

# Hazards to Family Relationships from Cell Phone Usage While Driving

Paul C. Rosenblatt, Ph.D, and Xiaohui Li, M.Ed.

University of Minnesota

**ABSTRACT.** The focus of the literature on the problems of cell phone use while driving has been on how driving is more risky while talking on a cell phone, but there are reasons to think that cell phone usage while driving is also risky to the relationships of the parties involved in the phone conversation. The same factors that make driving more risky while using a cell phone (for example, longer reaction times and impaired attention) can also make family communication in that situation more risky. This article provides a speculative theoretical analysis applying cognitive models of the effects of divided attention and distracted communication to suggest why cell phone communication when one of the family members in the conversation is driving can be risky. The analysis is applied to five hypothetical family conversation scenarios that could create difficulties.

Cell phone usage while driving is frequent and on the increase. In a survey of cell phone usage while driving an estimated 5.8% of drivers on the road were using a cell phone at any given moment in 2005 (Eby, Vivoda, & St. Louis, 2006). That percentage was twice what had been found with a similar survey in 2001. According to a Harris poll, 73% of adults in the U.S. talk on a cell phone while driving, and the percentage is higher the younger the adult (Harris Interactive, June 6, 2006). This suggests that cell phone usage while driving will become even more common in the future.

There are numerous studies of how driving while talking on a cell phone increases the chances of motor vehicle accidents (e.g., Beede & Kass, 2006; Drews, Pasupathi, & Strayer, 2008; Hunton, & Rose, 2005; Kass, Cole, & Stanny, 2007; National Highway Traffic Safety Administration, 2008; Sheridan, 2004; Strayer & Johnston, 2001; Redelmeier & Tibshirani, 1997). There are, however, no studies on how driving while talking on a cell phone with family members increases the chances of relationship difficulties (cf. Baron, 2008). What happens to a relationship when two family members are talking on a cell phone while one of them is driving? This speculative theoretical essay explores the possibility that driving while talking on a cell phone can be hazardous to family relationships. If we assume that the relationship risks involved in talking on a cell phone while driving are similar to the driving risks, (e.g., both tasks involve divided attention and distraction), we can develop ideas about how a family relationship may be impaired.

---

Direct correspondence to Dr. Paul C. Rosenblatt at [prosenbl@umn.edu](mailto:prosenbl@umn.edu).

### **Problems from Divided Attention**

As a general rule, multitasking reduces attention to any specific task (Strayer & Drews, 2007a), so it should not be surprising that cell phone usage while driving interferes with driving. Reaction times are slowed (Amado & Ulupinar, 2005; Beede & Kass, 2006; Caird, Willness, Steel, & Sciaifa, 2008; Hendrick & Switzer, 2007; Patten, Kitcher, Ostlund, & Nilsson, 2004; Strayer, Drews, & Johnston, 2003; Strayer & Johnston, 2001), and the reaction times are longer when cell phone conversations are more difficult and complex (Patten, Kitcher, Ostlund, & Nilsson, 2004). Attention to surrounding traffic, pedestrians, potholes, warning signs, traffic lights, the speedometer, and everything else a driver should monitor may be impaired while talking on a cell phone (Strayer, Drews, & Johnston, 2003). In fact, there is no evidence showing that talking on a cell phone improves attention to driving, but considerable evidence that talking on a cell phone while driving undercuts attention to what drivers need to attend to. Cell phone usage while driving means that drivers talking on cell phones see less on their periphery. Even when looking directly at something (another vehicle changing lanes, for example), little may register with them (Strayer, Drews, & Johnston, 2003), so they are more likely to commit errors in responding to the visual information. Also, drivers talking on cell phones will more often run red lights and more often stop at green lights and in general more often break traffic laws--Beede & Kass, 2006; Strayer & Drews, 2007b; Strayer, Drews, & Johnston 2003; Strayer & Johnston, 2001. They are less able to hold to the middle of their driving lane (Beede & Kass, 2006) and more likely to speed (Beede & Kass, 2006).

