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RESEARCH REPORT

RP 251

Educating Idaho Teenage Drivers of the Dangers of Distracted Driving

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16. Abstract The objective of this research project efforts are: 1) to develop an interactive driver-distracted presentation that can be used at different high schools in Idaho to educate teenage drivers about the danger of distracted driving, 2) to test the effectiveness of developed interactive presentation in promoting safe driving among teenage drivers, 3) to identify the most effective short messages that can be implemented in CMS to influence driving behavior of teenage drivers in Idaho regarding distracted driving, 4) test the effectiveness of using CMS short messages to influence teenage drivers driving behavior, and 5) test the effectiveness of involving high school students in distracted-driving public campaigns in improving their awareness of the danger of distracted driving				
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METRIC (SI*) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
in	inches	25.4		mm
ft	feet	0.3048		m
yd	yards	0.914		m
mi	Miles (statute)	1.61		km
		AREA		
in^2	square inches	645.2	millimeters squared	cm^2
ft^2	square feet	0.0929	meters squared	m^2
yd^2	square yards	0.836	meters squared	m^2
mi^2	square miles	2.59	kilometers squared	km^2
ac	acres	0.4046	hectares	ha
		MASS (weight)		
oz	Ounces (avdp)	28.35	grams	g
lb	Pounds (avdp)	0.454	kilograms	kg
T	Short tons (2000 lb)	0.907	megagrams	mg
		VOLUME		
fl oz	fluid ounces (US)	29.57	milliliters	mL
gal	Gallons (liq)	3.785	liters	liters
ft^3	cubic feet	0.0283	meters cubed	m^3
yd^3	cubic yards	0.765	meters cubed	m^3

Note: Volumes greater than 1000 L shall be shown in m^3

Symbol	When You Know	Multiply By	To Find	Symbol
		TEMPERATURE (exact)		
^oF	Fahrenheit temperature	5/9 (^oF-32)	Celsius temperature	^oC
		ILLUMINATION		
fc	Foot-candles	10.76	lux	lx
fl	foot-lamberts	3.426	candela/m^2	cd/cm^2
		FORCE and PRESSURE or STRESS		
lbf	pound-force	4.45	newtons	N
psi	pound-force per square inch	6.89	kilopascals	kPa

APPROXIMATE CONVERSIONS FROM SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	Miles (statute)	mi
		AREA		
mm^2	millimeters squared	0.0016	square inches	in^2
m^2	meters squared	10.764	square feet	ft^2
km^2	kilometers squared	0.39	square miles	mi^2
ha	hectares (10,000 m^2)	2.471	acres	ac
		MASS (weight)		
g	grams	0.0353	Ounces (avdp)	oz
kg	kilograms	2.205	Pounds (avdp)	lb
mg	megagrams (1000 kg)	1.103	short tons	T
		VOLUME		
mL	milliliters	0.034	fluid ounces (US)	fl oz
liters	liters	0.264	Gallons (liq)	gal
m^3	meters cubed	35.315	cubic feet	ft^3
m^3	meters cubed	1.308	cubic yards	yd^3

Symbol	When You Know	Multiply By	To Find	Symbol
		TEMPERATURE (exact)		
^oC	Celsius temperature	9/5 ^oC+32	Fahrenheit temperature	^oF
		ILLUMINATION		
lx	lux	0.0929	foot-candles	fc
cd/cm^2	candela/m^2	0.2919	foot-lamberts	fl
		FORCE and PRESSURE or STRESS		
N	newtons	0.225	pound-force	lbf
kPa	kilopascals	0.145	pound-force per square inch	psi

Technical Advisory Committee

Each research project is overseen by a technical advisory committee (TAC), which is led by an ITD project sponsor and project manager. The Technical Advisory Committee (TAC) is responsible for monitoring project progress, reviewing deliverables, ensuring that study objective are met, and facilitating implementation of research recommendations, as appropriate. ITD's Research Program Manager appreciates the work of the following TAC members in guiding this research study.

Project Sponsor/Projecr Manager – John Tomlinson

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Rik Hinton

FHWA-Idaho Advisor – Lance Johnson, P.E.

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Executive Summary/Abstract

The Centers for Disease Control and Prevention (CDC) has estimated that over 8 people die and over 1,000 people are injured each day in the United States (U.S.) in crashes that reported to involve a distracted driver[3]. Texting while driving was found to have the same amount of impairment as an alcohol content of 0.08[4].

 Among all drivers, teenage and novice drivers are more susceptible to being involved in driver distraction related crashes. Child Trends Data Bank found that 10% of all drivers under the age of 20 involved in fatal accidents were reported to be distracted, larger than any other age group. The data bank also found 26% of 16-17-year-old teens said they had texted while driving; 43% talked on the phone; 64% rode with a texting driver; and 48% had ridden with a driver who was using a cell phone dangerously.

The goal of this project was to educate teenage drivers throughout Idaho on the dangers of distracted driving and change the cultural norm that distracted driving is acceptable. To do that, the first step documented the distracted driving cultural norm of high school students (ages 15-19) in Idaho. This was done by distributing a survey to high school students that began with general demographic questions, such as age, gender, grade, and frequency of driving. Students were then asked to rate their willingness or feeling towards various distracted driving activities and scenarios. After students answered the questions about themselves, they were asked to identify how they thought their peers would respond. These answers were used to see if students perceived their peers differently than they view themselves and to help better define the cultural norm. A total of 165 surveys were completed and used for the analysis.

The other objective of this project was to test the effectiveness of active involvement in public service announcements. The National Institute for Advanced Transportation Technology (NIATT) sponsored a Distracted Driving Competition aimed to raise awareness of the dangers of distracted driving by encouraging students to create a public service announcement (PSA) in the form of a poster, image, or short video. The competition worked twofold; students would learn more about distracted driving as they worked on their projects and there would be more announcements for people to see. The competition was also open to voting from the public, to create more involvement and exposure to distracted driving.

The major conclusion developed within this study was that active involvement in public service announcements (PSA's) has a significant impact on teen's opinions. After the student competition and secondary survey, it was found that contest participants had a more negative opinion of distracted driving. This shows the educational aspect of the competition was effective in changing the opinions of those that participated. The public service announcements coming directly from one's own peers may also prove effective in changing the opinions of other students and over time, effectively changing the cultural norm of texting while driving.

Chapter 1: Introduction

Distracted driving is defined as "any activity a person engages in that has the potential to distract him or her from the primary task of driving" [1]. This ranges from the obvious distractions like texting and driving to the not-so-obvious distractions like having a simple conversation with a passenger in your car. Other activities include (but are not limited to) talking on your phone, eating or drinking, grooming, trying to navigate, and changing the radio. Texting is known to be the most dangerous distraction, due to the fact that the average text takes your eyes off the road for 5 seconds, which is enough time to drive the length of a football field with your eyes closed at 55 MPH [2]. Multitasking while driving is a serious safety hazard for drivers who engage in this practice as well as for others who share the road with them. Any non-driving activity engaged in while driving is a possible distraction, and increases the risk of an accident. According to the Centers for Disease Control and Prevention (CDC) it has been estimated that over 8 people die and 1,161 people are injured each day in the United States (U.S.) in crashes reported to involve a distracted driver [3].

Significant progress has been made to raise awareness of risky driving behaviors such as speeding, driving under the influence, and failure to wear a seatbelt. However, in this digital age, distracted driving has quickly become the most prevalent issue in road safety. Unlike other issues, the use of mobile phones and other technology has become so ingrained in our culture that it is difficult to encourage drivers to discontinue this behavior. But cell phone use is just one aspect of distracted driving. The real issue is multifaceted, involving cognitive, manual, and visual distractions and the nature of this complexity has proven difficult to address.

Manual distraction occurs when one or both hands are taken off the wheel such as reaching for your morning coffee on the way to work. Visual distraction occurs when drivers take their eyes off the road; for example, after reaching for coffee, it spills everywhere, and you look down at your ruined work clothes. Cognitive distraction is when a driver's mind is not focused on the task of driving; for example, you start to worry, will the coffee ruin your clothes? Do you need to go home and change? Now you are no longer focused on the task of driving. This is just one example of how multifaceted daily distractions can lead to serious consequences.

