The Effects of Cell Phone and Text Message Conversations on Simulated Street Crossing

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Objective: A fully immersive, high-fidelity street-crossing simulator was used to examine the effects of texting on pedestrian street-crossing performance.

Background: Research suggests that street-crossing performance is impaired when pedestrians engage in cell phone conversations. Less is known about the impact of texting on street-crossing performance.

Method: Thirty-two young adults completed three distraction conditions in a simulated street-crossing task: no distraction, phone conversation, and texting. A hands-free headset and a mounted tablet were used to conduct the phone and texting conversations, respectively. Participants moved through the virtual environment via a manual treadmill, allowing them to select crossing gaps and change their gait.

Results: During the phone conversation and texting conditions, participants had fewer successful crossings and took longer to initiate crossing. Furthermore, in the texting condition, smaller percentage of time with head orientation toward the tablet, fewer number of head orientations toward the tablet, and greater percentage of total characters typed before initiating crossing predicted greater crossing success.

Conclusion: Our results suggest that (a) texting is as unsafe as phone conversations for street-crossing performance and (b) when subjects completed most of the texting task before initiating crossing, they were more likely to make it safely across the street.

Application: Sending and receiving text messages negatively impact a range of real-world behaviors. These results may inform personal and policy decisions.

Keywords: pedestrian safety, mobile technology, distraction, texting, virtual environments, simulation

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INTRODUCTION

In recent years there has been a proliferation in mobile technology. In 2013, 97% of American adults under 35 were using cell phones (Rainie, 2013). Beyond making calls, these devices offer the ability to perform a range of tasks, including sending text messages, checking e-mail, and playing video games.

This growth in mobile technology has increased the extent to which people's collective attention is regularly divided between their phones and other tasks, such as driving or walking. Multitasking in the vehicle has a negative impact on both driving performance (e.g., Caird, Willness, Steel, & Scialfa, 2008; Horrey & Wickens, 2006) and secondary-task performance (Becic et al., 2010; He, McCarley, & Kramer, 2014). Evidence suggests that texting while driving may be even more dangerous. On-road and simulator studies have shown an increase in crash likelihood when drivers are texting, in addition to delayed response times and impaired lane keeping, relative to driving undistracted (Drews, Yazdani, Godfrey, Cooper, & Strayer, 2009; Owens, McLaughlin, & Sudweeks, 2011). Naturalistic driving data also confirm an inflated crash risk when young adult drivers are texting (National Highway Traffic Safety Administration [NHTSA], 2013).

The cost associated with texting is theorized to result from a combination of factors. Texting physically diverts a driver's eyes from the road, increasing the chance of missing critical information. Texting drivers spend 400% more time looking away from the driving scene compared to undistracted drivers (Hosking, Young, & Regan, 2009). Importantly, texting also imposes a significant cognitive demand that diverts a subset of the driver's attention away from driving, similar to a cell phone conversation (Yager, Cooper, & Chrysler, 2012).