Evidence is mixed about whether drivers on cell phones compensate for the cognitive demands of distracted driving. In theory, they could compensate for the distraction by, among other things, decreasing their speed and increasing their distance from the vehicle ahead of them. Some research shows such compensatory action (Haigney, Taylor, & Westerman, 2000; some research shows exactly the opposite, shorter stopping distances with cell phone conversation and an increase in speed with longer cell phone conversations (Rosenbloom, 2006). The balance of the research does not show compensation or its opposite (Caird, Willness, Steel, & Sciaifa, 2008). And perhaps there should be no surprise that the literature shows little evidence that drivers compensate for the effects of cell phone usage because there is research showing that drivers generally do a poor job of calibrating attempts at compensatory action to the magnitude of their distraction (Horrey, Lesch, & Garabet, 2008).

### **Generalizing from problems in driving to problems in talking on a cell phone**

If distraction, divided attention, and perceptual complexity make for a higher error rate while driving while talking on a cell phone, it seems reasonable to speculate that they will do the same to cell phone interaction. The person driving while talking on a cell phone will have a slower reaction time to things said by the other. This could be a problem if the interaction partner interprets the delayed reaction as an indicator of ambivalence, of not having a ready answer, or of hiding something, and if any of those attributions is upsetting to the interaction partner. If the driver on the cell phone misses important details in the conversation, this could lead to misunderstandings and subsequent hard feelings. It could lead to failure to act on an agreement that the interaction partner thought had been made. It might lead to missing information that would create more positive interactions, or that could be a warning that there is relationship trouble. If decisions made while driving and talking on the cell phone are made more slowly and with poorer quality communication, there may be frustrations and difficulties, possible threats to the underlying relationship, and needless economic or other losses as a result of a suboptimal decision. Missing some of the details might lead the driver to make guesses about what was said, some of which might be wrong.

A driver talking on a cell phone might not hear some things, might misspeak, might misunderstand, and might cut the conversation short of what it should be for optimal communication and comfortable relationship. In general, cell phone usage while driving might lead to missed relationship stop lights, slow reactions to dangerous relationship circumstances, loss of control of one's part of the interaction, and interaction mistakes that could lead to conflict, hurt feelings, misunderstandings, and possibly even serious damage to the relationship.

Supplementing speculations from the literature on distracted driving, one can turn to a more general literature on cognitive processes while distracted. With divided attention, people are less able to recall whatever they produced verbally, have more frequent pauses, and have deteriorated clause and sentence grammar (Jou & Harris, 1992). They repeat more and have more pauses where they say "er" and "um" (Oomen & Postma, 2001). This suggests that the conversation of cell phone drivers may stumble because the driver will not remember what he or she has said, will pause more often, and will be relatively inarticulate, all of which can challenge communication for both parties.

Talking on a cell phone while driving is different from talking to a passenger while driving. A passenger may know when the driver is in a demanding situation and become silent until the driving becomes easier again or even be in a position to warn the driver of hazards, but a conversation partner on the cell phone will not know that there are immediate hazards and cannot adjust her or his interactions appropriately (Charlton, 2009; Crundall, Bains, Chapman, & Underwood, 2005; Drews, Pasupathi, & Strayer, 2008). Furthermore, the norms of phone conversation may be intolerant of silence. Both partners might typically be expected to do their part to maintain a flow of talking, whereas in ordinary conversation when people are physically together, perhaps especially when they are in a close, long term relationship, there may be frequent substantial pauses. Perhaps family members can work out a set of understandings that will allow for long pauses while one of the partners is talking on a cell phone while driving, but perhaps not. Thus, a cell phone conversation with a family member while driving may not afford the driver the freedom to pause (cf., Crundall, Bains, Chapman, & Underwood, 2005).

### **Problems Inherent in Any Cell Phone Conversation**

In addition to the distraction problems a person has while talking on a cell phone and driving, there are a number of problems that both partners have while communicating via cell phone.

#### **Lack of visual information**

A telephone conversation between family members deprives the two of visual cues. They do not see each other's gestures, facial expressions, what the other is doing, or the immediate physical environment of the other. Research on telephone conversations shows that visual information might not typically make a difference (Drummond & Hopper, 1991), but without information from gestures and facial expressions there might still be times when it is more challenging to understand the emotional reaction of the other or what the other is referring to in the immediate surroundings.

