

What Constitutes a Typical Cell Phone Call?

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and Renju Jacob**



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13. ABSTRACT (Maximum 200 Words) A total of 21 young people completed a 35-multipart question survey about their use of cell phones. Of them, 15 completed logs of every call for a month and answered over 20 multipart questions about each call (depending on the call), covering a total of 1,168 cell phone calls, about half of which were made while driving. The purpose of this study was to identify typical conditions of cell phone use and determine how driving and non-driving conditions differ so studies of cell phone safety and usability can examine test conditions that closely approximate real use. Calls were more likely to be business than personal, though many of the calls were social and involved scheduling meetings. About 1/5 of all calls while driving involved the use of pencil/pen/paper. Calls while driving were often long distance, were often dialed using a phone book, and averaged about 2-1/2 minutes in length. However, about 3/4 of all calls were a minute or less. About half of the calls were in residential and rural areas, 1/4-1/5 involved driving in degraded weather, and half were in medium or heavy traffic. Many of these driving situations have not been examined in the literature.				
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What Constitutes a Typical Cell Phone Call?

-> A3 Graphical Summary <-

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Technical Report UMTRI 2003-38

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1 Issues

1. What constitutes a typical phone call?
2. How do cell phone calls made while driving differ from other cell phone calls?

2 Method

1. 21 people (mean age=28) completed a 35-multipart question survey about their use of cell phones
2. 15 of 21 completed logs of every call for a month, ~ 20 multipart questions/call

3 Results, Conclusions, and Recommendations

About 1/2 the subjects put the phone on the seat, but many other places were cited.

Rec.: Larger sample

Sample Size	Location of Phone while Driving (# Drivers)				
	Cradle	Pocket	Seat	Purse	Other
15	2	4	8	3	3
21	2	6	10	5	4

Many drivers did something wrong when on the phone - 1 crash.

Q: How do these incidents influence the use of phones while driving?

Sample Size	When On Your Cell Phone, Have You... (# Drivers)					
	Tailgated	Cut off someone	Hit another vehicle	Ran a red light	Missed an exit or turn	Unknowingly exceeded the speed limit
15	3	4	1	3	9	9
21	6	6	1	3	13	12

Using a phone book to dial was common while driving but has not been studied.

Rec.: Study phone book use.

Method of Dialing >	Manual	Phone Book	Speed	Voice	Total
Driving (#, row %)	210 (45%)	186 (40%)	59 (13%)	13 (3%)	468 (100%)

Not driving (#, row %)	151 (45%)	98 (29%)	75 (22%)	14 (4%)	338 (100%)
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Long distance calls predominated while driving.

Rec.: Dialing studies should examine mostly long distance calls.

Call -> Destination	Long Distance	Local	Short # (911, *75)	Toll-Free	International	Total
Driving	304	99	3	4	0	410
Not driving	100	212	3	1	0	316

Almost every call was answered & most calls were answered using the handset. But voice, supposedly less distracting, was only answered 1/10 calls. Q: Why?

Calls Received By ->	Handset	Headset	Voice	Voicemail	Total
	(#, row %)				
Driving	77 (85%)	1 (1%)	9 (10%)	4 (4%)	91 (100%)
Not driving	198 (81%)	3 (1%)	33 (13%)	12 (5%)	246 (100%)

The phone was answered in about 2-1/2 rings, quite quick, especially for driving. Q: Why is it so urgent?

	# of Rings (#, row %)						
	0	1	2	3	4	5	6
Driving	0 (0%)	16 (18%)	29 (33%)	23 (26%)	12 (14%)	5 (6%)	3 (4%)
Not driving	1 (0%)	42 (18%)	118 (50%)	37 (16%)	18 (8%)	15 (6%)	5 (2%)

For some calls, driving distracted both the subject and the other party. Rec.: Study them.

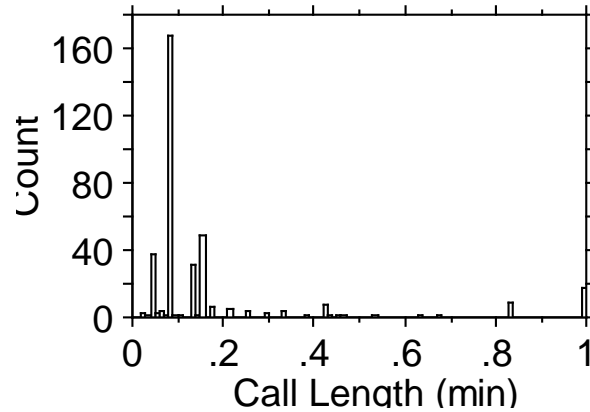
Subj. Was	Other Party Was (#, row %)		
	Driving	Not Driving	Unknown
Driving	40 (7%)	410 (75%)	100 (18%)
Not driving	50 (9%)	457 (85%)	31 (6%)
Total	90 (8%)	867 (80%)	131 (12%)

Calls while driving concerned more demanding topics. Why?

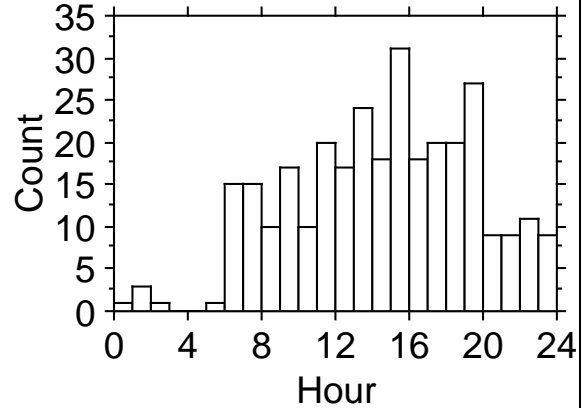
Rec.: Cell phone studies should explore a range of conversation demand.

Conversation Demand	Explanation	(#, column %)	
		Driving	Not Driving
1=Light	Chatty; "What's for dinner?"	204 (37%)	491 (75%)
2=Medium	Some decision making; "Hmm, you take Beth, I'll pick up Jon."	284 (52%)	162 (25%)
3=Demanding	mpg calculations; Divide 352 miles by 18 gallons of gas.	61 (11%)	5 (0%)
Total		549 (100%)	658 (100%)

**Most calls while driving were <15 s.
(Calls <1 min shown (80% of total))
Rec.: Study very short calls.**



**There were a few calls while driving at almost any hour.
Rec.: Study late night calls when drivers are fatigued.**



**Most calls required some attention because of imperfect channel quality.
Rec.: Degrade the channel in studies.**

	Listening Effort Required (n, column %)					Total
	1. None	2. No appreciable	3. Moderate	4. Considerable	5. No meaning	
Driving	221 (39%)	250 (45%)	66 (12%)	24 (4%)	0 (0%)	561 (100%)
Not driving	435 (75%)	98 (17%)	38 (7%)	8 (1%)	0 (0%)	579 (100%)

About 3/4 of all calls while driving <= 1 min. Calls while driving were > not driving (but the mean was ~3 min).

Rec.: Study short calls.

	Call Duration (min); note: D=Driving, ND = Not Driving											Total
	<=1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
D	363 73%	27 (6%)	17 (3%)	11 (2%)	23 (5%)	8 (2%)	2 (0%)	2 (0%)	1 (0%)	14 (3%)	27 (6%)	495 100%
N D	514 85%	34 (6%)	14 (2%)	10 (2%)	1 (0%)	2 (0%)	0 (0%)	1 (0%)	0 (0%)	2 (0%)	25 (4%)	603 100%

Subjects were relatively more likely to dial calls on expressways, but there were some calls on residential & urban roads.

Rec.: Those conditions have not been studied & should be.

Call Type	Where Calls Occurred (#, row %)					
	Xway	Residential	Urban	Rural	Other	Total
Outgoing	273 (58%)	83 (18%)	92 (20%)	16 (3%)	4 (0%)	468 (100%)
Incoming	21 (23%)	36 (40%)	15 (17%)	19 (21%)	0 (0%)	91 (100%)
Total	294 (53%)	119 (21%)	107 (19%)	35 (6%)	0 (0%)	559 (100%)

About 1/3 to 1/2 of all calls are in moderate or heavy traffic.

Rec.: Those conditions have not been studied & should be.

Call Type	Traffic while Driving (#, row %)				
	None (No Traffic)	Light (No Impact on Speed)	Moderate (Slowed by Traffic)	Heavy (Stop & Go)	Total
Outgoing	26 (6%)	183 (42%)	164 (37%)	68 (15%)	441 (100%)
Incoming	16 (20%)	36 (46%)	20 (25%)	7 (9%)	79 (100%)
Total	42 (8%)	219 (40%)	184 (35%)	75 (14%)	520 (100%)

About 1/5 of calls occurred in bad weather, common for Michigan in the winter.

Rec.: Those conditions have not been studied & should be.

Call Type	Weather while Driving (#, row %)				
	Clear	Rainy	Snowy	Windy	Total
Outgoing	368 (80%)	18 (4%)	74 (16%)	2 (0%)	462 (100%)
Incoming	69 (77%)	9 (10%)	10 (11%)	2 (2%)	90 (100%)
Total	437 (79%)	27 (5%)	84 (15%)	4 (1%)	552 (100%)

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INTRODUCTION

Over the last two decades, cellular phones have gone from being an unusual and expensive novelty to a common, inexpensive appliance. Some experts have even suggested that in the future landline phones will disappear and people will use only cell phones. The huge advantage of cell phones is the unlimited access to be called and to call others, at home, at the office, at a restaurant, and more commonly, while driving to and from those locations.

In a survey of 1,006 people in North Carolina, 550 (55%) reported having used a cell phone while driving (Stutts, Huang, and Hunter, 2002). Reported rates were about 68% in the 18-24 age bracket, 69% for ages 25-39, 62% for ages 40-54, 51% for ages 55-69, and 24% for ages 70 and above. Further, of those responding, 28% indicated they used a hands-free device when talking on the phone while driving.

Table 1 provides additional information on the total time the cell phone is used while driving (per day), the percentage of calls that are work-related, the typical number for incoming and outgoing calls (answered) per day, and how often respondents reportedly pulled off the road to use the phone. Calls were reported to most commonly last 1-4 minutes and were not work-related. For more than half the calls, the respondent rarely or never pulled off the road to use the phone. Finally, respondents received 1-2 incoming calls a day while driving and a made similar number of outgoing calls.

Stutts et al. (2002) also provide a summary of cell phone-related crashes including the road class being driven (most commonly local streets), the driver age, the type of maneuver (going straight was most common), and other items.

Table 1. Cell Phone Use Characteristics (Stutts et al., 2002, n=500 cell phone users)

Characteristic	N	Column %
Total time using the cell phone while driving on a typical day		
<1 minute	92	18
1-4 minutes	148	30
5-9 minutes	100	20
10-19	79	16
20-29	28	6
30-59	19	4
60-119	16	3
>=120	18	4
% of Calls that are work-related		
0	260	53
1-24%	46	9
35-49	17	4
50-75	67	14
75-99	67	14
100	31	6
Unknown/missing	12	
Typical # of outgoing calls made while driving		
None or almost none	122	25
<1/day	113	23
1-2 calls/day	147	30
3-5 calls/day	76	15
6-10 calls/day	22	4
>10 calls/day	18	4
Unknown/missing	2	
Typical # of incoming calls answered		
None or almost none	174	35
<1/day	81	16
1-2 calls/day	134	27
3-5 calls/day	69	14
6-10 calls/day	24	5
>10 calls/day	16	3
Unknown/missing	2	
How often do you pull off the road to use the cell phone?		
Never	172	35
Rarely	95	20
Sometimes	116	24
Usually	57	12
Always	54	11
Unknown/missing	6	

Several studies provide statistics on the frequency of phone use while driving. Reinfurt, Huang, Feaganes, and Hunter (2001) had pairs of observers at 85 sites in North Carolina count the number of passenger vehicles in each direction and the number of drivers who were talking on, dialing, or manipulating a cell phone. Usage rates were just under 3% in the morning, about 3% mid-day, and 3.5% in late afternoon. The study also provides interesting data on crash types.

As part of a study of seat belt use, observers looked at cell phone use at 2,063 sites scattered across the U.S. Table 2 displays some of the results. Notice that rates were about 3% (in agreement with Huang, Feaganes, and Hunter, 2001), being slightly higher for SUVs and vans, and lower for pickups. Rates were slightly higher in rural areas.

Table 2. Observed Cell Phone Use Rates from Utter (2001)

Vehicle Type	Overall	Urban	Suburban	Rural
All passenger vehicles	3.0	2.4	3.4	3.0
Passenger car	2.6	2.5	3.0	1.9
Vans and SUVs	4.8	2.8	5.6	7.1
Pickups	1.9	1.9	1.0	3.2

In contrast to landline phones, the unlimited access of cell phones can increase productivity and can therefore have economic benefits. However, there are several costs associated with cell phone use under some circumstances. One is the public risk of a crash, and the associated injuries and fatalities, when a cell phone is used in a moving vehicle. For example, one estimate is that 219 people were killed in cell phone-related crashes in the U.S. in 2001 (Green, 2001). Some suggest that the economic benefits of phone use while driving are roughly equivalent to the cost of deaths and injuries (Lissy, Cohen, Park, and Graham, 2000). Important aspects of these economic analyses are estimates of crash risk, of which there are very few (Redelmeier and Tibshirani (1997a, b, 2001)), and exposure (Reinfurt, Huang, Feaganes, and Hunter, 2001; U.S. Department of Transportation, 2001; Young, 2001; Stutts, Reinfurt, Staplin, and Rodgman, 2002; and Stutts, Feaganes, Rodgman, Hamlett, Meadows, Reinfurt, Gish, Mercadante, and Staplin, 2003).

In addition to data from cost-benefit and crash statistics analyses, data from human factors studies of cell phone use provide important insights into how cell phones are used while driving and the potential consequences. There is considerable research on this topic (see Goodman, Bents, Tijerina, Wierwille, Lerner, and Benel, 1997 and Green and Shah, 2003 for a recent reviews) and it continues to be a focus of considerable attention (de Waard, Brookhuis, and Hernandez-Gress, 2001; Uchida, Asano, and Hashimoto, 2002; and Strayer, Drews, and Johnston, 2003).

In drawing conclusions about the safety implications of cell phone use, the experimental cell phone tasks examined should represent actual cell phone use, or at least capture the essence of those aspects that are likely to interfere with driving. All too often authors assert that a task has both verbal and cognitive elements, and that is sufficient

to represent a cell phone call. To point to research conducted by this research team, Green, Hoekstra, and Williams (1993) conducted an on-the-road experiment concerning cell phone safety. One of the 3 verbal tasks intended to represent the distraction of conversation involved listing all of the items that subjects could think of in a category for a period of time (30 seconds). For example, if given “tree names,” they would say maple, oak, etc. Does this task resemble what people do when talking on a cell phone while driving?

In another example, McKnight and McKnight (1993) had subjects solve math problems (presented auditorily) while driving ($2 + 3 + 4 + 1/2 + 3 + 4 = ?$). Is this task representative of what people typically do while driving? Does it represent a reasonable worst case task?

The unstated assumption is that any verbal-cognitive task, especially one that involves holding a communication device, resembles a cell phone call. There is no data to support this hypothesis. More generally, there is no data in the literature, at least data that safety and human factors studies have used, to provide a basis for determining what constitutes a typical cell phone call.

In the summer of 2001, Motorola held a meeting before the Driver Assessment conference in Aspen, Colorado to determine research needs on cell phone use while driving (Anonymous, 2001). One of the recommendations from that meeting was for research on “cell phone user characteristics & use patterns while driving.” That recommendation, along with the concerns just noted, led to this research under the auspices of the UMTRI Driver Interface Affiliation Program. (See also Green, 2002.)

In refining the research program, the authors considered information in the meeting report and the nature of the communication process. To characterize a call, one must consider the users on both ends of the call (including the possibilities that one of the parties is a machine), other tasks performed while calling, the communication devices used (especially hand-held vs hands-free), the quality of the communications link, the calling task, and the content of the message (both informational and emotional). Figure 1 illustrates the elements of a phone call. Each of the elements of a call may differ from the conditions and materials used in prior research. Some of those differences may influence the outcome of the research and have implications for cell phone safety and usability. The authors are not suggesting that all prior research is useless, but rather that the results would be much better if the experimental tasks more closely approximated real cell phone use. (Note that is a flaw not only of the research of others, but also of prior research conducted by the first author.) To achieve these improved results, what constitutes a typical cell phone call needs to be determined.

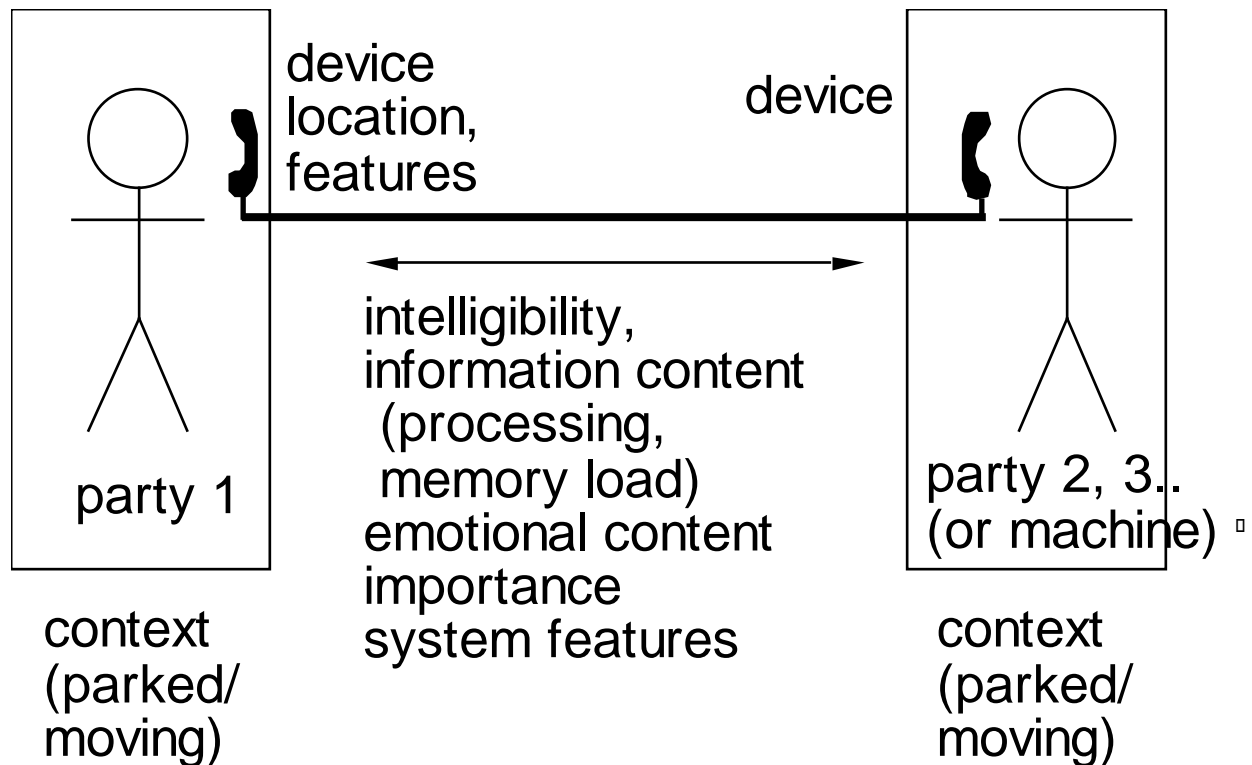


Figure 1. The Call Elements

With the goal of identifying typical and reasonable worst case tasks for future studies of cell phone safety and usability, the following 2 high level questions were addressed:

1. What constitutes a typical phone call?
2. How do cell phone calls made while driving differ from other calls?

These questions were further refined to the following:

1. What is the distribution of durations of cell phone calls made in moving vehicles, parked vehicles, and in other situations? What are the means and standard deviations? How do they vary with time of day and day of the week? What fraction of all cell phone calls occur while driving? What are the fractions of local and long distance calls, and incoming vs. outgoing calls?

Limited data on call durations were collected in this study. Additional information is anticipated in future research.

2. Who is making cell phone calls (age, sex of users) and whom are they calling? How often is the call to voice mail or an answering machine?
3. What kinds of cell phones are people using? How are calls dialed (enter all digits vs. speed dial vs. other methods) and answered? How often hands-free devices are used is of special interest.

4. What is the quality of service of the communication line in terms of intelligibility of speech on the link and fraction of calls dropped?
5. What are people discussing? What is the informational and emotional content of phone communications?
6. For calls made while driving, what are typical driving conditions? What types roads are being driven (road class, speed, etc.)? What are the weather conditions? How often are visibility and the road surface degraded by the weather? How much traffic is present?

SURVEY PLAN

How the Survey Was Completed

The participants for the study were recruited using an advertisement in the Ann Arbor News, the local paper, and in a few cases, from personal contacts. Those calling in response to the ad were screened over the phone following the instructions in Appendix A. Only subjects who made at least 10 cell phone calls per week, some of which occurred while driving, were recruited. The goal was to get usable data on a total of 1,000 phone calls from 20 people who used their cell phone while driving.

The data was collected from November of 2002 through February of 2003, with subjects starting at various times in that period as they became available. Ideally, subjects would have been recruited to be representative of the U.S. adult population on many demographic dimensions. However, the task of tracking every cell phone call for a month was expected to be onerous, and, given the funding resources available, there were constraints on the scope of the sample. Furthermore, because weather is a factor, the ideal situation would be to cover all months of the year.

The idea of enlarging the sample was explored with an automotive OEM and the sponsor. However, despite internal prodding, no one from those 2 organizations contacted by their liaisons with this project was willing to serve as a subject.

