

TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): Iowa DOT

INSTRUCTIONS:

Project Managers and/or research project investigators should complete a quarterly progress report for each calendar quarter during which the projects are active. Please provide a project schedule status of the research activities tied to each task that is defined in the proposal; a percentage completion of each task; a concise discussion (2 or 3 sentences) of the current status, including accomplishments and problems encountered, if any. List all tasks, even if no work was done during this period.

Transportation Pooled Fund Program Project # <i>(i.e., SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX))</i> <p style="text-align: center;">TPF-5(207)</p>	Transportation Pooled Fund Program - Report Period: <input type="checkbox"/> Quarter 1 (January 1 – March 31), 2013 <input checked="" type="checkbox"/> Quarter 2 (April 1 – June 30) <input type="checkbox"/> Quarter 3 (July 1 – September 30) <input type="checkbox"/> Quarter 4 (October 1 – December 31)	
Project Title: The use of video feedback in novice 14½ year-old drivers: the million-mile study		
Name of Project Manager(s): Daniel V. McGehee	Phone Number: 319-335-6819	E-Mail daniel-mcgehee@uiowa.edu
Lead Agency Project ID: RT 1007	Other Project ID (i.e., contract #):	Project Start Date: 04/01/2009
Original Project End Date: 03/31/2013	Current Project End Date: 7/31/2013	Number of Extensions: 1, with expanded scope

Project schedule status:

On schedule
 On revised schedule
 Ahead of schedule
 Behind schedule

Overall Project Statistics:

Total Project Budget	Total Cost to Date for Project	Percentage of Work Completed to Date
\$200,000		99%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date

Project Description:

This study is the third in a series of studies investigating the effect of providing newly-licensed teen drivers with video-based feedback. Video clips are captured by a DriveCam event recorder when the system is triggered by abrupt braking, accelerator steering. During the feedback phase of the study, a weekly report is sent to the teen's parent(s). The report includes descriptions and videos of the events recorded for their teen during the previous week, how often their teen and his/her passengers were wearing seat belts, and a graph showing how the number of events for their teen compares to his or her. In addition, the event recorder provides immediate feedback to the teen in the form of a flashing light when it has been triggered. The first two studies investigating this kind of feedback, with cohorts of teen drivers from both rural Iowa and suburban Minneapolis, showed promising results. Teen drivers with a high incidence of safety-relevant events in the first 8 weeks of study before feedback began experienced an 89% and 64% reduction (rural and suburban, respectively) in the number of the events with feedback.

Objective Part 1:

The objective of the current study is to examine how age and experience interact with providing video feedback. This study involves three groups of teen drivers (30 participants in each group):

(1) Teens age 14.5-15.5 with a school license

(2) Teens age 16 who have an intermediate license and never held a school license

(3) Teens age 16 who have an intermediate license and previously drove with a school license for at least 4 months.

Half the participants in each group will receive feedback beginning with the 5th week of the study. The other half is a control group (driving as they normally would) and does not receive any feedback. This allows us to compare the effect of the feedback to the natural maturation of new drivers as they gain driving experience.

This quarter:**Objective Part 2: Prevalence and Distribution of Distraction Errors**

Analyze the naturalistic driving data of newly licensed teen drivers to determine the types of distractions that are most often present in the vehicle. In addition, we examined whether certain distractions are associated with specific types of driving errors and whether more serious events are associated with specific distractions.

Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):

Conducted coding of distraction events and analyze results. DRAFT results here:

For this analysis, particular attention was paid to the coding of driver-related factors such as distraction, when present. All safety-relevant events for the 30 drivers were re-examined to ensure that distraction coding was comprehensive and consistent. Distractions were only coded if they occurred during the eight seconds prior to the event trigger. This was done in order to exclude any distractions that might have been caused by the trigger itself. Up to three distractions could be coded for each event. Table 2 shows all main categories of distraction coded for this study. Each category is broken down into the individual distractions that it is comprised of. Definitions aided the analysts in determining when it was to be coded.