Among all drivers nationwide, teenage drivers are more susceptible to being a distracted driver. Child Trends Data Bank did a study on distracted driving and found that 10% of all drivers under the age of 20 involved in fatal accidents were reported to be distracted. This was larger than any other age group. The data bank also found 26% of 16-17-year-old teens admitted to texting while driving, 43% talked on the phone, 64% rode with a texting driver, and 48% had ridden with a driver who was using a cell phone dangerously while driving. Texting while driving was found to have the same amount of impairment as an alcohol content of 0.08 [4].

The AAA Foundation for Traffic Safety surveyed over 2,500 people to help understand and promote a culture of safety on roadways. It was found that 81.1% of drivers say texting/emailing while driving is a very serious threat to safety and 78.2% said it was completely unacceptable. Surprisingly, however,

40.2% of drivers reported to have read a text/email while driving and 31.4% admitted to typing one. The AAA Foundation stated in their 2016 Traffic Safety Culture Index that "an attitude of 'do as I say, not as I do' persists among motorists, many of whom admit to engaging in dangerous behaviors that they deem as 'unacceptable'."[5]

This attitude is what the study aimed to change. Drivers know how dangerous distracted driving can be, but the "do as I say, not as I do" attitude has created a cultural norm that deems distracted driving as acceptable. Accepting this cultural norm has led to the largest consecutive increases in motor-vehicle fatalities (7% increase from 2014-2015 and 7% increase 2015-2016) in the past 5 decades, with 2016 being the first time in 10 years that the annual fatality total exceeded 40,000. In 2015 it was found that 10% of these motor-vehicle fatalities were reported to involve a distracted driver[6]. Changing the cultural norm is the key to stopping this 100% preventable crisis.

In order to do that, the first step was to document the distracted driving cultural norm of high school students (ages 15-19) in Idaho. This was done by distributing a survey to high school students that began with general demographic questions, such as age, gender, grade, and frequency of driving. Students were then asked to rate their willingness or feeling towards various distracted driving activities and scenarios. After students answered the questions about themselves, they were asked to identify how they thought their peers would respond. These answers were used to see if students perceived their peers differently than they view themselves. A total of 165 surveys were completed and used for the analysis.

The other objective of this study was to test the effectiveness of active involvement in public service announcements (PSA's) in positively impacting the distracted driving cultural norm. A Distracted Driving Competition, open to all high school students in Idaho, was conducted to raise awareness of the dangers of distracted driving by encouraging students to create a public service announcement (PSA) in the form of a poster, image, or short video. The competition worked twofold; students would learn more about distracted driving as they worked on their projects and there would be more announcements for people to see. The competition was also opened to voting from the public to create more engagement with the project.

A literature review was conducted on similar distracted driving competitions and campaigns, as well as any studies that looked into testing the effectiveness of these competitions as a method of raising awareness. There are dozens of distracted driving campaigns going on throughout the country aimed at raising awareness about the dangers of distracted driving through various forms such as presentations, educational classes, and competitions like the one in this study. However, not many studies tested the effectiveness of these competitions. Despite limited research on the subject, professionals seem to agree on the value of education and public awareness. Every article mentions cultural norms as the impetus for distracted driving, as was the case with similar issues such as drinking and driving and seatbelt use. Continued efforts to change behavior via PSAs and education proved successful with these issues, and most professionals believe they are also necessary in the case of distracted driving.

Students who participated in the competition were asked to take a survey 2 weeks after the competition was completed and again 5 months after to see how their views differed from the responses to the first survey involving all students. This was done to test the effectiveness of the competition and to see if engaging students in a competition like this altered their views on distracted driving. It was found that contest participants had a more negative opinion of distracted driving, confirming our hypothesis that active involvement in public service announcements has a significant impact on teen's' opinions.

This report includes a literature review on previous and current distracted driving campaigns, the study methodology for this project, including the development and implementation of the survey and competition. A separate literature review was done on the effectiveness of the competition in safety education. The report will then discuss the results gathered from the survey analysis as well as a compared analysis of the original survey participants and the competition participants. Lastly, the report will talk about the conclusions drawn from this project and future recommendations for research.

Chapter 2: Literature Review

Distracted driving has become a common and potent threat to society that continues to rise as traffic deaths and injuries increase. Many people, especially teenagers, engage in the habit of using their phones while driving, oblivious to the danger they are posing to other motorists, pedestrians and cyclists. People cannot wait; they eat, fiddle with the radio, and chat away with passengers while piloting a vehicle through traffic. Law enforcement agencies and research centers have begun the process of bringing awareness to distracted driving in order to limit or eradicate it, however, there is still work to be done. Changing cultural norms is important because many drivers engage in distracted driving despite acknowledging that it is not safe to do. This literature review will examine methods used to combat distracted driving.

The Distracted Driving Competition was created to bring awareness to Idaho high school students of the dangers of distracted driving. The competition awarded prizes to the students who came up with the best public service announcements, in the format of videos, memes, and posters. The competition worked twofold; students would learn more about distracted driving as they worked on their projects and there would be more announcements for people to see. This literature review will examine other methods and programs used to combat distracted driving.

The Oregon Department of Transportation (ODOT) formed a task force specifically for distracted driving. They met once a month from May to December 2016. ODOT distributed a brochure to DMVs and other places throughout the state to educate drivers about distracted driving, but as deaths continued to rise, more measures became necessary. The task force's main aims were to make the cell phone statute stricter, implement a coordinated education and media campaign, and develop a distracted driving toolkit. Toward this end, ODOT removed many exceptions to the cell phone statute, making it much harder for drivers to challenge tickets and increased the punishments for using cell phones while driving. Additional punishments included higher fines, and a distracted driving course that would be required to be taken when drivers were cited for using cell phones. They stated that changing the cultural norms takes time, but they believe by taking these initial positive first steps are they are on the way to changing the behaviors regarding distracted driving[7].

The state of Michigan has a Distracted Driving Action Team. They set up eight objectives to limit distracted driving accidents, although only two of them involved changing the cultural norm. The first objective was to publicize Michigan's laws aimed at deterring distracted driving. In addition, high school students were asked to create billboard designs with a panel of students selecting the winner to be posted at numerous locations throughout Michigan. The Action Team also had ongoing campaigns throughout the year for all age groups, educating them about distracted driving and going over various aspects and scenarios of distracted driving. The second objective for the Action Team was to provide information regarding the risks of distracted driving. They did this by conducting reviews of distracted driving educational programs and preparing a recommendation of classes for novice drivers to take. Other objectives were focused more on roadway countermeasures, data collection, and ongoing distracted driving projects to ensure Michigan was up to date on the most current information[8].

Safety Center Incorporated formed a contest similar to this one involving students creating their own distracted driving campaigns. Their contest was more of a school wide event, where large groups of students or whole schools would be involved. The students had to create a positive message and campaign activities engaging students, parents and community. The students also had to survey to see if they had increased driver awareness and safety. The contest provided monetary awards to the top three schools in three parts of California. The products were judged on the amount of teens and parents involved, survey results showing improvement, print/social media exposure and online posted activities[9].

Impact Teen Drivers is a national organization whose mission is to "change the culture of driving forever thereby saving lives not only in this generation of drivers, but also in all future generations of drivers". Impact Teen Drivers has reached over two million schools across America and continues to spread awareness in hopes to change the cultural norm of distracted driving. Create Real Impact is a competition where all students 14-22 in the US are invited to participate in. It is more similar to this competition where it involves individuals or small groups of students. Entries for the competition are videos, creative writing, art or music with a distracted driving theme. The awards for the competition are given to the top online vote getter (using social media), top judges' pick, and the four high schools with the most entries. The award for the contest is a $1500 educational grant [10].

Impact Teen Drivers notes that changing the culture of driving will take a multifaceted approach, but they do believe it is possible. For example, for many of us, wearing a seatbelt comes very naturally. Impact Teen Drivers states that in the 1980's the national seat belt compliance rate was between 11-14%, with today's rates being in the high double digits (California is at 96%). Over the years, the culture was changed to one that understood wearing a seatbelt was necessary for safety while in a vehicle. The same idea can be used to change the culture of distracted driving. Impact Teen Drivers has found the most effective way to engage a young person is to connect with them on an emotional level. This is not done by showing shocking or gory images, but by sharing personal stories and experiences that most young people could find themselves in at some point in their life. Impact Teen Drivers is on the right track to changing the cultural norm of distracted driving [10].