Subjects who met the screening criteria came to UMTRI for an interview. (Appendix B provides interview details.) They began by completing a consent form (Appendix C), followed by a form for biographical data and general calling behavior (Appendix D). Also, they were provided with forms on which to log each call (Appendix E). These materials are described in greater detail in the next section.

Subjects were asked to mail in the call logs once per week using provided self-addressed stamped envelopes, and at the end of the month, mail in a copy of their phone bill (with the last 4 digits of each number blanked out for privacy) to provide data on call timing and duration. This process is sometimes referred to as "bill harvesting."

Survey Forms

The biographical and calling behavior (or initial interview) form listed 35 multipart questions. The biographical section provided limited data on the driver (age, sex, income range); on the vehicle they drove most often (year, make and model, annual mileage, recent crashes, response to driving situations (to identify risky behavior), etc.); on their current cell phone use (who pays for it, how long they have had it, who they commonly call); on their cell phone features (speed dial, voice dialing, etc.); and on whether they had ever been involved in a cell-phone related crash.

The 2-page call log (or call diary) was the heart of the survey and a great deal of effort was expended to make the form simple to complete and fit on 2 sides of 1 sheet of

paper. Side1/page 1 contained most of the approximately 20 multipart questions about each call, such as if the call was outgoing or incoming (dialed or received, and how), if the call was a multiparty (conference) call, what kind of line the other party was using (cell, land, computer), the quality of the communication link, if the call was dropped, if other materials or devices were used during the call, the driving conditions (if appropriate), and data about the information and emotional content of the call.

Many of the questions were based on either wording or options from standard engineering evaluation protocols. For example, the question about call quality utilized the exact wording of the options given the International Telecommunications Union Recommendation P830 Listening Effort Scale (International Telecommunication Union, 1996) for call quality.

Information about driving conditions (in particular the wording of the options) was taken verbatim from the CDS (Crashworthiness Data System) code book, one of the best known crash databases currently used by the U.S. Department of Transportation (University of Michigan Transportation Research Institute, 2002). More specifically, the question about the crash scenario was CDS variable 371, barriers were v381, the number of travel lanes was v382, road surface was v386, light levels were v387, and weather was v386.

The question about emotional content was based on the Holmes-Rahe Social Readjustment Scale (Holmes and Rahe, 1967), a scale ranging from 11 (minor violations of the law) to 100 points (death of a spouse). To help subjects find relevant items from the roughly 40 listed, the scale was restructured (on page 2 of the call log in Appendix E) and items were grouped into 7 categories (family, money, social/recreational, spouse, work, personal, and health).

Creation of the survey materials attempted to balance collecting enough information to provide a solid basis for future research on cell phone calls with the time required to document each call. If that time was too long, there was concern that the quality of the data collected would suffer and that obtaining a sufficient number of responses would be difficult.

Survey Participants

A great deal of information was collected about the participants in this experiment, including the usual biographical data (age, sex), information about their driving behavior, information about their vehicles, and information about their phones. Only basic demographic information is reported in this section. Information about driving behavior, vehicles, and phones is reported in the results.

A total of 22 licensed drivers who used cell phones while driving responded to the newspaper advertisement (or in a few cases, were contacted personally), came to UMTRI, and all but 1 completed the initial survey regarding their use of cell phones. Of them, 15 submitted logs on calls they made for a month. Although this is a bit lower

than the goal of 20 subjects, the goal of at least 1,000 log sheets (1,168) was surpassed. The authors believe that these values are sufficient to provide useful data for designing future experiments, but short of the number needed to statistically characterize the U.S. adult population.

The authors have chosen to report data for both the 15 and 21 subject samples (some issues can be resolved based on the initial interview form) using the largest sample available, the 21 subjects. Other questions that are tied to the call logs are most appropriately addressed with data from the 15 subject sample. Although this approach can complicate comprehension because there is more data to discuss, the need for completeness is far more important.

For the 15 subjects (7 men and 8 women), their mean age was 29 (ranging from 20 to 51 years). In comparison, the other 7 subjects who did not complete the call logs (4 men and 3 women) ranged from 20 to 42 (mean 27), approximately the same age. Thus, this sample was younger than the population of drivers (<http://www2.state.id.us/itd/highways/ohs/99data/99driver.pdf>), though it is unknown how this sample compares with cell phone users overall or with cell phone usage while driving. However, there did not seem to be any major differences between the 15 subjects who completed the call logs and the 7 who did not.

Table 3 shows their incomes, with 9 of the 15 subjects (and 11 of the 21) having incomes of less than the \$20,000. The incomes of both samples are much lower than the averages for U.S. households (\$49,219 for 2002, http://advertising.washpost.com/the_market/top10/income.jsp) but it is unknown how these samples compare with cell phone users overall or those that use cell phones while driving. Also, the question did not specify if individual (assumed) or household income was desired. Many of the subjects were suspected to be single, so the 2 amounts should be the same. (Future studies should also record marital status.)

Table 3. Question 3, Income of Participants

Subject Sample	<\$20,000	\$21,000-\$30,000	\$31,000-\$40,000	\$41,000-\$50,000	>\$70,000
N=15	9	2	1	2	1
N=21	11	4	2	3	1

The 15 and 21 subject samples drove approximately 13,500 and 12,400 miles/year respectively (both with ranges of 300 to 30,000 miles), slightly above the roughly 13,000+ miles/year typical for the U.S. (<http://www.ott.doe.gov/facts/archives/fotw255.shtml>). Of the 15 subjects, 14 drove cars, with the other subject driving a minivan. Of the 21 subjects, 17 drove cars, 2 drove trucks, and 2 drove SUVs/minivans. Many of the cars were compacts. All but 4 of the 15 vehicles (and 5 of the 21) had automatic transmissions. Thus, the sample was very car-oriented, more so than the population of U.S. drivers (where more than half of the vehicles sold are not cars). Vehicles ranged from 1 to 11 years old for the 15

subject group (mean=6.7) and 1 to 12 years for the 21 subject group (mean=6.4). For the U.S., the average is 8.5 years for passenger cars and 9.4 years for light trucks (<http://www.michiganinbrief.org/edition06/text/appendix/append-J.htm>), so the sample has slightly newer vehicles than is typical for the U.S.

RESULTS

What Kinds of Cell Phones Did Subjects Have?

Subjects reported they obtained their first cell phone anywhere from 0 to 11 years ago. The mean for the 15 subject sample was 3.6 years and 4.1 years for the 21 subject sample. Only 2 subjects had phones more than 6 years ago.

Of the 21 subjects, 5 reported having Nokia phones, 4 reported Motorola phones (versus 5 and 3 respectively for the 15 subjects), and in both cases a single individual represented several manufacturers. However, several subjects reported the name of the service provider (Verizon, AT&T), suggesting the reports concerning phones were not completely reliable. In the future, this information should be noted by the experimenter by looking at the phone and should not just be reported by subjects. Further, both the phone manufacturer and phone service provider should have been recorded, as well as the phone model number (to determine features available) and, as will become apparent later, the service plan (the number of anytime minutes per month and when unlimited service is available).

Subjects reported having their current cell phone for a mean of 13 months (range of 2 to 48 months) for the 21 subjects and 16 months for the 15 subjects (range of 2 to 36), so they were reasonably familiar with their phones. As shown in Table 4, the most common reason for getting a phone was for emergency use, a response selected by over 1/3 of those responding. Notice, however, there were many other reasons as well. The values in each column exceed the sample size because several subjects selected more than 1 reason.

Table 4. Question 19. Why Did You Get Your First Cell Phone?

Reason	Subject Sample	
	Total=15	Total=22
Required by employer	1	2
Keep in touch with family members	4	6
Received as gift	2	2
Optimize time-making calls while walking or driving	2	2
More economical than local phone service	4	5
Emergencies	6	8
Other	2	2

None of the phones had a Bluetooth capability. For 9 of the 15 subjects and 13 of the 21 subjects, their cell phone was their primary phone. Thirteen out of the 15 and 17 out of the 21 subjects paid their own cell phone bills (Table 5). One of the subjects reported that the bills were sometimes paid by him/herself and other times by his/her parents. If anything, paying for the phone tends to minimize use. Two of the 21 subjects had more than 1 cell phone. Thus, these subjects had considerable experience with their current phone and depended upon it.

Table 5. Question 22. Who Pays the Bill? (# Drivers)

Subject Sample Size	Employer	I do	Parent	Other (Wife)
15	1	13	1	0
21	2	17	2	1

According to the Initial Interview Form, Which Cell Phone Features Were Reportedly Used while Driving?

Table 6 examines phone usage and features reported by subjects (but not verified). Notable is the substantial number of subjects who reported they used speed dial and/or the phone book for dialing calls, 11 of the 15 and 17 of the 21 subjects, corresponding to 73 and 80% of the subjects respectively. (Note, this is not the percentage of calls dialed and it is unknown how many subjects had these features but did not use them. Future studies should more carefully examine phone feature content.)

Table 6. Phone Features Used (n=15; 21 drivers)

Question	Speed Dial/ Phone Book	Hands- Free Kit	Voice- Activated	Calling Card	Computer	Other
24. Dialing	11; 17	3; 3	1; 1	0; 0	0; 0	7; 7

32. Location while driving	Cradle	Pocket	Seat	Purse	Other
	2; 2	4; 6	8; 10	3; 5	3; 4

25. Services	Call Waiting	Caller ID	EMS	IM	Direct Connect	Other
	11; 16	13; 18	3; 3	3; 3	3; 4	2; 3

26. Conversation	Speaker Phone	Head Set	Ear Piece	Hand-Held
	2; 3	3; 3	5; 5	13; 17

(See Appendix F for a description of these features.)

The “other” category was used by some subjects to indicate manual dialing. (The reason the percentages do not add up to 100% is that some of the percentages are from different subjects.) Subjects estimated they dialed about 8 calls/day (8.0 for the 15 subject sample, 8.1 for the 21), and received about 5-1/2 calls/day (5.5 for the 15 subject sample, 5.6 for the 21). Subjects reported they made (dialed and received) just over 20 calls/week when driving alone (22.4 and 21.0 respectively), a fairly large number. Thus according to these data, just over 20% of all cell phone calls occurred while driving for these samples. (Data based on actual usage appears later in this report and, in fact, the percentage based on the call logs was much higher.)

The 15 subjects reported they placed a mean of 57 cell phone calls per week (range of 14 to 210) and received a mean of 35 calls per week (range of 7 to 140). Of the calls placed and received, 27 calls were reported per person while driving (range of 3 to 150). For the 21 subjects, the mean for the number of calls placed per week was 59 and they received calls at an average of 38 per week, the range remaining the same. Of the calls placed and received, 33 calls were reported per person while driving (range of 3 to 161).

When calls were dialed, the initial location of the phone was typically on the seat (about half of the cases), in a pocket (about 1/4 of the cases), or in a purse (about 1/5 of the cases). Use of a cradle was uncommon.

Also note that enhanced message services (EMS) and instant messaging (IM) were used by a few, but not many, subjects. About 3/4 of the calls (for the overwhelming majority of the subjects) involved use of a hand-held phone.

Research on cell phone use while driving has concentrated on use of the phone alone. As shown in Table 7, for 953 of the 1,110 calls for which materials were coded (out of 1,168), no other materials were used. However, for 132 calls, pen/pencil/paper were used, including almost 103 of the 554 cell phone calls coded while driving – that is 18% of all calls. The use of other items (calculator, PDA, etc.) was quite rare, both while driving and not driving. The “other” category represents a truly mixed collection of items including computer (12 cases), and a phone address book, calendar, kitchen cookware, menu, and a shopping cart, all 1 case each.

Table 7. Materials Used During the Conversation (Question 7)

Materials Used	Driving	Not Driving	Total
No materials used	451	502	953
Pen/pencil/paper	98	34	132
Other items	0	17	17
Calculator	4	0	4
PDA	1	3	4
Map	0	0	0
Total Calls (all 1,168 were not coded)	554	556	1,110

How Aggressive Were These Drivers?

As shown in Table 8, responses to the questions concerning driving behavior are consistent with a youthful sample, being slightly aggressive. Probably the most indicative response is to question 14 (Which lane do you drive in the most?). Notice that the number of subjects preferring the left lane was triple the right, but about equal to those choosing the middle lane. If this sample were typical of the driving public, those choosing each of the 3 lanes would be equal or possibly biased to the right and middle lanes. Also note that about 1/3 of the subjects would try to beat a red light

(question 9) and be somewhat aggressive in going after an open parking spot (question 17).

Table 8. Driving Behavior Questions, What Drivers Usually Do (n=15; 21 drivers)

Question	Option 1	Option 2	Option 3	Option 4
9. When approaching an intersection & the light turns yellow	Floor it	Keep going if you don't see any police cars	Keep going & hope you make it before the light turns red	Stop
	3; 4	1; 1	5; 7	6; 9
10. When someone cuts you off on the highway	Make an obscene gesture	Honk your horn or flash your high beams	Slow down a bit to put a safer distance between the 2 of you	Pass them and then cut them off
	1; 1	2; 4	10; 14	2; 2
11. Do you usually	Drive the speed limit	Drive a couple miles per hour over the limit	Drive 5 - 10 mi/hr over the limit	Drive > 10 mi/hr over the limit
	2; 4	8; 9	4; 7	1; 1
13. You are in the left lane & you come up behind someone who is driving slower	Slow down	Use your high-beams until they move out of your way	Tail-gate them until they move out of your way	Go into the middle lane and pass them
	4; 6	1; 1	1; 2	9; 12
14. Which lane of the highway do you drive in the most?	right lane	middle lane(s)	left lane	
	2; 3	8; 9 (S2 reported right & middle.)	6; 10	
15. When you are stuck in a traffic jam on the highway & you are in a hurry	Accept the fact that you're going to be late	Switch lanes frequently to the lane moving the fastest	Drive on the shoulder	Get off hwy & find another route
	6; 8	5; 7	0; 0	4; 6
16. When behind someone on a 1-lane road who is driving exactly at the speed limit	Look for an opportunity to pass them	Pass them and cut them off for going so slow	Stay a safe distance behind them & drive at the speed limit	Tailgate them
	8; 11	1; 1	5; 8	1; 1
17. You circle a full lot for 5 min. & see a spot. Another car is coming in the opposite direction.	Speed up, gesture at the other person if they take it	Let the other person have it	Wait to see if the other person takes it or lets you have it	Try to get to the parking spot first
	0; 1	3; 3	7; 8	5; 9

Did Cell Phone Use Lead to Crashes and Undesired Driving Behavior?

As noted in the introduction, cell phone use is believed to be a causal factor in crashes. As shown in Table 9, 6 of the 15 subjects and 8 of the 21 subjects reported being involved in 1 or more crashes in the past 5 years. Eight of the 15 subjects (and 11 of the 21) had 1 or more tickets for moving violations in the last 5 years. Just over half of the subjects in both samples had received a ticket in the last year. In Michigan, for drivers ages 18-24, the mean number of fatal and serious crashes/1000 drivers/year is 3.6 (http://www.umich.edu/~urecord/0203/Aug11_03/06.shtml).

Table 9. Questions Concerning Crashes and Offenses (n=15; 21 drivers)

Question	Options			
8a. # of Police-reported crashes in last 5 years	0	1	2	3
	9; 13	4; 5	1; 2	1; 1
8b. # of Tickets for moving violations in last 5 years Note: 1 each of the 15 and 21 subjects had 4 tickets and 1 of the 21 subjects had 5.	0	1	2	3
	7; 10	5; 6	0; 1	2; 2
12. # of Tickets in past year	0	1-2	3-4	>5
	7; 10	7; 10	1; 1	0; 0

When asked, "Have you ever been involved in a crash or near crash in which your use of a mobile phone could have been a contributing factor?" (question 34), 2 subjects in the 15-subject sample responded yes. One described a crash in which while waiting at a red light, they thought the light turned green, so they bumped the vehicle in front of them. A second described almost hitting a pedestrian on a residential street.

Table 10 shows subjects recalled other non-crash consequences of driving and using the phone such as unknowingly exceeding the speed limit and missing turns (both about 60% of the subjects), cutting someone off (about 20%), running a red light (about 15%), and so forth.

Table 10. Question 33. When on Your Cell Phone, Have You...(n=15; 21 Subjects)

Tailgated	Cut off someone	Hit another vehicle	Ran a red light	Missed an exit or turn	Unknowingly exceeded the speed limit
3; 6	4; 6	1; 1	3; 3	9; 13	9; 12

In considering the previous results, keep in mind that these subjects tend to be a bit aggressive in their driving, but not substantially so, and if anything, there is a bias not to report incidents such as these.

According to the Call Logs, How Were Calls Initiated and Who Was Involved?

Overall, there were a total of 1,168 entries of which 1,153 were usable for some purpose. Included in the 1,153 were over 200 calls from 1 subject (#3) who grouped some of the calls together. Thus, some of the 2-way analyses were based on 897 calls.

Of the 1,153 calls, 806 (70%) were outgoing and 337 (29%) were incoming. The remaining few calls were not coded. Oddly, the data from the subject with aggregated data only included outgoing calls, and with those calls excluded, there were 556 (62%) outgoing (dialed) calls and 337 (38%) incoming (received) calls (and 4 missing data points). Since almost all calls involve 2 parties, the population average should be 50% dialed and 50% received.

Table 11 shows how calls were dialed, with manual dialing being most common. However, the percentage of use of various methods depends very much on if subject 3 is included or excluded. Without subject 3, 60% of the calls dialed use the manual method, 25% are speed dialed, and 13% use the phone book. When subject 3 is included, manually dialed calls are only 45% of the total and close to the number dialed using the phone book (40%), and the percentage of speed-dialed calls is cut in half. In both cases, the number of voice-dialed calls is a small percentage, but surprisingly, the percentage of calls voice dialed was slightly greater when not driving than driving, even though hands-free dialing is believed by some to be an advantage while driving. The infrequent use of voice dialing may be due to the absence of this feature on subjects' phones (something that was not checked), and the differences found may simply reflect statistical variation of the small sample.

Table 11. Number and Percentage of Calls Dialed (number of calls, column %)

Method	Without Subject 3			With Subject 3		
	Driving	Not Driving	Total	Driving	Not Driving	Total
Manual	130 (60%)	151 (45%)	281 (51%)	210 (45%)	151 (45%)	361 (45%)
Phone book	29 (13%)	98 (29%)	127 (23%)	186 (40%)	98 (29%)	284 (35%)
Speed	54 (25%)	75 (22%)	129 (23%)	59 (13%)	75 (22%)	134 (17%)
Voice	4 (2%)	15 (4%)	19 (2%)	13 (3%)	14 (4%)	27 (3%)
Total	217 (100%)	339 (100%)	556 (100%)	468 (100%)	338 (100%)	806 (100%)

Interestingly, in both cases, the driving and non-driving distributions differ in terms of the dialing method used (Chi-Square (3) = 21.9, $p < .0001$) without subject 3 and (Chi-Square (3) = 18.4, $p < .001$) with subject 3. If anything, this suggests the need for further examination of the dialing method. However, it also points out that methods other than manual entry are often used for dialing while driving, although the literature almost exclusively examines manual entry (Green and Shah, 2003).

Also of note for calls dialed is the rate category (Table 12). In this and subsequent tables, there are cases where round off errors may lead to a total of 99 or 101%. For example, both columns in Table 10 have a total of 101% when the percentages are added.

Table 12. Call Rate Categories (number of calls, column %)

Rate Category	Without Subject 3	With Subject 3
Short sequence (911, *75)	4 (1%)	4 (1%)
Local	311 (60%)	311 (43%)
Long distance	206 (40%)	404 (56%)
International	0 (0.0%)	0 (0.0%)
Toll-free	1 (0%)	5 (1%)
Other	0 (0%)	0 (0.0%)
Total	522 (100%)	724 (100.0%)

Without subject 3, almost 60% of the calls were local whereas with subject 3 included, the value is 43%. In both cases, the number of non-local, non-long distance calls (short sequence, international, toll-free) is practically zero. This suggests that further research on dialing behavior while driving should focus on a mixture of long distance and local calls (in the U.S., currently 7 or 11 digits, though local calls are beginning to require entry of the area code).

What is particularly notable is that long distance calls predominate when only calls dialed while driving are considered (Table 13). In both cases (with and without subject 3), the difference between the driving and non-driving conditions was statistically significant (Chi-Square (3) = 20.9, $p < .0001$ and Chi-Square (3) = 135.9, $p < .0001$). Without subject 3, local and long distance calls were dialed equally often while driving. With subject 3, long distance calls were 3 times more likely. If dialing is a risky thing to do, and long distance numbers are relatively more difficult to dial than local numbers, why are subjects more likely to dial long distance numbers than local numbers when they drive? One explanation is that it might be some sort of interaction of type of phone used in each context (when driving, only cell phones can be used) and the calling plans for each phone type. (With a cell phone, both long distance and local calls are charged from a pool of calling time. With landline phones, local calls are generally free, but long distance calls are charged by the minute.) That explanation is complicated by the fact that all of these calls were dialed by subjects using their own cell phones and that the land-line calls they made were not examined. Of course, all of this needs to be considered in the larger context of the social acceptance of driving and using the phone, how drivers treat their motor vehicle as a private space, how work and pleasure schedules are made using a phone, other motivations for cell phone use, and so forth.

