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Understanding the Psychological Factors Underlying Smartphone Related Distracted Driving: Exploratory Analysis Using a Nationwide Survey

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Abstract

As smartphone technology begins to reach sizeable levels of market saturation and as its usage becomes ubiquitous, distracted driving, and more specifically smartphone related distraction will experience substantial growth. In the United States, where smartphone ownership is around 77% for adults, cell phone related distracted driving has long been a noted issue. However, the expanded capabilities and ever-growing market of applications offered by smartphones opens the door for additional avenues of distraction. In response to this, law makers have attempted to address distraction through the implementation of various levels of mobile phone bans or restrictions. Existing research points to the mixed evidence regarding the influence of these laws on restricting use behaviors and limiting distraction related crashes. In an effort to better characterize and understand distracted driving behavior, this research explores emailing and social networks (Facebook, Twitter, Instagram, etc,) usage behaviors while driving. The exploration into the behaviors is coupled with investigation into the psychological factors that underlie them, while also controlling for potential heterogeneity across individuals (e.g. socio-economic and demographic factors). Utilizing the Theory of Planned Behavior (TPB) as the foundation, a nationwide survey was carried out to measure email and social network usage behaviors and the individuals' attitudes towards them. The survey was implemented in Qualtrics and participants were recruited from the pool of adults in the United States on the Amazon's Mechanical Turk platform. Complete responses were collected from 550 individuals. In addition to a comprehensive descriptive analysis, exploratory factor analysis and subsequently regression analysis were performed to understand the underlying psychological factors and their influence on the usage behaviors. Results indicate that about 47% (259 respondents) at least occasionally email or access social networks while driving and 12.9% (71 respondents) indicate that they perform a target behavior for at least half of their trips. Additionally, respondents positive attitudes, attitudes toward perceived benefits (temporal, workplace, and social), and attitudes about the behaviors' lack of influence on their driving ability showed positive influence on their frequency to partake in distracted driving events. This work further contributes to the literature on distracted driving, in particular associated with email and social network usage behaviors. Furthermore, the underlying attitudes toward these behaviors can help inform decision-makers design effective policies to curb distracted driving behaviors.

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Introduction

Background

The topic of distraction, and its relationship to the act of driving, has long been an issue of interest for improving transportation safety. In 2015, the National Highway Traffic Safety Administration (NHTSA) identified 3,196 fatal crashes that were directly linked to distracted driving. These crashes constitute 10% of total fatal crashes in the US. When looking more broadly at all injury crashes, driver distraction accounted for 15% of the total injury crashes in the United States in 2015 (*1*). These numbers highlight the negative implications of distraction during driving.

It should be noted that distraction can be difficult to isolate and identify. Being distracted indisputably plays a role in driver safety, but as a term distracted driving is broad and as such warrants explicit definition. Engström et al define distracted driving as any situation "where the driver allocates resources to a non-safety critical activity while the resources allocated to activities critical for safe driving do not match the demands of these activities" (*2*). The resource aspect of this definition can be further expanded to include visual resources, manual resources, cognitive resources, or any combination of the three. To provide an example, consider reading and responding to a text message. In this case, the driver expends visual and cognitive resources to read the message followed by visual, manual, and cognitive resources to type out a response. In this way, many activities can be classified as distracted driving including talking with passengers, eating, reading, and making/receiving phone calls or text messages among others.

Distracted driving has long gained interest of researchers and practitioners in their efforts to improve transportation safety. For as long as individuals have been driving, distraction has played a role in vehicle operation and safety. Over the last fifteen years, the rapid expansion of mobile technology, specifically the smartphone, has substantially reshaped how individuals access and consume information. A smartphone, or a mobile phone that has many of the capabilities of a computer (internet access, wide array of downloadable applications, etc.) is inherently different from a "standard" talk and text cell phone. Travel researchers Wang et al have found that smartphone use is impacting individuals daily lives in how they communicate with friends and family, fill down time, get information, explore novel technologies and in some cases fill needs for traditional computer access (laptops or desktops) (*3*). The expanded capabilities of these devices allow greater access to information but can also be a hotbed for distraction. 2016 survey data from the Pew Research Center indicate that 77% of American adults own a smartphone. When looking at specific age groups, 92% of 18-29 year olds, 88% of 30-49 year olds, 74% of 50-64 year olds, and 42% of the individuals over 65 identify as smartphone owners (*4*). The volume of smartphones on the road is undoubtedly growing, but one aspect vital to deciphering distracted driving is understanding the relationship between a smartphone in the pocket and a smartphone in the hand of an individual during the act of driving. In 2016, NHTSA published information from the National Occupant Protection Use Survey (NOPUS) where drivers' electronic device behaviors are observed at randomly sampled intersections around the country. The findings show that in 2015, 3.8% of US drivers used handheld cell phones to make calls and an additional 2.2% of drivers employed some manipulation of an electronic device (*5*). This indicates that about 6% of all drivers have some form of electronic device interaction. However, there is research pointing to the fact that cell phone use may be much higher. In their recent evaluation of existing literature on mobile phone use and driving, Lipovac et al conclude "that more than two thirds of drivers use a

mobile phone while driving" (*6*). With more capable and powerful devices in more drivers' hands, the implications on driver distraction are at the forefront for both researchers and policymakers alike. *This research aims to build on the existing body of work on talk/text related distraction by targeting smartphone owners and exploring their email and social media usage behaviors while driving.*

The safety implications of cell phone related distracted driving are substantial, and as a result many states have adopted a variety of laws to curb phone use on the road. According to the Insurance Institute for Highway Safety (IIHS) the most prominent of these laws are a ban on text messaging for all drivers (47 states & Washington D.C.), a ban on hand-held phone calls (15 states and Washington D.C.), and a total cell phone ban for young/novice drivers (38 states and Washington D.C.) (7). While the vast majority of states have some restriction on mobile phone use, the research on the effectiveness of these laws in influencing driver behavior is inconclusive. *This study aims to better the understanding on both what people use their smartphones for while driving and why they do it. Subsequently, this information can be used to design and promote more effective policy to curb driver distraction episodes*.

Literature Review

This section is not meant to offer a comprehensive review of current cell phone distracted driving literature. Readers interested in detailed review of distracted driving research can see McCartt et al, Benden et al, Lipovac et al, and Buckley et al (*6 – 10*). The primary goal of this review is to acknowledge key themes of research within the field related to cell phone related distracted driving and to further motivate this study. The review below is oranied into three themes of inquiry namely: 1) exploring overall prevalence and risk of cell phone distracted driving, 2) understanding the impact of existing laws on cell phone related distracted driving, and 3) identifying underlying psychological factors.

To date, there has been considerable interest into the prevalence of talking and texting while driving. When looking specifically at the younger cohort, research on US college students' use behaviors finds that 90% of respondents engage in some level of talking and texting while driving (*11*, *12*). Elevated behavior is not confined to adolescents. In their study of adult populations in the US, Engelberg et al and Gliklich et al find similar levels of engagement, around 60% respectively (*13*, *14*). Looking beyond the US, researchers in New Zealand have found that about 60% of drivers talk on the phone while driving, and in Australia cell phone related distraction extends beyond young individuals to all driving age adults, with evidence that smartphones may be even more distracting (*15*, *16*). While there is variation in the reported prevalence of talk and text related cell phone use, a major area of consensus is the elevated crash risk due to manipulating a cell phone while driving. Results from naturalistic studies indicate, regardless of age or experience, the use of a cell phone in any manner is associated with substantial increase in the risk of crashes and near-crashes (*10*, *17*). Additional research into the effects on adolescent drivers has shown the length of the distraction task also increases the crash risk (*10*, *18*).

To combat the growing public health crisis related to distracted driving, a common solution is to enact legislation to dissuade individuals from using their mobile phones. However, evidence regarding the efficacy of legislation on reducing distracted driving behaviors has been mixed. Existing work explores this issue from two perspectives, how the policies have influenced observed behavior and how they have influenced observed fatal and injury crashes. Focusing first on behavior, a major line of research explores the effectiveness of bans and restrictions by comparing behaviors before and after enacting legislation. In their review of legislation in New York, Connecticut and Washington D.C., McCartt et al note that legislation may lead to short term

reductions, linked to increased enforcement. However, the authors also noted that over time, distracted behaviors begin to increase (19). Two other studies explored behaviors in a similar way after a ban on hand held cell phones for teenage drivers was enacted in North Carolina, one in the short term (5 months after enforcement) and one long term (2 years after initial enforcement). In the short term study, authors' found little change in behavior but do note increased awareness of the law. In the long term study, reductions were observed in talking on the phone while texting increased. The findings were then compared with observations from South Carolina (no-ban) and the authors' concluded that the decrease in talking could not be attributed to the cell phone ban, but rather a behavioral shift in how people communicate, from talking to texting (*20*, *21*). Recent work sponsored by the NHTSA highlights the power of enforcement to dissuade individuals from using their cell phones behind the wheel. In two separate studies, one focused in Connecticut and New York and the other focused in Delaware and California, researchers find that there are significant increases in awareness and reductions in observed cell phone use after media and enforcement campaigns (*22*, *23*). These findings regarding behavior modification are logical. People respond to the negative incentive of tickets and penalties, but enforcement is oftentimes costly and difficult. When the advertising campaigns and officer visibility wane, individuals reengage in target behaviors and they persist. In line with the behavioral results, research into the influence of policy on injury and fatal crashes is also inconclusive. In New York State, Nikolaev et al found significant reductions in injury crashes and a slight reduction in fatal crashes after a complete hand-held ban was enacted (*24*). Conversely, while controlling for various driver types (new drivers vs. established drivers) Ehsani et al find a slight increase in severe crash types after the enactment of a texting ban in Michigan (*25*). The findings show that legal intervention can have some influence on behavior, but that its effectiveness is mixed. Additionally, in some cases safety performance appeared to deteriorate after legislation was enacted.

As can be seen there is a rich body of literature on the pervasiveness and dangers of cell phone related distracted driving. There are also a number of studies that have documented the mixed effectiveness of a common strategy for reducing distracted driving namely legislation. However, the question remains as to why people continue to use their phones while driving. To understand this, various works have explored the underlying psychological constructs to better understand cell phone behavior while driving. One logical pathway for conceptualizing behavior is through the lens of perceived risk. Nelson, Atchley and Little surveyed individuals in the US on their phone call behaviors and perceived risk. They find no direct link between risk and frequency of making phone calls while driving, but do note that the importance of the call was substantial in predicting behavior (*26*). When looking at texting, Atchley, Atwood, and Boulton pose various situations of texting and driving and measure individuals perceived risk. They find that risk again has little influence on the decision to text, and that the decision to text may lower the overall risk perception while driving (*27*). Outside of risk, Schlehofer et al identify three factors that positively influence frequency of cell phone behavior while driving, namely, perceived driving ability in relation to others, ability to compensate for changing conditions, and a desire to exercise control through multitasking (*28*). Hafetz et al explore the perceived advantages and disadvantages of abstention from all forms of cell phone use and find that those who perceive strong advantages in not using a cell phone while driving have much lower frequency (*29*). Feldmen et al identify mindfulness as a significant factor in texting behavior such that more mindful people engage in less texting and driving behavior (*30*). In a study replicated from previous work on drunk driving, US researchers explore the social norms (driver responsibility and legal recourse) of talk and text behavior through a variety of scenarios. They found that legal efforts against drunk driving have

created a substantial social stigma while current cell phone laws have not influenced social feelings as substantially (*31*). In the age of the smartphone, researchers have also posited that possession attachment may influence behavior. Weller et al investigate this topic through a survey of young drivers in the US and explore talk, text, app use, and internet access. They find attachment to be a significant predictor of each behavior (*32*). Even though these works have explored varied psychological constructs, they are not all based on a theory of behavior.

The focus of the research presented in this report, and of a considerable subset of the research on underlying psychological factors of distracted driving, is based on the Theory of Planned Behavior (TPB) originally proposed by Ajzen (*33*). Below research that has applied TPB are reviewed. Discussion about the features of TPB and its use in this study will be addressed in the methods section. One of the first works to apply TPB in a distracted driving context comes from Australia. Walsh et al employed TPB as way to conceptualize the intention to use a mobile phone to text or call while driving. After controlling for demographic variables, they found TPB to be applicable in explaining intent and behavior, and that calling and texting have significant differences and should be explored separately (*34*). Also in an Australian context, subsequent studies expand the TPB framework to include a variety of other factors namely: perception of risk, social and moral norms, mobile phone involvement, and past behaviors. All these factors have all been determined to make significant contributions to distracted driving behaviors (*35 –38*). These studies focus on understanding the underlying factors of calling, texting, or both. A more recent work by Gauld, Lewis, and White explores the phenomena of concealed texting in light of laws banning text messaging while driving. TPB along with moral norm, mobile phone involvement, and anticipated regret are investigated and the typical TPB controls explain 68% of the variance while the supplementary controls explain an additional 6% (*39*). Waddell and Wiener use a similar framework to explore differences in initiating and responding behavior for texting and calling and find significant contributions from TPB. However, they also note that the factors of TPB have a higher impact on the responding intention and behavior compared tot the initiating intention and behavior. They highlight social pressure to respond as a potential explanation (*40*). While much of the work cited thus far has been in an Australian context, Zhou et al apply TPB to understand hand-held and hands-free mobile phone use in China. They conclude TPB can successfully predict cell phone use intention (*41*). In the United States, Bayer and Campbell hypothesize automaticity predicts behavior in the context of texting while driving. They find that while controlling for demographic variables, automaticity does significantly predict behavior. They then include TPB controls and note that together with automaticity both remain significant (*42*). In their study of US college students' texting behavior, Bazargan-Hejazi et al use standard TPB controls along with group and moral norms to understand the underlying factors. They conclude TPB accounts for a considerable amount of the variation in texting intention (*43*). In a work especially relevant to this exploration, Tian and Robinson extend TPB constructs with past experience and perceived technological safety to explore calling, texting and social media behaviors in Midwestern college students. They find the TPB attitude construct to be a significant predictor in all behaviors, with past experience improving the explanatory power for all behaviors, while safety only significantly influences social media use (*44*).

The project adds to this body of work by exploring distracted driving behaviors using the TPB framework. Additionally, considerable effort has been made to understand talking and texting but very few studies have explored social media/networks and even fewer are aimed at understanding email behaviors while driving. *The research in this project explored the email and social media usage behaviors while driving*.

Research Objectives

The overall goal of the research is to understand new uses hand held devices and to understand the factors that underlie these behaviors. Subsequently this will help promote informed policy that targets the root causes of these behaviors and decrease overall driver distraction. The specific objectives of the study were twofold as described below:

1. The first objective of this work is to make a contribution to the distracted driving literature by furthering the understanding of two behaviors inherent to data-enabled smartphones namely: emailing and accessing social networks. Individuals are increasingly connected, and the expectation to be responsive both in a work and social setting is substantial. Prior research has shown this pressure may be putting stress on individuals to drive distracted. It has also been noted that younger individuals have a higher incidence of cell phone related distraction. As such, much of the existing work is aimed at college students and younger populations. This study takes an expanded approach by implementing a nationwide survey targeting drivers over the age of 18.

2. As a means to influence behavior, the literature demonstrates the varied effectiveness of current legislation. The second objective of this work is to shed light on the underlying psychological constructs and their influence on the distracted driving behaviors of interest. More specifically using established Theory of Planned Behavior (TPB), attitudes underlying distracted driving behaviors are explored. By capturing respondents' attitudes, the study aims to better understand distracted driving behaviors, and subsequently inform effective policy design and implementation.

Study Approach

In this section, the methodology and procedures that were used to carry out the research are presented. This begins with an overview of the applied theoretical framework, followed by data collection approach, and concludes with discussion of analysis techniques.

Theoretical Framework

As noted above, in this project, *the Theory of Planned Behavior (TPB) was used to understand the email and social media usage behaviors* (*33*, *45*). While there are a number of other theories of behaviors in the literature, TPB is employed in this research because of its relevance to this study and its wide acceptance in the literature. Originally proposed by Ajzen in 1985, the TPB framework built upon the earlier Theory of Reasoned Action (46, 47). Both theories hypothesize that behavior can be explained by individuals' attitudes and subjective norms. However TPB extends the original work by including the concept of Perceived Behavioral Control (PBC), or the perception that one can or cannot successfully perform the behavior. Figure 1, borrowed directly from Ajzen, depicts this relationship in the form of simple diagram for the purpose of conceptualization.