In Texas, Teens in the Driver Seat (TDS), a peer to peer safety program, has proven effective at reducing teen driver casualties. The Texas A&M Transportation Institute started the program in Texas, and it has since spread to three other states. The program is based on an app where a teen driver tells the app they are driving and once they are done they tap it again. Points are given for a distraction free trip, referring friends, and posting on social media. Monthly winners get amazon gift cards and other rewards. Schools accumulate TDS cup points and can win prizes as well. The program also involves spreading awareness through word of mouth, posters, and social media. Texas is the only state where teen fatal crashes have dropped every year since 2002. The program has shown to increase awareness up to 200% and cell phone usage while driving has dropped 30% at participating schools. A 20 county control group in Texas shows a decrease of 14.6% injury and fatal crashes over the 3 years the program has been implemented [11].

End Distracted Driving (EDD) is another organization focusing on keeping teens safe on the road. Joel Feldman, who had his daughter die in a distracted driving accident, heads the organization. EDD had a PSA contest like the NIATT and Impact Teen Driver competitions. Their contest, Students Against Destructive Decisions (SADD), had 170 entries from 18 states. Students from SADD affiliated schools were invited to participate. Prizes were awarded for first, second and third place in the meme and video categories. First place was $5,000, second $2500 and third place $1000. A panel of judges judged the entries [12].

End Distracted Driving also started a program called 9/11, Remember and Volunteer. After 9/11/2001, trial lawyers provided free legal help for 9/11 survivors, with over 1,100 lawyers who participated. For the fifteenth anniversary of 9/11, Feldman started a program where trial lawyers speak in schools about distracted driving. Feldman himself already travels the US giving motivational speeches about ending distracted driving. He has given 400 presentations as of early 2017.

Hang Up and Drive is another organization that gives speeches around the US. A distracted driver nearly killed Jacy Good in a crash that killed her parents. Ever since she was able to walk and talk again she has been an advocate for cell phone free roads. She and her husband have spoken at 772 events in the last 6 years [13].

People Against Distracted Driving (PADD) is another initiative resulting from tragedy. A family started it soon after the death of one of their children in a distracted driving crash. Their campaign is a little different from previous ones, focusing on changing laws and donating distracted driving signs. They have a goal of having one of the signs "Stay Alive, don't text and drive" and "Don't Drive Distracted" at every school in the US. They have been the leading donator of them since 2012. They also provide support to victim's families, and educational information about distracted driving [14].

A Maryland hospital hosted a program where, post surveyed, 23 percent of teens said they were less likely to text while drive. It was a more visual speech then what Hang Up and Drive does. 1200 teens across the US were invited to participate, and about 900 came. The program consisted of four sections. The first section was a regular introduction about distracted driving, the second portion was a tour of a trauma center, following the journey of a patient. The teens then viewed a personal video about a distracted driving crash. Lastly, they had a presentation from a survivor who was involved as a teenager and how it affected their life. The teens were surveyed before and after the experience and the percentage of teens who said they were unlikely to make a phone call or unlikely to send a text increased from 64 to 82% and 69 to 92% respectively [15].

Cell Control is a device and app families and companies can buy to keep their children and employees safe on the road. Once the app detects a speed over 10 mph, it will lock the phone to prevent usage. Administrators, the parents or employees, may set settings to allow certain functions, for example google maps, which might be necessary while driving. The app always allows 911 calls, as well as any specific functions specified by the administrator. Drivers are unable to override the service without the administrator being notified, making it extremely effective when stopping distracted driving in teens. The device also rates driving patterns with a 100-point scale, factoring in braking, acceleration, speed,

and cornering. This is effective in letting parents know their teens driving patterns, but also effective to let the teen themselves look at what their score is [16].

One controversial new tool to combat distracted driving is the "textalyzer", similar to the Breathalyzer. This new piece of technology would make it easy for police to see if a phone was being used after an accident. The device plugs into the phone and sees what apps were being used as well as screen taps and swipes with a time stamp. New York is mulling legislation to make the device legal. However, many people are wary and believe it is a violation of privacy. The device does not access any content though, just activity. It remains to be seen if the device will be legalized [17].

The Distracted Driving Foundation has a completely different belief than most others. They believe the technology exists to end texting while driving. They want all mobile phone carriers and car makers to add technology that blocks phone displays to drivers. They think police resources are better used elsewhere and the irresistible urge to use a phone will not be stopped another way.

Street Safe is a program in North Carolina taking Driver Education to the next level. It is for all young teen drivers and it involves hands on driving activities: losing control of a car, and interactive discussions like distracted driving. Law enforcement teaches the course. Street Safe also does school presentations and helps with traffic court [18].

Two organizations wanting people to learn texting effects driving by experience, but differently than Street Safe, are Finish Alive Stop Texting (FAST) and the Arrive Alive Tour. FAST, hosted with a NASCAR driver, hosts a once-a-year 'Roadeo' event. In the Roadeo, students drive through an obstacle course, see their brake reaction time and parallel park while texting to see how it compares to normal[19]. The Arrive Alive Tour is a commercial enterprise with a texting-while-driving simulator. They spend whole days at school campuses educating students and having them participate and watch the simulator. The company also surveys students to see how it changed their perspective [20].

Campaigns for Distracted Driving

Over the years there has been multiple campaigns developed to help raise awareness of distracted driving. Some of those programs and campaigns include (but are not limited to) "5 to Drive", The Teen Safe Driving Campaign, and the Safe Texting Campaign.

"5 to Drive"

In October 2013, NHTSA unveiled the "5 to Drive" teen safety campaign to reduce the high death rate of teens. The campaign challenges parents to discuss five critical driving practices with their teenage drivers that have the greatest beneficial impacts in the crash events. The '5 to drive' campaign topics include; no cell phone use or texting while driving, no extra passengers, no speeding, no alcohol and no driving or riding without a seat belt. Poor decisions among teen drivers can lead to crashes and fatalities at any time of the day.

The '5 to Drive' topics listed is designed to counteract poor driving decisions that have contributed heavily to the high death rate among teen drivers. NHTSA Administrator encouraged all parents of teenagers to have an open discussion with their teens about the dangers common among young drivers and to make sure their use the '5 to Drive' program [6].

Teen Safe Driving Campaign

Safety Center Incorporated, a teen safe driving educational organization, started a teen safety driving campaign where their goal was for students to create a positive teen-to-teen safe driving campaign reinforcing safe decisions and reducing distracted driving The campaign had participants from Northern California, Central California and Southern California and aimed to raise awareness by using interactive activities and positive messaging to reach the entire school body [9].

Safe Texting Campaign

The Safe Texting Campaign was developed in 2012 by parents who were alarmed with the impact of cell phone usage. The Safe Texting Campaign developed cell phone applications (Safe Texting, SafeTexting AR) that use GPS technology to reduce distracted driving. These apps limit cell phone use when traveling over 10 MPH by displaying a SafeTexting graphic and preventing access to most phone features. The applications will also automatically reply to inbound text messages letting the sender know that you are driving and will reply when it is safe to do so[21].

Student Competitions as a Method of Raising Awareness

Competitions like this one have not been utilized extensively in the efforts to raise awareness of distracted driving. Therefore, little evidence exists of their effectiveness. This second literature review presents a summary of the few published works available in regard to the viability of student competitions as a method of raising awareness aimed at preventing distracted driving.

In 2011, the World Health Organization (WHO) investigated the impact of distracted driving and identified several strategies for combating the issue, one of which is a widespread public awareness campaign. Such campaigns have proven to be successful in promoting seatbelt use. WHO claims many drivers consistently underestimate the risks associated with distracted driving, and that proper education on the dangers may be effective in reducing the use of mobile phones while driving. WHO suggests that because distracted driving is most common among young drivers, an awareness campaign aimed at the younger generation is likely the most effective option. Despite this, WHO makes it clear that data on the effectiveness of public awareness campaigns with respect to distracted driving is not available, and the complex nature of the issue may result in these methods being ineffective[22].