Table 13. Call Destinations (Number of Calls) Split by Subject Group and Driving

Destination	Without Subject 3		With Subject 3	
	Driving	Not driving	Driving	Not driving
Short sequence (911, *75)	1	3	3	3
Local	99	212	99	212
Long distance	106	100	304	100
Toll-free	0	1	4	1
International	0	0	0	0
Other	0	0	0	0
Total	206	316	410	316

Table 14 shows the received calls, split by the driving situation. (Note: Since subject 3 only provided data on calls dialed, the values with and without subject 3 are identical.) There was no significant difference in reception method between the driving and not driving situations (Chi-Square (3) = 0.841, $p=0.84$). Overall, about 82% of the calls were received on a handset, 13% by voice, 5% went to voice mail, and only 1% on a headset. The 1% makes sense because in order to receive a call on a headset one needs to prepare for it, and donning a headset can be awkward, especially while driving. Also, the 5% could be a recording error in that subjects may not have recorded calls they did not answer, but even with a substantial error, this percentage is very low. Interestingly, calls were much more likely to be received by voice than dialed by voice (13 vs. 3%). Keep in mind, however, this is for a small sample of subjects and available phone features were not examined carefully.

Table 14. How Calls Were Received (number, column %)

Method	Driving (%)	Not Driving (%)	Total (%)
Handset	77 (85%)	198 (81%)	275 (82%)
Headset	1 (1%)	3 (1%)	4 (1%)
Voice	9 (10%)	33 (13%)	42 (13%)
Voicemail	4 (4%)	12 (5%)	16 (5%)
Total	91 (100%)	246 (100%)	337 (100%)

Of the incoming calls, 210 (64%) were local and 119 (36%) were long distance, an interesting contrast to the dialed calls, where long distance calls were slightly more common. It was uncommon (12/325 cases, 4%) that subjects were on another call when a call was received. (Note: The total number of calls differs slightly in these 2 cases because not all of the information was recorded by subjects for every call.)

Furthermore, only 2 of the 878 calls were conference calls, both of which involved 3 parties. Given the small number, they were not examined.

In terms of how quickly subjects answered the phone, Table 15 provides data on the number of rings. Although the call log form only provided for values from 1-6 rings, a subject reported a call was answered in 0 rings. Some 50% of the calls while driving

were answered in 2 rings or less. Overall, subjects reported waiting an average of 2.7 rings while driving and 2.4 while not driving, a small difference that was not statistically significant (Chi-Square (6) = 11.25, $p = .08$). These values are similar to those reported by Nowakowski, Friedman, and Green (2002). This lack of a difference may suggest that the task of driving has a very minor impact on the priority subjects give to answering the phone.

Table 15. Number of Rings Before Answering (number, column %)

# of Rings	Driving (%)	Not Driving (%)	Total (%)
0	0 (0%)	1 (0%)	1 (0%)
1	16 (16%)	42 (18%)	58 (17%)
2	29 (34%)	118 (50%)	147 (46%)
3	23 (27%)	37 (16%)	60 (19%)
4	12 (14%)	18 (8%)	30 (9%)
5	5 (6%)	15 (6%)	20 (6%)
6	3 (4%)	5 (2%)	8 (3%)
Total	88 (100%)	236 (100%)	324 (100%)

When considering the impact of driving, one needs to consider both the caller and the receiver. Although not a predominating value, in 7% of all calls both parties were driving (13% without subject 3, Table 16). This situation has not been studied in the human factors literature; only those cases where the subject is driving have been examined. A useful addition to this survey would be to collect data on landline calls made by the same set of subjects, though for some of them, their cell phone was their primary phone.

Table 16. Who Was Driving? (Number, row %)

Group	Subject	Other Party			
		Driving	Not Driving	Unknown	Total
Without subject 3	Driving	39 (13%)	155 (53%)	100 (76%)	294 (100%)
	Not driving	50 (9%)	457 (85%)	31 (6%)	538 (100%)
	Total	89 (11%)	612 (74%)	131 (16%)	832 (100%)
With subject 3	Driving	40 (7%)	410 (75%)	100 (18%)	550 (51%)
	Not driving	50 (9%)	457 (85%)	31 (6%)	538 (49%)
	Total	90 (8%)	867 (80%)	131 (12%)	1,088 (100%)

What Was the Quality of Service?

It is frequently remarked that channel quality and disconnects are an issue for cell phones, and the quality of the connection could influence how and when people communicate and what they say. As shown in Table 17, with subject 3 excluded, there was no significant difference in the listening effort required whether the other party was on a cell phone or a landline phone (Chi-Square (3)=2.14, $p=.54$), though the effort for cell phones was very slightly higher (1.6 vs. 1.5, values in between no effort and no appreciable effort required, both quite good). When subject 3 was included, there was a statistically significant difference in the distributions (Chi-Square (3)=21.0, $p<.001$), though both means were 1.6. What occurred is that for the cell phone, there were more calls in the no effort category and more calls in the higher effort categories. Interestingly, no calls were rated as being not understandable (effort=5).

Table 17. Listening Effort Ratings, Cell Phone vs. Land Line Used by Other Party (N, column %)

Listening Effort	Without Subject 3			With Subject 3		
	Cell	Land Line	Total	Cell	Land Line	Total
1. Complete relaxation possible, no effort required	327 (61%)	202 (65%)	529 (63%)	327 (61%)	289 (53%)	616 (57%)
2. Attention necessary, no appreciable effort required	130 (24%)	74 (24%)	204 (24%)	132 (25%)	203 (37%)	335 (31%)
3. Moderate effort required	59 (11%)	27 (9%)	86 (10%)	59 (11%)	44 (8%)	103 (10%)
4. Considerable effort required	17 (3%)	7 (2%)	24 (3%)	19 (4%)	12 (2%)	31 (3%)
5. No meaning understood with any reasonable effort	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Total	533 (100%)	310 (100%)	843 (100%)	537 (100%)	548 (100%)	1,085 (100%)

Although the type of phone used by the other party did not influence listening effort, calls made while driving required greater listening effort than those made not driving (Chi-Square (3)=89.9 without subject 3, 151.5 with subject 3, $p<.0001$ and means of 1.8 vs. 1.3 respectively in both cases). As shown in Table 18, there is a trend for all categories, other than the no effort category, to be greater for the driving situation. This probably reflects some degradation of the call quality due to a moving source. Thus, when call quality is degraded to simulate use while driving, what must be considered is not overall quality, but the specific case of a moving source. It is possible that even though the instructions asked subjects to consider the quality of the connection, some subjects considered the topic of the conversation, which could be more difficult in the

dual-task driving situation. Nonetheless, it is important to note that most human factors studies of cell phones have ignored the issue of channel quality.

Table 18. Listening Effort Ratings, Driving vs. Not Driving (n, column %)

Listening Effort	Without Subject 3			With Subject 3		
	Driving	Not Driving	Total	Driving	Not Driving	Total
1. Complete relaxation possible, no effort required	134 (44%)	435 (75%)	569 (64%)	221 (39%)	435 (75%)	656 (58%)
2. Attention necessary, no appreciable effort required	108 (35%)	98 (17%)	206 (23%)	250 (45%)	98 (17%)	348 (31%)
3. Moderate effort required	49 (16%)	38 (7%)	87 (10%)	66 (12%)	38 (7%)	104 (9%)
4. Considerable effort required	17 (6%)	8 (1%)	25 (3%)	24 (4%)	8 (1%)	32 (3%)
5. No meaning understood with any reasonable effort	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Total	308 (100%)	579 (100%)	887 (100%)	561 (100%)	579 (100%)	1,140 (100%)

Table 19 provides some insight into the call problems experienced when driving and not driving. Most important is that, overall, there were no problems for most calls (90% without subject 3, 91% with subject 3). There seem to be no differences between driving and not driving in terms of the overall percentage of problem calls or the problem type, suggesting that the listening effort ratings were truly reflecting the quality of the communication and were not contaminated by the demands of the driving task. For example, 90% of the calls had no problems while driving (with subject 3) versus 90% while not driving. The most common problem was a bad connection (5% of all calls and about half of the problem calls), followed by dropped or disconnected calls (3%), audible warning (2%), and other problems (1%). The “other” category included a variety of unique problems (telemarketing, dog barking, etc.). There were no hardware problems. Interestingly, the percentage of calls dropped or disconnected was slightly (about 1%), but not significantly, greater when not driving than when driving. Given the problem of signal loss due to structures as one moves, the opposite was expected. There have been no studies, of which the authors are aware, that examine how drivers deal with calls that have problematic connections.

Table 19. Call Problems (n, column %)

Problem	Without Subject 3			With Subject 3		
	Driving	Not Driving	Total	Driving	Not Driving	Driving
Audible warning	10 (3%)	9 (2%)	19 (2%)	19 (3%)	9 (2%)	28 (2%)
Bad connection	16 (5%)	27 (5%)	43 (5%)	24 (4%)	27 (5%)	51 (5%)
Dropped or disconnected	6 (2%)	16 (3%)	22 (3%)	9 (2%)	16 (3%)	25 (2%)
Other problem	4 (1%)	3 (1%)	7 (1%)	4 (1%)	3 (1%)	7 (1%)
No problems	273 (88%)	512 (90%)	785 (90%)	518 (90%)	512 (90%)	1,030 (91%)
Total	309 (100%)	567 (100%)	876 (100%)	574 (100%)	567 (100%)	1,141 (100%)

The listening effort increased when call quality problems were present, as one would expect (Table 20). Because the cell sizes are small, only the data for all subjects is presented and the percentages are not shown. The total number of calls is slightly less than the previous table because not all calls were coded for the 2 variables of interest. Except for audible warnings, increases in all types of problems were linked to increases in listening effort. This further suggests that the listening effort ratings truly reflected the effort required.

Table 20. Listening Effort vs. Call Problems for All Subjects (n)

Listening Effort	Call Problem					Total
	Audible Warning	Bad Connect.	Dropped or Disconnect.	Other	None	
1. Complete relax. possible, no effort required	8	13	12	1	609	643
2. Attention necessary, no appreciable effort required	9	16	4	2	318	349
3. Moderate effort required	2	14	5	0	80	101
4. Considerable effort required	0	6	3	3	20	32
5. No meaning understood with any reasonable effort	0	0	0	0	0	0
Total	19	49	24	6	1,027	1,125

How Long Were Calls?

The calls lasted anywhere from 6 seconds up to 2 hours. The distribution of talk times is exponentially distributed with a mean time of 2.49 minutes for all subjects and 3.01 minutes with subject 3 excluded (Figure 2). For all subjects, 877 of the 1,098 calls (80%) were 1 minute or less, and 61 (6%), 31 (3%), 21 (2%), 24 (2%), and 10 (1%) were in different minute amounts greater than 1 minute.

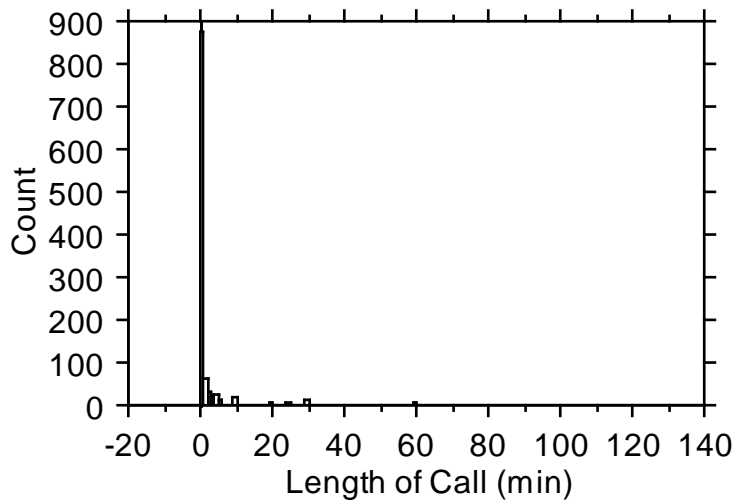


Figure 2. Reported Distribution of Call Durations (All Subjects)

Figure 3 shows the distribution of all calls of 1 minute or less. Curiously, 255 of the calls in the sample were about 5 seconds long. Although many cell phones show the call duration when a call ends, it could be that some phones did not, or subjects forgot to note the call duration when the call ended and then estimated it. So, for example, if unsure of the exact duration of a call, subjects would be more likely to estimate the duration was 10 seconds, not 9.

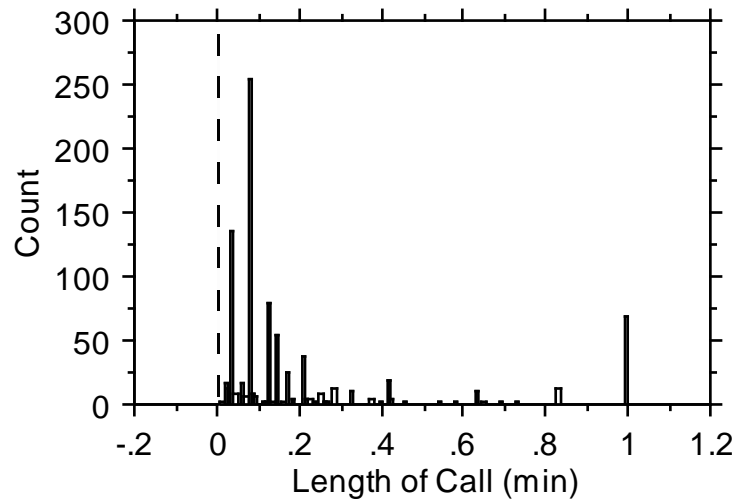


Figure 3. Distribution of Calls 1 Minute or Less (All Subjects)

When calls are partitioned by the driving situation (for all subjects), the mean duration while driving is 2.99 minutes (maximum of 120.0) vs. only 2.09 (maximum of 60) while not driving. As shown in Table 21, of the 1,098 calls (including subject 3) for which call duration was coded, calls made while driving were consistently longer (or at least reported longer) than calls made while not driving. Some 73% of all calls made while driving were 1 minute or less vs. 85% of all calls made while not driving. This suggests that drivers are not getting the educational message to keep calls short while driving to minimize distraction (at least in a relative sense).

Table 21. Reported Duration of Calls, Driving vs. Not Driving (n, column %)
All Subjects

Call Duration (min)	Driving	Not Driving
$t \leq 1$	363 (73%)	514 (85%)
$1 < t \leq 2$	27 (6%)	34 (6%)
$2 < t \leq 3$	17 (3%)	14 (2%)
$3 < t \leq 4$	11 (2%)	10 (2%)
$4 < t \leq 5$	23 (5%)	1 (0%)
$5 < t \leq 6$	8 (2%)	2 (0%)
$6 < t \leq 7$	2 (0%)	0 (0%)
$7 < t \leq 8$	2 (0%)	1 (0%)
$8 < t \leq 9$	1 (0%)	0 (0%)
$9 < t \leq 10$	14 (3%)	2 (0%)
$10 > t$	27 (6%)	25 (4%)
Total	495 (100%)	603 (100%)

Figures 4 and 5 show that the 5-second calls are less predominant when not driving. (Note: When comparing these 2 figures, keep in mind that the maximum y values are different.) The authors have no explanation for this outcome.

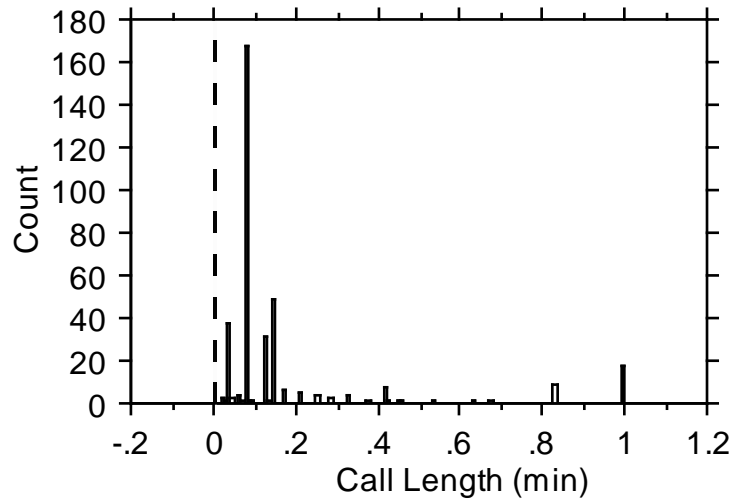


Figure 4. Distribution of All Calls 1 Minute or Less, All Subjects while Driving

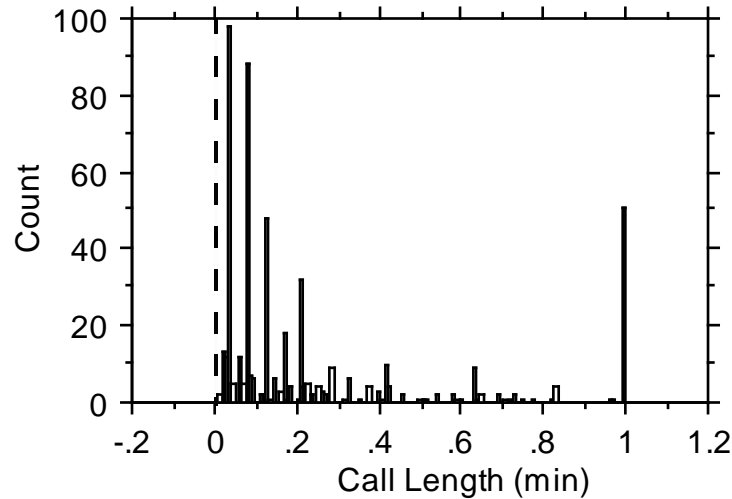


Figure 5. Distribution of All Calls 1 Minute or Less, All Subjects while Not Driving

The longer durations while driving, in part, could be due to the cost of making phone calls. When call durations are examined by called device, calls from cell phones were found to be a full minute longer than those from a land-line (3.06 vs. 1.96 min). As shown in Table 22, this difference reflects an overall increase in the entire distribution of calls, not just a few more calls of a particular duration.

Table 22. Reported Duration of Calls (min, column %), Cell vs. Land Line

Call Duration (min)	Called Party Using	
	Cell	Land Line
t<=1	405 (75%)	410 (85%)
1<t<=2	32 (6%)	23 (5%)
2<t<=3	16 (3%)	13 (3%)
3<t<=4	12 (2%)	6 (1%)
4<t<=5	19 (4%)	5 (1%)
5<t<=6	5 (1%)	5 (1%)
6<t<=7	1 (0%)	1 (0%)
7<t<=8	2 (0%)	1 (0%)
8<t<=9	1 (0%)	0 (0%)
9<t<=10	12 (2%)	1 (0%)
10 >t	35 (7%)	16 (3%)
Total (1,021 coded)	540 (100%)	481 (100)

Cell phone plans generally have 1 rate for all calls, charged by the minute, which encourages the use of long distance service, but decreases the duration of local calls. In fact (Table 23), these patterns are supported by the data, with land-line local calls being relatively longer than local cell phone calls (4.84 vs. 3.67 min), but long distance cell phone calls being longer than land-line calls (4.52 vs. 0.68 min). Bear in mind that

landline and cell refer to the other party's device. Subjects were recording only calls that involved their cell phones.

Table 23. Call Length vs. Called Device.

Call Type	Called Party Using					
	Cell			Land Line		
	N	Mean (min)	SD (min)	N	Mean (min)	SD (min)
Free	4	.08	0.00	1	.04	
Local	167	3.67	10.67	118	4.84	16.04
Long distance	121	4.52	9.37	205	0.68	3.07
Short sequence (911)	2	.23	.09	3	0.72	1.11

Given this result, one would expect a similar outcome when comparing calls made while driving (all cell phone calls) with those made while not driving (a mixture of cell phone and land-line calls). As shown in Table 24, what occurs is that local calls are much longer when driving (5.92 vs. 2.94 min), and long distance calls are longer as well (2.34 vs. 1.41 min), not what was expected. This could be due to some other sort of interaction, statistical chance, or a weak effect of the device since it concerns the device used by the other party, not the subject.

Table 24. Call Length vs. Driving/Not Driving.

Call Type	Driving			Not Driving		
	N	Mean (min)	SD (min)	N	Mean (min)	SD (min)
Free	4	0.80	0.00	1	0.40	
Local	99	5.92	17.19	212	2.94	9.70
Long distance	234	2.34	5.98	100	1.41	7.26
Short sequence (911)	3	0.11	0.5	3	4.09	5.18

The time of day is important to consider because it influences alertness and fatigue, which have important influences on driving. Figure 6 shows the frequency distribution of the time of day of calls made by subjects involving their own cell phones. The spikes in the distribution most likely reflect subjects rounding off when a call occurred. Notice that most calls occurred in the afternoon and evening hours, reasonable for a youthful population.

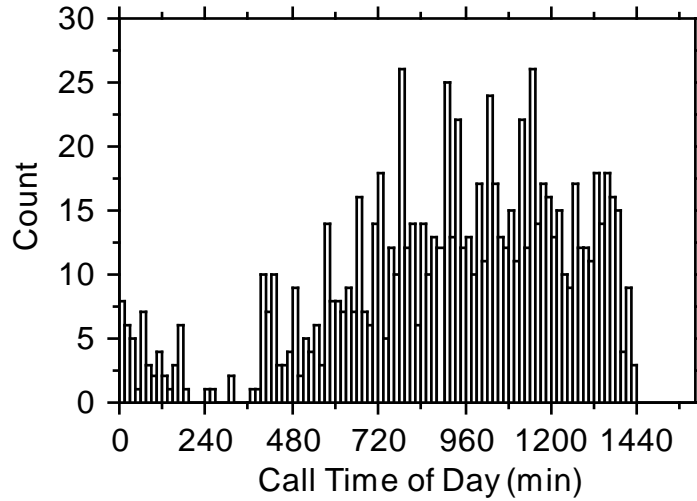


Figure 6. Time of Day of All Calls (15-Minute Increments)
 (Note: 240 minutes = 4 hours)

When the calls are partitioned based on whether the subject was driving, a different picture emerges (Figures 7 and 8). Calls made while driving are much more likely to occur during the afternoon and evening since driving is less frequent in the very late hours. Hence, using data from all calls to predict when calls occur would be misleading.