Table 2. Distraction Codes and Definitions

Cognitive Distractions	
Looked but did not see/inattentive	Driver appears to be looking at the roadway but has a delayed response or no response at all to the hazard or situation ahead; driver seems surprised or states that they were unaware.
Reading	Driver is reading papers, a magazine, book or map. If reading information from a phone or mp3, code as phone or mp3.

Talking/singing to themselves	Driver is talking or singing to themselves, regardless of the volume. Humming or whistling is also coded.
Dancing to the radio	Driver is moving a part of their body along with the music
Route planning	Driver is talking aloud or with passenger regarding a route or maneuver they will need to take
Listening to headphones	Driver is wearing headphones/earbuds
Upset emotionally	Driver is obviously emotionally upset (e.g., crying, angry yelling)
Passengers	
Teen in adjacent front seat	Front seated teen passenger is distracting in some way (see Table 3 for passenger distraction coding)
Teen in rear seat	Rear seated teen passenger is distracting in some way (see Table 3 for passenger distraction coding)
Adult in adjacent front seat	Front seated adult passenger is distracting in some way (see Table 3 for passenger distraction coding)
Adult in rear seat	Rear seated adult passenger is distracting in some way (see Table 3 for passenger distraction coding)
Child in adjacent front seat	Front seated child passenger is distracting in some way (see Table 3 for passenger distraction coding)
Child in rear seat	Rear seated child passenger is distracting in some way (see Table 3 for passenger distraction coding)
Object/Animal/Insect	
Moving object in vehicle	An object that moves suddenly inside the vehicle and gains the attention of the driver
Insect in vehicle	An insect flying around in the cabin of the vehicle that gains the attention of the driver
Pet in vehicle	Any interaction with a pet inside the vehicle
Object dropped by driver	Driver drops an object inside the vehicle and their attention is directed toward the object
Reaching for object (not cell)	The driver is attempting to locate/reach for an object inside the vehicle
Cell Phone	
Talking/listening	Driver is engaged in a cell phone conversation
Cell phone use	Driver is scrolling, dialing, operating the cell phone in some way
Hands free cell phone use	Driver is operating a hands-free cell phone
Locating/reaching for/putting away	Driver is reaching for the cell phone
Texting	Driver is reading/writing texts
PDA/MP3/iPod	
Viewing PDA	Driver is looking at the PDA
Operating PDA	Driver is using the PDA
Locating/reaching PDA	Driver is reaching for PDA
In-Vehicle Systems	
Adjusting climate controls	Driver is reaching for/adjusting the HVAC system
Adjusting radio/music	Driver is reaching for/adjusting the radio, CD track or MP3 iPod that is located on the center console where the radio is
Inserting/retrieving CD	Driver is reaching for/looking for a CD and inserting it into the player
Adjusting other device (unknown)	Driver is adjusting another in-vehicle device (sunroof, seat, windows, etc.)
External	
Looking at an external incident	Driver is looking outside the vehicle at some type of traffic incident/collision
Pedestrians located outside the vehicle	Driver is looking at/engaging with a person located outside the vehicle (not a construction worker). The person is not inside of another vehicle.
Animal located outside the vehicle	Driver is looking at an animal that is outside the vehicle and may or may not pose a safety hazard
Object located outside the vehicle	Driver is looking at something located outside the vehicle, most likely on the side of the roadway

