COMPARISON OF TEEN CELL PHONE AND PASSENGER CONVERSATION

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Report 150509-06

For
Texas Transportation Institute’s
Center for Transportation Safety

June 2005

TEXAS TRANSPORTATION INSTITUTE
The Texas A&M University System
College Station, Texas 77843-3135

Also presented at Driving Simulation Conference North America, DSC-2005, Orlando Florida.
ACKNOWLEDGMENTS

The authors wish to acknowledge the assistance of students Sara Meischen and Zac Henderson for their assistance during the development and conduct of the driver simulator research study.
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INTRODUCTION

BACKGROUND

Studies show that young drivers, specifically 16 year olds who have just received their licenses, are more likely to be involved in a crash than experienced drivers and even older teenagers.\(^1\) Many states in the US have begun to implement graduated licensing systems to reduce beginner driver crashes. Graduated licensing is used to expose beginners to the driving experience by removing or decreasing high risk conditions such as night-time driving, unsupervised driving, and multiple teen passengers for the first 6 months to 2 years after their 16\(^{th}\) birthday.

There have also been extensive studies on the use of cell phones and their negative effects on a driver’s performance.\(^2\) These studies have also shown that the cell phone use of a driver produces a higher risk than in-vehicle conversations. The combination of cell phone use and inexperienced drivers may create an even higher risk of crashes.

Since the introduction of graduated licensing in the US, crash reductions have been reported in several states using the system. As mentioned above, one criterion that is often used is limiting the number of non-family teen passengers in the vehicle with a novice driver. If there is concern that this type of in-vehicle interaction between teens is a high risk, then cell phone use by a novice driver may produce the same or even higher risks. This study compared these two types of driving situations and will inform policies on prohibiting cell phone as an appropriate recommendation to a graduated licensing program. The state of Texas recently enacted legislation prohibiting use of any wireless communication device during the 6 month probationary license period for novice drivers.

The study described here primarily served as a pilot study to establish institutional approval for the methods used. It also provided a manageable-sized data set with which to develop analytic methods and scoring criteria for driving performance. This paper details the procedural and analytical challenges faced and should provide researchers with lessons-learned from our laboratory.

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METHOD

PARTICIPANTS, RECRUITING AND IRB REQUIREMENTS

Unique challenges with teens

Prior to the study recruitment, the research team obtained study approval from the University’s Institutional Review Board (IRB) for Ethical Treatment of Human Research Participants. The application required special consideration due to the involvement of minors. It was decided to require a parent to accompany their child to the session. The parent was also asked to drive the teen from the study in case of any unanticipated side effects of having driven in the simulator either due to sickness or due to a shift in perceived risk. Another IRB requirement was to have the parent first sign a parental consent form, before the minor signs an informed consent form. Also the parent was required to fill out a separate consent form of their own for the paper survey they would be asked to complete concerning their own driving habits. All of these forms can be found in Appendix A.

Participants were recruited via word of mouth and flyer distribution. Thereresearchers distributed flyers at social events such as church and community meetings, and among friends and colleagues. Local driving instruction schools were also contacted, but proved to be unproductive since we were recruiting for graduates of these programs and the schools were unwilling to share lists of recent graduates. Recruitment for this study proved to be unexpectedly challenging. We discovered that teenagers are hard to reach on the phone, are irresponsible about returning phone calls. Scheduling a time convenient to both a parent and teen also was difficult. We found that if we were able to make initial contact with the parent, recruiting was easier as the parents liked the idea of their children participating in a study.

Nine teen drivers participated in the study: 5 males and 4 females, all were aged 16. Participants were required to have obtained their drivers licenses in the past 6 months from the time of their study. Participants reported having received their licenses ranging from 2 weeks to
5 months prior to the study Table 1 shows the demographic and driving experience data of our sample.

<table>
<thead>
<tr>
<th>Subject #</th>
<th>Gender</th>
<th>Age</th>
<th>How long have they had their license</th>
<th>How often they drive</th>
<th>Parent's Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>16</td>
<td>N/A</td>
<td>Several times a day</td>
<td>F</td>
</tr>
<tr>
<td>2</td>
<td>F</td>
<td>16</td>
<td>~ 1.5 mos</td>
<td>Several times a day</td>
<td>F</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>16</td>
<td>~ 3 mos</td>
<td>A few times a week</td>
<td>F</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>16</td>
<td>~ 2.5 mos</td>
<td>Once a day</td>
<td>M</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>16</td>
<td>~ 4 mos</td>
<td>Several times a day</td>
<td>F</td>
</tr>
<tr>
<td>6</td>
<td>F</td>
<td>16</td>
<td>~ 2.5 mos</td>
<td>A few times a week</td>
<td>M</td>
</tr>
<tr>
<td>7</td>
<td>M</td>
<td>16</td>
<td>~ 2 mos</td>
<td>Several times a day</td>
<td>M</td>
</tr>
<tr>
<td>8</td>
<td>F</td>
<td>16</td>
<td>~ 3.5 mos</td>
<td>A few times a month</td>
<td>F</td>
</tr>
<tr>
<td>9</td>
<td>M</td>
<td>16</td>
<td>~ .5 mos</td>
<td>Several times a day</td>
<td>F</td>
</tr>
</tbody>
</table>

**Table 1: Study Participant Demographics.**

**Simulator Sickness**

Participants were pre-screened via a telephone interview to determine if they met the study requirements and if they were pre-disposed to experience Simulator Induced Discomfort (SID) (see Appendix A). Fortunately, the demographic population used for this study does not commonly experience SID; in fact, there was a 100% completion rate for the 9 subjects ran.

**Simulator**

**Apparatus**

The study was conducted using a DriveSafety™ simulator with a 1995 Saturn SL mid-sized sedan with full instrumentation which provides a realistic interactive driving experience. The system includes a 150-degree wraparound visual field with high resolution (1024x768 pixels) projectors for each of the three projection screens positioned in front of the car. Rear and side-view mirrors are super-imposed on the scene as picture-in-picture insets on the display screens. Research participants control the accelerator and brake pedals and the steering wheel as they do in an actual vehicle. For the present study, a custom driving environment was created using the HyperDrive™ Authoring Suite software.

The Driving Simulator’s integrated computer was programmed to calculate measures of
vehicle velocity, acceleration, steering, braking, lane position, x and y coordinates, time, and collision data. An intercom system in the vehicle allowed an experimenter and the participant to freely speak back and forth. The driving simulator is illustrated in Figure 1.

Figure 1: TTI’s Driving Environment Simulator.

Experimental Design

One simulator program or “world” was created to test the three experimental conditions of no distraction, a cell phone distraction, and an in-vehicle passenger distraction. The world made a complete driving in loop consisting of two legs. Each leg contained all 7 event types (described below), but allowed for some variation in the drive to avoid anticipation of the events to come. In order to experience all three experimental conditions, each participant would drive the entire loop, experience both legs, and then after an optional break, would drive half of the loop, experiencing the third leg. The order of the three experimental conditions was counter-balanced among the nine participants, as well as the order of the various legs of the drive. This was accomplished by created two different start points along the loop.

Table 2 displays the order of the legs of the drive, and also the order of the experimental conditions for the 9 participants.
Table 2: Participant Simulator Drive Counter-balancing.

<table>
<thead>
<tr>
<th>Participant #’s</th>
<th>Run 1 Details</th>
<th>Run 2 Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 7</td>
<td>Leg 1</td>
<td>Leg 2</td>
</tr>
<tr>
<td></td>
<td>No Distraction</td>
<td>Passenger</td>
</tr>
<tr>
<td>3, 4, 9</td>
<td>Leg 2</td>
<td>Leg 1</td>
</tr>
<tr>
<td></td>
<td>Phone Distraction</td>
<td>No Distraction</td>
</tr>
<tr>
<td>5, 6, 8</td>
<td>Leg 1</td>
<td>Leg 2</td>
</tr>
<tr>
<td></td>
<td>Passenger Distraction</td>
<td>Phone Distraction</td>
</tr>
</tbody>
</table>

**Conversation Development**

In order to add to the comfort of the teen participants, undergraduate student workers were used to conduct the conversations on the cell phones and within the vehicle. We felt that the teen drivers would perhaps talk and drive more naturally with experimenters close to their own ages. The student workers were also used to develop the questions that would guide the topics of conversations. In development of the conversation topics, the students were encouraged to stay away from any topics that could become too emotionally charged or personal for the participants. The students were encouraged to include a variety of questions that would keep the conversation rotated through quick one answer responses, to more elaborate thought-provoking or calculated responses.

During the in-vehicle passenger distraction conditions, the student worker (seated in the front passenger seat) tried to avoid any signs of anticipation of the events that would occur; although, after each event, the student could encourage the teen driver to continue and could incorporate the event into the conversation, as would happen in a real-world situation.

For the cell phone distraction condition, a hands free land-line phone device was used to simulate the cell phone. The student worker, located in a room outside of the simulator facility,
would make a call to the teen driver. Since the student could not see the simulated environment, they were unaware of the events that were happening to the teen unless the teen spoke about them.