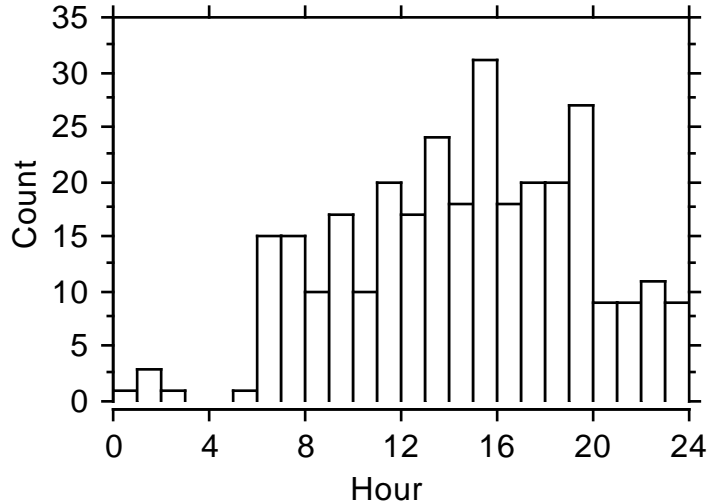


Figure 7. Time of Day of All Calls (1-Hour Increments) While Driving

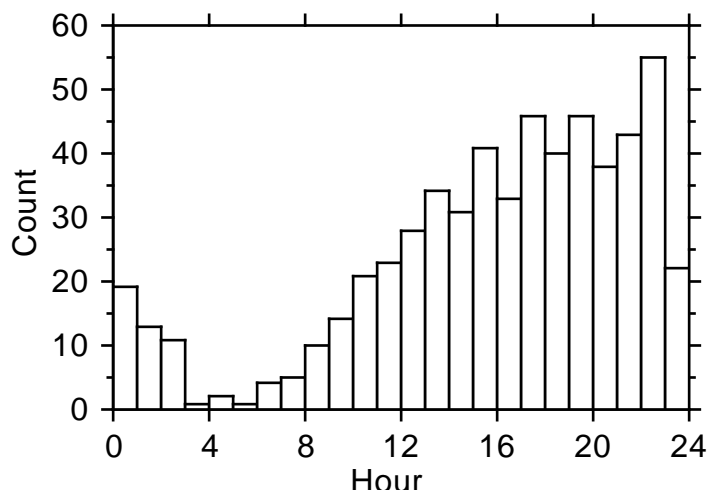


Figure 8. Time of Day of All Calls (1-Hour Increments) While Not Driving

A complicating factor is that many cell phone call plans have lower rates or unlimited calling minutes after 7:00, 8:00, or 9:00 p.m., encouraging evening use. This is evident in the calls made while not driving (Figure 8).

There were also day of the week differences between calls made while driving and not driving (Chi-Square (6)=16.7, $p < .05$, all subjects). (This data was not coded by subject 3.) As shown in Table 25, the number of calls per day was reasonably consistent for calls made when not driving; but for driving, there were fewer calls on the weekends and on Wednesdays. The lower weekend rate makes sense, as more than half were business calls, made while driving during the workweek. The Wednesday dip is a mystery.

Table 25. Day of the Week, Call Driving vs. Not Driving

	Day of Week, D = Driving, ND = Not Driving (#, row %)							Total
	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	
D	30 (10%)	50 (16%)	54 (17%)	35 (11%)	64 (21%)	44 (14%)	32 (10%)	309 (100%)
ND	74 (13%)	77 (13%)	87 (15%)	80 (14%)	78 (13%)	92 (16%)	95 (16%)	583 (100%)
Total	104 (12%)	127 (14%)	141 (16%)	115 (14%)	142 (16%)	136 (15%)	127 (14%)	892 (100%)

What Did the Call Concern?

As shown in Table 26, subjects rated conversations while driving as more demanding than those while not driving (Chi-Square (2) = 144.7, $p < .0001$). Over 1/2 of the calls while driving involved a medium level of demand while calls made while not driving were primarily light (over 70%). It must be emphasized that based on the examples provided,

this rating only concerned the demand of the conversation alone, not the combined effects of conversing and driving. If subjects were attempting to make driving and conversing on the phone easy to do, conversations while driving should be less demanding.

Table 26. Conversation Demand (Question 16) for All Subjects, Driving vs. Not Driving (N, column %)

Conversation Demand	Explanation	Driving	Not Driving	Total
1=Light	Chatty; "What's for dinner?"	204 (37%)	491 (71%)	605 (54%)
2=Medium	Some decision making; "Hmm, you take Beth, I'll pick up Jon."	284 (52%)	162 (29%)	446 (40%)
3=Demanding	mpg calculations; Divide 352 miles by 18 gallons of gas.	61 (11%)	5 (1%)	66 (6%)
Total		549 (100%)	568 (100%)	1,117 (100%)

One of the arguments for cell phones is that they are needed to deal with urgent matters. Tables 27 and 28 show the ratings for call urgency and when the response occurred, for driving and not driving respectively. Notice that only 3 of the 546 calls (.05%) while driving were in the most urgent category, while another 71 (13%) were of major importance and received a response within the trip. For some unknown reason, such occurrences were much less common when subjects were not driving (2 and 9 calls respectively) with approximately the same number of total calls (567). It could be that the concept of a trip is more ambiguous when not driving, but still, the total number of major severity events that occurred while driving (99) was much greater than those that occurred when not driving (35). Another explanation would be that urgent matters arise more frequently during the same hours that driving occurs.

Table 27. Call Urgency and Response for All Subjects, Driving (n) (Questions 15a and 15b)

Urgency	Response				Total
	Within Trip	Same Day	After Today	No Response	
Life/property threat	3	0	0	0	3
Major severity	71	26	0	2	99
Minor severity	146	131	4	4	285
No severity	40	63	6	50	159
Total	260	220	10	56	546

Table 28. Call Severity and Response for All Subjects, Not Driving (n)

Severity	Response				
	Within Trip	Same Day	After Today	No Response	Total
Life/property threat	2	0	0	1	3
Major severity	9	21	4	1	35
Minor severity	23	35	19	16	93
No severity	38	93	14	291	436
Total	72	149	37	309	567

As shown in Table 29, there was a significant difference between calls made while driving and those made while not driving in terms of their purpose, with calls made while driving being far more likely to concern business and less likely to be personal (Chi-Square (2) = 268.4, $p < .0001$).

Table 29. Call Purpose (Question 5) for All Subjects, Driving vs. Not Driving (n, row %)

	Business	Personal	Other	Total
Driving	346 (62%)	207 (37%)	8 (1%)	561 (100%)
Not driving	85 (15%)	483 (84%)	7 (1%)	575 (100%)
Total	431 (38%)	690 (61%)	15 (1%)	1,136 (100%)

Other evidence on the nature of calls comes from the analysis of the Holmes-Rahe data, coded as described in Appendix G. Of the 1,168 calls, roughly half occurred while driving and half while not driving, so the expected number of problems for driving and not driving on each Holmes-Rahe subscale should be equal. As shown in Table 30, there were far more calls made while not driving that were scored (142) than those made while driving (27), a factor-of-5 difference. It could be that because it was difficult to complete the scale while driving, subjects did not report this information, but they were very thorough in reporting everything else, so the difficulty of reporting explanation seems unlikely.

Table 30. Holmes-Rahe Data on Call Emotion

Category	Example	Driving	Not Driving	Total
Family	Death of a close family member	0	0	0
	Major change in the health or behavior of a family member	1	1	2
	Gaining a new family member	0	1	1
	Son or daughter leaving home	1	1	2
	Trouble with in-laws	2	3	5
	Major change in the # of family get-togethers	1	2	3
	Christmas season	5	5	10
	TOTAL	10	13	23
Money	Major change in financial status	0	0	0
	Taking out a loan for a major purchase	0	0	0
	Foreclosure on a mortgage or loan	0	0	0
	Taking out a loan for a lesser purchase	0	1	1
	TOTAL	0	1	1
Vacation	Major change in usual type and/or amount of recreation	0	0	0
	Major change in social activities	0	4	4
	Vacation	1	10	11
	TOTAL	1	14	15
Work	Fired from work	0	0	0
	Retirement	0	0	0
	Major business adjustment	0	2	2
	Change to a different line of work	1	0	1
	Major change in responsibilities at work	0	2	2
	Trouble with boss	0	1	1
	Major change in working hours or conditions	2	20	22
	TOTAL	3	25	28
Personal	Detention in jail, other institution	0	0	0
	Death of close friend	0	1	1
	Outstanding personal achievement	1	0	1
	Beginning or ceasing formal schooling	1	0	1
	Major change in living conditions	1	3	4
	Change in residence	1	1	2
	Change to a new school	1	7	8
	Major change in church activities	2	23	25
	Minor violations of the law	6	54	60
	TOTAL	13	89	102
GRAND TOTAL		27	142	169

Overall, personal matters were most common (e.g., 89 of the 142 major problems while not driving). For 2 categories, spouse (death, divorce, marital separation, marriage,

marital reconciliation, pregnancy, major change in number of arguments, beginning or ceasing work outside of home) and health (major personal injury or illness, sexual difficulties, revision of personal habits, major change in sleeping habits, major change in eating habits), there were no calls of emotional significance, not unusual for a healthy, unmarried population. Although calls of some emotional import were less than 15% of all calls, given the total number of calls, studying how people engage in emotionally-laden discussions while driving could use attention. The relatively low number could be a reporting error where subjects misinterpreted the scale, treating the anchors literally (Christmas season) instead of figuratively (as challenging as the Christmas season), especially as the survey occurred during a Christmas season.

Probably the best sense of what constitutes a cell phone call can be obtained by perusing the list of call topics while driving (Appendix H) and while not driving (Appendix I). These statements are the verbatim summaries of what subjects wrote calls concerned, alphabetized for convenience. Although it is difficult to categorize them, a large number of the calls involved scheduling (e.g., making plans for dinner) and other social matters.

Under What Conditions Did Calls Occur while Driving?

Prior to evaluating the data on driving conditions, some recoding was required. In 6-10 cases for questions 12 (weather), 13 (lighting), and 14 (road surface), multiple responses were provided where 1 was desired. Of the multiple responses, selected the most severe condition was selected, e.g., if daylight and overcast were indicated, overcast was selected. If wet and ice were indicated, ice was selected.

Subjects basically answered every incoming call both while driving and not driving (321 out of 323 calls). If incoming calls are essentially random (the calling party does not know when placing the call that the recipient is driving), they should represent the relative percentage of time subjects drive on each type of road, their exposure to each road type. The largest percentage (40%, Table 31) of incoming calls was answered while driving in a residential area. In contrast, 58% of all calls from all subjects were dialed when driving on expressways. Furthermore, the distribution of calls between dialing and receiving was significantly different (Chi-Square (4)=73.3, $p < .0001$, based on the data from all subjects), suggesting that subjects may have considered the driving conditions when *making* calls, which is more deliberate than *answering* calls.

Table 31. Area Where Calls Occurred for All Subjects (Question 8) (number, row %)

	Area	Xway	Residential	Urban	Rural	Other	Total
Without subject 3	Dialed	80 (37%)	82 (38%)	36 (17%)	16 (7%)	4 (2%)	218 (100%)
	Received	21 (23%)	36 (40%)	15 (16%)	19 (21%)	0 (0%)	91 (100%)
	Total	101 (33%)	118 (38%)	51 (17%)	35 (11%)	4 (1%)	309 (100%)
With subject 3	Dialed	273 (59%)	83 (18%)	92 (20%)	16 (3%)	4 (0%)	468 (100%)
	Received	21 (23%)	36 (40%)	15 (17%)	19 (21%)	0 (0%)	91 (100%)
	Total	294 (53%)	119 (21%)	107 (19%)	35 (6%)	4 (0%)	559 (100%)

The number of travel lanes also differed between calling and receiving calls because of the linkage between road type and the number of travel lanes (Chi-Square (4)=67.5, $p < .0001$, Table 32, all subjects). Sixty-five percent of calls were dialed on 4-lane roads whereas 56% of all calls were received on 2-lane roads, consistent with the prior question where dialed calls most commonly occurred on expressways but received calls were most common on residential roads. (Keep in mind that the total number of calls dialed and received differs from question to question because of incomplete responses from subjects.)

Table 32. Number of Travel Lanes Associated with Calls (Question 9)

	Call Type	Number of Travel Lanes					Total
		1	2	3	4	5	
Without subject 3	Dialed	9 (4%)	103 (49%)	23 (11%)	52 (25%)	25 (12%)	212 (100%)
	Received	8 (9%)	51 (56%)	8 (9%)	22 (24%)	2 (2%)	91 (100%)
	Total	17 (6%)	154 (51%)	31 (10%)	74 (24%)	27 (9%)	303 (100%)
With subject 3	Dialed	9 (2%)	104 (23%)	23 (5%)	301 (65%)	25 (5%)	462 (100%)
	Received	8 (9%)	51 (56%)	8 (9%)	22 (24%)	2 (2%)	91 (100%)
	Total	17 (3%)	155 (28%)	31 (6%)	323 (58%)	27 (5%)	553 (100%)

Dialed and received calls also differed significantly (Chi-Square (3) = 22.0, $p < .0001$) in terms of the traffic conditions under which they occurred while driving (Table 33). In general, subjects were relatively more likely to dial calls in heavier traffic than to receive them (for example, 6% of the calls for all subjects were dialed in no traffic but 20% were

received, and 15% of all calls were dialed in heavy traffic but only 9% were received). If incoming calls occur at random times and therefore reflect exposure to traffic conditions, subjects appear to be choosing to call in heavier traffic, which is unlikely to a wise decision. Admittedly, there is a possibility the heavier traffic was more stable, and therefore perceived to be safer.

Table 33. Traffic Conditions for Calls while Driving (Question 11, All Subjects)

Group	Call Type	Traffic				Total
		None (No Traffic)	Light (No Impact on Speed)	Moderate (Slowed by Traffic)	Heavy (Stop & Go)	
Without subject 3	Dialed	26 (13%)	106 (53%)	49 (25%)	19 (10%)	200 (100%)
	Received	16 (20%)	36 (46%)	20 (25%)	7 (9%)	79 (100%)
	Total	42 (15%)	142 (51%)	69 (25%)	26 (9%)	279 (100%)
With subject 3	Dialed	26 (6%)	183 (42%)	164 (37%)	68 (15%)	441 (100%)
	Received	16 (20%)	36 (46%)	20 (25%)	7 (9%)	79 (100%)
	Total	42 (8%)	219 (40%)	184 (35%)	75 (14%)	520 (100%)

It is important to point out that in this case, the traffic modifiers (light, moderate, heavy) were explained on the data sheet using the text in Table 30. Had that not occurred, the use of the terms could have been somewhat arbitrary depending on the individual. Also, keep in mind that these definitions refer to the use of the terms in the U.S. What might be considered to be heavy traffic in the U.S. could be moderate traffic in Japan.

As shown in Table 34, there was also a significant difference in the weather conditions (Chi-Square (3)=10.3, $p < .05$, for all subjects) for calls dialed while driving versus those received. Subjects sometimes behaved rationally, being less likely to make calls when driving in the rain (4 vs. 10%) than to answer them, but somewhat more likely when driving in the snow (16 vs. 11%). Note that these data were collected in the winter months in southeast Michigan when snow is common. Also, dialed calls represent random arrivals (exposure) and are almost all answered.

Table 34. Weather Conditions for Calls while Driving (Question 12, All Subjects)

Group	Call Type	Weather				
		Clear	Rainy	Snowy	Windy	Total
Without subject 3	Dialed	172 (81%)	18 (9%)	21 (10%)	2 (1%)	213 (100%)
	Received	69 (77%)	9 (10%)	10 (11%)	2 (2%)	90 (100%)
	Total	241 (80%)	27 (9%)	31 (10%)	4 (1%)	303 (100%)
With subject 3	Dialed	368 (80%)	18 (4%)	74 (16%)	2 (0%)	462 (100%)
	Received	69 (77%)	9 (10%)	10 (11%)	2 (2%)	90 (100%)
	Total	437 (79%)	27 (5%)	84 (15%)	4 (1%)	552 (100%)

Table 35 shows that there were some differences in the lighting conditions between calls dialed while driving vs. those received (Chi-Square (4) = 12.4, $p < .05$, for all subjects), with the percentage of received calls being slightly lower than dialed calls (56 vs. 62%) during the day. Keep in mind that these data were collected in mid winter in Michigan. Sunrise occurs at approximately 7:45 a.m. and sunset at about 5:00 p.m. (<http://www.timeanddate.com/worldclock/astronomy.html?n=784&obj=sun&month=12&year=2002&day=1>), so these data may underestimate the annual percentage of calls made during the day. Nonetheless, to the best of the authors' knowledge, the problem of manual dialing of cell phone calls using a handset in the dark has not been examined, yet there are opportunities for it to occur.

Table 35. Lighting Conditions for Calls while Driving (Question 13)

Group	Call Type	Lighting					
		Day	Overcast	Sunset	Dark	Dusk	Total
Without subject 3	Dialed	97 (45%)	29 (13%)	6 (3%)	71 (33%)	13 (6%)	216 (100%)
	Received	51 (56%)	11 (12%)	3 (3%)	17 (19%)	9 (10%)	91 (100%)
	Total	148 (48%)	40 (13%)	9 (3%)	88 (29%)	22 (7%)	307 (100%)
With subject 3	Dialed	290 (62%)	68 (15%)	6 (1%)	88 (19%)	13 (3%)	465 (100%)
	Received	51 (56%)	11 (12%)	3 (3%)	17 (19%)	9 (9%)	91 (100%)
	Total	341 (61%)	79 (14%)	9 (2%)	105 (19%)	22 (4%)	556 (100%)

As shown in Table 36, there was no statistical difference in the road surface condition between calls that were dialed and those that were received (Chi-Square (3)=3.6, $p=.31$, for all subjects), though dialed calls were somewhat more common when snow was on the road than for received calls (14% vs. 7%). Overall, about 64% of the calls occurred on dry roads, with the remaining calls occurring under less favorable conditions. Again, this data is from the winter in Michigan when road conditions are often unfavorable. Thus, these data represent a reasonable set of undesirable conditions, but certainly not worst case. The authors do not know of any studies of cell phone use that involved anything other than dry roads, roads that are reasonably easy to drive.

Table 36. Road Surface Conditions for Calls while Driving (Question 14)

Group	Call Type	Road Surface				
		Dry	Wet	Snow	Ice	Total
Without subject 3	Dialed	159 (74%)	38 (18%)	14 (7%)	4 (2%)	215 (100%)
	Received	62 (70%)	20 (23%)	6 (7%)	1 (1%)	89 (100%)
	Total	221 (73%)	58 (19%)	20 (7%)	5 (2%)	304 (100%)
With subject 3	Dialed	289 (62%)	104 (22)	63 (14%)	8 (2%)	464 (100%)
	Received	62 (70%)	20 (23%)	6 (7%)	1 (1%)	89 (100%)
	Total	351 (64%)	124 (22%)	69 (13%)	9 (1%)	553 (100%)

Finally, some calls occurred while driving but not while moving (Table 37). The “other” category included highway (which does not make sense except if the respondent was in a traffic jam), in a building, “other,” pulled off to side of road (2 cases), “side of fence,” traffic crash, and “yes.” Dialed calls outnumbered received calls by at least 10 to 1 and many of the calls that occurred when the vehicle was stationary involved dialing at a traffic light.

Table 37. Calls Made while Stationary (Question 10)

Group	Call Type	Road Surface					
		Traffic Light	Parking Lot	Traffic Jam	Driveway	Other	Total
Without subject 3	Dialed	13	12	2	3	8	38
	Received	3	1	2	0	2	8
	Total	16	13	4	3	10	46
With subject 3	Dialed	42	25	2	3	8	80
	Received	3	1	2	0	2	8
	Total	45	26	4	3	10	88

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

No study is without limitations. The sample size was reasonable (20 plus subjects for the survey questions, 1,100-plus calls from the call logs), but the data were drawn from a somewhat youthful group of cell phone users. When missing data are excluded and the data are partitioned, the sample size is smaller than desired in some cases. This was a constraint of the limited funding available for this project.

However, this study provides consider insight concerning the conditions under which real cell phone calls are made. It also provides statistics to guide future studies so that the cell phone tasks explored in experiments more closely approximate real world use.

To guide such research, the following observations should be considered.

While driving, there was no single place where phones were overwhelmingly located, though about half of the subjects placed the phone on the seat, followed by pocket and purse locations, and placing the phone in a cradle. Additional data are needed to obtain more precise statistics on phone location, which is critical for studies that examine answering the phone. This is important because the overwhelming majority of calls received involved a handset (85%), with most of the other calls being received by voice. Often this occurred very quickly (just over 2-1/2 rings). Interestingly, this was hardly different from how long subjects take to respond when they are not driving. Answering the phone is critical because crashes often occur in that situation and the extent to which searching for the phone is a safety concern needs to be documented. Furthermore, the fact that about half of the phones are on the seat (and unsecured) is worrisome because in the event of a crash, the phone can become a dangerous flying object.

Only 3 subjects in the sample had instant messaging and its use was not explored. As its' use becomes more common, attention to its use while driving should be considered. At this point, its impact on driving is unknown.

Approximately 1 in 5 calls while driving involved use of a pen, pencil, or paper. This is of particular concern when accompanied by use of a handset because at least 3 hands (1 for the wheel, 1 for the phone, and 1 for the writing implement) are needed. If the paper is held, then 4 hands are needed. Drivers have only 2 hands. Tasks involving note taking while driving should be examined.