Another vehicle	Driver is distracted by another vehicle or persons inside another vehicle. The vehicle can be driving or parked and contain passengers or not.
Construction	Driver is distracted by construction zone, worker, or equipment alongside the roadway
Dining	
Eating with a utensil	Driver is eating food with a utensil
Eating without a utensil	Driver is eating food without a utensil
Drinking from a covered container	Driver is drinking thru a straw or from a covered container
Drinking from uncovered container	Driver is drinking from an open cup
Reaching for/putting away food or drink	Driver is reaching for or putting away food or drink
Personal Hygiene	
Combing/brushing/fixing hair	Driver is grooming or styling hair. Driver may or may not be looking in a mirror. Habitual hair twirling or brushing hair out of eyes was not coded.
Applying makeup	Driver is applying makeup with or without the use of a mirror
Shaving	Driver is shaving with or without the use of a mirror
Brushing/flossing teeth	Driver is brushing/flossing teeth/ using toothpick
Biting/picking nails	Driver is biting or picking at nails with or without looking at their hands
Removing/adjusting jewelry, sunglasses, hat, or clothing	Driver is removing or adjusting jewelry, sunglasses, hat or clothing
Removing/inserting contacts	Driver is removing or inserting contacts
Looking in the vanity or rearview mirror at themselves	Driver looks at themselves in the rearview or vanity mirror
Other	Driver is cleaning/adjusting/altering or removing something on their person
Inattention to Roadway	
Looking out left window	Driver is observing traffic out the left window
Looking at left mirror	Driver is observing traffic in the left mirror
Looking in rearview mirror	Driver is observing traffic in the rear view mirror
Looking at right mirror	Driver is observing traffic in the right mirror
Looking out passenger window	Driver is observing traffic out the passenger side window
Looking down inside the vehicle	Driver is looking down inside the vehicle.
Looking at event recorder	Driver looks directly at the event recorder
Looking in back seat	Driver looks in the back seat
Looking over shoulder	Driver looks over their shoulder, blind spot
Unknown	Not able to tell where the driver is looking

In addition to coding the presence of a distracting passenger, it seemed important to indicate the type of behavior the passenger was engaging in that was distracting. We adapted the coding used by Heck and Carlos (2008), in which additional details surrounding the distracting behavior of passengers was coded. Table 3 shows the passenger distractions that were coded for this study.

Table 3. Passenger distractions coded.

Passenger Distractions	
The driver is involved in a conversation with a passenger	This is coded when the passenger is talking to driver <u>or</u> driver is talking to a passenger. Includes laughing with each other
Passenger is angry/emotional	The passenger is yelling at the driver or another passenger. The passenger is crying or upset.
Passenger is being noisy	The passenger is singing, yelling, whistling
Passenger is moving around inside the vehicle	The passenger is switching seats, wrestling with another passenger, dancing.
Passenger messes with the vehicle	The passenger changes the radio station,

controls	temperature controls or music volume.
Passenger diverts the drivers attention from driving	The passenger is giving the driver directions or showing the driver something
Passenger is on phone	Passenger is involved in a cell phone conversation
Passenger is texting	Passenger is texting
Passenger has a mishap	Passenger spills, drops something or accidentally hits a vehicle control
Passenger is purposely distracting driver	Passenger is poking, tickling, grabbing or hitting the driver

Data Analysis

Data analyses were completed on the safety-relevant events described above (good responses were not included in the analysis). Safety-relevant events were comprised of true triggers (i.e., incidents, near-crashes, and crashes), as well as invalid triggers where safety concerns were present. It should be noted that true triggers were less likely to be affected by characteristics of the driving environment, while invalid triggers were directly related to the prevalence of things like rough roads. However, both cases provided a window into driving behavior and captured potential safety-related events. Therefore, invalid triggers that contained safety-relevant behaviors were included in the analyses of safety-relevant events.

Descriptive statistics were done in order to determine the frequency and types of distractions present in the vehicles. Prevalence of distractions by gender type was also examined for the top three most common distractions. In addition, distractions present during the most serious of events, near crashes and crashes, were also explored.

Anticipated work next quarter:

Finalize the results and report.

Significant Results:

RESULTS

RESULTS

A total of 2726 safety-relevant events were captured for the 30-16 year-old teens in the control group. Out of these events, nearly 50% had some type of distraction present during the eight seconds prior to the trigger. More than 75% of the time there was a single distraction present. However, some events had multiple distractions occurring either simultaneously or concurrently during the eight seconds prior to the event trigger. For the 1,412 events in which a distraction was present, 1,770 distractions were coded. Table 4 summarizes the percent of events that had no, one, two or three or more distractions.

Table 4. Summary of Number of Distractions Detected

Number of distractions	Number of Events	Percent of Total Events
None	1314	48%
One	1089	40%
Two	288	11%
Three or more	35	1%

Figure 3 shows the percent of events containing distractions by gender. Results indicated that females were more likely than males to have distractions present during their events (58% vs. 45% of events). When distraction was present during female driving events, 79% had a single distraction, 19% had two distractions and 2% had three or more distractions during a single event. For male drivers, when distraction was coded, 75% of the time there was a single distraction, 23% there were two and 3% had three or more distractions coded.