The Traffic Injury Research Foundation (TIRF) published an article by President and CEO, Robyn Robertson, in 2011. Robertson discusses the current state of the distracted driving issue and shares her insight into possible strategies to manage the issue. An annual survey conducted by the Canadian agency indicated that distracted driving was the number one concern among Canadian drivers in 2010,

but the percentage of drivers reporting that they use their cell phone while driving increased from 20% to 37% from 2002 to 2006. Robertson also indicates that the insufficient research on the effectiveness of countermeasures is a barrier to progress. She explains that the fight against drinking and driving was successful largely due to the amount of research on the dangers of drunk driving. Thus, Robertson suggests that "intensive education and public awareness campaigns will likely play a much greater role in shifting attitudes and behaviours." [23]

In the International Journal of Injury Control and Safety Promotion, Overton et al. discuss the impact of distracted driving and several initiatives to reduce the prevalence of distracted driving behaviors. One of these initiatives, as others suggested, is education. Overton et al. also note the success of similar programs in reducing other negative driving behaviors such as speeding and drunk driving. They note that emphasis should be placed on changing the social acceptance of distracted driving. They suggest peer perception of driving behaviors directly affects how each individual will behave. Thus, it is recommended that education and public awareness be delivered to young drivers through trusted authority figures or personal relationships[24].

Perhaps the most discrete data on the effectiveness of education and public awareness campaigns on distracted driving comes from a study conducted in 2016 by Sahar Hassani and his colleagues. The group developed and implemented a 30-minute workshop at a variety of colleges in the Chicago metropolitan area. To evaluate the effectiveness of the workshop, participants were interviewed before, immediately after, and three months after the workshop. It was found that students responded more positively to behavioral questions immediately after the workshop, as well as 3 months after the workshop, but to lesser degree. This study confirms that proper education and public awareness of the risks of distracted driving may help change the perception of using cell phones while driving or otherwise being distracted[25].

Chapter 3: Study Methodology

Survey Development and Implementation

A four-page survey consisting of 22 questions was developed to distribute to high schools throughout Idaho. The survey was distributed to 9 schools and 165 students completed the survey which was used to identify trends to help decrease distracted driving.

The majority of the survey is based on a seven-point Likert scale where one indicated a level of strong agreement, four indicates a neutral response, and 7 indicates a level of strong disagreement. Figure 1 provides an example of the mechanism used in most of the survey analysis. Each response value is coded with a single color, and the width of each color bar represents the total percentage of responses for that value. Three percentage values are included above the graph, indicating the percentage of responses less than 4, equal to 4, and greater than 4, from left to right.
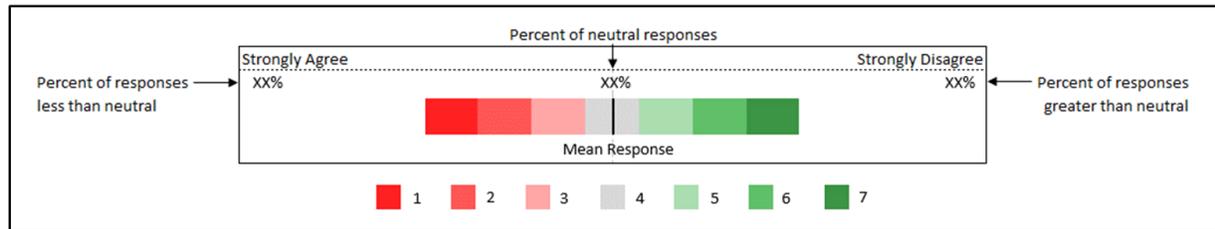

Figure 1: Graph Description

The survey began with general demographic questions such as age, gender, grade, and frequency of driving. The students were then asked to rate how willing they would be to text and email in various situations, their feelings towards texting/emailing while driving, and then they were asked to state their level of agreement to various statements like "I text/email while I drive because it is important to me to stay in contact with my friends."

After answering these questions about themselves, students were asked how they felt most students in their school would feel about the same subject. These answers were used to see if students perceived their peers differently than themselves. Three rounds of surveys were conducted, the first including students from several high schools in Idaho, and the second and third including students that participated in the student competition. These surveys were used to define distracted driving cultural norms and to test the effectiveness of PSA competitions in changing those norms.

The Competition

Distracted driving is quickly becoming one of the most pervasive and dangerous epidemics. Despite this, the dangers of distracted driving are not universally recognized, and many people of all ages continue to use their cell phones while driving. Because this is a recent trend, few studies have been conducted on potential mitigation techniques. Despite this, education and public awareness campaigns have proven

successful with drunk-driving. For this reason, a student competition was hosted encouraging high school students to prepare a public service announcement to raise awareness of the dangers of distracted driving. The student competition would encourage students to research and learn about distracted driving for themselves, and relay that information to their peers.

The primary objectives of the competition were to educate students on the dangers of distracted driving and to change the cultural norm of acceptance. The competition was open to all high school students in Idaho, and submissions could be done as a group or an individual. Students were given the option of creating a short video that brings awareness to distracted driving, or creating a series of social media posts (memes, short text messages, etc.). Figure 2 shows the flyer that was developed to promote the competition and mailed to over 150 schools, shared on social media, and provided all the information the students needed to get started on their PSA.

Figure 2: Competition Flyer

Advertising and Development

A website was developed for the competition (http://www.uidaho.edu/engr/research/itd-competition) which provided everything the students needed to get started including the official rules, and references for the students to use to learn about distracted driving. The references included previous research studies and statistics on distracted driving, campaigns against distracted driving, programs that aim to reduce distracted driving, and examples of memes and videos that relate to distracted driving. Once the competition was closed, the website was used for video and meme voting to choose the publics favorite submissions.

A webpage analysis was done to determine the effectiveness of the website. The total views on the website was 6,373 views, with the majority (3,495) of the views being on the competition's video voting page, and the results page being a close second at 1,149 views. Table 1 below is a summary of the website statics. Please note, the deadline for the competition was extended due to lack of submissions for the first deadline.

Table 1 Website Statistics Summary

Date	Description	Total Number of Views till that day.	Observation
October 28th	Original deadline of submitting memes and videos	260	
November 1st	Notification of deadline extension to November 18th	382	Number of views increased by 433 from November 1st to November 18th
November 18th	Extended deadline of submitting memes and videos	815	Number of views increased by 555 from October 28th to November 18th

Table 2 Website Voting Statistics Summary

Date	Description	Number of votes that day	Total number of votes till that day
December 1st	Voting pages launched	2100	2949
December 2nd	Second day of voting	1771	4720

Along with the website, Facebook, Twitter, Instagram, YouTube and Gmail accounts were made for the competition and used to get the word out about the competition, while also aiming to increase awareness of distracted driving by posting safety messages and distracted driving facts. Facebook was found to be the most successful social media site for advertising.

Another way the competition was advertised was by reaching out to teachers across the state. An email list of teachers throughout the state was developed and used to ask teachers to help promote safe driving by sharing the competition with their students. This was done after the deadline was extended, and proved to be the most successful form of advertising for this project, with many teachers excited to help and some teachers even making the competition a class assignment. (13 schools total for competition)

Radio stations also helped promote the competition by sharing our event on their social media sites, and a KTVB radio commercial was developed and implemented. A big thanks to everyone who participated – Thank you for helping make a difference!

Participants

The first round of surveys had a total of 165 participants with 64% male participants and 36% female. The majority of participants were 11th graders (66%), with significantly less 9th (9%), 10th (11%), and 12th (14%) graders. It was found that of the survey participants 53% of them drive less than 10 days per month. The competition had 57 total participants with 29 males (53%) and 28 females (47%). There were 33 videos submitted and 6 memes submitted totaling 39 submissions from 13 different schools throughout Idaho.

To ensure that there is no bias in the sample of students who participated in the competition, their answers to different questions in the the survey they took before participating in the competition was compared to the asnwers of other students who took the survey. It was found that there is no siginificant difference in the mean scores between the two groups. The results confirmed that their is no bias in the sample of students who participated in the competition.

The second and third round of surveys was completed by students who participated in the competition, one being taken within 2 weeks after the competition and the other 5 months after. The second round had 22 participants, and the third round of surveys had 19 participants.

Chapter 4: Results

When analyzing survey results, three different demographics were looked at: males vs. females, grade levels, and then the data , focusing on frequent versus infrequent drivers. Students who drove 10 or more days a month were labeled frequent drivers, and those who drove less than 10 days a month were labeled infrequent drivers.

