Cell phone essay

Contents

Also of importance, this data found that young drivers (16-24 years old) were most likely to be on their cell phones at 10 percent compared to six percent of those aged 2569 and one percent of drivers 70 and older (see Figure 1). Figure 1 Percentage of Drivers Talking on Hand-Held Phones 2000-2005 (SHISH, 2006). Public perception of the dangers of cell phone use while driving seems to coincide with common sense and experience, but common practice does not. In a survey done by Nationwide Insurance (SHISH, 2008), four out of five surveyed cell phone owners admitted to driving while distracted.

Even though almost half of the surveyed people consider cell phone use to be the most dangerous distraction, 98 percent of the drivers consider themselves to be safe drivers. An interesting result of the survey as that almost two-thirds of cell phone owners say they were expected by family, friends or employers to always be reachable by phone or other communication device. Among young drivers in this survey, 40 percent said they send or read text messages along with other activities while driving in order to “ remain connected” (SHISH, 2008).

Another survey of only teenage drivers conducted by State Farm Insurance, found that only 25 percent viewed cell phone use while driving as dangerous. Almost 80 percent, however, recognized that testing on cell phones while driving was risky (SHISH, 2008). The rate at which young drivers are most likely to be using cell phones while driving, along with their attitude towards

the perceived risk of using such devices, is concerning Decease tens group Is already at ten melanges rills Tort collisions even without these distractions.

A survey conducted by AAA and Seventeen magazine found that 46 percent of drivers 16 and 17 years old said that they text message while driving. This is a profound statistic because 37 percent of the same teenagers said that they believed that text messaging was the most dangerous driver distraction (Quaint, 2007).

2. Quantifying Cell Phone

Usage and Crash Risk Drivers' attentiveness has been a concern since the invention of the automobile. As technology increases, the number of driver distractions increases.

Each year, more than 42, 000 people are killed, more than 3 million are injured, and more than 6 million collisions occur on roads in the United States (SHISH, 2006). Estimates have attributed between 30-50 percent of collisions to distracted drivers, resulting in huge amount of societal cost (Cohen, 2003). Although common sense and experience tells us that using cell phones while driving is dangerous, a number of studies are voted to quantifying the exact risk associated with using a cell phone while driving.

Since the mid-sass, around 120 studies have attempted to validate a common conception: using a cell phone while driving is a distraction and therefore increases crash risk (SHISH, 2008). The literature on this subject investigates various relationships between cell phone use and accident risk. These studies can be separated into three general groups: epidemiological studies, experimental studies, and real-world studies. Epidemiological

studies examine real-world accident data and cell phone scores to draw conclusions based on the relationship between the two.

Behavioral and experimental studies attempt to measure some cognitive effect of cell phone use on normal driving functions such as visual attention, following distance, reaction time, and other driving tasks. Real-world studies attempt to show how real-world situations either Justify or disprove the other data. Before discussing selected studies, a summary of the general conclusions from each type of study is presented below: (a) Epidemiological Studies: Studies that analyze the relationship between cell phone SE and increased crash risk using case studies where people have been in actual accident.

Researchers have concluded that the use of cell phones while driving significantly increases the risk of collision (Ontario Medical Association, 2008). (b) Experimental and Behavioral Studies: These studies have been able to demonstrate that having a conversation on a cell phone is cognitively distracting and causes deterioration in driving performance. These studies also confirm the finding of the epidemiological studies that when driving performance is affected negatively, n increased crash risk is observed (Ontario Medical Association, 2008). C) Real-World Studies: These studies are observations of test subjects that are monitored while in the field. Conclusions are drawn based on the observed data and are a reflection of 2 actual events. The real-world studies have proven that the single most dangerous earlier Allocation Is cell phone use.

2. 1 Epidemiological Studies

Epidemiological studies have attempted to measure the association of cell phone use with the risk of collision. They examine accident data and cell phone records to obtain a correlation, resulting in a relationship between cell phone use and accident risk.

The following review focuses on three epidemiological studies that indicate cell phone use is associated with an increase risk of collision.

2. 1. 1 Cellular Phones and Traffic Accidents, 1996

In an early study in 1996, Violation and Marshall used a case-controlled design study where they selected 100 random drivers that had been involved in crashes in the previous two years and compared them against another group of 100 randomly selected drivers who had not been involved in crashes in the previous 10 years. The study concluded that using a cell phone for 50 minutes per month resulted in a collision risk 5. 9 times greater than not using a cell phone at all. In this study, the risk ratio is statistically significant, but the confidence limits were large. The obvious limitations of this study are: (1) small number of cell phone users in the sample; (2) selection bias; and (3) lack of evidence that the cell phone users were using their phones at the time of the collision.