**Practice Session**

The participants were given a practice drive to become familiar with the test vehicle. The practice drive was a world consisting of similar roadway types to the experimental worlds. The practice also allowed the participant to experience stops and turning. Before beginning the practice drive, the participants listened to the following recorded instructions:

> "Welcome to the TTI Driving Simulator. It is an interactive simulator, which means the driving scenes you experience react to your steering and pedal inputs to provide a realistic driving experience. During your drive in the simulator, please drive in a normal fashion and obey all traffic laws. This includes observing the posted speed limits, yielding to pedestrians, pulling over for emergency vehicles, and not passing other vehicles when there is a double yellow line. The small boxes you see at the top of the center screen and on the lower part of the side screen represent your rear and side view mirrors. They accurately display the scene to the rear. Try to use these displays as you would your mirrors.

Please be sure that your seat is adjusted to a comfortable position and that your seat belt is fastened. You may adjust the fan if you would like. Please do not turn on the radio during the study.

For the practice session your task is to get comfortable with driving in a simulated driving environment. The driving scene that will be presented to you begins with the simulator vehicle stopped on the side of the road. When the scene starts, you can put the car into Drive and pull into traffic. There will be green signs with yellow triangles on them directing you where to turn to follow the correct route.

If you have any questions regarding the practice session please consult the experimenter. Otherwise, acknowledge that you are ready by telling the
experimenter to begin the driving scene. Then press the stop button on the tape player.”

The practice drive session lasted approximately 10 minutes.

**Experimental Session**

As stated before, each participant would experience two experimental drives in the test vehicle: the first consisting of a complete lap around the experimental world, followed by a break and a drive consisting of only one leg of the world. Before beginning the drive, participants heard the following recorded instructions:

“You are now asked to complete an experimental driving scene. When the driving scene begins, the simulator vehicle will be stopped on the side of the roadway. Place the vehicle in ‘drive’, drive onto the roadway, and proceed through the driving environment.

During the experiment drive in a normal fashion and obey all traffic laws. This includes observing the posted speed limits, yielding to pedestrians, pulling over for emergency vehicles, and not passing other vehicles when there is a double yellow line. Just like in the practice session, there will be green signs with yellow triangles on them directing you where to turn to follow the correct route.

For part of your drive you will be asked to talk through a headset as if you were using a hands-free cell phone. The experimenter will let you know when it is time to use the telephone. For another part of the drive, an experimenter will sit inside the vehicle with you and carry on a conversation. For both of these situations, we’d like you to drive as you normally would when you are talking with a passenger in your own car or when you are using a cell phone while you drive.

At the end of the experiment the experimenter will ask you to bring the vehicle to a complete stop, place it in ‘park’. The experiment will take approximately forty-five minutes and you will be offered a break after 30 minutes.

If you have any questions regarding your task in the experiment consult the experimenter. Otherwise, acknowledge that you are ready by telling the experimenter to begin the driving scene.”
Scenario Development

*Measures of Effectiveness*

Seven measures of effectiveness governed the layout and scenario scripting of the simulator worlds. Figure 2 is a rough map of the worlds showing the points of interests where the different measures lay. At the points where specific events occur, the simulator records the appropriate data variables that are mentioned in the list of measures following the map.
Figure 2: Map of Simulator World with Points of Interest.
1. Baseline Driving – For each distraction condition speed, lane position, accelerator, and brake pedal values were recorded on open freeway to establish the teen’s baseline driving.

2. Emergency Vehicle Rear Approach – This segment involved a fire engine with flashing lights approaching the participant vehicle at a high speed from the rear (See Figure 3). The vehicle could be seen in the side, and rear view mirrors, and remained behind the participant until they pulled over on the side of the road and let the vehicle pass. Speed, lane position, turn indicator response, and accelerator and brake pedal values were recorded from the driving simulator for further analysis.

3. Amber Light Dilemma Zone – For this scenario, as the participant approaches an intersection, the light turns amber ?? seconds from arrival at the intersection as shown in Figure 4. Speed, accelerator and brake pedal values were recorded to determine the participant’s reaction to the amber light.
4. Hidden Pedestrian – As the teen drives through a densely urban area with cars parked along the side of the road, a hidden pedestrian suddenly crosses the street (See Figure 5). The participant’s braking and speed are recorded in response to the pedestrian, and also collision data if the pedestrian was hit.
5. Lead Vehicle Braking – In a no-passing zone along a stretch of 2 lane rural road, a SUV suddenly turns in front of the participant vehicle and begins traveling down the road. Although the SUV’s taillights are not responding, the SUV is drastically slowing down and speeding up. The participant’s speed, accelerator and brake values are measured, as well as the driver’s headway or proximity to the lead vehicle. Figure 6 displays the SUV driving in front of the simulator vehicle.

![Figure 6: Lead Vehicle Scenario.](image)

6. Lane closure – Along a segment of urban freeway, the teen is forced into the left of two lanes. A small warning sign warns of construction ahead, and then the driver encroached upon the construction zone displayed in Figure 7. The detection time and distance from the closure was measured from the first of the following events: left turn signal, release of accelerator, significant turn to the right of the steering wheel.
Figure 7: Lane Closure Scenario.

7. Hidden Car Pullout – Along a segment of 2 lane rural road with a speed limit of 65 MPH, the teen drivers suddenly face a car that pulls out of a hidden driveway as shown in Figure 8. The reaction time is determined by the participant’s speed, accelerator and brake pedal values, lane position, as well as possible collision information with the vehicle.
While the experimental drive is in session, an experimenter roughly records the driver’s response at each event, as well as what their conversation was at that particular moment. This data form can be found in Appendix B and was used for quick reference of the subjects responses without having to look at the simulator data files.

**RESULTS**

The results from the driving habits questions from the parents and teens are presented in Appendix D. The following sections present the driving performance data.

**Baseline Driving**

Lane position and velocity during the baseline driving were compared across distraction conditions and are shown in Table 3. A repeated measures ANOVA revealed a significant effect of distraction condition on lane position. Drivers in the no distraction condition stayed more to the right of the lane line than drivers in the phone and passenger distraction conditions, but varied in their lane more. A test on the standard deviation of lane position confirmed this as a significant difference. An ANOVA was also performed on the velocity data and failed to reach
significance. Foot activity on the brake and accelerator were also examined but showed no effects of distraction condition. Variation in velocity and pedal activity were also examined and no significant effects of distraction were found.

<table>
<thead>
<tr>
<th>Measure</th>
<th>No Distraction</th>
<th>Phone</th>
<th>Passenger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane Position (meters)</td>
<td>Mean</td>
<td>-0.085</td>
<td>-0.297</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation</td>
<td>0.313</td>
<td>0.15</td>
</tr>
<tr>
<td>Velocity (meters/second)</td>
<td>Mean</td>
<td>28.747</td>
<td>28.548</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation</td>
<td>1.606</td>
<td>2.037</td>
</tr>
</tbody>
</table>

**Table 3. Lane Position and Velocity for Baseline Driving Condition**

**Emergency Vehicle Rear Approach**

Detection of the fire truck in the rear view mirror was determined using a strict and a lax criterion for scoring when the driver pulled the car onto the shoulder. The strict criterion required the center of the vehicle to cross the edgeline while the lax criterion only required the right tire to cross the edgeline. The time elapsed between the appearance of the emergency vehicle and when these maneuvers took place was the dependent variable. The results are shown in Table 4. The differences between these times was marginally significant (p=.08).

<table>
<thead>
<tr>
<th>Measure</th>
<th>No Distraction</th>
<th>Phone</th>
<th>Passenger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to Center of Vehicle Crossing Edgeline (strict)</td>
<td>20.85</td>
<td>21.74</td>
<td>22.01</td>
</tr>
<tr>
<td>Time to Right Time Crossing Edgeline (lax)</td>
<td>19.66</td>
<td>19.99</td>
<td>23.53</td>
</tr>
</tbody>
</table>

**Table 4. Time (sec) to Respond to Emergency Vehicle.**

**Amber Light Dilemma Zone**

The performance in the amber light task was assessed a number of ways (see Table 5). More drivers ran the light in the no distraction condition. For those who did stop, the response point was determined by examining each data file and looking for a release of the accelerator.
pedal which persisted to a stop. This accelerator release was taken as the time and distance of a response and deceleration and lead-in velocity were determined from that point. The response time for no distraction was significantly longer than the response times for the two distraction conditions. The lead-in velocity was also higher for the no distraction condition. These two factors may explain why more subjects ran the light; subjects were driving faster and detected signal change sooner so felt they had a chance to cross the intersection before the signal turned red.