The following are the main conclusions that were drawn from the analysis:

- Texting is used a way to relieve boredom while driving
- Frequent drivers are more likely to turn off or put away their cell phone while driving
- Both females and males are willing to text while driving when they feel that it is safe to do so
- Frequent drivers are more strongly opposed to texting or emailing while driving than infrequent drivers
- Students believe they are more strongly opposed to texting or emailing while driving than their peers
- Both females and males think that their peers will be upset if they don't reply to their text
- The consequences of distracted driving are stronger deterrents than peer pressure and social involvement

Texting is used to Relieve Boredom While Driving

Students were asked on a scale of 1 to 7, how strongly they agree with the following statement: "If I text/email while driving, I am less likely to be bored while I am driving." For this question, a response of 7 indicated the student strongly agrees. Figure 3 shows the distributions of responses to this survey question for frequent drivers and infrequent drivers.

Frequent drivers agree more strongly with the statement, with a mean of 5.87, compared to the mean response of infrequent drivers, 4.82. Additionally, 78% of frequent drivers agreed with the statement, compared to only 49% of infrequent drivers.

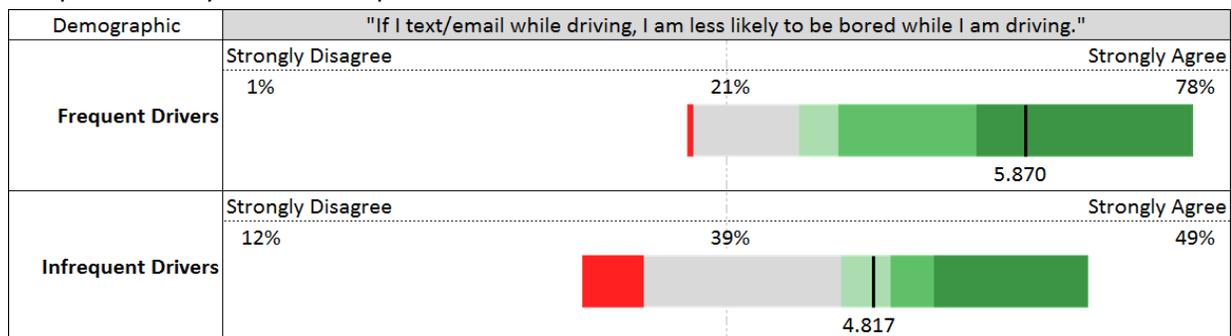| Demographic	"If I text/email while driving, I am less likely to be bored while I am driving."		
	Strongly Disagree		Strongly Agree
Frequent Drivers	1%	21%	78%
			5.870
	Strongly Disagree		Strongly Agree
Infrequent Drivers	12%	39%	49%
		4.817	

Figure 3: Survey Responses to Using Texting to Relieve Boredom

These data suggest that driving becomes a menial task for drivers, and young drivers tend to use texting to relieve boredom.

Frequent Drivers are more Likely to Turn Off or Put Away Their Cell Phone While Driving

Despite agreeing with the statement that texting/emailing while driving relieves boredom, it was found students who drive often are more aware of the temptation and are more likely to turn off or put away their cell phone before driving. Students were asked, "Before driving, how likely are you to think about putting your cell phone someplace you cannot get to it or turning it off?" A response of 7 indicates the student is very likely to consider putting their phone somewhere out of their reach.

Figure 4 shows the average response being 4.363 for frequent drivers and dropping to 3.034 for infrequent drivers. It was also found that men are less likely to put their cell phone away before driving, with the mean response of 4.627 and 3.113 for females and males respectively. Overall, it was found that frequent drivers are more opposed to texting/emailing while driving in general, with the mean responses for frequent and infrequent drivers being 6.259 and 5.670 respectively. Frequent drivers also had a 0% response rate stating texting/emailing while driving is cool (Figure 5).
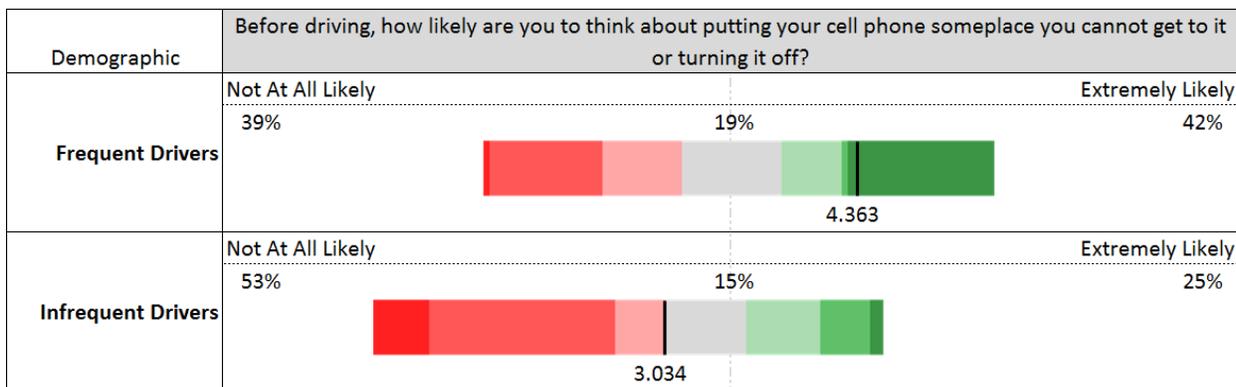

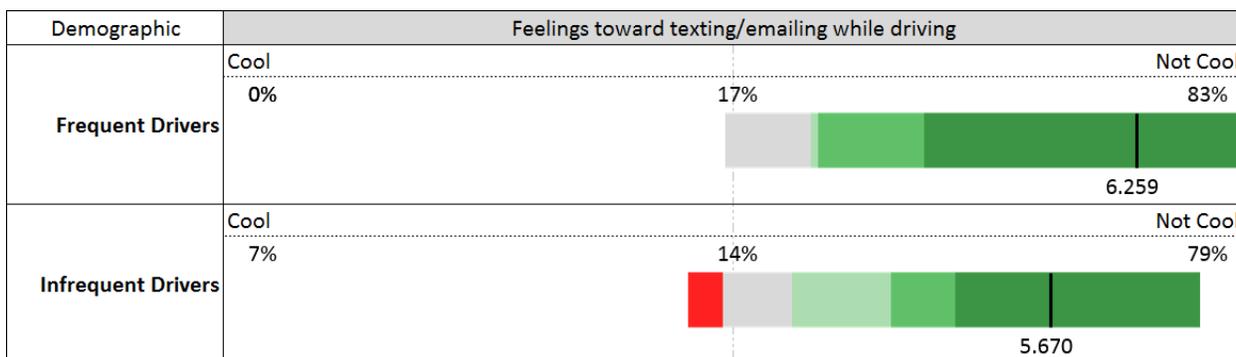**Figure 4: Likelihood Survey Responders Will Put Their Phone Away Before Driving**

Figure 5: Survey Responders Feelings Towards Texting/Emailing While Driving

Students Believe They are More Strongly Opposed to Texting or Emailing While Driving Than Their Peers