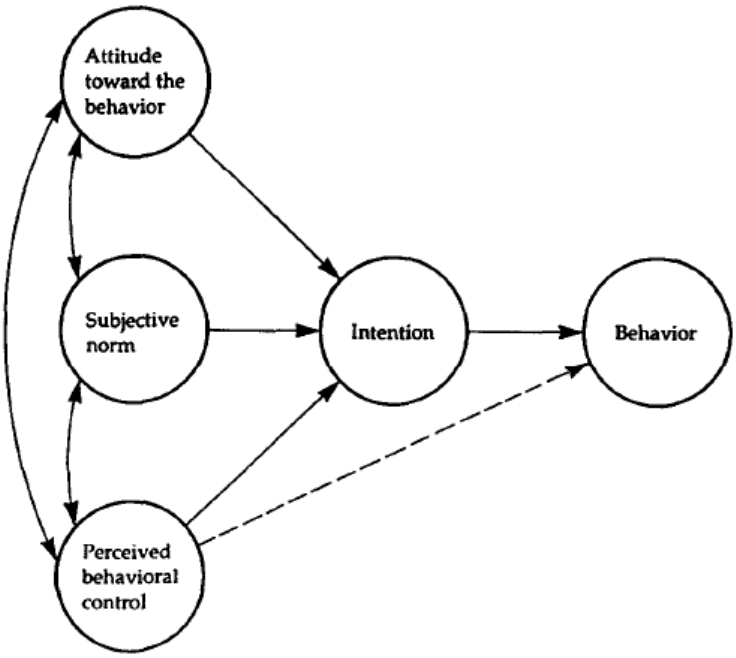

Figure 1: Structure of the Theory of Planned Behavior, Ajzen (1991)

Figure 1 highlights the influence of the three factors namely: attitudes, subjective norm, and perceived behavioral control, on intention and subsequently behavior. As a tool to explain behavior, TPB is employed in many contexts from weight-loss behavior to technology adoption, with varying degrees of success (*45*). When applied to cell phone related driving behavior, TPB has been used quite extensively and successfully to understand the underlying psychological factors. One of the core motivations for this work is to elicit an understanding of the "why" underpinning email and social media use while driving. This is quite similar to earlier works that aim to do the same in the context of calling and texting. These behaviors are elective, meaning individuals can easily choose to engage or not engage. Through deciphering the psychological why, targeted policy can be presented in such a way that individuals' consistently favor the safer option.

Data Collection

Researchers have explored various methods to tackle the issues that arise in distracted driving data collection. Some utilize behavioral observation, others target self-reported surveys, and a few use a combination of the two. *To collect the data necessary for this study, self-reported surveys were used*. A survey instrument was designed to capture respondents target behaviors, attitudes, and demographic characteristics. Survey hosting has become relatively easy in recent years with the expansion of online survey hosting sites (Survey Monkey, Qualtrics, etc.). To host the survey instrument, Qualtrics was selected for this project because of the ready access through university partnership with Qualtrics, relative ease in question implementation, and the variety of survey management features for data distribution, verification, processing, and analysis.

In terms of survey structure, the initial portion of the survey consists of screening questions to ensure individuals are adults (18 years or older) and asks their home state and postal code. This is done to confirm individuals meet our target population namely adults who are based in US. Following the screening, individuals were asked to report their smartphone ownership and typical

use behaviors, frequency of email and social network use while driving, and awareness of any laws or restrictions on cell phone use. Next they were asked to rate attitudes regarding sending/receiving email or viewing/posting on social networking sites using a 5 point Likert scale (Strongly Disagree, Disagree, Neither Agree Nor Disagree, Agree, and Strongly Agree). Finally, socio-economic and demographic information like employment, gender, income, commute mode, educational attainment and driver's license status were collected. A complete listing of the final survey questionnaire can be found in Appendix A and the four subsections are presented as they would appear to a responding individual.

After reviewing existing literature, the research team opted to focus this endeavor on the attitude aspect of the TPB. This was done to limit the burden on respondents and because attitudes typically have a strong relationship to behavior and intention in cell phone related distracted driving studies using TPB (*34-37*). Also, subsequent studies will attempt to explore the two other factors identified by TPB to influence behaviors namely: subjective norm, and perceived behavioral control. To maximize attitudinal coverage, a wide array of attitudes about various aspects of email and social networking use were explored. In total, approximately 30 questions were asked concerning the attitudes about email and social networking, respectively. As a whole, the entire survey contained 80 unique questions and it took approximately 30 minutes to complete the survey.

A critical component of any research endeavor is to ensure that the respondents comprise a representative sample of the population of interest. Historically, a considerable amount of psychological and behavioral research has been conducted using a population readily available to institutional researchers, namely, college students. Heightened prevalence of cell phone ownership and observed behavior has also made college aged participants specifically interesting in a distracted driving context. This overlap is evident in the literature. However, this also highlights a gap in the understanding of distracted driving behaviors for the wider adult population. Contacting a large and diverse group that is willing to respond is a challenging task. One way that this has been accomplished in the past is with telephone surveying or online recruitment.

In an effort to collect responses from a large and diverse group of individuals, Amazon's Mechanical Turk Platform was used to recruit participants (www.mturk.com). As described on the sites homepage, MTurk serves as a tool that turns a disaggregate band of anonymous individuals into a flexible workforce to complete tasks that require human interaction (image verification, market research, data cleaning, etc.). In order to accomplish this, requestors (individuals looking to crowdsource a job) post a Human Intelligence Task (HIT) which is then displayed on the MTurk marketplace. Interested workers can then complete the task in return for a set level of compensation (*48*). After a worker completes a task, the original requestor has the ability to review the work and accept or deny payment on the basis of quality. A worker's overall acceptance level is carried on to future HITs, and requesters are able to filter out workers with lower acceptance percentages. Amazon also allows integrated filtering based on the worker's characteristics, however excluding basic geographic location (e.g. allow responses only from US workers), most of these have a fee scaled by the desired number of workers.

While not primarily intended to recruit participants for surveys, MTurk platform has been used by researchers successfully in the past. Researchers from various contexts have explored the feasibility of MTurk samples and point out that with care quality and valid data can be obtained using the MTurk platform. Casler, Bickel and Hackett look at variations in both participant demographics and response quality for three distinct groups; college students, individuals recruited through social media, and MTurk workers. They find that not only are the MTurk samples of

comparable quality to the populations tested in person, but they are also considerably more diverse in demographic composition (*49*). In their analysis, Ross et al identify increased diversity along demographic variables like age, gender, and income but do warn of deviations from accepted distributions in education and a clustering of nationalities (*50*). In a political context, Levay, Freese, and Druckman compare MTurk samples with the American National Election Studies and determine that after controlling for a variety of political measurables MTurk samples can resemble population level information (*51*). In their investigation, Berinsky, Huber, and Lenz compare MTurk samples with in-person samples, internet panels, and national probability based samples. They find MTurk to be an acceptable middle ground, with a greater diversity than in-person sampling and less than more costly probability based techniques (*52*). It is not surprising that MTurk can provide improved diversity along some demographics while remaining homogenous along others. To be a participant, MTurk workers must first be aware of the platform while also being able to access the internet with connected compatible device. In some use cases, this may be problematic. However, in the scope of this work, these characteristics constitute a reasonable assumption about a potential population of smartphone distracted drivers. It also provides considerable improvements in age and geographic location diversity necessary for understanding the behaviors in a US wide context.

In response to the increasing use of MTurk for recruiting respondents for surveys, Amazon has created HIT templates that can be used to easily integrate this platform with online surveys. After seeing a posted HIT, a worker would navigate to the sample page in Figure 2, below, where they are given instructions, information about the survey, and an anonymous survey link.

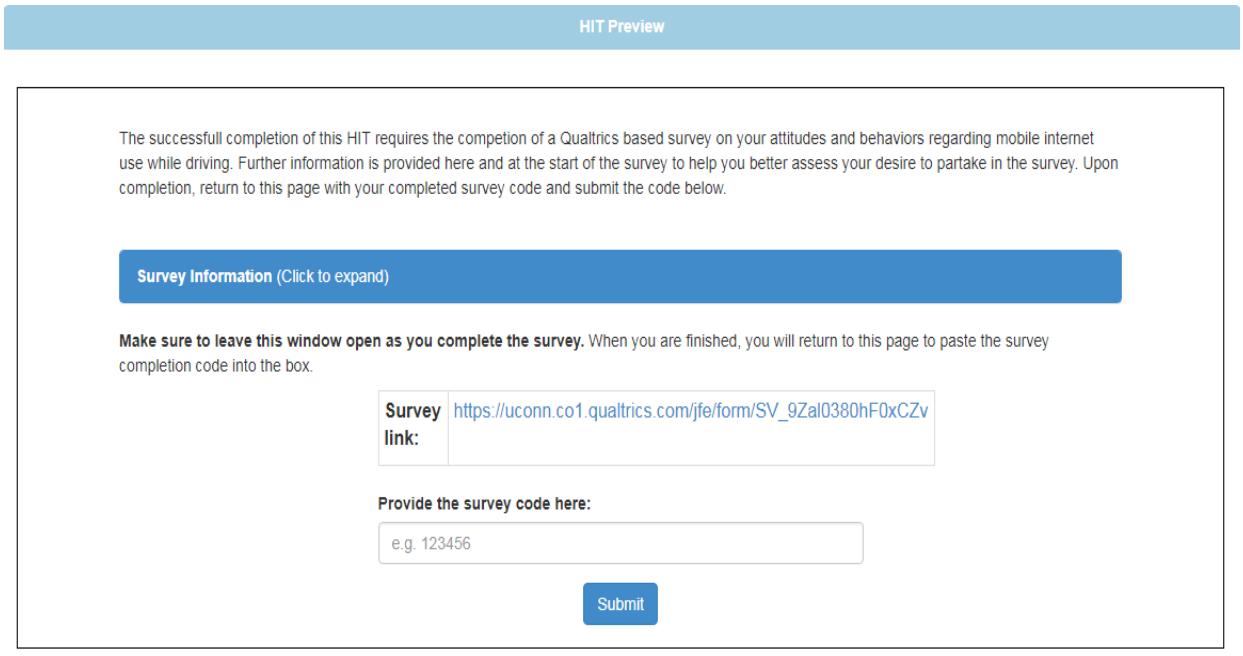

Figure 2: Sample Amazon Mechanical Turk Human Intelligence Task (HIT) preview

Due to the anonymous nature of MTurk, workers are only identified by their worker ID. Researchers must independently generate a completion code that the respondent enters back into MTurk after finishing the survey. For this study, the generation of the completion code was done in Qualtrics using an integrated random number generator and the code was visible to respondents

only upon survey completion. The survey code is then used to link MTurk worker IDs to completed surveys for data verification and payment purposes.

The main incentive for workers to complete tasks is the monetary compensation. In the MTurk marketplace, common payment for survey tasks range anywhere from a few cents to a few dollars. The onus is on the requester to set a reasonable level of compensation to attain the desired number of responses. Tasks that are long or arduous typically receive higher levels of compensation, or are otherwise passed over by MTurk workers. Research indicates that 75 cents can be successfully used to recruit participants for a 30 minute study, but higher compensation typically results in quicker responses (*53*). In the case of this study, workers were offered $2.50 for completion of the conservatively estimated 30 minute survey. This is substantially higher than the median hourly rate of $1.38 for MTurk workers estimated by Horton and Chilton (*54*).

In lieu of the considerably high rate of compensation for this survey, four verification questions (Appendix A, questions: 5, 10.1, 18.3, & 24) were built into the survey to ensure respondents do not rapidly dash to completion. These verification questions are presented in the same manner as adjacent questions, however they instruct the respondent to select a predetermined option (for example: Please Select Strongly Disagree). While this design allows for response verification, it also requires checks to be made to ensure the responses were correct prior to offering payment. Respondents were automatically disqualified from payment if they do not complete the survey, or if they do not provide a valid completion code back to MTurk. To determine which complete respondents to receive payment, the verification questions were manually checked. If only one verification question is violated, but the survey is otherwise reasonable, payment is issued. If only one verification question is violated but survey responses are provided in a systematic manner, the response is excluded and the respondent is not paid. In the case of multiple incorrect verification questions, the response is excluded and the respondent is not paid. Figure 3 highlights the survey process from the HIT discovery through final payment.

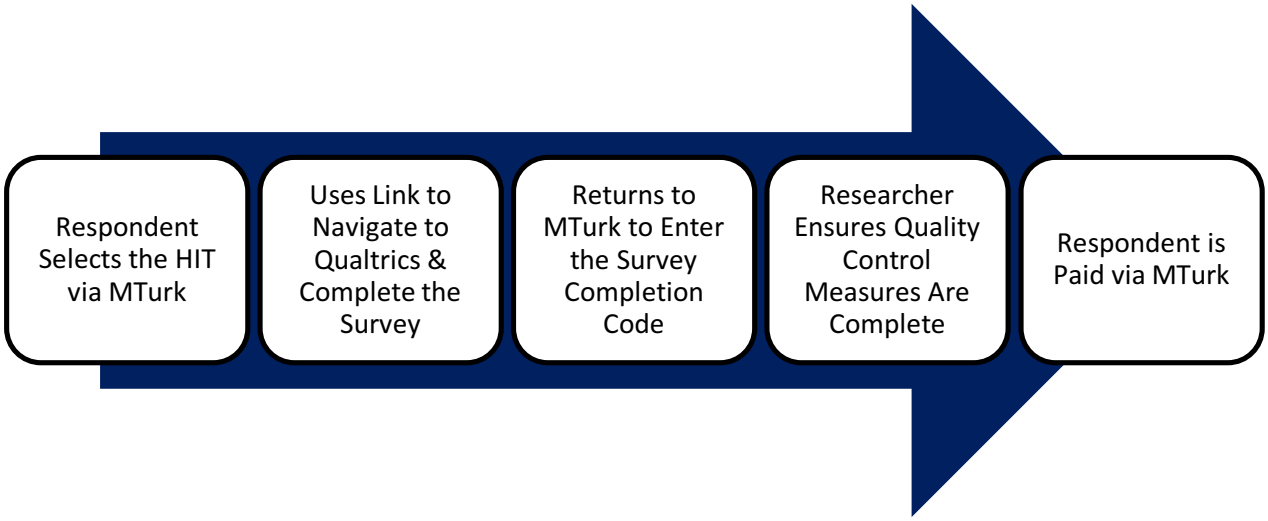

Figure 3: Flowchart of the Data Collection, Verification, and Payment Process

To test both the survey instrument and the MTurk distribution system, a 50 person pilot study was done. The goal of the pilot was to identify any issues with the survey instrument, determine how long it would take to get 50 responses, and identify the amount of time to verify and pay the respondents. The results of the pilot were promising. It took only a few hours to get all 50 responses – while the pace at which the target number of responses received was surprising,

this was not unreasonable. Considering the compensation for this survey is substantially higher than the median earnings and also the pay for most HIT tasks, it is likely that the HIT garnered considerable interest. After the success of the pilot study, a full distribution targeting 500 respondents was implemented. The only change incorporated in the second wave was an MTurk filter excluding workers, by worker ID, who had participated in the pilot to prevent responses from the same individuals. In the main study, the 500 target responses were obtained within about 5 hours of being posted in the marketplace. A complete discussion of the survey results can be found in the following sections.

Analysis Techniques

A comprehensive descriptive analysis was first completed to characterize the survey responses and assess their quality and validity. The survey instrument employed captured a wide variety of indicators were used to understand their attitudes towards target behaviors. This was done to ensure any nuances in the way people perceive email and social networking are captured. It is likely that a number of indicators are likely manifestations of a more general latent, or unobserved attitudinal construct. *In an effort to capture the underlying attitudinal constructs, a factor analysis was carried out*. Much of the descriptive analysis was limited to univariate and bivariate analysis. As a result, descriptive analysis alone is not sufficient to garner insight into how attitudes influence email and social network behavior while driving. Additionally, descriptive analysis doesn't allow for controlling the influence of socioeconomic and demographics factors. *In order to accomplish this, a simple linear regression model was estimated with the email and social media usage as dependent variables and the latent attitudinal constructs from the factor analysis and other observed factors as controls*. Descriptive analysis is presented in the following section. In the next section, factor analysis and regression analysis results are discussed.

Descriptive Analysis

After finalizing collection and issuing payment, a comprehensive descriptive analysis was completed to characterize the survey responses. Here, summary information is presented on geographic location, demographic information, smartphone usage behaviors, and awareness of any laws. Following the exploration into who these individuals are, comparisons are presented between the group of respondents who report participating in some form of distracted behavior and those who report never using their mobile phones while driving.

Differences in geographic location can often influence various aspects of human behavior. One of the main goals of this survey was to be able to capture the regional variations. Therefore, a representative nationwide sample was sought to characterize email and social network distraction behaviors across the U.S. Using the integrated high-level filters in MTurk, the collection of only U.S. based respondents was accomplished with relative ease. However, little influence was available in selecting where in the U.S. these respondents would come from. Figure 4, above, highlights the number of individuals from each state as well as the statewide distribution of all 550 responses. Alaska and the District of Columbia were the only two geographic bodies not represented. The distribution of survey respondents compares favorably with the population distribution by state derived from 2016 ACS estimates (*55*). As expected, the 5 most populous states: California, Florida, New York, Pennsylvania, and Texas, all have substantial representation in the sample. Together, these 5 states represent about 34% of the total sample. This compares well with the total population estimates from these 5 states at about 37% of the entire U.S from the ACS. Due to the relatively limited size of the sample, some states deviate from their population

distributions. California is underrepresented in the sample at only 6.55% of the total respondents, while the true population make up is around 12% of the US population. On the other hand, North Carolina comprises only about 3% of the population but comprises about 6% of the sample. However, the average difference between the sample distribution and the population distribution are reasonable close, thus, allowing for a nationwide study of the email and social media usage behaviors while driving.