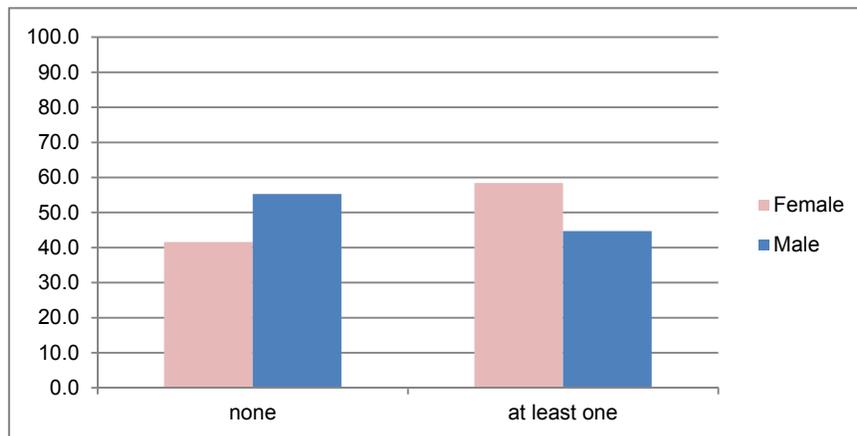


Figure 3. Number of Distractions by Gender

An analysis of all 1770 distractions found that 45% were a front or rear-seated teen passenger, 29% were cognitive distractions, and 8% were distractions related to cell phone use. The other 18% of distractions were: external (5%), use of in-vehicle systems (3%), personal hygiene (3%), passengers (other than teens) (1%), dining (2%) inattention to the roadway (2%), object/animal/insect (1%) and other devices (PDA, mp3, iPod) (1%). The breakdown can be seen

below in Figure 4.

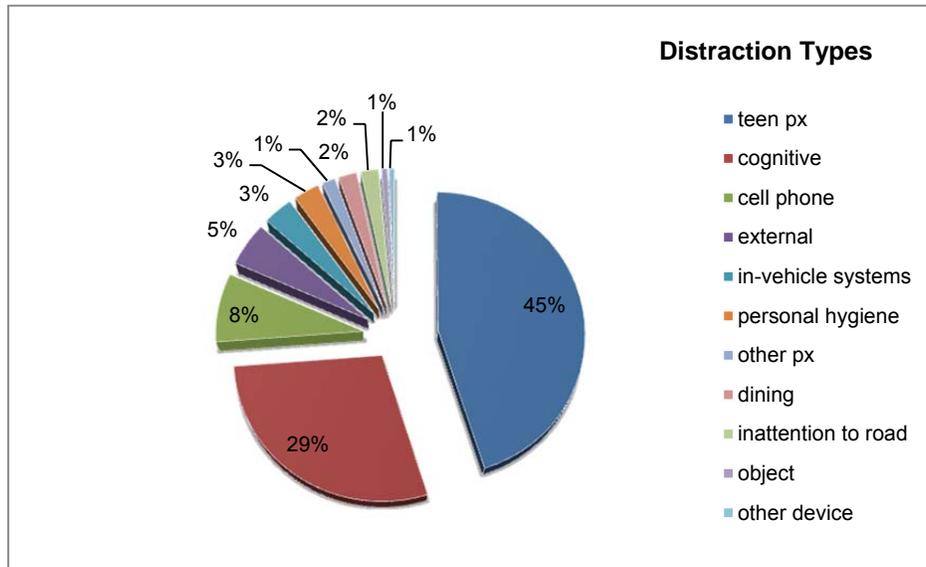


Figure 4. Breakdown of distractions by types

Cell phone was the third most often coded distraction type, with 8% of all distractions coded being related to cell phone usage. Eighty-three percent of the cell phone distractions occurred when females were driving compared to 17% for males. When cell phone use was broken down, 34% of the time drivers were talking or listening, 22% of the time drivers were dialing, 5% of the time they were reaching for/putting away the phone and 45% of the time they were engaged in texting. Females were only slightly more likely than males (36% vs 30%) to be engaged in cell phone use (talking, listening, or dialing). However, females were more than seven times more likely to be engaged in texting than males (30% vs 4%).