Subjects reported that use of a phone while driving did lead to undesirable behavior such as unknowingly speeding and missing turns (about 3/4 of the subjects), cutting drivers off (1/4), running red lights (1/6), and in 1 case, causing a minor fender bender. Readers should not put too much emphasis on these statistics, as the sample is admittedly small. Accordingly, this topic should be examined in a larger sample with particular focus on the phone task at the moment of the incident (dialing, answering, conversing, other) and the impact of that incident on subsequent use of the phone. This

information could be helpful in tailoring education programs to discourage phone use and in providing some insight as to whether educational programs will have any benefit.

Of the 1,100-plus calls, about 70% were outgoing and 30% incoming, with about 1/2 being made while driving and 1/2 while not driving. Depending on the sample selected, anywhere from 45-60% of all calls were dialed manually, 13-40% involved a phone book, 13-25% were speed dialed, and only a small percent were voice dialed. In contrast, virtually all of the studies in the literature involve only manual dialing, and very few concern manual dialing of handheld phones. These dialing methods should be examined experimentally, especially as a function of user experience. In this study, subjects had a mean of 4 years of experience with a cell phone, and based on the call statistics, may have made thousands of calls while driving. Further, most had their current phone for over a year. This level of experience with a test device is difficult to achieve in an experiment.

Depending on the subject sample, 1/2 to 3/4 of the calls made while driving were long distance. This suggests that studies of dialing and driving should concentrate on long distance calls (for manual dialing), the most challenging and most common case. There were no instances recorded of the most difficult case, international calls, but their frequency could change if rate structures change.

A particularly worrisome situation is where both calling parties were driving (and distracted). Depending on the sample used, 7 to 13% of calls while driving involve this situation, a scenario that deserves examination.

About 90% of the calls did not involve any major connection problems (e.g., dropped calls). However, more than 1/2 of the calls while driving were above the lowest level of the ITU listening effort scale; that is, at least some attention was necessary. There were no cases where communication with the other party could not be understood. Future human factors studies should consider situations where the call channel quality is slightly degraded.

Calls made while driving were actually longer (by a minute) than those made while not driving (2 vs. 3 minutes). The call distribution was roughly exponential, and in part reflected a few long calls (2 hours). Overall, about 3/4 of the calls made while driving were 1 minute or less, and many of them were reported as 15 seconds or less.

Calls were made while driving at all times of the day, with a peaking between 5:00 and 6:00 p.m. Calls were more uniformly distributed than those made while not driving. The number of calls after 10:00 p.m. into the early hours of the morning was lower, but they were recorded. Anecdotally, some have said they make such calls while driving to help keep themselves alert. This anecdote and its performance benefits deserve further exploration.

Calls concerned a wide range of topics and synopses of every call recorded appear in Appendices H and I. More than half of all calls involved some level of demand and

many of them concerned social matters (e.g., getting together), at least based on the written summaries. However, subjects classified over 60% of all calls as being business, with the remainder being personal (with a few exceptions). Calls involving life/property matters were rare; only 3 calls in the sample. Also rare were calls with significant emotional content (e.g., major change in the health of a family member) and less than 10% of all calls were serious enough to receive a Holmes-Rahe rating. Nonetheless, this does suggest some educational opportunities. (“I have something to tell you. Are you sitting down?” “Yes, but I am driving.”) These data and especially the subject synopses of each call provide a rich database for researchers to construct dialogs in future studies of driving and phoning.

As was noted earlier, since received calls were essentially random, and almost all calls received were answered, then the distribution of received calls among conditions represented subjects’ exposure to those conditions. For example, since about 1/4 of the calls received were on expressways, then this sample spent about 1/4 of their time driving on expressways. Interestingly, calls were most commonly received in residential areas (40%), but most commonly dialed on expressways (59%). In contrast, most studies, especially those conducted in driving simulators, typically involve either rural roads or expressways. Interestingly, while 21% of all calls were received on rural roads, dialing them was rare (3%). This suggests that researchers need to reconsider the test roads used in experiments, as they do not match the types of roads for some types of calls.

Studies of cell phone use often involve light or no traffic, especially for on-the-road experiments and also to some degree for simulator experiments. However, about 1/3 of all calls were received in moderate or heavy traffic and, depending on the sample, 1/3 to 1/2 of all calls were dialed under those conditions.

Over 50% of all calls were dialed or received during the day, another 10% when it was overcast, and the remainder occurred at sunrise, sunset, or in the dark. Dark conditions may create particular problems for retrieving and handling phones.

According to the call logs, about 20% of calls were made under degraded weather conditions (rain, snow, wind) and 25% when the road surface was degraded (wet, snow, ice). Keep in mind that the data was collected in the winter in Michigan, so degraded conditions may be more common during that period than averaged across the year. Nonetheless, the authors do not know of any cell phone studies that involved degraded conditions. Because road feel is so critical to driving in these situations, driving simulators used to examine degraded conditions should have a motion base.

Thus, this report highlights the need for additional research on cell phones in a wide variety of situations that have not been explored—using phone books to dial, conversation where both parties are driving, taking notes while using a handset and driving, somewhat degraded communication link quality, fatigued drivers, driving in residential and in urban areas, and driving in moderate and heavy traffic, and in bad weather.

Further, this study indicates that most calls are fairly brief and often involve non-emotional social matters.

Research on cell phone use while driving has been conducted for a variety of purposes. One is to understand the psychological mechanisms involved in multitask timesharing. A second is to provide engineering data on the usability of various devices and make predictions of the crash risk associated with using them under a variety of conditions. Hopefully, those engaged in research for the second purpose now have a better sense of what constitutes a cell phone call, and there will be fewer studies that utilize counting aloud backwards by 7s, verbal logic tasks (“True or false: A bear is a tree”), and other psychological standards as surrogates for a phone call.

Clearly, with additional funds, this study could be done bigger and better – exploring a wider age range sample, including more subjects to more precisely estimate percentages, and resolving a few points by making minor improvements to the protocol (obtaining phone model numbers and features, reorganizing the log form, etc.). However, as is, this report provides useful information to guide future studies and represents a significant advance in knowledge relating to phone use while driving. The authors hope that this serves as a basis for future studies that lead to a better understanding of the issues of cell phone usability and safety while driving.

REFERENCES

Anonymous (2001). Motorola Research Summit 2001—Report, Schaumburg, IL: Motorola.

Goodman, M., Bents, F.D., Tijerina, L., Wierwille, W., Lerner, N., and Benel, D. (1997), An Investigation of the Safety Implications of Wireless Communications in Vehicles (Technical report DOT HS 808 635), Washington, D.C.: U.S. Department of Transportation (<http://www.nhtsa.dot.gov/people/injury/research/wireless/>).

Green, P. (2001). Telematics: Promise, Potential, and Risks, presentation at the Management Briefing Seminar panel session (Traverse City Conference), Traverse City, Michigan.

Green, P. (2002). What We Want to Know about How People Use Cell Phones while Driving (presentation at Society of Automotive Engineering panel session, State of the Industry for Driver Focus Research), Warrendale, PA: Society of Automotive Engineers.

Green, P., Hoekstra, E., and Williams, M. (1993). On-The-Road Tests of Driver Interfaces: Examination of a Navigation System and a Car Phone (Technical Report UMTRI-93-35). Ann Arbor, MI: The University of Michigan Transportation Research Institute.

Green, P. and Shah, R. (2003). Task Time and Glance Measures of the Use of Telematics: A Tabular Summary of the Literature (Technical Report UMTRI 2003-33), Ann Arbor, MI: The University of Michigan Transportation Research Institute.

Holmes, T.H. and Rahe, R.H. (1967). The Social Readjustment Rating Scale, Journal of Psychosomatic Research, 11, 213-218.

International Telecommunication Union (1996). Subjective Performance Assessment of Telephone-band and Wideband Digital Codecs (ITU Recommendation P.830), Geneva, Switzerland: International Telecommunication Union.

Lissy, K., Cohen, J., Park, M., and Graham, J.D. (2000). Cellular Phones and Driving: Weighing the Risks and Benefits, Risk in Perspective, 8(6), July, 1-6 (<http://www.hcra.harvard.edu/riparchive.html>).

McKnight, A.J., and McKnight, A.S. 1993. The Effect of Cellular Phone Use upon Driver Attention, Accident Analysis and Prevention, 25(3), June, p. 259-265.

Nowakowski, C., Friedman, D., and Green, P. (2002). An Experimental Evaluation of Using Automotive HUDs to Reduce Driver Distraction while Answering Cell Phones, Proceedings of the Human Factors and Ergonomics Society 46th Annual Meeting, Santa Monica, CA: Human Factors and Ergonomics Society, CD-ROM.

Redelmeier, D.A., and Tibshirani, R.J. (2001). Cell Phone Regulation, Canadian Medical Association Journal, 165, 14-15.

Redelmeier, D.A., and Tibshirani, R.J. (1997a). Association between Cellular-Telephone Calls and Motor Vehicle Collisions, New England Journal of Medicine, 336(7), 453-458.

Redelmeier, D.A., and Tibshirani, R.J. (1997b). Is Using a Car Phone Like Driving Drunk? Chance, 10(2), 5-9.

Reinfurt, D. W., Huang, H. F., Feaganes, J. R., and Hunter, W. W. (2001). Cell Phone Use while Driving in North Carolina (technical report), Chapel Hill, N.C.: Highway Safety Research Center, University of North Carolina, (<http://www.hsrtc.unc.edu/pdf/2001/cellphone.pdf>).

Serafin, C., Wen, C., Paelke, G. and Green, P. (1993). Development and Human Factors Tests of Car Telephones (Technical Report UMTRI-93-17). Ann Arbor, MI: The University of Michigan Transportation Research Institute.

Strayer, D.L., Drews, F.A., and Johnston, W.A. (2003). Cell Phone Induced Failures of Visual Attention during Simulated Driving, Journal of Experimental Psychology, Applied, 9(1) March, 23-32

Stutts, J.C., Reinfurt, D.W., Staplin, L., and Rodgman, E.A. (2002). The Role of Driver Distraction in Crashes (technical report), Washington, D.C.: AAA Foundation for Traffic Safety.

Stutts, J.C., Huang, H.F., and Hunter, W.W. (2002). Cell Phone Use while Driving in North Carolina: 2002 Update Report (technical report), Chapel Hill, NC: University of North Carolina Highway Safety Research Center (<http://www.hsrtc.unc.edu/pdf/2002/CellPhone2002Report.pdf>).

Stutts, J., Feaganes, J., Rodgman, E., Hamlett, C., Meadows, T., Reinfurt, D., Gish, K., Mercadante, M., and Staplin, L. (2003). Distractions in Everyday Driving (Technical report), Washington, D.C.: AAA Foundation for Traffic Safety (<http://www.aaafoundation.org/pdf/distractionInEverydayDriving.pdf>).

Uchida, N., Asano, Y., and Hashimoto, K. (2002). Effects of Cell Phone Conversation Load on Viewpoints Control while Driving, Jidosha Kenkyu [JARJ research journal], 24(6) June, 229-232.

U.S. Department of Transportation (2001). NHTSA Reports on Major Survey of Cell Phone Use by Drivers, Washington, D.C.: U.S. Department of Transportation, National Highway Traffic Safety Administration (<http://www.dot.gov/affairs/nhtsa3601.htm>).

University of Michigan Transportation Research Institute (2002). NASS CDS Data Set Codebook (number 2002-4, version 20-Aug 02), Ann Arbor, MI: University of Michigan Transportation Research Institute, Transportation Data Center, (<http://www.umtri.umich.edu/tdc/doc/cds2001.pdf>).

Utter, D. (2001). Passenger Vehicle Driver Cell Phone Use, Results from the Fall 2000 National Occupant Protection Use Survey (Research Note DOT HS 809 293), Washington, D.C.: National Highway Traffic Safety Administration, U.S. Department of Transportation, (<http://www-nrd.nhtsa.dot.gov/pdf/nrd-30/NCSA/RNotes/2001/809-293.pdf>).

de Waard, D., Brookhuis, K. A., and Hernandez-Gress, N. (2001). The Feasibility of Detecting Phone-Use Related Driver Distraction, International Journal of Vehicle Design, 26,(1), 85-95.

Young, R. A. (2001). Association between Embedded Cellular Phone Calls and Vehicle Crashes involving Airbag Deployment, First International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design. 1st. Proceedings. Aspen, CO: 390-400.

APPENDIX A - INITIAL CONTACT INFORMATION

Phone Interview

[caller: may I speak to Jason please]

Hi, this is Jason...what is your name?

Hi...(Name)...Just to give you a quick run-down of what we would like to do...

".....this study is being conducted by the Human Factors division of the University of Michigan Transportation Research Institute. It is a month-long study, and if you are qualified, you will be paid \$50.00. The study consists of completing a two-page survey after EVERY cell phone call you make OR receive. The survey does consist of about 25 questions BUT we have created it so that it can be completed very quickly and easily following each call.

Clear so far?

Great...Now I'd like to ask you a couple questions.

- What is your age?
- Do you make and receive at least 3-5 phone calls a day or 12-15 phone calls per week?
 - IF NO: less than 12-15...ask how many...if below 10 "I'm sorry we need participants who consistently make or receive more than 10 phone calls per week. If I can take your name and contact information down I will put you on our waiting list and we will notify you if any openings become available."
 - IF YES: move to next question
- About how many of those calls are made while driving? (half is good, but one-quarter is sufficient)

"Great, well it sounds like you would be a perfect participant!"

"Now we need to arrange a time for you to come out to UMTRI to complete a questionnaire and pick up your month's-supply of surveys"

Schedule time on Friday, Monday, Tuesday...

"Do you need directions to UMTRI?"

IF OVER 15 OF ANY ONE AGE GROUP:

“We’ve actually filled all the spots for your particular age. I can take your name and contact information down and put you on our waiting list and we will notify you if any of the participants fail to finish the study.”

From Detroit Metro Airport

Take I-94 west to Ann Arbor (approximately 18 miles). Turn north on US-23 (Exit 180). Get off at the Plymouth Road exit and head west (left) on Plymouth Road, and follow the directions below, "Driving West on Plymouth Road."

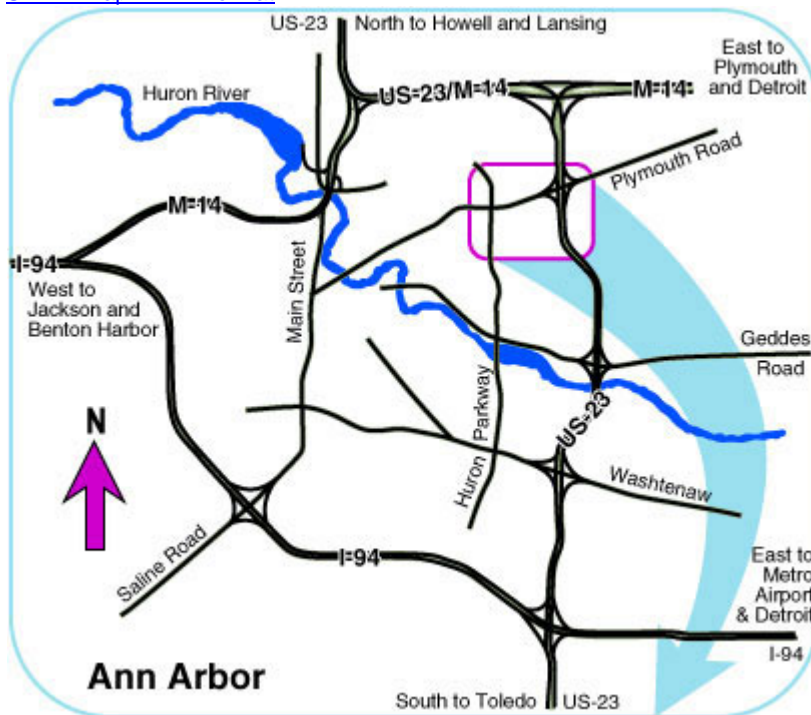
From Downtown Detroit

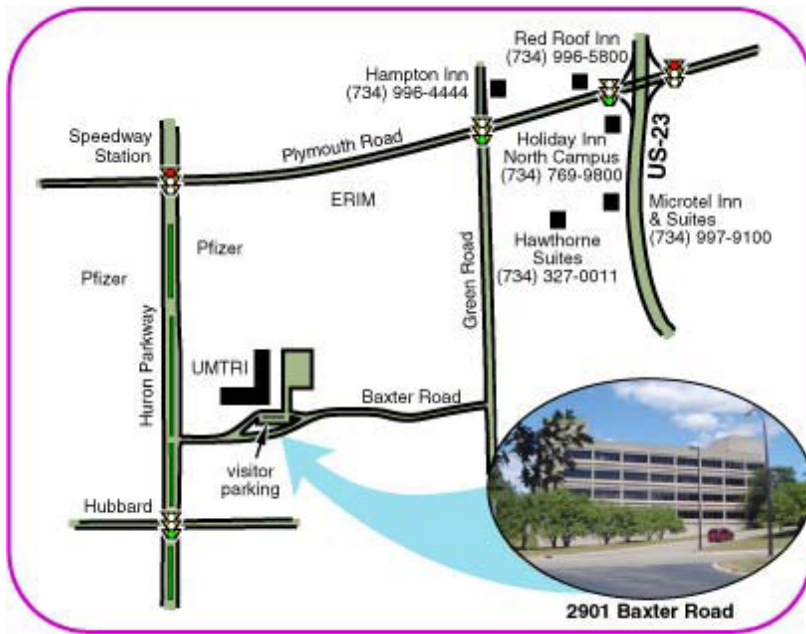
Take the Lodge Freeway (US-10) north and follow the signs for I-96 to Lansing. Take I-96 (approximately 22 miles) to M-14. Exit to the left and take M-14 (approximately 16 miles) to US-23. Turn south onto US-23, and immediately move to the right lane, exiting (right/west) onto Plymouth Road, and follow the directions below.

Driving West on Plymouth Road

At the third stop light, turn south (left) onto Huron Parkway. The first street to the left is Baxter Road, and UMTRI is on the left-hand corner. There is ample designated visitor parking in front of the building.

[UMTRI Map in PDF format](#)





University of Michigan Transportation Research Institute
2901 Baxter Road, Ann Arbor, Michigan 48109-2150 USA
Phone (734) 764-6504 | Fax (734) 936-1081

UMTRI - MOBILE PHONE STUDY

CONTACT SHEET

NAME: _____

PARTICIPANT #: _____

DATE OF BIRTH: _____

PHONE NUMBER: _____

EMAIL: _____

APPENDIX B - INITIAL INTERVIEW MATERIALS

Participant arrival interview

- Greet and meet in conference room
 - Complete contact sheet

- Description of Study, Questionnaire, and brief of this meeting
 - “This is a month-long study developed to characterize a cell phone users use patterns. Basically, we want to uncover the various parts that comprise an “average” cell phone conversation.”
 - “You will be given several two-page surveys that are to be completed after every cell phone call you make OR receive. These completed surveys are to be sent here to UMTRI every week in these provided envelopes.”
(Show surveys and envelopes)
 - “You will be paid \$50.00 when we receive your fourth-week’s surveys.”
 - “Finally, I will be giving you a questionnaire regarding your driving history and cell phone usage to complete before you leave.”

“Any questions so far?”

- Instructions and clarification
 - “Here is the two-page survey you will be completing after each cell phone call you make or receive.”
 - Emphasize...do not complete while driving...
 - Clarify question #9 (Show picture of a two lane highway and a two lane roadway with cars traveling in each direction)
 - Explain what questions to skip if the call is not placed or received while driving.
 - Read and explain directions for completing the second page.

- Confidentiality statement
 - “I want to make it clear that your personal information and survey information will be strictly confidential. After receiving your surveys, they will be given a number and referred to by that number for the entire study. Therefore your name will not be associated with any survey directly.”

Give questionnaire and ask if participant has any questions.

UMTRI – Cell phone Survey Instructions

First, I would like to thank you for participating in this month-long study regarding cell phone usage. Remember, your personal information and survey information will be strictly confidential. After receiving your surveys, they will be given a number, and referred to by that number for the entire study. Therefore your name will not be associated with any survey directly.

You have been given 50 two-page surveys and four large envelopes.

- Please complete a two-page survey for **EVERY** cell phone call you make **OR** receive.
- Please remember to only complete in-car-calls when you have safely stopped the car.
- At the end of each week (for four weeks) place ALL of your completed surveys in one of the envelopes provided and drop in the mail.

- You will be paid \$50.00 after completing the surveys at the end of the four-week period.

If you need additional surveys at any time or have any questions, please email me at dnosaj@umich.edu or call (734) 763-6081.

APPENDIX C – CONSENT FORM



UMTRI
University of Michigan
Transportation Research Institute
2901 Baxter Road, Ann Arbor, MI 48109-2150

Participant # _____

What Constitutes a Typical Cell Phone Call?

Primary Investigator: Paul Green (763 3795),

Research Assistant: Jason George (763 6081)

The purpose of this study is to determine what constitutes a typical cell phone call and how calls made while driving differ from other calls, if at all. This information will be used in future studies of cell phone safety and usability while driving to develop typical calls and call scenarios.

After collecting some biographical data, we will ask you some questions about the cell phone you normally use, your calling habits, your driving habits, etc. We will then give you a packet of forms to record 20 items (mostly checking boxes) about each call. The questions concern who you spoke to (friend, business associate, etc.), if you were driving, and general information about the content of the call. To protect your privacy, we do not want any personal details, only the general topic of each call. (It was about a problem with a friend.) Please do not use names.