Loss of information that gestures, posture, and other visual attributes of a speaker could convey--whether that information reinforces and clarifies the spoken message, provides meaning or interpretation to the message, or somehow contradicts or qualifies the message--could create difficulties. If at times loss of visual information means that a telephone conversation is more demanding than a face-to-face conversation, there may be a higher communication error rate with phone conversation, and consequently there may need to be more effort put into correcting errors in order to make the conversation effective (see

Drummond & Hopper, 1991, on repair of telephone miscommunication). For both family members, the one driving and the one at the other end of the interaction and possibly not as distracted as the driver, the importance of making communication work in the absence of visual information means that they may at times need to put extra effort into getting messages across and to understanding messages. And this may create greater distraction from other ongoing tasks than if the two were face-to-face (Hunton & Rose, 2005). In addition, the need to rely on other cues when visual cues are absent means that the family members interacting via phone will of necessity rely more heavily on aural cues in order to interpret and understand what one another says, but the aural cues when a person is driving while talking on the cell phone may be confusing, misleading, and difficult to interpret. The aural cues the driver gives off may say as much about the demands of driving as they do about anything else. And at the same time, a distracted driver who is talking on a cell phone and who therefore needs to rely on aural cues may, because of the distractions of driving, miss crucial aural information from the family member with whom he or she is interacting.

### **Low signal to noise ratio**

Cell phone usage while driving may give a lower signal to noise ratio partly because of current limits of cell phone technology, and also because of the noise the car and surrounding traffic make (engine noise, the noise of tires on the highway, the sound of the car's fan, the sound of a radio or audio player). One may drive into areas of poorer cell phone reception. In addition, the transmission of a particular utterance may be delayed electronically, sometimes voices are changed spectrally, and sometimes there is just silence as the telephone system delays and eliminates a bit of what is said (Kawano, Iwaki, Azuma, Moriwaki, & Hamada, 2005), and these problems are more likely when a vehicle is moving. Even at their best, many cell phones as of this writing do not send or receive as well as most land line phones and certainly not as well as face-to-face communication. So there is the potential frustration of not understanding or being understood well. Not only can a poor signal to noise ratio be challenging to the interaction (leading to misunderstanding and requests for repetition or clarification), but the frustration may itself infect the relationship with feelings of upsetness at the partner. And particularly if the topic of interaction is important or the relationship already has vulnerabilities, there can be serious fallout from communication with a relatively low signal to noise ratio.

### **Concerns the non-driver might have about the driver's safety**

Cell phone usage while driving may make the family member at the other end of the conversation angry or worried that the driver is risking life and property. The worried family member may be abrupt, wanting to cut off the conversation as soon as possible, and that may lead the driver to conclude that the other family member does not value the conversation, rejects what is being said, or has negative feelings toward him or her. Hearing the anger or worry in the voice of the interaction partner may make the driver upset, particularly if he/she assumes that the anger and worry is related to the topic of the conversation.

### **Five Hypothetical Problem Scenarios**

What follows is an exploration of five hypothetical examples of potential relationship problems that could arise when a driver is conversing via cell phone with a family member. The five scenarios are offered as illustrations and elaborations of the arguments in this article and lay out theoretical arguments about the ways that cell phone usage while driving may be hazardous to family relationships.

### **Request to the driver to run an errand**

A study conducted in Norway (Ling, 2006) suggested that a common type of message a driver may receive via cell phone is a request from a family member to pick up some groceries on the way home. Given the inefficiencies of communication by cell phone, even something as simple as being asked to pick up a gallon of milk and a loaf of bread has some likelihood of being misunderstood or remembered inaccurately. The most common errors, bringing home the wrong thing or forgetting something, probably only produce mild irritation and frustration in the relationship, and the discomfort may be brief. But that is still a tax on the relationship from communicating via cell phone while one of the partners is driving.

### **Telephone report of good news**

Imagine a driver who is called by a family member with a report of good news. "I got that promotion at work! I'm getting ahead, and I'll be earning more!" Imagine too that the driver is distracted by the demands of driving and did not quite understand what was said, though the driver could tell that the other was excited about something. Perhaps the driver says a rather bland, "That's nice," hoping that the next thing said will reveal the information that was missed. But the family member reporting the good news hears the bland "That's nice" as disaffirming, for example, doubting that she or he can do the job, not caring whether she or he gets ahead, feeling negative about the taking on of more responsibility, or feeling competitive about the increased pay. The family member calling with the good news may feel hurt by the bland response and may hang up abruptly. Then the driver still does not know what the news was.