Table 5. Performance in Amber Light Task

<table>
<thead>
<tr>
<th>Measure</th>
<th>No Distraction</th>
<th>Phone</th>
<th>Passenger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number who Ran Light</td>
<td>4</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Response Time (sec)</td>
<td>7.383</td>
<td>6.305</td>
<td>6.481</td>
</tr>
<tr>
<td>Response Distance (m)</td>
<td>62.603</td>
<td>51.113</td>
<td>51.08</td>
</tr>
<tr>
<td>Deceleration (m/s)</td>
<td>-0.231</td>
<td>-0.406</td>
<td>-0.342</td>
</tr>
<tr>
<td>Velocity (m/s)</td>
<td>20.433</td>
<td>18.962</td>
<td>19.601</td>
</tr>
</tbody>
</table>

Hidden Pedestrian

This performance measure was the most difficult to score because the appropriate driving maneuver, short of striking the pedestrian, is not as clear cut. No driver in the study ever struck the pedestrian. This task certainly has real-world validity, but proved to be particularly difficult to interpret. We attempted to look at braking and swerving, but could not get good inter-rater agreement as to when drivers performed these evasive maneuvers. The most objective measure of performance was the minimum proximity to the pedestrian and is shown in Table 6. Drivers had “closer calls” with the pedestrian in the distraction conditions than in the no distraction condition.

Table 6. Proximity to Pedestrian

<table>
<thead>
<tr>
<th>Measure</th>
<th>No Distraction</th>
<th>Phone</th>
<th>Passenger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closest proximity to pedestrian (m)</td>
<td>7.27</td>
<td>6.25</td>
<td>5.87</td>
</tr>
</tbody>
</table>

Lead Vehicle Braking
This measure also required extensive interpretation of the data on a case-by-case basis and proved equally difficult to interpret and achieve good inter-rater agreement. Because the lead car was varying its speed between 35 and 55 mph, the standard deviation of the subject’s speed was not an appropriate performance measure. The lag time to respond to the lead vehicle’s change in speed also proved difficult to score as the choice of response (accelerator release or brake) was dependent on headway. If subjects happened to be following closely when the lead vehicle slowed, they stepped on the brake while if there was adequate following distance they would simply release the accelerator and coast. Headway by distraction condition was examined, but due to the large variance, was not significant. The large variation was due to the accordion-like nature of the lead car speed variation. Further analytical work on this dependent variable is underway.

Lane closure

The criterion for determining when the subject noticed the upcoming lane closure was either the activation of the right turn signal or the initiation of a lane change as indicated by lane position, whichever came earliest. Again, this measure required individual review of data files by two experimenters and involved some subjective interpretation in cases where the turn signal was not used. The data were highly variable, somewhat due to the uncertainty in scoring when a lane change had been initiated. Some drivers made slow, shallow lane changes without using a turn signal, while others always used the signal and made short cutting lane changes. This variable did not show any effects of distraction, but further analyses within subjects are underway. By looking at lane change driving habits in other sections of the experiment, we hope to be able to compare those to the lane closure scenario.

Hidden Car Pullout

The number of collisions with the car that pulled out was tabulated and is shown in Table 7. For those trials where there was no collision, the minimum headway between the subject’s car and the pullout car was isolated and is also shown in the table. We attempted to isolate response times by looking at steering angle, accelerator release, and brake activation. But, as in similar variables, consistency across judges could not be assured.
Table 7. Performance on the Pullout Car Task.

<table>
<thead>
<tr>
<th>Measure</th>
<th>No Distraction</th>
<th>Phone</th>
<th>Passenger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closest Distance to Pullout Car</td>
<td>7.208</td>
<td>3.868</td>
<td>3.622</td>
</tr>
<tr>
<td>Number of Collisions</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

**DISCUSSION**

This preliminary analysis of the data suggests that distraction due to in-vehicle passengers has a more detrimental effect on driving performance than does telephone conversations. Both types of distraction are worse than having no conversation task.

The main purpose of this study for our laboratory was to develop scenarios and data analysis techniques for each of the performance measures. The full details of the statistical analysis can be found in the technical report. Due to the small number of participants, a full analysis of the order effects was not possible. Certainly one would expect some learning to have taken place and the surprise nature of some of the events (e.g. pedestrian and emergency vehicle) to have dissipated in later trials.

Several of the performance measures required interpretation of response (e.g. lane closure, emergency vehicle response) and some degree of “reading the tea leaves”. Scoring of these variables required experimenters to examine each event and try to judge when a lane change or deceleration was initiated. This type of individual analysis was very time consuming and required at least two experimenters to review each data file to assure consistency, particularly in this pilot study where performance criterion had not been established enough to automate this scoring. Applying this level of analysis to a large sample of subjects would be very costly. We hope to take the fine-grained analyses conducted on these data and develop algorithms to apply to future data sets to speed up the analysis process.

Variables with discrete behaviors were much easier to identify. In hindsight, we should have instructed participants to use their turn indicator for every lane change. This would have eliminated the judgement calls required to score the emergency vehicle and lane closure.
scenarios. Time of turn signal activation can easily be flagged in the data file and does not require individual review of the data file.

Overall, the participants found the study to be engaging and challenging. They did not report noticing repeating events and genuinely seemed surprised by the emergency events even on the third trial. The conversations may have served as enough distraction to mask the experimental manipulations. We initially had been concerned about the possibility that requiring so many emergency braking responses would induce simulator sickness in our participants. This was not the case with this group of participants. Experience in other studies in our laboratory suggests that younger participants are less prone to sickness. We believe that with older (age 55 or older) drivers, many of these scenarios would produce very high rates of sickness. This will limit our ability to compare the performance of teens to mature drivers.
APPENDIX A:

RECRUITMENT, CONSENT, AND DEBRIEFING
METHOD OF RECRUITMENT

Below is a sample of the notice to be posted to recruit subjects from the College Station/Bryan area.

TEEN DRIVERS NEEDED

The Texas Transportation Institute is now conducting a study of teen driving characteristics in a simulated driving experience. The study is being performed in the Driving Environment Simulator at the Gibb Gilchrist Building on Research Parkway in College Station.

Participants must have normal to corrected to normal vision, and have received a valid driver’s or hardship license in the past 6 months. The study will take no longer than 90 minutes to complete. Participants will receive $20 upon the completion of the study.

Parental Consent and attendance for the duration of the study is mandatory for participants under 18. Parents will be asked to complete a short questionnaire and will be compensated $10 for their time.

If you would like more information or are interested in participating, please contact:

Alicia Williams
Texas Transportation Institute
Texas A&M University
College Station, TX 77843-3135
(979) 458-0786
a-williams@tamu.edu

Texas A&M University System Employees are not eligible for compensation.
Phone Pre-Screening Questionnaire

Age ______________  Gender______________  Ethnicity______________

Inclusion Criteria

If a participant fails to meet one of the criteria, stop, skip the Health Screening and proceed to the Closing
If all inclusion criteria are meet proceed to the Health Screening.

“There are several criteria that must be met for participation in this study. I will need to ask you several
questions to determine your eligibility.”

1. **Do you possess a valid driver’s license within the United States?**
   
   [Exclude is no current valid driver’s license]

2. **How many times per week do you drive?**
   
   [Exclude if less than one time a week]

3. **Do you work for any department in the Texas A&M University System?**
   
   [Instruct the participant that they cannot be compensated if they work for the University, and ask
   them if they still want to proceed]

4. **Are you able to read English?**
   
   [Exclude if the subject can not read English]
Phone Pre-Screening Questionnaire cont’d

General Health Exclusion Criteria

If a participant fails to meet one of the criteria, stop and proceed to the Closing.

Before this list of questions is administered, please communicate the following:

“Because of pre-existing health conditions, some people are not eligible for participation in this study. I need to ask you several health-related questions before you can be scheduled for a study session. Your response is voluntary and all responses are confidential. This means that you can refuse to answer any questions that you choose and that only a record of your motion sickness susceptibility will be kept as part of this study. No other responses will be kept. Please answer yes or no to the following questions:”

1. If the subject is female:
   Are you, or is there a possibility that you are pregnant?
   [Exclude if there is any possibility of pregnancy.]

2. Have you been diagnosed with a serious illness that might cause dizziness or motion sickness? If yes, is the condition still active? Are there any lingering effects? If yes, do you care to describe?
   [Exclude if there is any current serious condition.]

3. Do you suffer from inner ear, dizziness, vertigo, or balance problems? If yes, please describe.
   [Exclude if there is any recent history of the above symptoms]

4. Do you ever suffer from motion sickness? If yes, on what mode of transportation and what were the conditions? What symptoms did you experience? How old were you when this occurred?
   [Exclude if there are any recent history of motion sickness]

5. Are you currently taking any medications that might contribute to dizziness or motion sickness?
   [Exclude if medication is for motion sickness, psychiatric disorder, including anti-depressants, heart conditions, seizures or epilepsy, respiratory disorder, frequent headaches, or insulin for diabetes.]
Phone Pre-Screening Questionnaire cont’d

Closing

If participant MEETS ALL criteria (Driving Inclusion and General Health Exclusion Criteria):
- Inform the participant to refrain from alcohol and drug intake for the 24 hours preceding the session.
- Schedule the appointment.
- Give directions
- Stress the importance of attending the session and provide a contact name and number
- Bring eyeglasses if required for driving
- Reinforce that the parents must also attend and may want to consider bringing reading material
- Encourage the parent to be the driver on the way home from the study

If the person DOES NOT meet one or more of these criteria, explain that this study requires meeting all of these conditions, thank the person for their time, and, if reasonable ask if they wish to remain on the list of participants for other TTI studies.

