EXAMINING STRATEGIES FOR REDUCING CELL PHONE USE WHILE DRIVING: INVESTIGATING THE POTENTIAL OF TARGETING NON-DRIVING PARTICIPANTS OF CELL PHONE CONVERSATIONS AND TESTING THE UTILITY OF TECHNIQUES FOR REDUCING HABITUAL RESPONSES TO CELL PHONES

by

MEGAN MICHELLE MILLER

B.A., University of Colorado at Colorado Springs, 2007
M.S., Kansas State University, 2009

AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY

Department of Psychological Sciences
College of Arts and Sciences

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2014

Abstract

The current research investigated strategies to reduce cell phone use while driving. Anti-distracted driving campaigns, which typically communicate risk information and target driver behavior, may produce limited effects because people tend to underestimate their risk from this behavior (e.g., Schlehofer et al., 2010). Study 1 compared the effects of messages targeting drivers to messages targeting non-drivers in order to examine the potential of discouraging people from having cell phone communication with others who are driving.

Some anti-distracted driving campaigns have emphasized the potential harm to both the driver and others, but whether one approach (self-oriented or other-oriented messaging) is more persuasive than the other has not been examined empirically. Study 1 compared messages that were self-oriented, other-oriented, or neutral in terms of who could be affected by cell phone use while driving.

Although cell phone use while driving generally is perceived as dangerous, people may make justifications for engaging in the behavior on at least some occasions, and these justifications may override the influence of risk knowledge on behavior. Consistent with inoculation theory (McGuire, 1961), if given the opportunity to practice refuting these justifications in a controlled setting, people will be more likely to defend themselves against justifications to engage in cell phone use while driving. Thus, Study 1 tested the prediction that participation in an inoculation task would reduce the likelihood of cell phone use while driving.

Results from Study 1 suggested an advantage of targeting non-driving participants of cell phone conversations to enhance efforts for reducing on-the-road cell phone use. Study 1 also demonstrated a positive effect of inoculation, but primarily for behavior of non-driving participants of cell phone conversations.

In addition to overconfidence in ability to avoid risk, habitual tendencies also may impede the influence of risk communication campaigns (Bayer & Campbell, 2012). Study 2 investigated the potential of mindfulness-based and implementation intentions techniques for helping people overcome habitual responses to their cell phone when doing so is inappropriate or inconvenient. Results indicated that pairing mindfulness-based training with risk information may be significantly more effective than risk information alone at inhibiting inappropriate cell phone use.

EXAMINING STRATEGIES FOR REDUCING CELL PHONE USE WHILE DRIVING: INVESTIGATING THE POTENTIAL OF TARGETING NON-DRIVING PARTICIPANTS OF CELL PHONE CONVERSATIONS AND TESTING THE UTILITY OF TECHNIQUES FOR REDUCING HABITUAL RESPONSES TO CELL PHONES

by

MEGAN MICHELLE MILLER

B.A., University of Colorado at Colorado Springs, 2007
M.S., Kansas State University, 2009

A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY

Department of Psychological Sciences
College of Arts and Sciences

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2014

Approved by:

Major Professor
Laura A. Brannon

Abstract

The current research investigated strategies to reduce cell phone use while driving. Anti-distracted driving campaigns, which typically communicate risk information and target driver behavior, may produce limited effects because people tend to underestimate their risk from this behavior (e.g., Schlehofer et al., 2010). Study 1 compared the effects of messages targeting drivers to messages targeting non-drivers in order to examine the potential of discouraging people from having cell phone communication with others who are driving.

Some anti-distracted driving campaigns have emphasized the potential harm to both the driver and others, but whether one approach (self-oriented or other-oriented messaging) is more persuasive than the other has not been examined empirically. Study 1 compared messages that were self-oriented, other-oriented, or neutral in terms of who could be affected by cell phone use while driving.

Although cell phone use while driving generally is perceived as dangerous, people may make justifications for engaging in the behavior on at least some occasions, and these justifications may override the influence of risk knowledge on behavior. Consistent with inoculation theory (McGuire, 1961), if given the opportunity to practice refuting these justifications in a controlled setting, people will be more likely to defend themselves against justifications to engage in cell phone use while driving. Thus, Study 1 tested the prediction that participation in an inoculation task would reduce the likelihood of cell phone use while driving.

Results from Study 1 suggested an advantage of targeting non-driving participants of cell phone conversations to enhance efforts for reducing on-the-road cell phone use. Study 1 also demonstrated a positive effect of inoculation, but primarily for behavior of non-driving participants of cell phone conversations.

In addition to overconfidence in ability to avoid risk, habitual tendencies also may impede the influence of risk communication campaigns (Bayer & Campbell, 2012). Study 2 investigated the potential of mindfulness-based and implementation intentions techniques for helping people overcome habitual responses to their cell phone when doing so is inappropriate or inconvenient. Results indicated that pairing mindfulness-based training with risk information may be significantly more effective than risk information alone at inhibiting inappropriate cell phone use.

Table of Contents

List of Figures

List of Tables

Acknowledgements

I would like to thank my advisor, Dr. Laura Brannon, for the guidance and support she has provided me and for her contributions to this research. I also would like to thank the members of my supervisory committee, Dr. Gary Brase, Dr. Joye Gordon, and Dr. Richard Harris for their feedback and suggestions. I also appreciate the contributions made by my outside chairperson, Dr. Jason Ellis, to the completion of my final examination. Finally, I am grateful for the support and encouragement given by my parents, Joe and Cindy Miller, and my husband, Jeffrey Hagio, as I worked toward the completion of my doctoral degree.

Chapter 1 - Introduction

The Issue: Cell Phone Use While Driving

In 2011, cell phone use (voice conversations and text messaging) was involved in 350 fatal motor vehicle accidents that resulted in 385 deaths, and approximately 21,000 people were injured in accidents involving cell phone use (National Highway Traffic Safety Administration, 2013b). Texting while driving specifically has been estimated to contribute to 1.6 million motor vehicle accidents annually (National Highway Traffic Safety Administration, 2008). However, it is likely that the numbers of accidents and resulting deaths and injuries associated with cell phone use while driving are even greater than those reported here because accidents resulting from cell phone use while driving are believed to be underreported. Methods for reporting cell phone use in accidents are not consistent nationwide, and cell phone use might not even be included in accident reports if there is no admission from the driver or if the behavior is not illegal within a specific jurisdiction (National Safety Council, 2013).

In response to vehicular accidents involving cell phone-induced distraction, legislation has been enacted prohibiting at least some forms of cell phone use while driving, and campaigns have been developed to promote awareness of safety and legal issues associated with this behavior. The use of cell phones for text messaging is illegal in 41 states and the District of Columbia, and all use of handheld cell phones while driving is illegal in 11 states and the District of Columbia (National Highway Traffic Safety Administration, 2013a). Some states also outlaw hands-free cell phone use while driving but only for specific groups, such as teenagers and bus drivers. Also, although bans on cell phone use while driving are becoming more common, the pressure for drivers to follow these laws may not be extremely strong because some states have only secondary laws banning cell phone use while driving, meaning that drivers must commit

another driving offense in order for police officers to ticket the driver for violation of the cell phone use ban.

In addition to legislative changes, wireless companies and government agencies have developed campaigns discouraging cell phone use while driving. Initiated by AT&T and supported by other major wireless carriers (Verizon, Sprint, and T-Mobile), the "It Can Wait" campaign aims to reduce texting and driving through the presentation of statistics, brief video biographies of people who have been involved in texting while driving accidents, and a texting while driving simulator mobile app (It Can Wait, 2013). The US Department of Transportation aims to increase awareness of both the safety and legal consequences of cell phone use while driving with its Distraction.gov website and the "One Text or Call Could Wreck It All" and "Phone in One Hand, Ticket in the Other" slogans.

Legislative and social focus largely has been on the use of cell phones for sending and receiving text messages, which may not be surprising given the substantial increase in risk for getting into an accident for this specific form of distracted driving. Compared to undistracted driving, there is a 23 times greater risk of getting into an accident when texting while driving (Virginia Tech Transportation Institute, 2009). Less attention seems to have been paid to talking on a cell phone (with either a handheld or hands-free device) while driving, for which there is a four times increased risk of getting into an accident that results in injury (McEvoy et al., 2005) or causes property damage (Redelmeier & Tibshirani, 1997). Although the risk of an accident may be reduced for talking on a cell phone compared to texting while driving, there is an increased risk of getting into an accident while talking on a phone compared to not using a cell phone at all. Also, legislation banning handheld cell phone use but not the use of hands-free devices to talk on a cell phone while driving is inconsistent with psychological research demonstrating no

difference in impairment between talking on a handheld cell phone and talking on a hands-free cell phone while driving. A review of psychological research on the effects of cell phone use while driving demonstrates the need for greater awareness of the risks associated with any form of cell phone use while driving and increased efforts to reduce this behavior.

A Review of Research on Cognitive and Driving Deficits Associated with Cell Phone Use While Driving

A series of laboratory studies conducted by Strayer and colleagues has demonstrated that it is the cognitive, not physical, distraction associated with cell phone use while driving that is the key contributor to distracted driving errors (Strayer & Drews, 2007; Strayer, Drews, & Crouch, 2006; Strayer, Drews, & Johnston, 2003; Strayer & Johnston, 2001). More specifically, their work has demonstrated support for an "inattention blindness" hypothesis, which states that even if drivers have their eyes on the road when concurrently engaging in a cell phone conversation and driving, they may not fully cognitively process information in their visual field, which has very important safety implications for cell phone use while driving.

Comparing the Effects of Using Handheld and Hands-Free Devices

A typical design used by Strayer and colleagues involves within-subjects comparisons of a single-task (driving only) condition and a dual-task condition. In the dual task condition, participants complete a driving simulation task while also engaging in either handheld or hands-free cell phone use or another task unrelated to driving. Multiple studies have shown no significant differences in driving errors between handheld and hands-free dual task conditions, and that under both of these conditions, there is a significant increase in performance deficits when participants switch from the single task condition to the dual-task condition (Strayer et al., 2006; Strayer et al., 2003; Strayer & Johnston, 2001). Other driving simulator research also has

demonstrated impaired driving performance when participating in a hands-free cell phone conversation compared to only engaging in the driving task (Just, Keller, & Cynkar, 2008; Patten, Kircher, Ostlund, & Nilsson, 2004). Using fMRI (functional magnetic resonance imaging), Just et al. (2008) also found decreases in activation of brain regions associated with spatial processing involved in driving tasks. Data from epidemiological research also suggests no significant safety advantage of using a hands-free device to talk on a cell phone while driving (McEvoy et al., 2005; Redelmeier & Tibshirani, 1997).

Support for the Inattention Blindness Hypothesis

People may believe that talking on a cell phone, especially with a hands-free device, is not as risky as texting while driving because not only are a driver's hands less occupied, but a driver also can keep his or her eyes on the road more easily than when texting and driving. People might also argue that they can drive safely while talking on their cell phone because they make an extra effort to keep their eyes fixated on objects that are most critical to safe driving. However, driving simulator research has demonstrated support for an inattention blindness hypothesis, which is not consistent with these pro-cell-phone-use-while-driving arguments. Independent of the object's relevance to traffic safety, participants have been found to have poorer explicit and implicit memory for objects presented in a simulated driving scene when talking on a hands-free cell phone than when not talking on the cell phone (Strayer & Drews, 2007; Strayer et al., 2003). Additionally, eye tracking data revealed that among the objects participants fixated on, even those most critical to safety, memory was poorer in the dual-task (cell phone use while driving) condition than in the single task (driving only) condition (Strayer & Drews, 2007). These findings suggest that when engaged in cell phone conversations, drivers do not hone their attention on safety-critical objects, and that when talking on a cell phone,

drivers may be looking at but not actually "seeing" stimuli in the driving field because too much cognitive energy is devoted to processing the cell phone conversation. Finally, by measuring a component of event-related brain potentials (ERP) known to be associated with attention allocated to a task, Strayer and Drews (2007) further supported the inattention blindness hypothesis by demonstrating that memory errors in the dual-task condition of their study were a result of encoding, not retrieval, errors. Limitations on ability to encode information about the driving environment can have tragic consequences when a driver must react quickly to unexpected objects or people on the road.

Relative Impairment of Cell Phone Use While Driving

Talking with a passenger and listening to the radio. Upon learning that having a cell phone conversation with a hands-free device is no safer than talking on a handheld cell phone, a person might ask how using a hands-free device differs from the driver having a conversation with a vehicle passenger or even listening to the radio. Research has investigated these questions and has found no significant performance deficits associated with basic language-involving activities such as listening to the radio or a book on tape or generating speech that requires minimal cognitive energy (Strayer & Johnston, 2001). However, as conversations (or similar language-involving activities) become more complex, negative impacts on driving performance become more likely (Patten et al., 2004; Strayer & Johnston, 2001). Thus, at a basic level, speaking or listening to speech do not seem to significantly disrupt driving, but when these behaviors are part of an active, engaging conversation, significant deficits are likely to occur.

Research demonstrating that active participation in conversations can be distracting (Patten et al., 2004; Strayer & Johnston, 2001) suggests that even in-vehicle conversations can impair driving performance. However, there are key differences between cell phone

conversations and in-vehicle conversations that make cell phone conversations riskier than in-person conversations. A vehicle passenger has the ability to experience the driving situation in very much the same way as the driver. Thus, because passengers are immediately aware of an increase in traffic density or severe weather, they are likely to halt a conversation when encountering these or other conditions that demand the driver's full attention. Passengers also can assist with navigation and identification of sudden hazards. In the context of a cell phone conversation, the other conversation participant is unable to assist with the driving experience, and may not even be aware that the other person is driving. In fact, driving simulator research has found more driving deficits to occur when participants engage in a cell phone conversation than when they engage in an in-vehicle passenger conversation (Drews, Pasupathi, & Strayer, 2008; Strayer & Drews, 2007). Further, examination of the conversations in these studies revealed that assistance with the driving task was more common in the passenger conversation condition than in the cell phone conversation condition.

Cell phone use while driving compared to drunk driving. Given that alcohol intoxication is now well recognized as causing cognitive impairments that significantly impact safe driving ability, researchers have examined the relative impairment of cell phone use while driving by comparing its effects to the effects of driving while intoxicated. Strayer et al. (2006) found that although driving deficits differed qualitatively between participants who completed a driving simulator task while under legal alcohol intoxication (were more aggressive, followed a pace car more closely, and braked more quickly/forcefully) and those who talked on a cell phone while driving (kept a larger following distance and took longer to brake), deficits were significantly greater in these conditions than for the single-task (driving only) condition. These results suggest

that the overall impact of cell phone distraction while driving may be equivalent to the impact of alcohol impairment on driving safety.

Need for Additional Action

Although research has demonstrated cell phone use while driving to impact driving safety to an extent equivalent to driving while under the influence of alcohol (Strayer et al., 2006), punishment for causing an accident while engaging in cell phone use while driving does not always match the punishment given for accidents caused by alcohol intoxication. This is true even for texting while driving, which is perceived as and has been demonstrated by research to be the most risky form of cell phone use while driving. For example, in Indiana in 2012, a 3-year-old boy, a 5-year-old girl, and a 17-year-old were killed when their family's Amish buggy was rear-ended by the van of a 21-year-old driver who was texting while driving. A grand jury chose not to charge the driver (Jones, 2013). Also, research indicates that even though people perceive drivers to be just as responsible for causing an accident when talking on a cell phone while driving, or even more responsible when texting compared to a driver who has been drinking and causes an accident, they tend to expect more severe punishments for drunk drivers than for distracted drivers (Atchley, Hadlock, & Lane, 2012). Though, one state does seem to recognize the similarity between drunk driving and distracted driving. In New Jersey, drivers who are texting and cause an accident that results in an injury can receive punishments similar to those given for driving while intoxicated and causing an injury (State of New Jersey, 2012). Also, although multiple empirical studies as well as epidemiological research have detected no difference in driving deficits between handheld and hands-free cell phone use while driving (McEvoy et al., 2005; Redelmeier & Tibshirani, 1997; Strayer et al., 2006; Strayer et al., 2003; Strayer & Johnston, 2001), hands-free cell phone use while driving is still widely permitted. The

widespread permission of using hands-free mobile devices while driving, and the typically mild punishments given to distracted drivers at fault for accidents, even those resulting in injuries and fatalities, sends the message that hands-free use is safer than handheld use and that, in general, cell phone use while driving is not a very serious issue.

Survey data indicates that public risk perceptions are consistent with the implications of legislation. Texting while driving is perceived as more dangerous than talking on a phone with either a handheld or hands-free device, and talking on a handheld device is perceived to be more dangerous than talking on a hands-free device (AAA Foundation for Traffic Safety, 2013a; Atchley, Atwood, & Boulton, 2011). Also, actual behavior is, to some extent, consistent with risk perception. Among respondents of a national survey, almost half reported that on at least some occasions, they answer their phone while driving, and a smaller percentage of respondents (10%) reported sending text messages or emails while driving (Schroeder, Meyers, & Kostyniuk, 2013). However, rates of cell phone use while driving vary across age groups and have been found to be highest among young drivers. In studies with college student samples, approximately three-quarters of participants have reported sending text messages at least some of the time while driving (Atchley et al. 2011; Nelson, Atchley, & Little, 2009), over 90% have reported reading text messages (Atchley et al., 2011), and in one study, all participants reported talking on their cell phone while driving at least some of the time (Nelson et al., 2009).

Unfortunately, although efforts have been made to increase awareness of the dangers associated with cell phone use while driving, people continue to engage in this risky behavior. National survey data indicate that between 2010 and 2012, only slight decreases occurred in the proportion of respondents who always or almost always answer their phone or initiate a phone call while driving (Schroeder et al., 2013). Surprisingly, with so much attention on the dangers of

text messaging while driving, the proportion of drivers who send text messages while driving increased slightly, and no change was found for drivers who always send or read text messages while driving (Schroeder et al., 2013). These data suggest a continued need for increasing awareness of the serious risks associated with cell phone use while driving. Still, although some people have reported that exposure to risk information influenced them to reduce their cell phone use while driving (Schroeder et al., 2013), as will be discussed below, it is unlikely that risk information is sufficient to significantly impact driver behavior. Examination of person and social factors associated with cell phone use while driving sheds light on techniques that may improve efforts to discourage cell phone use while driving.

Person and Social Factors Associated with Cell Phone Use While Driving

A Rationale for Targeting Non-Driving Participants of Cell Phone Conversations

Comparative Optimism and Overconfidence

Survey research has found that risk perceptions are not a strong predictor of cell phone use while driving (Atchley et al., 2011; Nelson et al., 2009), and comparative optimism may help explain the lack of relationship between risk perceptions and behavior. In the domain of risk perceptions in general, risk tends to be perceived as greater for others than for the self (e.g., Sjoberg, 2000), and this also appears to be true specifically for cell phone use while driving. A national survey found that although the majority of respondents supported legislation banning the use of handheld cell phones while driving, more than half report engaging in the behavior, and about half of those individuals believed cell phone use while driving had no effect on their own driving performance (Schroeder et al., 2013). Others have found that, among people who reported using a cell phone while driving, their perceptions of risks to others but not their perceptions of risk to the self, significantly predicted support for regulation of cell phone use

while driving (White, Eiser, Harris, & Pahl, 2007). One study found that people who reported ever having used a cell phone while driving perceived this behavior to be less risky than those who had never engaged in this behavior (White, Eiser, & Harris, 2004). A lack of differences between these two groups for a variety of other behaviors that could be risky while driving suggests that the individuals with lower risk perceptions for cell phone use while driving did not have lower risk perceptions in general. These results are consistent with other research demonstrating a cognitive dissonance effect, such that attitude or risk perception of cell phone use while driving is shaped by behavior (Atchley et al., 2011). If individuals perceive a situation or behavior as risky and then successfully engage in the behavior, they may adjust their attitudes (lower risk perception) to be consistent with their behavior.

People may perceive themselves to be at less risk than others because of a general tendency to be overly optimistic about their chances of experiencing positive events and avoiding negative events (Weinstein, 1980) and because of a more specific tendency to be overconfident in their ability to avoid health or safety risks (Dunning, Heath, & Suls, 2004). This tendency has been shown to occur specifically in the context of driving related safety risks. It has been fairly well documented in the driving literature that people tend to perceive themselves as better than average drivers or to perceive that they have better control than other drivers (Horswill & Mckenna, 1999; McCormick, Walkey, & Green, 1986; Svenson, 1981). Some research has demonstrated that overconfidence or illusions of control occur in the context of cell phone use while driving and that this overconfidence is a significant predictor of self-reported frequency of cell phone use while driving (Schlehofer et al., 2010).

Those who are overconfident in their ability to use their cell phone while driving are most likely to engage in the behavior (Schlehofer et al., 2010) and thus, are the individuals that anti-

distracted driving campaigns should be targeting. Unfortunately, because of their overconfidence or illusions of control, these individuals may not be strongly influenced by risk information because they may perceive themselves as better than average and exempt to these messages. In other contexts, research has shown that risk information targeting the message recipient may not be as effective as desired if the message recipient perceives him or herself as immune to the risk (Grant & Hofmann, 2011). Thus, campaigns may need to take an indirect approach to changing driver behavior. Distracted driving campaigns have focused largely on targeting drivers directly. However, the driver is not the only person involved in a cell phone conversation. Campaigns, public service announcements, and educational programs may benefit from targeting the non-driving participant of a cell phone conversation by encouraging people to avoid having voice or text message conversations with others they know to be driving or to quickly terminate a conversation upon learning the other person is driving. Not only would targeting non-drivers broaden the scope of campaign efforts, but it might be a solution for overcoming the obstacle of driver overconfidence.

Social Influence

Along with the literature on overconfidence and illusory control, research demonstrating the role that social influence plays in eliciting cell phone use while driving suggests that persuasive techniques may need to expand beyond increasing risk awareness in order to be effective. In today's society, the ability to connect with others at any moment is the norm, and, especially among young adults, cell phones are valued as primary tools for maintaining social networks and fulfilling belongingness needs (Walsh, White, & Young, 2009). Examination of risk perceptions and reported frequency of cell phone use while driving suggests that when receiving a phone call or text message while driving, the social pressure to respond might

outweigh the influence of risk knowledge on behavior. Among teens who responded to a survey conducted by AT&T, approximately 90% said they expect to receive a response within five minutes of sending a text message, and approximately 50% said they expect a response right away (AT&T, 2012). If teens expect nearly immediate responses to messages they send, they may perceive their peers to have the same expectations and may feel pressured to respond very quickly to messages they receive. Data from a national survey also is suggestive of the influence that social pressures may have on cell phone use while driving. Survey respondents reported a greater frequency of answering calls and reading text messages than initiating phone calls and text conversations (Schroeder et al., 2013). If behavior were completely influenced by risk perceptions, we should expect no difference in the frequencies of initiating and responding to voice and text cell phone conversations while driving because these behaviors are functionally identical.

The fact that drivers are more likely to respond to calls and text messages than to initiate them may be an indication that their behavior is at least partly influenced by social pressure. In fact, one study found college-aged drivers perceived replying to text messages to be equally as dangerous as initiating text messages while driving, but they reported replying to text messages more often than initiating text messages (Atchley et al., 2011). Thus, there was an inconsistency between risk perceptions and actual behavior. The researchers inferred that when receiving a text message, a driver may perceive less choice in engaging in a text conversation than they would if initiating the conversation, making risk knowledge less salient. Also, survey research has found that when answering a call while driving, drivers are more likely to continue the conversation than to take a risk-averse response (e.g., indicating they will return the call later; Schroeder et al., 2013). Thus, social pressure to respond to a text message or to complete a conversation may

override the influence of risk perceptions on behavior. These findings further support the need for campaigns to target the non-driving participants of cell phone conversations. Encouraging people to avoid calling or texting others who they know to be driving removes the pressure on drivers to respond to incoming calls or text messages. Of course, when calling or texting someone, it is not unusual to be unaware of what the person is doing at the time. Thus, campaigns also should encourage people to end a conversation immediately upon learning that the other person is driving.

Habitual Tendencies and Temptation

In addition to overconfidence in one's ability to compensate for cell phone distraction, habit or temptation may explain why people engage in cell phone use while driving, even if they believe this behavior is dangerous. Habitual texting tendencies have been shown to significantly predict sending and reading text messages while driving, and habitual texting has been found to explain significantly more variance in text messaging while driving than is explained by overall cell phone use (Bayer & Campbell, 2012). Cell phone use while driving may be described as a counterintentional habit. "Counterintentional habits may be formed especially when behavior involves short-term hedonistic-driven motives at the expense of long-term benefits of attaining valued goals" (Verplanken & Faes, 1999, p.595). That is, answering a phone call or text message can provide immediate rewards (e.g., fulfilling a social need to connect or belong, easing anxiety of not knowing who is calling/texting and why) that may form the habit of immediately answering a phone call or text message even when doing so contradicts valued goals, which may have more serious long-term consequences than would choosing not to answer the phone. This also helps explain why people sometimes engage in cell phone use while driving even if they are aware of the potential risks.

Techniques for Enhancing Persuasive Appeals and Resisting Temptation

While targeting the non-driving participant of an on-the-road cell phone or text message conversation certainly may be advantageous to reducing this hazardous behavior, there is still a need for targeting driver behavior. As noted above, risk communication alone may not significantly impact behavior, because overconfidence and illusory control may influence drivers to justify engaging in the behavior. However, through the use of inoculation theory-based strategies, drivers might be persuaded to change their behavior if asked to argue against justifications for cell phone use while driving. Inoculation-based strategies (described below) also might help influence people to avoid or end cell phone communication with another person who is driving. Also, given the role that habit plays in influencing cell phone use while driving, it may be beneficial to teach people techniques to help them resist habitual tendencies to engage in cell phone conversations while driving as well as in other situations for which cell phone use is inconvenient or inappropriate.

Comparing Effects of Emphasizing Risks to the Self versus Others

When deciding whether or not to engage in a behavior, people may base their decision on how they personally will be affected by the behavior or on how other people will be affected. Especially in the domain of helping behavior, examining whether behavior is egoistically (self-oriented, e.g., Cialdini, Schaller, Houlihan, Arps, Fultz, & Beaman, 1987), or altruistically driven (other-oriented, e.g., Batson, Duncan, Ackerman, Buckley, & Birch, 1981) has been a heavily investigated and debated topic. Research also has examined whether persuasive communication is more or less effective if it emphasizes costs and benefits to the self versus costs and benefits to others. For example, one study demonstrated that health care professionals were more strongly influenced to use hand sanitizer when presented with a message indicating that doing so would

help keep patients safe than when presented with a message emphasizing that hand sanitizer use would protect health care professionals from disease (Grant & Hofmann, 2011). Others also have found an advantage of using other-oriented messages to change attitudes. For example, a message encouraging people to provide support to a family caregiver was associated with more attitudes supportive of family caregivers if the message emphasized how the support, or lack thereof, would affect the caregiver (other-oriented), than if the message emphasized how the message reader would benefit from giving the support or would suffer from withholding support (self-oriented; Gopalan & Brannon, 2006). Research also has examined long-term health effects of engaging in prosocial behavior for other-oriented versus self-oriented reasons. One study found that older adults who engaged in volunteer activities for other-oriented reasons had a reduced mortality risk compared to those who volunteered for self-oriented reasons, whose mortality risk was similar to older adults who did not engage in volunteer activities (Konrath, Fuhrel-Forbis, Lou, & Brown, 2011).

