Chapter 84
Driving Home the Message:
Using a Video Game Simulator to Steer Attitudes Away From Distracted Driving

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ABSTRACT

A pre-test, post-test experiment was conducted to determine if using a popular racing game on a PlayStation® 3 video game console could change a player's intent to drive distracted. Results indicated that those who were driving distracted (texting or talking) in a video game driving simulator had significantly more crashes, speed violations, and fog-line crossings than those in a non-distracted driving control group. These findings are consistent with predictions from the ACT-R cognitive architecture and threaded cognition theory. A follow-up study manipulated the original protocol by establishing a non-distracted baseline for participants' driving abilities as a comparison. Results demonstrated that this manipulation resulted in a significantly stronger change in attitude against driving distracted than in the original procedure. The implications help to inform driving safety programs on proper protocol for the use of game consoles to change attitudes toward distracted driving.

INTRODUCTION

Statistics compiled by the National Highway Traffic Safety Administration (NHTSA) in 2009 indicated that 5,474 people were killed on U.S. roadways that were attributed to some sort of distraction. Of these distracted-driving fatalities, 18% were related to cell phone use (NHTSA, 2010). In response, many state authorities have outlawed the practice of texting while driving. At the time of this writing, thirty-four states, plus Washington D.C. and Guam, ban texting while driving for all drivers. Other states (e.g., Alabama, Missouri) have texting while driving bans in place for novice drivers (NHTSA, 2010).

The NHTSA defines distracted driving as "a specific type of inattention that occurs when drivers divert their attention from the driving task to focus on some other activity" (NHTSA, 2010, p. 1). There are many things that can distract a driver from the primary task of driving a vehicle. Sending or reading text messages, dialing phone

numbers, or having conversations on cell phones while driving would all be considered distracted driving. While some may euphemistically refer to texting or talking while driving as "multitasking" both texting and talking on the phone while driving are forms of distracted driving.

Although distracted driving is illegal in many places, people continue to engage in this dangerous practice. Even more troubling is the fact that young adults belong to the generation that is most likely to multitask (Carrier, Cheever, Rosen, Benitez, & Chang, 2008) while also being the generation that has the least amount of driving experience. U.S. national telephone survey data corroborates that 18-20 year-old drivers "have the highest incidence of self-reported crash or near-crash experiences compared to all other age groups and the highest incidence of phone involvement at the time of the crash or near-crash" (NHTSA, 2012, p. 5). A compilation of survey and experimental findings highlights the dangers of texting while driving (Jacobson & Gostin, 2010). One study found that drivers' eyes are off the road for 4.6 out of every 6 seconds of texting while driving, and that the odds ratio of a serious crash is 23.2 times greater for those who text while driving compared to drivers who were not texting and driving (FMCSA, 2010). An experiment using a driving simulator demonstrated that the impairments associated with cell phone use were equally as bad as impairments observed in intoxicated drivers (Strayer, Drews, & Crouch, 2006).

Knowing that distracted driving puts lives at risk, the question becomes how can we demonstrate to drivers, particularly young drivers, in a safe, affordable, controlled manner the dangers of multitasking behind the wheel? Further, can we use technology to change attitudes toward it? The following paragraphs will use theories of multitasking and threaded cognition to explain and predict participants' inabilities to successfully navigate in a game-based, distracted-driving simulation. Following this, the third-person effect will be used to predict participants' perceptions

by comparing their own distracted-driving behaviors versus "others" behaviors. The results of an experiment and follow-up test will then be reported to determine if a common video game driving simulator can be used as a tool to change attitudes toward distracted driving.

LITERATURE REVIEW

Many theories across disciplines recognize that people are cognitive misers. That is to say, because there is so much data available to process in a given moment, people need to take shortcuts. While these shortcuts save time and mental energy in processing information, it often comes at the expense of sound, analytical decision making (Tversky & Kahneman, 1974). In communication, the limited capacity model acknowledges the limited pool of resources that viewers have when encoding, storing, and retrieving message information when viewing televised content (Lang, Bolls, Potter, & Kawahara, 1999; Lang, 2000). In cognitive psychology, multimedia learning theory also recognizes that people have limited cognitive capacity (Mayer & Moreno, 2002). The redundancy principle acknowledges that processing information through too many senses can create a condition that is favorable to cognitive overload, and impeding the learning process (Leahy, Chandler, & Sweller 2003; Mayer & Moreno, 2002; Mousavi, Low, & Sweller, 1995). In the study of human-computer interaction, media equation also recognizes that interactive technologies can overload perceptual bandwidth (Reeves & Nass 1996; Reeves & Nass, 2000).

While these theories all acknowledge that media conventions can overload the senses, others have documented this pattern of limited capabilities in the arena of multitasking. In an attempt to further the understanding of human performance and overload, scholars have identified four broad domains of research related to multitasking (see Salvucci, 2005 for review). The study of *discrete*

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