Additional Pre-Experiment Questions

These questions should be asked when the participants shows up for the experiment.

1. Since we last spoke, are you taking any medications that might contribute to dizziness or motion sickness?

   [Exclude if medication is for motion sickness, psychiatric disorder, heart conditions, seizures or epilepsy, respiratory disorder, frequent headaches, or insulin for diabetes.]

2. Are you “sick” or in other than your “usual state of fitness”?

   [Record the subject’s response. Exclude if based on the severity of their response.]

Post Experimenter Only Section

Was the session completed?_______________________

How many breaks were required _______________________

When was the session terminated? (if the subject got sick)_________________
PARENTAL INFORMED CONSENT (for child participation): Page 1 of 3

My child has been invited to participate in an experiment to evaluate cell phone use and in-vehicle conversations in a driving simulator experience. The experiment is to take place in the Gibb Gilchrist Building. My child is being selected as a possible participant because they have normal or corrected to normal vision, has obtained a valid driver’s or hardship license in the past six months, and has no apparent limitations impeding their ability to drive. I have been instructed to read this form and ask any questions I may have before agreeing to allow my child to participate in the study. This experiment is being conducted by Susan T. Chrysler of the Texas Transportation Institute (TTI), part of the Texas A&M University System. Southwest Region University Transportation Center is funding this experiment.

**Background Information:** The purpose of this study is to examine the effects of cell phone use and passenger conversations on teen driving. 60 people like my child will participate in the study. During the experiment, I understand that I will be asked to leave the room. My child’s driving data and questionnaire responses will not be available to me. The researchers are not trained drivers education or testing specialists and can not assess driving skill.

**Procedures:** If I agree to allow my child be in this study, they will be asked to participate in a brief introductory session, a practice session, and the experimental session in the simulator. This study will take no longer than 1 hour. I also agree to allow my child to be video and audio recorded during the study. Although my child’s name will not be mentioned, it is possible that video/audio of his/her study could be used during a presentation of the study’s findings.

*Introductory Session:* During the introductory session my child will read the assent form and will indicate their willingness to continue with the experiment by signing the form. Before proceeding, I will receive a copy of this consent form, as well as a copy of my child’s assent form. He/she will also fill out a Simulator Sickness Questionnaire, indicating any from a list of symptoms they may feel before beginning the study.

*Driving Simulator Practice Session:* During the practice session my child will be provided an information sheet about the simulator and instructions on performing the practice session. This practice session will provide the opportunity to become familiar with driving the simulator and will last approximately 5 minutes.

*Driving Simulator Experimental Session:* During the simulator portion of the experiment, my child will be asked to drive through a simulated driving environment, and respond to the different signal displays as he/she normally would when driving my own vehicle. This portion of the experiment will take approximately 45 minutes. Breaks will be available.

*Questionnaire:* Following the experiment, my child will be asked to complete a questionnaire to provide demographic information about themselves, as well as some experiential information pertaining to driving. He/she will also complete a second Simulator Sickness Questionnaire, indicating any symptoms they may feel after exiting the simulator vehicle. While my child is in the simulator, I will be asked to wait in a nearby room. I will be asked to complete a questionnaire about my driving habits.

Initial  
Date
Debriefing: Before leaving, my child will be provided a debriefing packet explaining the purpose of the study and how the results will be used.

I understand that the only risk associated with this study is a temporary condition named 'Simulator Induced Discomfort' (SID) which is characterized by feelings of dizziness and increased body temperature. The potential for this discomfort is minimal as it only mildly affects about 10 persons out of every 100 under the driving conditions and rarely occurs in younger people. I understand that my child is to indicate to the investigator if I experience any of these symptoms, and that the study will be stopped to prevent any further discomfort to him/her. I understand that it is my child’s right to stop the study at any time for any reason without any repercussion. If he/she asks to stop the study because they are not feeling well, they will still receive full payment for participation. I understand that TTI suggests I drive my child home after the study in case there are any temporary symptoms of SID.

Confidentiality: I understand the records of this study will be kept private. In any sort of report that might be published, no information will be included which may make it possible to identify my child. I understand the research records will be kept in a locked file, accessible only to the investigator. My child and myself will be asked to sign a form acknowledging payment for my participation. These forms are kept separate from this signed consent form and any other data that would identify us by name. My child’s driving performance data, speed and lane position, is being recorded by the computer. These data files will be coded only with an ID number and not by my child’s name.

Benefits: For participation in this study my child will receive $20.

Voluntary Nature of the Study: My child’s decision whether or not to participate will not affect his/her current or future relations with the Texas Transportation Institute, Texas A&M University, or the Texas A&M University System, nor will it affect their grades or school standing. If my child decides to participate, they are free to withdraw at any time without affecting those relationships.

Contacts and Questions: The researcher conducting this study is Susan T. Chrysler, Ph.D. If I have questions now or later, I may contact Susan T. Chrysler at the Texas Transportation Institute, Texas A&M University, College Station, TX 77843-3135, (979) 862-3311, s-chrysler@tamu.edu.

I will be given a copy of this form for my records. A copy of this form will be given to me prior to my child proceeding with the experiment.

This research study has been reviewed and approved by the Institutional Review Board - Human Subjects in Research, Texas A&M University. For research-related problems or questions regarding subjects' rights, the Institutional Review Board may be contacted through the IRB Coordinator, Office of Vice President for Research and Associate Provost for graduate Studies at (979) 845-1811.

Initial

Date
Statement of Consent: I have read and understand the explanation provided me. I have had all my questions answered to my satisfaction, and my signature indicates I voluntarily agree to allow my child to participate in this study. I have been provided a copy of this consent form.

__________________________________  ___________
Signature of Research Participant’s Parent  Date

______________________________
Printed Name of Child

__________________________________  ___________
Signature of Principal Investigator   Date
INFORMED CONSENT (for parent questionnaire): Page 1 of 2

While my child has been invited to participate in an experiment to evaluate cell phone use and in-vehicle conversations in a driving simulator experience, I have been asked to complete a questionnaire covering mine and my child’s driving habits. The experiment is to take place in the Gibb Gilchrist Building. I have been instructed to read this form and ask any questions I may have before agreeing to participate in the study. This experiment is being conducted by Susan T. Chrysler of the Texas Transportation Institute (TTI), part of the Texas A&M University System. Southwest Region University Transportation Center is funding this experiment.

Procedures: If I agree to be in this study I will be asked to complete a questionnaire to provide demographic information about myself, as well as experiential information pertaining to mine and my child’s driving. This study will take no longer than 15 minutes. I understand that there are no risks associated with this study. I understand that it is my right to stop the study at any time for any reason without any repercussion.

Confidentiality: I understand the records of this study will be kept private. In any sort of report that might be published, no information will be included which may make it possible to identify me or my child. I understand the research records will be kept in a locked file, accessible only to the investigator. I will be asked to sign a form acknowledging payment for my participation. These forms are kept separate from this signed consent form and any other data that would identify me by name.

Benefits: For participation in this study, I will receive $10 cash upon completion.

Voluntary Nature of the Study: My decision whether or not to participate will not affect my current or future relations with the Texas Transportation Institute, Texas A&M University, or the Texas A&M University System. If I decide to participate, I am free to withdraw at any time without affecting those relationships.

Contacts and Questions: The researcher conducting this study is Susan T. Chrysler, Ph.D. If I have questions now or later, I may contact Susan T. Chrysler at the Texas Transportation Institute, Texas A&M University, College Station, TX 77843-3135, (979) 862-3311, s-chrysler@tamu.edu.

I will be given a copy of this form for my records.
A copy of this form will be given to me prior to my child proceeding with the experiment.

This research study has been reviewed and approved by the Institutional Review Board - Human Subjects in Research, Texas A&M University. For research-related problems or questions regarding subjects' rights, the Institutional Review Board may be contacted through the IRB Coordinator, Office of Vice President for Research and Associate Provost for graduate Studies at (979) 845-1811.

Initial

Date
I understand that the Texas Transportation Institute conducts many research projects throughout the year and may contact me again to participate in another study. I am under no obligation to participate in future studies. My name, contact information, responses to demographic and driving habits questionnaires, and performance on any vision tests will be retained to assist in my potential selection for inclusion in future studies. If I do not wish to be contacted in the future I may indicate this by marking the box below.

☐ I do not wish to participate in any further studies. Do not retain my personal information nor contact me for participation in any future studies.