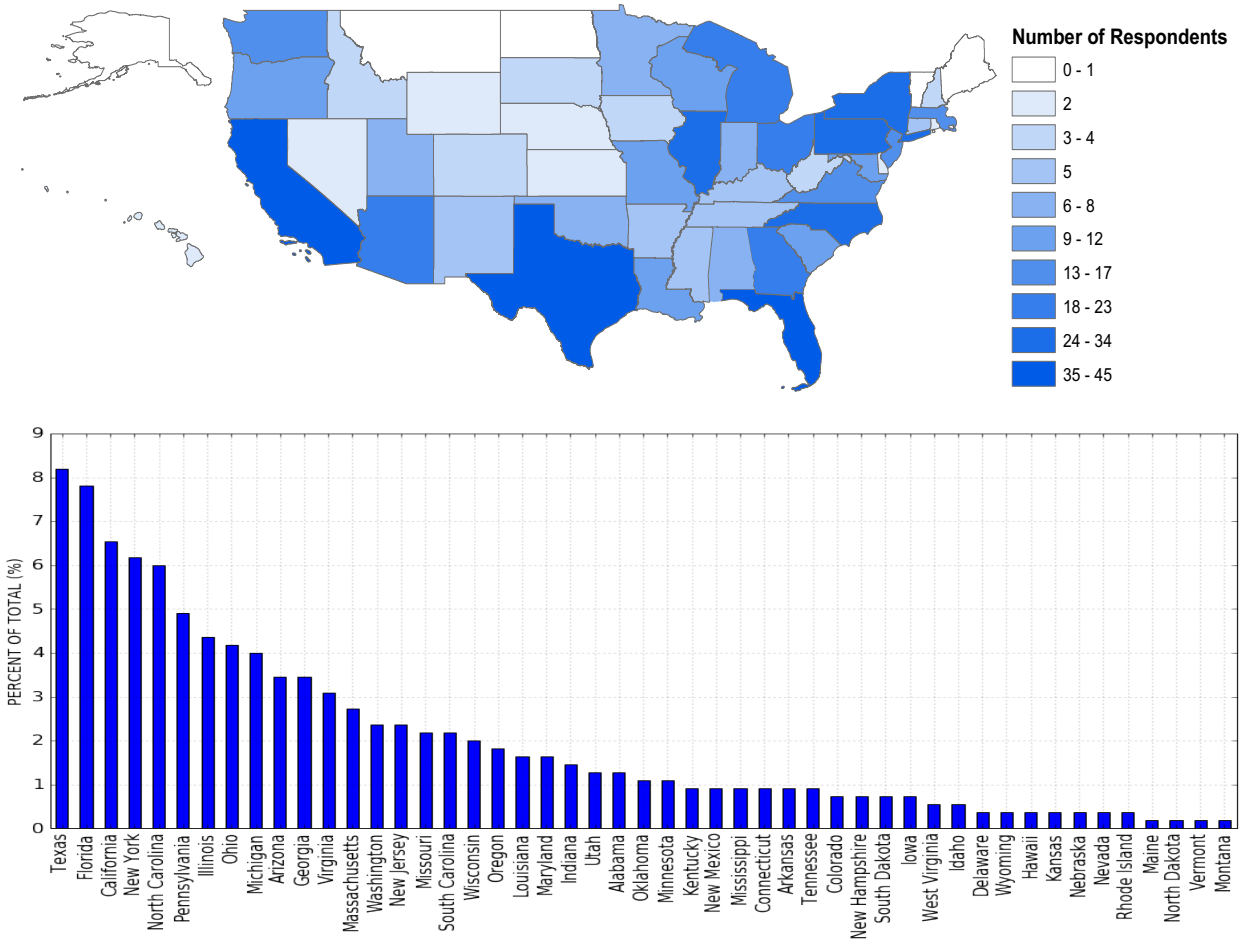

Figure 4: Reported State of Residence and Associated Distribution

Extending beyond location, Figure 5 highlights the sample distributions of age and gender. Similar to the geographic distribution, the age and gender make-up of the sample compare well with population distributions obtained from the ACS (*56*). The survey was designed to explore the attitudes and behaviors of adults, and as such the collected responses explicitly exclude individuals younger than 18. The respondents were asked to report their age in predefined age-bins, and the delineation of those bins is highlighted in the left pie chart in Figure 5. The majority of individuals in the sample, about 46%, reported being between 25 and 34 years old. This is followed by the next eldest range, 35 to 50, at almost 32%. Younger adults, aged 18 to 24, surprisingly comprised only a small portion of the total sample at 8.18%. In the context of this work, a lack of younger adults is not inherently limiting as the study set out to explore the entire range of adults. Also, much of the established literature is focused expressly on the younger, college aged cohort. In line

with expectations, elderly individuals, those over the age of 65, comprised the smallest portion of the sample, and no responses were collected from individuals over 85 years old.

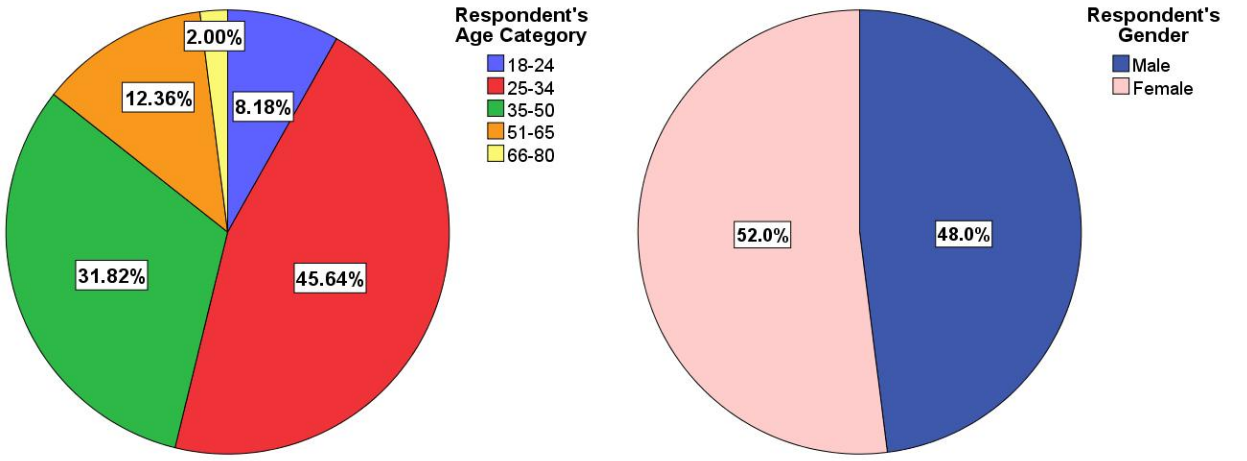

Figure 5: Age and Gender Distribution

Also noted in Figure 5, the sample is predominantly female at 52%. The estimated population level distribution is about 51% female (*56*). At a coarse demographic level, focusing only on age, gender, and location, the sample recruited through MTurk closely represents the population across the US. These findings are in line with earlier research that MTurk can be used to obtain representative samples. Also they further allude to the potential of MTurk as an alternative way to collect data on a representative sample of individuals in survey studies.

While the sample is similar to population level characteristics in some respects, the trend does not hold across all the demographic information collected. Tables 1 and 2 provide a summary of the other demographic information collected in the survey. Educational attainment and employment characteristics are presented in Table 1. Ethnicity, income, and key travel characteristics are presented in Table 2.

When considering educational attainment, the sample is quite accomplished. Over 87% of respondents report at least some college experience. Looking more broadly at the entire sample, all surveyed individuals have at least a high school diploma or GED. A small subset of the sample, just over 10%, report currently continuing their education and are enrolled in some level of schooling. These numbers indicate a higher level of education than would be expected at a population level, but taking into account the access and awareness hurdle of the MTurk system discussed previously, this may be reasonable. These findings also coincide with those of Ross et al where they note MTurk samples to be skewed toward higher education levels (*50*).

Much of the same can be said of the sample's employment. The vast majority of respondents are employed, about 87%. Of those that are employed, most report working full time at 40 or more hours a week. Interestingly, a considerable proportion of workers, just over 39%, are employed in professional or managerial 'white-collar' jobs. The presence of these individuals is interesting considering the fact that they presumably make considerably more that the average MTurk worker per hour. This presents the question; why would full time employees spend valuable time working for comparatively little? A simple explanation can be found in the inherent flexibility of MTurk, which some may find freeing or interesting compared to their traditional fulltime work.

In this way, individuals may find MTurk a productive way to fill downtime while simultaneously making additional income. This explanation is speculative, but it does offer some understanding into the samples educational and employment characteristics and warrants additional exploration.

Table 1: Education and Employment Characteristics

Variable		Count	Percent of Total
Educational Attainment (N=550)	Less than High School Graduate	0	0.00%
	High School Graduate, including GED	66	12.00%
	Some College or Associate's Degree	189	34.36%
	Bachelor's Degree	226	41.09%
	Graduate or Professional Degree	68	12.36%
	Other	1	0.18%
Currently Enrolled in School (N=550)	No	493	89.64%
	Yes	57	10.36%
Employed (N=550)	No	74	13.45%
	Yes	476	86.55%
Typical Work Hours (N=476)	Less than 20 hours per week	18	3.78%
	20 to 39 hours per week	93	19.54%
	40 or more hours per week	365	76.68%
Employment Type (N=476)	Sales	79	16.60%
	Service	105	22.06%
	Management, professional, or related	187	39.29%
	Farming, Fishing, & Forestry	4	0.84%
	Construction, Extraction & Maintenance	11	2.31%
	Production, Transportation & Material Moving	17	3.57%
	Other	73	15.34%

Having discussed education and employment, Table 2 highlights ethnicity, income, and typical means of travel. In terms of ethnic distribution, the majority of respondents are White/Caucasian at nearly 80% of the sample. African American and Asian individuals comprise the next largest groups at 6.36% each. The remaining ethnicities have much smaller representation in the sample. In regard to ethnicity, the sample is less diverse than the population. Per ACS estimates, the population distribution breaks down to about 73.3% White, 12.6% Black or African American, 5.2% Asian, and 3.1% multiracial. The sample has a proportional overrepresentation of White individuals and underrepresentation of African American individuals, but not at completely unreasonable levels.

Focusing next on income, the household income distribution is concentrated around the two middle income bins with about 57% of respondents reporting household income between $25,000 and $75,000. Low income households comprise only 13.45% of the sample which is similar to the number of high income households that make over $100,000 at 14.55%.

In regard to travel characteristics, the sample is comprised almost completely of licensed drivers and over 91% report typically traveling as the primary driver for their travel (alone or in a carpool as the driver). In relation to the focus on distracted driving, these findings are reassuring; most of the survey pool can legally drive and appear to drive as their main means of transportation.

Table 2: Ethnicity, Income, and Typical Travel Characteristics

Variable		Count	Percent of Total
Ethnicity (N=550)	White/Caucasian	437	79.45%
	Black/African American	35	6.36%
	Asian Only	35	6.36%
	American Indian, Alaskan Native	5	0.91%
	Native Hawaiian, Other Pacific	1	0.18%
	Multiracial	16	2.91%
	Hispanic	19	3.45%
	Other	2	0.36%
Household Income (N=550)	Less than $25,000	74	13.45%
	$25,000 - $49,999	158	28.73%
	$50,000 - $74,999	155	28.18%
	$75,000 - $99,999	83	15.09%
	$100,000 - $149,999	59	10.73%
	Greater than $150,000	21	3.82%
Licensed Driver (N=550)	No	11	2.00%
	Yes	539	98.00%
Typical Travel Mode (N=550)	Drive Alone	356	64.73%
	Carpool - Primary Driver	146	26.55%
	Carpool - Passenger	26	4.73%
	Taxi/TNC (Uber, Lyft)	2	0.36%
	Public Transportation	14	2.55%
	Bike	1	0.18%
	Walk	4	0.73%
	Other	1	0.18%

The demographics alone are telling, but part of understanding who the respondents are is characterizing their technology ownership. Table 3, below, highlights the ownership status of the survey respondents. A major change in the area of cell phone related distraction is the widespread proliferation of technology, and specifically the smartphone. As discussed earlier, recent studies place smartphone ownership in 2016 at around 77% for adults in the US (*4*). An important aspect of Table 3 is the almost complete adoption of the smartphone by survey respondents. At 98.55% reported ownership, only 8 individuals reported not owning a smartphone. This is significant because data from just the previous year cites much lower levels of adoption and can provide a sense of smartphone uptake. One of the largest selling points of smartphone technology is its

mobility. While smartphone ownership is vital to understating distracted driving in this study's context, an understanding of other owned devices is also telling. The substantial number of laptop and tablet owners in the sample reflects this trend for portability in technology. With ownership rates of 86.00% and 67.64% respectively, it appears that the vast majority of sampled individuals are moving away from non-portable alternatives like desktop computers and landline phones. Even relative newcomers, like the smartwatch (e.g. Apple Watch, Samsung Gear), have considerable representation in the sample with 14% of respondents saying they own one. Considering the previously noted skew towards educated, employed, and relatively high income individuals in the sample, the elevated rates of technology adoption are not explicitly surprising. However, they do note the growing presence of mobile computing and reliance on the ability to do things "on-the-go", which certainly has implications on driving and distraction.

Table 3: Technology Ownership

Device (N=550)	**Yes**	**No**	**Percent of Respondents With Device**
Smartphone	542	8	98.55%
Standard Cell Phone	103	447	18.73%
Tablet	372	178	67.64%
Laptop Computer	473	77	86.00%
Desktop Computer	340	210	61.82%
Smartwatch	77	473	14.00%
Landline Phone	143	407	26.00%

With a survey sample comprised predominantly of smartphone owners, the smartphone usage behaviors were explored. Figure 6 highlights the reported ranking of eight common smartphone uses: calling, texting, accessing social networks (Facebook, Twitter, Instagram, etc.), general internet access (shopping, news, and information), emailing, listening to music, navigation, and using dedicated messaging apps (Viber, WhatsApp, Kik, etc.). When looking at the ranks, it is apparent that for the majority of respondents calling and texting are the top two smartphone activities. This is in line with the existing research and in part explains why legislation thus far has targeted these two behaviors specifically. While not as clearly defined as the ranks for calling and texting, it is apparent that the majority of surveyed individuals place accessing social networks within their top 3 smartphone activates. Directly in line with the widespread adoption of the smartphone, social networking, also known as social media or social networks, has seen substantial and impactful growth. Big names like Facebook, Instagram, and Twitter have users around globe and provide a unique social experience which easily explains social networking's rank in the top 3. The remaining activities have no clear rank and it seems individuals value them at varying degrees. Because emailing is the other focus behavior of this study, it warrants explicit comment. Emailing falls between third and sixth for many respondents with a rank of fifth appearing the most. Considering that emailing is not as constant a means of communication as texting or making a phone call, while also lacking the fun of social networking, it is understandable that it is ranked after these activities. However, emailing is perhaps the most formal and work-related of the activities which contributes to its importance. The lower ranking may be explained by the fact that people typically email from another device, like a computer, but as prior research has shown the

more important the communication is, the more likely it is to be answered while driving. This fact makes emailing interesting withstanding its middling rank among respondents.

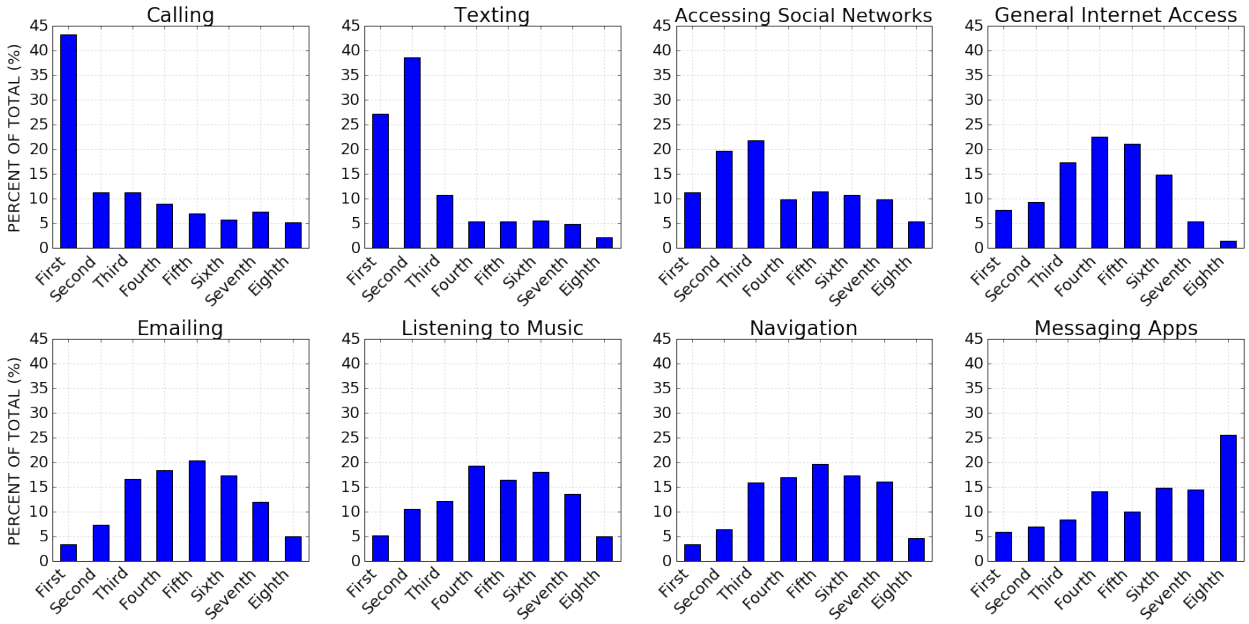

Figure 6: Reported Smartphone Use Ranks: What Do You Use Your Phone For?