Alternatively, the family member calling with good news may react to what seems to be disaffirmation by criticizing or belittling the driver. On the defensive, the driver may verbally attack the partner. The driver may still not know what the good news was, but now the two are saying hurtful things to one another.

An alternative scenario is that the driver says a bland "That's nice," understanding fully what was said, but doing what Baron (2008) called volume control in the use of a mobile phone, trying to head off distraction in driving by not encouraging considerable input from the other, and not wanting to engage in substantial verbal output. In that case, the relationship might not suffer from the driver's lack of understanding but may suffer from the driver's lack of enthusiasm, and the implicit message that "I am too busy to give you much attention right now."

### **Telephone report of bad news**

In the next scenario, a husband who is driving answers a cell phone from his wife who has bad news to report. Imagine, for example, that a pipe has burst in the apartment upstairs, and parts of their apartment are flooded, plaster is falling, ceiling fixtures have filled with water, and furniture has been damaged. She is extremely upset, worried about a possible fire, how the flooding will be stopped, and overwhelmed with the problems of cleaning up the mess. She wants and needs her husband's emotional support, understanding, and affirmation. Imagine that the husband is distracted by the demands of driving and he did not hear all that she said, so he asks her questions about what she has already told him, and then she may feel upset that he had not listened well to her. Also, distracted driving probably means there are some delays in responding to things said, and those delays could be very upsetting to her, particularly when an immediate response means that her husband is offering strong support and a delayed response does not. For example, if she says, "I'm exhausted, and I've done everything I can think of to deal with this. But I'm worried that maybe I haven't done what I should do." At that point, a delay of a few seconds before responding could be taken to mean the husband is critical of what she has done. Also, if distracted

driving means the husband speaks monosyllabically or says little, perhaps the wife hears her husband's saying little to mean that he does not care.

### **Arguments**

Imagine a couple in an argument over the phone, while one of the partners is driving. The driver might misunderstand some things, miss verbal cues, be off in timing, and fail to engage with sufficient mental and emotional resources. This conversation could have strong implications for the short or even long term quality of the relationship. A delay in reacting, for example, may be a result of having to make a complicated driving maneuver. If the cell phone partner does not see the maneuver, he or she may assume that the delay in reacting means that the driver feels remote, is withholding feelings, is upset, or does not have a ready answer when she or he should. Those assumptions may lead to hurt feelings, anger, escalation in conflict, and recollections of other times when the partner was not present or attentive.

### **Apologizing**

Some phone conversations are so matter of fact and surface that it hardly matters whether the family members who are interacting understand fully or communicate clearly. But it seems important for a person who is making an apology to be 100% present and alert. Ling (2006) found that apologies do occur via cell phone while driving. So imagine that a couple had a nasty and hurtful argument just as the driver was leaving the house. As the driver heads for work, he or she wants to apologize and so calls the partner on the cell phone. The first sentence or two may go very well in the sense that the driver has been thinking about what to say, perhaps even rehearsing what to say. But then the partner does not react with quite the words anticipated in response to what was said, and the driver cannot quite grasp what the words are, nor, in heavy morning rush hour traffic, can the driver think clearly about what to say next. Perhaps anything said next in the phone conversation could make problems. Let's say the driver says "What?" To the driver this means, "Please repeat what you just said," but to the partner it means, "I cannot believe that you just said such an inappropriate thing." That kind of blurred communication could make things worse than they were when the driver left for work.

Or let's say the driver decides that she or he cannot really continue the apology via phone, that apologizing via cell phone was a mistake, so the driver says something abrupt like, "I can't talk now. Let's talk some more later." To the driver that means that she or he means well and wants to talk when less distracted. The partner may hear it as a critical reaction to what she or he just said, something like, "I have had all I can take from you.". When the two finally get together face-to-face, the conversation may begin with much more hurt and animosity than if apology had not been attempted over the cell phone.

### **Relationships in Jeopardy**

All relationships have their ups and downs, so there is every reason to think that a relationship can weather additional difficulties related to cell phone usage while driving, but relationships can benefit from avoiding interactions that unnecessarily create difficulty. Consider couple relationships, however, in which things have been so difficult that both partners are considering ending the relationship. In this situation it is conceivable that the problems arising from a single difficult phone conversation may push the relationship past a tipping point. For one or both of the partners, a telephone conversation in which the distractions of driving leads to misunderstanding or what can be taken as disaffirmation may be a last difficult experience that pushes one or both partners to a decision to divorce.

