

# Mobile telephones, distracted attention, and pedestrian safety

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## Abstract

Driver distraction is a major cause of traffic accidents, with mobile telephones as a key source of distraction. In two studies, we examined distraction of pedestrians associated with mobile phone use. The first had 60 participants walk along a prescribed route, with half of them conversing on a mobile phone, and the other half holding the phone awaiting a potential call, which never came. Comparison of the performance of the groups in recalling objects planted along the route revealed that pedestrians conversing recalled fewer objects than did those not conversing. The second study had three observers record pedestrian behavior of mobile phone users, i-pod users, and pedestrians with neither one at three crosswalks. Mobile phone users crossed unsafely into oncoming traffic significantly more than did either of the other groups. For pedestrians as with drivers, cognitive distraction from mobile phone use reduces situation awareness, increases unsafe behavior, putting pedestrians at greater risk for accidents, and crime victimization.

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## 1. Introduction

### 1.1. Prevalence of mobile phones

Americans carry mobile phones and conduct conversations on them just about anywhere (Sunderland, 1999). Mobile phone use has grown from 1% of the U.S. population in the mid-1980s to about 14.5% or 38 million subscribers in 1996 to 207 million U.S. users in 2005 (Cellular Telecommunications and Internet Association, 2005; Katz and Aspden, 1998).

### 1.2. Safety and distracted attention among drivers using mobile phones

The growth in mobile phone use has brought attention to safety associated with the technology. Some major concerns include radiation emission and distraction while driving. Because many drivers have a mobile phone and use it while driving—up to 974,000 at any moment during the day

(Glassbrenner, 2005; Mussa and Upchurch, 1999), researchers have raised concerns about traffic accidents associated with mobile phone use while driving (Lamble et al., 1999; McKnight and McKnight, 1993; Violanti, 1997, 1998). There is evidence of increased distraction and motor vehicle collisions associated with mobile phone use (Redelmeier and Tibshirani, 1997; Strayer and Johnson, 2001). In addition, in spite of laws that ban handheld calls while driving while allowing hand free calling, it appears that driver distraction relates more to the difficulty and complexity of the conversation than whether it is a hands free or handheld unit (Patten et al., 2004). Studies of auditory distraction have produced contradictory results (cf. Hatfield and Murphy, 2007).

### 1.3. Mobile phone use and pedestrian safety

Our research dealt with a related aspect of mobile phone use and safety: pedestrian distraction associated with mobile phone conversation. It is not clear that walking safety will be similarly affected by phone conversation distraction, since walking represents more of a natural human behavior than driving. Although driving often becomes routine, perhaps the extra effort required to manage an automobile makes drivers more vulnera-

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ble to distracted attention. On the other hand, crossing a street also requires cognitive attention (cf. Hatfield and Murphy, 2007); and pedestrians, 4641 of whom were killed and 68,000 injured in traffic crashes in 2004 (NHTSA, 2006), are often at risk. Most such crashes occur when the pedestrian crosses the street (daSilva et al., 2003), and many seem to result from pedestrian inattentiveness (Bungum et al., 2005). Thus, for pedestrians using mobile phones, distracted attention may increase their risk of accidents. We conducted two studies related to this, one addressing distracted attention and the other addressing pedestrian street-crossing behavior.

## 2. Study 1: mobile phone use and object recall for pedestrians

### 2.1.1. Study aims

This study sought to find if pedestrians suffer distraction from conversation on mobile phones, which might reduce their situational awareness, making them less safe and more vulnerable to an accident.

### 2.1.2. Design

The study centered on a real pedestrian environment using one hand held mobile telephone in two experimental conditions. All participants walked a prescribed route, but half of them did so while having a telephone conversation on a mobile phone, and the other half simply held the mobile phone, awaiting a potential call, which never came.

### 2.1.3. Participants and sampling

Researchers stopped 60 passersby near the main pedestrian entrance to a large urban state land-grant university campus and asked them to participate in a test of mobile phone reception. Pedestrians walked through the area alone, in small groups, or among a larger number of independent pedestrians (such as might occur between classes). To avoid potential bias in the sample, a researcher approached most pedestrians walking alone and in small groups to request participation, occasionally bypassing a male or female to keep the sample balanced for gender. For sets of unaffiliated pedestrians, the research team used random numbers to select which person to approach, occasionally bypassing males or females to keep the sample balanced for gender. If the person agreed, he or she was assigned to either the conversation or the no conversation condition. To obtain 15 males and 15 females in each condition, the researchers assigned every second male to the “no conversation group” and did the same for females.

### 2.1.4. Mobile phone conditions

Each individual who agreed to participate received a mobile phone and the following instructions: “We’re testing the performance of different cell phones from various buildings on campus. We’ll hand you a phone and have you walk from here

Table 1  
Script for the conversation condition

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“Hi, what’s your name?” ---
“My name is . . . ”
“What’s your major?” ---
“Oh, my major is . . . ”
“What did you have for breakfast?” ---
“I had toast, juice and coffee.”
“What did you have for lunch?” ---
“That’s interesting. I had a hamburger, fries and a soda.”
“What was your favorite part about where you grew up?” ---
“Seen any good movies lately?” IF YES, “What did you like about that movie?”
“Do you have a favorite TV show?” IF YES, “What do you like about it?”
(If necessary, they asked similar questions about favorite book, song or group, city or place until they approach the end point).
“Thanks for participating in our study.”

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to there” (pointing to the other end of the walk about 100 yards away). Participants in the no conversation condition received instructions to, “hold the phone by your side and walk like normal; and if it rings, answer it. Otherwise don’t worry about it. It rings loud.” They did not receive a call or converse with anyone while they walked. They simply held the phone. Participants in the conversation condition received a call from a member of the research team once they had started walking. They spoke on the mobile phone with the caller while walking. The team member had a conversation script that required the participant to remember and comment on recent experiences. The script, shown in Table 1, had them recall such things as recent meals, favorite part of growing up, and recent movies. Investigators told all participants that their participation was voluntary; and obtained voluntary consent from them.

### 2.1.5. Situation awareness task

Prior to the study, five “out-of-place” objects had been planted along the route: three at eye level (a sign reading UNSAFE!, a boot, and a cup) and two at ground level (two pieces of fake vomit, and a chalk sketch of an Ostrich with its head in the ground). At the end of the walk, an interviewer apologized for the deception, explained that this was a study of people’s recall, and obtained verbal informed consent to ask some questions about what they remembered seeing during the walk. All participants consented. The interviewer showed them five sets of four photographs. Each set had one planted object mixed with three deflector objects (see Fig. 1). The interviewer explained that all, some, or none of the objects might have been along the route, and asked the participant which if any they recalled seeing.

## 2.2. Results

The analysis revealed that pedestrians noticed significantly more objects in the no conversation condition (LS mean = 1.58, S.E. 1.28) than in the conversation condition (LS mean = 1.15, S.E. 1.26) ( $F_{1,51}$  d.f. = 5.71,  $p < 0.05$ ). The effect size was relatively small, at 0.11 (SS condition = 2.435, SS error = 21.754).

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