The growing influence of social networking, coupled with the widespread use of email, spurred the original interest into exploring these behaviors in the context of distracted driving, but it is important to also understand how frequently do individuals engage in these behaviors. Figure 7 highlights the distribution of respondents use frequencies for both behaviors. The orange bars represent the frequency distribution for email use while driving and the blue bars represent the same for social networking access. The majority of respondents say they never use email while driving (about 60%), and a slightly higher proportion say they never access social networks while driving (about 65%). For those respondents that do engage in distracted behaviors, more individuals report occasionally sending or reading email while driving than accessing social networks. The same can be said for those individuals that report performing a behavior for 50% of trips. It is interesting to note that in high frequency individuals, those that perform a behavior for most or all trips, posting or viewing content on social networks has a slight edge ever emailing.

Figure 7 presents a snapshot of how frequently survey respondents reported performing the target behaviors behind the wheel. However, it does not truly capture the prevalence of distracted driving in the sample. To understand overall distraction in the context of these two behaviors, it is useful to look at the total number of individuals that report at least occasional performance of either activity. In this sense, the sample can be divided into two groups, a never use group and a group that has reported at least occasional use of one or both of the target behaviors. This can be seen in Figure 8 below. Of the surveyed individuals, 291 report never engaging in either activity i.e. 53% of the sample. 62 report emailing only (11.27% of sample), 42 report accessing social networking only (7.64% of sample), and 155 report engaging in both activates (28.18% of sample). Together, 259 respondents report at least some distracted driving i.e. 47.09% of the sample. This shows that a significant share of the population engages in use of smartphone for emailing and social media usage. It is therefore important to explore these behaviors further so that effective policies can be

designed. Comparisons between the characteristics of these groups are discussed later in this section.

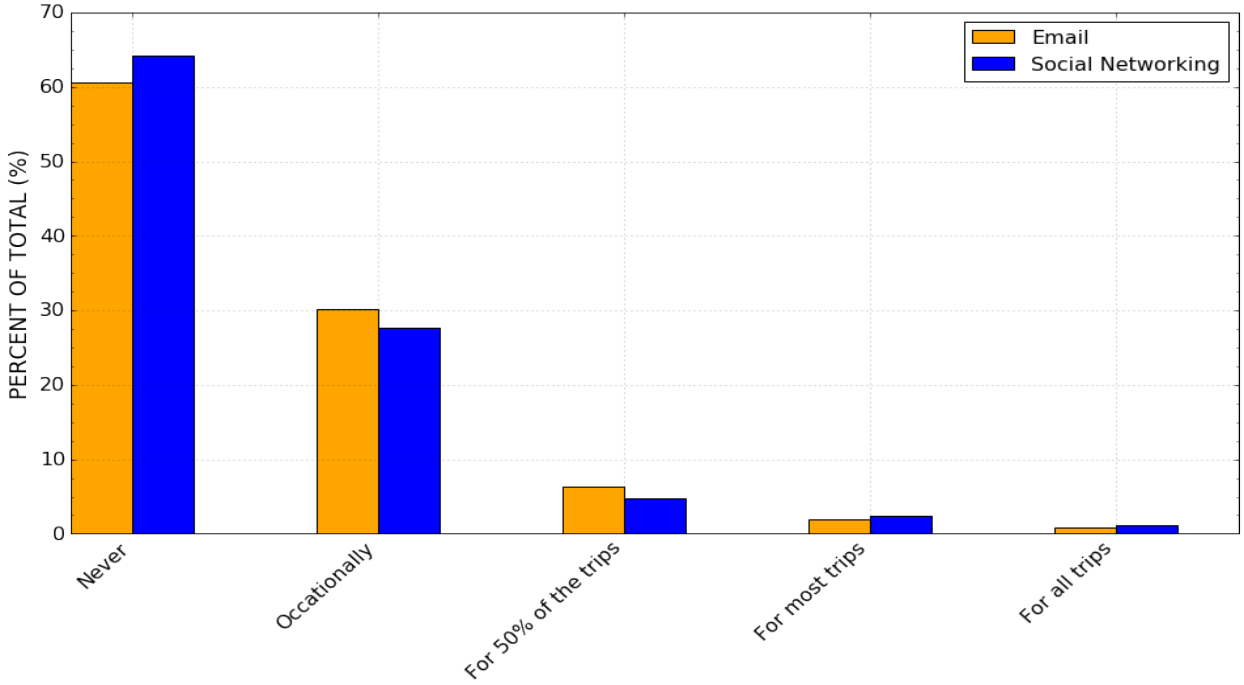

Figure 7: Distribution of Reported Email and Social Network Frequency While Driving

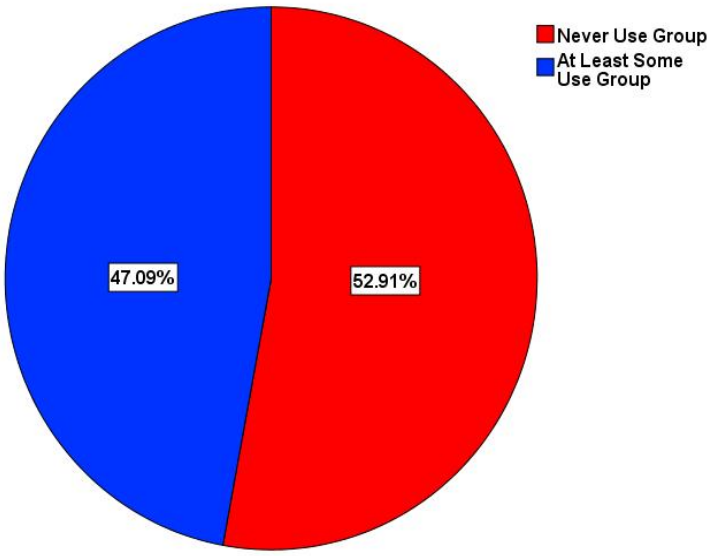

Figure 8: Target Behavior Prevalence

Attitudes

Characterization of, and understanding, the underlying attitudes regarding the target behaviors are a main focus of this study. This subsection is dedicated solely to the responses to the different attitudinal questions. In an effort to present the information in the most effective way possible, the full text of the attitudinal questions won't be used. Instead, variable names associated with the attitudinal questions will be used in the remainder of the report. Table 4 presents the mapping between measured attitudes and variable names. Attitudes are grouped as they would appear to survey respondents.

Table 4: List of Measured Attitudes and Variable Names

Measured Attitude	Variable Name
Sending/Reading email while driving is harmful	e_harmful
Sending/Reading email while driving is unwise	e_unwise
Sending/Reading email while driving is bad	e_bad
Sending/Reading email while driving is worthless	e_worthless
Sending/Reading email while driving is dangerous	e_dangerous
Sending/Reading email while driving is illegal	e_illegal
Sending/Reading email while driving improves productivity	e_imp_prod
Sending/Reading email while driving improves efficiency	e_imp_eff
Sending/Reading email while driving increases social connectivity	e_inc_sc
Sending/Reading email while driving helps coordinate social activities	e_coord_sa
Sending/Reading email while driving increases work connectivity	e_inc_wc
Sending/Reading email while driving helps coordinate work activities	e_coord_wa
Sending/Reading email while driving allows me to be more responsive	e_responsive
Sending/Reading email while driving will increase the amount of time at home	e_inc_th
Sending/Reading email while driving does not affect driving ability	e_na_da
Sending/Reading email while driving will not increase my chances of being caught by the police	e_no_police
Sending/Reading email while driving does not pose a safety hazard for other drivers	e_no_sh_d
Sending/Reading email while driving does not pose a safety hazard for non-motorists	e_no_sh_nm
Sending/Reading email while driving will reduce tendency to speed	e_red_speed
Sending/Reading email while driving helps keep someone mentally alert	e_ment_alert
Sending/Reading email while driving is pleasant	e_pleasant
Sending/Reading email while driving is interesting	e_interesting
Sending/Reading email while driving is fun	e_fun
Sending/Reading email while driving is exciting	e_exciting
Sending/Reading email while driving increases sense of security	e_inc_security

Measured Attitude	Variable Name
Sending/Reading email while driving makes me feel apprehensive	e_apprehensive
Most people send/read email while driving because it makes them feel more informed	e_mp_informed
Most people send/read email while driving out of fear of missing out on work related information	e_mp_miss_w_info
Most people do not send/read email while driving from fear of losing control	e_mp_fear_lc
Most people do not send/read email while driving from fear of creating a safety hazard for other drivers	e_mp_fear_sh_d
Most people do not send/read email while driving from fear of creating a safety hazard for non-motorists	e_mp_fear_sh_nm
Viewing/Posting content on social networking sites while driving is harmful	sn_harmful
Viewing/Posting content on social networking sites while driving is unwise	sn_unwise
Viewing/Posting content on social networking sites while driving is bad	sn_bad
Viewing/Posting content on social networking sites while driving is worthless	sn_worthless
Viewing/Posting content on social networking sites while driving is dangerous	sn_dangerous
Viewing/Posting content on social networking sites while driving is illegal	sn_illegal
Viewing/Posting content on social networking sites while driving increases work connectivity	sn_inc_wc
Viewing/Posting content on social networking sites while driving helps coordinate social activities	sn_coord_sa
Viewing/Posting content on social networking sites while driving helps coordinate work activities	sn_coord_wa
Viewing/Posting content on social networking sites while driving increases work efficiency by eliminating distraction related to social networking sites at the workplace	sn_inc_we
Viewing or posting content on social networking sites while driving doesn't affect driving ability	sn_no_da
Viewing/Posting content on social networking sites while driving will not increase my chances of being caught by the police	sn_no_police
Viewing/Posting content on social networking sites while driving doesn't pose a safety hazards for other drivers	sn_no_sh_d
Viewing/Posting content on social networking sites while driving doesn't pose a safety hazard for non-motorists	sn_no_sh_nm

Measured Attitude	Variable Name
Viewing/Posting content on social networking sites while driving will reduce tendency to speed	sn_red_speed
Viewing/Posting content on social networking sites while driving helps keep someone mentally alert while driving	sn_ment_alert
Viewing/Posting content on social networking sites while driving is pleasant	sn_pleasant
Viewing/Posting content on social networking sites while driving is interesting	sn_interesting
Viewing/Posting content on social networking sites while driving is fun	sn_fun
Viewing/Posting content on social networking sites while driving is exciting	sn_exciting
Viewing/Posting content on social networking sites while driving increases the sense of security	sn_inc_security
Viewing/Posting content on social networking sites while driving is frightening	sn_frightening
Most people view/post content on social networking sites while driving because it makes them feel informed	sn_mp_informed
Most people view/post content on social networking sites while driving from fear of social exclusion or 'missing out'	sn_mp_fomo
Most people do not view/post content on social networking sites while driving from fear of losing control	sn_mp_fear_lc
Most people do not view/post content on social networking sites while driving from fear of creating a safety hazard for other drivers	sn_mp_fear_sh_d
Most people do not view/post content on social networking sites while driving from fear of posing a safety hazard for non-motorists	sn_mp_fear_sh_nm

With the variable names defined, Tables 5 and 6 present a summary of the responses in the form of percentage of total respondents. Each attitude was measured on a 5 point scale. However, these tables focus only on a 3 category aggregated scale to present an overall sense of agreement/disagreement with the attitude. Similar attitudes are grouped together within each table. The complete 5 point listing can be found in Appendix B for those interested in the disaggregate levels of agreement/disagreement. In reviewing Table 5 about email use while driving, a level of agreement between respondents and conventional wisdom is observed i.e. emailing while driving is dangerous, it can impact driving ability, it is not inherently fun or interesting, etc. For the most part, this holds true across the five different categories of questions: negative aspects, beneficial aspects, lack of influence on personal driving ability, positive aspects, and perception on how other people view emailing while driving. In the first set of questions, those about how emailing while driving is negative in some way, over 90% of respondents agree with these statements. However, two outliers are apparent: 1) for the e_worthless, where only 62% of surveyed individuals agree, and 2) for the e_illegal, where only 76% of individuals agree. The lack of continuity on legality makes sense as some states currently do not expressly ban emailing while driving. However, it is interesting to observe such a large variation regarding attitudes about email's worthlessness. In the

next category of attitudes, those about the variety of benefits from emailing while driving, the respondents are again in agreement, but at a much lesser level. Only between 55-67% of them disagree that emailing while driving provides any benefit. When it comes to benefits, it appears some respondents do view emailing while driving as a task that can provide tangible benefits, with responsiveness receiving the highest level of agreement.

Table 5: Summary of Email Attitudes

Attitudes	Disagree	Neither Agree or Disagree	Agree
	% of Total		
e_harmful	2.91%	4.36%	92.73%
e_unwise	2.00%	2.73%	95.27%
e_bad	2.91%	4.73%	92.36%
e_worthless	14.73%	23.27%	62.00%
e_dangerous	2.55%	3.09%	94.36%
e_illegal	7.27%	16.00%	76.73%
e_imp_prod	67.82%	13.82%	18.36%
e_imp_eff	69.82%	13.45%	16.73%
e_inc_sc	56.18%	21.82%	22.00%
e_coord_sa	56.18%	20.73%	23.09%
e_inc_wc	57.82%	15.27%	26.91%
e_coord_wa	55.27%	19.27%	25.45%
e_responsive	56.73%	13.27%	30.00%
e_inc_th	68.91%	16.00%	15.09%
e_na_da	88.91%	4.73%	6.36%
e_no_police	83.82%	8.55%	7.64%
e_no_sh_d	91.09%	3.82%	5.09%
e_no_sh_nm	90.73%	3.82%	5.45%
e_red_speed	63.27%	18.91%	17.82%
e_ment_alert	82.36%	11.64%	6.00%
e_pleasant	74.73%	15.45%	9.82%
e_interesting	70.73%	14.91%	14.36%
e_fun	80.73%	10.55%	8.73%
e_exciting	79.64%	10.91%	9.45%
e_inc_security	87.64%	7.64%	4.73%
e_apprehensive	24.18%	10.73%	65.09%
e_mp_informed	36.55%	25.09%	38.36%
e_mp_miss_w_info	21.82%	17.64%	60.55%
e_mp_fear_lc	19.64%	17.45%	62.91%
e_mp_fear_sh_d	14.91%	11.64%	73.45%
e_mp_fear_sh_nm	15.82%	11.45%	72.73%

In the following category of attitudes about the lack of influence on driving ability, a strong majority of surveyed individuals disagree, above 80% for most attitudes. This disagreement would imply that the survey respondents do view emailing while driving as influential on driving ability, except for emailing and speeding where a considerable number of individuals, 17.82%, agree that emailing while driving reduces speeding. Similar to the negative aspects, the positive questions received a majority of dissenting responses at about 70-87% disagree. While the majority of respondents agree emailing while driving is negative and disagree that it is positive, much fewer disagree with the positive aspects. The final attitudinal indicator category is how the respondents regard most people's desires to use email while driving. Here, the majority agree that others refrain from emailing behind the wheel due to influence on driving ability at over 62%.