Campaigns designed to reduce cell phone use while driving seem to tap the idea of emphasizing how the self and others may be affected by cell phone use while driving. One component of the "It Can Wait" campaign is the televised broadcasting of brief video biographies of people who have been affected by vehicular accidents in which cell phone use was involved. Some videos highlight individuals who caused an accident by texting while driving and either suffered serious personal consequences (self-oriented) or seriously injured or killed others as a result of their behavior (other-oriented). Other videos include the family members of distracted drivers or victims of distracted driving who have died or are unable to speak for themselves because they have been so seriously injured. However, whether self-

oriented appeals are more influential than other-oriented appeals or vice versa has not been empirically tested. The current research examined this question.

Applying Inoculation Theory to Protect Against Pro-Cell Phone Use Justifications

McGuire's inoculation theory on persuasion resistance was developed as an analogy to biomedical immunization (McGuire, 1961a, 1961b; McGuire & Papageorgis, 1961). The theory states that people will be better able to resist a persuasive attack if previously exposed to a weakened form of the attack and provided refutations than they will if they do not receive such inoculation treatment. Also, refutation practice has been demonstrated as a stronger form of immunization against persuasive threats than has belief strengthening, which has been found to be as ineffective as no immunization (McGuire, 1961b; McGuire & Papageorgis, 1961; Szybillo & Heslin, 1973). Inoculating a belief against counterarguments is expected to be more effective than simply strengthening the target belief because the former arouses awareness that the target belief is vulnerable to arguments, motivating the person to develop defenses of the target belief, and strengthening the target belief (McGuire, 1961a, 1961b; McGuire & Papageorgis, 1961). Another possible explanation for the effectiveness of inoculation treatment is that by developing refutations against one counterargument, any subsequent counterarguments appear less impressive or threatening than they would have without having experienced the inoculation treatment (McGuire, 1961a, 1961b; McGuire & Papageorgis, 1961).

When conducting biomedical inoculation, typically, the immunization treatment is designed to protect against a specific strain of a virus, because it is known to be the strain most likely to attack during a given time period. With regard to psychological immunity, however, there may be a wide array of persuasive arguments a person will encounter for any given topic. Thus, while inoculation may be conducted with an argument that runs counter to a person's

beliefs in order to increase resistance to later attacks, later attacks may be quite different from the argument used in the inoculation procedure. McGuire (1961a) demonstrated that inoculation against novel attacks will be strongest when people are actively rather than passively involved in the inoculation procedure. That is, people will be better able to resist persuasive attacks to which they previously have not been exposed if during inoculation they are presented with a counterargument and asked to generate their own refutations than if they are provided refutations.

Inoculation theory has been tested in a variety of domains. For example, inoculation treatment has been shown to protect college students' "healthy attitudes about credit card debt" from credit card advertisements (Compton & Pfau, 2004), marketing campaigns from attacks by competitors (Szybillo & Heslin, 1973), and voters' support for a political candidate from attacks by a competing candidate (An & Pfau, 2004; Pfau, Kenski, Nitz, & Sorenson, 1990). Especially relevant to the current study, programs designed to prevent risky or health-threatening behavior have effectively employed inoculation-based strategies. For example, Duryea (1983) tested a preventive alcohol education program based on the tenets of inoculation theory in which high school students were instructed to generate refutation responses to pro-drinking and driving arguments (e.g., "I always have my friends watch me real close when I drive after drinking"). Students who participated in the program demonstrated better knowledge about alcohol and its effects, better ability to refute pro-drinking and driving arguments, lesser tendency to comply in risky alcohol-related situations, and fewer attitudes supportive of drinking and driving.

We expect it is not uncommon for individuals, especially young adults, to be exposed to arguments from others, especially their peers, supporting cell phone use while driving at least some of the time or under certain conditions (e.g., "I focus really hard on the car in front of me,

and I have no problems driving safely"). It also is quite possible that people have made similar arguments for their own behavior (either verbally to others or to themselves when alone). Thus, given the claim that "immunization interventions realize a greater efficiency when used in a situation where susceptibility to pressure and persuasion is significant (Duryea, Ranson, & English, 1990, p. 171)," we expected that exposing participants to an inoculation task would increase their attitudes in support of and their intentions for restricting cell phone use while driving compared to those who only are exposed to an informational message discouraging cell phone use while driving. Also, to make the inoculation task as strong as possible, participants in the current research generated their own refutations to justifications for cell phone use while driving because resistance to novel counterarguments has been found to be strongest when inoculation involves active (participant-generated) refutation (McGuire, 1961a). It is quite possible that in their daily lives after participation in the study, participants will encounter or internally generate justifications for cell phone use while driving other than those presented to them in the study. Consistent with McGuire's (1961a) findings, by generating their own refutations in the inoculation task, participants should be less susceptible to social or internal persuasions to engage in cell phone use while driving than they would if refutations were given to them (passive refutation). The advantage of self-generated refutations also is consistent with persuasion research that has shown arguments to be most compelling when they are self-generated (Petty, Ostrom, & Brock, 1981).

Inoculation also may be beneficial in the context of encouraging non-driving participants of cell phone conversations to end the conversation until the other person is no longer driving. Earlier, social pressure was discussed as an immediate issue for the driver, but it is possible that a non-driving participant of a phone conversation would feel pressured to continue the

conversation. For example, the driver might make justifications for continuing the conversation (e.g., "No, I'm fine. I've had plenty of practice having phone conversations while I'm on the road"). Inoculation treatment could better prepare non-drivers to respond to these justifications in a way that will reduce risk to the driver.

Changing Habit with Implementation Intention Plans and Mindfulness Training

Implementation Intention Plans

According to models of behavior change, behavioral intention directly predicts actual behavior (Ajzen & Fishbein, 1980). However, the relationship between behavioral intention and actual behavior has been shown to be significantly strengthened when an individual develops implementation intentions (Gollwitzer, 1993, 1999; Gollwitzer & Sheeran, 2006). That is, people are more likely to achieve a desired goal if they have specific plans for how, when, and where they will work towards that goal than if they have only a goal intention. Implementation intentions typically are structured as "if-then" plans, such that if a person encounters a specific stimulus or situation, then he or she will engage in a specific cognitive or behavioral response (Gollwitzer, 1993). After mentally rehearsing a plan, when encountering a specific stimuli or situation (the "if" portion of a plan), less conscious effort will be required to act in a goal-consistent manner than if a plan had not been made. Thus, control of behavior shifts from the person to the environment (Gollwitzer, 1999). In a way, implementation intention plans are a method for creating desirable habits through repeated and intended stimulus-response pairings (Verplanken & Faes, 1999).

Implementation intention plans have been shown to be effective at increasing the likelihood of goal attainment in a variety of contexts. For example, in the domain of health-related goals, implementation intention plans have been shown to increase exercise activity

(Milne, Orbell, & Sheeran, 2002), consumption of healthy foods (Verplanken & Faes, 1999), and cancer screening (Sheeran & Orbell, 2000). Research also has demonstrated implementation intentions may contribute to student success. Students who experience test anxiety may benefit from using implementation intentions to help them stay focused on an exam (Parks-Stamm, Gollwitzer, & Oettingen, 2010). Also, implementation intention plans have been shown to positively impact student productivity and time management, especially at times when they can easily be distracted from completing their goals (i.e., during winter break; Gollwitzer & Brandstatter, 1997).

Not only can implementation intentions be useful with helping people produce a desired behavior, but, especially relevant to the current study, they also have been effective at inhibiting unwanted or inappropriate behaviors or with helping people resist temptations. In some of the earliest work testing implementation intentions, Mischel and Patterson tested children's ability to resist distraction of a clown box containing attractive toys while engaging in a boring peg task. The children were told that if they worked hard and completed the peg task while the experimenter was away, then they would later be allowed to play with the "fun toys" in the room. Children were less likely to be distracted from the peg task by the clown box if they were given a plan by the experimenter (e.g., "When Mr. Clown Box says to look at him and play with him, then you can just not look at him, and say, 'I'm not going to look at Mr. Clown Box.'") than if they were not given a plan and only were instructed to work hard on the peg task while the experimenter was gone (Mischel & Patterson, 1976; Patterson & Mischel, 1975, 1976). Similar temptation resistance strategies have been found to be effective with adult samples. For example, automatic positive evaluations of chocolate were reduced among participants who previously thought of possible situations in which they could be tempted to eat the chocolate and generated

responses they could use to avoid or refuse the chocolate (Hofmann, Deutsch, Lancaster, & Banaji, 2010). Similarly, implementation intentions have been used to help people resist eating tempting, unhealthy foods (Achtziger, Gollwitzer, & Sheeran, 2008; Kroese, Adriaanse, Evers, & De Ridder, 2011). Research has also demonstrated that implementation intentions can be effectively used to ward off negative thoughts or feelings that may derail goal attainment. For example, Achtziger et al. (2008), found that tennis players' performance and fitness during a tennis match was rated better by themselves and their trainers/teammates if prior to the match, the players planned specific responses (e.g., "I will calm myself and tell myself 'I will win'") to negative thoughts (e.g., "feeling angry") that they might experience during the tennis match that could have detrimental impacts on their performance.

While Mischel and Patterson (1976) found implementation intention plans to be effective only if the experimenter provided the participants with a plan, compared to asking participants to generate their own plan, tests of implementation intentions with adult samples have found participant-generated plans to be effective (e.g., Achtziger et al., 2008; Armitage, 2007; Hofmann et al., 2010). With Mischel and Patterson's participants ranging in age from 3.5 to 5 years old, it is not surprising that participant-generated plans were unsuccessful. Also, effectiveness of self-generated implementation intention plans is consistent with persuasion research demonstrating enhanced effects of personalization or personal involvement (e.g., Brannon & McCabe, 2002; Brock, Brannon, & Bridgwater, 1990; Pease, Brannon, & Pilling, 2006; Petty & Cacioppo, 1979, 1984; Petty et al., 1981).

Given research demonstrating the role that habit plays in cell phone use while driving and the similarity between the mechanisms behind the formation of counterintentional habits and goal-directed habits developed through implementation intention plans (Verplanken & Faes,

1999), this may be an effective strategy for helping people overcome the counterintentional habit of cell phone use while driving. Thus, the current study tested whether generating implementation intention plans for inhibiting temptations to engage in cell phone use when it is inappropriate or inconvenient is more influential on actually resisting this temptation than is only a message communicating the consequences of giving in to this temptation.

Mindfulness Training

Mindfulness is "the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment" (Kabat-Zinn, 2003, p. 145). That is, mindfulness entails giving full attention to a present experience and maintaining emotional stability in response to thoughts that may occur during that experience. When in a mindful state, an individual does not judge or emotionally react to thoughts or sensations that could otherwise be stress-inducing, nor do they actively attempt to ignore such thoughts or sensations. Rather, any thoughts or sensations experienced in the present moment are accepted with an open mind. Some literature focuses on mindfulness as an individual difference variable. That is, some people tend to be mindful, open, and accepting across contexts. However, research suggests that with long-term, active practice of mindfulness meditation, trait mindfulness might be enhanced (Brown & Ryan, 2003).

Trait mindfulness has been found to be related to various cognitive, emotional, and well-being variables. Positive correlations have been found between trait mindfulness and aspects of emotional intelligence, attentiveness and receptivity to experience, mindful engagement, novelty seeking and producing, internal state awareness, positive affect, life satisfaction, self-esteem, self-actualization, autonomy, and competence (Brown & Ryan, 2003). Trait mindfulness has been found to be inversely correlated with facets of neuroticism (depression, self-consciousness,

angry hostility, and impulsiveness), anxiety, and negative affect (Brown & Ryan, 2003). Individuals higher in trait mindfulness have been found to display more emotionally stable responses to and greater tolerance of stressful stimuli than those lower in this trait (e.g., Arch & Craske, 2010). Also, mindfulness has been found to be negatively correlated with rumination (Brown & Ryan, 2003; Raes & Williams, 2010), and more specifically, has been found to moderate the relationship between rumination and uncontrollability of rumination (Raes & Williams, 2010). That is, greater mindfulness is not necessarily associated with completely ignoring potentially distracting thoughts, but it does appear to be associated with the ability to experience intrusive thoughts without experiencing a strong emotional reaction to those thoughts or becoming controlled by the thoughts (Raes & Williams, 2010).

Given the positive impacts of mindfulness on cognitive and emotional well-being, mindfulness-based therapy has been used to help people cope with tempting or distracting stimuli, thoughts, and feelings in numerous contexts. Research has demonstrated success of mindfulness interventions with helping people cope with a variety of disordered behaviors, such as disordered eating (Baer, Fischer, & Huss, 2006). Even brief mindfulness-based interventions or training sessions have been shown to be successful in research settings with non-clinical samples. For example, a laboratory study found a mindfulness-based exercise to be associated with a greater reduction in smoking behavior in the week following the laboratory experience than was a control condition (Bowen & Marlatt, 2009). Bowen and Marlatt also found that although smoking urges did not decrease in their mindfulness intervention group, the relationship between smoking urges and negative affect was weaker in this group than in the control group. This finding demonstrates that mindfulness does not equate to the absence of intrusive thoughts, but it may enable a person to react to such thoughts in an emotionally neutral and healthy

manner. Other laboratory research has found mindfulness-based inductions to be associated with greater emotional stability when exposed to negatively valenced stimuli and a greater willingness to expose oneself to such stimuli (Arch & Craske, 2006) and to be associated with less negative mood after exposure to negative mood-inducing stimuli (Broderick, 2005). Very brief, one-time sessions also have been shown to reduce mind-wandering (Mrazek, Franklin, Phillips, Baird, & Schooler, 2013) and to temper problematic behavioral correlates of mind-wandering (Mrazek et al., 2013; Mrazek, Smallwood, & Schooler, 2012).

Some research even has begun to explore the implications of mindfulness for cell phone use while driving. One study found scores on a trait mindfulness measure to be negatively related to self-reported frequency of texting while driving (Feldman, Greeson, Renna, & Robbins-Monteith, 2011). Research (not on the topic of cell phone use while driving) has found trait mindfulness to moderate the intention-behavior relationship, such that goal intentions predicted actual behavior among mindful individuals but not among less-mindful individuals. Also, less mindful individuals have been found to be more likely than mindful individuals to have their goal intentions disrupted by counterintentional habits (Chatzisarantis & Hagger, 2007). Thus, we anticipated that a mindfulness-based intervention could be useful with helping students deal with temptations to engage in cell phone use at times when doing so is inappropriate or inconvenient.

The Current Research

The current research involved two studies to test methods for enhancing persuasive communication to discourage cell phone use while driving and cell phone communication with someone who is driving (Study 1) and to test techniques to help people resist the temptation to respond to phone calls and text messages when cell phone use is inconvenient or inappropriate (Study 2).

Study 1

One purpose of Study 1 was to compare the effects of messages that target drivers engaging in cell phone use to messages targeting non-driving participants of cell phone conversations. Legislative and campaign efforts to increase awareness of the risks associated with distracted driving typically aim to change driver behavior. Unfortunately, primarily targeting drivers with risk information may not produce optimal effects because people tend to perceive risk to be lower for themselves than they do for others (Schlehofer et al., 2010; Schroeder et al., 2013; Sjoberg, 2000; White et al., 2004; White et al., 2007). Also, social pressure to respond to an incoming call or text message while driving may override the influence of risk knowledge on behavior (Schroeder et al., 2013; Walsh et al., 2009). Cell phone conversations occurring on the road can be avoided or quickly terminated by either person involved in the conversation. Thus, campaigns that primarily target drivers are targeting only half of the people involved in the situation. Targeting the other person involved in the cell phone conversation not only expands a campaign target population but also works around the issues of driver overconfidence and social pressure. Considering the literature on comparative optimism and social pressure, especially in the context of cell phone use while driving, we expected that participants would express a greater willingness to avoid cell phone communication with someone else who is driving than they would if they were driving. That is, if there is a general tendency for people to perceive cell phone use while driving to be risky for others more so than for themselves, it was expected that participants would report being less likely to engage in cell phone conversations with others who are driving than they would be to engage in cell phone use while they are driving. ***Hypothesis 1: Persuasive effects will be greater in the non-driver target message condition than in the driver target message condition.***

Another aim of Study 1 was to examine whether a message discouraging cell phone use while driving is more effective if it emphasizes how the message reader could be affected by cell phone use while driving than if the message emphasizes how people other than the reader could be affected. Previous research on a variety of behaviors has shown self- and other-oriented motives to differentially influence behavior (e.g., Batson et al., 1981; Cialdini et al., 1987; Gopalan & Brannon, 2006; Grant & Hofmann, 2011; Konrath et al., 2011). Campaigns discouraging cell phone use while driving have tapped self- and other-oriented motives for restricting this behavior, but whether one motive is more influential than the other has not been empirically tested. Considering the number of people who could potentially be affected by vehicular accidents caused by cell phone use, it may be very useful for campaigns to know whether it is more advantageous to emphasize risks to the self or to emphasize risks to others associated with cell phone use while driving. ***Research Question: Will self- and other-oriented messages be more persuasive than neutral messages, and will self- and other-oriented messages differ in degree of effectiveness?***

The outcomes of an accident resulting from cell phone use while driving are likely to be much more serious for the driver and others on the road than for the person at the other end of the phone conversation (non-driver). For example, the driver and others on the road could be killed or seriously injured, or the driver could be faced with legal punishment, but the non-driver is not at risk for these consequences. Therefore, we expected that participants would report being especially likely to avoid or terminate cell phone communication with others who are driving if exposed to a message that emphasized how having cell phone conversations with others who are driving could harm the driver and others on the road than if the message emphasized how they (as a non-driving conversant) personally could be affected. ***Hypothesis 2: In the non-driver***

target message condition, the other-oriented message will be more influential than the self-oriented message.

Study 1 also tested an application of inoculation theory for reducing cell phone use while driving and cell phone communication with someone who is driving. Although people generally seem to recognize that cell phone use while driving is dangerous, they may make or be exposed to justifications to engage in cell phone use while driving (or to continue a phone conversation with someone who is driving), and these justifications can threaten the influence of risk knowledge on behavior. Given the numerous successful applications of inoculation theory in a variety of contexts (An & Pfau, 2004; Compton & Pfau, 2004; Duryea, 1983; Duryea et al., 1990; McGuire, 1961a, 1961b; McGuire & Papageorgis, 1961; Pfau et al., 1990; Szybillo & Heslin, 1973), and persuasion literature demonstrating the strong influence of self-generated arguments on attitudes (McGuire, 1961a; Petty et al., 1981), we expected that participants would report being less likely to engage in cell phone use while driving or to engage in cell phone communication with someone who is driving if they personally generated arguments against justifications for this behavior than if they did not engage in this inoculation task. ***Hypothesis 3: Persuasive effects will be greater among participants who complete the inoculation tasks than among those who do not complete these tasks.***

Finally, Study 1 assessed participants' perceptions for how well they believed they could compensate for cell phone distractions while driving as well as their perceptions of how well others could compensate for these distractions. Consistent with previous research (Schlehofer et al., 2010; Schroeder et al., 2013; White et al., 2007), we expected that participants in this study would perceive themselves as being better able than others to compensate for cell phone distractions while driving. ***Hypothesis 4: Participants will perceive themselves as being better***

able than others to compensate for cell phone distractions while driving. Also, because previous research has found reduced risk perceptions and overconfidence in ability to compensate for cell phone distractions to be significantly related to cell phone use while driving, the current research also examined whether perceived ability to compensate for cell phone distractions was related to likelihood of engaging in cell phone use while driving and engaging in cell phone communication with someone who is driving. ***Hypothesis 5: Perceived ability to compensate for cell phone distractions will account for differences in likelihood of engaging in cell phone use while driving and likelihood of engaging in cell phone communication with someone else who is driving?***

Study 2

The purpose of study 2 was to investigate the utility of techniques for reducing temptations or habitual tendencies to answer a call or text message at times when doing so is inconvenient or inappropriate (such as when one is driving). The habitual nature of responding to text messages and cell phone calls may be one reason why people sometimes engage in cell phone use while driving, even if they perceive it as dangerous (Bayer & Campbell, 2012). That is, people may automatically react to a ringing phone without really thinking about why they are reacting or without thinking about the potential consequences of the behavior. The immediate rewards of responding to a call or text message may override any knowledge or beliefs about the negative consequences of engaging in cell phone use at times when it is important for attention to be focused elsewhere. Therefore, simply increasing risk awareness may not be sufficient to change this behavior. Teaching people techniques they can use to resist the temptation or to overcome the habitual tendency to respond to their phone may be an important component to producing behavior change.

Given the success with mindfulness-based strategies (Arch & Craske, 2006; Bowen & Marlatt, 2009; Broderick, 2005; Mrazek et al, 2013; Mrazek et al., 2012) and implementation plans (Achtziger et al., 2008; Gollwitzer, 1993, 1999; Gollwitzer & Sheeran, 2006; Hofmann et al., 2010; Kroese et al., 2011; Mischel & Patterson, 1976; Patterson & Mischel, 1975, 1976) for helping people resist temptations and habitual responses in other contexts, we investigated the potential of these techniques for helping people resist responding to incoming calls or text messages when doing so is inconvenient or inappropriate. We anticipated that on its own, an informational message about why students should not engage in cell phone use in certain situations would not be powerful enough to influence resistance to answer phone calls or text messages at inappropriate or inconvenient times. We expected that compared to only exposing participants to a message about the consequences of cell phone use in certain situations, pairing the message with either a mindfulness-based technique or implementation intentions planning would significantly decrease responses to text messages in a situation (during class) where cell phone use is inappropriate. ***Hypothesis: The mindfulness and implementation intentions training conditions will be more influential than the control conditions.***

To our knowledge, mindfulness-based training and implementation intention planning have not been tested as methods for resisting cell phone use, nor have they been compared to each other as techniques for resisting temptations or habitual responses in other contexts. Therefore, we did not have a specific prediction that one technique would be more effective than the other. ***Research Question 1: Is one training method (mindfulness or implementation intention) more effective than the other at reducing cell phone use at a time when doing so is inappropriate or inconvenient?***

We also wanted to examine whether perceived helpfulness differed between the mindfulness and implementation intentions techniques and whether perceived helpfulness would be related to the behavioral outcome (whether or not participants responded to the experimental text message during their class time). ***Research Question 2: Are the mindfulness and the implementation intentions techniques perceived to differ in how helpful they will be with temptation resistance, and does perceived helpfulness predict differences in behavior?***

Chapter 2 - Study 1

Overview

Design

Study 1 consisted of a 2 (message target: driver/non-driver) X 3 (message orientation: self/others/neutral) X 2 (inoculation: absent/present) between subjects design. One purpose of Study 1 was to compare the effects of messages targeting driving versus non-driving participants (who are not in a vehicle) of cell phone conversations. Another aim of this study was to examine whether a message discouraging cell phone use while driving/with someone who is driving is more effective if it emphasizes how the message reader could be negatively affected by participating in cell phone communication (self-oriented) than if it emphasizes how people other than the reader could be affected (other-oriented). A third goal of this study was to examine the effects of inoculation, or arguing against justifications for engaging in cell phone use while driving/with someone who is driving. Likelihood of engaging in cell phone use while driving (or engaging in a phone conversation with someone who is driving) served as the primary outcome variable. Behavior likelihood was assessed for both voice conversations and text message conversations across the following within-subjects factors: conversation importance (two levels: important/unimportant), conversant environment (two levels: driving/not driving), and conversant position (two levels: answer/initiate). Perceived ability to compensate for cell phone distractions while driving also was assessed.

Hypotheses and Research Questions

Hypothesis 1: Persuasive effects will be greater in the non-driver target message condition than in the driver target message condition.

Research Question: Will self- and other-oriented messages be more persuasive than neutral messages, and will self- and other-oriented messages differ in degree of effectiveness?

Hypothesis 2: In the non-driver target message condition, the other-oriented message will be more influential than the self-oriented message.

Hypothesis 3: Persuasive effects will be greater among participants who complete the inoculation tasks than among those who do not complete these tasks.

Hypothesis 4: Participants will perceive themselves as being better able than others to compensate for cell phone distractions while driving.

Hypothesis 5: Perceived ability to compensate for cell phone distractions will account for differences in likelihood of engaging in cell phone use while driving and likelihood of engaging in cell phone communication with someone else who is driving?

Method

Participants

Participants were recruited from undergraduate psychology courses and earned course credit for their participation. According to national reports, cell phone use while driving occurs among the 16-24 year old age group more than any other age group (National Highway Traffic Safety Administration, 2011), making a college sample ideal for this study. One hundred sixty-nine students participated in Study 1. Two participants did not complete any of the dependent measures, and therefore, their data were not included in analyses. Data from six additional participants were not included because these participants incorrectly responded to both questions in both versions of the manipulation check (one version without a reference to the message and one version with a reference to the message). The final data set used in analyses was collected from 161 students (60% female) with an average age of 20 years (*SD* = 2.766). The majority of

participants identified as Caucasian (77%). The remaining identified as African American (12%), Hispanic (4%), Asian American/Pacific Islander (4%), Native American (2%), or other (1%). Consistent with reports that a high percentage of college students engage in cell phone use while driving on at least some occasions (Atchley et al. 2011, Nelson et al., 2009), 84% of participants in this study reported that they have used a cell phone while driving at some time.

Materials and Measures

Experimental Messages

Constant message. A constant message (presented to all participants) was written to communicate the dangers associated with cell phone use while driving, including talking on handheld and hands-free devices and texting while driving. The message presented statistical information on the number of accidents associated with distracted driving and the likelihood of getting into an accident when using a cell phone while driving. Information presented in the constant message was gathered from published empirical research papers and reports from sources such as the AAA and the National Safety Council. The constant message appears in Appendix A.

Manipulated messages. Six different manipulated messages were written such that each message varied by the two experimental message conditions: message target (driver or non-driver) and message orientation (self, others, or neutral). In all other respects, including length, the manipulated messages were written to be as similar as possible. The manipulated messages appear in Appendix B.

Pretesting. Prior to use in the main study, the constant message and the manipulated messages were evaluated in a pretesting study conducted online using Qualtrics Survey Software. The pretest study had a sample of 78 undergraduate students from general psychology

courses, and this sample was separate from the sample of participants for the main study. Data from 10 pretesting participants were not included in analyses because these participants did not follow instructions. Data from two participants were not included in analyses because these participants completed the study in five minutes or less, which raised concerns about how well these participants attended to instructions and to the messages they evaluated. These data reductions resulted in a final sample size of 66 participants for the pretesting study. As reflected in the degrees of freedom for the message target and message orientation analyses below, some participants did not provide complete data for these items and therefore were not included in analyses for evaluations of the manipulated messages. Pretest message evaluation items appear in Appendix C.

Constant message. Pretest participants evaluated the constant message by responding to two items: "How convincing do you think the message is?" and "How realistic do you think the message is?" Participants responded to these questions using a 7-point Likert scale (1 = *not at all* to 7 = *completely*). The convincing rating (M = 5.121, SD = 1.103) for the constant message was significantly higher than the midpoint of the response scale, $t(65) = 8.261$, $p < .001$, as was the realistic rating (M = 5.379, SD = 1.160), $t(65) = 9.653$, $p < .001$.

Message target manipulation. Pretest participants also evaluated the six versions of the manipulated messages. All six manipulated messages appeared on one page, but the order in which the messages appeared was randomized across participants. Participants were told that the six messages might seem similar but that no two were exactly alike. Following each message, participants evaluated how well the message focused on the intended message target by responding to the following questions: "To what extent do you think the message above focuses on discouraging you from talking on your cell phone while driving" and "To what extent do you

think the message above focuses on discouraging you from having a phone conversation with someone who is driving?" Participants used a 7-point Likert scale (1 = *not at all* to 7 = *completely*) to evaluate each of the six messages on these two items.