Once a week send the forms to us using the stamped envelopes provided, and at the end of the month, send us a copy of your phone bill (with the last 4 digits of each number blanked out for privacy) to provide data on call timing and duration.

You will be paid \$50 for your time. You may withdraw from this study at any time without penalty.

I HAVE READ AND UNDERSTAND THE INFORMATION PRESENTED ABOVE. MY PARTICIPATION IN THIS STUDY IS ENTIRELY VOLUNTARY.

Print your name

Date

Sign your name

Witness (experimenter)

For additional information about your rights, contact:
Human Subjects Projection Office, 1042 Fleming Building, 503 Thompson St., Ann Arbor, MI 48104-1342
Ph: 936-0933, fax: 647 9084, email: IRB-Behavsci-Health@umich.edu, web:
<http://www.irb.research.umich.edu>

APPENDIX D – BIOGRAPHICAL DATA AND GENERAL CALL BEHAVIOR

Mobile phone pre-questionnaire:

Participant # _____

1. Gender: M F

• Age: _____

• Yearly Income Range:

- | | |
|------------------|-------------------|
| A. Under \$20K | E. \$51K - \$60K |
| B. \$21K - \$30K | F. \$61K - \$70K |
| C. \$31K - \$40K | G. Over \$70K |
| D. \$41K - \$50K | H. Rather not say |

YOUR VEHICLE AND DRIVING INFORMATION

4. Are you a licensed driver? YES NO
5. Your car is: MANUAL AUTOMATIC

6. What is the Year, Make, and Model of the vehicle in which you make most of your mobile phone calls?

Year:
Make:
Model:

7. Approximately how many miles do you drive each year? (American Avg. is 9K-11K)

8. In the past 5 years: How many police-reported crashes have you been involved in?

How many tickets for moving violations?

9. When you are approaching an intersection and the light turns yellow, what do you usually do:

- A. Floor it.
- B. Keep going as long as you don't see any police cars.
- C. Keep going and hope that you make it before the light turns red.
- D. Stop.

10. When someone cuts you off on the highway, do you usually:

- A. Make an obscene gesture.
- B. Honk your horn or flash your high beams.
- C. Slow down a bit to put a safer distance between the two of you.
- D. Pass them and then cut them off.

11. Do you usually:

- E. Drive the speed limit.
- F. Drive a couple miles per hour over the speed limit.
- G. Drive five to ten miles per hour over the speed limit.
- H. Drive more than ten miles per hour over the speed limit.

12. How many times in the past year have you been given a ticket for a traffic violation?

- A. Never.
- B. Once or twice.
- C. Three or four times.
- D. More than 5.

13. When you're in the left lane and you come up behind someone who is driving slower than you, do you usually:
 - A. Slow down.
 - B. High-beam then until they move out of your way.
 - C. Tail-gate them until they move out of your way.
 - D. Go into the middle lane and pass them.
14. Which lane of the highway do you drive in the most?
 - A. The right lane.
 - B. The middle lane(s).
 - C. The left lane.
15. When you are stuck in a traffic jam on the highway and you are in a hurry to get somewhere, do you usually:
 - A. Accept the fact that you're going to be late.
 - B. Switch lanes frequently depending on which lane is moving the fastest.
 - C. Drive on the shoulder.
 - D. Get off the highway and look for an alternate route.
16. When you are driving behind someone on a one-lane road who is doing exactly the speed limit, do you usually:
 - A. Look for an opportunity to pass them.
 - B. Pass them and cut them off for going so slow.
 - C. Stay a safe distance behind them and do the speed limit.
 - D. Tailgate them.
17. You are circling a full parking lot for five minutes when you see a spot. Another car is coming in the opposite direction. Do you:
 - A. Speed up and start gesturing at the other person if they try to take it.
 - B. Let the other person have it.
 - C. Wait to see if the other person takes it or lets you have it.
 - D. Try to get to the parking spot first.

ABOUT YOUR CURRENT MOBILE PHONE AND USE

18. When did you get your first mobile phone?
 19. Why?
 - A. Required by employer
 - B. To keep in touch with family members
 - C. Received as a gift
 - D. To optimize time – making calls while walking or driving
 - E. More economical than local phone service
 - F. Emergencies
 - G. Other: _____
20. What is the make and model of your current primary mobile phone?
 21. How long have you had it?
 22. Who pays the bill?
 - A. Employer
 - B. I do
 - C. Parent
 - D. Relative
 - E. Other: _____

23. Is it a Bluetooth phone? YES NO

PHONE FEATURES

24. **Dialing:** Circle all that apply and provide approximate percentage of use.

- A. Speed dial/Phone Book % _____
- B. Hands free car kit % _____
- C. Voice-activated dialing % _____
- D. Calling card % _____
- E. Computer (modem) dialed, % _____
- F. Other: _____ % _____

25. **Services:** Circle all that apply and provide approximate percentage of use.

- A. Call waiting % _____
- B. Caller ID % _____
- C. EMS (Enhanced Messaging Service) % _____
- D. IM (Instant Messaging) % _____
- E. Direct-connect feature % _____
- F. Other: _____ % _____

26. **Conversation:** While in the car, what percentage of the time do you use:

- A. Speaker phone % _____
- B. Head set % _____
- C. Ear piece % _____
- D. Handheld unit % _____

27. Is your mobile phone your primary phone? YES NO

28. Do you have more than 1 mobile phone? YES NO
If so, for what purpose?

29. Approximately how many calls do you **make** per day from your/each mobile phone?

30. Approximately how many calls do you **receive** per day on your mobile phone?

31. Approximately how many mobile phone calls do you make and receive while **driving alone** each day/week?

32. Normally, where is your phone when driving?

- A. Cradle
- B. Pocket
- C. Seat
- D. Purse
- E. Other: _____

33. When talking on your mobile phone, while driving alone, have you:

- A. Tailgated.
- B. Cut someone off.
- C. Hit another vehicle.
- D. Ran a red light.
- E. Missed an exit or turn.
- F. Unknowingly exceeded the speed limit.

34. Have you ever been involved in a crash or near crash in which your use of a mobile phone could have been a contributing factor?

YES NO

If so, describe it...

Where and when (road, day of week, time)

How fast were you driving?

APPENDIX E – INDIVIDUAL CALL LOG FORM

<div style="text-align: center; border: 1px solid black; width: fit-content; margin: 0 auto; padding: 2px;">DIALED</div> <p>How:</p> <ul style="list-style-type: none"> <input type="radio"/> Manual <input type="radio"/> Speed (one button) <input type="radio"/> Voice dial <input type="radio"/> Calling Card <input type="radio"/> Phone Book <p>Nature of call:</p> <ul style="list-style-type: none"> <input type="radio"/> Short Sequence (911, *75) <input type="radio"/> Local <input type="radio"/> Long distance <input type="radio"/> International <input type="radio"/> Toll-free <input type="radio"/> Other: _____ 	<div style="text-align: center; border: 1px solid black; width: fit-content; margin: 0 auto; padding: 2px;">RECEIVED</div> <p>How:</p> <ul style="list-style-type: none"> <input type="radio"/> Hand Set <input type="radio"/> Head Set <input type="radio"/> Voice <input type="radio"/> On-Dash button <input type="radio"/> Sent to Voice Mail <input type="radio"/> Not Answered <p>The call was:</p> <ul style="list-style-type: none"> <input type="radio"/> Local <input type="radio"/> Long distance <p>Were you on another call?</p> <ul style="list-style-type: none"> <input type="radio"/> YES <input type="radio"/> NO <p>How many rings before answer?</p> <p style="text-align: center;">1 2 3 4 5 6</p>	<p>5. What was the nature of the call?</p> <ul style="list-style-type: none"> <input type="radio"/> Business <input type="radio"/> Personal <input type="radio"/> Wrong Number <input type="radio"/> Other: _____ <p>6. Problems with the call? (check all that apply)</p> <ul style="list-style-type: none"> <input type="checkbox"/> None <input type="checkbox"/> Dropped/Disconnected <input type="checkbox"/> Bad connection/static <input type="checkbox"/> Audible warnings (battery, etc.) <input type="checkbox"/> Hardware problem <input type="checkbox"/> Other: _____ <p>7. Any other materials during the conversation? (check all that apply)</p> <ul style="list-style-type: none"> <input type="checkbox"/> None <input type="checkbox"/> Calculator <input type="checkbox"/> Map <input type="checkbox"/> Pen/Pencil & Paper <input type="checkbox"/> PDA <input type="checkbox"/> Other: _____ 	<p>10. If call occurred while vehicle was stationary:</p> <p>Was the car:</p> <ul style="list-style-type: none"> <input type="radio"/> At a traffic light <input type="radio"/> In a traffic jam <input type="radio"/> In a parking lot <input type="radio"/> In a driveway <input type="radio"/> Other: _____ <p>11. How was the traffic?</p> <ul style="list-style-type: none"> <input type="radio"/> Traffic-free <input type="radio"/> Light (no impact on speed) <input type="radio"/> Moderate (slowed by traffic) <input type="radio"/> Heavy (stop-and-go) <p>12. What were the weather conditions?</p> <ul style="list-style-type: none"> <input type="radio"/> Clear <input type="radio"/> Rain <input type="radio"/> Snow <input type="radio"/> Sleet <input type="radio"/> Hail <input type="radio"/> High Winds <input type="radio"/> Other: _____ <p>13. What was the lighting like?</p> <ul style="list-style-type: none"> <input type="radio"/> Daylight <input type="radio"/> Overcast <input type="radio"/> Sunset <input type="radio"/> Dusk <input type="radio"/> Dark <p>14. The road surface was:</p> <ul style="list-style-type: none"> <input type="radio"/> Dry <input type="radio"/> Wet <input type="radio"/> Snow or slush <input type="radio"/> Ice <input type="radio"/> Other: _____ 							
<p>1. Was it a conference call? <input type="radio"/> YES <input type="radio"/> NO Number of parties: _____</p> <p>2. Were any of the other parties driving? <input type="radio"/> YES <input type="radio"/> NO <input type="radio"/> DON'T KNOW</p> <p>3. Was the other party on a:</p> <ul style="list-style-type: none"> <input type="radio"/> Land line <input type="radio"/> Mobile phone <input type="radio"/> Computer <p>4. Quality of the connection:</p> <p style="padding-left: 20px;">Listening: Effort Scale</p> <ul style="list-style-type: none"> <input type="radio"/> Complete relaxation possible, no effort required <input type="radio"/> Attention necessary; no appreciable effort required <input type="radio"/> Moderate effort required <input type="radio"/> Considerable effort required <input type="radio"/> No meaning understood with any reasonable effort 	<p style="text-align: center;">IF NOT AN IN-CAR-CALL SKIP TO #15</p> <p>8. Where were you driving?(check all that apply)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Residential <input type="checkbox"/> Rural <input type="checkbox"/> Urban <input type="checkbox"/> Expressway <input type="checkbox"/> Other: _____ <p>9. Numbr of travel lanes</p> <ul style="list-style-type: none"> <input type="radio"/> 1 <input type="radio"/> 2 (two lane roadway OR roadway w/one lane in each direction) <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5+ <p style="padding-left: 20px;">If divided highway:</p> <ul style="list-style-type: none"> <input type="radio"/> positive barrier (concrete, metal, upright barrier) <input type="radio"/> without positive barrier (trees, gravel, paved medians) 	<p>15. Rate the importance of the call:</p> <p>a. Respond to the call:</p> <ul style="list-style-type: none"> <input type="radio"/> Within time of trip <input type="radio"/> Same day <input type="radio"/> After today <input type="radio"/> No response (Info. only) <p>b. Severity</p> <ul style="list-style-type: none"> <input type="radio"/> Threat to life or property <input type="radio"/> Major (Time critical message) <input type="radio"/> Minor (Late for dinner) <input type="radio"/> None <p>16. Would you characterize this conversation as:</p> <ul style="list-style-type: none"> <input type="radio"/> Light (chatty) "What's for dinner?" <input type="radio"/> Medium (some decision making) "Hmm, you take Beth, I'll pick up Jon" <input type="radio"/> Demanding (mpg calculations) "Divide 352 miles by 18 gallons of gas" <p>17. Rate the general emotional content of the call:</p> <table border="0" style="width: 100%; text-align: center;"> <tr> <td style="width: 20%;">No emotion: Information only</td> <td style="width: 10%;">1</td> <td style="width: 10%;">2</td> <td style="width: 10%;">Typical call to friend</td> <td style="width: 10%;">3</td> <td style="width: 10%;">4</td> <td style="width: 10%;">Heated argument</td> <td style="width: 10%;">5</td> </tr> </table> <p>18. Briefly describe the content of the call:</p> <p>_____</p> <p>_____</p> <p style="text-align: right;">Approximate length of call: _____</p> <p style="text-align: right;">Date: _____ Time: _____</p>	No emotion: Information only	1	2	Typical call to friend	3	4	Heated argument	5
No emotion: Information only	1	2	Typical call to friend	3	4	Heated argument	5			

Please indicate which category AND subtopic describes your conversation.

If the specific topic is not included here please mark "Not Listed" AND

Mark an "X" on the line that indicates where within these topics (which are ranked from greatest to least emotional content) your conversation fell.

FAMILY

- Death of a close family member
- Major change in the health or behavior of a family member
- Gaining a new family member
- Son or daughter leaving home
- Trouble with In-laws
- Major change in the number of family get-togethers
- Christmas season
- Not Listed

MONEY

- Major change in financial status
- Taking out a mortgage or loan for a major purchase
- Foreclosure on a mortgage or loan
- Taking out a mortgage or loan for a lesser purchase
- Not Listed

SOCIAL/RECREATIONAL

- Major change in usual type and/or amount of recreation
- Major change in social activities
- Vacation
- Not Listed

SPOUSE

- Death of Spouse
- Divorce
- Marital separation from mate
- Marriage
- Marital reconciliation
- Pregnancy
- Major change in the number of arguments with spouse
- Spouse beginning or ceasing to work outside the home
- Not Listed

WORK

- Fired from work
- Retirement
- Major business re-adjustment
- Change to different line of work
- Major change in responsibilities at work
- Trouble with boss
- Major change in working hours or conditions
- Not Listed

PERSONAL

- Detention in jail, other institution
- Death of close friend
- Outstanding personal achievement
- Beginning or ceasing formal schooling
- Major change in living conditions
- Change in residence
- Change to a new school
- Major change in church activities
- Minor violations of the law
- Not Listed

HEALTH

- Major personal injury or illness
- Sexual difficulties
- Revision of personal habits
- Major change in sleeping habits
- Major change in eating habits
- Not Listed

APPENDIX F – PHONE FEATURES

Speed dial – This feature is a short cut to dial a phone number. For example, the user might program *51 to represent the phone number for a long distance call (734 764 1817). This feature is useful for phone numbers that are long, difficult to dial, or commonly used. (See www.ossidian.com/glossary/s.html.)

Phone book – This feature is a short cut to dial a phone number. The phone number is entered into a list. To dial the number, the user goes to the phone book, scrolls through the list, and then selects the number to dial. This feature is useful for phone numbers that are long, difficult to dial, or commonly used.

Hands-free kit – This hardware allows the user to take a hand-held phone and modify it for hands-free operation, that is to be a speaker phone. Usually it includes a cradle, speaker, microphone, and connectors. (See www.freecellphonesguy.com/freecellphonesguy-wireless-glossary.cfm.)

Enhanced Message Service (EMS) - An EMS-enabled mobile phone can send and receive messages that have special text formatting (such as bold or italic), animations, pictures, icons, sound effects and special ring tones.
(http://www.webopedia.com/TERM/E/Enhanced_Message_Service.html)

Instant Messaging (IM) - A service that alerts users when friends or colleagues are on line and allows them to communicate with each other in real time through private online chat areas. With instant messaging, a user creates a list of other users with whom he or she wishes to communicate; when a user from his or her list is on line, the service alerts the user and enables immediate contact with the other user. While instant messaging has primarily been a proprietary service offered by Internet service providers such as AOL and MSN, businesses are starting to employ instant messaging to increase employee efficiency and make expertise more readily available to employees.
(www.microsoft.com/windowsxp/experiences/glossary_h-n.asp)

Direct Connect – This refers to a feature initially implemented on Nextel phones that allows the user to readily connect to a few other phones in a walkie-talkie like fashion.
(See www.nextel.com/services/directconnect/nationwide_dc.shtml.)

APPENDX G – METHOD FOR CODING HOLMES-RAHE DATA

Rationale for coding Holmes-Rahe questionnaire:

Based on the data provided within the questionnaire, as a whole, and based on potentially misinterpreted directions (some number) questionnaires were re-coded. The Holmes-Rahe based questionnaire (page two) is coded in two ways. If the participant's phone call relates specifically to the predefined Holmes-Rahe "emotional situation" the call is coded as a Y (yes) under its respective numerical representation (consistent with coding scheme for the whole document). *The "emotional situations" were divided into seven groups (Family, Spouse, Personal, Money, Work, Health, Social/Recreational) therefore between 3 and 9 Holmes-Rahe "emotional situations" fall under each category.*

Therefore, if an emotional situation falls under "**Personal**" and is **9th** on the scale (the 9th being a **specific** predefined "emotional situation"), it would be coded as **Y – P9**. If the participant's call is not represented by one of the predefined "emotional situations" the participant was directed to check the "Not Listed" box AND place a mark next to the Holmes-Rahe "emotional situation" that best reflects the emotional content of the call. Under this condition the code would read **PNL – 9** for **PersonalNotListed** – (emotionally similar to) **9**.

Under certain circumstances the information provided by the participant in the document as a whole contradicts their response in the Holmes-Rahe portion of the questionnaire. This is apparent when the content of the call does not match the **specific** Holmes-Rahe "emotional situation" the participant has marked. In this case, we assume, that the participant failed to mark the "Not Listed" box and only marked the "emotionally similar" representation.

Example: The content of the call has been described as a returned call from a university regarding a complaint having been filed **by the recipient**. This call was coded by the participant **specifically** as a "Minor violation of the law" (Holmes-Rahe emotional situation number 9) In this case the participant was not discussing his minor violation of the law, rather his call was "emotionally similar to" a minor violation of the law. Therefore we code this situation NOT as Y – P9 BUT as PNL – 9

APPENDIX H - TOPICS OF CALLS MADE WHILE DRIVING

A GIRL DID NOT CHECK OUT FROM APPT.
A GIRL IN MY GROUP CALLED TO TELL ME SHE WOULDN'T MAKE OUR MEETING
ACCOUNTANT
ADVERTISING
AFTER SCHOOL SCHEDULE
AGENCIES IN PHONE BOOK
AGREED TO GO TO APPT.
ARRANGING BIRTHDAY PARTY FOR 8 YEAR OLD SON
ASKED TO WORK A PRODUCTION EVENT
ATTORNEY CALLED BACK ON MY L??? LEFT VERY DETAILED MESSAGE
BAD CONNECTION
BANK DEPOSITS
BRING HOME DINNER
BRINGING HOME DINNER
BRINGING HOME DINNER
BUSINESS CARDS
BUSINESS LICENSE
BUSINESS TAXES
CALL ABOUT JOB INFO WITH INFORMATION LEFT ON VOICE MAIL
CALL ABOUT STOPPING TO PICK UP (UNREADABLE) AT STORE
CALL CHECK VOICEMAIL
CALL DAD I WILL STOP BY TO PICK UP PACKAGE
CALL FOR DIRECTIONS
CALL FOR DIRECTIONS
CALL FROM COWORKER
CALL HOME LATE BECAUSE OF WEATHER
CALL HOME TO REMIND OF AN APPOINTMENT
CALL IN TO WORK
CALL LAVALONG NO MESSAGE TO RESPOND TO
CALL MADE. THEY ARE WAITING
CALL MY MOTHER TO SEE IF MY GRANDDAUGHTER WAS THERE SO I COULD PICK HER UP
CALL TO CHECK IF STOP NEEDED AFTER WORK
CALL TO CHECK VOICEMAIL AT WORK
CALL TO CHECK WHAT WAS NEEDED AT STORE
CALL TO DOCTORS OFFICE
CALL TO GET VOICEMAIL AT WORK
CALL TO REPORT ACCIDENT AND SPINOUT ON FREEWAY
CALL TO REPORT DISABLED TRUCK PARTIALLY IN TRAFFIC LANE
CALLED 555 TOWNER TO FIND OUT WHEN THEY DO TB TESTING
CALLED A FRIEND TO DO ME A FAVOR REGARDING WORK
CALLED A FRIEND TO RELAY INFORMATION ABOUT UPCOMING PLANS AND SITUATION
CALLED A--- TO LET HIM KNOW I WAS IN DET AND MEET ME AT THE COMAN YOUNG BUILDING
CALLED ABOUT RESPONSIBILITIES INVOICE
CALLED DAD TO HAVE HIM GET RED WIND TICKETS
CALLED EYE-DOCTOR FOR INFO
CALLED EYE-DOCTORWANT TO CONFIRM APPOINTMENT