Table 6: Summary of Social Network Attitudes

Attitudes	Disagree	Neither Agree or Disagree	Agree
	% of Total (N=550)		
sn_harmful	3.45%	4.18%	92.36%
sn_unwise	2.18%	2.91%	94.91%
sn_bad	4.18%	3.64%	92.18%
sn_worthless	9.27%	16.36%	74.36%
sn_dangerous	2.36%	3.09%	94.55%
sn_illegal	6.00%	15.82%	78.18%
sn_inc_wc	78.18%	10.00%	11.82%
sn_coord_sa	49.45%	19.09%	31.45%
sn_coord_wa	72.55%	13.64%	13.82%
sn_inc_we	78.73%	11.64%	9.64%
sn_no_da	89.82%	5.64%	4.55%
sn_no_police	81.45%	8.36%	10.18%
sn_no_sh_d	90.18%	3.27%	6.55%
sn_no_sh_nm	90.18%	4.36%	5.45%
sn_red_speed	65.82%	19.45%	14.73%
sn_ment_alert	83.64%	9.82%	6.55%
sn_pleasant	73.09%	14.00%	12.91%
sn_interesting	70.91%	13.09%	16.00%
sn_fun	75.82%	12.36%	11.82%
sn_exciting	77.45%	12.36%	10.18%
sn_inc_security	89.82%	6.18%	4.00%
sn_frightening	16.18%	10.91%	72.91%
sn_mp_informed	22.73%	21.27%	56.00%
sn_mp_fomo	14.91%	11.09%	74.00%
sn_mp_fear_lc	17.27%	12.91%	69.82%
sn_mp_fear_sh_d	15.45%	9.82%	74.73%
sn_mp_fear_sh_nm	15.64%	11.09%	73.27%

The attitudes about social networking are similar to those on email. However, there are some attitudes measured across both behaviors that differed by more than 10% of respondents. One of the major attitudes that contrasted substantially between email and social networking while driving is whether or not the behavior is worthless. Many more respondents felt that social networking while driving is worthless, at 74.36%, compared to only 62% for email. Also substantially different were the attitudes regarding work connectivity and coordination of work activities. In both cases, the majority of respondents disagree with those statements. However, emailing while driving was agreed with much more substantially at 26.91% and 25.45% compared to only 11.82% and 13.82% for social networking. The final substantial gap in attitudes about the two behaviors was about most people's desire to perform a target behavior because it made them feel informed. In this case, a majority of respondents, 56% agreed concerning social networking and only 38.36% agreed for email.

Law Awareness

This subsection is focused on the respondents' awareness of distracted driving laws in their home state and how that awareness stands when compared to the existing legislation. This is presented below in Figure 8.

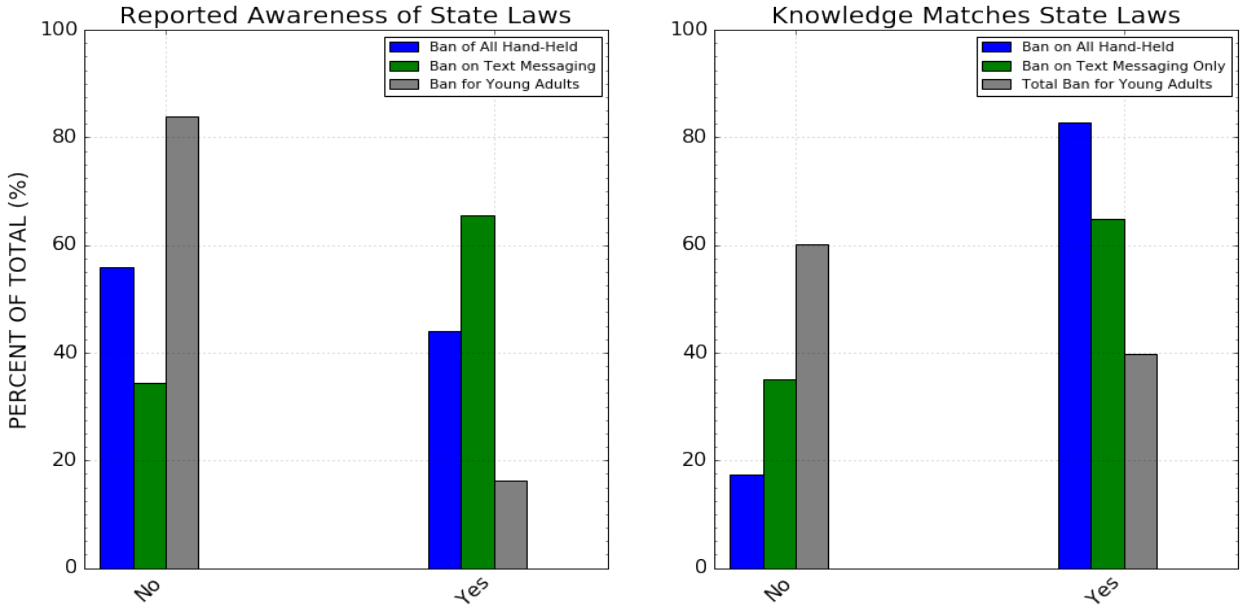

Figure 9: Self-Reported Awareness of Major Cell Phone Laws and Asymmetry of Knowledge

The left portion of Figure 8 highlights the distribution of respondent's reported awareness of the three major cell phone related laws currently in practice. The graph on the right depicts how the respondent's reported answer aligns with the actual laws in their state. The majority of states have a text messaging ban, so the high number of responses indicating yes is reasonable. A total ban for young drivers is next most prevalent, but interestingly it appears most of the respondents report not having one in their state. This is perhaps due to the fact that those laws impact only a narrow age range, which also happens to fall predominantly outside the scope of the surveyed individuals. Finally, a total hand held ban is in place in the fewest number of states and explains why only about 45% of respondents reported having one. The heightened level of awareness about

this law may be due to its controversial nature. That said, the mismatch between existing laws and people's awareness is a cause for concern and an area that warrants attention.

Comparison of Use vs Never Use Group

In this section, comparisons are presented between those respondents who report at least some distracted driving behavior (including email, social networking, or both) and those who report never performing either of the target behaviors. This is done as part of the descriptive analysis section to explore any differences in the underlying distributions of these two groups with respect to demographic makeup and measured attitudes. In lieu of restating the complete descriptive analysis presented above, only the substantial differences are highlighted here. The distributions in this section are presented out of the respective group totals rather than the entire sample to normalize them for direct comparison.

The differences in target behavior frequency are originally highlighted in Figure 7. However, the differences between those that report never emailing or social networking (the never use group) and the group with at least some use extend beyond just the reported frequency of behavior. Figure 9 highlights the variation in age composition of the two groups.

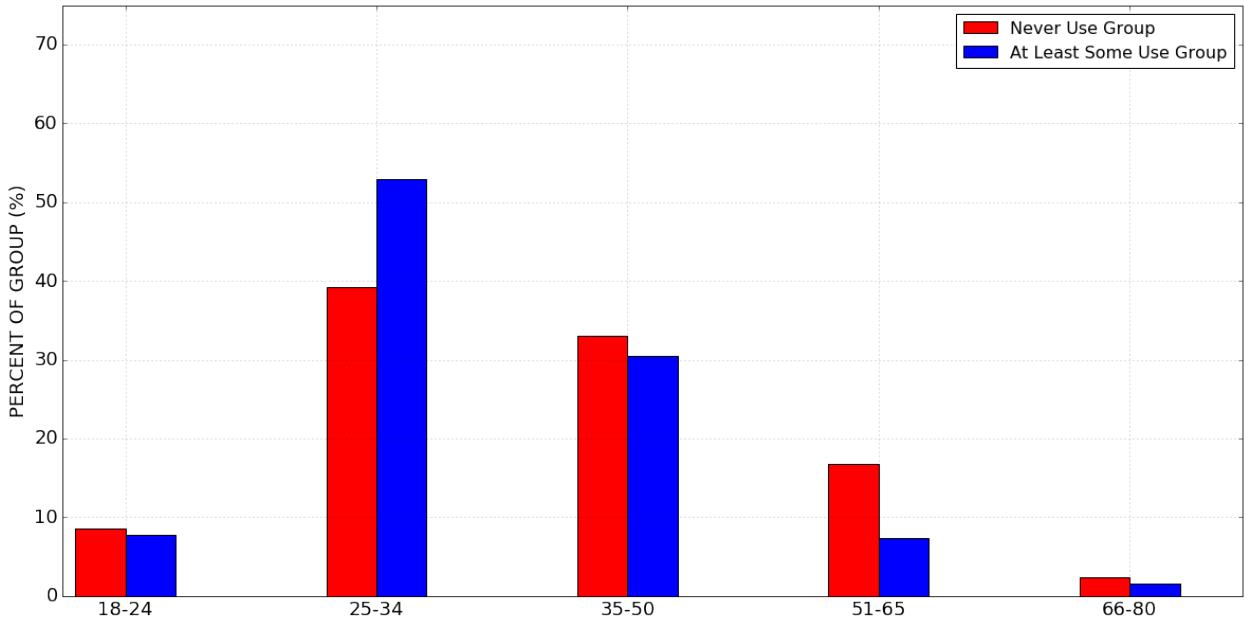

Figure 10: Age Distribution Comparison

The current consensus on distracted driving is that younger individuals have a higher propensity to drive distracted. When looking at the two groups target behaviors, email and social networking access, this is somewhat apparent. The proportion of individuals in each group between 18 and 24 years old is quite similar, but is also in line with the overall sample distribution at around 8%. The discrepancy between individuals 25-30 years old however reinforces previous findings. Over 50% of the group that reported at least some use falls within this category. In contrast, over 50% of the never use group falls between the ages of 35-65. In a sense, Figure 9 demonstrates the fact that the at least some use group is on the whole younger than their never use counterparts.

To further explore how the two groups differ, Table 7 presents the variation in their reported technology ownership. In line with expectation, almost all the individuals that report not

owning a smartphone also report never emailing or accessing social networking while driving. One individual in the group with at least occasional use also reported not owning a smartphone, however they do report owning a tablet which can explain the discrepancy in distracted driving behavior. Another important aspect of Table 7 is the substantially higher percentage of the group with some use to also own a tablet, a laptop, or a smartwatch. All of which are common tools for accessing email and social networking on the go. The never use group is characterized by owning more landlines and desktop computers, both of which are inherently stationary and commonly lack portability. At an ownership level, the group with some use is undoubtedly more tech-forward than the never use group. This apparent trend toward tech adoption may also coincide with an idea presented earlier about communicating on-the-go.

Table 7: Technology Adoption by Target Group

	Never Use Group				At Lease Some Use Group			
Device	**Total Count**	**Yes**	**No**	**Percent of Group With Device**	**Total Count**	**Yes**	**No**	**Percent of Group With Device**
Smartphone	291	284	7	97.59%	259	258	1	99.61%
Standard Cell Phone	291	46	245	15.81%	259	57	202	22.01%
Tablet	291	184	107	63.23%	259	188	71	72.59%
Laptop Computer	291	238	53	81.79%	259	235	24	90.73%
Desktop Computer	291	187	104	64.26%	259	153	106	59.07%
Smartwatch	291	21	270	7.22%	259	56	203	21.62%
Landline Phone	291	80	211	27.49%	259	63	196	24.32%

Age and technology ownership are important aspects in characterizing how these groups differ, but understanding how those with smartphones use them further shines light on understanding the target behaviors. Figure 10 depicts the same activity ranks presented in Figure 6 except here the rankings of each group are shown together. In conjunction with ownership, this understanding into how each respective group uses their smartphone captures some of the nuance in what is most valued about their device.

If texting and calling are the traditional aspects of smartphone use, the never use group is markedly traditional. Represented by the red bars, a vast majority of this group ranks calling first followed promptly by texting second. This is in contrast with the group that reported at least some use, where a majority does still ranked calling first, but a much larger emphasis is placed on texting. A similar trend can be observed in accessing social networks. The group with at least some use places a greater emphasis on this activity, and a slight majority of respondents actually ranked social networking access second of the eight options. Also, at least some use group placed social networking in the top three ranks more consistently than the never use group. Exploring email, a different pattern appears. The group with at least some use does rank emailing higher than the never use group in the top two spots, however a considerable percentage of the never use group rank email as the third most performed smartphone activity. Those individuals in the never use group also ranked emailing between third and sixth at a much higher level than the group with some use. What these rankings reveal appears to be a much higher level of homogeneity in the

never use group. The group with at least some use appears to value activities quite differently, especially when it comes to calling, texting, accessing social networks, and emailing. Table 7 already highlights ownership of connected devices at an elevated level, perhaps the heightened ownership also promotes variety in the performed activates. The four remaining activities, general internet access, listening to music, navigation, and using dedicated messaging apps do have some slight variations, but as a whole they are reasonably similar across the two groups.

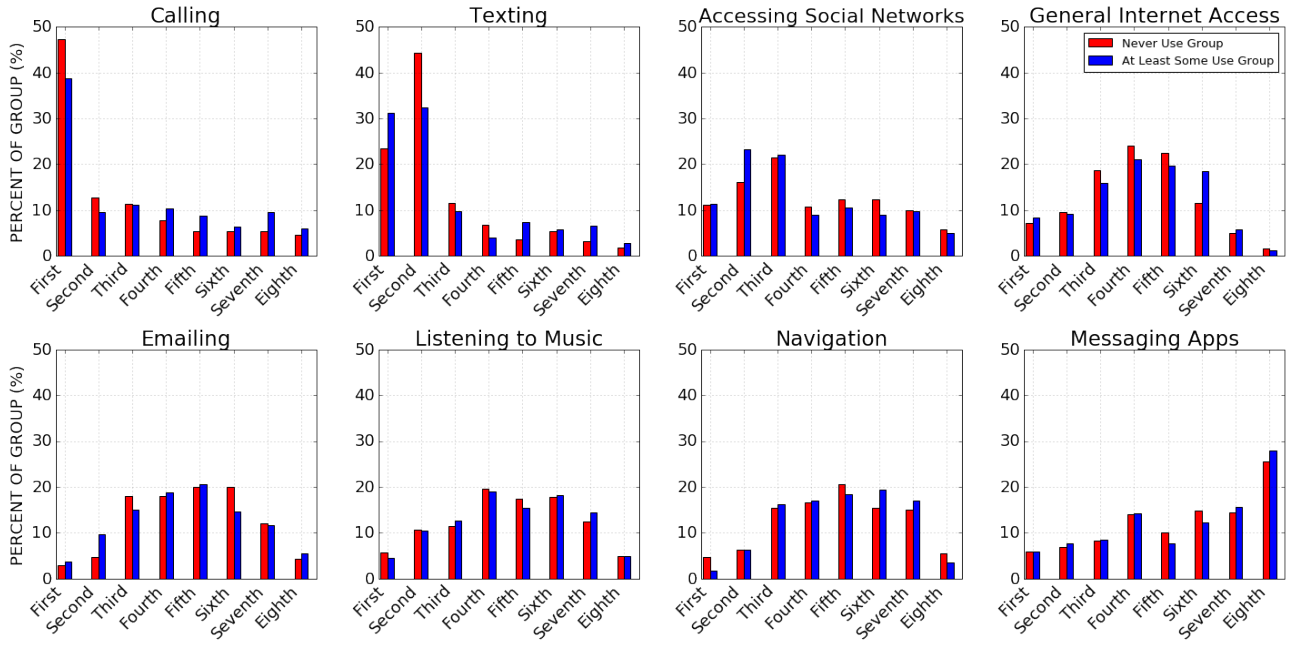

Figure 11: Smartphone Ranks by Target Group

The relationship between attitude and behavior lies at the core of this study. To finalize the comparison between these two groups, a discussion of the responses to a subset of important attitudinal questions is presented. Figure 10 depicts four attitudes for both email and social networking and the response distribution for each group. Figure 10 is used to convey how substantially attitudes can differ between individuals that decide to partake in a behavior and those that do not.

As discussed earlier, there are many similarities in the overall attitudes about both email and social networking. When those same attitudinal responses are filtered by behavior, in this case some email or social network use against never users, some noteworthy variations in attitude is displayed. Looking first at how each group views how bad the target behaviors are, these variations are obvious. Just as before, the majority of respondents do agree that the behaviors are bad, but the group that reported never performing either target behavior agreed to the most extreme extent. Those that do perform the behaviors agree and strongly agree at about the same level. An even larger deviation can be seen when looking at the positive aspects of the target behaviors. The second row of graphs in Figure 10 presents the experience of fun derived from performing the activities while driving. Here, the never use group is strongly in opposition to the statement. On the other hand, the group with at least some use still disagrees but a considerable proportion of respondents have neutral or positive feelings indicating that positive feelings may influence behavior.