Results of the pretesting showed that participants correctly distinguished the message target manipulations (driver and non-driver). Paired samples *t*-tests revealed that ratings of how well a message targeted a driver engaging in cell phone use were significantly higher for the driver target messages ($M = 5.404$, $SD = 1.180$) than for the non-driver target messages ($M = 4.481$, $SD = 1.490$), $t(60) = 3.985$, $p < .001$. Ratings of how well a message targeted a non-driver from engaging in cell phone communication with someone else who is driving were significantly higher for the non-driver target messages ($M = 5.475$, $SD = 1.195$) than for the driver target messages ($M = 4.213$, $SD = 1.601$), $t(60) = 5.050$, $p < .001$.

Additionally, within message target conditions, the driver target messages were rated as focusing more strongly on targeting drivers ($M = 5.404$, $SD = 1.180$) than on targeting non-drivers ($M = 4.213$, $SD = 1.601$), $t(60) = 4.728$, $p < .001$, and the non-driver target message was rated as focusing more strongly on targeting non-drivers ($M = 5.475$, $SD = 1.195$) than on targeting drivers ($M = 4.481$, $SD = 1.490$), $t(60) = 4.001$, $p < .001$.

Finally, the driver ($M = 5.404$, $SD = 1.180$) and non-driver messages ($M = 5.475$, $SD = 1.195$) were rated as targeting the intended audience equally well, $t(60) = -.649$, $p = .519$. In other words, the non-driver target messages were not perceived as targeting non-driver behavior more strongly than the driver messages were perceived as targeting drivers. Mean ratings for how strongly the driver and non-driver target messages focus on driver and non-driver behavior are displayed in Figure 1.

Message orientation manipulation. For each of the six manipulated messages, in addition to evaluating how well each message targeted a driving versus a non-driving participant of a cell phone conversation, participants evaluated the extent to which each message focused on how the reader (self-oriented) could be affected by consequences outlined in the message and how people other than the reader (other-oriented) could be affected by consequences outlined in the message. Participants responded to the following questions: "To what extent do you think the message above focuses on how you could be affected by the consequences described in the message?" and "To what extent do you think the message above focuses on how people other than you could be affected by consequences described in the message?" Participants used a 7-point Likert scale (1 = *not at all* to 7 = *completely*) to evaluate each of the six messages on these two items.

Results of the pretesting showed that the message orientation manipulations (self/others/neutral) were correctly distinguished by study participants. Paired samples *t*-tests revealed that ratings of how well a message emphasized how the message recipient (the self) could be affected by engaging in cell phone communication while driving/with someone who is driving were significantly higher for the self-oriented messages ($M = 5.771$, $SD = 1.128$) than were ratings for both the other-oriented messages ($M = 4.951$, $SD = 1.254$), $t(60) = 4.055$, $p < .001$, and messages that were neutral in terms of who could be affected ($M = 4.533$, $SD = 1.494$), $t(60) = 5.121$, $p < .001$. Other-oriented messages ($M = 4.951$, $SD = 1.251$) were rated as emphasizing risks to the self significantly more strongly than were neutral messages ($M = 4.533$, $SD = 1.494$), $t(60) = 2.421$, $p = .019$. This significant difference between the other-oriented and neutral messages is perhaps explained by the fact that because of the nature of cell phone conversations, it may be impossible to remove from the other-oriented messages any emphasis on how the message reader (the self) could be affected. For example, the driver target/other-

oriented message communicates how causing an accident could negatively impact others (e.g., the losses and burdens others would experience), but a reader can easily infer how he or she would be affected by causing the accident. Still, what is important is that how the reader (self) is affected is made much less explicit in the other-oriented messages than in the self-oriented messages.

Ratings of how well a message emphasized how people other than the message recipient could be affected by engaging in cell phone communication while driving/with someone who is driving were significantly higher for the other-oriented messages (M = 5.812, SD = 1.053) than were ratings for both the self-oriented messages (M = 5.008, SD = 1.156), $t(60) = 4.260$, $p <$ .001, and messages that were neutral in terms of who could be affected (M = 4.557, SD = 1.555), $t(60) = 5.195$, $p < .001$. Self-oriented messages (M = 5.008, SD = 1.156) were rated as emphasizing risks to others significantly more strongly than were neutral messages (M = 4.557, SD = 1.555), $t(60) = 2.491$, $p = .016$. This significant difference between the self-oriented and neutral messages is perhaps explained by the fact that because of the nature of cell phone conversations, it is essentially impossible to remove from the self-oriented messages any emphasis on how other people could be affected by the reader's actions. For example, the driver target/self-oriented message talks about the possibility of the message reader causing an accident and harming or killing others, but the message focuses on how causing an accident and harming others could negatively affect the driver (e.g., the guilt the person would experience, the legal punishments they could face). Although the self-oriented message does emphasize risks to others more strongly than does the neutral message, what is important is that how others could be affected is made much less explicit in the self-oriented messages than in the other-oriented messages.

Evaluations also were examined within each message orientation condition. The self-oriented message was rated as focusing significantly more strongly on risks to the self (M = 5.771, SD = 1.128) than on risks to others (M = 5.001, SD = 1.156), $t(60) = 4.505$, $p < .001$. The other-oriented message was rated as focusing significantly more strongly on risks to others (M = 5.812, SD = 1.053) than on risks to the self (M = 4.951, SD = 1.254), $t(60) = 4.407$, $p < .001$. Neutral messages were rated as focusing equally on risks to the self (M = 4.533, SD = 1.494) and on risks to others (M = 4.557, SD = 1.555), $t(60) = -.239$, $p = .812$.

Finally, the self-oriented messages (M = 5.771, SD = 1.128) and other-oriented messages (M = 5.812, SD = 1.053) were rated as emphasizing the intended risk orientation equally well, $t(60) = -.371$, $p = .712$. In other words, the other-oriented messages were not perceived as emphasizing risk to others more strongly than the self-oriented messages were perceived as emphasizing risk to the self. Mean ratings for how strongly the self-oriented, other-oriented, and neutral messages emphasize risks to the self and risks to others are displayed in Figure 2.

Inoculation Tasks

Description of tasks. Three inoculation tasks were designed to influence participants to think more deeply about the consequences of cell phone use while driving or about having a phone conversation with someone who is driving. Half of the participants were randomly assigned to complete these tasks, and the framing of the tasks matched the message target condition of the message the participant read earlier. Thus, if a participant read a driver target message and was assigned to complete the inoculation tasks, these tasks asked the participant to think about cell phone use while driving. If a participant read the non-driver target message and was assigned to complete the inoculation tasks, these tasks asked the participant to think about engaging in cell phone communication with someone else who is driving. In the first task,

participants were asked to comment on the worst thing that could happen if they engaged in cell phone communication while driving/with someone who is driving and to comment on the worst thing that would happen if they decided to delay these conversations until they/the other person is finished driving. In the second task, participants generated their own arguments against potential justifications for cell phone use while driving (e.g., "I've talked on my phone while driving before and haven't gotten into an accident"). In the third task, participants commented on how cell phone use while driving is inconsistent with their personal values. The inoculation tasks appear in Appendix D.

Pretesting. Included in the pretesting study for the base message and manipulated messages were pretesting items for the inoculation tasks to ensure that these items would be interpreted correctly by participants in the main study. Pretest participants were presented with both sets of the inoculation tasks (one framed to match the driver target message condition and one to match the non-driver target message condition). The sets of inoculation tasks were presented one at a time, and the order in which these scenarios were presented was randomized across participants. Responses to the inoculation tasks in the pretesting study suggested that the items were written clearly and were interpreted as intended.

Manipulation Check

One question was written to assess whether participants correctly identified the message target manipulation (driver/non-driver) of the message they read: "Thinking about the message you just read, which of the following options more strongly describes the focus of the message? A) The message focused mainly on discouraging me from talking on my cell phone while I am driving, or B) The message focused mainly on discouraging me from having a phone conversation with someone else who is driving." Participants responded to a second question to

assess whether they correctly identified the message orientation manipulation (self/others/neutral) of the message they read: "Thinking about the message you just read, which of the following options most strongly describes the focus of the message? A) The message focused primarily on how I could be affected by the consequences described in the message, B) The message focused primarily on how people other than myself could be affected by the consequences described in the message, or C) The message seemed to be vague or neutral about who could be affected. It did not focus strongly on how either I or others could be affected." Three true-false questions about information included in the constant message also were included as fillers to disguise the purpose of the manipulation check questions. The manipulation checks and filler items appear in Appendix E. Participants first responded to these questions without any access to the message. Then they were presented with the two manipulation check questions a second time but were provided a snippet of the manipulated message that they read. We wanted to be sure that any errors with the first set of questions was not a result of participants forgetting what the message said and that participants could correctly identify the manipulations if reminded of them.

Dependent Measures

Likelihood of engaging in cell phone use while driving/with someone who is driving.

Participants responded to a set of 34 items written for this study about cell phone use while driving and cell phone communication with someone else who is driving. Half of the items focused on likelihood of *engaging* in conversations and the other half focused on likelihood of *avoiding* these conversations. Sixteen items that focused on likelihood of engaging in conversations were selected from the questionnaire for inclusion in data analyses. Participants responded to each item using a 7-point Likert scale (1 = *very unlikely* to 7 = *very likely*). Of the

16 items selected for data analyses, eight of these questions focused on cell phone use for voice conversations, four of which focused on cell phone use while driving and four of which focused on cell phone communication with someone else who is driving. Two items asked about answering phone calls for both important and unimportant conversations, and two items asked about initiating phone calls for both important and unimportant conversations: "If I were to receive a phone call while I am driving, I would answer the call and have a conversation if I knew the call was important (unimportant)"; "If I were driving and thought of a phone call I needed to make, I would make the call while I am driving if the call is important (unimportant)". For the items asking about communicating with someone who is driving, two items asked about answering phone calls for both important and unimportant conversations, and two items asked about initiating phone calls for both important and unimportant conversations: "If I were to receive a phone call from someone and then learn they are driving, I would have a conversation with that person if I knew the call was important (unimportant)": "If I were to make a phone call to someone and then learn they are driving, I would have a conversation with that person if the call was important (unimportant)". The remaining eight items focused on text message conversations and mirrored the structure of the eight items about voice conversations in terms of asking about answering and initiating both important and unimportant conversations while driving and with someone else who is driving. See Appendix F for the full questionnaire.

Perceived ability to compensate for cell phone distractions while driving. Participants responded to eight items adapted from Schlehofer et al. (2010) and White et al. (2004) about their perceptions of the ability to compensate for cell phone distractions while driving, ability to multitask, and likelihood of getting into an accident when using a cell phone while driving. Participants responded to each item using a 7-point Likert scale. Four items were selected from

the questionnaire for inclusion in data analyses. Two items asked participants about how well they thought they could compensate for cell phone distractions while driving: "To what extent can you compensate for the distractions of using a cell phone while driving (1 = *not at all*, 7 = *very much*)" and "It is easy for me to tell if my driving is affected by talking or texting on my cell phone (1 = *strongly disagree*, 7 = *strongly agree*)." Responses to these two items were averaged to create a single score for perceived self-ability to compensate for cell phone distractions. Two items asked participants about how well they thought other people could compensate for cell phone distractions while driving: "To what extent do you think the average student at your college can compensate for the distractions of using a cell phone while driving (1 = *not at all*, 7 = *very much*)" and "It is easy for other people to tell if their driving is affected by talking or texting on their cell phone (1 = *strongly disagree*, 7 = *strongly agree*). Responses to these two items were averaged to create a single score for perceived others-ability to compensate for cell phone distractions. The other four items in the questionnaire were not included in data analyses because the items did not assess perceived ability to compensate (i.e., two items about perceived likelihood of getting into an accident) or because there was not a parallel self/other's ability item (e.g., one item about perceived self-ability to multitask, and one item about trusting other's ability to use a cell phone while driving). The full questionnaire appears in Appendix G.

Additional Measures. Participants also reported demographic information (age, gender, year in school, and ethnicity) and reported whether or not they have ever engaged in cell phone use while driving. Items are displayed in Appendix H.

Procedure

Participants completed the entire study online using Qualtrics Survey Software. All participants were first presented with an electronic consent form and were informed that by

continuing on to the study would be accepted as an indication of their consent to participate. Participants began the study by providing demographic information and completing measures for driving frequency and cell phone use frequency. Next, participants were informed that on the next couple of pages, they would read a message about cell phone use while driving and then answer a few questions about the message (manipulation checks). To encourage participants to fully read the message, they were told before reading the message that if they answered all of the questions correctly they would be entered into a drawing for a cash prize. On the next page, participants were presented with the constant message about dangers of cell phone use while driving. On the following page, participants were randomly presented with one of the six manipulated messages. Immediately after reading the manipulated message, participants completed the manipulation checks. Following completion of the manipulation checks, participants completed the inoculation tasks if they were randomly assigned to this condition. Finally, participants completed questionnaires for the dependent measures. Participants not assigned to the inoculation tasks condition completed these measures immediately after completing the manipulation checks. Figure 3 presents a diagram illustrating the procedural order for Study 1.

Results

Behavior Likelihood

Effects on self-reported likelihood of engaging in cell phone use while driving or with someone who is driving were examined with two mixed-factors ANOVAs. One ANOVA was conducted for reported likelihood of engaging in voice conversations and one was conducted for reported likelihood of engaging in text message conversations. In each analysis, the between-subjects factors were message target (two levels: driver/non-driver), message orientation (three

levels: self/others/neutral), and inoculation (two levels: absent/present). The within-subjects factors in each analysis were conversant position (two levels: answer/initiate), importance of conversation (two levels: important/unimportant) and conversant environment (two levels: driving/not driving). These analyses served to examine whether reported likelihood of engaging in the behavior differs when receiving versus initiating communication, between important and unimportant conversations, and when the participant is driving versus not driving. The analyses also served to examine whether the type of persuasive message participants read and whether or not they completed the inoculation tasks influenced their reported likelihood of engaging in cell phone communication while driving or with someone who is driving. Means and standard deviations for self-reported likelihood of engaging in voice conversations are presented in Table 1. Means and standard deviations for self-reported likelihood of engaging in text message conversations are presented in Table 2.

Voice conversation. The ANOVA for engaging in a voice conversation revealed a significant main effect of conversant position, $F(1, 143) = 35.058$, $p < .001$, partial $\eta^2 = .197$. Participants reported being less likely to initiate ($M = 3.510$, $SD = 1.726$) than to answer phone calls ($M = 3.886$, $SD = 1.728$).

The main effect of conversation importance was significant, $F(1, 143) = 168.723$, $p < .001$, partial $\eta^2 = .541$. Participants reported being less likely to engage in a voice conversation if a phone call is unimportant ($M = 3.089$, $SD = 1.710$) than if it is important ($M = 4.307$, $SD = 1.844$). This main effect was qualified by a significant interaction between conversation importance and conversant environment, $F(1, 143) = 19.721$, $p < .001$, partial $\eta^2 = .121$. Pairwise comparisons with Bonferroni correction were used to examine significant interaction effects. As displayed in Figure 4, if a conversation is not important, likelihood of engaging in a voice

conversation does not differ if talking on the phone while driving (M = 3.048, SD = 1.853) versus talking on the phone with someone who is driving (M = 3.129, SD = 1.795), $F(1, 143)$ = .927, p = .337, partial η^2 = .006. However, for important calls, participants report being less likely to talk on the phone with someone who is driving (M = 4.123, SD = 1.937) than to talk on the phone while driving (M = 4.490, SD = 2.047), $F(1, 143) = 9.044$, p = .003, partial η^2 = .059.

For the between-subjects factors, the analysis revealed a significant main effect of inoculation, $F(1, 143) = 4.184$, p = .043, partial η^2 = .028. Participants who completed the inoculation tasks (M = 3.435, SD = 1.602) reported being less likely than those who did not complete these tasks (M = 3.944, SD = 1.726) to engage in a cell phone conversation while driving or with someone who is driving. This main effect was qualified by a significant three-way interaction effect of message target, message orientation, and inoculation, $F(2, 143) = 4.145$, p = .018, partial η^2 = .055. As displayed in Figure 5, if participants read a message emphasizing how having a phone conversation with someone else who is driving could negatively affect people other than themselves (the non-driver/others message), they reported being less likely to engage in a cell phone conversation (as either a driver or non-driver) if they completed the inoculation tasks (M = 3.000, SD = 1.417) than if they did not complete these tasks (M = 4.667, SD = 1.188), $F(1, 143) = 5.745$, p = .018, partial η^2 = .039. No other significant differences emerged within the non-driver target message condition, all p-values > .126. Within the driver target message condition, no mean comparisons were statistically significant, all p-values > .081.

Text message conversation. Unlike the results for voice conversations, a significant effect of conversant position (answer/initiate) was not found for text conversations.

The ANOVA for engaging in a text message conversation revealed a significant main effect of conversation importance, $F(1, 143) = 82.747$, $p < .001$, partial η^2 = .367. Participants

reported being less likely to engage in a text message conversation if the conversation is unimportant (M = 2.292, SD = 1.460) than if it is important (M = 3.037, SD = 1.750). A significant main effect for conversant environment also emerged, $F(1, 143) = 7.633$, $p = .006$, partial $\eta^2 = .051$. Participants reported being less likely to engage in a text message conversation with someone who is driving (M = 2.524, SD = 1.639) than to engage in a text message conversation while driving (M = 2.805, SD = 1.640). Both of these main effects were qualified by a significant interaction between conversation importance and conversant environment, $F(1, 143) = 13.034$, $p < .001$, partial $\eta^2 = .084$.

As displayed in Figure 6, pairwise comparisons with Bonferroni correction revealed that for unimportant text messages, likelihood of engaging in a text conversation does not differ if engaging in a text conversation while driving (M = 2.332, SD = 1.603) versus engaging in a text conversation with someone who is driving (M = 2.252, SD = 1.551), $F(1, 143) = .587$, $p = .445$, partial $\eta^2 = .004$. However, for an important conversation, participants report being less likely to engage in a text message conversation if communicating with someone who is driving (M = 2.797, SD = 1.890) than they are to engage in a text conversation while driving (M = 3.277, SD = 1.932), $F(1, 143) = 13.928$, $p < .001$, partial $\eta^2 = .089$.

The analysis also revealed a marginally significant main effect of inoculation, $F(1, 143 = 3.563$, $p = .061$, partial $\eta^2 = .024$. Participants reported being less likely to engage in a text message conversation if they completed the inoculation tasks (M = 2.429, SD = 1.434) than if they did not complete these tasks (M = 2.891, SD = 1.585). Also, the interaction effect between conversant environment and inoculation was significant, $F(1, 143) = 4.749$, $p = .031$, partial $\eta^2 = .032$. As displayed in Figure 7, pairwise comparisons with Bonferroni correction revealed that compared to participants who did not complete the inoculation tasks (M = 2.848, SD = 1.681),

those who did reported being less likely to engage in a text message conversation with someone who is driving (M = 2.188, SD = 1.535), $F(1, 143) = 6.676$, $p = .011$, partial $\eta^2 = .045$. However, whether participants completed the inoculation tasks (M = 2.671, SD = 1.640) or not (M = 2.934, SD = 1.672) did not significantly influence their likelihood of engaging in a text message conversation while driving, $F(1, 143) = .874$, $p = .351$, partial $\eta^2 = .006$.

The four-way interaction effect of message target, message orientation, inoculation, and message importance was significant, $F(2, 143) = 4.302$, $p = .015$, partial $\eta^2 = .057$. As shown in Figure 8, participants who read the message emphasizing how engaging in cell phone communication with someone else who is driving could negatively affect others (the non-driver/others message) reported being less likely to engage in an important text message conversations (as either a driver or non-driver) if they completed the inoculation tasks (M = 2.017, SD = .984) than if they did not complete these tasks (M = 3.972, SD = 1.684), $F(1, 143) = 7.192$, $p = .008$, partial $\eta^2 = .048$. No other pairwise comparisons for this four-way interaction were statistically significant, all p-values > .106.

There also were two uninterpretable (probably spurious) significant interaction effects. One was a four-way interaction among conversant position, conversation importance, message target, and inoculation, $F(1, 143) = 3.746$, $p = .055$, partial $\eta^2 = .026$, and the other was a five-way interaction among conversant position, conversant environment, message target, message orientation, and inoculation, $F(2, 143) = 4.113$, $p = .018$, partial $\eta^2 = .054$.

Perceived Ability to Compensate

Main analysis. Effects on perceived ability to compensate for cell phone distraction while driving were examined with a mixed-factors ANOVA. The between-subjects factors were message target (two levels: driver/non-driver), message orientation (three levels:

self/others/neutral), and inoculation (two levels: absent/present). The within-subjects factor was perceived ability target (two levels: self/others). This analysis served to examine whether participants perceived differences between themselves and others in ability to compensate for distractions of cell phone use while driving and to examine whether the type of persuasive message participants read and whether or not they completed the inoculation tasks influenced their perceptions about ability to compensate for distractions. The only significant result to emerge from this analysis was a main effect of perceived ability target, $F(1, 152) = 54.835$, $p < .001$, partial $\eta^2 = .265$. Participants believed they ($M = 4.506$, $SD = 1.465$) are better able than others ($M = 3.709$, $SD = 1.287$) to compensate for distractions of cell phone use while driving.

Perceived ability to compensate as a covariate. The two mixed-factors ANOVAs conducted for the voice and text message conversation behavior likelihood variables were conducted again with perceived self-ability to compensate entered as a covariate. When this covariate was included in the analyses, a significant main effect of self-ability to compensate emerged for both voice [$F(1, 141) = 20.367$, $p < .001$, partial $\eta^2 = .126$] and texting conversations [$F(1, 141) = 27.658$, $p < .001$, partial $\eta^2 = .164$]. Also, the previously significant main effect of conversant environment (driving/not driving) for texting behavior and the previously significant interaction between conversation importance and conversant environment that emerged in analyses for both voice and text conversations were no longer significant. These changes in statistical significance suggests that participants' positive perceptions of their ability to compensate for cell phone distractions while driving may be underlying differences in how likely participants are to engage in cell phone conversations (calls or texts) as a driver and how likely they are to engage in cell phone conversations with someone who is driving. In other words, it seems that participants are more likely to engage in cell phone communication while driving than

they are to engage in cell phone communication with someone else who is driving because participants perceive themselves as better able than others to compensate for cell phone distractions.

Summary of Study 1 Results

For both voice conversations and text message conversations, participants reported being less likely to engage in unimportant conversations than in important conversations, but for important conversations, participants reported being less likely to engage in the conversation with someone who is driving than they are to engage in cell phone conversations while driving.

The analyses also revealed a positive influence of the inoculation manipulation. Participants reported being less likely to engage in cell phone communication if they had completed the inoculation tasks than if they had not. However, for voice conversations, the influence of inoculation was significant only for participants who read the message emphasizing how having a phone conversation with someone who is driving could negatively affect others. This same pattern was found for texting behavior but specifically for important conversations. Also for text message conversations, the effect of inoculation was significant only for reported likelihood of non-driving cell phone conversations. That is, inoculation did not significantly influence likelihood of engaging in a text message conversation while driving, but it did decrease the likelihood of engaging in a text message conversation with someone who is driving.

Two major themes emerged from the results of Study 1. Regardless of experimental manipulations, participants reported being more likely to engage in cell phone conversations (call or text), especially important conversations, while driving than they are to engage in conversations with someone else who is driving. The inoculation tasks produced the desired effects for likelihood of texting behavior but only when participants think about communicating

with someone who is driving and not when they think about their behavior as a driver. Relatedly, inoculation interacted with persuasive messages but only with messages that discourage cell phone communication with someone who is driving and that emphasize how the driver and others could be affected by this behavior. A second major theme of Study 1 is that participants perceived themselves as better able than others to compensate for cell phone distractions while driving, and these inflated perceptions may be the reason why participants reported being more likely to engage in cell phone use while driving than to communicate with someone else who is driving. Collectively, these results suggest a challenge with reducing cell phone conversations on the road by targeting driver behavior and that the use of messages and inoculation techniques targeting the behavior of the non-driving conversant of a cell phone conversation may be a more promising approach for reducing cell phone use while driving.

Chapter 3 - Study 2

Overview

While the results of Study 1 suggest an advantage to increasing the scope of anti-distracted driving campaigns by targeting the non-driving participants of cell phone conversations, the results from Study 1 should not be taken to suggest that targeting driver behavior is a lost cause. Rather, approaches other than simply communicating risk may need to be explored. In addition to the tendency for people to be overconfident in their ability to compensate for cell phone distraction while driving, habitual tendencies for cell phone use (Bayer & Campbell, 2012) also help explain why risk information alone may not be sufficient to change cell phone use while people are driving.

The purpose of Study 2 was to address habitual or temptation factors that may influence people to engage in cell phone use while driving even if they believe it to be dangerous. This study was designed to test the prediction that in addition to informing people about the consequences of cell phone use in certain situations, teaching them how to resist the urge to respond to phone calls or text messages at times when it is inappropriate or inconvenient to do so may be critical to changing behavior. Study 2 tested whether brief mindfulness training and implementation intentions planning, which have been shown to be effective with helping people resist other types of distractions and temptations, can be useful techniques for helping people resist responding to their phone. Although cell phone use while driving is of primary interest in this study, participants also were presented with information about the consequences of cell phone use in other contexts (during a class lecture, while doing homework/studying, and when having an important face-to-face conversation) and were asked to think about resisting responding to their phone in these contexts. Ideally, we would want to test the effect of

mindfulness-based acceptance and implementation intentions planning for helping people resist responding to their phones while driving. However, ethical and logistical reasons restricted assessing cell phone use while driving. Instead, behavior was assessed in a classroom setting. Whether or not participants responded to a text message sent by the researchers during the participant's class time served as the primary dependent variable.

Hypothesis and Research Questions

Hypothesis: The mindfulness and implementation intentions training conditions will be more influential than the control conditions.

Research Question 1: Is one training method (mindfulness or implementation intentions) more effective than the other at reducing cell phone use at a time when doing so is inappropriate or inconvenient?

Research Question 2: Are the mindfulness and the implementation intentions techniques perceived to differ in how helpful they will be with temptation resistance, and does perceived helpfulness predict differences in behavior?

Method

Participants

Participants were recruited from general psychology courses and earned course credit for their participation. With the 16-24 year old age group being especially prone to multitasking with digital devices in situations when their attention should be directed elsewhere, such as listening to a class lecture or completing schoolwork (e.g., Rideout, Foehr, Roberts, 2010; Tindell & Bohlander, 2012) and while driving (National Highway Traffic Safety Administration, 2011), college students were the ideal participants for this study. One hundred eighty-one participants (60% female) were recruited for Study 2. The sample had an average age of 20 years (*SD* =

3.470). The majority of participants identified as Caucasian (82%). The remaining participants identified as Hispanic (5%), African American (4%), Asian American/Pacific Islander (3%), Native American (2%), and other (3%). All participants reported possessing a cell phone that was capable of making and receiving calls and text messages. Consistent with reports that a high percentage of college students engage in cell phone use while driving on at least some occasions (Atchley et al. 2011, Nelson et al., 2009), 91% of participants in this study reported that they have used a cell phone while driving at some time.