## **Discussion**

### **Sometimes cell phones may not be good for relationships**

There is a paradox with cell phone usage. Many people use cell phones to be closer and more in contact with family members (e.g., Ling, 2006, writing about Norwegian families; Wei & Lo, 2006, writing about young people in Taiwan). And yet when cell phone usage is combined with driving, the results might be negative for relationships. One might be more often in contact with important others, but the quality of the contact may be poor, particularly when driving is combined with an activity like driving that requires full attention. Perhaps that is one reason why cell phone use is associated with increased family distress and lower levels of family satisfaction (Chesley, 2005)

### **Needed study of attention division in driving while using a cell phone**

People driving and talking on the cell phone divide their attention, but as of this writing we have not seen an analysis of how the division is carried out. At one moment might all of one's attention be on driving and at another moment all on talking? Or are there never times when driving gets 100% of the attention and never times when the conversation gets 100% of the attentions? Is driving always or almost always privileged over talking or is the reverse true? Between the lines in much of the literature on driving while using a cell phone may be the idea that the cell phone interaction is privileged over the driving, but there is as yet no direct evidence of that.

To complicate matters further, perhaps with driving while talking on the phone there are three areas of attention, not two: the driving, the phone conversation, and an attention monitor. A person's attention monitor would be an internal executive function which would monitor where the person's attention is directed and other high priority alternatives to which to pay attention, and it would make decisions about how to allocate attention based on internal priority-setting criteria. If there is an attention monitor at work in distracted drivers, the attention monitor must always get some of the driver's attention; otherwise it is not a functioning monitor. And that would mean that neither driving nor the conversation ever get full attention.

### **Possible mitigating factors**

Perhaps in many family relationships in which there are recurrent cell phone conversations while someone in the family is driving there are learning processes that mitigate the relationship hazards. Something as simple as saying, "I'm driving," may, in some relationships, come to neutralize many of the problems discussed in this paper. Or family members may, over time, narrow the range of possible topics while talking on a cell phone, eliminating topics that are more likely to be difficult when one of them is driving. It could be useful and interesting to carry out family studies of the evolution of phone interactions when one of the family members is driving. However, there are reasons to believe that even with the most optimal of learning, some problems will not be avoided. Unpredictable topics and emotions come up; relationship emergencies arise that might override the ordinary limits a couple or family might have evolved for phone conversations when one of the partners is driving; and of course driving itself always has unpredictable elements.

### **An additional reason for not using cell phones while driving**

The very substantial literature on cell phones and driving talks about the risk in the driving, and a subtext in that writing is "Don't drive while talking on a cell phone. It is too dangerous." But all that writing, all the publicity given that writing, and even the passage in a number of states of laws that make some or all cell phone usage while driving illegal has not stopped millions of drivers from talking on a cell phone while driving. Perhaps the line

of thought developed in this paper, that the risks are not only ones of driving safety but also of relationship safety, might discourage more people from talking on cell phones while driving. Interacting via cell phone while driving may not only be hazardous to the safety of car, driver, and others; it may also be hazardous to relationships.