The students were asked how they thought most students in their school felt about texting while driving. When compared to the responses answered about their own feelings, it was apparent that most students believe they are more strongly opposed to texting or emailing while driving than their peers. This comparison is shown in Figure 6. Eighty-one percent of students indicated a negative opinion of texting or emailing while driving, while only 25% believed their peers felt the same.
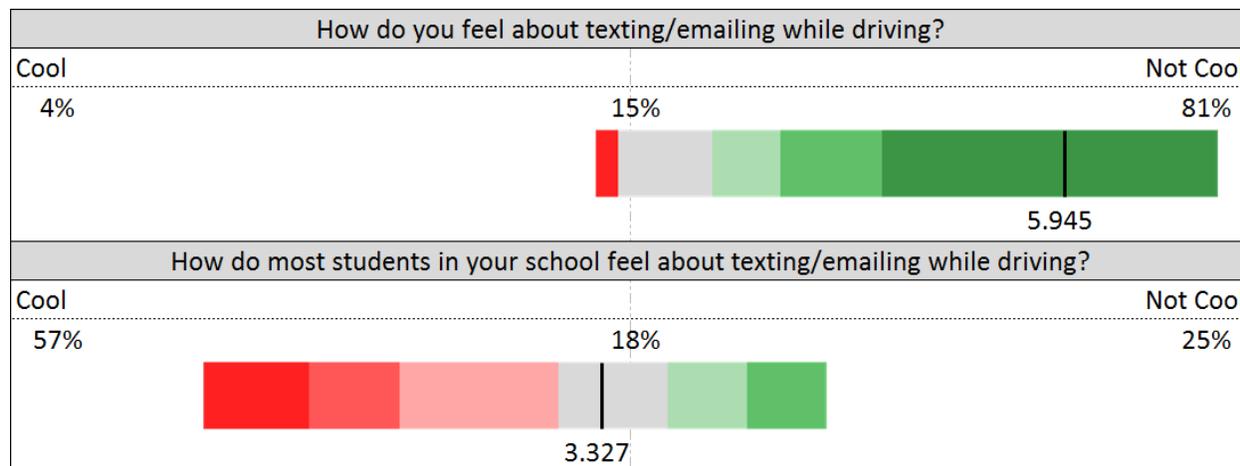
Figure 6: Results Comparing Students own Feelings with How They Think Their Peers Feel

Students are Willing to Text or Email While Driving if They Feel it is 'Safe' to do so

Students were asked "How willing would you be to text or email someone in the following situations while driving alone?" With the situations ranging from being stopped at a red light to driving on the highway.
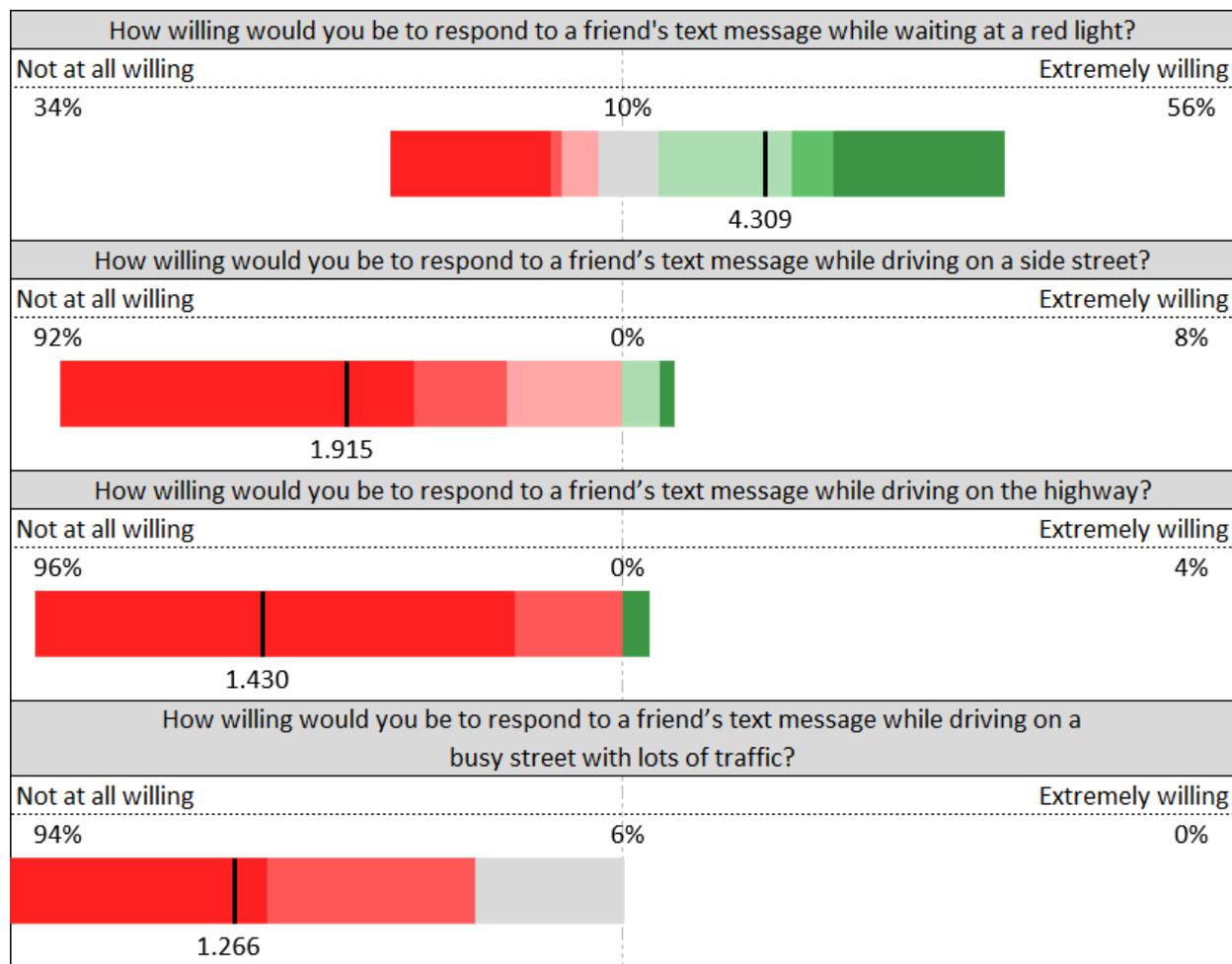
How willing would you be to respond to a friend's text message while waiting at a red light?

Not at all willing — Extremely willing
34% | 10% | 56%
4.309

How willing would you be to respond to a friend's text message while driving on a side street?

Not at all willing — Extremely willing
92% | 0% | 8%
1.915

How willing would you be to respond to a friend's text message while driving on the highway?

Not at all willing — Extremely willing
96% | 0% | 4%
1.430

How willing would you be to respond to a friend's text message while driving on a busy street with lots of traffic?

Not at all willing — Extremely willing
94% | 6% | 0%
1.266

Figure 7: Students Willingness to Text in Various Situations

In a relatively safe situation, such as being stopped at a red light, young drivers are much more willing to text with 56% of survey participants indicating they would be willing to do so. In more dangerous situations, including driving on a side street, highway, or busy street, less than 10% of students indicated they would be willing to text.

The Consequences and Enforcement of Distracted Driving are Stronger Deterrents Than Peer Pressure and Social Involvement.

Students were asked to specify their level of agreement with a series of statements pertaining to various motivators and deterrents of distracted driving. Four statements were considered in the following analysis:

- "I text/email while I drive because it is important to stay in contact with my friends." (Question 10a)
- "If I text/email while driving, I am less likely to be bored while I am driving." (Question 12a)

- "If I text/email while driving, I will be more likely to get a ticket." (Questions 13a)
- "If I text/email while driving, I am more likely to be in an accident." (Questions 15a)