Materials and Measures

Imagination Tasks

Four scenarios were written for this study that focused on situations in which a person should be attending to something important and should not be using their cell phone. One scenario was used as a practice task to familiarize participants with the process of imagining themselves in these types of situations. In the practice imagination task, participants were given the following instructions: "Please close your eyes and imagine you are studying for a final exam. Your cell phone is in your backpack or purse sitting on the chair next to you, and shortly after you have started studying, you hear your phone vibrating from an incoming call or text message. [At this time, the experimenter triggered a cell phone to vibrate on a table at the front of the room in order to enhance the imaginative experience.] You're feeling tempted to pull out your phone to see who is contacting you, but you have limited time to study, and you currently have a borderline grade in the class you're studying for, so you really need to stay focused on studying so that you can make the most of the time you have available and so that you can do really well on the exam. Still, you're feeling distracted by thoughts about who might be contacting you and why. Please keep your eyes closed a bit longer until I ask you to open them,

and take a moment to imagine yourself in the situation I just described, thinking about any tempting thoughts or feelings you might experience."

The other three scenarios were similar to the practice task but described being interrupted by a phone call or text message during an important face-to-face conversation, while attending a class lecture, and while driving. In each of these scenarios, participants were instructed to think about trying to resist the temptation to respond to their phone and, if applicable, were instructed to think about using the technique they learned (mindfulness-based acceptance or implementation intentions planning) to help them resist this temptation. The full text of all imagination scenarios appears in Appendix I. Others have demonstrated positive effects of participants imagining different situations in which they may be faced with a temptation and thinking about how they would a resist that temptation (e.g., Hofmann et al., 2010).

Message about Cell Phone Distraction

A message was written that presents information about the consequences of talking or texting on a cell phone while concurrently engaging in other tasks that require generous cognitive attention such as while having a face-to-face conversation, listening to a class lecture, completing homework, and driving. Information presented in the message was gathered from statistical reports and published empirical research papers. The message appears in Appendix J.

Intervention Conditions

Mindfulness training. Participants in the mindfulness training condition were told that when their cell phone rings at times when they are engaged in a task or activity that needs their full attention, they should recognize any tempting thoughts or urges to answer the phone, but they should acknowledge these thoughts and feelings in a non-judgmental manner. That is, they should not allow their behavior to be guided by their thoughts and feelings, and they also should

not attempt to actively ignore or push away their thoughts because doing so can actually make it more difficult to eliminate the thoughts. Instead, they should allow thoughts to pass naturally out of awareness, and they might even imagine their thoughts as waves in the ocean or leaves floating down a stream to help remove meaning from the thoughts. Participants were informed that taking this acceptance-based approach has been found to be effective at helping people cope with a variety of urges, temptations, and addictions. The instructions for the mindfulness condition were adapted from other studies that have found positive effects for brief mindfulness and acceptance training for reducing behaviors driven by temptation or other uncomfortable thoughts and feelings (Bowen and Marlatt, 2009; Hayes et al., 1999). As a manipulation check, participants were asked to write down their understanding of the mindfulness technique. Participants were instructed to think about using mindfulness-based acceptance to help them deal with any tempting thoughts or feelings as they completed the imagination tasks.

Implementation intentions planning. Participants assigned to the implementation intentions planning condition were told that research has found people are more likely to resist a temptation that could disrupt a more important task if they have a specific plan for how they will overcome that temptation or how they will deal with a potential distraction. They were informed that these plans can be very simple and are typically phrased as "if-then" statements. In other words, to help pursue a goal or resist a temptation, they would make a plan that if something specific happens, then they will react in a specific way that is consistent with their goal. If there are situations in which they know they should not be distracted by their phone, creating specific, yet simple plans for things they could do or say to themselves to help prevent them from even looking at their phone when receiving calls or text messages would make it easier to resist the temptation to answer and may even help reduce tempting thoughts. Participants were informed

that with repeated practice of their plan, they should not have to think about doing it, and their planned response should become an automatic reaction in these situations.

Participants in the implementation intentions condition were asked to generate their own plan for something they could do or say/think to themselves to resist the temptation to respond to their phone at times when doing so is inappropriate or inconvenient. Participants were presented with the statement, "If I receive a text message or phone call when I am doing something that needs my full attention, I will _____" and they were asked to complete the sentence with their personal plan. Participants recorded their plan in writing both at the bottom of the message about cell phone distraction and on a separate sheet of paper. At the end of the study, the copy of the message with their personal plan was returned to participants. The second copy of their written plan was retained by the experimenter. Participants were instructed to think about using their personal plan to help them deal with any tempting thoughts or feelings as they completed the imagination tasks.

Dependent Measures

Attitude toward the training technique. Two items written for this study asked participants in the mindfulness and implementation intentions conditions how helpful they thought the training technique would be: "The training technique I learned today will be helpful with overcoming the temptation to answer phone calls and text messages when I should be focusing on something else (e.g., driving, listening to a class lecture, completing schoolwork/studying for an exam, having a face-to-face conversation)" and "The training technique I learned today will be helpful with not being distracted by receiving phone calls and text messages on my cell phone and staying focused on tasks or activities that need my full attention." Participants responded to these two items using a 7-point Likert scale (1 = *strongly*

disagree, 7 = *strongly agree*). A third item asked participants how likely they would be to try using the technique they learned: "If I receive phone calls or text messages when I am doing something that needs my full attention, I will try using the technique I learned today to help me not be distracted by my phone ringing and staying focused on tasks or activities that need my full attention." Participants responded to this item using a 7-point Likert scale (1 = *very unlikely*, 7 = *very likely*). The items appear in Appendix K.

Cover story measures. Two questionnaires were created for the lab portion of this study to conceal our interest in assessing the influence of study manipulations on participants' cell phone use behavior after their participation in the lab session. In one questionnaire (Appendix L), participants responded to questions about their perceived risks of and attitudes toward cell phone use in specific contexts (e.g., while studying, during a face-to-face conversation, during a class lecture, while driving). Participants indicated how strongly they agreed with statements using a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). In the second questionnaire (Appendix M) participants responded to questions assessing their perceived ability to resist answering text messages and phone calls in specific contexts (e.g., while studying, during a face-to-face conversation, during a class lecture, while driving). Participants responded to statements using a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*).

Additional measures. Participants reported demographic information (age, gender, year in school, and ethnicity), the instructor of their general psychology course, and indicated whether or not they had ever used a cell phone while driving (Appendix N). Participants also provided their cell phone number and service provider (see Appendix O), which were needed for sending text messages to participants in the days following their participation in the lab portion of the study (described below).

Behavioral measure. To assess effects of exposure to the informational message and the effects of the mindfulness-based acceptance and implementation intentions planning techniques, a text message was sent from the experimenters to participants during their general psychology class session two days after their participation in the lab portion of the study asking participants if they would like to complete a short survey for additional research credit. Whether or not participants responded to the text message during their class time served as the primary dependent measure. It was possible that some students did not attend class when the text message was sent to them, but we anticipated most students would be in class at that time. Also, because participants were randomly assigned to conditions, absences from class should not have varied systematically with experimental condition.

Procedure

Lab Session

Assignment to conditions. The procedural order within each experimental condition is displayed in Figure 9. The study began in a lab setting with up to eight students participating in each session. Experimental conditions varied across sessions, such that all participants within one study session were exposed to one of the four experimental manipulations (mindfulness-based acceptance, implementation intentions planning, control, or message-only control). Participants were sampled from three large general psychology classes (about 200 students in each class). Students from each of the three classes had an equal chance of being assigned to each of the four experimental conditions. That is, within each of the three class sections, each of the four experimental conditions was equally represented. Lab sessions for each of the experimental conditions were held on Mondays, Tuesdays, and Wednesdays and at a variety of times throughout the day. Lab sessions were not held on Thursdays and Fridays because, as will

be described below, text messages were sent to participants on the two days following their participation in the lab session, and we did not want text messages to be sent to participants over the weekend. Also, the three class sections from which participants were sampled all took place in the same classroom.

Opening instructions. At the beginning of the session, participants were provided with a consent form that outlined the purposes of the research and any risks and benefits involved. After providing their consent to participate in the study, participants provided demographic information (Appendix N). Next, participants were told by the experimenter that the study focused on situations in which it is inappropriate or inconvenient to be texting or talking on a cell phone, and that even if they receive phone calls or text messages when they are doing something important or when they know their attention should be focused on something else, it may be very difficult to resist the temptation or to overcome the habitual tendency to respond to their phone. Participants were told that the purpose of the study was to inform people why it is important to not let habit or temptation get the best of them in these situations.

Practice imagination task. Next, with the exception of participants in the message-only control condition, participants were told that a little later in the study they would imagine themselves in situations in which it is inappropriate or inconvenient to answer a call or text message or to even look at their phone to see who is contacting them. At this time, participants completed the practice imagination task (studying scenario; see Appendix I) to familiarize them with the imagination process and with a situation in which they might be tempted to respond to their phone but should be focusing on something more important. Participants were informed that as they completed this task they would hear a cell phone vibrating to help them imagine themselves in the situation. They were told that they would hear the phone ringing several times

and that they should not think of it as someone repeatedly contacting them but as someone calling or texting them just once. The repeated sound was just meant to help participants imagine themselves in the situation.

Presentation of cell phone distraction message. After completing the practice imagination task, participants were told that resisting the temptation to respond to phone calls or text messages or to even resist taking out their phone to see who is contacting them in the situation just described may be relatively easy if they are very motivated to do well on the exam and thus, stay focused on studying. However, there are other situations in which it may be more difficult to resist the temptation because they may believe the consequences are much less severe or non-existent, and the experimenter wanted to discuss some of those situations. At this time, participants were presented with a copy of the message about cell phone distraction (Appendix J) so that they could follow along as the experimenter read the message aloud.

Temptation resistance training and imagination tasks. Next, with the exception of participants in the message-only control condition, participants were told that they would complete a few more imagination tasks so that they could think about resisting the temptation to respond to their phone in these types of situations, now that perhaps they were more aware of why it would be beneficial to not be distracted by their cell phone in a situation like the one they imagined earlier. At this time, participants in the control condition completed the three remaining imagination tasks. Participants in the mindfulness and implementation intentions conditions were told that the experimenter would like to teach them a technique that should make it easier to cope with the cell phone distraction, and that they should think about using the technique as they completed the remaining imagination tasks. At this time, participants in the mindfulness and

implementation intentions conditions were given instructions for how to use their respective training condition and then completed the three remaining imagination tasks (Appendix I).

Dependent measures. After completing the remaining imagination tasks, participants completed the questionnaire assessing attitudes toward the training technique (in the mindfulness and implementation intention planning conditions; Appendix K) and completed the cover story measures (perceived risks and attitudes toward cell phone use, Appendix L; and ability to resist cell phone temptation, Appendix M). Participants in the message-only control condition were only presented with the message about consequences of cell phone use in certain situations; these participants did not complete the imagination tasks and completed dependent measures immediately after being presented with the message about cell phone distractions. Inclusion of the message-only control condition allowed for examination of whether simply imagining oneself trying to resist responding to cell phone calls or text messages without any special instruction for how to resist the temptation (i.e., the control condition) would be beneficial beyond only being given information about why it is important to resist this temptation.

Instructions for follow-up text messages. Next, all participants were told that the researchers conducting the study were interested in the negative effects of technology, like the distraction of cell phones as was being examined in this study, but that our research lab also is interested in examining technology as a tool for communicating with research participants. Participants were told that within the next few days the researchers would like to send them a couple of text messages. The first message would be a reminder about what they learned in the current study. The second text message would be an invitation to complete a brief online survey for an additional research credit. It was anticipated that at the time of receiving the text message, some students would not care to complete the follow-up survey and would not respond to the text

message. In order to motivate students to respond to the text message, they were asked to respond to the text message even if they did not wish to complete the follow-up survey so that we would be sure they received the message and that anyone who wanted to complete the follow-up survey would have the opportunity to do so. They also were told that they would need to respond to the message so that the experimenter would know how much research credit to grant them. If participants replied to the text message indicating that they did not want to complete the follow-up survey, then at that time they would be given research credit only for the lab portion of the study. Participants were informed that they would not be penalized if they chose not to complete the follow-up survey. At this time, participants were asked to provide their cell phone number and service provider (Appendix O) so that we could send the text messages, and they were informed that their cell phone information would be kept confidential by experimenters and would be used only for the purpose of our research.

Distribution of cell phone distraction message. At the end of the session, all participants were given a paper copy of the anti-cell phone use message to take with them and were encouraged to post it in a place where they would see it daily to help remind them why they should try to not allow their cell phones to disrupt important activities and commitments in their lives. In the mindfulness condition, at the bottom of the sheet with the informational message was a description of the technique participants learned. In the implementation intentions condition participants were given back the copy of the message on which they recorded their personal plan. Participants in both training conditions were told that the technique they learned would not completely eliminate the temptation to use their phone in situations like those discussed in the study, but the more they practice it in their daily lives, the easier it should become to resist the temptation.

Text Messages

Reminder message. One day after participating in the lab session, participants were sent a text message reminding them about what they learned in the lab session. Participants in both control conditions were told, "Cell phone distraction can have negative consequences in your daily life. Sometimes it's important to resist using your phone." Participants in the mindfulness condition received a message that read, "Cell phone distraction can have negative consequences in your daily life. Try using mindfulness-based acceptance to resist using your cell phone." The reminder message sent to participants in the implementation intentions planning condition read, "Cell phone distraction can have negative consequences in your daily life. Try using the plan you made to resist using your cell phone."

Behavioral assessment message. Two days after participating in the lab session, the following text message was sent to participants during their general psychology class meeting time: "Interested in completing a short survey for research credit? Reply Y or N. First 20 to respond (Y or N) have a chance to win $20." We anticipated that some students would read the text message but not respond immediately, which would make it impossible to distinguish between students who waited until their class session had ended to both read and respond to the message and those who read the message in class but responded after class. It was important to distinguish between these two groups because we considered reading a text message during class time to be a form of giving in to temptation to react to one's phone at an inappropriate time, even if waiting until after class to respond. In order to motivate participants to respond immediately upon reading the message, the text message indicated that students would have a chance to earn a cash prize if they responded quickly. Approval for sending text messages to students during class time was obtained from all instructors of courses in which participants were recruited. Text messages were not sent on days which exams were being given.

Results

Response Rate and Data Reduction

Because they never responded to the experimental text message sent to them during their class time, data from 16 participants were not included in data analyses. Of the 160 participants who did send a response to the text message, data from 22 were not included in analyses. For 10 participants, the experimental text message was mistakenly sent to the participants too early or too late relative to the participant's class time. Twelve participants responded to the experimental text message, but their data were not included in analyses because they took an especially long time to respond to the text message (three hours or more). Finally, data from three participants in the mindfulness training condition were not included in analyses because the manipulation check indicated that these participants did not understand how to use mindfulness-based acceptance.

Perceived Helpfulness of Temptation Resistance Techniques and Likelihood of Use

Participants in the mindfulness and implementation intentions conditions were asked to respond to three items about the technique they learned using a seven-point Likert response scale: 1) the technique they learned would be helpful with overcoming the *temptation to respond* to their phone at times when they need to be focusing on something more important (1 = *strongly disagree* to 7 = *strongly agree*), 2) the technique they learned would be helpful with *reducing distraction* if they receive calls or text messages at times when they need to be focusing on something more important (1 = *strongly disagree* to 7 = *strongly agree*), and 3) how likely they would be to *try using* the technique in their daily lives (1 = *very unlikely* to 7 = *very likely*). Three *t*-tests were conducted (one for each of the items described above) to examine whether perceived helpfulness and likelihood of using the technique differed between the mindfulness and implementation intentions conditions. Means and standard deviations appear in Table 3.

Helpfulness with reducing temptation. Both the implementation intentions technique (M = 5.553, SD = .978) and the mindfulness technique (M = 4.967, SD = 1.129) were perceived to be at least moderately helpful with reducing the temptation to respond to cell phone calls and text messages at times when it is inappropriate. However, the implementation intentions technique was perceived to be more helpful than the mindfulness technique, $t(66) = -2.291$, $p = .025$.

Helpfulness with reducing distraction. Both the implementation intentions technique (M = 5.158, SD = 1.175) and the mindfulness technique (M = 4.667, SD = 1.295) were perceived to be at least moderately helpful with reducing distraction from cell phone calls and text messages. The t-test revealed that perceived helpfulness with reducing distraction did not differ statistically between the two conditions, $t(66) = -1.636$, $p = .107$.

Likelihood of using the technique. In both the implementation intentions condition (M = 5.816, SD = 1.087) and the mindfulness condition (M = 5.400, SD = 1.380) participants reported being at least moderately likely to try using the technique they learned in their daily lives. Reported likelihood of trying to use the technique did not differ statistically between the two conditions, $t(66) = -1.391$, $p = .169$.

Logistic regression predicting actual behavior. A logistic regression analysis was conducted to predict whether or not participants responded to the text message during class with the following three variables as predictors: 1) perceived helpfulness of the technique with reducing temptation, 2) perceived helpfulness of the technique with reducing distraction, and 3) reported likelihood of using the technique. As shown in Table 4, none of these variables significantly predicted actual behavior, for all Wald χ^2, $p > .105$.

Behavioral Outcome

Primary Analysis

Whether or not participants responded to a text message sent to them by the researchers during the students' class time was the primary outcome variable of interest in Study 2. Table 5 shows the percentage of participants in each experimental condition who responded to the text message during their class period. One striking finding was that while we expected class time texting behavior to be somewhat high, the behavior was more common than expected. The highest rate of in-class texting occurred in the message-only control condition, with 91% of participants in this condition responding to the text message during their class time. While class time texting behavior was still higher than expected in the mindfulness condition (70%), there was a 21% reduction of text messages in the mindfulness condition compared to the message-only control condition. The percentage of text message responses sent during class in the implementation intentions condition (82%) and the control condition (80%) fell between response rates for the mindfulness and message-only control conditions.

A logistic regression analysis was conducted to examine whether responding to a text message during class is statistically less likely among participants who were taught a temptation resistance technique (mindfulness-based acceptance or implementation intentions planning) than among participants who were assigned to the control condition (with imagination tasks) or to the message-only control condition (no imagination tasks). Condition was entered as a binary predictor in the regression analysis, and three dummy variables were created with the mindfulness condition serving as the comparison. A test of the full model with the predictor variable against a constant-only model was not statistically significant, Wald χ^2 (3) = 4.390, p = .222. The model with variables included did not improve classification compared to the null model (81% correctly classified by both models). However, the unique comparisons of the dummy variables are of most interest for the hypothesis and research questions. Table 6 shows

regression coefficients (*B*) and their standard errors, Wald statistics, odds ratios [Exp(*B*)], and 95% confidence intervals for odds ratios. According to the Wald criterion, only the coefficient for the specific comparison of the mindfulness condition with the message-only control was statistically significant, Wald χ^2 (1) = 3.837, p = .050, Exp(*B*) = 4.143. The odds ratio for this coefficient indicates that the odds of responding to the text message during class are over four times greater for participants in the message-only control condition than for participants in the mindfulness condition. The non-significant Wald statistics for the inoculation intentions and the control conditions indicate that for neither of these conditions do the odds of responding to the text message during class differ significantly from the odds of responding during class in the mindfulness condition. As shown in Table 7, none of the Wald statistics are significant for comparisons with the implementation intentions condition, and as shown in Table 8, none of the Wald statistics are significant for comparisons with the control condition.

Summary of Study 2 Results

One surprising finding of this study was the higher than expected percentage of text message responses sent during participant class time in all experimental conditions (as high as 91% in the message-only control condition). It was predicted that participants assigned to one of the temptation resistance training conditions (mindfulness or implementation intentions) would be less likely to respond to a text message while attending a college class than would participants assigned to a control condition. Overall, responses to text messages during class were less likely from participants in the training conditions than they were from students who were assigned to a control condition. However, only the mindfulness-based acceptance condition and the message-only control condition differed significantly in odds of responding to the text message during class time. Compared to participants who only received a message about the consequences of

cell phone distraction, the rate of responding to a text message during class was 21% lower among participants who received mindfulness training in addition to the message about consequences of cell phone distraction. Also, the implementation intentions technique was found to be no more effective than either of the control conditions.

In both the mindfulness and implementation intentions training conditions, participants perceived the training technique to be at least moderately helpful (means close to 5 on a seven-point scale) with reducing temptation to respond to calls or text messages, but perceived helpfulness was statistically greater for the implementation intentions condition than it was for the mindfulness condition. However, perceptions of helpfulness did not seem to influence actual behavior because class-time response rates did not differ between the mindfulness and implementation intentions conditions. Also, independent of experimental conditions, perceptions of how helpful the technique would be with reducing temptation to respond to calls or text messages did not significantly predict texting behavior. In both the mindfulness and the implementation intentions conditions, participants perceived the training technique to be at least moderately helpful (means close to 5.5 on a 7 point scale) with reducing distraction caused by their cell phone, and they reported being at least moderately likely to try using the technique in their daily lives (means close to 5.5 on a 7 point scale). Both perceived helpfulness of reducing distraction and reported likelihood of using the technique did not differ between mindfulness and implementation intentions conditions, and neither helpfulness with distraction nor anticipated likelihood of use significantly predicted texting behavior in class.

The results of this study suggest that simply informing people why they should resist the temptation to respond to their phone at times when doing so is inappropriate or inconvenient is not an effective approach to change behavior. The data from this study demonstrate a benefit of

teaching people to use the simple cognitive-behavioral technique of mindfulness-based acceptance to help them resist the temptation to respond to their phone at times when doing so is inappropriate. Although the implementation intentions training was perceived to be significantly more helpful with reducing temptation than was the mindfulness training, the behavioral data suggest the mindfulness training is actually the more effective of the two techniques. Thus, the data also suggest that perceptions of how well a temptation resistance technique will work are not a good predictor of actual effectiveness.

Chapter 4 - General Discussion

The current research investigated methods for improving persuasive messages and testing temptation resistance techniques for discouraging cell phone use while driving. The following section will review why cell phone use while driving is problematic and potential limitations with the most common strategies for discouraging this behavior. Then, the major purposes and methodologies of the current studies will be summarized, and major findings will be discussed. Finally, limitations, implications, and applications of the current research as well as directions for future research will be discussed.

Review of the Issue

In today's world of essentially non-stop access to technology, cell phone use while driving is a growing concern for driving safety. Cell phone use while driving is associated with over a million vehicular accidents, tens of thousands of injuries, and hundreds of deaths each year (National Highway Traffic Safety Administration, 2008, 2013b). The cognitive deficits that result from texting and cell phone conversations (even when using a hands-free device) have been well demonstrated by cognitive psychologists and has been shown to be just as dangerous as drunk driving (Strayer & Drews, 2007; Strayer et al., 2006; Strayer et al., 2003; Strayer & Johnston, 2001). Many states have enacted laws banning at least some forms of cell phone use while driving (National Highway Traffic Safety Administration, 2013a), and government agencies and cell phone companies have developed campaigns to increase awareness of the consequences of cell phone use while driving (It Can Wait, 2013). Unfortunately, even though the general public perceives cell phone use, especially texting, while driving to be dangerous (AAA Foundation for Traffic Safety, 2013a; Atchley et al., 2011), only slight reductions in this behavior have been observed in recent years (Schroeder et al., 2013). In the current research,

89% of participants across both studies reported that they had engaged in cell phone use while driving at some time, which is consistent with other reports of three quarters or more of college student samples reporting that they engage in some type of cell phone use while driving at least some of the time (Atchley et al. 2011, Nelson et al., 2009). Clearly, there is a great need to continue investigating effective strategies for discouraging this risky behavior.

A review of the literature on person and social factors associated with cell phone use while driving indicated some likely explanations for why existing risk communication campaigns do not appear to be reducing this problem. One factor that appears to play an important role is comparative optimism, or overconfidence in one's ability to use a cell phone while driving, which has been found to be a significant predictor of self-reported frequency of cell phone use while driving (Schlehofer et al., 2010). People who are overconfident in the ability to compensate for cell phone distractions while driving may see themselves as an exception to risk and are unlikely to be influenced by risk communication. Thus, the current research examined the potential of messaging designed to reduce on-the-road cell phone communication by targeting the behavior of non-driving participants of cell phone conversations. Habitual texting tendencies also have been found to predict cell phone use while driving and have been suggested as a possible explanation for people engaging in cell phone use while driving even if they are aware of the potential consequences (Bayer & Campbell, 2012). A second major purpose of the current research was to test techniques for helping people resist the temptation to respond to calls and text messages at times when using their cell phone is inappropriate or inconvenient.

Review of the Current Studies and Major Findings

Study 1

Study Purposes

One purpose of the current research was to address the limitations associated with targeting drivers in anti-distracted driving campaigns by investigating the potential of messages that target non-driving participants of cell phone conversations. Study 1 was designed to compare messages that target driver behavior to messages that target the behavior of the non-driving conversant of cell phone conversations and to explore differences in messages that emphasize consequences to the self versus consequences to others. Because there is a tendency to perceive others as less able than oneself to safely have phone conversations while driving (Schlehofer et al., 2010), we predicted people would be more strongly persuaded by a message encouraging them to avoid cell phone communication with someone who is driving than by a message discouraging them from having conversations while driving. Also, some research has shown that perceived risk to others but not perceived risk to the self predicts support for regulation of cell phone use while driving (White et al., 2007), and research in other contexts has demonstrated an advantage of messaging that emphasizes risks to others, rather than risks to the self, especially with behaviors for which the message recipient perceives him or herself as immune to the risk (Grant & Hofmann, 2011). Thus, we also predicted that a message discouraging cell phone use while driving/with someone who is driving would be more influential if it emphasized how others could be affected (other-oriented) than if it emphasized how the message reader could be affected (self-oriented).

Another purpose of Study 1 was to test the use of inoculation (McGuire, 1961) as a strategy for discouraging cell phone use while driving. Consistent with the tendency for people

to overestimate their ability to compensate for cell phone distraction while driving, we suspected it is not uncommon for people, especially young adults, to make or be exposed to justifications for engaging in cell phone use while driving (e.g., "I focus really hard on the car in front of me, and I have no problems driving safely"). We predicted that participants who were inoculated against these justifications by making counter-arguments would express fewer intentions for engaging in cell phone use while driving than would participants who were not inoculated.

Method Summary

In Study 1, participants read a persuasive message about the consequences of cell phone use while driving. The first part of the message was constant across all participants and presented statistical information about the consequences of cell phone use while driving (Appendix A). The second half of the message varied by two between-subjects factors: message target (two levels: driver/non-driver) and message orientation (three levels: self/others/neutral). Thus, the manipulated portion of the message focused on behavior of either a driving participant or a non-driving participant of a cell phone conversation and emphasized how the behavior could negatively affect the reader (self-oriented) or other individuals (other-oriented), or the message was neutral in terms of who could be affected (Appendix B). After participants read the message about consequences of cell phone use while driving, half of participants were randomly assigned to complete a set of inoculation tasks (Appendix D). The outcome variable was self-reported likelihood of engaging in cell phone use while driving and was examined across three within-subjects factors: conversant position (two levels: answer/initiate), conversant environment (two levels: driving/not driving), and conversation importance (two levels: important/unimportant). Likelihood of engaging in cell phone communication was examined across these within-subjects factors for both voice conversations and text message conversations.

Major Findings

One primary finding of Study 1 was that independent of experimental manipulations, participants reported being more likely to engage in voice or text message cell phone conversations, especially important conversations, while they are driving than they are to have conversations with someone else who is driving. Also, consistent with previous research (Schlehofer et al., 2010), our participants perceived themselves to be significantly better able than others to compensate for cell phone distractions while driving. When self-perceived ability to compensate for distraction was entered as a covariate in the main analyses, differences in likelihood of engaging in cell phone conversations as a driver versus as a non-driver became non-significant. These results are consistent with previous research illustrating overconfidence as a significant predictor of cell phone use while driving (Schlehofer et al., 2010).