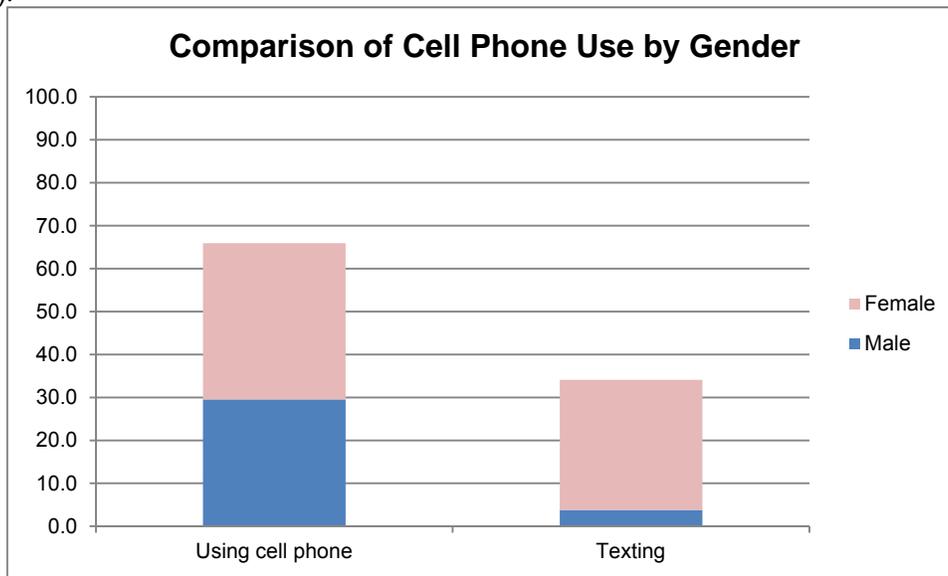


Figure 5. Cell phone use comparison by gender

Cognitive distractions were the second most frequent type of distraction, with 29% of all distractions being coded as such. Two-thirds of all cognitive distractions occurred when females were driving. When cognitive distractions were broken down, singing or talking to oneself accounted for 82% of these distractions. Females were almost twice as likely to be distracted by singing/talking to themselves as males (53% vs 28%).