2. 1. 2 Association between Cellular Telephone

Calls and Motor Vehicle Collisions, 1997 Redeliver and Diphtheria (1997) conducted he most quoted epidemiological study of cell phone use and increased crash risk in 1997.

This research was a case cross-over design, where each subject served as his/ her own control. The study included 699 drivers who had been involved in a collision and who owned cell phones. The authors used five-minute intervals of time before the time of the collision, and compared those against the same time on the previous day. The authors were able to conclude that the risk of collision was approximately four times higher than when the same subjects were not using their cell phones. The only significant limitation to this study is that collision times are estimated.

There exists the possibility that cell phone use was a post-collision call instead of a pre- collision call. The authors made a conscious effort to eliminate calls that were precipitated by the collision by identifying 9-1-1 calls and through thorough questioning of the drivers.

2. 1. 3 Wireless Telephones and the Risk of Road

Accidents, 2001 Labeler and Andean conducted an epidemiological study in Quebec in 2001. This study was based on a self-reported questionnaire from a sample of 36, 079 artisans, of which 35 percent had records with cellular telephone providers. Taking into account only age and year of observation, cell phone users had a 38 percent higher risk of collisions than non-users. Including additional constraints, such as miles driven and driving habits increased the relative risk by 11 percent for males and 21 percent for females. The authors also applied the case cross-over design used by Redeliver and Diphtheria to their data. This method produced a relative risk of being in a crash while using a cell phone at 5. 13 times that of a non- user. However, the authors concluded that this case cross-over design over-

estimates the risk, and determined that a more realistic risk of collision is around 1. 3-1. 4 times that of a non-user.

2. 2 Experimental Ana Ventrally studies

The majority of the literature reports on experimental and behavior studies examine the impact of cell phone use on the cognitive functions necessary for driving. Many of the experimental studies have correlated how cell phone use, including hands-free devices, while driving interferes with or degrades various aspects of driving. Because of the quantity of experimental and behavioral studies, only representative research is reviewed in the following four categories: (1) Field-of-View Studies; (2) Brain Research Studies; (3) Simulator Studies; and (4) Benchmark Impairment Studies.

2. 2. 1 Field of View Studies

In 2003, Strategy's research group at the University of Utah found that drivers who use cell phones are less able to process visual information. Based on the observations of participants in a simulator, the study was able to conclude that drivers conversing on cell phones increase their risk of collisions. The researchers attributed the increase in collision risk to a theory called " Inattention Blindness". Inattention Blindness is summarized to be, " Even when participants [drivers] are directing their gaze at objects in the driving environment, they may fail to ' see' them because attention is directed elsewhere. " The study also found that the use of hands-free and hand-held cell phones equally impair the driver's ability to see objects.

The study found that " the disruptive effects of cell phone conversations on driving are due in a large part to the diversion of attention from driving to the phone conversation. This diversion of attention also affects the driver's

ability to react to sudden event placing distances and others at increased risk for injury (Strayed, 2003). In 2005, researchers from the Japanese Automobile Research Institute further examined the findings from the University of Utah report. The authors of this report agreed with the conclusions of the earlier report, but felt that a more direct assessment of the visual attention needed to be done to identify the exact amount of diversion from what the driver is looking at to the cell phone conversation.

The authors conducted experiments with drivers on a simulator using the medically known physiological response " Binocular Fusion". The results of this study show that, " engaging in hands-free phone conversation interferes with visual information processing. The increment of binocular gaze dissociation by conversing on a phone indicates that the driver's attention is diverted from the external scenery to the conversation. The purpose of the report was not necessarily to prove that speaking on a cell phone increases crash risk, but this relationship is inferred by the authors (Echidna, 2005). Figure 2 is extracted from Wood's field-of-view study in 2006 that obtained similar results as the studies mentioned above. It demonstrates the umber of errors drivers made while listening and responding to questions went up dramatically when compared against no distractions. 4 Figure 2 Number of Errors for Various Distraction Situations (Source: Wood, 2006)

2. 2. 2 Brain Research studies

A 2005 Study by GM Corp.. Wayne State University Medical School, and Henry Ford Hospital set a foundation for understanding how cell phone use by a driver influences the brain function. This study used Functional Magnetic Resonance Imaging (fem.) and Magnetoencephalography (MEG) to

locate essential brain activated structures and their corresponding dynamics. As discussed above, field-of- view studies generally depend on behavior observations to determine if the mind is focused on the road and thus fail to completely reflect what the brain may actually be doing.