The results from Study 1 indicate a challenge with changing driver behavior and suggest an advantage of targeting non-driver behavior. The need for targeting non-driving participants of cell phone communication is supported by other research that has shown that people report being more likely to respond to than to initiate cell phone communication while driving (Atchley et al., 2011; Schroeder et al., 2013) and that upon answering a call, people are more likely to carry-out the conversation than to indicate that they will return the call at a later time (Schroeder et al., 2013). We also found a greater likelihood of answering than initiating communication, but only for voice conversations, not for text message conversations. It has been suggested that drivers may perceive less choice about whether or not to engage in a cell phone conversation when being contacted than when initiating communication (Atchley et al., 2011). In other words, drivers may experience social pressure to respond to incoming calls or text messages. One way to reduce this social pressure is to persuade the non-driving participants of cell phone conversations to avoid calling or texting others who they know to be driving or to quickly end the conversation if they

learn the other person is driving. The results of the current research suggest that people generally are likely to avoid cell phone communication with people who are driving. Campaigns that explicitly remind people why they should not text or talk on the phone with people who are driving may help reinforce these intentions.

Campaigns aiming to reduce cell phone use while driving have communicated how drivers can be harmed by their own cell phone use while driving and they have emphasized how other drivers, pedestrians, and family and friends of the driver can be harmed (e.g., the "It Can Wait" campaign), but whether people are more strongly persuaded by self-oriented versus other-oriented communication to inhibit cell phone use while driving has not be empirically examined. In the current research, we found only a few significant effects of the message target (driver/non-driver) and message orientation (self/other/neutral) message manipulations. However, the significant effects that did emerge support the use of messages that target the behavior of non-driving conversation participants and that emphasize how other people can be harmed by engaging in cell phone communication with someone who is driving. The advantage of emphasizing risks to others is consistent with other research that has shown an advantage of emphasizing risks to others, rather than risks to the self, to influence behavior for which the message recipient is overconfident in his or her ability to avoid risk (Grant & Hofmann, 2011).

As predicted, participants reported being less likely to engage in cell phone communication (either while driving or with someone who is driving) if they completed the inoculation tasks than if they did not. However, for texting behavior, the effect of inoculation was significant only for reported likelihood of having a text message conversation with someone else who is driving. Inoculation had no influence on reported likelihood of engaging in a text message conversation while driving. For voice conversations, inoculation interacted with the

non-driver/other-oriented message, such that within this message condition, likelihood of engaging in cell phone communication (collapsing across driving and not driving environments) was significantly lower among participants who completed the inoculation tasks than among those who did not. This same pattern was found for texting behavior but specifically for important conversations. These results suggest that the use of inoculation techniques may not be worthwhile in campaigns aiming to change driver behavior, but they may be useful in efforts to encourage people to avoid cell phone communication with others who are driving.

Study 2

Study Purposes

A second major purpose of the current research was to test two techniques, mindfulness-based acceptance and implementation intentions, as methods for helping people overcome the temptation or habitual tendency to respond to phone calls and text messages at times when doing so is inappropriate or inconvenient. Mindfulness-based techniques (Baer et al., 2006; Bowen & Marlatt, 2009) and implementation intentions planning (Achtziger et al., 2008; Gollwitzer & Brandstatter, 1997; Hofmann et al., 2010; Kroese et al., 2011; Mischel & Patterson, 1976; Patterson & Mischel, 1975, 1976) have been found to be effective at helping people overcome other types of temptations or habitual tendencies that are counterintentional (i.e., counterproductive to personal goals or contradict personal values). Trait mindfulness has been found to be negatively related to counterintentional habits (Chatzisarantis & Hagger, 2007) and specifically has been found to be negatively related to self-reported frequency of texting while driving (Feldman et al., 2011). However, mindfulness-based techniques and implementation intentions planning have not been tested as strategies to help people reduce counterintentional cell phone use habits. It was predicted that participants would be more likely to resist using their

cell phone at times when doing so is inappropriate or inconvenient if they learned to use a mindfulness-based acceptance or implementation intentions technique than if they were only exposed to a message about the consequences of cell phone distraction.

Method Summary

In a lab setting, all participants were presented with a message about the consequences of cell phone distraction in various situations (face-to-face conversation, in learning contexts, and while driving). Additionally, half of participants were taught how to use either mindfulness-based acceptance or implementation intentions planning to help them resist the temptation to respond to calls or text messages at times when doing so is inappropriate or inconvenient, and they were guided through imagination tasks to imagine using the technique in scenarios they read about in the message. The other half of participants were assigned to either a control condition, in which they received the message about consequences of cell phone distraction and completed the imagination tasks but were not instructed to imagine using a specific technique to resist the temptation; or they were assigned to a message-only control condition, in which participants received the message about consequences of cell phone distraction but did not learn a temptation resistance technique and did not complete the imagination tasks. One day after participation in the lab session, participants received a text message reminding them that sometimes it is important to resist using their phone, and if applicable, they were reminded to try using the temptation resistance technique they learned the day prior. On the next day (two days after the lab session) during their general psychology class time, participants received a text message asking if they would like to complete an online survey for additional research credit. Whether or not participants responded to the text message during their class time served as the primary dependent variable.

Major Findings

It was expected that in-class texting behavior would be somewhat common, especially among participants assigned to one of the control conditions, but it was surprising to see how common this behavior was across all conditions. Rates of responding to the experimental text message during class time was as high as 91% in the message-only control condition, and the lowest rate of responses sent during class occurred in the mindfulness condition (70%). The difference in odds of responding between the mindfulness and message-only control conditions was the only significant difference found among experimental conditions, which partially supported the prediction that the temptation resistance conditions would be more effective than the control conditions. The in-class response rate was nearly identical for the implementation intentions condition (82%) and the control condition (80%), both of which were lower (though not statistically) than the in-class response rate for the message-only control condition (91%). These trends suggest a possible benefit of generating a plan for resisting the temptation to use one's phone and imagining oneself trying to resist cell phone use when doing so is inappropriate. It is possible that the effects of the implementation intentions training and the imagination with no training were simply too small to reach significance. Thus, the results of Study 1 suggest that the combination of a message about the consequences of cell phone distraction, mindfulness-based acceptance training, and imagining using the training seems to be the most promising approach of those tested in the current study for helping people resist using their phone at times when doing so is inappropriate or inconvenient. These results also are supportive of further investigation of using implementation intentions for reducing habitual cell phone use.

As a secondary focus of Study 2, perceived helpfulness of the mindfulness and implementation intentions techniques was assessed. Both techniques were perceived as at least moderately helpful (means close to 5 on a seven-point scale) with reducing the temptation to

respond to phone calls or text messages when doing so is inappropriate, but the implementation intentions technique was perceived as significantly more helpful. Both techniques also were rated as moderately helpful (means close to 5 on a seven-point scale) with reducing cell phone distraction, and for both techniques participants reported being at least moderately likely (means close to 5 on a seven-point scale) to try using the technique in their daily lives. Perceived helpfulness with reducing temptation, perceived helpfulness with reducing distraction, and likelihood of using the technique did not significantly predict in-class texting behavior. These results suggest that people cannot necessarily predict how well the technique will work.

Limitations

Uncertainty about Class Attendance

In Study 2, we did not know for sure whether participants were actually attending class when the experimental text message was sent to them. However, we expected that most students attend class most of the time, and because participants were randomly assigned to conditions, class absences should not have varied systematically across experimental conditions. Also, cell phone use behavior was assessed during class time because this provided a timeframe during which we could be highly confident about where our participants were and what they were doing, and it was a time during which they should not be using their phone. In addition to ethical reasons for not assessing cell phone use while driving, it would be impossible to know when our participants were driving, and many of them may not drive very often if they live on or within walking distance of campus.

Lack of Knowledge about Long-Term Outcomes

In Study 2 behavior was assessed only a couple of days after participants learned the temptation resistance technique. Without additional practice sessions or reminders, it is possible

that many participants did not continue using the technique in their daily lives. Still, the study demonstrated that this technique can work at least in the short term. Additional reminders to use the technique or brief follow-up practice sessions may be needed to produce longer-lasting effects.

Inability to Directly Assess Cell Phone Use While Driving

Although the primary focus of the current research was to examine methods for discouraging cell phone use while driving, we could not draw conclusions specifically about how the messages and temptation resistance techniques would influence actual cell phone use while driving because for logistical and ethical reasons, we could not make behavioral assessments of participant cell phone use while driving. However, Study 1 did produce results that provide guidance for modifying anti-distracted driving campaigns to include a focus on the behavior of non-driving conversants. Also, participants were asked how likely they would be to engage in cell phone use while driving or with someone who is driving, which could be likened to behavioral intentions, and behavioral intention has been shown to be a good predictor of actual behavior (Ajzen & Fishbein, 1980).

Although cell phone use while driving was not assessed directly in Study 2, the study demonstrated that mindfulness-based acceptance can be an effective technique for resisting temptation to respond to incoming calls or text messages in situations where cell phone use is inappropriate or inconvenient. Based on oral feedback collected in the lab sessions, participants tended to report that resisting answering their phone would be more difficult when in class than while driving. The potential life-threatening consequences of cell phone use while driving versus the less serious consequences of in-class cell phone use was commonly reported as a reason for being more likely to resist cell phone use while driving than while in class. Thus, if we were able

to find an effect of mindfulness training in a context that is especially difficult to resist the temptation to answer text messages (during class), we expect this technique could be especially helpful in a driving context, for which people seem to be more motivated to not use their phone but may need some guidance with how to overcome temptation or habitual tendencies.

Implications and Applications

Targeting Non-Driving Conversants and In-Vehicle Passengers

The results from Study 1 suggest that limitations may exist with aiming to reduce cell phone use while driving by primarily targeting driver behavior with risk information. The results of Study 1 also indicate that targeting the non-driving participant of cell phone conversations may be an effective way to overcome the limitations of current and previous strategies. Campaigns should target non-driving participants of cell phone conversations just as strongly as (if not more so than) they target the driving participant. Some investigations of the impairing effects of cell phone use while driving have found it to be just as dangerous as drunk driving (Strayer et al., 2006). Because risk of drunk driving is now so well understood and socially unacceptable, campaigns could highlight the similarity in risk between drunk driving and cell phone distracted driving. To target non-driving participants of cell phone conversations, campaigns could mimic anti-drunk driving campaigns by emphasizing that if people would not let a friend drive drunk, then they also should not let a friend drive distracted. Not only could these campaigns target non-driving participants of cell phone conversations, but they also could communicate the importance of passengers discouraging drivers from engaging in cell phone conversations.

Utility of Mindfulness Techniques

The major implication of the results from Study 2 is that in addition to informing people about the dangers of cell phone use while driving, teaching people easy-to-use techniques to overcome habit or temptation may be a valuable component in the effort to change driver behavior. Although people generally recognize cell phone use while driving as dangerous, many people continue to do it, perhaps at least partly because habitual tendencies or temptation override risk knowledge when receiving a call or text (Bayer & Campbell, 2012). Even with only a one-time, brief training session on mindfulness-based acceptance and a follow-up text message reminder, we found a reduction in the rate of in-class responding to a text message compared to participants who only received an informational message about the consequences of cell phone distraction. These results demonstrate that long, intensive training sessions may not be necessary to help people learn how to use mindfulness-based acceptance and for this technique to be effective. However, in order to produce long-lasting effects, follow-up practice sessions or simple reminders sent to participants may be necessary.

Applying Mindfulness Training in the Classroom

Although we are primarily interested in how temptation resistance strategies could help to reduce cell phone use while driving, the current research demonstrated that these techniques, particularly mindfulness, can be helpful with reducing cell phone distraction in a classroom setting. It probably is no surprise to many class instructors that their students engage in text messaging during class sessions, but the rate at which our data show this behavior occurs may be a surprise to some and demonstrate the severity of in-class cell phone distraction. Study 2 has demonstrated the effectiveness of mindfulness-based acceptance specifically with reducing the use of cell phones during class time. Educators can easily teach mindfulness-based acceptance to

their students and incorporate brief mindfulness practice sessions into their classes to help their students stay focused on course material.

Future Directions

Tailoring Messages to Individual Difference Variables

Only a couple of effects of message orientation (self versus other) were found in the current research. It may be worthwhile to examine whether certain types of messages work best for certain types of people. For example, self-orientation and other-orientation could be assessed with the personal distress (self-oriented) and empathic concern (other-oriented) subscales of the Interpersonal Reactivity Index (Davis, 1980) and the interaction of these individual difference variables with self- and other-oriented messages could be examined. We would expect that a self-oriented message would be most influential for people who score high in personal distress and an other-oriented message would be especially influential for people who score high in empathic concern.

Improving Perceptions of the Utility of Mindfulness Techniques

Regarding strategies to reducing temptation to use one's cell phone when doing so is inappropriate or inconvenient, future research could examine methods for persuading people that mindfulness is an effective technique for temptation resistance. In the current research, the mindfulness technique we tested was perceived to be at least moderately helpful with resisting temptation to respond to one's phone and with reducing cell phone distraction, and participants reported being at least moderately likely to use the technique in their daily lives. Although mindfulness was perceived to potentially be less helpful than implementation intentions with temptation resistance, relative to a control, mindfulness actually was more effective than implementation intentions with reducing in-class texting behavior. Finding methods for

strengthening perceptions of the usefulness of mindfulness-based techniques is an important next step in the investigation of strategies for helping people resist responding to their phones.

Comparing Experimenter- and Participant-Generated Plans

Future research might compare experimenter-generated versus participant-generated implementation intention plans. In studies with child samples, experimenter-generated but not participant-generated plans have been found to be effective at reducing temptation (Mischel & Patterson, 1976). To our knowledge, experimenter- and participant-generated plans have not been compared with an adult sample. To some extent, Study 2 investigated this comparison by giving participants in the mindfulness condition specific instructions for how to react to cell phone distractions at times when they need to focus on something else versus instructing participants in the implementation intentions condition to generate their own plan for something they could say or do to resist the temptation to respond to their phone. However, the structure of mindfulness techniques tends to be slightly more elaborate and less specific than implementation intention plans (e.g., "Don't evaluate or judge the urges or feelings you experience, but just recognize that they exist. You also might imagine your urges as something else more neutral or calming, such as waves in the ocean or leaves floating down a stream." versus "If you receive a text message while driving, tell yourself that you can read and respond to the text after you arrive to your destination."). Therefore, future research could compare experimenter- and participant-generated implementation intentions plans. Future studies also might compare mindfulness-based acceptance with experimenter-generated implementation intentions plans.

Testing Implementation Intentions for In-Vehicle Passengers

In Study 2 of the current research, implementation intention plans were examined as a method for helping people overcome the temptation to respond to their phone when doing so is

inappropriate or inconvenient. However, future research might examine the effectiveness of teaching people to develop implementation intentions for how to prevent a driver from engaging in cell phone use. The findings from Study 1 suggest that people are motivated to prevent others from engaging in cell phone use while driving, at least partly because people generally perceive others as not very good at compensating for cell phone distraction. We suspect that if people report being likely to avoid or quickly cease cell phone communication with someone else who is driving, they might be especially motivated as a passenger to prevent a driver from engaging in cell phone use while driving, because as a passenger, they would be at risk for injuries or death if the driver were to get into an accident. Having a plan for how to react to a driver who responds to incoming calls or text messages or begins to initiate cell phone communication should increase the likelihood of passengers acting on safety beliefs and intentions to prevent a driver from using his or her cell phone.

Conclusions

Cell phone use while driving has become a major issue regarding driving safety. Especially among young drivers, engaging in voice and text conversations while driving is common in today's world where staying connected almost constantly through digital devices is the norm. Serious, including fatal, vehicular accidents caused by distracted driving along with psychological research demonstrating the impairing effects of distracted driving have propelled the development of campaigns to increase awareness of the risk associated with cell phone use while driving. Unfortunately, risk information may be ineffective with people who believe they are immune to the impairing effects of cell phone distraction. Also, even if people understand the risk involved with this behavior, habit or the temptation to read a text message or answer a phone call in order to fulfill short-term social needs may override risk knowledge and long-term values

of safety and responsibility. The current research provided some direction for working around these barriers to more successfully reduce cell phone use while driving.

In addition to targeting behavior of drivers, campaigns may be even more influential by encouraging people to avoid cell phone communication with others who are driving. People report being more likely to engage in cell phone conversations while driving than they are to have cell phone conversations with someone else who is driving. Greater perceived self-ability than perceived ability of others to compensate for cell phone distraction while driving seems to be underlying the difference in likelihood of cell phone use while driving versus with someone who is driving. It does not matter whether conversations are avoided or terminated by the driving conversant or the non-driving conversant. If people are more likely to end a phone conversation with someone who is driving, perhaps because they are not very confident in others' ability to talk on the phone while driving, then campaigns should take advantage of this by targeting non-drivers to end on-the-road cell phone communication.

Previous and existing campaigns have highlighted how a driver personally can be affected (self-oriented) and how that person can harm others (other-oriented) by talking or texting on a cell phone while driving. In the current research, any significant effects that were found for message orientation were with the other-oriented message that targeted behavior of a non-driving conversant. Thus, in addition to targeting non-driving participants of cell phone conversations, there seems to be an advantage to emphasizing how others (i.e., the driver and others on the road) could be harmed by having a phone conversation with someone who is driving. Additionally, campaigns may benefit from incorporating inoculation-type strategies to encourage people to think more deeply about consequences of distracted driving, especially when targeting non-driving participants of cell phone conversations.

Although the current research suggests an advantage of targeting non-driving participants of cell phone conversations, this does not mean that campaigns should not target driver behavior. Some people may be influenced by risk information to avoid cell phone use while driving. However, previous research and the current research suggest that risk information on its own is not sufficient to produce substantial reductions in this behavior. Habit or the temptation to fulfill short-term social needs may overpower knowledge about the risks associated with cell phone use while driving. Teaching people to use a technique like mindfulness-based acceptance to help them overcome habitual tendencies or to resist temptation to respond to their phone may be critical to influencing people to inhibit cell phone use while driving or at other times when doing so is inappropriate or inconvenient. Teaching teenagers and college students how to use mindfulness-based acceptance can easily be incorporated in high school and college courses and can be used not only to help reduce cell phone use while driving but also to help students reduce their cell phone use in class where this distraction appears to be especially problematic.

References

AAA Foundation for Traffic Safety. (2013a). 2012 Traffic Safety Culture Index. Washington, DC: AAA Foundation for Traffic Safety. Retrieved September 1, 2013 from, https://www.aaafoundation.org/sites/default/files/2012TrafficSafetyCultureIndex.pdf

Achtziger, A., Gollwitzer, P. M., & Sheeran, P. (2008). Implementation intentions and shielding goal striving from unwanted thoughts and feelings. *Personality and Social Psychology Bulliten, 34,* 381-393.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.

An, C., & Pfau, M. (2004). The efficacy of inoculation in televised political debates. *Journal of Communication, 54,* 421-436.

Arch, J. J., & Craske, M. G. (2010). Laboratory stressors in clinically anxious and non-anxious individuals: The moderating role of mindfulness. *Behavior Research and Therapy, 48,* 495-505.

Armitage, C. J. (2007). Efficacy of a brief worksite intervention to reduce smoking: The roles of behavioral and implementation intentions. *Journal of Occupational Health Psychology, 12,* 376-390.

Atchley, P., Atwood, S., Boulton, A. (2011). The choice to text and drive in younger drivers: Behavior may shape attitude. *Accident Analysis and Prevention, 43,* 134-142. doi: 10.1016/j.aap.2010.08.003

Atchley, P., Hadlock, C., Lane, S. (2012). Stuck in the 70s: The role of social norms in distracted driving. *Accident Analysis and Prevention, 48,* 279-284. doi: 10.1016/j.aap.2012.01.026

AT&T. (2012). AT&T Teen Driver Survey: Executive Summary. Retrieved May 1, 2013 from, http://www.att.com/gen/press-room?pid=2964

Baer, R. A., Fischer, S., & Huss, D. B. (2006). Mindfulness and acceptance in the treatment of disordered eating. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 23,* 281-300.

Batson, C. D., Duncan, B. D., Ackerman, P., Buckley, T., & Birch, K. (1981). Is empathic emotion a source of altruistic motivation? *Journal of Personality and Social Psychology, 40,* 290-302.

Bayer, J. B., & Campbell, S. W. (2012). Texting while driving on automatic: Considering the frequency-independent side of habit. *Computers in Human Behavior, 28,* 2083-2090.

Bowen, S., & Marlatt, A. (2009). Surfing the urge: Brief mindfulness-based intervention for college student smokers. *Psychology of Addictive Behaviors, 23,* 666-671.

Brannon, L. A., & McCabe, A. E. (2002). Schema-derived persuasion and perception of AIDS risk. *Health Marketing Quarterly, 20*, 31-48.

Brock, T. C., Brannon, L. A., & Bridgwater, C. (1990). Message effectiveness can be increased by matching appeals to recipients' self-schemas: Laboratory demonstrations and a national field experiment. In S. Agres, J. Edell, & T. Dubitsky (Eds.), *Emotions in advertising: Theoretical and practical explorations* (pp. 285-315). Westport, CT: Quorum Books.

Broderick, P. C. (2005). Mindfulness and coping with dysphoric mood: Contrasts with rumination and distraction. *Cognitive Therapy Research, 29*, 501-510.

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*, 822-848.

Chatzisarantis, N. L. D., & Hagger, M. S. (2007). Mindfulness and the intention-behavior relationship within the theory of planned behavior. *Personality and Social Psychology Bulliten, 33*, 663-676.

Cialdini, R. B., Schaller, M., Houlihan, D., Arps, K., Fultz, J., & Beaman, A. A. (1987). Empathy-based helping: Is it selflessly or selfishly motivated? *Journal of Personality and Social Psychology, 52*, 749-758.

Compton, J. A., & Pfau, M. (2004). Use of inoculation to foster resistance to credit card marketing targeting college students. *Journal of Applied Communication Research, 32*, 343-364.

Davis, M. H. (1980). A multidimensional approach to individual differences in empathy. *JSAS Catalog of Selected Documents in Psychology, 10*, 85.

Drews, F. A., Pasupathi, M., & Strayer, D. L. (2008). Passenger and cell phone conversations in simulated driving. *Journal of Experimental Psychology: Applied, 14*, 392-400.

Dunning, D. Heath, C., & Suls, J. M. (2004). Flawed self-assessment. *Psychological Science in the Public Interest, 5*, 69-106.

Duryea, E. J. (1983). Utilizing tenets of inoculation theory to develop and evaluate a preventive alcohol education intervention. *Journal of School Health, 53*, 250-256.

Duryea, E. J., Ranson, M. V., English, G. (1990). Psychological immunization: Theory, research, and current health behavior applications. *Health Education Quarterly, 17*, 169-178.

Feldman, G., Greeson, J., Renna, M., & Robbins-Monteith, K. (2011). Mindfulness predicts less texting while driving among young adults: Examining attention- and emotion-regulation motives as potential mediators. *Personality and Individual Differences, 51*, 856-861. doi:10.1016/j.paid.2011.07.020

Gollwitzer, P. M. (1993). Goal achievement: The role of intentions. *European Review of Social Psychology, 4*, 141-185.

Gollwitzer, P. M. (1999). Implementation intentions: Strong effects of simple plans. *American Psychologist, 54*, 493-503.

Gollwitzer, P. M., & Brandstatter, V. (1997). Implementation intentions and effective goal pursuit. *Journal of Personality and Social Psychology, 73*, 186-199.

Gollwitzer, P. M., & Sheeran, P. (2006). Implementation intentions and goal achievement: A meta-analysis of effects and processes. *Advances in Experimental Social Psychology, 38*, 69-119.

Gopalan, N., & Brannon, L. A. (2006). Increasing family members' appreciation of family caregiving stress. *The Journal of Psychology, 140*, 85-94.

Grant, A. M., & Hofmann, D. A. (2011). It's not all about me: Motivating hand hygiene among health care professionals by focusing on patients. *Psychological Science, 22*, 1494-1499. doi: 10.1177/0956797611419172

Hayes, S. C., Bissett, R. T., Korn, Z., Zettle, R. D., Rosenfarb, I. S., Cooper, L. D., Grundt, A. M. (1999). The impact of acceptance versus control rationales on pain tolerance. *The Psychological Record, 49*, 33-47.

Hofmann, W., Deutsch, R., Lancaster, K., & Banaji, M. R. (2010). Cooling the heat of temptation: Mental self-control and the automatic evaluation of tempting stimuli. *European Journal of Social Psychology, 40*, 17-25.

Horswill, M. S., & McKenna, F. P. (1999). The effect of perceived control on risk taking. *Journal of Applied Social Psychology, 29*, 377-391.

It Can Wait. (2013). Retrieved June 15, 2013, from http://www.itcanwait.com/

Jones, D. (2013, May 14). No text worth dying for: Texting while driving continues to be thorny issue for drivers, police. *South Bend Tribune.* Retrieved from http://www.southbendtribune.com

Just, M. A., Keller, T. A., Cynkar, J. (2008). A decrease in brain activation associated with driving when listening to someone speak. *Brain Research, 1205,* 70-80. doi:10.1016/j.brainres.2007.12.075

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice, 10,* 141-156. DOI: 10.1093/clipsy/bpg016

Konrath, S., Fuhrel-Forbis, A., Lou, A., & Brown, S. (2011). Motives for volunteering are associated with mortality risk in older adults. *Health Psychology, 31,* 87-96.

Kroese, F. M., Adriaanse, M. A., Evers, C., & De Ridder, D. T. D. (2011). "Instant success": Turning temptations into cues for goal-directed behavior. *Personality and Social Psychology Bulletin, 37,* 1389-1397.

McCormick, I. A., Walkey, R. H., & Green, D. E. (1986). Comparative perceptions of divers ability—A confirmation and expansion. *Accident Analysis and Prevention, 18,* 205-208.

McEvoy, S. P., Stevenson, M. R., McCartt, A. T., Woodward, M., Haworth, C., Palamara, P., Cercarelli, R. (2005). Role of mobile phones in motor vehicle crashes resulting in hospital attendance: a case-crossover study. *British Medical Journal, 331,* 428-430. doi: 10.1136/bmj.38537.397512.55

McGuire, W. J. (1961a). Resistance to persuasion conferred by active and passive prior refutation of the same and alternative counterarguments. *Journal of Abnormal and Social Psychology, 63,* 326-332.

McGuire, W. J. (1961b). The effectiveness of supportive and refutational defenses in immunizing and restoring beliefs against persuasion. *Sociometry, 24,* 184-197.

McGuire, W. J., & Papageorgis, D. (1961). The relative efficacy of various types of prior belief-defense in producing immunity against persuasion. *Journal of Abnormal and Social Psychology, 62,* 327-337.

Milne, S., Orbell, S., & Sheeran, P. (2002). Combining motivational and volitional interventions to promote exercise participation: Protection motivation theory and implementation intentions. *British Journal of Health Psychology, 7,* 163-184.

Mischel, W., & Patterson, C. J. (1976). Substantive and structural elements of effective plans for self-control. *Journal of Personality and Social Psychology, 34,* 942-950.

Mrazek, M. D., Franklin, M. S., Phillips, D. T., Baird, B., & Schooler, J. W. (2013). Mindfulness training improves working memory capacity and GRE performance while reducing mind wandering. *Psychological Science, 24,* 776-781.

Mrazek, M. D., Smallwood, J., & Schooler, J. W. (2012). Mindfulness and mind wandering: Finding convergence through opposing constructs. *Emotion, 12,* 442-448.

National Highway Traffic Safety Administration. (2008). National Motor Vehicle Crash Causation Survey. (Report No. DOT HS 811 059). Retrieved February 15, 2013, from http://www-nrd.nhtsa.dot.gov/Pubs/811059.PDF.