Statement of Consent: I have read and understand the explanation provided me. I have had all my questions answered to my satisfaction, and my signature indicates I voluntarily agree to participate in this study. I have been provided a copy of this consent form.

__________________________________  ___________
Signature of Research Participant’s Parent  Date

__________________________________
Printed Name of Child

__________________________________  ___________
Signature of Principal Investigator   Date
INFORMED ASSENT (for under 18): Page 1 of 3

I have been invited to participate in an experiment to evaluate cell phone use and in-vehicle conversations in a driving simulator experience. The experiment is to take place in the Gibb Gilchrist Building. I am being selected as a possible participant because I have normal or corrected to normal vision, I’ve obtained a valid driver’s or hardship license in the past 6 months, and I have no apparent limitations impeding my ability to drive. I have been instructed to read this form and ask any questions I may have before agreeing to participate in the study. This experiment is being conducted by Susan T. Chrysler of the Texas Transportation Institute (TTI), part of the Texas A&M University System. Southwest Region University Transportation Center is funding this experiment.

Background Information: The purpose of this study is to examine the effects of cell phone use and passenger conversations on teen driving. 60 people like me will participate in the study. During the experiment my parent will be asked to leave the room, and my driving data and questionnaire responses will not be available to him/her.

Procedures: If I agree to be in this study, I am asked to participate in a brief introductory session, a practice session, and the experimental session in the simulator. This study will take no longer than 1 hour. I also agree to be video and audio recorded during the study. Although my name will not be mentioned, it is possible that video/audio of this study could be used during a presentation of the study’s findings.

Introductory Session: During the introductory session my parent will read the consent form, and I will read the assent form. I will indicate my willingness to continue with the experiment by signing the form. I will not be able to participate if my parent does not sign the consent form. Before proceeding, I will receive a copy of this form. I will also fill out a Simulator Sickness Questionnaire, indicating any from a list of symptoms I may feel before beginning the study.

Driving Simulator Practice Session: During the practice session I will be provided an information sheet about the simulator and instructions on performing the practice session. This practice session will provide the opportunity to become familiar with driving the simulator and will last approximately 5 minutes.

Driving Simulator Experimental Session: During the simulator portion of the experiment, I will be asked to drive through a simulated driving environment, and respond to the different signal displays as I normally would when driving my own vehicle. This portion of the experiment will take approximately 45 minutes. Breaks will be available.

Questionnaire: Following the experiment, I will be asked to complete a questionnaire to provide demographic information about myself, as well as some experiential information pertaining to driving. I will also complete a second Simulator Sickness Questionnaire, indicating any symptoms I may feel after exiting the simulator vehicle.

Debriefing: Before leaving, I will be provided a debriefing packet explaining the purpose of the study and how the results will be used.

Initial
Date
INFORMED ASSENT (for under 18): Page 2 of 3

I understand that the only risk associated with this study is a temporary condition named 'Simulator Induced Discomfort' (SID) which is characterized by feelings of dizziness and increased body temperature. The potential for this discomfort is minimal as it only mildly affects about 10 persons out of every 100 under the driving conditions, are rarely occurs with younger people. I understand that I am to indicate to the investigator if I experience any of these symptoms, and that the study will be stopped to prevent any further discomfort to me. I understand that it is my right to stop the study at any time for any reason without any repercussion. If I ask to stop the study because I am not feeling well, I will still receive full payment for participation. I understand that TTI suggests that my parent drives me home after the study in case there are any temporary symptoms of SID.

Confidentiality: I understand the records of this study will be kept private. In any sort of report that might be published, no information will be included which may make it possible to identify me. I understand the research records will be kept in a locked file, accessible only to the investigator. I will be asked to sign a form acknowledging payment for my participation. These forms are kept separate from this signed consent form and any other data that would identify me by name. My driving performance data, speed and lane position, is being recorded by the computer. These data files will be coded only with an ID number and not by my name.

Benefits: For participation in this study, I will receive $20 cash upon completion.

Voluntary Nature of the Study: My decision whether or not to participate will not affect my current or future relations with the Texas Transportation Institute, Texas A&M University, or the Texas A&M University System, nor will it affect my grades or school standing. If I decide to participate, I am free to withdraw at any time without affecting those relationships.

Contacts and Questions: The researcher conducting this study is Susan T. Chrysler, Ph.D. If I have questions now or later, I may contact Susan T. Chrysler at the Texas Transportation Institute, Texas A&M University, College Station, TX 77843-3135, (979) 862-3311, s-chrysler@tamu.edu.

I will be given a copy of this form for my records.
A copy of this form will be given to me prior to my proceeding with the experiment.

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______ Initial
_______ Date
I understand that the Texas Transportation Institute conducts many research projects throughout the year and may contact me again to participate in another study. I am under no obligation to participate in future studies. My name, contact information, responses to demographic and driving habits questionnaires, and performance on any vision tests will be retained to assist in my potential selection for inclusion in future studies. If I do not wish to be contacted in the future I may indicate this by marking the box below.

☐ I do not wish to participate in any further studies. Do not retain my personal information nor contact me for participation in any future studies.

**Statement of Consent:** I have read and understand the explanation provided me. I have had all my questions answered to my satisfaction, and my signature indicates I voluntarily agree to participate in this study. I have been provided a copy of this consent form.

______________________________ ___________
Signature of Research Participant  Date

______________________________ ___________
Signature of Principal Investigator  Date
I have been invited to participate in an experiment to evaluate cell phone use and in-vehicle conversations in a driving simulator experience. The experiment is to take place in the Gibb Gilchrist Building. I am being selected as a possible participant because I have normal or corrected to normal vision, I’ve obtained a valid driver’s or hardship license in the past 6 months, and I have no apparent limitations impeding my ability to drive. I have been instructed to read this form and ask any questions I may have before agreeing to participate in the study. This experiment is being conducted by Susan T. Chrysler of the Texas Transportation Institute (TTI), part of the Texas A&M University System. Southwest Region University Transportation Center is funding this experiment.

**Background Information:** The purpose of this study is to examine the effects of cell phone use and passenger conversations on teen driving. 60 people like me will participate in the study.

**Procedures:** If I agree to be in this study, I am asked to participate in a brief introductory session, a practice session, and the experimental session in the simulator. This study will take no longer than 1 hour. I also agree to be video and audio recorded during the study. Although my name will not be mentioned, it is possible that video/audio of this study could be used during a presentation of the study’s findings.

*Introductory Session:* During the introductory session my parent will read the consent form, and I will read the assent form. I will indicate my willingness to continue with the experiment by signing the form. Before proceeding, I will receive a copy of this form. I will also fill out a Simulator Sickness Questionnaire, indicating any from a list of symptoms I may feel before beginning the study.

*Driving Simulator Practice Session:* During the practice session I will be provided an information sheet about the simulator and instructions on performing the practice session. This practice session will provide the opportunity to become familiar with driving the simulator and will last approximately 5 minutes.

*Driving Simulator Experimental Session:* During the simulator portion of the experiment, I will be asked to drive through a simulated driving environment, and respond to the different signal displays as I normally would when driving my own vehicle. This portion of the experiment will take approximately 45 minutes. Breaks will be available.

*Questionnaire:* Following the experiment, I will be asked to complete a questionnaire to provide demographic information about myself, as well as some experiential information pertaining to driving. I will also complete a second Simulator Sickness Questionnaire, indicating any symptoms I may feel after exiting the simulator vehicle.

*Debriefing:* Before leaving, I will be provided a debriefing packet explaining the purpose of the study and how the results will be used.

_______ Initial
_______ Date
INFORMED CONSENT (for over 18): Page 2 of 3

I understand that the only risk associated with this study is a temporary condition named 'Simulator Induced Discomfort' (SID) which is characterized by feelings of dizziness and increased body temperature. The potential for this discomfort is minimal as it only mildly affects about 10 persons out of every 100 under the driving conditions, are rarely occurs with younger people. I understand that I am to indicate to the investigator if I experience any of these symptoms, and that the study will be stopped to prevent any further discomfort to me. I understand that it is my right to stop the study at any time for any reason without any repercussion. If I ask to stop the study because I am not feeling well, I will still receive full payment for participation.

Confidentiality: I understand the records of this study will be kept private. In any sort of report that might be published, no information will be included which may make it possible to identify me. I understand the research records will be kept in a locked file, accessible only to the investigator. I will be asked to sign a form acknowledging payment for my participation. These forms are kept separate from this signed consent form and any other data that would identify me by name. My driving performance data, speed and lane position, is being recorded by the computer. These data files will be coded only with an ID number and not by my name.

Benefits: For participation in this study, I will receive $20 cash upon completion.

Voluntary Nature of the Study: My decision whether or not to participate will not affect my current or future relations with the Texas Transportation Institute, Texas A&M University, or the Texas A&M University System, nor will it affect my grades or school standing. If I decide to participate, I am free to withdraw at any time without affecting those relationships.