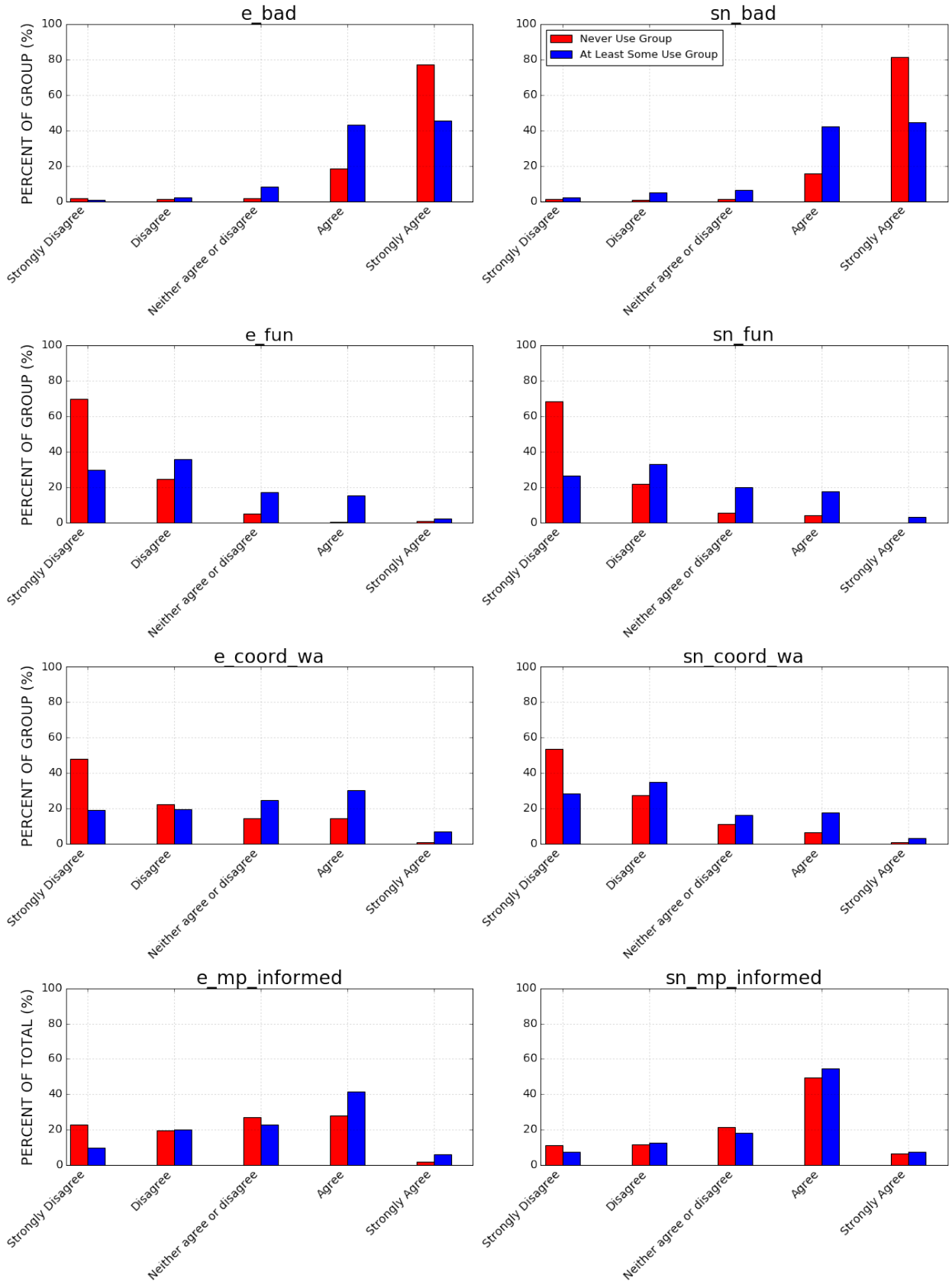

Figure 12: Attitudinal Comparison of Both Behaviors by Target Group

The target behaviors aid in coordination of work activates while driving is the next attitude highlighted. In this case, there are differences between the groups as well as the target behaviors. The majority of the never use group, as expected, disagrees with little difference between emailing and social networking. At least some group, however, is in agreement that emailing while driving can provide aid in coordinating work activities highlighted by the majority of respondents agreeing with the statement. When looking at the same statement for social networking access, the majority of respondents disagree that social networking aids in coordinating work activities. This discrepancy further highlights the fact that emailing has a strong link to work, while social networking may not. The final attitude presented in Figure 10 is most people perform a target behavior because it makes them feel more informed. In this context, the never use group provides conflicted responses regarding email with about an equal share of response for strongly disagree, disagree, neither agree or disagree, and agree. The same group of individuals does however feel most people view or post on social networking sites for the gain of information. The group with at least some use is in agreement that most people perform either behavior in an attempt to feel more informed.

In reviewing the comparison of each group, it is apparent that there are some key differences in who they are, what they use their smartphone for, and their attitudes about email and social network use while driving. To further explore these differences, factor analysis was carried out to consolidate the attitudinal indicators and to identify the underlying latent attitudinal constructs. This was followed by a regression analysis to explore the influence of the latent attitudes while controlling for demographic characteristics on the dependent variable to engage in some email or social media usage behaviors.

Modeling Analysis and Results

In this section, first results from factor analysis is presented followed by a discussion of the regression analysis results aimed at exploring the relationship between attitude and distracted driving behaviors.

Factor Analysis

By design, the survey instrument employed here captures information about a wide variety of attitudinal indicators about each of the target behaviors. This was done to ensure any nuances in the way people perceive email and social networking are captured. However, it is logical to explore the possibility that there are a variety of latent, or unobserved, attitudes that concisely represent the larger number of measured indicators. To discern these latent aspects, a procedure known as factor analysis is most commonly employed. Factor analysis is a tool used for a variety of reasons: to reduce the number of measured items into a succinct representation for interpretation, to identify latent constructs, or to test hypotheses on the relationships within the original measured items (*57*). Factor analysis is often employed in two ways: 1) Exploratory Factor Analysis (EFA) and 2) Confirmatory Factor Analysis (CFA). The two methods are designed to accomplish two different tasks. EFA is typically used in the reduction or investigation of a variety of measured items, for example identifying latent constructs or determining an overarching theory. On the contrary CFA is typically used, as its name suggests, to confirm the structure of an established theory or concept (*58*). In this project, the consolidation of the attitudinal indicators into underlying latent constructs falls within the purview of EFA.

In factor analysis, there are a variety of assumptions and operational choices that can influence the subsequent solution. Some of the key choices include the applied factor extraction

model, the number of relevant factors to extract, and the applied rotation method (*59*). The applied factor model defines how the correlation between factors are treated and analyzed, and how they are used to explain the overall variance in the measured items. The determination of the number of factors defines how many factors will be included in the solution and is guided by a wide variety of criteria defined by the researcher. Finally, to promote interpretation of the final factors, a rotation method is used to either allow correlation between factors or to assume them to be orthogonal (*58*). Fortunately, due to the popularity of EFA, the technique has substantial presence in literature with clearly defined set of best practices. Work by Costello and Osborne, and additional work by Brown, highlight some of these endeavors and both were used to aid in the operational decisions of this study (*60*, *61*).

The specific steps that were taken to apply EFA in this project are described below. IBM's SPSS statistical analysis software was employed to carry out the EFA. Latent factor identification was the goal of this portion of the analysis so selection of an extraction method was straight forward based on information in the best practice techniques. Principal Axis Factoring (PAF) was determined to be the best fit for this research due to its direct applicability to latent construct identification (*60*). PAF was selected over candidate options like Maximum Likelihood or Least Squares due to the inherent skew found in the raw item responses. To determine an acceptable number of factors, a few methods were used in concert. The first method was the analysis of the scree plot, highlighted in Appendix C Figure C1. Factors are typically included prior to where the plot finally levels off. The number of factors here was determined to be between nine and twelve due to the final drop in the plot occurring in that neighborhood. The final decision on the number of unique factors to include was based on the exclusion of trivial factors, those that have two or fewer measured items or weak item loadings (*61*). Researchers Tabachnick and Fidell suggest a cut off level of 0.32 or above to exclude of weak loadings (*62*). After a number of trials with various numbers of factors between nine and twelve, nine unique factors were used in the final analysis. The final important decision governing the results was the selection of rotation method. Considering that many of the measured items have inherent correlation (e.g. an individual's positive attitudes about emailing while driving are correlated with their negative attitudes), the choice of an oblique rotation method was obvious. A Direct Oblimin rotation was applied to allow for correlations between the latent factors. In all, the derived nine factors explained over 66% of the variances in the measured items prior to rotation.

Table 8 highlights the factors and the associated measured attitudes that map to each construct. These factors are listed in order of explained variance, with the first latent factor explaining the most, the second explain the second most, and so on. In addition to Table 8, Appendix C presents the complete results of the factor analysis including both the pattern matrix and the structure matrix necessary for comprehensive evaluation. Table C1 highlights the pattern matrix, or simply, the grouping of measured items and latent factors with associated loading values. Each loading value indicates how strongly the measured item maps to the latent factor, with higher values indicating a stronger mapping. In this work, loadings less than 0.35 are considered to have little impact on the latent factor and as such are not presented in Table C1. Table C2 presents the structure matrix and highlights the correlation between measured items and the other relevant factors. The final determination of a label for each latent factor is a subjective process. To ensure transparency, the following paragraphs convey the reasoning for each determination. The overall process of factor determination was based on a combination of which measured items map to each factor as well as how strong those mappings are.

Table 8: Factor Analysis Mapping

Proposed Latent Factor	Measured Variable(s)
Overall positive attitude, includes both behaviors	(1)e_pleasant; (2)e_interesting; (3)e_fun; (4)e_exciting; (5)e_inc_security; (6)sn_pleasant; (7)sn_interesting; (8)sn_fun; (9)sn_exciting; (10)sn_inc_security
Overall attitude about most peoples' motivation to not perform the target behaviors due to negative influence on driving ability, both behaviors	(1)e_mp_fear_lc; (2)e_mp_fear_sh_d; (3)e_mp_fear_sh_nm; (4)sn_mp_fear_lc; (5)sn_mp_fear_sh_d; (6)sn_mp_fear_sh_nm
Perceived social and work benefits from performing the target behaviors, predominantly email related	(1)e_imp_prod; (2)e_imp_eff; (3)e_inc_sc; (4)e_coord_sa; (5)e_inc_wc; (6)e_coord_wa; (7)e_responsive; (8)e_inc_th; (9)sn_coord_sa
Overall negative attitude toward emailing while driving	(1)e_harmful; (2)e_unwise; (3)e_bad; (4)e_worthless; (5)e_dangerous; (6)e_illegal
Perception of other peoples' motivation to perform the target behaviors due to information gain, both behaviors	(1)e_mp_informed; (2)e_mp_miss_w_info; (3)sn_mp_informed; (4)sn_mp_fomo
Overall negative attitude toward social networking while driving	(1)sn_harmful; (2)sn_unwise; (3)sn_bad; (4)sn_worthless; (5)sn_dangerous; (6)sn_illegal
Overall attitude about the target behaviors lack of negative influence on driving ability, both activities	(1)e_na_da; (2)e_no_sh_d; (3)e_no_sh_nm; (4)sn_na_da; (5)sn_no_sh_d; (6)sn_no_sh_nm
Perceived distraction from work activities, social networking only	(1)sn_inc_wc; (2)sn_coord_wa; (3)sn_inc_we
Perception of both activates influence on increasing speeding/reducing alertness	(1)e_red_speed; (2)sn_red_speed; (3)sn_ment_alert

The determination of a suitable characterization for the first latent factor, overall positive attitude about both target activities, was intuitive. Every measured item that defined a positive sentiment or attitude mapped to the first factor. This fact alone would lead most to the conclusion that this factor encompasses an overarching unmeasured positive attitude. This conclusion is only further supported by the loading scores. Looking at Table C1, the included items exhibit strong loadings between 0.7 and 0.83, except for improved sense of security which has a loading closer to 0.4 for both activities. This indicates that factor one is strongly related to how pleasant, fun, interesting, and exciting the target activities are. As such, the final name applied to the first latent factor was the "overarching positive attitudes about email and social networking and driving.

The second derived latent factor is characterized by another specific subset of measured items that extend across both target activates. In this case, all the measured items included in the second latent factor are related to attitudes about most peoples' motivation to not partake in the target behaviors because of negative influence on driving ability. This includes losing control,

creating a safety hazard for other drivers, and creating a safety hazard for non-motorists. The loadings of these items also proved to be very strong with all items loading onto the factor at a level above 0.72. In this way, the name applied to characterize the second factor was the overall attitude about most peoples' motivation to not perform both target behaviors due to negative influence on driving ability.

The third latent factor determined through EFA is linked directly to the measured attitudes about tangible benefits primarily from emailing while driving. The included items are sending/reading email while driving improves: productivity, improves efficiency, increases social and work connectivity, helps coordinate social and work activities, helps responsiveness, increases the time at home. The factor also included social network access helps coordinate social activities. The loading scores are also moderate to strong. Due to these facts, the underlying latent construct was determined to encompass any perceived social and work benefits from performing the target behaviors, predominantly email related.

The fourth and sixth factors involve the same measure items but are unique to each target behavior. Both of these latent factors have items capturing attitudes about how harmful, unwise, bad, worthless, dangerous, and illegal the behaviors are. The difference being the fourth factor captures those related to emailing while driving, and the sixth factor captures those related to social networking while driving. The loadings in both cases are similar, with how illegal the behaviors are representing the weakest link. As such, these factors encompass an overall negative attitude about email use in factor four and about social network use in factor 6.

Information is an important focus in the modern world and the fifth factor captures the underlying influence in how individuals view most peoples' desire for information as it relates to email and social network use. The items related to the fifth factor are a fear of missing out on work information related to email, a fear of missing out on social information related to social networking, and a desire to feel informed related to both behaviors. The measured items on both of the target behaviors are similar. However, the loadings are stronger for those related to social network use. In this way, the name given to the fifth derived unobserved factor was the perception of other peoples' motivation to perform the target behaviors due to information gain.

The seventh latent factor identified from the measured items is tied to how the respondents view the target behaviors influence on their own driving ability. The same items mapped to this factor are present for both behaviors and include attitudes about how the target behaviors do not affect driving ability, do not pose safety hazards for other drivers, and do not pose safety hazards for non-motorists. The loadings are not as strong as those for other latent factors with values ranging from 0.38 to 0.57. Using this information, the factor was determined to capture an overall attitude about the target behaviors lack of negative influence on driving ability for both email and social network access.

The final two factors identified through EFA are fundamentally different than the others because they both represent negative factor loadings. When negative loadings are present, it indicates that the underlying construct represents something opposite of the measured items. This is important to note prior to presenting the reasoning for the labels offered for factors eight and nine. The eighth factor contained items solely about social network use while driving. Those measured items are related to the perceived benefits of social network use; increases work connectivity, helps coordinate work activities, and eliminates workplace distraction due to social media use. The fact that the derived scores are negative shows that the underlying factor captures an attitude opposite from these measure items. To account for this, the final label for factor eight was the perceived distraction from work activities due to social networking.

The final factor identified in this analysis is marked by items such as emailing or social networking while driving reduces tendency to speed and social networking while driving helps keep someone mentally alert. Again, the associated factor scores are negative indicating the latent factor captures something opposite of what these items are measuring. With this in mind, the ninth factor was labeled perception of both activities' influence on increasing speeding/reducing alertness.

The findings of the factor analysis indicate some fundamental differences in the underlying attitudes about email and social network use while driving, but also highlight some similarities. A comprehensive discussion of the significance of these findings can be found in the discussion and conclusion section.

Regression Analysis

When simply considering the descriptive analysis, much can be said about the overarching trends and some high level conclusions can be drawn. Nevertheless, this summary information is not sufficient to garner insight into how attitudes and demographics influence email and social network behavior while driving. In order to accomplish this, a simple linear regression model was estimated using the survey data. The structure of the model employed is presented below:

$$y = \alpha + \beta' X + \varepsilon$$

where

y = Binary variable defining at least some reported frequency of email OR social networking use;
α = constant representing any unobserved factors;
X = independent variables including latent factor scores and demographic variables;
β = regression coefficients associated with the independent variables;
ε = error term.

The dependent variable in this model, at least some reported frequency of email or social networking use, is defined from the respondents self-reported use frequencies. This indicator captures the same groups discussed in the comparison portion of the descriptive analysis. The determination of the final model formulation was accomplished through a systematic inclusion of variables, review of the significance of all included variables, and the removal of any insignificant variables or those that substantially altered the existing formulation; potentially indicating possible multicollinearity issues. This process began first with the latent attitude variables followed by other demographic and behavioral aspects, both of which were guided by some of the preliminary findings presented in the descriptive analysis. To include the latent attitudinal variables, a factor score was generated for each individual and latent factor using integrated regression analysis in the EFA procedure in SPSS. These variables are characterized by a continuous value between zero and one with a mean of zero and a variance equal to the squared multiple correlation between the estimated factor scores and the true item values, per SPSS documentation. As such, these scores take individual's responses to relevant measured items and regression to assign a value for the associated latent factor. The final modeling results are presented in Table 9.

Table 9: Regression Results

Independent Variables	B	Std. Error	t	Sig.	95% Conf. Int. Lower Bound	95% Conf. Int. Upper Bound
Constant	.199	.078	2.548	.011	.046	.352
Overall positive attitude, includes both behaviors	.129	.024	5.268	.000	.081	.177
Overall attitude about most peoples' motivation to not perform the target behaviors due to negative influence on driving ability, both behaviors	-.042	.018	-2.280	.023	-.078	-.006
Perceived social and work benefits from performing the target behaviors, predominantly email related	.085	.023	3.765	.000	.041	.129
Overall attitude about the target behaviors lack of negative influence on driving ability, both activities	.044	.021	2.091	.037	.003	.086
Perception of both activates influence on increasing speeding/reducing alertness	-.054	.024	-2.274	.023	-.100	-.007
The respondent is a driver for most travel events	.199	.062	3.217	.001	.077	.320
Respondent currently employed	.138	.052	2.670	.008	.037	.240
Respondent is from the Western US	-.086	.044	-1.937	.053	-.173	.001
Respondent owns a desktop computer	-.074	.036	-2.046	.041	-.144	-.003
Respondent owns a smartwatch	.184	.051	3.591	.000	.083	.284
Respondent Ranks Calling & Texting as their top 2 smartphone activities	-.083	.037	-2.266	.024	-.154	-.011
Respondent Ranks Social Networking in their top 3 smartphone activities	.082	.036	2.318	.021	.013	.152

All variables included in the final formulation are significant at the 90% confidence level or higher. When comparing this formulation to a similar nested formulation using only the demographic variables it is found that including the attitudinal variables significantly accounts for an additional 23% of variance in email and social network use behavior ($F = 38.597$ with $df_1 = 5$ and $df_2 = 537$). In all, the final model accounts for nearly 36% of the variance with an R^2 value of 0.359. Bringing the focus first to the attitudes, only five of the nine derived items proved to be significant. Those that were excluded include the two factors capturing an overall negative attitude for both behaviors, the factor describing most people's behavioral influence due to a desire for information gain, and the factor highlighting attitudes about social networking's propensity to

distract from work activities. At a demographic level, age, education, and income all proved insignificant.