National Highway Traffic Safety Administration (2011). Driver Electronic Device Use in 2010. (Report No. DOT HS 811 517). Retrieved September 5, 2013, from. www-nrd.nhtsa.dot.gov/CATS/index.aspx.

National Highway Traffic Safety Administration (2013a). Digest of Distracted Driving Laws. (Report No. DOT HS 811 770). Retrieved September 1, 2013, from http://www.distraction.gov/content/get-the-facts/state-laws.html

National Highway Traffic Safety Administration (2013b). Distracted Driving 2011. (Report No. DOT HS 811 737). Retrieved September 5, 2013, from. www-nrd.nhtsa.dot.gov/CATS/index.aspx.

National Safety Council (2013). Crashes involving cell phones: Challenges of collecting and reporting reliable crash data. Retrieved February 15, 2013, from http://www.nsc.org/safety_road/Distracted_Driving/Pages/Cell-Phone-Crash-Data.aspx

Nelson, E., Atchley, P., & Little, T. D. (2009). The effects of perception of risk and importance of answering and initiating a cellular phone call while driving. *Accident Analysis and Prevention, 41,* 438-444. doi: 10.1016/j.aap.2009.01.006

Parks-Stamm, E. J., Gollwitzer, P. M., & Oettingen, G. (2010). Implementation intentions and test anxiety: Shielding academic performance from distraction. *Learning and Individual Differences, 20,* 30-33.

Patten, C. J. D., Kircher, A., Ostlund, J., & Nilsson, L. (2004). Using mobile telephones: Cognitive workload and attention resource allocation. *Accident Analysis and Prevention, 36,* 341-350. doi:10.1016/S0001-4575(03)00014-9

Patterson, C. J., & Mischel, W. (1975). Plans to resist distraction. *Developmental Psychology, 11,* 369-378.

Patterson, C. J., & Mischel, W. (1976). Effects of temptation-inhibiting and task-facilitating plans on self-control. *Journal of Personality and Social Psychology, 33,* 209-217.

Pease, M. E., Brannon, L. A., & Pilling, V. K. (2006). Increasing selective exposure to health messages by targeting person versus behavior schemas. *Health Communication, 19,* 231-240.

Petty, R. E., & Cacioppo, J. T. (1979). Issue involvement can increase or decrease persuasion by enhancing message-relevant cognitive responses. *Journal of Personality and Social Psychology, 37,* 1915-1926.

Petty, R. E., & Cacioppo, J. T. (1984). The effects of involvement in responses to argument quantity and quality: Central and peripheral routes to persuasion. *Journal of Personality and Social Psychology, 46,* 69-81.

Petty, R. E., Ostrom, T. M., & Brock, T. C. (1981). *Cognitive responses in persuasion*. Hillsdale, New Jersey: Erlbaum Associates.

Pfau, M., Kenski, H. C., Nitz, M., & Sorenson, J. (1990). Efficacy of inoculation strategies in promoting resistance to political attack messages: Application to direct mail. *Communication Monographs, 57,* 25-43.

Raes, F., & Williams, J. M. G. (2010). The relationship between mindfulness and uncontrollability of ruminative thinking. *Mindfulness, 1,* 199-203.

Redelmeier, D. A., & Tibshirani, R. J. (1997). Association between cellular-telephone calls and motor vehicle collisions. *The New England Journal of Medicine, 336,* 453-458.

Rideout, V. J., Foehr, U. G., Roberts, D. F. (2010). Generation M^2: Media in the lives of 8- to 18-year-olds. *Journal of Personality and Social Psychology, 51,* 125-139.

Schlehofer, M. M., Thompson, S. C., Ting, S., Ostermann, S., Nierman, A., & Skenderian, J. (2010). Psychological predictors of college students' cell phone use while driving. *Accident Analysis and Prevention, 42,* 1107-1112.

Schroeder, P., Meyers, M., & Kostyniuk, L. (2013, April). National survey on distracted driving attitudes and behaviors – 2012. (Report No. DOT HS 811 729). Washington, DC: National Highway Traffic Safety Administration.

Sheeran, P., & Orbell, S. (2000). Using implementation intentions to increase attendance for cervical cancer screening. *Health Psychology, 19,* 283-289.

Sjoberg, L. (2000). Factors in risk perception. *Risk Analysis, 20,* 1-11.

State of New Jersey, Office of the Governor. (2012). Violators causing serious crashes face prosecution under criminal homicide or assault-by-vehicle laws [Press release]. Retrieved from http://www.state.nj.us/governor/news/news/552012/approved/20120718d.html

Strayer, D. L., & Drews, F. A. (2007). Cell-phone-induced driver distraction. *Current Directions in Psychological Science, 16,* 128-131.

Strayer, D. L., Drews, F. A., & Crouch, D. J. (2006). A comparison of the cell phone driver and the drunk driver. *Human Factors, 48,* 381-391.

Strayer, D. L., Drews, F. A., & Johnston, W. A. (2003). Cell phone-induced failures of visual attention during simulated driving. *Journal of Experimental Psychology: Applied, 9,* 23-32.

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.

Svenson, O. (1981). Are we all less risky and more skillful than our fellow drivers? *Acta Psychologica, 47,* 143-148.

Szybillo, G. J., & Heslin, R. (1973). Resistance to persuasion: Inoculation theory in a market context. *Journal of Marketing Researc1, 20,* 396-403.

Tindell, D. R., & Bohlander, R. W. (2012). The use and abuse of cell phones and text messaging in the classroom: A survey of college students. *College Teaching, 60,* 1-9. doi: 10.1080/87567555.2011.604802

Verplanken, B., & Faes, S. (1999). Good intentions, bad habits, and effects of forming implementation intentions on healthy eating. *European Journal of Social Psychology, 29,* 591-604.

Virginia Tech Transportation Institute. (2009). New data from Virginia Tech Transportation Institute provides insight into cell phone use and driving distraction. Retrieved November 5, 2013, from http://www.vtnews.vt.edu/articles/2009/07/2009-571.html

Weinstein, N. D. (1980). Unrealistic optimism about future life events. *Journal of Personality and Social Psychology, 39,* 806-820.

Walsh, S. P., White, K. M., Young, R. M. (2009). The phone connection: A qualitative exploration of how belongingness and social identification relate to mobile phone use amongst Australian youth. *Journal of Community & Applied Social Psychology, 19,* 225-240. doi: 10.1002/casp.983

White, M. P., Eiser, J. R., & Harris, P. R. (2004). Risk perceptions of mobile phone use while driving. *Risk Analysis, 24,* 323-334. doi: 10.1111/j.0272-4332.2004.00434.x

White, M. P., Eiser, J. R., & Harris, P. R., & Pahl, S. (2007). Who reaps the benefits, who bears the risks? Comparative optimism, comparative utility, and regulatory preferences for mobile phone techology. *Risk Analysis, 27,* 741-753. doi: 10.1111/j.1539-6924.2007.00881.x

Appendix A - Study 1 Constant Message about Cell Phone Use While Driving

Sending text messages while driving increases the risk of getting into an accident by 23 times. On average, while sending or receiving a text message, a driver's eyes are taken off the road for 5 seconds, and if driving 55 mph, that's equivalent to blindly driving the length of a football field. Talking on a cell phone while driving also is dangerous. The likelihood of getting into a crash is four times greater when a driver is talking on a cell phone. In fact, research using driving simulators has found talking on a cell phone while driving to be just as dangerous as driving while under the influence of alcohol.

People might question how talking on a cell phone while driving is different from talking to another passenger. The difference is that a passenger can see the driver's surroundings and is likely to pause a conversation when road conditions demand more attention or will assist the driver in making safe driving decisions. Because they may be unaware of the driver's road conditions, a person at the other end of a phone conversation is unlikely to pause the conversation as a passenger would.

Because of dangers associated with cell phone use while driving, many states now prohibit handheld use of mobile devices but permit the use of hands-free devices, like Bluetooth headsets. Unfortunately, scientific research has shown that these devices do not eliminate cognitive distraction, which has been shown to be the main cause of distracted driving accidents. Communication is a very complex activity, and people might not realize the impact having a conversation has on their ability to drive safely. Driving simulator research has shown that when driving and talking on a hands-free cell phone, even if people look at things on the road, they actually might not see everything because their brain is busy processing the cell phone conversation.

Appendix B - Study 1 Manipulated Messages

Driver/Self-Oriented

If ***you talk on your cell phone while driving***, regardless of whether you call someone or someone calls you, ***you personally*** could experience serious negative consequences.

For example, if you are distracted and get into an accident, you could be seriously injured and may no longer be able to walk, drive, or speak, perhaps preventing you from doing many things you enjoy doing now. You also could injure or even kill another person. You'd probably feel pretty guilty about being in this situation, and the other person's family and friends could be very angry with you. Your own family and friends might be angry with you or disappointed in you. Your ability to pursue your personal goals could be hampered if you receive jail time or other legal punishment.

Also, research has shown that the cognitive distraction you experience when talking on your cell phone while driving is as dangerous as the cognitive impairment experienced when driving under the influence of alcohol. If you wouldn't risk putting yourself in danger and getting in trouble with police by driving drunk, then it would make sense that you also wouldn't risk putting yourself in a similar situation by talking on your cell phone while driving.

Sure, an accident is possible even if you don't talk on your cell phone while driving, and, like drunk driving, talking on your cell phone while driving will not always result in an accident, but it reduces the attention you can give to the road, making an accident more likely. The increased risk of an accident is the same if you call someone as it is if someone calls you. ***Is talking on your cell phone while driving really worth the losses, regret, and guilt you could personally experience?***

Driver/Other-Oriented

If ***you talk on your cell phone while driving***, regardless of whether you call someone or someone calls you, ***other people*** could experience serious negative consequences.

For example, if you are distracted and get into an accident, your family could be burdened with the responsibility of taking care of you if you were seriously injured and could no longer do many things you can do now. Another person also could be injured or even killed. That person's life could be ruined, and their family and friends could be extremely saddened. Your own family and friends might be hurt and sad to see you in this situation. The lives of people who rely on you such as your classmates, coworkers, friends, and family could be negatively affected if you receive jail time or other legal punishment.

Also, research has shown that the cognitive distraction you experience when talking on your cell phone while driving is as dangerous as the cognitive impairment experienced when driving under the influence of alcohol. If you wouldn't risk putting other people in danger and making others

upset by driving drunk, then it would make sense that you also wouldn't risk putting others in a similar situation by talking on your cell phone while driving.

Sure, an accident is possible even if you don't talk on your cell phone while driving, and, like drunk driving, talking on your cell phone while driving will not always result in an accident, but it reduces your attention to the road, making an accident more likely. The increased risk of an accident is the same if you call someone as it is if someone calls you. ***Is talking on your cell phone while driving really worth the harm, losses, and sadness other people could experience?***

Driver/Neutral

Cell phone use while driving is increasingly being recognized as a form of distracted driving. If ***you talk on your cell phone when you are driving***, regardless of whether you call someone or someone calls you, you are contributing to the problem of distracted driving.

Many car accidents occur each year because people are talking on their cell phones while they are driving. Even if people are using a hands-free device, the chance of an accident occurring is greater than if not talking on a cell phone at all. The likelihood of an accident is even greater when people send and read text messages on their cell phones while driving.

Also, research has shown that the cognitive distraction experienced when talking on a cell phone while driving is as dangerous as the cognitive impairment experienced when driving under the influence of alcohol. If you wouldn't drive drunk, then it would make sense that you also wouldn't talk on your cell phone when you are driving. If you talk on your cell phone while you are driving, you could cause an accident.

Sure, an accident is possible even if you don't talk on your cell phone while driving, and, like drunk driving, talking on your cell phone when you are driving will not always result in an accident, but it reduces the attention you can give to the road, making an accident more likely. The increased risk of an accident is the same if you call someone as it is if someone calls you. ***Is talking on your cell phone while driving really worth increasing the chances of an accident?***

Non-Driver/Self-Oriented

If you talk on the phone with *a* ***friend who is driving***, regardless of whether they call you or you call them, ***you personally*** could experience serious negative consequences.

For example, if your friend is distracted and gets into an accident, you might no longer be able to do many things you enjoy doing with your friend now if they are seriously injured. Another person also could be injured or even killed. You'd probably feel pretty guilty about contributing to your friend being in this situation, and your friend could be angry with you. Your own family might be angry with you or disappointed in you.

You may no longer be able to rely on your friend in times of need if they receive jail time or other legal punishment.

Also, research has shown that the cognitive distraction people experience when talking on their cell phone while driving is as dangerous as the cognitive impairment experienced when driving under the influence of alcohol. If you wouldn't risk putting yourself in danger and getting in trouble by letting a friend drive drunk, then it would make sense that you also wouldn't risk putting yourself in a similar situation by having a phone conversation with them while they are driving.

Sure, an accident is possible even if you don't talk on the phone with someone who is driving, and, like drunk driving, having a phone conversation with someone who is driving will not always result in an accident, but it reduces their attention to the road, making an accident more likely. The increased risk of an accident is the same if you call your friend as it is if they call you. ***Is having a phone conversation with someone who is driving worth the losses, regret, and guilt you could personally experience*****?**

Non-Driver/Other-Oriented

If you talk on the phone with ***a friend who is driving***, regardless of whether they call you or you call them, ***your friend and others*** could experience serious negative consequences.

For example, if your friend is distracted and gets into an accident, they could be seriously injured and may no longer be able to walk, drive, or speak, perhaps preventing them from doing many things they enjoy doing now. Another person also could be injured or even killed. That person's life could be ruined, and their family and friends could be extremely saddened. Your friend's own family might be hurt and sad to see your friend in this situation. Your friend's ability to pursue their goals could be hampered if they receive jail time or other legal punishment.

Also, research has shown that the cognitive distraction people experience when talking on their cell phone while driving is as dangerous as the cognitive impairment experienced when driving under the influence of alcohol. If you wouldn't risk putting people in danger and getting your friend in trouble by letting them drive drunk, then it would make sense that you also wouldn't risk putting them in a similar situation by having a phone conversation with your friend while they are driving.

Sure, an accident is possible even if you don't talk on the phone with someone who is driving, and, like drunk driving, having a phone conversation with someone who is driving will not always result in an accident, but it reduces the attention that person can give to the road, making an accident more likely. The increased risk of an accident is the same if you call your friend as it is if they call you. ***Is having a phone conversation with someone who is driving worth the harm, losses, and sadness they and others could experience?***

Non-Driver/Neutral

Cell phone use while driving is increasingly being recognized as a form of distracted driving. If you talk on the phone with ***a friend who is driving***, regardless of whether they call you or you call them, you are contributing to the problem of distracted driving.

Many car accidents occur each year because people are talking on their cell phones while they are driving. Even if people are using a hands-free device, the chance of an accident occurring is greater than if not talking on a cell phone at all. The likelihood of an accident is even greater when people send and read text messages on their cell phones while driving.

Also, research has shown that the cognitive distraction experienced when talking on a cell phone while driving is as dangerous as the cognitive impairment experienced when driving under the influence of alcohol. If you wouldn't let a friend drive drunk, then it would make sense that you also wouldn't have a phone conversation with them while they are driving. If you call someone who is driving and continue the phone conversation with them, they could get in an accident.

Sure, an accident is possible even if you don't talk on the phone with someone while they are driving, and, like drunk driving, having a phone conversation with someone who is driving will not always result in an accident, but it reduces the attention they can give to the road, making an accident more likely. The increased risk of an accident is the same if you call your friend as it is if they call you. ***Is having a phone conversation with someone who is driving really worth increasing the chances of an accident?***

Appendix C - Study 1 Pretesting Message Evaluation Items

Constant Message Evaluation Items
After reading the constant message, participants responded to the two items below.

1. How convincing do you think the message is?

1	2	3	4	5	6	7
Not at all convincing						Completely convincing

2. How realistic do you think the message is?

1	2	3	4	5	6	7
Not at all realistic						Completely realistic

Manipulated Messages Evaluation Items
After reading each of the six manipulated messages, participants responded to the four items below.

To what extent do you think the message above focuses on…

1. Discouraging you from talking on your cell phone while driving?

1	2	3	4	5	6	7
Not at all						Completely

2. Discouraging you from having a phone conversation with someone who is driving?

1	2	3	4	5	6	7
Not at all						Completely

3. How you could be affected by the consequences described in the message?

1	2	3	4	5	6	7
Not at all						Completely

4. How people other than you could be affected by the consequences described in the message?

1	2	3	4	5	6	7
Not at all						Completely

Appendix D - Study 1 Inoculation Tasks

Driver-Focused Condition

TASK 1

A) **Realistically**, what is the worst outcome that could result from having a conversation on your cell phone while you are driving? (Provide your answer in at least 2 complete sentences.)

B) **Realistically**, what is the worst outcome that could result from waiting until you are done driving to make phone calls or to respond to any calls you received while you were driving? (Provide your answer in at least 2 complete sentences.)

TASK 2

Below are some statements that you might make to yourself to justify talking on your cell phone while driving on at least some occasions, even if you know it is dangerous and believe this behavior should be restricted.

We would like you to provide arguments to refute (disagree with) each of the statements below. We will be using the best arguments in future research, so we'd like you to come up with the strongest arguments you can think of. (Provide your response in at least 2 complete sentences).

Argument 1: "There have been times that I have talked on my phone while driving, and I haven't gotten into an accident."

Argument 2: "As long as I keep my eyes focused on the car in front of me and other things on the road, I can talk on my phone while driving without any problems."

Argument 3: "If I have a phone conversation with someone while I am driving, it's really no different from having a conversation while that person is in the car with me, and I've never been in an accident as a result of talking to passengers while I am driving."

TASK 3

Considering the potential consequences you listed in Task 1 and the counterarguments you made in Task 2, **please comment on how talking on your cell phone while driving is inconsistent with your personal values or goals**. For example, if you value safety or if you strive to be seen as a responsible individual, how is talking on your cell phone while driving inconsistent with these values? (Provide your answer in 3-5 complete sentences.)

Non-Driver-Focused Condition

TASK 1

A) **Realistically**, what is the worst outcome that could result from having a phone conversation with a friend while they are driving? In this scenario, you are not driving and are in another location, such as at home. (Provide your answer in at least 2 complete sentences.)

B) As you are having a phone conversation with a friend, you learn that they are driving (you are not). **Realistically**, what is the worst outcome that could result from requesting that your friend call you back later when they are not driving? (Provide your answer in at least 2 complete sentences.)

TASK 2

Below are some statements that others might make to you or that you might to yourself to justify having a phone conversation with someone who is driving on at least some occasions, even if you know it is dangerous and believe this behavior should be restricted.

We would like you to provide arguments to refute (disagree with) each of the statements below. We will be using the best arguments in future research, so we'd like you to come up with the strongest arguments you can think of. (Provide your response in at least 2 complete sentences).

Argument 1: "There have been times that I have talked on the phone with someone while they are driving, and they haven't gotten into an accident."

Argument 2: "As long as they keep their eyes focused on the car in front of them and other things on the road, people can talk on their phone with me while they are driving without any problems."

Argument 3: "If I have a phone conversation with someone while they are driving, it's really no different from having a conversation while I am in the car with them, and I've never been in an accident as a result of talking to someone who is driving when I'm riding in the car with them."

TASK 3

Considering the potential consequences you listed in Task 1 and the counterarguments you made in Task 2, **please comment on how continuing a phone conversation with another person who you know is driving is inconsistent with your personal values or goals**. For example, if you value safety or if you strive to be seen as a responsible individual, how is talking on your cell phone while driving inconsistent with these values? (Provide your answer in 3-5 complete sentences.)

Appendix E - Study 1 Manipulation Check

Participants in Study 1 responded the questions below after reading the manipulated message.

1. Thinking about the message you just read, which of the following options ***more strongly*** describes the focus of the message?

    a. The message focused **mainly** on discouraging me from **talking on my cell phone while I am driving**.

    b. The message focused **mainly** on discouraging me from **having a phone conversation with someone else who is driving**.

2. Thinking about the message you just read, which of the following options ***most strongly*** describes the focus of the message?

    a. The message focused **primarily** on how **I could be affected** by the consequences described in the message.

    b. The message focused **primarily** on how **people other than myself could be affected** by the consequences described in the message.

    c. The **message seemed to be vague or neutral about who could be affected**. It did not focus strongly on how either I or other could be affected.

The following items were included in the manipulation check questionnaire as fillers to disguise the purpose of the manipulation check questions.

3. Talking on a cell phone while driving is just as dangerous as drunk driving.

    a. True
    b. False

4. When driving a vehicle, having a phone conversation is no different from having a conversation with a passenger in the car.

    a. True
    b. False

5. Research shows that talking on a cell phone with a hands-free device while driving is not any safer than using a hand-held phone.

    a. True
    b. False

Appendix F - Study 1 Likelihood of Engaging in Cell Phone Use While Driving/With Someone Who is Driving Questionnaire

Please indicate how likely you are to engage in the behaviors described below using the following response scale.

1	2	3	4	5	6	7
Very Unlikely						Very Likely

If I were to receive a phone call while I am driving…

1. I would answer the call and have a conversation if I knew the call was important.

2. I would answer the call if I knew the call was important, but I would immediately inform the caller that I am driving and will return their call later.

3. I would answer the call and have a conversation while I am driving even the person calling was a friend just wanting to chat.

4. I would answer the call, but if the person calling was a friend just wanting to chat, I would immediately inform them that I am driving and will return their call later.

5. I would NOT answer the call and would wait until I reached my destination or could pull off the road to return the call, BUT ONLY if I knew the call WAS NOT important.

6. I would NOT answer the call and would wait until I reached my destination or could pull off the road to return the call, EVEN if I knew the call WAS important.

If I were driving and thought of a phone call I needed to make…

7. I would make the call while I am driving if the call is really important.

8. I would make the call while I am driving even if the call is not important.

9. I would wait until I reached my destination or could pull off the road to make the call, BUT ONLY if the call WAS NOT important.

10. I would wait until I reached my destination or could pull off the road to make the call, EVEN if the call WAS important.

If I were to receive a text message while I am driving…

11. I would read and respond to the message while I am driving if the message is really important.

12. I would read and respond to the message while I am driving even if it was a friend just wanting to chat.

13. I would wait until I reached my destination or could pull off the road to respond to the message BUT ONLY if it WAS NOT about something important.

14. I would wait until I reached my destination or could pull off the road to respond to the message EVEN if it WAS about something important.

If I were driving and thought of a text message I needed to send…

15. I would send the message while I am driving if the message is really important.

16. I would send the message while I am driving even if the message is not important.

17. I would wait until I reached my destination or could pull off the road to send the message BUT ONLY if it WAS NOT about something important.

18. I would wait until I reached my destination or could pull off the road to send the message EVEN if it WAS about something important.

For the following items, please indicate how likely you are to engage in the behavior described when you ARE NOT driving but the other person referenced in the statement is driving. In the situations described below, you are not in the vehicle with the driver.

If I were to receive a phone call from someone and then learn they are driving…

19. I would have a conversation with that person if I knew the call was important.

20. I would have a conversation with that person even the person calling was a friend just wanting to chat.

21. I would tell the person to call me back when they are not driving, BUT ONLY if the call IS NOT important.

22. I would tell the person to call me back when they are not driving, EVEN if the call IS important.

If I were to make a phone call to someone and then learn that they are driving…

23. I would have a conversation with that person if the call was important.

24. I would have a conversation with that person even if I was calling just to chat.

25. I would tell the person to call me back when they are not driving, BUT ONLY if the call IS NOT important.

26. I would tell the person to call me back when they are not driving, EVEN if the call IS important.

If I were to receive a text message from someone and then learn that they are driving…

27. I would have a text message conversation with that person if it was about something important.

28. I would have a text message conversation with that person even they were texting me just to chat.

29. I would tell the person to text me back when they are not driving, BUT ONLY if they DO NOT have something important to tell me.

30. I would tell the person to text me back when they are not driving, EVEN if they have something important to tell me.

If I were to send a text message to someone and then learn that they are driving…

31. I would have a text message conversation with that person if it was about something important.

32. I would have a text message conversation with that person even if it was just to chat.

33. I would tell the person to text me back when they are not driving, BUT ONLY if I DID NOT HAVE something important to tell them.

34. I would tell the person to text me back when they are not driving, EVEN if I HAVE something important to tell them.

Appendix G - Study 1 Perceived Ability to Compensate for Cell Phone Distractions While Driving

Respond to the questions below using the scale provided.

1. To what extent can you compensate for the distractions of using a cell phone while driving?

1	2	3	4	5	6	7
Not at All						Very Much

2. To what extent do you think the average student at your college can you compensate for the distractions of using a cell phone while driving?

1	2	3	4	5	6	7
Not at All						Very Much

3. Using my cell phone while driving increases the chances of me getting into an accident

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

4. Using their cell phone while driving increases the chances of other people getting into an accident

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

5. It's easy for me to multi-task, so using a cell phone while driving isn't as distracting for me as it is for some other people.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

6. It is easy for me to tell if my driving is affected by talking or texting on my cell phone.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

7. It is easy for other people to tell if their driving is affected by talking or texting on their cell phone.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

8. If I call someone while they are driving, I trust their judgment about whether or not they are able to safely talk on their phone while driving.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Note. Responses to items 1 and 6 were averaged to produce a single score for perception of self ability to compensate for distractions for cell phone use while driving. Responses to items 2 and 7 were averaged to produce a single score for perception of others' ability to compensate for distractions from cell phone use while driving. These composite scores were used in analyses.

Appendix H - Study 1 Demographics

1. Gender
   - Male
   - Female
   - Prefer not to answer

2. Age _____

3. Year in school
   - Freshman
   - Sophomore
   - Junior
   - Senior
   - Other/None of the above

4. Ethnicity
   - White/Caucasian
   - African American/Black
   - Asian/Pacific Islander
   - Native American
   - Hispanic
   - Other

5. I have never used my cell phone for talking or texting (including reading text messages) while driving.
   - True
   - False

Appendix I - Study 2 Imagination Scenarios

The imagination tasks were completed by participants in the mindfulness-based acceptance, implementation intentions planning, and control condition. None of the imagination tasks were completed in the message-only control condition.

Studying Scenario – Practice Task
Please close your eyes and imagine you are studying for a final exam. Your cell phone is in your backpack or purse sitting on the chair next to you, and shortly after you have started studying, you hear your phone vibrating from an incoming call or text message. [At this time, the experimenter triggered a cell phone to vibrate on a table at the front of the room in order to enhance the imaginative experience.] You're feeling tempted to pull out your phone to see who is contacting you, but you have limited time to study, and you currently have a borderline grade in the class you're studying for, so you really need to stay focused on studying so that you can make the most of the time you have available and so that you can do really well on the exam. Still, you're feeling distracted by thoughts about who might be contacting you and why. Please keep your eyes closed a bit longer until I ask you to open them, and take a moment to imagine yourself in the situation I just described, thinking about any tempting thoughts or feelings you might experience.

With the exception of the last sentence in each scenario, the following imagination scenarios were identical across the mindfulness-based acceptance, implementation intentions planning, and control conditions. Participants in the mindfulness-based acceptance and implementation intentions conditions were told to think about using the technique they learned to resist the temptation to respond to their phone. Participants in the control condition were told to think about trying resist responding to their phone with no special instructions for how to do so.