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______ Initial
_______ Date
INFORMED CONSENT (for over 18): Page 3 of 3

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☐ I do not wish to participate in any further studies. Do not retain my personal information nor contact me for participation in any future studies.

Statement of Consent: I have read and understand the explanation provided me. I have had all my questions answered to my satisfaction, and my signature indicates I voluntarily agree to participate in this study. I have been provided a copy of this consent form.

______________________________ ___________
Signature of Research Participant  Date

______________________________ ___________
Signature of Principal Investigator  Date
## Simulator Sickness Questionnaire

<table>
<thead>
<tr>
<th>Study Name________________________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date_______________ Participant #____________________</td>
</tr>
</tbody>
</table>

**Directions:** Circle any symptoms below that apply to you right now

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>None</th>
<th>Slight</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>General discomfort</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Fatigue</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Boredom</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Drowsiness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Headache</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Eye Strain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Difficulty Focusing</td>
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<td>8</td>
<td>Salivation increased</td>
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<td>9</td>
<td>Salivation decreased</td>
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<td>10</td>
<td>Sweating</td>
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<td>11</td>
<td>Nausea</td>
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<td>12</td>
<td>Difficulty concentrating</td>
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<td>13</td>
<td>Mental depression</td>
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<td>14</td>
<td>&quot;Fullness of the Head&quot;</td>
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<td>15</td>
<td>Blurred Vision</td>
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<td>16</td>
<td>Dizziness w/ eyes open</td>
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<td>17</td>
<td>Dizziness w/ eyes closed</td>
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<td>18</td>
<td>Vertigo *</td>
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<td>19</td>
<td>Visual flashbacks **</td>
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<td>Faintness</td>
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<td>21</td>
<td>Awareness of breathing</td>
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<td>22</td>
<td>Stomach awareness ***</td>
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<td>23</td>
<td>Loss of appetite</td>
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<td>Increased appetite</td>
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<td>Desire to move bowels</td>
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<td>26</td>
<td>Confusion</td>
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<td>27</td>
<td>Burping</td>
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<td>28</td>
<td>Vomiting</td>
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<td>29</td>
<td>Other</td>
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</tbody>
</table>

* Vertigo is experienced as loss of orientation with respect to vertical upright.

** Visual illusion of movement or false sensations similar to automobile dynamics, when not in the simulator or the automobile.

*** Stomach awareness is usually used to indicate a feeling of discomfort which is just short of nausea.
DEBRIEFING PACKET

If you would like a copy of the results of this study or have any questions concerning your participation please write or call the Human Factors Program of the Texas Transportation Institute at Texas A&M University.

Susan T. Chrysler, Ph.D.

Human Factors Program
Texas Transportation Institute
The Texas A&M University System
College Station, TX 77843-3135
(979) 862-3311

Studies show that young drivers, specifically 16 year olds who have just received their licenses, are more likely to be involved in a crash than experienced drivers and even older teenagers. Many states in the US have begun to implement graduated licensing systems to reduce beginner driver crashes. Graduated licensing is used to expose beginners to the driving experience by removing or decreasing high risk conditions such as night-time driving, unsupervised driving, and multiple teen passengers for the first 6 mos-2 yrs after their 16th birthday.

There have also been extensive studies on the use of cell phones and their negative effects on a driver’s performance. These studies have also shown that the cell phone use of a driver produces a higher risk than in-vehicle conversations. We expect the combination of cell phone use combined with inexperienced drivers, creates an even higher risk of crashes. There have not, to our knowledge, been any graduated licensing programs to restrict cell phone use among novice drivers.

This study will use the Texas Transportation Institute’s driving simulator to measure newly-licensed 16 year olds’ driving performance while talking on cell phones, and also while talking to passengers within their cars. The participants will be placed in hazardous driving situations, and real-time data will be collected through the simulator in order to measure their performance.

Since the introduction of graduated licensing in the US, crash reductions have been reported in several states using the system. As mentioned above, one criterion that is often used is limiting the number of non-family teen passengers in the vehicle with a novice driver. If there is concern that this type of in-vehicle interaction between teens is a high risk, than cell phone use by a novice driver may produce the same or even higher risks. This study will compare the two types of driving situations and will form conclusions on whether or not prohibiting cell phone use would be an appropriate recommendation to a graduated licensing program.
APPENDIX B:

SIMULATOR CONVERSATION QUESTIONS, AND DATA FORM
POSSIBLE SIMULATOR DRIVE QUESTIONS

1. How old are you?
2. What classes are you taking in school right now?
3. What types of things do you usually do after school each day?
4. What school do you go to?
5. Have you considered what line of work/career you want to go into?
6. Who is your role model? Why?
7. When is your birthday?
8. Were you named after anyone, or did your parents just pick your name randomly?
9. Many people believe it is important for our children to know about the past. What about the past do you think is important for children to know?
10. **** Would you like to join a sorority in college?
11. Did you drive here today?
12. What are you doing when you leave here today? Do you mind if I ask why?
13. Can you give me directions to get to your house from here?
14. What kind of car do you usually drive? How do you like that car?
15. What’s your favorite thing to do in Bryan/College Station?
16. If you were driving from your house to school, is the second turn you make a left or a right?
17. What grade are you in?
18. What is your favorite college and why?
19. How many classrooms do you go into each day at your school?
20. **** Who is a woman you look up to?
21. What is in your CD player right now?
22. Tell me about your favorite types of music.
23. What were the last 3 CD’s you listened to?
24. Do you have an MP3 player?
25. What is the most embarrassing CD that you own?
26. Are there any “fads” going on right now at your school?
27. Do you like scary movies or funny movies?
28. What is your favorite magazine?
29. What is the oldest show on TV that you can remember watching as a kid?
30. Do you have to have the T.V. on to be able to go to sleep?
31. Do you listen to music in the morning, or do you prefer silence?
32. What are the last 3 movies that you went to the theater to see?
POSSIBLE SIMULATOR DRIVE QUESTIONS CONT’D

33. What is your favorite type of food?
34. What is your favorite dessert?
35. What all did you have to eat yesterday?

36. Do you play any sports?
37. Have you ever been hunting?
38. Tell me a little bit about your family?

39. Do you like watching professional sports on TV?
40. What is your favorite sport to watch on TV?
41. Please name a person, either a historic figure or one from your personal past, who has particularly affected you.

42. What color is your car?
43. How many keys are on your keychain?

44. ***** Do you like to wear jewelry? What Kind?

45. Do you like your handwriting?
46. What is your favorite book?
47. In what ways do you think differently about the past now than you did when you were younger?

48. Do you eat breakfast every day?
49. What is the last thing you do before you go to bed?
50. Tell me the first three things you do in the morning when you wake up.

51. Are you a summer or winter kind of person?
52. What types of things do you and your friends do in the summer?
53. Have you ever been to Europe?
54. Tell me three places that you would like to go in the world.

55. Do you wear glasses or contacts, both or neither?
56. Would you ever consider having lasik eye surgery done?

57. What is your favorite day of the week?
58. What’s your favorite color?
59. How many windows are in your house?

60. Have you ever been snow skiing?
61. What word or catch phrase do you use all of the time?
62. How many times (on average) do you start your vehicle every day?

63. Do you like sweet or salty foods?
64. Do you like Hard Candy or Chocolate?
65. What is your favorite restaurant?

67. Do you prefer Coffee, Tea or neither?
68. What is your favorite vegetable?
69. Does it bother you when people call you trying to sell you stuff over the telephone?
70. Do you usually just hang up on those people, or do you listen to what they have to say?

71. Where do you like to go shopping for clothes?
72. Did you do any Christmas shopping this year? If so, where?
73. What would be the first three things you grabbed out of your room if your house was on fire?

74. What is your shoe size?
75. When the president is on every national TV channel, do you listen to what he has to say, or just turn the channel to something on cable?