CALLED FRIEND ABOUT EVENING ACTIVITIES
CALLED FRIEND ABOUT PLANS FOR EVENING
CALLED FRIEND ABOUT TIME OF EVENT
CALLED FRIEND BACK WITH PLANS
CALLED HOME TO SAY I WAS IN HOUSTON
CALLED HOPE DENTAL CLINIC TO REGISTER L--- AND A--- FOR DENTAL APPT
CALLED J--- TO SEE IF I COULD DO RESEARCH STUDY
CALLED L--- TO SEE IF SHE WANTED TO GO OUT TONIGHT TO BALLROOM DANCE
CALLED L---- TO ASK HER A QUESTION HOWEVER I FORGOT WHAT I CALLED HER FOR
CALLED LAVALONG HOWEVER I WAS GETTING TOO MUCH STATIC SO I CALLED BACK
CALLED MY MOM TO SEE IF SHE WAS COMING TO PICK ME UP TO GO TO MY DADS HOUS
CALLED OTHER PARTNER
CALLED RESTAURANT TO GET INFO
CALLED TO CHECK IF RESTARAUNT OPEN FOR BREAKFAST
CALLED WORK TO CHECK VOICEMAIL
CALLED WORK TO SEE IF EQUIPMENT WAS READY
CALLING FAMILY MEMBER TO COORDINATE MEETING
CALLING OUT FROM APPT
CATCHING UP WITH OLD FRIEND
CHANGE OF DIRECTIONS
CHATting W/ MY BOYFRIEND
CHATting W/ MY PARENTS TELLING THEM WHEN I'D BE HOME
CHATting W/ MY ROOMMATE
CHATting WITH BROTHER
CHECK VOICE MAIL AT WORK
CHECK VOICEMAIL
CHECKED VOICE MAIL AT WORK
CHECKING IN
CHECKING IN TO OFFICE
CHECKING IN WITH WORK
CHECKING LOCATION
CHILD CARE NETWK INQUIRED ABOUT THEIR CHILD CARE SCHOLARSHIP
CLIENTS NOT BEING SERVICED
COMPUTER QUESTION
D.B.A
D.B.A'S
DAD ASKED WHAT I DID IN ST LOUIS AND WHEN I WAS LEAVING FOR HOUSTON
DAUGHTER CALLED ASKED ME AM I GOING TO PICK HER UP
DECIDING PLANS FOR TRIP THAT NIGHT
DIRECTION
DIRECTION
DIRECTION
DIRECTION
DIRECTION
DIRECTION
DIRECTION
DIRECTION
DIRECTION
DIRECTION
DIRECTION
DIRECTION
DIRECTION & INFORMATION

DIRECTION FOR APPOINT.
DIRECTIONS TO A CALL
DIRECTIONS TO MY SISTER
DIRECTIONS TO NEW ADVERTISEMENT OFFICES
DISCOUNTED RATES FOR OLD CLIENTS AND W? FORMS
DISCUSS A TUESDAY MEETING
DISCUSSED CHRISTMAS PLANS
DISCUSSED RIDE HOME WITH FRIEND
DISCUSSED THANKSGIVING RIDE HOME WITH SISTER
DO I NEED TO STOP AT STORE
DO I WANT TO PAY FOR MY ADS
DOCTOR OFFICE INFO
DROP OFF PAPERWORK
EMAIL ME THE FILES
EX-WIFE CALLING SON TO TELL HIM SHE'D BE LATE PICKING HIM UP FROM DAD'S HOUSE
EX-WIFE GOT MIXED UP ON LOCATIONS FOR PICK-UP, DROP-OFF, WITH MY YOUNGEST SON
FAMILY CALLED AND LEFT MESSAGE NOTHING IMPORTANT
FAMILY MEMBER CALLED WITH QUESTIONS REQUEST
FILLING A PRESCRIPTION
FREEWAY ACCIDENT (NOT INVOLVED)
FRIEND CALLED ABOUT DINNER PLANS
FRIEND CALLED TO SAY SHE IS RUNNING LATE FOR TODAY'S PLANS
FRIEND CALLED TO SEE IF SOMEONE WOULD BE AT OUR APARTMENT
FRIEND CALLED TO TALK ABOUT POSSIBILITIES FOR THE EVENINGS PLAN
FRIEND CALLED TO TALK AND MAKE PLANS
FRIEND CALLING TO SAY SHE'S COMING OVER EARLY
FRIEND TELLING ME OF A PARTY
FRIEND WAS LATE FOR BOWLING
GAS RECEIPTS
GAS RECEIPTS
GET DIRECTIONS
GET VOICE MAIL
GETTING DIRECTIONS
GIRLS NOT WEARING ATTRACTIVE CLOTHES
GOING TO THE BAR
GOT VOICE MAIL
GOT VOICE MAIL
GOT VOICEMAIL
HAD TO STOP FOR GAS BEFORE GETTING DINNER
HAS A CONVERSATION WITH A COMPANY ABOUT PARTICULARS OF SERVICE THEY ARE PROVIDING
HEAVY DAMP TRAFFIC CAUSING SLOWDOWN NEAR AIRPORT
HIRING NEW GIRLS
HIRING NEW GIRLS
HOURS AT WORK AND A SECOND AGENCY
HOW WAS YOUR DAY ARE YOU COMING OVER
HOW WAS YOUR DAY?
HOW YOU DOING HAPPY THANKSGIVING
HOW'S IT GOING
HUNG UP

HUNG UP
HUNG UP
I CALLED A FRIEND RETURNED HER CALL AND TALKED ABOUT SITUATION
I CALLED MY BOYFRIEND AND WE HAD A CASUAL CONVERSATION
I NEED TO BORROW MONEY FOR MY ADS
I NEEDED TO FORWARD MY PHONES
I WAS CHATTING W/ MY MOM
I'LL BE THERE IN 5 MIN
I'LL BE THERE SOON
I'M COMIN INTO TOWN MEET AT 7
I'M DONE WITH MY WORK I'LL BRING IT OVER
I'M OUTSIDE WAITING
INFORMATION ABOUT HOURS
INFORMATION CALL
INTERVIEWING AT A PUBLIC LOCATION
ISSUES
ISSUES
ISSUES
JUST CALLED TO SAY HELLO
LATE COMING HOME
LATE FOR WORK
LATE FOR WORK
LATE GETTING TO THE BOWLING ALLEY
LAVALIFE MESSAGE WAITING FOR ME TO RESPOND
LAVALONG TO CHECK MESSAGE
LAWYER
LEFT MESSAGE ON FRIENDS CELL PHONE ABOUT MEETING LATER
LETTING OFFICE KNOW AT LUNCH
LETTING OFFICE KNOW GOING HOME
LISTENING TO PROTOCOL FOR EMERGENCIES
LOCKS ON THE DOOR AT WORK
LUNCH
LUNCH
M--- RESPONDING TO MY VOICE AD AT LAVALIFE
MAKING PLANS FOR THE EVENING
MAKING PLANS WITH MY SISTER ABOUT FRIDAY
MAY BE LATE FOR WORK
MEDICATION
MEET AT 7 AT TENNIS COURTS
METRO TIME ????
MONEY AT WORK
MONEY DIRECTIONS
MONEY DIRECTIONS
MONEYAT WORK
MORE ISSUES AND EMPLOYEEES
MULTIPLE VEHICLE TRAFFIC ACCIDENT
MY BOYFRIEND AND I WERE DECIDING WHAT TIME WE WANTED TO LEAVE TO MEET EACH OTHER
MY BOYFRIEND AND I WERE MAKING PLANS AND CHATTING
MY DAD'S BIRTHDAY CALLED HIM

MY DAUGHTER'S THERAPIST CALLED TO GIVE UPDATE ON MY DAUGHTER'S COUNSELING
MY FRIEND AND I WERE DECIDING WHAT BAR WE WANTED TO GO TO
MY FRIEND AND I WERE DECIDING WHAT TO DO
MY MOM CALLED JUST TO CHAT
MY ROOMMATE AND I WERE CAUSALLY TALKING
MY ROOMMATE CALLED ME TO SEE IF I HAD A DRILL
NEED TO STOP AT DRUG STORE
NEW ADS
NEW ADS FOR BUSINESS
NEW ADS IN PAPERS
NEW ATTIRE FOR WORK
NEW CLIENTS FOR WORK
NEW DRESS CODES
NEW EMPLOYEE
NEW EMPLOYEE
NEW EMPLOYEE DEPOSIT
NEW EMPLOYEES
NEWSPAPER ADS
OFFICE PROCEDURES AND W4 PAPERS
ON OUR WAY TO PICK HIM UP
ONE OF MY FRIENDS CALLED TO TELL ME WHEN OUR BBALL GAME WAS
OPENING SECOND BUSINESS
OUT OF STATE LICENSES
PARTY PLANS
PARTY PLANS
PAST CLIENTS
PAYING FOR M.T. ADS
PERCENTAGES OF PAY
PERSONAL ISSUES
PERSPECTIVE NEW EMPLOYEES
PHONE FORWARDING
PICKED UP MAIL
PICKUP BREAKFAST
PLANNING
PLANNING
PLANS
PLANS
PRINTING SUPPLIES
REPORT TO OFFICE
REPORTING TO OFFICE
RESPONDED BACK TO CALL FROM FRIEND ON WORK PHONE W/MORE PRIVACY
RETURNED FIRST CALLED DID NOT GO THROUGH SETTING UP APPOINT.
LETTING KNOW LOCATION"
RETURNING INFORMATION TO OFFICE
RETURNING INFORMATION TO OFFICE
ROOMMATE CALLED ABOUT SPRING BREAK PLANS MICHIGAN HOCKEY ETC
RUNNING LATE
RUNNING LATE FOR WORK
S--- CALLED TO SEE IF I WAS STILL GOING TO MEET HER AT THE GAS STATION
SCHOOL

SCHOOL
SOMETHING WAS LOST NEEDED TO KNOW WHERE IT WAS I DIDN'T KNOW
SON HOME FROM SCHOOL
SON TO HIS DAD
STOP AT DRUG STORE
STRESSED OUT
T--- RESPONDED TO MY VOICE MAIL AT LAVALIFE
TALK TO AN ACQUAINTANCE
TALK TO CLIENT ABOUT INFO AND TOUCHING BASES
TALK TO DISTRIBUTION. MADE A PURCHASE
TALK TO FAMILY MEMBER
TALK TO FAMILY MEMBER
TALK TO FAMILY MEMBER ABOUT WEEKEND PLANS
TALK TO FAMILY MEMBER. DINNER PLANS
TALK TO FRIEND
TALK TO FRIEND
TALK TO FRIEND ABOUT SEEING A MOVIE "MATRIX"
TALK TO FRIEND. CATCHING UP ON OLD NEWS
TALK TO MOTHER ABOUT PLANS
TALK TO PROSPECTIVE CLIENT ABOUT THINGS
TALK WITH CLIENT
TALKED ABOUT PLANS FOR TONIGHT. TIME CONFIRMATION
TALKED TO A FRIEND ABOUT FAMILY PROBLEMS
TALKED TO FAMILY MEMBER. CONFIRM PLANS
TALKED TO FRIEND. GOT DIRECTIONS
TALKED TO FRIEND. SET UP TIME TO MEET
TALKED WITH FAMILY MEMBER
TALKED WITH FAMILY MEMBER ABOUT PLANS/NEWS
TALKING ABOUT WEEKEND
TALKING TO BROTHER ABOUT HIS NEW JOB
TALKING TO FRIEND ABOUT PLANS FOR THE EVENING
TALKING WITH MOM
TAX PAPERS
TAX PAPERS
TELLING BROTHER WHAT MOVIES I RECENTLY SAW
TELLING CLIENT I WAS RUNNING LATE
TELLING COUSIN I'M COMING TO HIS HOUSE OVER SPRING BREAK
TELLING HIM WE WERE ON OUR WAY TO PICK HIM UP
TELLING MY BOYFRIEND WHEN I WOULD BE AT HIS HOUSE
TIME TO PICK UP TICKET DISCUSSED
TIPS FROM CLIENTS
TOUCHING BASE WITH CLIENT
TRANSPORTATION
TWO CLIENTS CANCELLED PAYMENT ON THEIR CREDIT CARDS
U OF M CAPH CALLED ME TO CONFIRM DEPOSIT WAS RECEIVED
UPDATE FRIEND WHO MISSED CLASS
VOICE MAIL
VOICE MAIL
VOICEMAIL FROM CLIENT. AGAIN PHONE DID NOT PICK UP. LACK OF COVERAGE

W---- CALLED TO TELL ME HE WOULD NOT BE ABLE TO VISIT TODAY
WAIT FOR NEW EMPLOYEES
WANTED TO ASK ME A QUESTION
WANTED TO SEE IF OTHER FRIEND WAS ON THE WAY
WAS LATE FOR A PARTY
WHAT GIRLS ARE AW???
WHAT INFORMATION NEEDED FOR APPOINT.
WHAT RESTAURANT?
WHEN YOU GETTING HERE
WHO MADE MONEY DROPS?
WIFE CALLED TO FIND ME AT MALL
WILL BE A LITTLE LATE
WILL YOU PICK ME UP FROM WORK
YARN SHOP

APPENDIX I - CALLS MADE WHILE NOT DRIVING

A-- CALLED ME BACK
AGAIN GETTING INFO FOR FINANCIAL AID FROM MOTHER
AIRLINE OPERATOR COLLECTING MONEY FOR TICKET
ANNOYING, HUNG UP
ARGUING WITH MOTHER ABOUT SATURDAY NIGHT PLANS
ARRANGE A TIME TO PICK THINGS UP FROM FRIEND'S HOUSE
ASK FRIEND TO HOCKEY GAME
ASKED BROTHER TO PICK UP SOMETHING FROM THE STORE
ASKED FRIEND TO COME OVER
ASKED FRIEND TO COME OVER FOR POKER
ATTEMPTED TO RETURN ATTORNEY'S CALL ONCE I WAS OFF THE ROAD ONLY GOT HIS SECRETARY
AND LEFT MESSAGE
BROTHER BOUGHT A LAPTOP
BROTHER WANTED ME TO PICK UP SOMETHING
BROTHER WANTED TO SEE WHAT I WAS DOING FOR DINNER
BROTHER WANTED TO USE CAR
BUDDY CALLING TO SAY HE WAS COMING OVER
BUSINESS ACQUAINTANT CATCHING UP WITH THINGS, STATUS
BUSINESS CARDS
CALL ABOUT A JOB OFFER
CALL ABOUT GROUP PROJECT
CALL COMFORT ZONE TO FIND OUT WHAT TIME AND DAY DO THEY HAVE BALL-ROOM DANCE
LESSONS
CALL DR K--- ASKED IF THEY HAVE ANY OPENING POSITIONS FOR A MEDICAL ASSISTANT
CALL FRIEND TO GET TOGETHER TO STUDY
CALL FROM A FRIEND TO TALK PLAN A VISIT
CALL L--- JUST TO TALK
CALL L--- TO SEE HOW SHE WAS DOING
CALL LAVALONG TO FIND OUT IF I RECEIVED ANY MESSAGES
CALL MARYMEY DOCTOR TO INFORM HER I WAS RUNNING LATE FOR APP
CALL ME BACK
CALL ME BACK
CALL ME TOMORROW
CALL MY DAD TO TELL HIM MOM WOULD DROP ME OFF AT HIS HOUSE TODAY AROUND 4PM
CALL MY GIRLFRIEND B---- AND ASKED HER TO UNLOCK THE DOOR BECAUSE I DO NOT HAVE MY KEY
CALL MY JOB AT THE COUNTY TO INFORM THEM I WAS RUNNING BEHIND A LITTLE FOR WORK
CALL REGARDING WORK DECISIONS AND PLANS
CALL S--- MY SISTER TO SEE IF SHE COULD PICK MY DAUGHTER UP FROM THE DANCE AND
BABYSITTER FOR ME
CALL T--- TO LET HIM KNOW I AM IN DETROIT
CALL TO FATHER REGARDING VISIT
CALL TO FIND OUT WHAT TIME MY DOCTOR APPT SCHEDULE FOR
CALL TO GET DIRECTIONS
CALL TO INQUIRE ABOUT A COMPANY SERVICE
CALL TO LOCATE WIFE AT MALL
CALL WAS DROPPED ALMOST IMMEDIATELY
CALL WCC FOR QUESTION ABOUT FINANCIAL AID FOR SCHOOL
CALL WORK, MAY BE LATE; ACCIDENT, TRAFFIC

CALL YOU BACK I'M ON THE OTHER LINE
CALLED A FRIEND TO TALK ABOUT THE WEEKEND
CALLED A-- HE RESPOND TO MY VOICE MAIL AND I CALLED HIM BACK TO TALK TO HIM
CALLED A2 TEMPS CONCERNING JOB
CALLED ABOUT RED WINGS TICKETS
CALLED BRANDY TO SEE WHAT SHE WAS UP TO
CALLED C---- TO INFORM HER I WOULD NOT BE ABLE TO MAKE IT TO HER CANDLE LIGHT PARTY
CALLED FAMILY MEMBER ABOUT A MESSAGE THEY LEFT
CALLED FAMILY MEMBER ABOUT THEIR MESSAGE HEATED CONVERSATION YET BRIEF
CALLED FOX THEATER TO FIND OUT IF I CAN PAY AT THE DOOR OR DO THEY ONLY TAKE TICKETS
CALLED FRIEND
CALLED FRIEND ABOUT SOMEONE BEING AT HOME
CALLED FRIEND I HAVEN'T TALKED TO IN A WHILE
CALLED FRIEND TO FIND OUT PLANS FOR THE DAY
CALLED FRIEND TO FIND OUT WHAT SHE WAS DOING TONIGHT
CALLED FRIEND TO GET ANOTHER FRIEND'S ADDRESS
CALLED FRIEND TO SAY I WAS CLOSE TO HOUSE
CALLED FRIEND TO SEE HOW SHE WAS WHATS NEW
CALLED FRIEND TO TELL HER I WAS ON MY WAY OVER
CALLED GRANDMA IN FLORIDA TO WISH HER A HAPPY VALENTINES DAY
CALLED GRANDMA TO WISH HER A HAPPY VALENTINES DAY
CALLED HOME ABOUT VACATION FAMILIES HEALTH ETC
CALLED HOME TO ASK ABOUT SPRING BREAK
CALLED HOME TO ASK ROOMMATE TO LEAVE FRONT DOOR UNLOCKED
CALLED IN REGARDS TO A COMPUTER ISSUE
CALLED INFORMATION (555-1212) TO GET THE PHONE # FOR FOX THEATER IN DETROIT
CALLED L---- TO FIND OUT WHAT TIME I NEED TO PICK HER UP FOR TOMORROW
CALLED L---- TO SAY HI AND FIND OUT HOW SHE WAS DOING TODAY
CALLED LAVALONG TO FIND OUT HOW MANY PEOPLE CALLED TO RESPOND TO MY AD FOR A HUSBAND
CALLED MOM AT 3AM TO SEE IF I COULD GO OVER TO HER HOUSE
CALLED MOM BACK TO FIND OUT WHERE SHE WAS AND WHAT WAS TAKING SO LONG FOR HER TO PICK ME UP
CALLED MOTHER ABOUT DINNER
CALLED MY APARTMENT COMPLEX FROM SCHOOL TO FIND OUT WHY NO ONE CAME OUT SATURDAY TO DO THE DOOR
CALLED MY FRIEND TO SEE WHAT HER PLANS FOR SUPERBOWL WERE
CALLED MY GIRLFRIEND B---
CALLED MY GRANDMOTHER TO SEE IF MY DAUGHTER ALEXIS WAS AT HER HOUSE
CALLED MY MOM AND ASK HER TO TAKE ME TO THE LIBRARY
CALLED MY MOM AND ASKED HER IF SHE COULD PICK MY MONEY UP TOMORROW TOO WHEN SHE PICK UP HER MONEY
CALLED MY MOM AT HER HOUSE AND I GOT THE ANSWERING MACHINE
CALLED MY MOM TO ASK HER WHAT TIME SHE WAS GOING TO COME AND PICK ME UP
CALLED MY MOM TO SEE IF SHE WAS STILL GOING TO PICK ME UP TO GO TO SCHOOL
CALLED N--- TO LET HIM KNOW I AM IN DET AND TO MEET ME AT THE COLMOM BUILDING
CALLED ROOMMATE ABOUT BANK MONEY
CALLED SISTER IN COLORADO OVER CORRESPONDENCE SE?
CALLED SISTER TO ASK DIRECTIONS
CALLED T--- BACK HE HUNG UP ON ME
CALLED T--- TO SEE WHAT HE WAS UP TO

CALLED T--- TO TELL HER I WAS RUNNING LATE FOR D--- DOCTOR APPOINTMENT
CALLED TO CHECK ON MY MESSAGES A LAVALONG TO SEE IF I HAD RECEIVED ANY CALLS THEN
RESPONDED TO MY MESSAGES
CALLED TO GET A RIDE
CALLED TO SAY HELLO
CALLED TO SAY I COULDN'T MEET MY FRIEND
CALLED TO SAY I WAS ON MY WAY OVER
CALLED TO SAY WE WERE ON OUR WAY HOME
CALLED TO SEE HOW I WAS DOING
CALLED TO SEE WHAT I WAS DOING
CALLED TO SEE WHAT TIME DESTINY DAYCARE SERVE LUNCH I FORGOT HER LUNCH IN MY CAR AND
TOLD THEM I NEED TO DROP OFF HER LUNCH
CALLED TO TELL MY BROTHER I WAS ON MY WAY TO PICK HIM UP
CALLED W FORMATION TO GET THE NUMBER FOR THE STATE BOARD TESTING FOR NURSING
CALLING ABOUT PLANS FOR THE NIGHT
CALLING IN TO APPT.
CALLING MY MOM TO DECIDE ON PLANS
CALLING THE LIBRARY TO SEE IF THEY HAVE A BOOK FOR SCHOOL
CAN I GET A...
CANCELED PLANS FOR THE NIGHT RESCHEDULED
CANCELLED MEETING TONIGHT
CASUAL CONVERSATION WITH MY MOM AND DAD
CHANGE OF PLANS
CHATTING W/ MY BOYFRIEND
CHATTING W/ MY BOYFRIEND
CHATTING W/ MY BOYFRIEND
CHATTING W/ MY BOYFRIEND
CHATTING W/ MY BOYFRIEND ON MY RIDE HOME
CHATTING W/ MY MOM
CHATTING W/ MY PARENTS
CHATTING W/ MY PARENTS
CHATTING W/ MY PARENTS
CHATTY CONVERSATION WITH FATHER
CHATTY CONVERSATIONWITH MOTHER
CHATTY CONVERVASTION WITH BROTHER
CHECK OFFICE VOICEMAIL
CHECK TO SEE IF ANY CANCELLATION AT 2ND JOB
CHECK VOICE MAIL
CHECK VOICE MAIL
CHECKED VOICEMAIL MESSAGES TOOK DOWN INFO
CHECKING IN WITH MOTHER
CHECKING IN WITH MY BROTHER
COME DOWNSTAIRS
COME OVER
COME OVER
COME OVER
COME OVER
COME OVER
COME OVER
COME OVER
COME PICK ME UP