Wanting to stay in contact with friends and being bored are common reasons for texting while driving, while questions the likelihood of receiving a ticket or getting in an accident are considered the strongest deterrents of distracted driving. Four groups were considered, which include students that agreed with each of these questions. While responses to these questions are not mutually exclusive, these groups were compared with respect to their responses to the following question: "To what degree do you agree or disagree with the following statement: People should not text/email while driving." Figure 8 shows the distribution of responses to this question for each group.
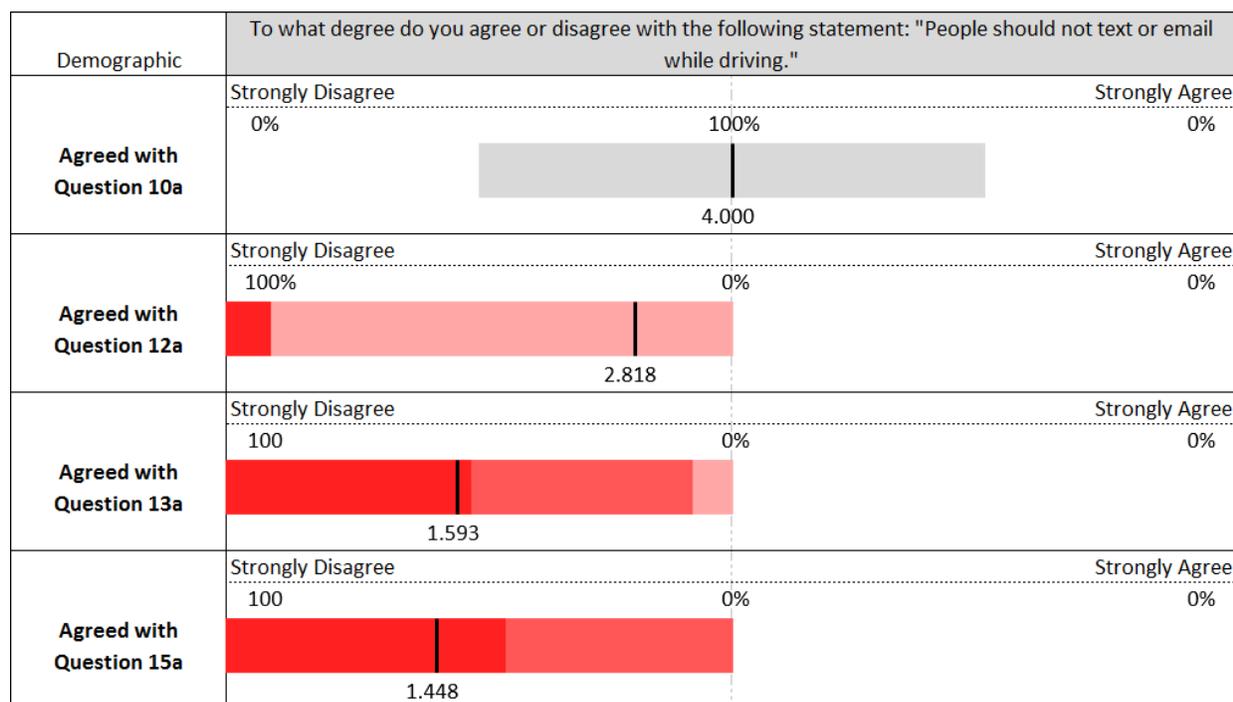
Demographic	To what degree do you agree or disagree with the following statement: "People should not text or email while driving."		
Agreed with Question 10a	Strongly Disagree 0%	100%	Strongly Agree 0%
		4.000	
Agreed with Question 12a	Strongly Disagree 100%	0%	Strongly Agree 0%
	2.818		
Agreed with Question 13a	Strongly Disagree 100	0%	Strongly Agree 0%
	1.593		
Agreed with Question 15a	Strongly Disagree 100	0%	Strongly Agree 0%
	1.448		

Figure 8: Results Showing Motivators and Deterrents of Distracted Driving

Students that agreed they are more likely to get a ticket or be in an accident if they text or email while driving more strongly agreed that people should not text or email while driving. These data suggest that the consequences of distracted driving (accidents, tickets, e.g.) are stronger deterrents of distracted driving than social pressure is a motivator.

Chapter 5: Comparative Analysis

The same survey was distributed to all contest participants at the end of the competition, and again 5 months after. A total of 22 responses were received from the first round of contest participants, and 18 responses were collected 5 months after. Both were compared to the original survey participants to see the short term and long-term effects the competition had on the students. For most questions, the difference between the two survey groups was negligible, and can be attributed to the small sample size of the contest participants.

Students were asked "To what degree do you agree or disagree with the following statement: "People should not text or email while driving."" The results to this question are shown in Figure 9 below. The difference between the first and second survey rounds was negligible; however, all show that students strongly agree with the statement. The survey results for the contest participants that were surveyed 5 months after the competition showed 100% agreement with the statement, when 5% of the students were still in the 'neutral zone' from the original survey participants. This showed that the competition participants still had a negative view of distracted driving 5 months after the competition.

When classifying more specific feelings towards distracted driving such as good/bad or okay/not okay, the difference between the groups was more noticeable. Figure 10 shows that contest participants have

Figure 9: General Feelings About Texting While Driving

a more negative opinion of distracted driving than those that did not participate. For both questions the contest participants had a 0% response rate stating that texting/emailing while driving is good/okay, while the original survey participants had 2% and 5% stating that texting/emailing while driving is good/okay respectively. This was a very positive outcome from the competition because all contest participants are agreeing that texting/emailing while driving is bad.

Demographic	Feelings toward texting/emailing while driving		
Original Survey Participants	Good 2%	20%	Bad 78% 5.733
Contest Participants	Good 0%	0%	Bad 100% 6.684
Contest Participants 5 Months After	Good 0%	11%	Bad 89% 6.353
Demographic	Feelings toward texting/emailing while driving		
Original Survey Participants	OK 5%	7%	Not OK 88% 5.933
Contest Participants	OK 0%	11%	Not OK 89% 6.474
Contest Participants 5 Months After	OK 11%	6%	Not OK 83% 6.059

Figure 10 Results Showing More Specific Feelings Towards Texting While Driving

There was a slight regression in the results 5 months after. More students began to think distracted driving was not as bad or that is was okay. However, there was still improvement from the original survey participants. Only 11% of students had a neutral feeling that texting while driving was 'good' compared to the original 22%.

When asked about their willingness to respond to a friend's text message at a red light, there was a significant improvement among competition participants and only a slight regression 5 month after. Figure 11 shows that originally 56% of students said they were willing to text at a red light. That dropped to 30% for competition participants, and 39% for the contest participants 5 months after. Even though there was an increase of 9% for the contest participants surveyed 5 months after, it was still a respectable improvement over the original 56%.
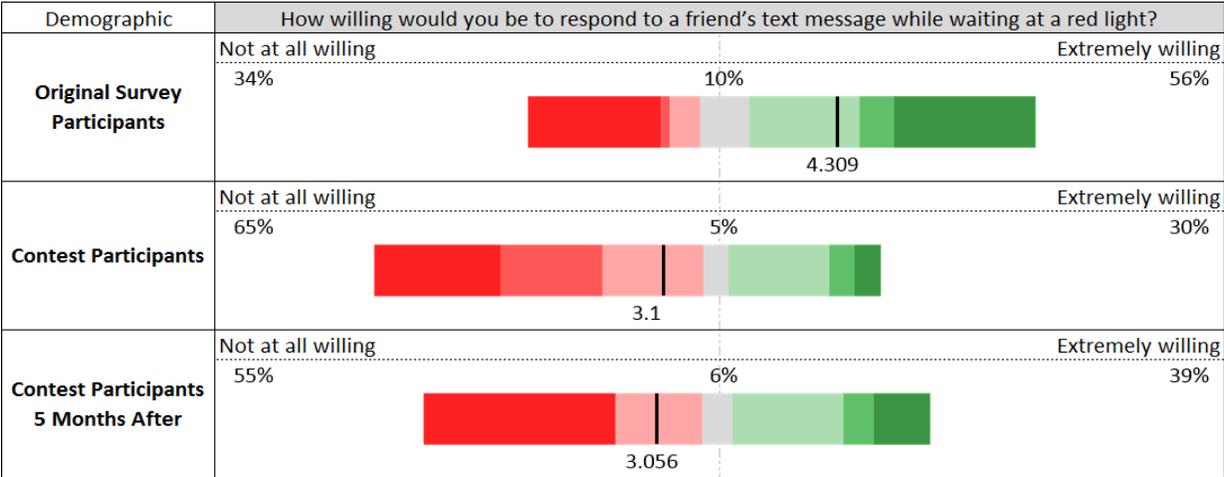
Demographic	How willing would you be to respond to a friend's text message while waiting at a red light?		
Original Survey Participants	Not at all willing		Extremely willing
	34%	10%	56%
		4.309	
Contest Participants	Not at all willing		Extremely willing
	65%	5%	30%
	3.1		
Contest Participants 5 Months After	Not at all willing		Extremely willing
	55%	6%	39%
	3.056		

Figure 11: Willingness to Text at a Red Light

Chapter 6: Conclusions

The main objective of the study presented in this paper was to test the effectiveness of active involvement in PSA's in changing the cultural norm that deems distracted driving acceptable. Before participating in the contest, the participants' opinion of distracted driving was consistent with the opinions of all other students who took the survey. After the contest, it was found that contest participants had a more negative opinion of distracted driving, confirming our hypothesis that active involvement in public service announcements has a large impact on teen's opinions.