76. Have you ever caught a fish?
77. What would your dream job be?
78. If you had three wishes, what would you wish for, and you can’t wish for more wishes.
SIMULATOR DRIVE DATA SHEET

Run 1
saved file: ________________

Leg #: _______________ Distraction: ________________

Event 1: _______________
Subject Reaction: _______________________
Conversation: _______________________

Event 2: _______________
Subject Reaction: _______________________
Conversation: _______________________

Event 3: _______________
Subject Reaction: _______________________
Conversation: _______________________

Event 4: _______________
Subject Reaction: _______________________
Conversation: _______________________

Event 5: _______________
Subject Reaction: _______________________
Conversation: _______________________

Event 6: _______________
Subject Reaction: _______________________
Conversation: _______________________

Run 2
saved file: ________________

Leg #: _______________ Distraction: ________________

Event 1: _______________
Subject Reaction: _______________________
Conversation: _______________________

Event 2: _______________
Subject Reaction: _______________________
Conversation: _______________________

Event 3: _______________
Subject Reaction: _______________________
Conversation: _______________________

51
SIMULATOR DRIVE DATA SHEET CONT’D

Event 4: ______________________
  Subject Reaction: _______________________
  Conversation: _______________________

Event 5: ______________________
  Subject Reaction: _______________________
  Conversation: _______________________

Event 6: ______________________
  Subject Reaction: _______________________
  Conversation: _______________________

Run 3                     saved file:___________________
Leg #:__________________              Distraction:_____________________________

Event 1: ______________________
  Subject Reaction: _______________________
  Conversation: _______________________

Event 2: ______________________
  Subject Reaction: _______________________
  Conversation: _______________________

Event 3: ______________________
  Subject Reaction: _______________________
  Conversation: _______________________

Event 4: ______________________
  Subject Reaction: _______________________
  Conversation: _______________________

Event 5: ______________________
  Subject Reaction: _______________________
  Conversation: _______________________

Event 6: ______________________
  Subject Reaction: _______________________
  Conversation: _______________________
APPENDIX C:

PAPER SURVEY QUESTIONNAIRES AND DATA
DRIVING HABIT QUESTIONNAIRE (for Teens)

DEMOGRAPHICS

1. Sex: □ Male □ Female  
   Birthdate: ______________
   Name of High School: ______________  Year: __________

2. Racial Background:
   □ White  
   □ African-American  
   □ Asian or Pacific Islander  
   □ Hispanic  
   □ Other or Mixed

3. Do you live in:
   □ City streets (ex: Bryan, College Station)  
   □ Sub-division (ex: Emerald Forest)  
   □ Small town (ex: Caldwell, Hearne, Navasota)

4. Grade Point Average
   4.0 or better  
   3.5-4.0  
   3.0-3.5  
   2.5-3.0  
   2.0-2.5  
   1.5-2.0  
   lower than 1.5

5. Do you have a job? □ Yes □ No
   If Yes:
   Where: ________________________________
   How many hours per week: ______________
   Do you drive as a part of your job? □ Yes □ No
DRIVING HABIT QUESTIONNAIRE (for Teens) CONT’D

DRIVING HISTORY

6. How often do you drive a motor-vehicle?
   - [ ] A few times a year
   - [ ] A few times a month
   - [ ] A few times a week
   - [ ] Once a day
   - [ ] Several times a day

7. Whose vehicle do you drive?
   - [ ] own my own car
   - [ ] parents let me use one of their vehicles permanently
   - [ ] must ask permission to drive family car
   - [ ] other non-family

8. How often do you drive with other people in your vehicle? (family or friends)
   - [ ] Almost every day
   - [ ] Few days a week
   - [ ] Few days a month
   - [ ] Few days a year

9. How many times per week do you drive during these times?
   - [ ] 5:00 - 9:00 am
   - [ ] 9:00 am - 12:00 pm
   - [ ] 12:00 - 3:00 pm
   - [ ] 3:00 - 6:00 pm
   - [ ] 6:00 - 9:00 pm
   - [ ] 9:00 pm - 12:00 am
   - [ ] 12:00 midnight - 5:00 am

10. Please estimate how many days a month you drive on each type of roadway:
    - [ ] City (multi-lane, traffic signals); ex: Texas Avenue
    - [ ] Suburban (neighborhoods, stop signs); ex: Southwest Parkway
    - [ ] Rural (high speed, two lane roads); ex: FM 1179
    - [ ] Urban Freeway (high speed, multiple lanes near large cities); ex: 1-45 in Houston
    - [ ] Rural Freeway; ex: HW 21 to Austin
    - [ ] About the same on each
DRIVING HABIT QUESTIONNAIRE (for Teens) CONT’D

11. Overall, where would you rank the parent whom you accompanied today in terms of driving ability compared to all other drivers, of all ages, on the road in this community?
   □ Far above average
   □ Above average
   □ Average
   □ Below average
   □ Far below average

12. Overall, where would you rank yourself in terms of driving ability compared to all other drivers, of all ages, on the road in this community?
   □ Far above average
   □ Above average
   □ Average
   □ Below average
   □ Far below average

VEHICLE INFORMATION

13. What kind of vehicle do you drive most often?
   □ Passenger Car
   □ Van or minivan
   □ Sport utility vehicle
   □ Pick-up truck
   □ Motorcycle / Moped

   What is the year, make, and model of your vehicle that you drive the most? (ex. 1998 Ford Mustang)
   ________________________________________________________________

Communication Issues

14. Do you have your own cell phone? □ Yes □ No

   If Yes, how long have you had your phone? ____________
DRIVING HABIT QUESTIONNAIRE (for Teens) CONT’D

15. Do you use an earpiece or other adaptor for your cell phone so you can talk without using your hands:
   While driving?
     □ Never
     □ Rarely
     □ Sometimes
     □ Most Times
     □ Always
   Other times?
     □ Never
     □ Rarely
     □ Sometimes
     □ Most Times
     □ Always

16. Have you ever text messaged while driving?  □ Yes  □ No

17. How often do you use text messaging feature?
     □ Never
     □ Rarely
     □ Sometimes
     □ Most Times
     □ Always

18. Do you have your own personal digital assistant (PDA) (for example a Palm Pilot or another brand)?
     □ Yes  □ No

TRAFFIC SAFETY ISSUES

How often do you?

19. Drive through a light that was already red before you reached it
     □ Never  □ Rarely  □ Sometimes  □ Most times  □ Always

20. Drive 10 mph higher than the speed limit
     □ Never  □ Rarely  □ Sometimes  □ Most times  □ Always

21. Drive 20 mph higher than the speed limit
     □ Never  □ Rarely  □ Sometimes  □ Most times  □ Always

22. Enter an intersection as the light turns yellow
     □ Never  □ Rarely  □ Sometimes  □ Most times  □ Always

23. Come to a rolling stop at a stop sign
     □ Never  □ Rarely  □ Sometimes  □ Most times  □ Always
DRIVING HABIT QUESTIONNAIRE (for Teens) CONT’D

How often do you?

24. Cross the railroad tracks when the red lights are blinking
   □ Never    □ Rarely    □ Sometimes    □ Most times    □ Always

25. Wear a Seat Belt
   □ Never    □ Rarely    □ Sometimes    □ Most times    □ Always

26. Talk on a cell phone while driving?
   □ Never    □ Rarely    □ Sometimes    □ Most times    □ Always

27. Use a Personal Digital Assistant (e.g. Palm Pilot) while driving?
   □ Never    □ Rarely    □ Sometimes    □ Most times    □ Always

28. Use the text message feature on your phone while driving?
   □ Never    □ Rarely    □ Sometimes    □ Most times    □ Always

29. Wear headphones for listening to music while driving?
   □ Never    □ Rarely    □ Sometimes    □ Most times    □ Always

What is the importance of these safety issues?

30. Speeding
   □ Not Important    □ Little Importance    □ Fairly Important    □ Very Important

31. Drunk Driving
   □ Not Important    □ Little Importance    □ Fairly Important    □ Very Important

32. Red light running
   □ Not Important    □ Little Importance    □ Fairly Important    □ Very Important

33. Aggressive driving
   □ Not Important    □ Little Importance    □ Fairly Important    □ Very Important

34. Poor road signs
   □ Not Important    □ Little Importance    □ Fairly Important    □ Very Important

35. Driving ability of older drivers (over the age of 75)
   □ Not Important    □ Little Importance    □ Fairly Important    □ Very Important
What is the importance of these safety issues?

36. Driving ability of younger drivers (under the age of 18)
   - Not Important
   - Little Importance
   - Fairly Important
   - Very Important

37. In-vehicle distractions during driving (for example, cell phone use)
   - Not Important
   - Little Importance
   - Fairly Important
   - Very Important

DRIVER EDUCATION

38. When did you receive your Driver’s license? ____________________ (Month/Year)

39. Did you take a formal driver’s education course at the time of your initial licensure?  
   - Yes  
   - No

40. If yes, which type of Driver’s Ed did you take?
   - In-School Program
   - Commercial School (ex: A+ Driving School)
   - Parent Taught

41. How satisfied with the driver education process that you went through are you?
   - Very Dissatisfied
   - Somewhat Dissatisfied
   - Satisfied
   - Very Satisfied

42. Who do you believe has had the most influence on the way you drive?
   - The parent that is here with me today
   - My other parent
   - My classmates
   - My sibling(s)
   - My driving instructor
   - Other ____________________

43. What specific problems, concerns, or issues do you have concerning the driver education and licensing process in Texas?

44. Are there any laws or rules concerning teen driving that you would like to see changed?
45. Are you aware there are special restrictions placed on newly licensed drivers under 18 in Texas (Texas Graduated Licensing laws)? □ Yes □ No

If so, how do you feel about Texas Graduated Licensing laws? Do you think they are effective?

46. Do you have any special rules that your parents impose on you concerning driving activities? (For example, only certain roadway types, times of day, cell phone use)

47. Do you have any special rules that your parents impose on you concerning driving privileges? (For example, maintain certain grades, household chores, adherence to other family rules)

48. Do you think you are better at multi-tasking than your parent that is here with you today? (For example, driving while speaking on the cell phone)
49. If you use a cell phone, even occasionally, place an “X” in the column to indicate your behavior in each traffic situation. It is okay to mark more than one column.