Cognitive Distractions

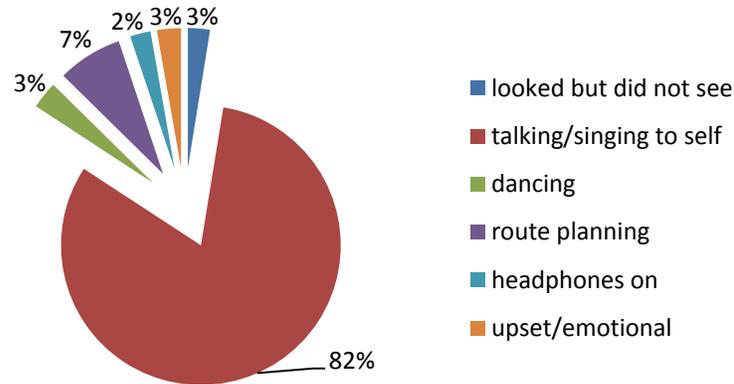


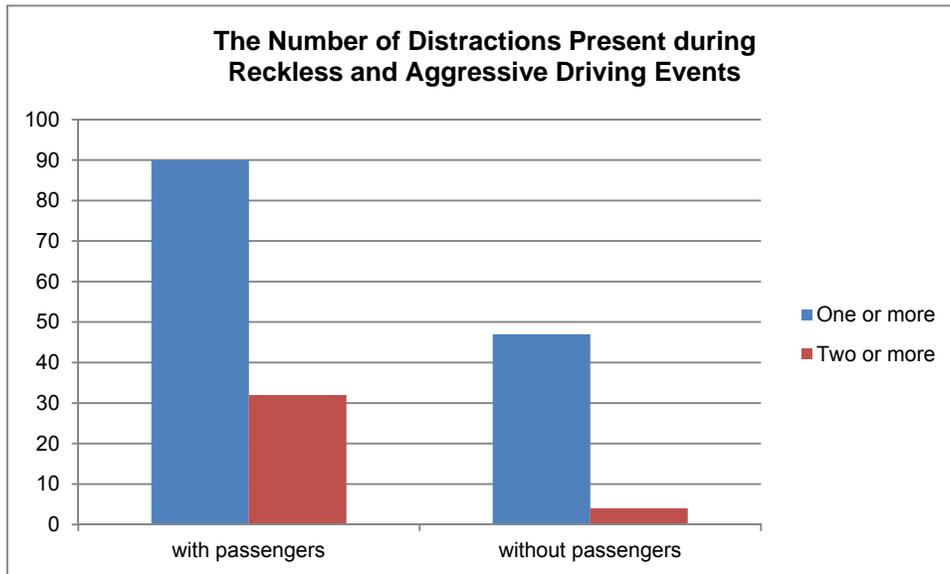
Figure 6. Breakdown of cognitive distractions

Teen passengers were present in 947 of the 2726 total events. That is slightly more than a third of the events. When male teens had passengers present, 60% of the time there was only one, 23% of the time they had two, and 17% of the time they had three or more. For female drivers with teens present, 66% had a single passenger, 19% had two and 15% had three or more.

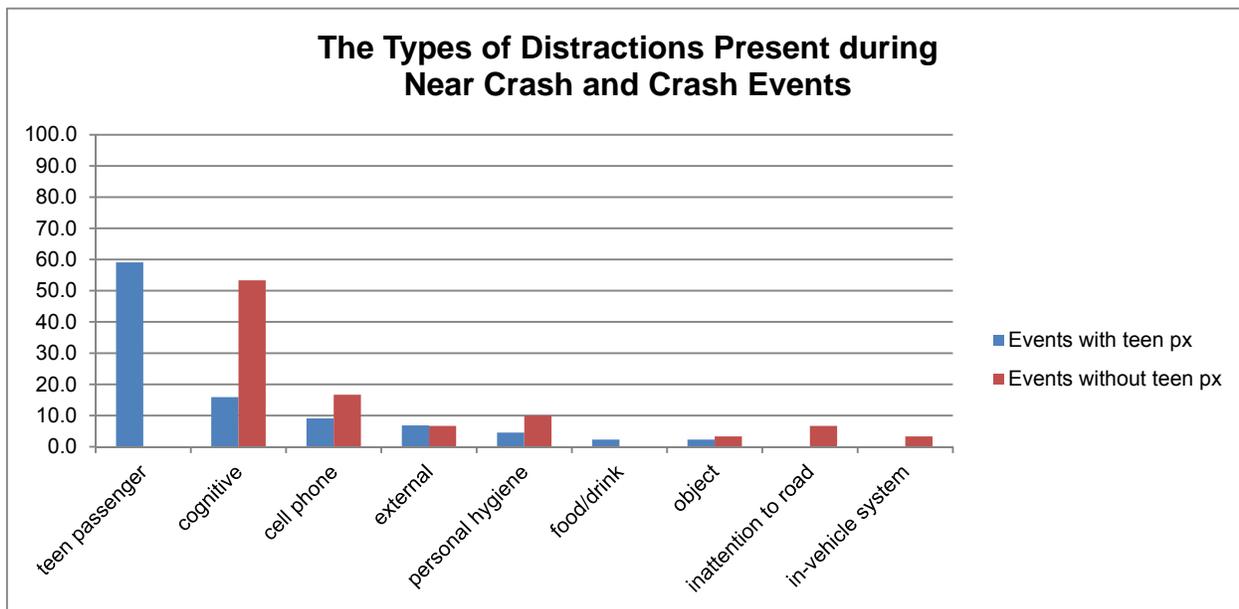
Of the 947 events in which teen passengers were present, 709 had the front or rear passenger coded as being a distraction. That means that 75% of the time, when passengers were present in the vehicle, they were involved in some type of activity that could have been distracting to the driver. When driver gender was examined there was little difference in the percent of events containing passenger distraction, 49% for males and 51% for females.