Of the variables that proved significant, seven show a direct positive influence on email or social network use while driving, including; an overall positive attitude about the behaviors, the perception of benefits derived from performing mostly email related behaviors, overall attitude about the lack of negative influence of the target behaviors on personal driving ability, whether the individual is a driver for most travel events, whether the individual is employed, whether the individual owns a smartwatch, and whether the individual ranks social networking within their top three smartphone activities. The variables that has a negative influence on overall distracted behavior are; the overall attitude about most people's motivation not to partake due to negative influence on driving ability, perception on how much the behaviors increase speeding or reduce mental alertness while driving, if the individual lives in the western region of the US, if the individual owns a desktop computer, and if the individual ranks both calling and texting in their top two smartphone activities. A comprehensive discussion of these results and what they imply can be found in the discussion and conclusions section.

Discussion and Conclusions

In this section, a discussion of the results is presented followed by some concluding thoughts.

Discussion

Within the discussion, the focus is first on the results obtained in the Exploratory Factor Analysis, with comments on how the latent factors can influence future understanding of email and social network related distracted driving. The second portion is dedicated to presenting some implications from the initial regression analysis, with explanation into the direction of influence of variables and the overall significance on shaping policy.

In conceptualizing the attitudes underpinning social network and email use while driving, the EFA results offer some interesting insights. First, when considering how positively people view each behavior, it appears that there may be no need to expressly differentiate between email and social network use. A potential explanation for this can be found in the fact that on some level the explicit activity may not matter when it comes to positive attitudes about distracted driving. If someone feels positive sentiment towards any act of smartphone use while driving, regardless of the exact behavior, a single positive attitude may be suitable to characterize that. The relationship of the positive surveyed attitudes reinforces this. On the contrary, when considering overall negative attitudes, there is evidence that people feel fundamentally different about email and social network use while driving. This is evident in the unique negative latent factor generated for each behavior. The same reasoning used to explain the negative attitudes can be applied to the attitudes about the perceived benefits of the activities. A strong latent factor regarding the tangible benefits related predominantly to email use while driving was uncovered; while a negative construct was exposed using similar measured items about social network use. This indicates that positive attitudes about the social and work benefits are linked to email, while those same measures uncover an opposite view about social network use while driving. These differences make sense when considering the status quo surrounding each behavior. Email is typically seen as tool to convey a more structured and professional form of communication than that of social networking. Simultaneously, social networking carries a stigma related to wasted time and unfettered attention consumption. One stance on the topic would characterize social networking as simply a

communication hub where people spend hours sharing pictures and comments and evidence of this can be seen in blocks and bans of social networks in many schools and workplaces.

One thing that can be agreed upon is the fact that both these behaviors are used to convey information. This important aspect was also exposed via factor analysis concerning most people's motivation to partake based on the perceived information gain. In this case, no difference was noted between which behaviors mapped to the factor. This shows that when considering other people and their quest for information there is little difference in what behavior is actually performed. Moving to attitudes about the target behaviors and driving ability, specifically the latent attitude uncovered about speeding and mental alertness, it appears that individuals view both the measured behaviors together. However, the two behaviors are more closely linked concerning increased propensity to speed with only social networking viewed as a cause for someone to be less mentally alert. In a way, this factor captures a similar sentiment uncovered about overall driving ability. When considering the impact on personal driving ability due to email or social network use, there was no evidence indicating one behavior differed from the other. In fact, the measured items capturing attitudes about the influence, or lack thereof, on driving ability were grouped together to represent an overall attitude about lack of influence on personal driving ability. With respect to existing work, it has been shown that most people are over confident in their driving ability in most situations and this factor captures that (*63*). Finally, the last factor uncovered in the analysis, the perception of most people's motivation to not partake in the target behaviors due to negative influence on driving behavior, is also substantial. Slightly different from the personal driving ability factor, this overarching construct encompasses the perception of why other drivers would not partake in light of the known negative impact on driving ability. As such, it seems irrelevant what the specific behavior is and this is logical as it is nearly impossible to decipher what another driver is using their phone for. Further confirmatory analysis is necessary to further cement these factors and their relationship to email and social network related distracted driving, but they can serve as a good starting point for future explorations into these and other smartphone related behaviors.

Uncovering the nine factors mentioned above was only a part of this investigation. The second focus of the discussion is on the linear regression analysis and how those factors influence distracted driving behavior. Of the nine latent factors, only 5 proved significant in the final formulation. The latent factor describing an overall positive attitude about the behaviors proved to be one of the most impactful predictors on distracted driving propensity. In the context of a known 'risky' activity like distracted driving, it would appear that any positive sentiment about the behavior(s) is a good indicator of participation. This is further validated by the positive influence of the factor concerning perception of benefits derived from the target behaviors. If an individual exhibits a positive attitude and perceives benefits from partaking in the behaviors it is more likely that they will partake. Conceptually similar, the modeling results also indicate that the less impact on personal driving ability the individual feels, the higher the level of participation is.

In all, these three predictors and their influence on email and social network distraction are logical, but what can be done to influence society as a whole away from these risky behaviors? One solution is to further market the dangers of these behaviors with public discussion into how impactful a few second glance from the roadway is in increasing crash risk. While this is currently done for most young drivers, this work highlights a similar need in adult populations. This can be targeted in conjunction with marketing that highlights how the majority of individuals do not partake because of the dangers and how the behaviors can have an impact on speeding and

alertness, both of which are shown to have a negative influence on the smartphone distraction studied here.

Apart from the attitudes alone, technology adoption is also important in understanding distracted behavior. Ownership of novel technology, like the smartwatch, is a strong positive predictor. This can be interpreted alongside the positive influence of ranking social media highly as a common smartphone activity. Together they capture a potentially dangerous shift in communication. As novel technology becomes more saturated in the market and individuals communicate more through social networks, there could be a spike in distracted driving behavior. Younger generations of drivers often touted for their enthusiasm for these technologies may only exacerbate the issue, and this study shows adult populations are shifting as well with almost ubiquitous smartphone ownership. More traditional individuals, those with desktop computers or that use their smartphones predominantly for calling and texting may not be as susceptible to email and social network related distracted driving, but nothing can be said of their propensity to text or call behind the wheel. The positive impact employment has on email and social network distracted can be characterized by necessity. Any job requires some level of communication and as communication continues to become more rapid, the expectation to respond also grows. As such, it does make sense that employed individuals partake more. To combat this, employers should continue emphasis on the dangers of distracted driving and maintaining communication only when it is safe to do so. The final point of discussion is about geographic location. The final results indicate a lower propensity to drive distracted in the western states. One explanation of this would simply be cellphone coverage. Many of the major carriers lack quality coverage away from the coast and as such drivers may not feel motivation to use their smartphones if the service quality is low. However, this also represents the potential for growth as cell coverage continues to expand and become more affordable.

Conclusions

This study presents the information gathered through a nationwide survey aimed at furthering the understanding of email and social networking use while driving in the adult population. The main goals were to identify any underlying latent attitudes that influence the behaviors and to explore the influence of those attitudes. The choice of attitudes in this study was based on adopting the Theory of Planned Behavior to understand the behaviors (*33*). The survey instrument used was designed in Qualtrics with the goal of capturing the frequency of email and social network use while driving, smartphone ownership, the ranking of commonly performed smartphone activities, other technology ownership, demographics, law awareness, and finally a wide array of attitudes about the two target behaviors. To collect this information, the survey was distributed using Amazon's Mechanical Turk service.

A total of 550 responses were collected in late 2017. The sampled was comprised of individuals from across the United States, except for Alaska and the District of Columbia. Typical population demographics like age and gender match population level estimates from the ACS. In other aspects like education, income, and employment the sample was slightly skewed towards higher education, higher income, and higher employment. Of the surveyed individuals, about 53% reported never using their smartphones for either of the distraction causing behaviors. Of the remaining 47% with at least some use, 11.27% reported only emailing, 7.64% reported only social networking, and 28.18% reported partaking in both behaviors to some degree.

To understand these behaviors further, Exploratory Factor Analysis was done on the 60 measured attitudes to identify any underlying latent aspects. The results of this analysis yielded nine unique factors; overall positive attitude for both behaviors, overall attitude about most

peoples' motivation to not perform the target behaviors due to negative influence on driving ability, perceived social and work benefits from performing the target behaviors, overall negative attitude toward emailing while driving, perception of other peoples' motivation to perform the target behaviors due to information gain, overall negative attitude toward social networking while driving, overall attitude about the target behaviors lack of negative influence on driving ability, perceived distraction from work activities due to social networking, and perception of both activates influence on increasing speeding/reducing alertness.

Using the derived latent factors, a regression model was developed to explore the relationship between attitudes and reported distracted driving behavior while also controlling for the heterogeneity associated with observed socio-economic and demographic factors. The dependent variable in this case was binary and derived from the reported frequencies of both behaviors. It indicated whether or not the surveyed individual reported at least occasional email or social networking use while driving.

The results of this analysis indicate a positive relationship with the distracted driving behaviors from the following predictors: an overall positive attitude about the behaviors, the perception of benefits derived from performing mostly email related behaviors, overall attitude about the lack of negative influence of the target behaviors on personal driving ability, whether the individual is a driver for most travel events, whether the individual is employed, whether the individual owns a smartwatch, and whether the individual ranks social networking within their top three smartphone activities. The predictors with a negative influence on distracted driving behavior are; the overall attitude about most people's motivation not to partake due to negative influence on driving ability, perception on how much the behaviors increase speeding or reduce mental alertness while driving, if the individual lives in the western region of the US, if the individual owns a desktop computer, and if the individual ranks both calling and texting in their top two smartphone activities.

These results highlight some important issues that are eminent in the distracted driving domain. The first of those is the rapid expansion and adoption of smartphone technology. Of the sampled individuals, over 98% are reported smartphone owners. Technology adoption is shown in this study to impact distracted driving frequency and as the general populace becomes increasingly more tech savvy it is logical to assume distraction on the road will also increase. Poignant steps can be made to reiterate the dangers of smartphone related distraction and based on the results here can make an impact on frequency of use. A major focus to accomplish this is increased visibility of the dangers of smartphone related distraction and with a focus on how most people do not partake because of those dangers. Much of the existing research has focused on the impacts of text messaging and phone calls and this work makes a significant contribution to the literature by bringing the focus to email and social network use.

While the study was done in a comprehensive manner, improvements and future work will help to supplement the work as a whole. The first limitation in this study is in the modeling analysis. While the linear model applied here is viable for a preliminary exploration of the potential influence of attitudinal factors, it makes a number of assumptions that may not all be satisfied. For example, linear regression requires the dependent variable to follow a normal distribution. But the dependent variable in the study is a binary variable – a clear violation of the assumption. A more rigorous modeling analysis can further enhance the analysis. Efforts are already underway to carry out a more comprehensive modeling analysis. As part of future work, this data will be explored using a variety of discrete variable models and also explore the integrated choice and latent variable models. Also, in this study only one of the three factors that is posited by TPB to influence

the behaviors was considered. The survey will be extended in subsequent studies to consider the inclusion of social norms and perceived behavioral control. Both these efforts can enhance the analysis and provide additional insights into smartphone related distraction.

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Appendix A. Survey Instrument

This appendix presents the survey instrument as it appeared to respondents. Slight variations are possible as the original survey instrument was distributed electronically online via Qualtrics.

Exploration of Human Psychological Factors Underlying Mobile Phone Usage Behaviors while Driving, Survey Instrument

Survey Flow

WebService: GET - http://reporting.qualtrics.com/projects/randomNumGen.php - Fire and Forget

Standard: Introduction (1 Question)
Block: Part A: Screening (4 Questions)
Standard: Part B: Technology use and mobile phone usage behavior while driving (10 Questions)
Standard: PART C: ATTIUDES TOWARDS USING MOBILE PHONE WHILE DRIVING (12 Questions)
Standard: PART D: SOCIO-DEMOGRAPHICS (14 Questions)

Page Break

Start of Block: Block 2

What is the purpose of the survey? You are invited to participate in this survey to help understand mobile phone use behaviors while driving. Mobile phones have become a very pervasive and impactful technology, and more recently the growth of the mobile internet has made this particular technology inseparable from everyday human life. A significant portion of mobile internet use occurs while travelling, including during the act of driving. In spite of all the information and communication benefits, mobile phone use while driving has been found to be detrimental with often severe negative consequences. Mobile phone usage is believed to be an important contributor to distraction from the primary task of driving, subsequently, it has been shown to increase occurrences of traffic incidents.

The main focus of this survey is to understand your attitudes towards the use of the mobile internet while driving. In particular, we are interested in understanding your attitudes in terms of associated risks and benefits as they relate to two specific types of mobile internet usage, namely, reading/sending emails and viewing/posting on social networking sites while driving. An improved understanding of the underlying attitudes will help design and implement better policies and solutions to address the negative implications of mobile phone usage while driving.

What am I being asked to do?
Your participation in this study will require completion of a survey. The survey questionnaire will take approximately 30 minutes of your time. Upon completion of this study and after we have assessed the validity of the information provided, you will be provided with $2.50 for your efforts. Responses will be collected anonymously and results will only be disseminated in an aggregate form. Participation in this study is completely voluntary and this survey does not involve any risk to you. However, the benefits of your participation may impact society at large by providing insights into the underlying attitudes behind mobile phone use. You do not have to answer any question that you do not feel comfortable answering, but please note that if you skip or do not offer valid responses to quality control items that are embedded in the survey questionnaire, you may not be eligible for compensation.

How can I contact you?
We will be happy to answer any questions you have about this study. If you have further comments or concerns about this project, or if you have a research-related problem, you may contact Dr. Karthik Charan Konduri at karthik.konduri@uconn.edu. If you have any questions about your rights as a research participant you may contact the University of Connecticut Institutional Review Board (IRB) at 860-486- 8802. The IRB is a nationally recognized group tasked with reviewing research studies in order to protect the rights and welfare of research participants.

Thank you

End of Block: Block 2

Start of Block: Part A: Screening

In this section, we will ask you some screening questions to assess eligibility to participate in the survey.

Q1 How old are you?

- ○ Less than 18 years (1)
- ○ 18-24 years (2)
- ○ 25-34 years (3)
- ○ 35-50 years (4)
- ○ 51-65 years (5)
- ○ 66-80 years (6)
- ○ More than 80 years (7)

Page Break

Q2 Please select the state in which you currently reside:

▼ Alabama (1) ... Wyoming (51)

Q2A Please provide the postal code of the area you reside:

_____

Page Break

End of Block: Part A: Screening

Start of Block: Part B: Technology use and mobile phone usage behavior while driving

In this section, we will ask you some questions about your cell phone usage behaviors during driving.

Q3 Do you currently own a smartphone?

- Yes (1)
- No (2)

Q3A Which of the following activities do you use your smartphone for? Please drag and drop all activities into the appropriate bin. Also, for the selected activities please rank them from most to least used.

Selected Activities	Unselected Activities
_____ Making/receiving phone calls (1)	_____ Making/receiving phone calls (1)
_____ Sending/receiving text messages (2)	_____ Sending/receiving text messages (2)
_____ Accessing social media (Twitter, Facebook, Snapchat, Instagram, etc.) (3)	_____ Accessing social media (Twitter, Facebook, Snapchat, Instagram, etc.) (3)
_____ Using designated messaging apps (Whatsapp, GroupMe, Viber, etc.) (4)	_____ Using designated messaging apps (Whatsapp, GroupMe, Viber, etc.) (4)
_____ Emailing (5)	_____ Emailing (5)
_____ General Internet Access (news, shopping, information) (6)	_____ General Internet Access (news, shopping, information) (6)
_____ Listening to music (7)	_____ Listening to music (7)
_____ Navigation (GPS) (8)	_____ Navigation (GPS) (8)

Q4
Please select all devices that you currently own and use regularly (select any/all that apply).