COME PICK ME UP
COME PICK ME UP
COME TO BOSTON THIS WEEKEND
COME TO MCKINLEY STREET
COME TO THE BAR
COME TO THE BAR
COME TO THE BAR
COME TO THE BAR
CONFIRMING PLAYING BASKETBALL WITH GROUP
CONTACTED FEMALE FRIEND FOR PLAN TOMORROW EVENING AND ON THE WEEKEND
CONTINUATION OF DROPPED CALL ABOUT RELATIONSHIPS AND MOVING IN WITH SOMEONE
CONTINUING DROPPED CALL
CONVERSATION WITH A FRIEND ABOUT CHANGES IN CIRCUMSTANCES NEW SITUATIONS
CONVERSING WITH MY MOTHER
COUSIN AND I SWITCHING DATES FOR VISIT OVER SPRING BREAK
COUSIN FROM FLORIDA CALLED TO CATCH UP
DAD CALLING TO SAY HELLO
DAILY PLANS WITH HUSBAND
DECIDING PLANS FOR THE WEEKEND MY FRIEND IS MOVING INTO NEW APARTMENT
DECIDING WHERE TO GO FOR EVENING
DID WE HAVE PLANS TO MEET WITH PROFESSOR
DID WE HAVE PLANS TO MEET WITH PROFESSOR
DID YOU DO THE HOMEWORK YET? - WHAT ARE THE PROBLEMS?
DINNER ORDER
DINNER ORDER
DINNER ORDER
DINNER ORDER
DIRECTIONS TO APT
DISCUSS MEETING TOMORROW
DISCUSS PICK-UP OF DOCUMENTS
DISCUSS PLAN CHANGES FOR ASSIGNMENT - ARRANGE PICK-UP, DROP-OFF OF MATERIALS
DISCUSS PLANS
DISCUSS PLANS FOR THE NIGHT
DISCUSS PLANS FOR TONIGHT TOMORROW
DISCUSS RIDE HOME FOR TGIVING
DISCUSS THANKSGIVING PLANS
DISCUSSED BIG PROJECT AND MEETING ON SATURDAY
DISCUSSED DINNER ARRANGEMENTS FOR SUNDAY NIGHT
DISCUSSED DINNER PLANS FOR SUNDAY WITH DAD
DISCUSSED HOMEWORK
DISCUSSED MEETING
DISCUSSED MEETING FOR TOMORROW
DISCUSSED MEETING FOR TOMORROW
DISCUSSED MEETING THIS AFTERNOON
DISCUSSED MORE EMAIL PROBLEMS
DISCUSSED PLANS FOR THE NIGHT
DISCUSSED PLANS FOR TOMORROW
DISCUSSED PRESENTATION TOMORROW AND MEETING LATER
DISCUSSED PROBLEMS W/ EMAILING PARTS OF OUR PROJECT

DISCUSSED PROCEDURAL ISSUES
DISCUSSED PROJECT
DISCUSSED PROJECT AND SATURDAY MEETING
DISCUSSED RIDE BACK TO SCHOOL
DISCUSSED RIDE HOME FOR TGIVING
DISCUSSED STATUS OF PROJECT
DISCUSSED TODAY'S MEETING
DISCUSSED TOMORROW'S MEETING
DR M--- CALLED AND SCHEDULE A DENTIST APT
DROP OFF MY GLOVES
DROPPED CALL
ENJOY THE GAME?
FAMILY MEMBER CALLED ABOUT BRINGING SOMETHING TO HER
FAMILY MEMBER CALLED AND LEFT MESSAGE TO CALL BACK ASAP
FEMALE FRIEND CALLED ABOUT GETTING TOGETHER LATER ON TODAY
FRIEND AND I PLANNED OUR EVENING
FRIEND BROKE UP WITH GIRLFRIEND
FRIEND BROKE UP WITH GIRLFRIEND SHOCK
FRIEND CALLED ABOUT CLASSES GROUP MEETINGS, ETC.
FRIEND CALLED ABOUT GETTING TOGETHER OVER THE WEEKEND
FRIEND CALLED ABOUT HOMEWORK
FRIEND CALLED ABOUT HOMEWORK
FRIEND CALLED ABOUT STOPPING BY
FRIEND CALLED ABOUT THE UPCOMING WEEKEND AND TO SAY HELLO
FRIEND CALLED ABOUT WEEKEND
FRIEND CALLED ABOUT WEEKEND CLASSES JOBS SUMMER ETC
FRIEND CALLED BACKWITH PLANS
FRIEND CALLED FOR DIRECTIONS TO FLORIDA
FRIEND CALLED FOR EVENING PLANS
FRIEND CALLED TO ASK A QUESTION AND CHAT
FRIEND CALLED TO BORROW DIGITAL CAMERA
FRIEND CALLED TO FIND OUT PLANS FOR NEXT WEEKEND
FRIEND CALLED TO FIND OUT SCORE OF HOCKEY GAME
FRIEND CALLED TO GET PICKED UP FROM APT ON NORTH W DIRECTIONS
FRIEND CALLED TO MAKE FUTURE PLANS
FRIEND CALLED TO MAKE PLANS
FRIEND CALLED TO MAKE SURE GROUP PAPER WAS READY
FRIEND CALLED TO SAY HELLO
FRIEND CALLED TO SAY HELLO
FRIEND CALLED TO SAY SHE WAS COMING OVER
FRIEND CALLED TO SAY SHE WAS IN TOWN
FRIEND CALLED TO SAY SHE WOULD BE LATE
FRIEND CALLED TO SEE IF WE WERE STILL AT LUNCH
FRIEND CALLED TO TALK
FRIEND CALLED TO TALK DESCRIBE EVENTS OF DAY LEFT MESSAGE
FRIEND CALLED WHO I LEFT MESSAGE WITH LAST NIGHT
FRIEND CALLED WITH A TICKET TO BASKETBALL GAME
FRIEND CALLING ME TO SAY HE CAN GIVE ME A RIDE HOME
FRIEND CALLING ME TO TELL ME WHAT TIME HE'LL PICK ME UP

FRIEND FROM HOME ASKING ABOUT MY TGIVING PLANS
FRIEND INVITING ME TO BIRTHDAY PARTY
FRIEND TELLING ME HE'S IN ANN ARBOR AND NEEDS DIRECTIONS
FRIEND TELLING ME SHE'S HAVING A PARTY
FRIEND WANTED TO TELL ME HE WAS ON HIS WAY
FRIEND WAS WAITING TO PICK ME UP
FRISBEE GOLF?
FRISBEE GOLF?
FRISBEE GOLF?
FRISBEE GOLF?
GETTING INFORMATION ON FINANCIAL AID
GIVING DRIVING DIRECTIONS TO FRIEND
GO TO THE MALL?
GOIN TO THE BAR
GOIN TO THE BAR TONIGHT
GOT ANSWERING MACHINE
GOT ANSWERING MACHINE
GOT CUT OFF
GOT DINNER
GOT VOICE MAIL
GOT VOICE MAIL
GOT VOICE MAIL
GOT VOICE MAIL
GOT VOICE MAIL
GOT VOICE MAIL
GOT VOICE MAIL
GOT VOICE MAIL
GOT VOICE MAIL
GOT VOICE MAIL
GOT VOICE MAIL
GOT VOICE MAIL
GOT VOICE MAIL
GOT VOICEMAIL
GOT VOICEMAIL
GOT VOICEMAIL
GOT VOICEMAIL
GOT VOICEMAIL
GOT VOICEMAIL
GOT VOICEMAIL
GOT VOICEMAIL
GRANDPA PASSED AWAY THIS MORNING
GROUP MEMBER CALLING TO CONFIRM GROUP MEETING
HAD TO ASK ROOMATE TO PICK ME UP AFTER CLASS
HAD TO GET PROJECT TO CLASS ON TIME
HAD TO MEET WITH A FRIEND TO GIVE HIS WATCH BACK
HAD TO SCHEDULE AN APPOINTMENT
HAPPY BIRTHDAY
HAPPY THANKSGIVING
HAVING SECOND THOUGHTS ABOUT DECISIONS I MADE
HE WANTED ME TO CALL HIM BACK LATER
HEADLIGHTS LEFT ON IN MY DADS CAR
HOPE CLINIC CALLED TO SCHEDULE APT TO GET A FOOD BAG THIS FRIDAY - ON HOLD

HOW ARE YOU?
HOW IS YOUR DAY
HOW WAS YOUR WEEKEND?
HOW YA DOIN'?
HOWS IT GOING
HOWS IT GOING I'M STOPPING BY
HOW'S IT GOING?
I CALLED A STORE TO SEE IF THEY HAD GOTTEN A SHIRT IN
I CALLED MY MOM IN THE MORNING TO SEE IF SHE WOULD BABY SIT A--- FOR ME
I CHATTED WITH MY PARENTS
I HAD TO CALL WORK AND TELL THEM I WAS GOING TO BE LATE
I LEFT A MESSAGE FOR MY SISTER IN LAW
I LEFT MY GLOVES IN YOUR CAR DROP THEM OFF AT MY HOUSE
I WAS CHATTING W/ MY BOYFRIEND
I WAS CHATTING W/ MY MOM
I WAS CHATTING W/ MY PARENTS
I WAS FINALLY ON MY WAY HOME
I WAS GOING TO BE LATE TO THE OFFICE
I'LL BE HOME SOON
I'LL BE OVER IN A SEC
I'LL BE RIGHT OVER
I'LL BE THERE IN A MINUTE
I'LL CALL YOU BACK
I'LL CALL YOU WHEN I GET OUT OF WORK
I'LL PICK YOU UP IN 20MINUTES
I'M AT YOUR HOUSE
I'M COMIN INTO TOWN
I'M COMIN OVER
I'M COMIN OVER
I'M COMIN OVER
I'M COMIN OVER
I'M COMIN OVER
I'M COMIN OVER
I'M COMIN OVER
I'M COMIN OVER
I'M COMIN OVER
I'M COMIN OVER
I'M COMIN OVER
I'M COMIN TO THE HOUSE ON GREENWOOD
I'M COMING OVER.
I'M COMING OVER.
I'M COMING OVER.
I'M COMING TO PICK YOU UP
I'M OUTSIDE
I'M OUTSIDE LET ME IN
I'M OUTSIDE WAITING
I'M OUTSIDE WAITING
I'M OUTSIDE WAITING
I'M WAITING OUTSIDE
INFORMED SISTER OF NATURE OF REGISTERED LETTER
INVITING FRIEND TO PARTY
INVITING FRIEND TO PARTY

JUST CHATTING

L---- CALLED AND ASKED ME IF I COULD BABYSIT
LARGE ACCIDENT ON FREEWAY
LATE FOR GROUP MEETING
LATE GETTING OFF NEEDED TO GET BACK HOME
LAVALIFE CALL TO CHECK VOICE MAIL TO SEE HOW MANY GUY ANSWERED MY VOICE AD FOR A HUSBAND
LAVALIFE CALLED TO SEE HOW MANY MEN ANSWERED MY VOICE MAIL FOR THE DATING SERVICE
LAVALIFE CHECK MESSAGES
LAVALIFE DATING SERVICE CHECKING TO SEE IF ANY GUY ANSWERED MY VOICE MAIL
LAVALIFE TO CHECK VOICE MAIL
LAVALONG TO CHECK MESSAGE
LAVALONG TO CHECK MESSAGE
LEFT HIS WATCH AT MY HOUSE
LEFT MESSAGE WITH SISTER FOR SELLING OF FAMILY ESTATE
LET PARENTS KNOW I WAS ON MY WAY HOME
LETS GO GET DINNER
LETS GO HAVE A BEER
LET'S GO IN 10 MINUTES- YOU DRIVING OR ME?
LETS GO TO A MOVIE
LETS GO TO A MOVIE MEET AT MEIJERS
LETS GO TO SUBWAY
LET'S GO TO SUBWAY
LETS PLAY FOOTBALL
MADE A GENERAL PHONE CALL
MADE PLANS FOR THE NIGHT
MAKING AN APPOINTMENT
MAKING DOCTOR APPOINTMENT
MAKING PLANS FOR EVENING
MAKING PLANS FOR SPRING BREAK
MAKING PLANS FOR THE EVENING
MAKING PLANS FOR THE EVENING
MAKING PLANS FOR THE EVENING
MAKING PLANS FOR THE EVENING
MAKING PLANS FOR THE EVENING
MAKING PLANS FOR THE FOLLOWING WEEKEND
MAKING PLANS FOR THE NIGHT
MAKING PLANS FOR THE WEEKEND
MAKING PLANS OVER SPRING BREAK WITH FRIEND
MAKING PLANS TO PLAY BASKETBALL
MAKING PLANS WITH A FRIEND
MAKING PLANS WITH FRIEND
MAKING PLANS WITH SISTER OVER SPRING BREAK
MEET ME AT TOUCHDOWNS
MEET ME IN 10 MIN
MEET ME IN 20 MINUTES AT THE TENNIS COURTS
MEET YOU AT TOUCHDOWNS
MISSED CALL BUT PAHONE ALERTED ME TO VOICE MAIL. CLIENT CALL
MISSED CLASS HAD TO GET TOGETHER TO DO HOMEWORK
MOM CALLED ME AND SHE SAID SHE WAS OUTSIDE MY APT DOOR AND TO COME OUTSIDE SO WE

CAN LEAVE
MOM CHECKING UP ON ME
MONEY
MORE WORK SCHEDULE
MRS J---- CHECK TO SEE IF SHE WAS GOING TO PAY MY DAY CARE
MY BOYFRIEND CALLED ME & ASKED ME A QUESTION
MY BOYFRIEND CALLED-CHATTED
MY DAD TO FIND OUT IF A----- WAS THERE
MY FLIGHT LANDED I'M AT MCNAMARA TERMINAL
MY FRIEND CALLED AND I TOLD HER ABOUT A DEATH
MY FRIEND CALLED ME AND I CALLED HER BACK ABOUT A DEATH
MY GIRLFRIEND R--- CALLED AND ASKED ME IF I GOT THE DET FREE PRESS SHE WANT ME TO READ A
ARTICLE ABOUT HER
MY GROUP & I HAD TO DECIDE WHO WAS GOING TO OUR MEETING
MY PARENTS CALLED FOR DIRECTIONS
MY SISTER CALLED ME AND ASK ME IF SHE COULD DROP OFF MY GRANDDAUGHTER
NEEDED A RIDE FROM COWORKER TO OFFICE
NEEDED TO DECIDE GROUP MEETING TIME
NEW EMPLOYEES
NEW NAMES FOR GIRLS
NONE
NONE
OLD BILL FOR METRO TIMES
ORDERED SALAD AND BEEF NACHOS
PARTY PLANS
PARTY PLANS
PHONE INTERVIEW WITH CLIENT
PICK ME UP
PICK ME UP
PLAN FOR THE NIGHT
PLAN FOR TONIGHT
PLANS
PLANS
PLANS
PLANS
PLANS
PLANS
PLANS FOR SPRING BREAK
PLANS FOR TGIVING BREAK W/ FRIEND FROM HOME
PLANS FOR THE NIGHT
PLANS FOR THE WEEKEND
PLANS FOR THE WEEKEND
PLAY RACQUET BALL?
PROFESSOR RETURNED A CALL REGARDING A MEETING THAT DAY
RACKETBALL?
RAQUETBALL
RECEIVED A CALL ABOUT A JOB
REMINDER FROM C___ ABOUT B___ HAIRCUT
REPORTING INFORMATION TO COWORKER
RE-SCHEDULING DATE FOR 15'-20' LATER DUE TO UNEXPECTED WORK

RETURNED A CALL ABOUT A BUSINESS MATTER
RETURNED A CALL TO A FRIEND MADE PLANS TO GET TOGETHER
RETURNED CALL
RETURNED FEMALE FRIEND'S CALL WHEN I COULD BE MORE RELAXED TALKING TO HER
RETURNING A CALL
ROOMMATE TELLING ME TO HURRY UP GROCERY SHOPPING
ROOMMATE CALLED FROM CAR ASKING ABOUT EXTRA HOCKEY TIX
SEE WHAT I WAS DOING
SEEING HOW MY MOTHER WAS DOING
SEETING UP PLANS TO PLAY RAQUET BALL THAT DAY
SEND SECURITY TO THE GIRL WHO DIDN'T CHECKOUT
SET UP AN INTERVIEW
SISTER ASKING COMPUTER QUESTIONS
SISTER CALLED TO ASK WHEN I WOULD BE IN
SISTER GOT IN CAR ACCIDENT
SLEEP CLINIC CALL TO SEE IF I COULD DO SLEEP STUDY SHE ASKED NO QUESTIONS TO SEE IF I
QUALIFY
SON HOME FROM SCHOOL
SON LEFT BOOKS AT MY HOME, WITH MOM AT WALMART NEEDS TO PICK THEM UP
STOP BY
STRESSED OUT
STRESSED OUT
T--- CALLED TO TALK
TALK TO CLIENT
TALK TO DAD
TALK TO FAMILY MEMBER
TALK TO FRIEND
TALK TO FRIEND
TALK TO FRIEND. CATCHING UP ON NEWS AND HAPPENINGS
TALK TO MOM
TALK TO MOM
TALK TO MOM RE: THANKSGIVING
TALK TO OFFICE
TALK TO SISTER ABOUT RIDE HOME FOR TGIVING
TALKED ABOUT ARRANGEMENTS FOR A WORK MATTER
TALKED ABOUT RELATIONSHIPS HE NEEDED HELP
TALKED ABOUT WEEKEND
TALKED TO A FRIEND I HAVEN'T TALKED TO IN A LONG TIME
TALKED TO CLIENT ABOUT PROJECTS
TALKED TO DAD ABOUT SPRING BREAK
TALKED TO FRIEND ABOUT HOMEWORK
TALKED TO FRIEND, CAUGHT UP ON THINGS
TALKED TO GROUP MEMBER GOT DIRECTIONS TO HOUSE
TALKED TO GROUPMATE ABOUT GROUP PROJECT
TALKED TO PARENTS ABOUT CLASSES VACATIONS ETC
TALKED TO SISTER IN HOUSTON
TALKED WITH A FRIEND ABOUT EVERYDAY THINGS
TALKED WITH CLIENT. RECEIVED INFORMATION
TALKED WITH FRIEND ABOUT LIFE PLANS ACTIVITIES
TALKED WITH FRIEND ABOUT SICK PARENT HOW TO COPE

WANTED TO SEE HOW HE DID ON HIS EXAM
WANTED TO SEE IF HE WANTED TO WORK OUT
WANTED TO SEE WHAT WAS GOING ON
WANTED TO SEE WHAT WAS GOING ON AT A PARTY HAD TO WORK
WANTED TO TELL FRIEND PLANS FOR SPRING BREAK
WANTED TO TELL ME ABOUT A FRIEND THAT WANTS TO RENT WITH US
WASN'T GOING TO MAKE IT FOR LUNCH
WATCH THE GAME?
WE GOT ANOTHER RIDE
WE'RE STOPPIN BY
WHAT ARE YOU DOIN
WHAT ARE YOU DOIN
WHAT ARE YOU DOIN TONIGHT
WHAT ARE YOU DOIN TONIGHT
WHAT ARE YOU DOIN TONIGHT
WHAT ARE YOU DOIN TONIGHT?
WHAT ARE YOU DOIN?
WHAT ARE YOU DOIN'?
WHAT ARE YOU DOIN'?
WHAT ARE YOU DOIN'?
WHAT ARE YOU DOING TONIGHT?
WHAT DO YOU WANT FROM THE STORE
WHAT KIND OF APPLES DO YOU WANT
WHAT TIME ARE WE LEAVING TOMORROW?
WHAT TIME ARE WE MEETING
WHAT TIME ARE YOU LEAVING FOR HOME
WHAT TIME SHOULD WE MEET TOMORROW?
WHAT TIME SHOULD WE MEET?
WHAT TIME WAS THE MEETING WITH PROFESSOR
WHAT'S FOR DINNER
WHAT'S ON TOMORROW'S EXAM?
WHAT'S UP
WHEN ARE WE MEETING?
WHEN ARE YOU LEAVING FOR THE BAR
WHEN ARE YOU LEAVING?
WHEN ARE YOU LEAVING?
WHEN YOU GOIN OUT
WHEN YOU GOIN TO THE BAR
WHERE ARE YOU
WHERE ARE YOU?
WHERE ARE YOU?
WHERE ARE YOU?
WHERE ARE YOU?
WHERE ARE YOU?
WHERE SHOULD WE EAT DINNER?
WOODBURY GREEN CONDO CALLED TO FIND OUT IF THE MAINTENANCE MAN WAS STILL COMING
OVER AT 10 TO REPAIR DOOR
WORK QUESTION
WORK QUESTION
WORK SCHEDULE REARRANGING

YEARBOOK INTERVIEW ABOUT WHAT I LEARNED IN COLLEGE