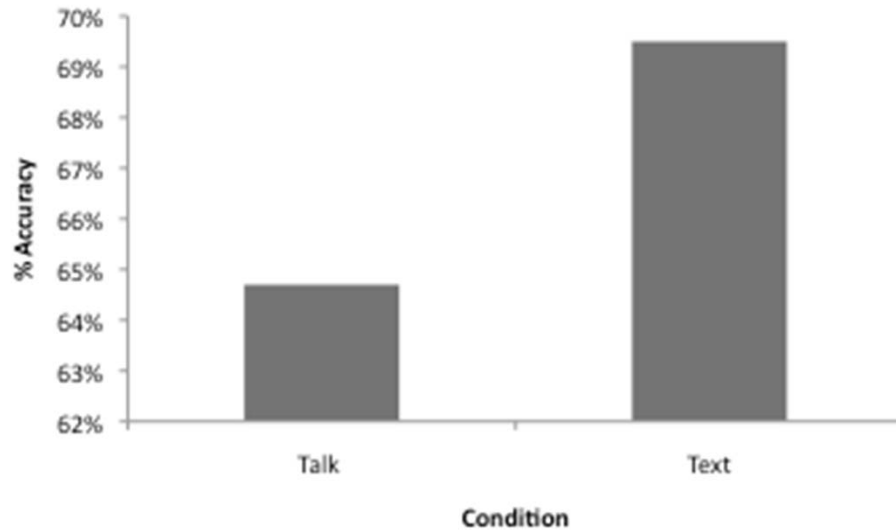


Accuracy: $p < .05$

BPT: $p = .051$

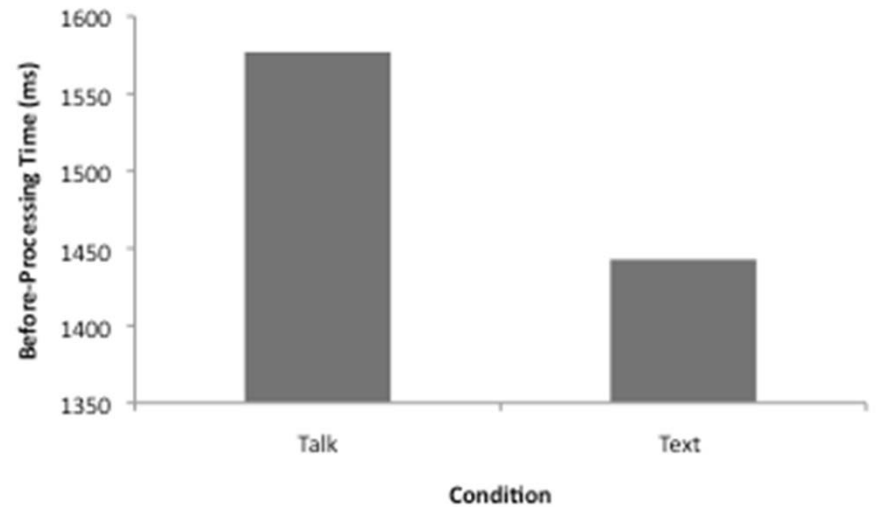


Results: Main Effect of Condition



Accuracy
significant at
 $p < .05$

BPT: trend



Results: Interactions



- 3-way interactions among task difficulty, distractor level, and texting vs. talking
- Accuracy & BPT
 - ▣ Combination of two-series task, generating words, and talking condition produces much worse performance than the easier tasks

Discussion



- Hypothesis about task difficulty: supported
- Hypothesis about distractor levels: supported

Discussion (cont.)



- Hypothesis about texting and talking: not supported
- Performance better for texting than for talking
 - ▣ Did not actually text while performing the task
 - ▣ Coping strategies

Limitations



- Methodological errors
- Computer task instead of actual driving simulator

Future Studies



- Ensure texting during computer task
- Change program to advance continuously
- Age effects

Thanks!



- Dr. Nowatka

- Dr. Bopp

- Participants

References

- Bopp, K. L. & Verhaegan, P. (2009). Working memory and aging: Separating the effects of content and context. *Psychology and Aging, 24*, 968-980.
- Horrey, W. J. & Wickens, C. D. (2006). Examining the impact of cell phone conversations on driving using meta-analytic techniques. *Human Factors, 48*, 196-205.
- Hosking, S. G., Young, K. L., & Regan, M. A. (2009). The effects of text messaging on young drivers. *Human Factors, 51*.
- Strayer, D. L. & Johnston, W. A. (2001). Driven to distraction: Dual-task studies of simulated driving and conversing on a cellular telephone. *Psychological Science, 12*, 462-466.
- Unsworth, N., Heitz, R. P., Schrock, J. C., & Engle, R. W. (2005). An automated version of the operation span task. *Behavior Research Methods, 37*, 498-505.