The authors suggest that there are situations where behavioral indicators will show that the mind is on the road, but in reality, it is not. With this understanding, the authors set out to uncover the exact neural mechanisms that are associated with distracted behaviors while driving. Putting participants in a simulator and monitoring their brain function, the authors were able to identify the major brain pathways involved in driving and distracted driving.

This study set a foundation for determining and measuring how the brain reacts to distracted driving (Young, 2005). In 2007, researchers at Carnegie Mellon University conducted a study furthering the previous study by using Functional Magnetic Resonance Imaging (fem.) to investigate the impact of concurrent auditory language comprehension on the brain activity when simultaneously exposed to a simulated driving experience. Participants operated a driving simulator, either undisturbed or while listening to statements they had to identify as true or false.

This auditory language comprehension was designed to mimic talking on a cell phone. The participant’s brain activity was monitored during the simulations and was compared against the fem. scans of the undisturbed driver’s brain. The authors found that when participants experienced the dual-task condition, mental resources were taken away from areas of the

brain that deal with driving tasks (see Figure 3). This occurred even though the areas of the brain that deal with driving tasks and auditory comprehension are different.

The authors were able to make two conclusion based on their experimental data: (1) mental resources re diverted from driving tasks to 5 auditory comprehension regardless of other physical tasks; and (2) the deterioration of driving performance occurs because of a competition of mental resources in the brain between driving tasks and auditory comprehension Oust, 2008). Figure 3 Percentage Change in Signal Intensity for Five Functional Groupings of Cortical Areas (Source: Just, 2008) Spatial processing areas significantly decrease with the addition of the sentence listening task.

2. 2. 3 Simulator Studies

In 2001, Strategy's research group at the University of Utah submitted test subjects to efferent levels of distractions while driving in a simulator. The researchers were able to conclude that cellular phone conversations while driving caused the subjects to react slower to stimuli and perform tasks with considerably reduced precision. Specifically, while engaged in cell phone conversations the subjects were twice as Kelly to mils simulated tramcar slogans compared to when teen were not Lacerates.

These results were also qualified by showing that talking on a cell phone was more dangerous than when the driver was subjected to common in-vehicle distractions, such as the radio and books-on-tape. The researchers also wanted to determine if the reason the subjects missed the traffic signals was because they did not see them or because they were slow to respond to

them. To determine this, the researchers examined the memory of the subjects after normal driving as well as distracted driving. The results indicated clear memory impairment after having been engaged in cell phone conversations.

The researchers were able to conclude that active participation in a cell phone conversation while driving disrupted driving performance by diverting attention from driving tasks to a cognitive process. In a 2002 observational study by the Insurance Corporation of British Columbia, researchers used a complex method of identifying specific cell phone users and non- users through in-field observations, and linking these people with their driving records. This method presents some obvious limitations or uncertainty about the user classification; however, the results corresponded well with other identifying methods.

The driving records of the cell phone users had higher counts of moving violation citations over the previous four years, to include speeding, alcohol, failure to SE seat belts, aggressive driving violations, and non-moving violations. Although the correlation between these violations and use of a cell phone is not scientifically proven by this study, it does likely reflect a difference in lifestyle, attitude 6 and personality of the typical cell phone users; indicating they are inherently riskier drivers (Wilson, 2003). These simulator studies are consistent with a self-report survey conducted by the Traffic Injury Research Foundation.

The authors of this report determined that people who use cell phones while driving were more likely to have received a traffic ticket in he last year, drive

after drinking, and to consume greater quantities of alcohol when they drink. Again, these behavioral indicators cannot necessarily be directly linked to cell phone use; rather, they suggest a personality type who frequently uses a cell phone while driving (Fairness, 2002).

2. 2. 4 Benchmark Impairment Studies

Innumerable studies have been able to prove the correlation between cell phone use while driving and an increased risk of crashing when compared to normal driving.

What these studies have failed to do is show a comparison to known impairment levels. There have been at least three studies that compare the cell phone driver to a drunk driver at the per-SE blood-alcohol concentration limit of 0. 08 wet/Volvo. This blood alcohol concentration has been thoroughly studied and quantified as the limit at which the average driver will become incapable of safely operating a motor vehicle. Comparing the cell phone driver to a benchmark of this caliber becomes a solid comparison and explanation to how dangerous driving while on a cell phone really is.

In a 2002 study by Burns et al. , the authors designed a study to compare the impairment from handshake and hand-held phone conversations to the decline in rolling performance caused Day alcohol Impalement. Participants were given letter an alcoholic beverage or a placebo drink and placed in front of a driving simulator that represented realistic driving tasks. The quantity of alcohol was determined from the participant’s age and body mass, and was closely correlated with the legal limit of . 08 MGM/ml blood alcohol concentration.