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<thead>
<tr>
<th></th>
<th>Not make a call</th>
<th>Pause a current call</th>
<th>End a current call</th>
<th>Not answer a ringing phone</th>
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<tbody>
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<td>During rain</td>
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<td>In bumper-to-bumper traffic</td>
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<td>On a high-speed freeway</td>
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<td>On local streets with stop signs and lights</td>
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<td>While driving with passengers in the vehicle</td>
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<td>While driving in a parking lot</td>
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<tr>
<td>While driving at night</td>
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DRIVING HABIT QUESTIONNAIRE (for Parents)

DEMOGRAPHICS

1. Sex: □ Male □ Female Birthdate: ______________

2. Racial Background:
   □ White
   □ African-American
   □ Asian or Pacific Islander
   □ Hispanic
   □ Other or Mixed

3. Do you live in:
   □ City streets (ex: Bryan, College Station)
   □ Sub-division (ex: Emerald Forest)
   □ Small town (ex: Caldwell, Hearne, Navasota)

DRIVING HISTORY

4. When did you receive your driver’s license?
   Did you take a formal driver’s education course at the time of your initial licensure?
   □ Yes □ No, taught by family member or learned by myself

5. If yes, which type of Driver’s Ed did you take?
   □ In – School Program
   □ Commercial School (ex: A+ Driving School)

6. How often do you drive a motor-vehicle?
   □ A few times a year
   □ A few times a month
   □ A few times a week
   □ Once a day
   □ Several times a day

7. Whose vehicle do you drive?
   □ own my own car
   □ parents let me use one of their vehicles permanently
   □ must ask permission to drive family car
   □ other non-family

DRIVING HABIT QUESTIONNAIRE (for Parents) CONT’D
8. How often do you drive with other people in your vehicle? (family or friends)
   ☐ Almost every day
   ☐ Few days a week
   ☐ Few days a month
   ☐ Few days a year

9. How many times per week do you drive during these times?
   _____5:00 - 9:00 am
   _____9:00 am - 12:00 pm
   _____12:00 - 3:00 pm
   _____3:00 - 6:00 pm
   _____6:00 - 9:00 pm
   _____9:00 pm - 12:00 am
   _____12:00 midnight - 5:00 am

10. Please estimate how many days a month you drive on each type of roadway:
    _____City (multi-lane, traffic signals); ex: Texas Avenue
    _____Suburban (neighborhoods, stop signs); ex: Southwest Parkway
    _____Rural (high speed, two lane roads); ex: FM 1179
    _____Urban Freeway (high speed, multiple lanes near large cities); ex: 1-45 in Houston
    _____Rural Freeway; ex: HW 21 to Austin
    _____About the same on each

11. Overall, where would you rank the child whom you accompanied today in terms of driving ability compared to all other drivers, of all ages, on the road in this community?
    ☐ Far above average
    ☐ Above average
    ☐ Average
    ☐ Below average
    ☐ Far below average

12. Overall, where would you rank yourself in terms of driving ability compared to all other drivers, of all ages, on the road in this community?
    ☐ Far above average
    ☐ Above average
    ☐ Average
    ☐ Below average
    ☐ Far below average
VEHICLE INFORMATION

13. What kind of vehicle do you drive most often?
   □ Passenger Car
   □ Van or minivan
   □ Sport utility vehicle
   □ Pick-up truck
   □ Motorcycle / Moped

What is the year, make, and model of your vehicle that you drive the most? (ex. 1998 Ford Mustang)
______________________________________________________________

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14. Do you have your own cell phone? □ Yes □ No

   If Yes, how long have you had your phone? _____________

15. Do you use an earpiece or other adaptor for your cell phone so you can talk without using your hands:

   While driving?
   □ Never
   □ Rarely
   □ Sometimes
   □ Most Times
   □ Always

   Other times?
   □ Never
   □ Rarely
   □ Sometimes
   □ Most Times
   □ Always

16. Have you ever text messaged while driving? □ Yes □ No

17. How often do you use text messaging feature?
   □ Never
   □ Rarely
   □ Sometimes
   □ Most Times
   □ Always
DRIVING HABIT QUESTIONNAIRE (for Parents) CONT'D

18. Do you have your own personal digital assistant (PDA) (for example a Palm Pilot or another brand)?
   □ Yes  □ No

TRAFFIC SAFETY ISSUES

How often do you?

19. Drive through a light that was already red before you reached it
   □ Never  □ Rarely  □ Sometimes  □ Most times  □ Always

20. Drive 10 mph higher than the speed limit
   □ Never  □ Rarely  □ Sometimes  □ Most times  □ Always

21. Drive 20 mph higher than the speed limit
   □ Never  □ Rarely  □ Sometimes  □ Most times  □ Always

22. Enter an intersection as the light turns yellow
   □ Never  □ Rarely  □ Sometimes  □ Most times  □ Always

23. Come to a rolling stop at a stop sign
   □ Never  □ Rarely  □ Sometimes  □ Most times  □ Always

24. Cross the railroad tracks when the red lights are blinking
   □ Never  □ Rarely  □ Sometimes  □ Most times  □ Always

25. Wear a Seat Belt
   □ Never  □ Rarely  □ Sometimes  □ Most times  □ Always

26. Talk on a cell phone while driving?
   □ Never  □ Rarely  □ Sometimes  □ Most times  □ Always

27. Use a Personal Digital Assistant (e.g. Palm Pilot) while driving?
   □ Never  □ Rarely  □ Sometimes  □ Most times  □ Always

28. Use the text message feature on your phone while driving?
   □ Never  □ Rarely  □ Sometimes  □ Most times  □ Always

29. Wear headphones for listening to music while driving?
   □ Never  □ Rarely  □ Sometimes  □ Most times  □ Always
What is the importance of these safety issues?

30. Speeding
   □ Not Important □ Little Importance □ Fairly Important □ Very Important

31. Drunk Driving
   □ Not Important □ Little Importance □ Fairly Important □ Very Important

32. Red light running
   □ Not Important □ Little Importance □ Fairly Important □ Very Important

33. Aggressive driving
   □ Not Important □ Little Importance □ Fairly Important □ Very Important

34. Poor road signs
   □ Not Important □ Little Importance □ Fairly Important □ Very Important

35. Driving ability of older drivers (over the age of 75)
   □ Not Important □ Little Importance □ Fairly Important □ Very Important

36. Driving ability of younger drivers (under the age of 18)
   □ Not Important □ Little Importance □ Fairly Important □ Very Important

37. In-vehicle distractions during driving (for example, cell phone use)
   □ Not Important □ Little Importance □ Fairly Important □ Very Important

DRIVER EDUCATION

38. How satisfied with the driver education process that your child went through are you?
   □ Very Dissatisfied
   □ Somewhat Dissatisfied
   □ Satisfied
   □ Very Satisfied

39. Who do you believe has had the most influence on the way your child drives?
   □ Me
   □ My child’s other parent
   □ My child’s classmates
   □ My child’s siblings
   □ My child’s driving instructor
   □ Other _______________
40. What specific problems, concerns, or issues do you have concerning the driver education and licensing process in Texas?

41. Are there any laws or rules concerning teen driving that you would like to see changed?

42. Are you aware there are special restrictions placed on newly licensed drivers under 18 in Texas (Texas Graduated Licensing laws)? □ Yes □ No

If so, how do you feel about Texas Graduated Licensing laws? Do you think they are effective?

43. Do you have any special rules that you impose on your child concerning driving activities? (For example, only certain roadway types, times of day, cell phone use)

44. Do you have any special rules that you parents impose on your child concerning driving privileges? (For example, maintain certain grades, household chores, adherence to other family rules)
45. Do you think you are better at multi-tasking than your child that is here with you today? (For example, driving while speaking on the cell phone)

46. If you use a cell phone, even occasionally, place an “X” in the column to indicate your behavior in each traffic situation. It is okay to mark more than one column.

<table>
<thead>
<tr>
<th></th>
<th>Not make a call</th>
<th>Pause a current call</th>
<th>End a current call</th>
<th>Not answer a ringing phone</th>
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</thead>
<tbody>
<tr>
<td>On a freeway on-ramp</td>
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<tr>
<td>During rain</td>
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<td>In bumper-to-bumper traffic</td>
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<tr>
<td>On a high-speed freeway</td>
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<tr>
<td>On local streets with stop signs and lights</td>
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<tr>
<td>While driving with passengers in the vehicle</td>
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<td>While driving in a parking lot</td>
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<tr>
<td>While driving at night</td>
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</tbody>
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APPENDIX D: RESULTS OF SURVEY

SURVEY DATA

Post-Driving Simulator Questionnaire

Comparison of Simulator Driving Experience to on-Road

Subject Performance Perception

Unpleasantness During Driving Experience