The original survey participants helped document the cultural norm by revealing both females and males are willing to text while driving when they feel it is safe to do so, and many stated that texting is often used to relieve boredom while driving. It was found that frequent drivers (those who drive more than 10 days a month) are more likely to turn off or put away their cell phone while driving, and are more opposed to distracted driving in general. When asked about their peers, it was found that students believe they are more strongly opposed to texting or emailing while driving than their peers. Students also stated that they think their peers will be upset if they don't reply to their text, which could be a cause to the "do as say, not as I do" attitude. However, while students are worried their friends may be upset with them, it was found that the consequences and enforcement of distracted driving (i.e. tickets, accidents) are stronger deterrents than peer pressure and social involvement.

The Distracted Driving Competition was developed to bring awareness to teens in Idaho and to test the effectiveness of engaging teens in creating PSA's about safety education. While teens were learning about the dangers of distracted driving for themselves by creating these PSA's, they also shared this information with their peers. The competition participants were surveyed after the competition, and 5 months later, and these surveys were used to see if the competition affected their views about distracted driving.

Although there was a slight regression in some of the survey responses 5 months after the competition, there was still an overall improvement when compared to the original 165 survey participants. When surveyed within 2 weeks after the competition, participants responded with 100 percent agreement that texting/emailing while driving was bad, versus the 22 percent who had either been unsure of how to answer or said it was good. When surveyed 5 months after, there was still an 11 percent improvement from the original survey participants.

Despite limited research on the subject, professionals seem to agree on the value of education and public awareness. Every article mentions social norms as the impetus for distracted driving, as was the case with similar issues such as drinking and driving and seatbelt use. Continued efforts to change these cultural and social norms via PSAs and education proved successful with these issues, and most professionals believe they are also necessary in the case of distracted driving. However, as we continue to combat distracted driving, it is important to constantly evaluate our progress and the effectiveness of the education and public awareness campaigns implemented.

The primary conclusion developed within this study was that actively involving teens in creating public service announcements (PSA's) aimed at their peers has a significant impact on teen's opinions about distracted driving. Additionally, a bonus to the competition and its presence over all social media means that is may also prove effective in changing opinions of other students over time with little or no additional effort. Every view works to change the cultural norm of acceptable texting while driving (which has a goal of zero), and is one step closer to stopping a significant percent of distracted related crashes.

As part of the study, the project team made an interactive safety presentation to students to educate them about what constitute distraction to the driving task and ways to ensure they do not engage in any activities that can cause distractions. The post presentation interviews showed that the presentation positively impacted students' opinions about distracted driving. It would be very beneficial to provide the presentation materials, and similar educational materials, to school districts for possible use in their safety education efforts.

Future recommendations for research could include expanding the data pool to groups of all ages, and to test the effectiveness of introducing this topic at early ages. Another topic of interest would be to document the cultural norm that deals with voice texting or live video streaming while driving (Snapchat, Facebook live). Although it may take time, each step taken to learn more about distracted driving is a positive step closer to changing the cultural norm.

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Appendix A
Survey Instrument

Distracted Driving Student Survey

We need your help and honesty. This survey is part of a research study about distracted driving. You will not be asked to give your name. This is an <u>anonymous</u> survey, and your identity is protected. Only group results will be reported.

Please read each question carefully. There are no "right" or "wrong" answers. Just choose whichever answer you think is closest to the truth. This survey is <u>voluntary</u>. If you do not wish to respond to a question, you may leave it blank and continue. The results of this survey will be used for programs in your school and community. There are no negative consequences or rewards for participation. Thank you for completing this survey.

Please answer each question by completely filling in the square. By completing this survey, you are indicating that you agree that we can use this anonymous information for our research. **Please do not write your name on the survey.**

1. How old are you?

    ☐ 13   ☐ 14   ☐ 15   ☐ 16   ☐ 17   ☐ 18   ☐ 19   ☐ 20   ☐ 21+

2. What is your sex? ☐ male   ☐ female

3. What grade are you in?

    ☐ 9   ☐ 10   ☐ 11   ☐ 12

4. During the past 30 days, on how many days did you drive a car or other vehicle?
   1. ☐ I did not have a license to drive during the past 30 days
   2. ☐ 0 days
   3. ☐ 1 or 2 days
   4. ☐ 3 to 5 days
   5. ☐ 6 to 9 days
   6. ☐ 10 to 19 days
   7. ☐ 20 to 29 days
   8. ☐ All 30 days

5. Regardless of whether you drive or not, suppose you are driving and are alone in the vehicle. How willing would you be to text or email someone in the following situations?

	Not at All Willing (1)	(2)	(3)	(4)	(5)	(6)	Extremely Willing (7)
Respond to a friend's text message while waiting at a red light 5a	☐	☐	☐	☐	☐	☐	☐
Respond to a friend's text message while driving on a side street 5b	☐	☐	☐	☐	☐	☐	☐
Respond to a friend's text message while driving on the highway 5c	☐	☐	☐	☐	☐	☐	☐
Respond to a friend's text message while driving on a busy street with lots of traffic 5d	☐	☐	☐	☐	☐	☐	☐
Respond to a text message or email from your parents while driving 5e	☐	☐	☐	☐	☐	☐	☐

6. Before driving, how likely are you to think about putting your cell phone someplace you cannot get to it or turning it off?

I don't drive	Extremely Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Extremely Likely
☐	☐	☐	☐	☐	☐	☐	☐
0	1	2	3	4	5	6	7

7. Each row shows a range of feelings about texting / emailing while driving. Please select one box on each row that best shows how you feel about texting / emailing while driving. Boxes toward the middle of a row indicate a neutral feeling. Boxes closest to a word indicate a stronger feeling.

7a	Cool	☐	☐	☐	☐	☐	☐	☐	Not Cool
7b	Dangerous	☐	☐	☐	☐	☐	☐	☐	Safe
7c	Foolish	☐	☐	☐	☐	☐	☐	☐	Sensible
7d	Good	☐	☐	☐	☐	☐	☐	☐	Bad
7e	OK	☐	☐	☐	☐	☐	☐	☐	Not OK
		1	2	3	4	5	6	7	

8. In your opinion, how would you feel about texting / emailing while driving?

8a	Cool	☐	☐	☐	☐	☐	☐	☐	Not Cool
8b	Dangerous	☐	☐	☐	☐	☐	☐	☐	Safe
8c	Foolish	☐	☐	☐	☐	☐	☐	☐	Sensible
8d	Good	☐	☐	☐	☐	☐	☐	☐	Bad
8e	OK	☐	☐	☐	☐	☐	☐	☐	Not OK
		1	2	3	4	5	6	7	

How much do <u>you</u> agree or disagree with the following statements?

	1 Strongly Agree	2 Agree	3 Somewhat Agree	4 Neither Agree nor Disagree	5 Somewhat Disagree	6 Disagree	7 Strongly Disagree
9. "I text/email while I drive because it is important to me to stay in contact with my friends."	☐	☐	☐	☐	☐	☐	☐
10. "If I text/email while driving, I will be less likely to miss out on what's happening."	☐	☐	☐	☐	☐	☐	☐
11. "If I text/email while driving, I am less likely to be bored while I am driving."	☐	☐	☐	☐	☐	☐	☐
12. "If I text/email while driving, I will be more likely to get a ticket."	☐	☐	☐	☐	☐	☐	☐
13. "If I text/email while driving, I will be more likely to get in trouble with my parents."	☐	☐	☐	☐	☐	☐	☐
14. "If I text/email while driving, I am more likely to be in an accident."	☐	☐	☐	☐	☐	☐	☐
15. "If I don't respond to a friend's text or email right away, they may think I am upset with them."	☐	☐	☐	☐	☐	☐	☐
16. "I would feel bad if I texted someone who was driving and he/she had an accident because of my text."	☐	☐	☐	☐	☐	☐	☐

17. How much do you agree or disagree with the following statements?

	Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree
19. "I am able to text or email while driving because I am good at doing many things at once (i.e., multi-tasking)."	☐	☐	☐	☐	☐	☐	☐
20. "I feel like I have to respond to people's texts or emails right away, or I could be left out."	☐	☐	☐	☐	☐	☐	☐
21. "It's up to me whether I text or email while driving."	☐	☐	☐	☐	☐	☐	☐
22. "If I really wanted to, I could choose to never text or email while driving."	☐	☐	☐	☐	☐	☐	☐
	1	2	3	4	5	6	7

Thank you!