Face-to-Face Conversation Scenario
Please close your eyes and imagine you're at a restaurant having a meal with a close friend, and they express that they have something very important and personal to share with you. Your friend's story goes on for about 20 minutes, and it's not nearly as important or interesting as you expected it to be. About half way through your friend's story, you hear your cell phone vibrating from an incoming call or text message. [At this time, the experimenter triggered a cell phone to vibrate on a table at the front of the room in order to enhance the imaginative experience.] You feel tempted to pull out your phone to see who is contacting you, but you know it would be rude to answer your phone or even check to see who is calling or texting while your friend is sharing their story. Still, you're feeling distracted by thoughts about who might be contacting you and why. Take another moment and think about (using mindfulness-based acceptance/the plan you created to help you with) resisting the temptation to respond to your phone in this situation.

Class Lecture Scenario

Please close your eyes and imagine you're in one of you classes listening to a lecture. Your cell phone is in your backpack or purse sitting next to you, and about 10 minutes into the class session, you hear your phone vibrating from an incoming call or text message. [At this time, the experimenter triggered a cell phone to vibrate on a table at the front of the room in order to enhance the imaginative experience.] You feel tempted to pull out your phone to see who is contacting you, but you also want to stay focused on the lecture because the instructor occasionally gives pop quizzes at the end of class, so you don't want to miss important material if there's a chance there will be a quiz today. Still, you are feeling distracted by thoughts about who might be contacting you and why. Take another moment and think about (using mindfulness-based acceptance/the plan you created to help you with) resisting the temptation to respond to your phone in this situation.

Driving Scenario

Please close your eyes and imagine you are driving. Your cell phone is in your backpack or purse sitting on the passenger seat next to you, and shortly after you have started driving to your destination you hear your cell phone vibrating from an incoming call or text message. [At this time, the experimenter triggered a cell phone to vibrate on a table at the front of the room in order to enhance the imaginative experience.] You feel tempted to pull out your phone to see who is calling or texting you, but you also don't want to risk getting into an accident as a result of being distracted by your phone. Still, you're feeling distracted by thoughts about who might be contacting you and why. Take another moment and think about (using mindfulness-based acceptance/the plan you created to help you with) resisting the temptation to respond to your phone in this situation.

Appendix J - Study 2 Message about Cell Phone Distraction

The cell phone has been a very useful invention for communicating more quickly and efficiently than we once could, but in certain situations, cell phone use can have negative consequences.

In some situations, cell phone use can result in negative social consequences. For example, while having a face-to-face conversation with a friend, you receive a text message and send a reply. It's unlikely you'll have heard anything your friend said while you were texting, and your friend may be irritated that they aren't receiving your attention. Perhaps other people have done this to you and you've felt like they didn't hear a word you said. This might not be a big deal when having a casual conversation, but if your friend is sharing important information or is seeking support, they may feel upset if they aren't receiving your attention. Missing part of an important conversation because you were reading or sending text messages could cause people close to you to perceive you as impolite, uncaring, or irresponsible, possibly making it difficult for them to trust you in the future.

In the context of learning-related tasks, research has found that students who use their cell phone during these tasks have lower GPAs than those who focus only on the learning task. One study found that the more text messages students received while watching a lecture, the worse they scored on a test of the material, and students scored even worse if they responded to the messages during the lecture than if they waited until after the lecture. Listening to a lecture and sending text messages both involve language, so they are processed by the same areas of the brain, but your brain can't fully process both at the same time, which makes it difficult for you to understand or even remember the lecture information. Similarly, interrupting homework/studying with texting or phone calls can be distracting and cause mental fatigue, making it more challenging to complete your work. Not only is your work interrupted, but switching back to your work also requires time to recall what you were doing before being interrupted by your phone. Sometimes you might lose your train of thought entirely.

Finally, using your cell phone during other tasks can have serious safety risks. Recently, there has been a growing focus on the safety risks of cell phone use while driving. Your risk of getting into an accident is 4 times greater if you talk on your cell phone and is 23 times greater if you send text messages while driving than it is if you are only driving. Research has found talking on a cell phone while driving to be just as dangerous as driving under the influence of alcohol. Many people believe cell phone use while driving is dangerous because it takes our hands off the steering wheel and our eyes off the road. However, cognitive distraction is really what makes cell phone use while driving dangerous. Even though driving and communicating may seem to be things we can do without much effort, both are actually quite complex. Research using driving simulators has shown that when people talk on the phone while driving, even if using a hands-free device, the brain's ability to process information about the driving situation is reduced, increasing the chances of getting into an accident.

Appendix K - Study 2 Attitudes Toward Training Technique

1. The training technique I learned today will be helpful with overcoming the temptation to answer phone calls and text messages when I should be focusing on something else (e.g., driving, listening to a class lecture, completing schoolwork/studying for an exam, having a face-to-face conversation).

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

2. The training technique I learned today will be helpful with not being distracted by receiving phone calls and text messages on my cell phone and staying focused on tasks or activities that need my full attention.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

3. If I receive phone calls or text messages when I am doing something that needs my full attention, I will try using the technique I learned today to help me not be distracted by my phone ringing and staying focused on tasks or activities that need my full attention.

1	2	3	4	5	6	7
Very Unlikely						Very Likely

Appendix L - Study 2 Cover Story Measure: Perceived Risks and Attitudes toward Cell Phone Use

Indicate your agreement with the statements below by entering a number from 1 to 7 in the space next to each statement.

Indicate your level of agreement with the statements below about cell phone use while <u>completing homework or studying</u>.

1 2 3 4 5 6 7
Strongly Disagree Strongly Agree

1. _____ READING text messages on a cell phone disrupts productivity.

2. _____ SENDING text messages on a cell phone disrupts productivity.

3. _____ ANSWERING A PHONE CALL disrupts productivity.

4. _____ It is important to have my cell phone silenced and out of sight so that I am not disrupted by incoming text messages or phone calls while working on homework or studying.

5. _____ It's easy for me to multi-task, so sending text messages while working on homework or studying isn't as distracting for me as it is for other people.

6. _____ It is easy for someone to tell if their productivity has been disrupted by using their cell phone while working on homework or studying.

7. _____ I would need a lot of convincing to believe text messaging or having phone conversations while working on homework affects my productivity.

8. _____ The effects on productivity from having cell phone or text message conversations while doing homework or studying are likely to be only very minor.

9. _____ Any distracting effects of having cell phone or text message conversations while doing homework or studying will last even after the conversation is finished.

Indicate your agreement with the statements below about cell phone use <u>while having a face-to-face conversation</u>.

1 2 3 4 5 6 7
Strongly Disagree Strongly Agree

10. _____ READING text messages on a cell phone is disruptive to a face-to-face conversation.

11. _____ SENDING text messages on a cell phone is disruptive to a face-to-face conversation.

12. _____ ANSWERING A PHONE CALL is disruptive to face-to-face conversation.

13. _____ It is important to have my cell phone silenced and out of sight so that I am not disrupted by incoming text messages or phone calls when having an important face-to-face conversation.

14. _____ It's easy for me to multi-task, so sending text messages while engaging in a face-to-face conversation isn't as distracting for me as it is for other people.

Indicate your level of agreement with the statements below about cell phone use <u>during a class lecture</u>.

1 2 3 4 5 6 7
Strongly Disagree Strongly Agree

15. _____ READING text messages on a cell phone can impair how well I learn course material.

16. _____ SENDING text messages on a cell phone can impair how well I learn course material.

17. _____ It is important to have my cell phone silenced and out of sight so that I am not disrupted by incoming text messages or phone calls.

18. _____ It is easy for someone to tell if their learning has been affected by using their cell phone during a class lecture.

19. _____ It's easy for me to multi-task, so sending text messages while listening to a class lecture isn't as distracting for me as it is for other people.

20. _____ I would need a lot of convincing to believe reading or sending text messages during a class lecture affects my learning.

21. _____ The effects on learning from sending text messages during a lecture are likely to be only very minor.

22. _____ Only the person sending text messages during class will have their learning disrupted.

23. _____ Any distracting effects of sending text messages during class will last even after the text messaging is finished.

24. _____ Reading and sending text messages during class should not be allowed.

Indicate your level of agreement with the statements below about cell phone use <u>while driving</u>.

1 2 3 4 5 6 7
Strongly Disagree Strongly Agree

25. _____ READING text messages on a cell phone increases the chances of me getting into an accident.

26. _____ SENDING text messages on a cell phone increases the chances of me getting into an accident.

27. _____ TALKING on a cell phone increases the chances of me getting into an accident.

28. _____ TALKING on a cell phone WITH A HANDS-FREE DEVICE (e.g., Bluetooth headset) increases the chances of me getting into an accident.

29. _____ It is important to have my cell phone silenced and out of sight so that my attention to the road is not disrupted by incoming text messages or phone calls.

30. _____ It's easy for me to multi-task, so talking or texting on my cell phone while driving isn't as distracting for me as it is for other people.

31. _____ It is easy for someone to tell if their driving has been affected by talking or texting on a cell phone while driving.

32. _____ I would need a lot of convincing to believe talking or texting on a cell phone while driving is dangerous.

33. _____ The effects of cell phone use on driving ability are likely to be only very minor.

34. _____ The only people at risk are those who use a cell phone while driving.

35. _____ Any distracting effects of cell phone use while driving will last even after the call is finished.

36. _____ Using a hand-held mobile phone while driving should be restricted.

37. _____ Using a hands-free mobile phone while driving should be restricted.

Appendix M - Study 2 Cover Story Measure: Perceived Ability to Resist Cell Phone Temptation

Indicate how likely you would be to do each of the behaviors listed below. Respond by referring to the scale below and entering a number from 1 to 7 in the space next to each statement.

If my phone were to begin vibrating from an incoming text message or phone call <u>while completing homework or studying</u>…

1 2 3 4 5 6 7
Strongly Disagree Strongly Agree

1. _____ It would be easy for me to ignore my phone.
2. _____ It would be easy for me to give my full attention to my homework/studying.
3. _____ I would feel tempted to pull out my phone to see who is contacting me.
4. _____ I would feel tempted to answer the call or text message.
5. _____ I would be tempted to answer, but I would be able to resist answering, even if I really wanted to talk to the person contacting me.
6. _____ I would be tempted to answer, but I would be able to resist answering, as long as it wasn't someone I really wanted to talk to.
7. _____ I would be tempted to answer, and I wouldn't be able to resist answering, no matter who was contacting me.

If my phone were to begin vibrating from an incoming text message or phone call <u>while having an important face to face conversation</u>…

1 2 3 4 5 6 7
Strongly Disagree Strongly Agree

8. _____ It would be easy for me to ignore my phone.
9. _____ It would be easy for me to give my full attention to the face to face conversation.
10. _____ I would feel tempted to pull out my phone to see who is contacting me.
11. _____ I would feel tempted to answer the call or text message.

12. _____ I would be tempted to answer, but I would be able to resist answering, even I really wanted to talk to the person contacting me.

13. _____ I would be tempted to answer, but I would be able to resist answering, as long as it wasn't someone I really wanted to talk to.

14. _____ I would be tempted to answer, and I wouldn't be able to resist answering, no matter who was contacting me.

If my phone were to begin vibrating from an incoming text message or phone call during a <u>class lecture</u>…

1 2 3 4 5 6 7
Strongly Disagree Strongly Agree

15. _____ It would be easy for me to ignore my phone.

16. _____ It would be easy for me to give my full attention to the class lecture.

17. _____ I would feel tempted to pull out my phone to see who is contacting me.

18. _____ I would feel tempted to answer the call or text message.

19. _____ I would be tempted to answer, but I would be able to resist answering, even if I really wanted to talk to the person contacting me.

20. _____ I would be tempted to answer, but I would be able to resist answering, as long as it wasn't someone I really wanted to talk to.

21. _____ I would be tempted to answer, and I wouldn't be able to resist answering, no matter who was contacting me.

If my phone were to begin vibrating from an incoming text message or phone call <u>while driving</u>…

1 2 3 4 5 6 7
Strongly Disagree Strongly Agree

22. _____ It would be easy for me to ignore my phone.

23. _____ It would be easy for me to give my full attention to driving.

24. _____ I would feel tempted to pull out my phone to see who is contacting me.

25. _____ I would feel tempted to answer the call or text message.

26. _____ I would be tempted to answer, but I would be able to resist answering, even if I really wanted to talk to the person contacting me.

27. _____ I would be tempted to answer, but I would be able to resist answering, as long as it wasn't someone I really wanted to talk to.

28. _____ I would be tempted to answer, and I wouldn't be able to resist answering, no matter who was contacting me.

Appendix N - Study 2 Demographics

1. Gender
   - Male
   - Female
   - Prefer not to answer

2. Age _____

3. Year in school
   - Freshman
   - Sophomore
   - Junior
   - Senior
   - Other/None of the above

4. Ethnicity
   - White/Caucasian
   - African American/Black
   - Asian/Pacific Islander
   - Native American
   - Hispanic
   - Other

5. Who is your General Psychology course instructor? (circle one)
   - Lora Adair
   - David Arndt
   - Laura Brannon
   - Gary Brase
   - Clive Fullagar
   - Erik Garcia
   - Lesly Krome
   - Andrew Marshall
   - Jorge Piocuda
   - Chelsea Schnabelrauch
   - Megan Strain

6. I have never used my cell phone for talking or texting (including reading text messages) while driving.
   - True
   - False

Appendix O - Study 2 Participant Cell Phone Information Sheet

The researchers of this study would like to send you a reminder about today's study and would like to invite you to complete a follow up survey in the future. Because this research focuses on cell phones, you will receive a text message inviting you to complete the survey. Therefore, we will need you to provide your cell phone number and service provider. Even if you do not wish to complete the follow up survey, please respond to the text message so that we will know whether we should grant you research credit for only the lab portion of the study or for both the lab portion and the follow up survey. Your cell phone information will be kept confidential by experimenters of this research and will be used only for the purpose of our research.

Please enter your cell phone number below.

_____ _____ _____ - _____ _____ _____ - _____ _____ _____ _____ (ex.: 785-555-5555)

Cell phone service provider. Please select an option from the list below or enter your provider using the "other" option if your provider is not listed. (The text message described in item 6 above will be sent to you via email. In order to send a text message this way, we also need to know your service provider.)

AT&T

T-Mobile

Verizon

Sprint

Virgin Mobile

Tracfone

Metro PCS

Boost Mobile

Cricket

Nextel

Alltel

Ptel

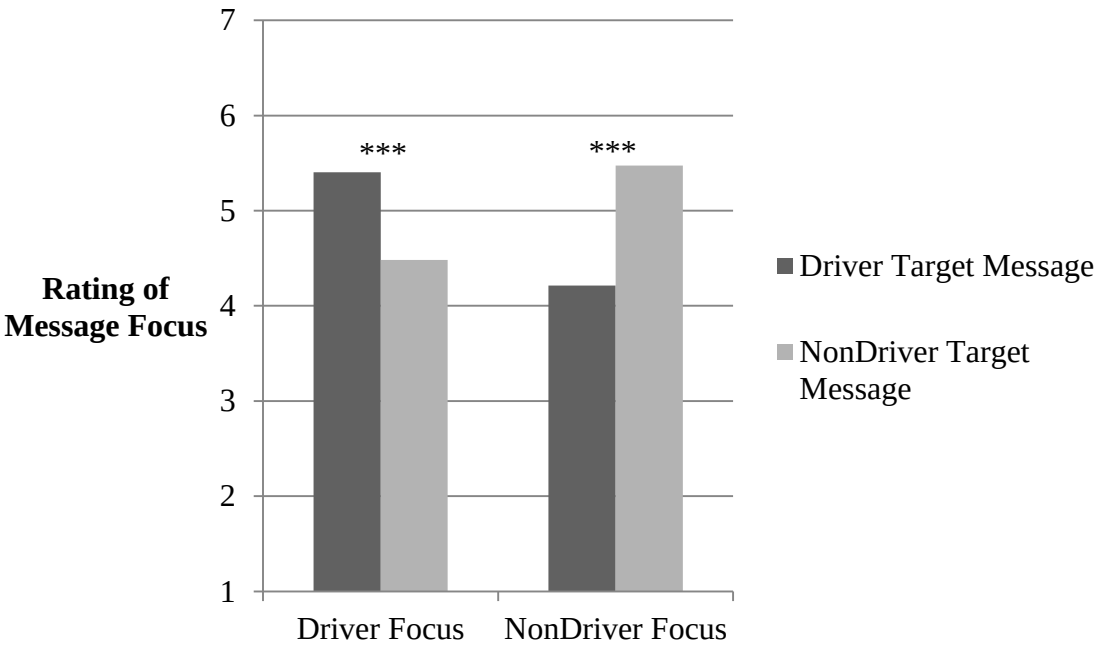
Suncom

Qwest

U.S. Cellular

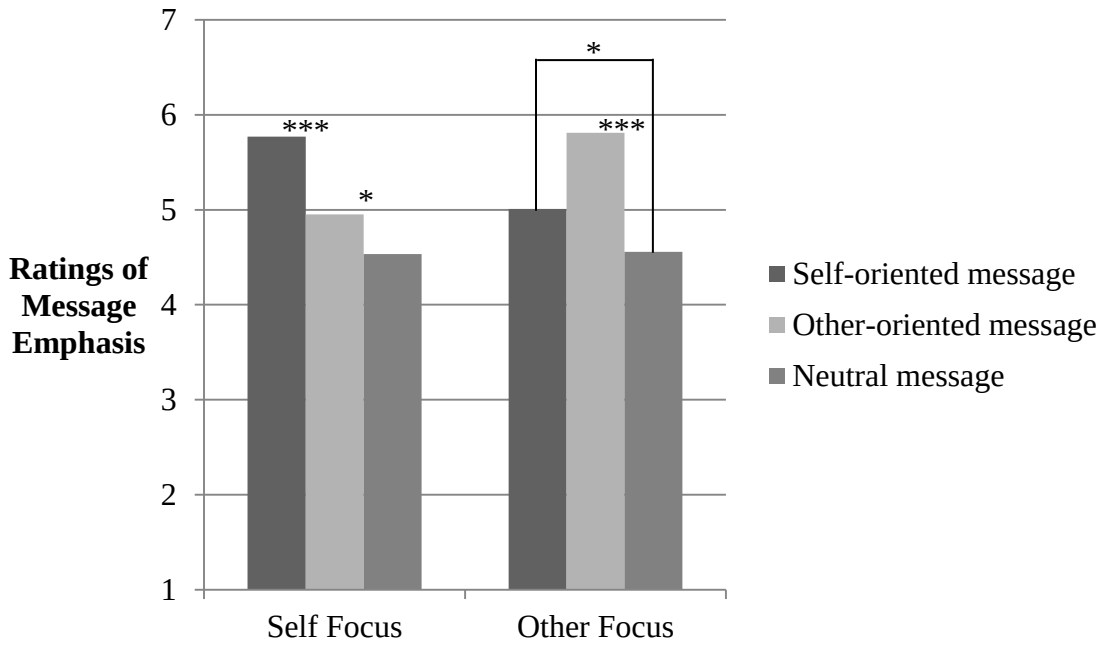
Other _____

Figure 1 – Study 1 Pretesting: Mean ratings of how strongly the driver target messages and non-driver target messages focus on the behavior of a driver or the behavior of a non-driver who is engaging in a cell phone conversation



****p* < .001

Figure 2 – Study 1 Pretesting: Mean ratings of how strongly the self-oriented, other-oriented, and neutral messages emphasize risks to the self or risks to others for cell phone use while driving



***$p < .001$

*$p < .05$

Figure 3 – Study 1 procedural order

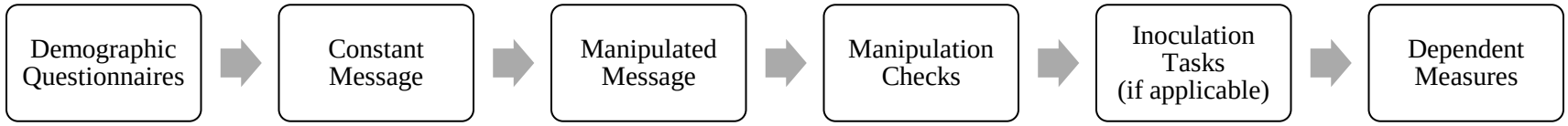
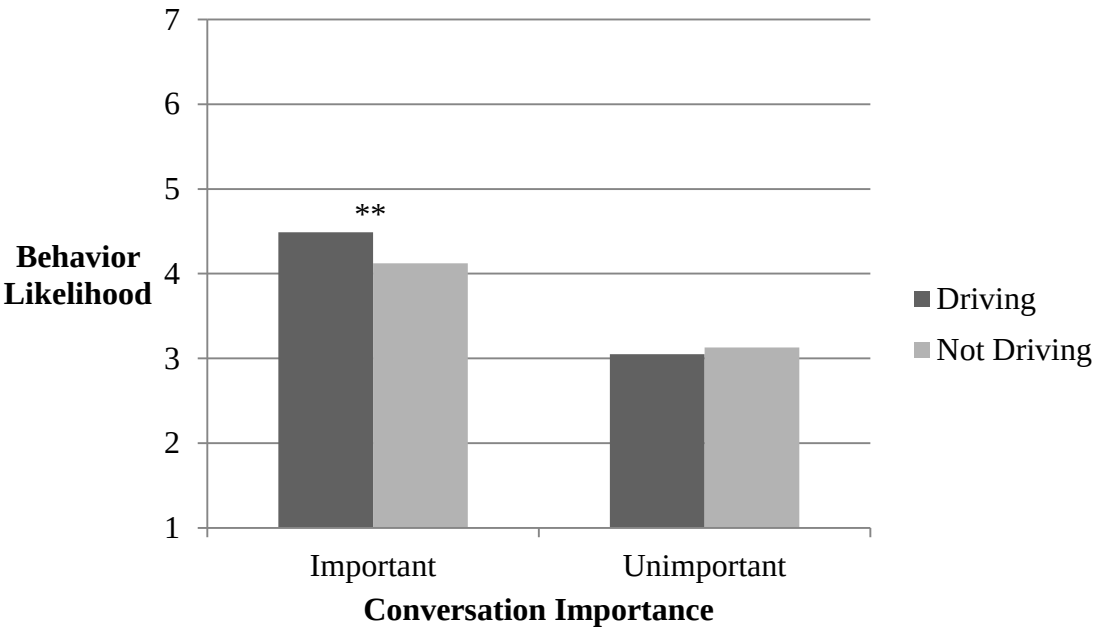
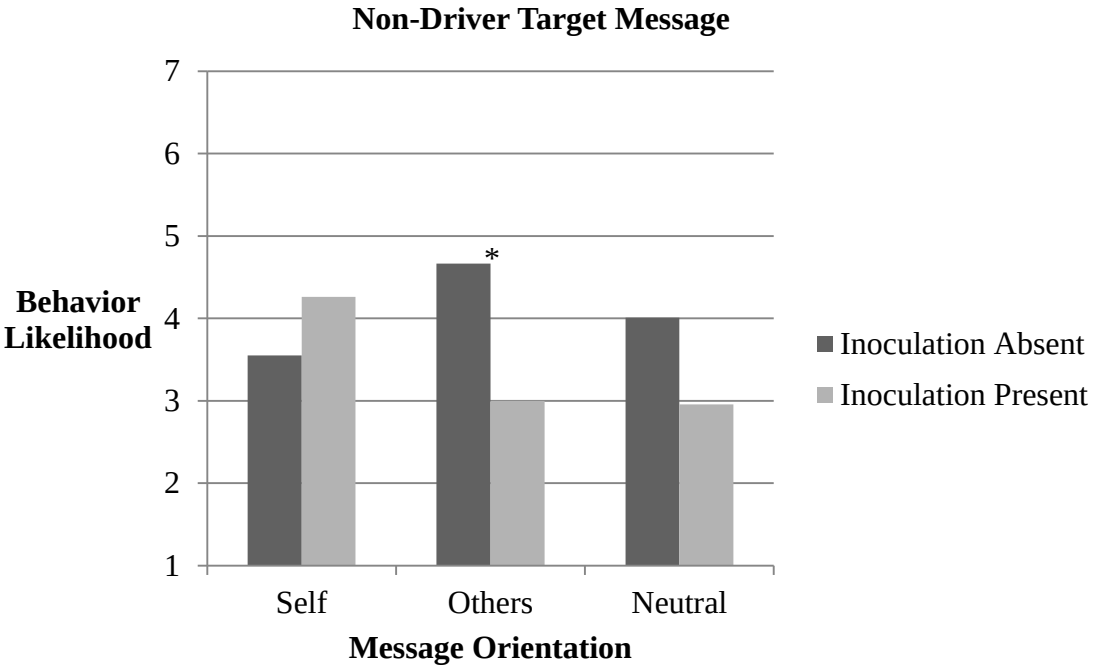


Figure 4 – Study 1: Likelihood of engaging in a phone voice conversation as a function of conversation importance and conversant environment



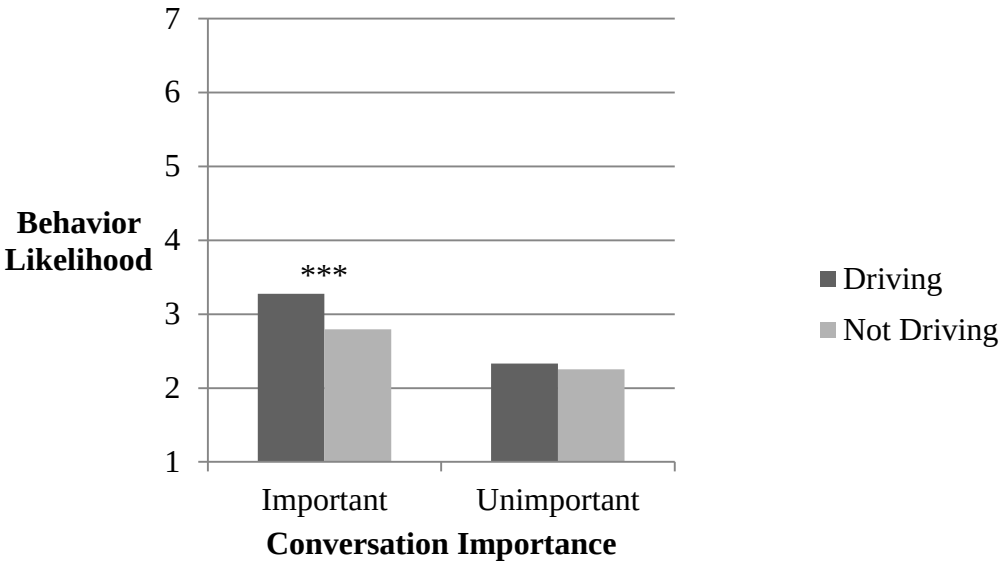
$^{**}p < .01$

Figure 5 – Study 1: Likelihood of engaging in a voice phone conversation among participants in the non-driver target message condition as a function of message orientation and inoculation