The results of this experiment showed a clear substantial decrease in driving performance when using a hand-held phone, in comparison to the sober condition. Driving performance under the influence of alcohol was significantly worse than normal driving, but better than driving while using a phone, leading to a conclusion that driving while talking on a phone is more impairing then driving at the legal limit of alcohol. Strategy’s research group at the University of Utah published research comparing the cell phone driver and the drunk driver in 2003, and a revised report in 2006.

The purpose of their research was to provide a direct comparison of the driving performance of a cell phone driver and an alcohol impaired driver in a controlled laboratory setting. These researchers used participants who were casual drinkers and compared their own sober driving, cell phone driving, and alcohol-impaired driving to themselves. This method of control seems to be more accurate than the previous studies’ process of comparing the same situations in different subjects. The researchers were able to conclude that both the intoxicated driver and the cell phone drivers’ driving profiles were different from the sober base-line.

Cell phone drivers exhibited a delay in their response to events, had longer following distances, took longer to recover lost speed following braking, and were involved in more traffic accidents. Drivers in the intoxicated condition exhibited a more aggressive driving profile by following closer to the vehicle in front of them and braking harder. The researchers suggest the data indicates impairment or risk from cell phone use is as great as that of the intoxicated driver, but in different ways.

The authors also noted that driving impairments associated with hands-free devices and hand-held devices were not significantly different, indicating that the impairment comes from a diversion of attention from the processing of normal driving tasks. 7 2. 3 Real-World Studies Several real-world studies have been conducted and are being conducted to further validate the epidemiological and experimental studies. Our review indicates that the majority of these studies are funded in part by insurance companies or makers of driving performance enhancers.

The most commonly cited real-world study involved 100 cars and 42, 000 hours of driving time monitored by in-vehicle cameras and sensors over a one-year period. The study was conducted by the Virginia Tech Transportation Institute in 2006, and concluded that, " secondary task distractions" were the prime factor in collisions. The single biggest distraction leading to collisions was cell phone conversations, dialing, and sending text messages. The Virginia Tech Transportation Institute is conducting another study that involves 2500 drivers and will last three years (Bundle).

We have been able to identify several other current real-world studies that are underway. The studies are funded primarily by insurance companies, Ana we nave Eden unaDle to totals any International tout teen Owe to proprietary reasons (Olson, 2007; Robinson, 2008). 2. 4 Police Accident Reports Since the studies prove the hypothesis that cell phone use while driving increases rash risk, quantitative analysis of crash causation data should reflect this. This, however, is not the case. The reasons that the real-world data does not

match the experimental and epidemiological conclusions are due primarily to two factors.

First, three states in 2001 and six states in 2002 provided a specific space on their uniform crash reports to indicate that the use of a cell phone had been involved in the collision. In addition, even with a space available on a police report to record cell phone involvement, the box may or may not be marked. The investigating officer has ultimate responsibilities at an accident scene, including tending to injured, restoring traffic flow, completing the investigation, and issuing citations for criminal violations.

Officer discretion plays a part in the completion of police reports; even if evidence of cell phone use is present, the officer may or may not indicate that cell phone use was a factor in the collision. A NATHAN study of North Carolina supports this analysis. The study concluded that the underreporting of crashes that are a result of inattention due to cell phone use is substantial.

The portion of crashes that were reported to be u to inattention because of cell phone use was 1. percent which is significantly below the estimated value obtained in more comprehensive studies of 3050 percent (Cohen, 2003). Second, even if the collection of this data is a requirement for every state, it would likely still be inaccurate because of the publics reluctance to report cell phone use to police. Because the risks of using cell phones while driving are becoming commonly known and more states are adopting laws to outlaw the use of cell phones while driving, the likelihood that an offender admit to using a cell phone to a police officer becomes less.

In addition, a police officer’s reasonable investigation time does not allow for a comprehensive investigation of every crash to include determining the use of cell phones. This is more likely to be reserved for very serious crashes where serious injury and or loss of life were present. To help address the underreporting of crashes that are due to cell phone use, several federal agencies, national organizations, and state and local governments have worked to improve the data collection.

In 2003, the national Governors’ Highway Safety Association released a revised edition of the Model Minimum Uniform Crash Criteria (MUCH), which included changes that would help record the number of crashes associated with distracted driving. The changes, which were developed with the help of 8 MANTAS, the Federal Highway Administration, the Federal Motor Carrier Safety Administration, and numerous state and local agencies, define the information that should be collected at an accident scene. Included in the new criteria is that reports should include any information regarding distracted driving.