## References

- Amado, S., & Ulupinar, P. (2005). The effects of conversation on attention and peripheral detection: Is talking with a passenger and talking on the cell phone different? *Transportation Research Part F: Traffic Psychology and Behaviour*, 8, 383-395.
- Baron, N. S. (2008). Adjusting the volume: Technology and multitasking in discourse control. In J. E. Katz (Ed.), *Handbook of mobile communication studies* (pp. 177-193). Cambridge, MA: MIT Press.
- Beede, K. E., & Kass, S. J. (2006). Engrossed in conversation: The impact of cell phones on simulated driving. *Accident Analysis and Prevention*, 38, 415-421.
- Caird, J.K., Willness, C. R., Steel, P., & Sciaifa, C. (2008). A meta-analysis of the effects of cell phones on driver performance. *Accident Analysis and Prevention*, 40, 1282-1293.
- Charlton, S. G. (2009). Driving while conversing: Cell phones that distract and passengers who react. *Accident Analysis and Prevention*, 41, 160-173.
- Chesley, N. (2005). Blurring boundaries? Linking technology use, spillover, individual distress, and family satisfaction. *Journal of Marriage and Family*, 67, 1237-1248.
- Crundall, D., Bains, M., Chapman, P., & Underwood, G. (2005). Regulating conversations during driving: A problem for mobile telephones. *Transportation Research Part F: Traffic Psychology and Behaviour*, 8, 197-211.
- 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.
- Drummond, K., & Hopper, R. (1991). Misunderstanding and its remedies: Telephone miscommunication. In N. Coupland, H. Giles, & J. M. Wiemann (Eds.), *Miscommunication and problematic talk* (pp. 301-314). Newbury Park, CA: Sage.
- Eby, D. W., Vivoda, J. M., & St. Louis, R. M. (2006). Driver hand-held cellular use: A four-year analysis. *Journal of Safety Research*, 37, 261-265.
- Haigney, D. E., Taylor, R. G., & Westerman, S. J. (2000). Concurrent mobile (cellular) phone use and driving performance: Task demand characteristics and compensatory processes. *Transportation Research Part F: Traffic Psychology and Behaviour*, 3, 113-121.
- Harris Interactive (2006). Rochester, NY: Harris Interactive. Retrieved July 16, 2009, from <http://poll.orpub.com/>.
- Hendrick, J. L., & Switzer, J. R. (2007). Hands-free versus hand-held cell phone conversation on a braking response by young drivers. *Perceptual and Motor Skills*, 105, 514-522.
- Horrey, W. J., Lesch, M. F., & Garabet, A. (2008). Assessing the awareness of performance decrements in distracted drivers. *Accident Analysis and Prevention*, 40, 675-682.
- Hunton, J., & Rose, J. M. (2005). Cellular telephones and driving performance: The effects of attentional demands on motor vehicle crash risk. *Risk Analysis*, 25, 855-866.
- Jou, J., & Harris, R. J. (1992). The effect of divided attention on speech production. *Bulletin of the Psychonomic Society*, 30, 301-304.
- Kass, S. J., Cole, K. S., & Stanny, C. J. (2007). Effects of distraction and experience on situation awareness and simulated driving. *Transportation Research Part F: Traffic Psychology and Behaviour*, 10, 321-329.
- Kawano, T, Iwaki, S, Azuma, Y, Moriwaki, T, & Hamada, T. (2005). Degraded voices through mobile phones and their neural effects: A possible risk of using mobile phones during driving. *Transportation Research Part F: Traffic Psychology and Behaviour*, 8, 331-340.

- Ling, R. (2006). Life in the nomos: Stress, emotional maintenance, and coordination via the mobile telephone in intact families. In A. Kavoori & N. Arceneaux (Eds.), *The cell phone reader: Essays in social transformation* (pp. 61-84). New York: Peter Lang.
- National Highway Traffic Safety Administration (2008). *Driver distraction: A review of the current state of knowledge*. DOT HS 810 704, Spring, VA: National Technical Information Service, National Highway Traffic Safety Administration, U.S. Department of Transportation.
- Oomen, C. C. E., & Postma, A. (2001). Effects of divided attention on the production of filled pauses and repetitions. *Journal of Speech, Language, and Hearing Research*, 44, 997-1004.
- Patten, C. J. D., Kitcher, A., Ostlund, J., & Nilsson, L. (2004). Using mobile telephones: Cognitive workload and attention resource allocation. *Accident Analysis and Prevention*, 36, 341-350.
- 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.
- Rosenbloom, T. (2006). Driving performance while using cell phones: An observational study. *Journal of Safety Research*, 37, 207-212.
- Sheridan, T. B. (2004). Driver distraction from a control theory perspective. *Human Factors*, 46, 587-599.
- Strayer, D. L., & Drews, F. A. (2007a). Multitasking in the automobile. In A. F. Kramer, D. A. Wiegmann, & A. Kirlik (Eds.) *Attention: From theory to practice* (pp. 121-133). New York: Oxford University Press.
- Strayer, D. L., & Drews, F. A. (2007b). Cell-phone-induced driver distraction. *Current Directions in Psychological Science*, 16, 128-131.
- 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.
- Wei, R., & Lo, V.-H. (2006). Staying connected while on the move: Cell phone use and social connectedness. *New Media & Society*, 8, 53-72.