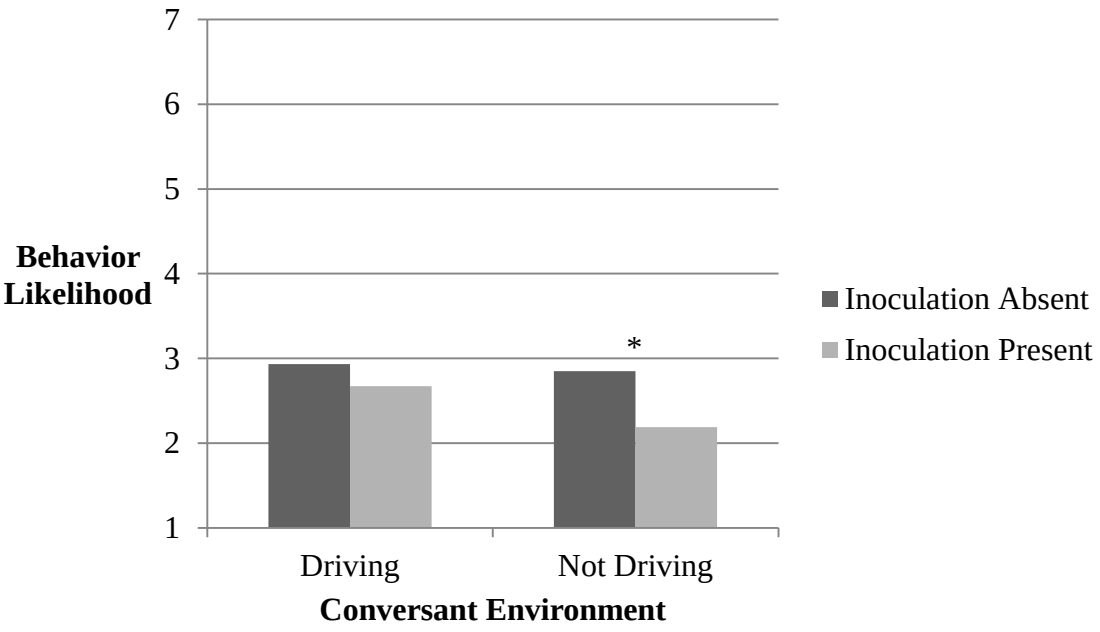
*$p < .05$

Figure 6 – Study 1: Likelihood of engaging in a text message conversation as a function of conversation importance and conversant environment



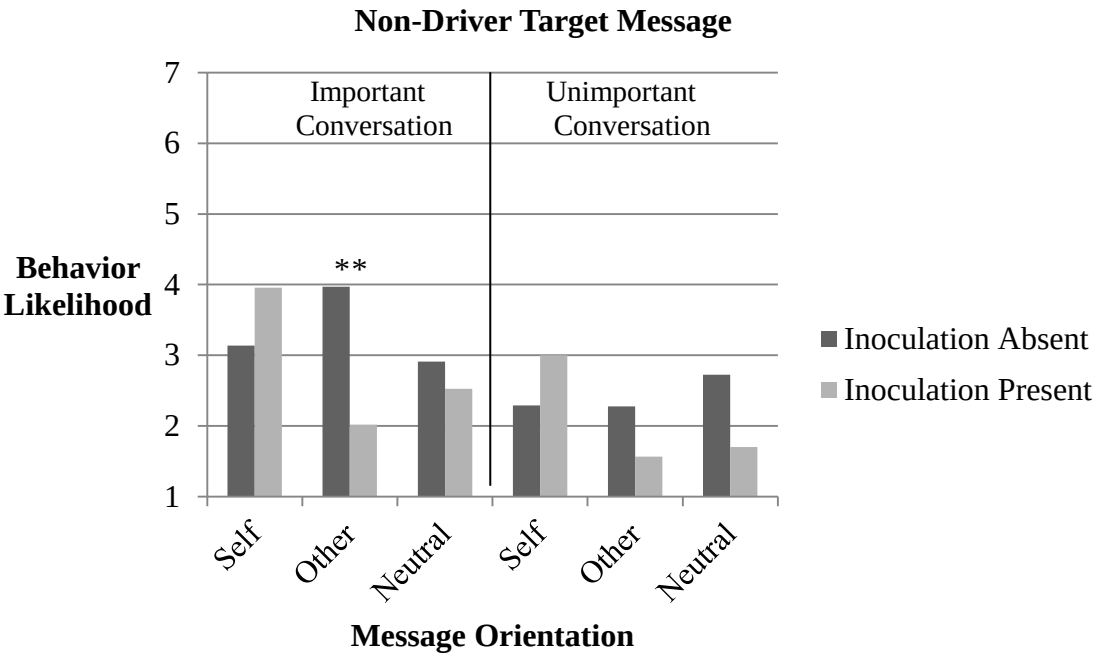
***$p < .001$

Figure 7 – Study1: Likelihood of engaging in a text conversation as a function of conversant environment and inoculation



*$p < .05$

Figure 8 – Study 1: Likelihood of engaging in a text message conversation as a function of conversation importance, message orientation, and inoculation among participants who read a message targeting non-driver behavior



**p = .01

Figure 9 – Study 2 procedural order by experimental condition

Mindfulness and Implementation Intentions Conditions

Control Condition

Message-Only Control

Table 1 – Study 1: Means and standard deviations for likelihood of engaging in a cell phone voice conversation as a function of conversation importance, conversant Environment (driving/not driving), inoculation (present/absent), message target (driver/non-driver), and message orientation (self/other/neutral)

	Important Conversation			Unimportant Conversation			Total Across Conversation		
	Driving	Not Driving	Total	Driving	Not Driving	Total	Driving	Not Driving	**Total**
Inoculation Present									
Driver Target									
Self	3.65 (1.80)	3.35 (1.71)	3.50 (1.72)	2.00 (0.96)	2.19 (1.48)	2.10 (1.16)	2.83 (1.18)	2.77 (1.45)	**2.80 (1.28)**
Other	5.00 (2.16)	4.92 (1.55)	4.96 (1.72)	3.27 (1.98)	3.92 (1.68)	3.60 (1.69)	4.13 (1.83)	4.42 (1.49)	**4.28 (1.53)**
Neutral	4.38 (2.39)	3.67 (2.21)	4.02 (2.22)	2.96 (2.42)	2.75 (2.14)	2.85 (2.18)	3.67 (2.26)	3.21 (2.08)	**3.44 (2.09)**
Total	4.34 (2.14)	3.99 (1.92)	4.17 (1.94)	2.74 (1.90)	2.96 (1.88)	2.85 (1.78)	3.54 (1.84)	3.47 (1.79)	**3.51 (1.73)**
Non-Driver Target									
Self	5.27 (1.62)	4.73 (1.29)	5.00 (1.27)	3.55 (1.90)	3.50 (1.48)	3.52 (1.60)	4.41 (1.66)	4.11 (1.26)	**4.26 (1.35)**
Other	4.37 (1.82)	2.90 (1.94)	3.63 (1.70)	2.63 (1.66)	2.10 (1.37)	2.37 (1.39)	3.50 (1.53)	2.50 (1.56)	**3.00 (1.42)**
Neutral	3.68 (1.93)	3.46 (1.80)	3.57 (1.45)	2.55 (1.70)	2.14 (1.58)	2.34 (1.54)	3.11 (1.68)	2.80 (1.52)	**2.96 (1.42)**
Total	4.43 (1.85)	3.61 (1.85)	4.02 (1.60)	2.88 (1.75)	2.53 (1.56)	2.70 (1.55)	3.66 (1.65)	3.07 (1.59)	**3.36 (1.49)**
TOTAL									
Self	4.40 (1.87)	4.00 (1.66)	4.19 (1.68)	2.71 (1.64)	2.79 (1.59)	2.75 (1.53)	3.55 (1.61)	3.39 (1.50)	**3.47 (1.48)**
Other	4.66 (1.97)	3.84 (2.02)	4.25 (1.81)	2.93 (1.81)	2.95 (1.76)	2.94 (1.63)	3.79 (1.68)	3.39 (1.79)	**3.59 (1.58)**
Neutral	4.04 (2.16)	3.57 (1.98)	3.80 (1.86)	2.76 (2.07)	2.46 (1.88)	2.61 (1.88)	3.40 (1.90)	3.01 (1.81)	**3.21 (1.78)**
Total	4.39 (1.99)	3.80 (1.88)	4.09 (1.77)	2.81 (1.82)	2.75 (1.73)	2.78 (1.66)	3.60 (1.74)	3.27 (1.69)	**3.44 (1.60)**

	Important Conversation			Unimportant Conversation			Total Across Conversation		
	Driving	Not Driving	Total	Driving	Not Driving	Total	Driving	Not Driving	**Total**
Inoculation Absent									
Driver Target									
Self	4.61 (2.36)	4.21 (2.30)	4.41 (2.28)	3.25 (2.25)	3.57 (2.14)	3.41 (2.09)	3.93 (2.17)	3.89 (2.17)	**3.91 (2.11)**
Other	4.25 (2.23)	4.71 (1.94)	4.48 (1.96)	3.61 (2.01)	4.07 (1.76)	3.84 (1.82)	3.93 (2.02)	4.39 (1.73)	**4.16 (1.78)**
Neutral	4.81 (2.00)	4.42 (1.91)	4.62 (1.77)	2.69 (1.28)	3.00 (1.17)	2.85 (1.05)	3.75 (1.53)	3.71 (1.48)	**3.73 (1.34)**
Total	4.55 (2.17)	4.45 (2.02)	4.50 (1.97)	3.20 (1.90)	3.56 (1.76)	3.38 (1.73)	3.87 (1.89)	4.01 (1.80)	**3.94 (1.75)**
Non-Driver Target									
Self	4.14 (2.27)	4.06 (1.91)	4.10 (1.93)	3.17 (1.89)	2.83 (1.56)	3.00 (1.64)	3.65 (2.04)	3.44 (1.63)	**3.55 (1.74)**
Other	5.44 (1.33)	5.33 (1.15)	5.39 (1.14)	2.63 (1.66)	4.17 (1.70)	3.94 (1.33)	4.58 (1.24)	4.75 (1.38)	**4.67 (1.19)**
Neutral	4.75 (2.15)	4.21 (2.23)	4.48 (2.05)	3.38 (2.25)	3.71 (2.17)	3.54 (2.05)	4.06 (2.04)	3.96 (2.17)	**4.01 (1.99)**
Total	4.63 (2.07)	4.40 (1.90)	4.51 (1.85)	3.36 (1.86)	3.41 (1.84)	3.39 (1.72)	3.99 (1.88)	3.90 (1.80)	**3.95 (1.73)**
TOTAL									
Self	4.34 (2.29)	4.13 (2.06)	4.23 (2.06)	3.20 (2.02)	3.16 (1.84)	3.18 (1.83)	3.77 (2.07)	3.64 (1.87)	**3.71 (1.88)**
Other	4.72 (1.99)	4.96 (1.67)	4.84 (1.71)	3.65 (1.73)	4.11 (1.70)	3.88 (1.61)	4.18 (1.75)	4.53 (1.58)	**4.36 (1.56)**
Neutral	4.78 (2.03)	4.32 (2.03)	4.55 (1.87)	3.02 (1.81)	3.34 (1.72)	3.18 (1.62)	3.90 (1.76)	3.83 (1.81)	**3.87 (1.65)**
Total	4.59 (2.12)	4.43 (1.95)	4.51 (1.90)	3.26 (1.87)	3.49 (1.79)	3.38 (1.71)	3.93 (1.87)	3.96 (1.79)	**3.94 (1.73)**

	Important Conversation			Unimportant Conversation			Total Across Conversation		
	Driving	Not Driving	Total	Driving	Not Driving	Total	Driving	Not Driving	**Total**
Total Across Inoculation									
Driver Target									
Self	4.15 (2.13)	3.80 (2.05)	3.97 (2.04)	2.65 (1.83)	2.91 (1.95)	2.78 (1.80)	3.40 (1.82)	3.35 (1.91)	**3.38 (1.82)**
Other	4.61 (2.19)	4.82 (1.73)	4.71 (1.83)	3.44 (1.96)	4.00 (1.69)	3.72 (1.73)	4.03 (1.90)	4.41 (1.58)	**4.22 (1.63)**
Neutral	4.60 (2.16)	4.06 (2.05)	4.33 (1.98)	2.82 (1.88)	2.88 (1.67)	2.85 (1.65)	3.71 (1.88)	3.47 (1.78)	**3.59 (1.71)**
Total	4.45 (2.14)	4.23 (1.97)	4.34 (1.95)	2.98 (1.90)	3.27 (1.83)	3.12 (1.76)	3.71 (1.86)	3.75 (1.80)	**3.73 (1.74)**
Non-Driver Target									
Self	4.57 (2.10)	4.31 (1.71)	4.44 (1.74)	3.31 (1.87)	3.09 (1.54)	3.20 (1.62)	3.94 (1.91)	3.70 (1.52)	**3.82 (1.62)**
Other	4.77 (1.71)	3.81 (2.05)	4.29 (1.72)	3.04 (1.59)	2.88 (1.78)	2.96 (1.55)	3.91 (1.50)	3.34 (1.84)	**3.63 (1.55)**
Neutral	4.24 (2.07)	3.85 (2.03)	4.04 (1.81)	2.98 (2.00)	2.96 (2.03)	2.97 (1.89)	3.61 (1.90)	3.40 (1.94)	**3.51 (1.79)**
Total	4.53 (1.96)	4.01 (1.91)	4.27 (1.74)	3.13 (1.81)	2.98 (1.76)	3.05 (1.66)	3.83 (1.77)	3.50 (1.74)	**3.66 (1.63)**
TOTAL									
Self	4.37 (2.10)	4.06 (1.88)	4.21 (1.89)	2.99 (1.87)	3.00 (1.74)	3.00 (1.71)	3.68 (1.87)	3.53 (1.71)	**3.61 (1.71)**
Other	4.69 (1.96)	4.34 (1.94)	4.51 (1.77)	3.26 (1.79)	3.47 (1.81)	3.36 (1.67)	3.97 (1.71)	3.91 (1.77)	**3.94 (1.61)**
Neutral	4.43 (2.10)	3.96 (2.02)	4.19 (1.88)	2.90 (1.92)	2.92 (1.83)	2.91 (1.75)	3.66 (1.87)	3.44 (1.84)	**3.55 (1.73)**
Total	**4.49 (2.05)**	**4.12 (1.94)**	**4.31 (1.84)**	**3.05 (1.85)**	**3.13 (1.80)**	**3.09 (1.71)**	3.77 (1.81)	3.63 (1.77)	**3.70 (1.68)**

Note. Values in parentheses are standard deviations. With the exception of the "non-driver/other/inoculation absent" cell (n = 9 for both important and unimportant conversations), all sample sizes for all inner cells ranged from 11 to 18. Because only a main effect emerged for the conversant position (answer/initiate) factor, means and standard deviations in this table collapse across conversant position.

Table 2 – Study 1: Means and standard deviations for likelihood of engaging in a cell phone text message conversation as a function of conversation importance, conversant Environment (driving/not driving), inoculation (present/absent), message target (driver/non-driver), and message orientation (self/other/neutral)

	Important Conversation			Unimportant Conversation			Total Across Conversation		
	Driving	Not Driving	Total	Driving	Not Driving	Total	Driving	Not Driving	**Total**
Inoculation Present									
Driver Target									
Self	2.96 (1.50)	2.00 (1.45)	2.48 (1.27)	1.96 (1.23)	1.88 (1.43)	1.92 (1.31)	2.46 (1.20)	1.94 (1.41)	**2.20 (1.24)**
Other	3.21 (1.76)	2.68 (1.88)	2.95 (1.64)	2.11 (1.43)	2.11 (1.44)	2.11 (1.24)	2.66 (1.35)	2.39 (1.54)	**2.53 (1.26)**
Neutral	3.23 (2.13)	2.58 (2.31)	2.90 (1.99)	2.46 (2.16)	1.92 (1.50)	2.19 (1.55)	2.85 (2.08)	2.25 (1.81)	**2.55 (1.73)**
Total	3.14 (1.78)	2.44 (1.89)	2.79 (1.64)	2.18 (1.63)	1.97 (1.42)	2.08 (1.34)	2.66 (1.56)	2.21 (1.57)	**2.43 (1.40)**
Non-Driver Target									
Self	4.38 (2.04)	3.54 (1.98)	3.96 (1.80)	3.08 (2.04)	2.92 (1.79)	3.00 (1.89)	3.73 (1.84)	3.23 (1.86)	**3.48 (1.78)**
Other	2.43 (1.72)	1.60 (1.14)	2.02 (0.98)	1.67 (0.84)	1.47 (1.08)	1.57 (0.68)	2.05 (1.17)	1.53 (0.97)	**1.79 (0.79)**
Neutral	2.85 (2.03)	2.20 (1.74)	2.53 (1.75)	1.90 (1.39)	1.50 (0.67)	1.70 (1.00)	2.38 (1.66)	1.85 (1.15)	**2.11 (1.32)**
Total	3.18 (2.05)	2.39 (1.78)	2.78 (1.69)	2.19 (1.56)	1.95 (1.42)	2.07 (1.40)	2.68 (1.67)	2.17 (1.52)	**2.43 (1.49)**
TOTAL									
Self	3.67 (1.89)	2.77 (1.87)	3.22 (1.70)	2.52 (1.75)	2.40 (1.67)	2.46 (1.68)	3.09 (1.65)	2.58 (1.74)	**2.84 (1.64)**
Other	2.81 (1.75)	2.12 (1.61)	2.47 (1.40)	1.88 (1.16)	1.76 (1.29)	1.83 (1.01)	2.34 (1.28)	1.95 (1.33)	**2.15 (1.09)**
Neutral	3.07 (2.05)	2.41 (2.04)	2.74 (1.86)	2.22 (1.85)	1.74 (1.20)	1.98 (1.36)	2.64 (1.88)	2.08 (1.54)	**2.36 (1.55)**
Total	3.16 (1.90)	2.41 (1.83)	2.79 (1.65)	2.18 (1.59)	1.96 (1.41)	2.07 (1.36)	2.67 (1.60)	2.19 (1.53)	**2.43 (1.43)**

	Important Conversation			Unimportant Conversation			Total Across Conversation		
	Driving	Not Driving	Total	Driving	Not Driving	Total	Driving	Not Driving	**Total**
Inoculation Absent									
Driver Target									
Self	3.60 (2.24)	3.20 (2.14)	3.40 (2.15)	2.90 (2.21)	2.50 (1.91)	2.70 (2.02)	3.25 (2.13)	2.85 (1.92)	**3.05 (1.99)**
Other	3.35 (1.90)	3.35 (1.81)	3.35 (1.76)	2.85 (1.80)	2.77 (1.60)	2.81 (1.65)	3.10 (1.73)	3.06 (1.60)	**3.08 (1.60)**
Neutral	3.23 (1.56)	2.96 (1.63)	3.10 (1.48)	1.96 (0.95)	2.50 (1.41)	2.23 (1.12)	2.60 (1.11)	2.73 (1.43)	**2.66 (1.20)**
Total	3.40 (1.89)	3.17 (1.85)	3.29 (1.80)	2.59 (1.77)	2.59 (1.63)	2.59 (1.64)	2.99 (1.71)	2.88 (1.64)	**2.94 (1.62)**
Non-Driver Target									
Self	3.42 (2.15)	2.86 (1.96)	3.14 (1.96)	2.31 (1.47)	2.28 (1.53)	2.29 (1.38)	2.86 (1.69)	2.57 (1.68)	**2.72 (1.61)**
Other	4.22 (1.92)	3.72 (1.68)	3.97 (1.68)	2.28 (1.20)	2.28 (1.12)	2.28 (1.11)	3.25 (1.45)	3.00 (1.33)	**3.13 (1.31)**
Neutral	2.64 (1.95)	3.18 (2.22)	2.91 (1.87)	2.50 (1.70)	2.95 (2.21)	2.73 (1.75)	2.57 (1.82)	3.07 (2.20)	**2.82 (1.80)**
Total	3.38 (2.07)	3.16 (1.96)	3.27 (1.87)	2.36 (1.45)	2.47 (1.66)	2.41 (1.42)	2.87 (1.65)	2.82 (1.74)	**2.84 (1.57)**
TOTAL									
Self	3.50 (2.16)	3.02 (2.02)	3.26 (2.02)	2.56 (1.84)	2.38 (1.69)	2.48 (1.69)	3.04 (1.88)	2.70 (1.77)	**2.87 (1.77)**
Other	3.70 (1.91)	3.50 (1.73)	3.60 (1.72)	2.61 (1.57)	2.57 (1.42)	2.59 (1.44)	3.16 (1.59)	3.03 (1.46)	**3.10 (1.45)**
Neutral	2.96 (1.74)	3.06 (1.88)	3.01 (1.64)	2.21 (1.34)	2.71 (1.79)	2.46 (1.43)	2.58 (1.44)	2.89 (1.79)	**2.73 (1.47)**
Total	3.39 (1.97)	3.16 (1.89)	3.28 (1.82)	2.47 (1.62)	2.53 (1.64)	2.50 (1.53)	2.93 (1.67)	2.85 (1.68)	**2.89 (1.58)**

	Important Conversation			Unimportant Conversation			Total Across Conversation		
	Driving	Not Driving	Total	Driving	Not Driving	Total	Driving	Not Driving	**Total**
Total Across Inoculation									
Driver Target									
Self	3.31 (1.94)	2.67 (1.93)	2.99 (1.84)	2.48 (1.87)	2.22 (1.71)	2.35 (1.76)	2.90 (1.79)	2.44 (1.74)	**2.67 (1.72)**
Other	3.28 (1.79)	3.00 (1.84)	3.14 (1.68)	2.46 (1.63)	2.43 (1.53)	2.44 (1.47)	2.87 (1.53)	2.71 (1.57)	**2.79 (1.43)**
Neutral	3.23 (1.83)	2.77 (1.97)	3.00 (1.72)	2.21 (1.65)	2.21 (1.46)	2.21 (1.33)	2.72 (1.64)	2.49 (1.62)	**2.61 (1.46)**
Total	3.28 (1.83)	2.81 (1.89)	3.04 (1.73)	2.39 (1.70)	2.29 (1.55)	2.34 (1.51)	2.83 (1.64)	2.55 (1.63)	**2.69 (1.53)**
Non-Driver Target									
Self	3.80 (2.12)	3.13 (1.96)	3.47 (1.91)	2.62 (1.73)	2.53 (1.64)	2.58 (1.61)	3.21 (1.77)	2.83 (1.75)	**3.02 (1.69)**
Other	3.10 (1.97)	2.40 (1.69)	2.75 (1.58)	1.90 (1.01)	1.77 (1.14)	1.83 (0.91)	2.50 (1.38)	2.08 (1.31)	**2.29 (1.19)**
Neutral	2.74 (1.94)	2.71 (2.02)	2.73 (1.78)	2.21 (1.55)	2.26 (1.79)	2.24 (1.50)	2.48 (1.70)	2.49 (1.84)	**2.48 (1.59)**
Total	3.28 (2.05)	2.78 (1.90)	3.03 (1.79)	2.27 (1.50)	2.21 (1.56)	2.24 (1.41)	2.78 (1.65)	2.50 (1.66)	**2.64 (1.53)**
TOTAL									
Self	3.57 (2.03)	2.91 (1.95)	3.24 (1.87)	2.55 (1.78)	2.39 (1.67)	2.47 (1.67)	3.06 (1.77)	2.65 (1.74)	**2.86 (1.70)**
Other	3.20 (1.86)	2.72 (1.78)	2.96 (1.63)	2.20 (1.39)	2.12 (1.39)	2.16 (1.26)	2.70 (1.46)	2.42 (1.47)	**2.56 (1.33)**
Neutral	3.01 (1.88)	2.74 (1.97)	2.88 (1.73)	2.21 (1.59)	2.23 (1.59)	2.22 (1.39)	2.61 (1.66)	2.49 (1.70)	**2.55 (1.51)**
Total	**3.28 (1.93)**	**2.80 (1.89)**	**3.04 (1.75)**	**2.33 (1.60)**	**2.25 (1.55)**	**2.29 (1.46)**	2.81 (1.64)	2.52 (1.64)	**2.66 (1.53)**

Note. Values in parentheses are standard deviations. With the exception of the "non-driver/other/inoculation absent" cell (n = 9 for both important and unimportant conversations), all sample sizes for all inner cells ranged from 11 to 18. Because no significant interpretable effects emerged for the conversant position (answer/initiate) factor, means and standard deviations in this table collapse across conversant position.

Table 3 – Study 2: Means and standard deviations for perceived helpfulness of reducing temptation, perceived helpfulness of reducing distraction, and likelihood of using the technique in the mindfulness and implementation intentions conditions

	Experimental Condition	
Outcome Variable	Mindfulness	Implementation Intentions
Helpful with Temptation Resistance[a]		
M (*SD*)	4.967 (1.129)	5.553 (.978)
n	30	38
Helpful with Reducing Distraction[b]		
M (*SD*)	4.667 (1.295)	5.158 (1.175)
n	30	38
Will Try Using[c]		
M (*SD*)	5.400 (1.380)	5.816 (1.087)
n	30	38

[a]Exact item wording: "The training technique I learned today will be helpful with overcoming the temptation to answer phone calls and text messages when I should be focusing on something else (e.g., driving, listening to a class lecture, completing schoolwork/studying for an exam, having a face-to-face conversation)." Participants responded to this item using a seven-point Likert scale, 1 = *strongly disagree* to 7 = strongly agree.

[b]Exact item wording: "The training technique I learned today will be helpful with not being distracted by receiving phone calls and text messages on my cell phone and staying focused on tasks or activities that need my full attention." Participants responded to this item using a seven-point Likert scale, 1 = *strongly disagree* to 7 = strongly agree.

[c]Exact item wording: "If I receive phone calls or text messages when I am doing something that needs my full attention, I will try using the technique I learned today to help me not be distracted by my phone ringing and staying focused on tasks or activities that need my full attention." Participants responded to this item using a seven-point Likert scale, 1 = *very unlikely* to 7 = *very likely*.

Table 4 – Study 2: Summary of logistic regression analysis for responding to a text message during class time as a function of perceived helpfulness with reducing temptation, perceived helpfulness with reducing distraction, and likelihood of using the technique

	B	SE	Wald	*df*	*p*	Exp(*B*)	95% C.I. for Exp (*B*)	
							Lower	Upper
Help Temptation	-.396	.437	.820	1	.365	.673	.286	1.585
Help Distraction	.146	.470	.096	1	.757	.864	.344	2.173
Will Try Using	.649	.402	2.608	1	.106	1.913	.871	4.203

Table 5 – Study 2: Percentage of text message responses sent during class time within each experimental condition

	Experimental Condition			
	Mindfulness	Implementation Intentions	Control	Message-Only Control
Responses during class	70%	82%	80%	91%
n	30	38	35	32

Table 6 – Study 2: Summary of logistic regression analysis for responding to a text message during class time as a function of experimental condition with mindfulness as the comparison

	B	SE	Wald	*df*	*p*	Exp(*B*)	95% C.I. for Exp (*B*)	
							Lower	Upper
Condition			3.998	3	.262			
Condition_Impl. Int.	.641	.578	1.230	1	.267	1.898	.612	5.890
Condition_Control	.539	.581	.861	1	.353	1.714	.549	5.351
Condition_MOControl	1.421	.726	3.837	1	.050	4.143	.999	17.178

Table 7 – Study 2: Summary of logistic regression analysis for responding to a text message during class time as a function of experimental condition with implementation intentions as the comparison

	B	SE	Wald	*df*	*p*	Exp(*B*)	95% C.I. for Exp (*B*)	
							Lower	Upper
Condition			3.998	3	.262			
Condition_Mind	-.641	.578	1.230	1	.267	.527	.170	1.635
Condition_Control	-.102	.595	.029	1	.864	.903	.282	2.897
Condition_MOControl	.781	.737	1.230	1	.289	2.183	.515	9.251

Table 8 – Study 2: Summary of logistic regression analysis for responding to a text message during class time as a function of experimental condition with control as the comparison

	B	SE	Wald	*df*	*p*	Exp(*B*)	95% C.I. for Exp (*B*)	
							Lower	Upper
Condition			3.998	3	.262			
Condition_Mind	-.539	.581	.861	1	.353	.583	.187	1.821
Condition_Impl. Int.	.102	.595	.029	1	.864	1.107	.345	3.552
Condition_MOControl	1.386	.739	1.425	1	.233	2.417	.568	10.290