When a single teen passenger was present, 69% of the time teen passenger distraction was coded. Nearly 75% of these distractions were coded as conversation between that passenger and the driver. As the number of passengers increased, the percent of events passenger distraction was coded for increased as well; to 83% for two teen passengers and 85% for three or more passengers. The types of distracting activities that passengers were engaging in included; making loud noises, texting, giving directions or showing driver something. These four categories made up more than 90% of the types of passenger distractions coded. Interestingly, as the number of passengers increased in the vehicle, the percent of events with passengers texting decreased, while the percent of events with passengers making loud noises increased. In fact, the percent of events with passengers “yelling, screaming or singing” was 2.5 times greater when there were 3 or more passengers present in the vehicle than when there was only one.

There were 347 events that were coded as aggressive or reckless driving. About half (53%) of those events had teen passengers present. Of those, 90% had some form of distraction coded, with the distraction being a teen passenger 66% of the time. Of the other aggressive or reckless events, for which no teen passengers were present, only 47% had a distraction coded, with the most frequently coded distractions being singing/talking to themselves (29%), cell phone (23%) and another vehicle or driver (19%).



There were 93 events that captured a near crash or crash. About one-third (38%) of those events had teen passengers present. Of those, 91% had some form of distraction coded, with the distraction being a teen passenger nearly 60% of the time. The type of distraction coded for the passenger was simply “having a conversation” almost 70% of the time. For the near crashes and crashes with no teen passengers present, only 45% had a distraction coded, with over half being coded as singing/talking to themselves (53%).



CONCLUSIONS

The teen drivers in the study had a distraction present in nearly half of the events that were captured. While a lot of attention has been given to the distractions associated with technology in the vehicle (cell phones, navigation devices, entertainment systems, etc), the most frequent type of distraction coded was the presence of other teen passengers engaging in conversation (45 percent). Cognitive distractions, such as singing along with the radio, were the second most common distraction present. Third most common, detected in only 10% of the events containing distraction, was cell phone use.

Overall, females were slightly more likely than males to have distractions present during their events. 83% of the cell phone distractions and 66% of the cognitive distractions were coded when a female was driving. This gender difference was not seen, however, when examining passenger distraction.

When examining cell phone distraction, there was a clear gender divide when examining how cell phones were used. Females were just as likely as males to talk/listen or dial the cell phone but 7.5 times more likely to be seen texting.

Cognitive distractions are extremely difficult to code unless you concentrate on coding only what can be seen or heard. It is nearly impossible from watching a video to determine whether a driver is “inattentive”, “lost in thought” or “looked but did not see”. Unless there is something in the driving environment that requires a response by the driver, and that response is either late or does not occur, an analyst would have a difficult time determining the attentional state of a driver at any point in time. Therefore, for this particular study, the code “looked but did not see” was only used when the driver was late or neglected to respond to an impending situation **and** it was obvious, either from verbiage given by the driver or a look of great surprise on their face, that they had not been paying attention to the driving environment. Given the caveat discussed in the previous paragraph, the most frequently coded cognitive distraction was drivers singing/talking to themselves. Interestingly, females were almost twice as likely to have this type distraction present during their events.

When a teen passenger was present in the vehicle, 75% of the time they were engaging in some type of activity that was distracting to the driver. As the number of passengers present in the vehicle increased, the percent of events that had passenger distraction present increased as well. When only one passenger was present they were engaging in distracting activities during 69% of the events. However, when there were two or three teen passengers, the percent of events containing passenger distraction increased to 83% and 85% respectively. The type of distraction changed as the number of passengers increased as well, with the percent of events containing passengers “screaming, yelling, or singing” being 2.5 times greater when there were three or more passengers than when there was only one.

Circumstance affecting project or budget. (Please describe any challenges encountered or anticipated that might affect the completion of the project within the time, scope and fiscal constraints set forth in the agreement, along with recommended solutions to those problems).

None

Potential Implementation:

Technology interventions; Additional education in driver ed and public service; legislative changes