- [ ] Standard Cellphone (e.g. talk & text capable) - do not check if you own a smartphone (1)
- [ ] Tablet (e.g. IPad, Android tablet) (2)
- [ ] Laptop Computer (3)
- [ ] Desktop Computer (4)
- [ ] Smart Watch (e.g. Apple Watch, Samsung Gear) (5)
- [ ] Landline (Stationary Phone) (6)
- [ ] None of the Above (7)

Q5 For quality control purposes, please select No.

- ○ Yes (1)
- ○ No (2)

Page Break

Here we are interested in your smart phone usage behaviors while driving. Please only report activities while you are the driver.

Q6 How frequently do you read or send emails while driving?

- ○ Never (1)
- ○ Occasionally (2)
- ○ For 50% of the trips (3)
- ○ For most trips (4)
- ○ For all trips (5)

Q7 How frequently do you view or post on social networking sites while driving?

- ○ Never (1)
- ○ Occasionally (2)
- ○ For 50% of the trips (3)
- ○ For most trips (4)
- ○ For all trips (5)

Q8
Are you aware of any laws/policies in your area prohibiting mobile phone use while driving?

- ○ Yes (1)
- ○ No (2)

Q8A Please select any/all laws or policies that you are aware of in your local area

- ☐ Ban on Hand-held mobile phones for all drivers (1)
- ☐ Ban on text messaging while driving for all drivers (2)
- ☐ Ban on all mobile phone use for young drivers (under 18 or 21) (3)
- ☐ Other laws/policies, please specify (4) _____

Page Break

End of Block: Part B: Technology use and mobile phone usage behavior while driving

Start of Block: PART C: ATTIUDES TOWARDS USING MOBILE PHONE WHILE DRIVING

In this section of the survey, we will collect information to understand your attitudes towards risks and benefits associated with mobile phone use while driving.

In particular, we are interested in understanding your attitudes towards reading or sending emails.

Q9 Please indicate your level of agreement with the following statements.

	Strongly Disagree (1)	Disagree (2)	Neither Agree Nor Disagree (3)	Agree (4)	Strongly Agree (5)
Sending or reading emails while driving is harmful (1)	○	○	○	○	○
Sending or reading emails while driving is unwise (2)	○	○	○	○	○
Sending or reading emails while driving is bad (3)	○	○	○	○	○
Sending or reading emails while driving is worthless (4)	○	○	○	○	○
Sending or reading emails while driving is dangerous (5)	○	○	○	○	○
Sending or reading emails while driving is illegal (6)	○	○	○	○	○

Q10 Please indicate your level of agreement with the following statements.

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
For quality control purposes, select Strongly Disagree (1)	○	○	○	○	○
Sending or reading emails while driving improves productivity (2)	○	○	○	○	○
Sending or reading emails while driving improves efficiency. (3)	○	○	○	○	○
Sending or reading emails while driving increases social connectivity. (4)	○	○	○	○	○
Sending or reading emails while driving helps coordinate social activities. (5)	○	○	○	○	○
Sending or reading emails while driving increases work connectivity. (6)	○	○	○	○	○
Sending or reading emails while driving helps coordinate work activities. (7)	○	○	○	○	○
Sending or reading emails while driving allows me to be more responsive. (8)	○	○	○	○	○
Sending or reading emails while driving will increase the amount of time at home. (9)	○	○	○	○	○

Q11 Please indicate your level of agreement with the following statements.

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Sending or reading emails while driving does not affect driving abilities. (1)	○	○	○	○	○
Sending or reading emails while driving will not increase my chances of being caught by the police. (2)	○	○	○	○	○
Sending or reading emails while driving does not pose a safety hazard for other drivers. (3)	○	○	○	○	○
Sending or reading emails while driving does not pose a safety hazard for non-motorists. (4)	○	○	○	○	○
Sending or reading emails while driving will reduce tendency to speed. (5)	○	○	○	○	○
Sending or reading emails while driving helps keep someone mentally alert while driving. (6)	○	○	○	○	○

Q12 Please indicate your level of agreement with the following statements.

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Sending or reading emails while driving is pleasant. (1)	○	○	○	○	○
Sending or reading emails while driving is interesting. (2)	○	○	○	○	○
Sending or reading emails while driving is fun. (3)	○	○	○	○	○
Sending or reading emails while driving is exciting. (4)	○	○	○	○	○
Sending or reading emails while driving increases sense of security. (5)	○	○	○	○	○
Sending or reading emails while driving makes me feel apprehensive. (6)	○	○	○	○	○

Q13 Please indicate your level of agreement with the following statements.

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Most people read or send emails while driving because it makes them feel more informed. (1)	○	○	○	○	○
Most people read or send emails while driving out of fear of missing out on work related information. (2)	○	○	○	○	○
Most people do not send or read emails while driving from fear of losing control. (3)	○	○	○	○	○
Most people do not send or read emails while driving from fear of creating a safety hazard for other drivers. (4)	○	○	○	○	○
Most people do not send or read emails while driving from fear of posing a safety hazard for non-motorists. (5)	○	○	○	○	○

Page Break

Now, we are interested in understanding your attitudes towards viewing or posting on social networking sites while driving.

Q14 Please indicate your level of agreement with the following statements.

	Strongly Disagree (1)	Disagree (2)	Neither Agree Nor Disagree (3)	Agree (4)	Strongly Agree (5)
Viewing or posting content on social networking sites while driving is harmful (1)	○	○	○	○	○
Viewing or posting content on social networking sites while driving is unwise (2)	○	○	○	○	○
Viewing or posting content on social networking sites while driving is bad (3)	○	○	○	○	○
Viewing or posting content on social networking sites while driving is worthless (4)	○	○	○	○	○
Viewing or posting content on social networking sites while driving is dangerous (5)	○	○	○	○	○
Viewing or posting content on social networking sites while driving is illegal (6)	○	○	○	○	○

Q15 Please indicate your level of agreement with the following statements.

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Viewing or posting on social networking sites while driving increases work connectivity. (1)	○	○	○	○	○
Viewing or posting on social networking sites while driving helps coordinate social activities. (2)	○	○	○	○	○
Viewing or posting on social networking sites while driving helps coordinate work activities. (3)	○	○	○	○	○
Viewing or posting on social networking sites while driving increases work efficiency by eliminating distraction related to social networking sites at the workplace. (4)	○	○	○	○	○
Viewing or posting on social networking sites while driving doesn't affect driving ability. (5)	○	○	○	○	○
Viewing or posting on social networking sites while driving will not increase my chances of being caught by the police. (6)	○	○	○	○	○

Q16 Please indicate your level of agreement with the following statements.

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Viewing or posting on social networking sites while driving doesn't pose a safety hazards for other drivers. (1)	○	○	○	○	○
Viewing or posting on social networking sites while driving doesn't pose a safety hazard for non-motorists. (2)	○	○	○	○	○
Viewing or posting on social networking sites while driving will reduce tendency to speed. (3)	○	○	○	○	○
Viewing or posting on social networking sites while driving helps keep someone mentally alert while driving. (4)	○	○	○	○	○

Q17 Please indicate your level of agreement with the following statements.

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Viewing or posting on social networking sites while driving is pleasant. (1)	○	○	○	○	○
Viewing or posting on social networking sites while driving is interesting. (2)	○	○	○	○	○
Viewing or posting on social networking sites while driving is fun. (3)	○	○	○	○	○
Viewing or posting on social networking sites while driving is exciting. (4)	○	○	○	○	○
Viewing or posting on social networking sites while driving increases the sense of security. (5)	○	○	○	○	○
Viewing or posting on social networking sites while driving is frightening. (6)	○	○	○	○	○

Q18 Please indicate your level of agreement with the following statements.

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Most people view or post on social networking sites while driving because it makes them feel informed. (1)	○	○	○	○	○
Most people view or post on social networking sites while driving from fear of social exclusion or 'missing out'. (2)	○	○	○	○	○
For quality control purposes, please select Neither Agree Nor Disagree (3)	○	○	○	○	○
Most people do not view or post on social networking sites while driving from fear of losing control. (4)	○	○	○	○	○
Most people do not view or post on social networking sites while driving from fear of creating safety hazard for other drivers. (5)	○	○	○	○	○
Most people do not view or post on social networking sites while driving from fear of posing a safety hazard for non-motorists. (6)	○	○	○	○	○

Page Break

End of Block: PART C: ATTIUDES TOWARDS USING MOBILE PHONE WHILE DRIVING

Start of Block: PART D: SOCIO-DEMOGRAPHICS

In this section of the survey, you will be asked to provide socioeconomic and demographic information.

Q19 What is your gender?

- ○ Male (1)
- ○ Female (2)

Q20 What is your typical mode of transportation?

- ○ Drive alone (e.g. drive a van, SUV, Truck, motorcycle) (1)
- ○ Drive with others – I am the primary driver (2)
- ○ Drive with others – I am a passenger (3)
- ○ Taxi/Transportation Network Companies (e.g. Lyft, Uber, and Sidecar) (4)
- ○ Public transportation (e.g. public bus, school bus, shuttle bus, intercity train, commuter train, subway/elevated train) (5)
- ○ Bicycle (6)
- ○ Walk (7)
- ○ Other, please specify: (8) _____

Q21 Are you currently employed?

- ○ Yes (1)
- ○ No (2)

Q21A How many hours do you work per week on average?

- ○ 40 or more hours per week (1)
- ○ 20 to 39 hours per week (2)
- ○ Less than 20 hours per week (3)

Q21B Which one of the following categories best describes your occupation?

- ○ Sales (1)
- ○ Service (2)
- ○ Management, professional, and related (3)
- ○ Farming, fishing, and forestry (4)
- ○ Construction, extraction, and maintenance (5)
- ○ Production, transportation, and material moving (6)
- ○ Other, please specify: (7) _____

Q22 What is the highest level of education you have completed?

- ○ Less than high school graduate (1)
- ○ High school graduate, include GED (2)
- ○ Some college or Associate's degree (Vocational) (3)
- ○ Bachelor's degree (BA, AB, BS) (4)
- ○ Graduate or Professional Degree (MA, MS, MBA, MD, PHD, EdD, JD) (5)
- ○ Other (6)

Q23 Are you enrolled in any type of school?

- ○ Yes (1)
- ○ No (2)

Q23A In which type of school are you enrolled?

- ○ K-12 (1)
- ○ Post-Secondary, College, Trade (2)
- ○ Post graduate (3)
- ○ Other (4)

Q24 For quality control purposes, please select Five.

- ○ One (1)
- ○ Two (2)
- ○ Three (3)
- ○ Four (4)
- ○ Five (5)

Q25 What is your ethnicity?

- ○ White/ Caucasian (1)
- ○ Black/ African American (2)
- ○ Asian only (3)
- ○ American Indian, Alaska Native (4)
- ○ Native Hawaiian, Other Pacific (5)
- ○ Multiracial (6)
- ○ Hispanic/Mexican (7)
- ○ Other (8)

Q26 What is your yearly household income?

- ○ Less than $25,000 (1)
- ○ $25,000 - $49,999 (2)
- ○ $50,000 - $74,999 (3)
- ○ $75,000 - $99,000 (4)
- ○ $100,000 - $149,999 (5)
- ○ >=150,000 (6)

Q27 Are you a licensed driver?

- ○ Yes (1)
- ○ No (2)

Page Break

Q28 Thank you for completing the survey on distracted driving.

If you have any questions or comments about the survey please provide your input below.

_____
_____
_____

End of Block: PART D: SOCIO-DEMOGRAPHICS

Appendix B. Respondents' Attitudes

This appendix presents the tables highlighting the responses from the attitude portion of the survey.

Table B1: Complete Listing of Email Related Attitudes

Attitudes	Strongly Disagree		Disagree		Neither Agree or Disagree		Agree		Strongly Agree	
	Count	Percent of Total	Count	Percent of Total	Count	Percent of Total	Count	Percent of Total	Count	Percent of Total
e_harmful	8	1.45%	8	1.45%	24	4.36%	186	33.82%	324	58.91%
e_unwise	6	1.09%	5	0.91%	15	2.73%	151	27.45%	373	67.82%
e_bad	7	1.27%	9	1.64%	26	4.73%	165	30.00%	343	62.36%
e_worthless	18	3.27%	63	11.45%	128	23.27%	137	24.91%	204	37.09%
e_dangerous	6	1.09%	8	1.45%	17	3.09%	127	23.09%	392	71.27%
e_illegal	16	2.91%	24	4.36%	88	16.00%	144	26.18%	278	50.55%
e_imp_prod	208	37.82%	165	30.00%	76	13.82%	90	16.36%	11	2.00%
e_imp_eff	227	41.27%	157	28.55%	74	13.45%	81	14.73%	11	2.00%
e_inc_sc	192	34.91%	117	21.27%	120	21.82%	105	19.09%	16	2.91%
e_coord_sa	191	34.73%	118	21.45%	114	20.73%	113	20.55%	14	2.55%
e_inc_wc	185	33.64%	133	24.18%	84	15.27%	129	23.45%	19	3.45%
e_coord_wa	189	34.36%	115	20.91%	106	19.27%	120	21.82%	20	3.64%
e_responsive	207	37.64%	105	19.09%	73	13.27%	137	24.91%	28	5.09%
e_inc_th	225	40.91%	154	28.00%	88	16.00%	69	12.55%	14	2.55%
e_na_da	348	63.27%	141	25.64%	26	4.73%	28	5.09%	7	1.27%
e_no_police	289	52.55%	172	31.27%	47	8.55%	24	4.36%	18	3.27%
e_no_sh_d	394	71.64%	107	19.45%	21	3.82%	21	3.82%	7	1.27%
e_no_sh_nm	384	69.82%	115	20.91%	21	3.82%	22	4.00%	8	1.45%
e_red_speed	226	41.09%	122	22.18%	104	18.91%	86	15.64%	12	2.18%
e_ment_alert	348	63.27%	105	19.09%	64	11.64%	25	4.55%	8	1.45%
e_pleasant	233	42.36%	178	32.36%	85	15.45%	47	8.55%	7	1.27%
e_interesting	237	43.09%	152	27.64%	82	14.91%	69	12.55%	10	1.82%
e_fun	280	50.91%	164	29.82%	58	10.55%	40	7.27%	8	1.45%
e_exciting	283	51.45%	155	28.18%	60	10.91%	46	8.36%	6	1.09%
e_inc_security	345	62.73%	137	24.91%	42	7.64%	20	3.64%	6	1.09%
e_apprehensive	78	14.18%	55	10.00%	59	10.73%	179	32.55%	179	32.55%
e_mp_informed	92	16.73%	109	19.82%	138	25.09%	189	34.36%	22	4.00%
e_mp_miss_w_info	51	9.27%	69	12.55%	97	17.64%	263	47.82%	70	12.73%
e_mp_fear_lc	31	5.64%	77	14.00%	96	17.45%	177	32.18%	169	30.73%
e_mp_fear_sh_d	24	4.36%	58	10.55%	64	11.64%	202	36.73%	202	36.73%
e_mp_fear_sh_nm	26	4.73%	61	11.09%	63	11.45%	210	38.18%	190	34.55%

Table B2: Complete Listing of Social Networking Related Attitudes

Attitudes	Strongly Disagree		Disagree		Neither Agree or Disagree		Agree		Strongly Agree	
	Count	Percent of Total	Count	Percent of Total	Count	Percent of Total	Count	Percent of Total	Count	Percent of Total
sn_harmful	7	1.27%	12	2.18%	23	4.18%	162	29.45%	346	62.91%
sn_unwise	9	1.64%	3	0.55%	16	2.91%	145	26.36%	377	68.55%
sn_bad	8	1.45%	15	2.73%	20	3.64%	154	28.00%	353	64.18%
sn_worthless	13	2.36%	38	6.91%	90	16.36%	134	24.36%	275	50.00%
sn_dangerous	7	1.27%	6	1.09%	17	3.09%	137	24.91%	383	69.64%
sn_illegal	15	2.73%	18	3.27%	87	15.82%	134	24.36%	296	53.82%
sn_inc_wc	247	44.91%	183	33.27%	55	10.00%	55	10.00%	10	1.82%
sn_coord_sa	170	30.91%	102	18.55%	105	19.09%	151	27.45%	22	4.00%
sn_coord_wa	229	41.64%	170	30.91%	75	13.64%	65	11.82%	11	2.00%
sn_inc_we	271	49.27%	162	29.45%	64	11.64%	47	8.55%	6	1.09%
sn_no_da	371	67.45%	123	22.36%	31	5.64%	20	3.64%	5	0.91%
sn_no_police	322	58.55%	126	22.91%	46	8.36%	35	6.36%	21	3.82%
sn_no_sh_d	380	69.09%	116	21.09%	18	3.27%	24	4.36%	12	2.18%
sn_no_sh_nm	381	69.27%	115	20.91%	24	4.36%	24	4.36%	6	1.09%
sn_red_speed	238	43.27%	124	22.55%	107	19.45%	67	12.18%	14	2.55%
sn_ment_alert	334	60.73%	126	22.91%	54	9.82%	28	5.09%	8	1.45%
sn_pleasant	247	44.91%	155	28.18%	77	14.00%	63	11.45%	8	1.45%
sn_interesting	240	43.64%	150	27.27%	72	13.09%	82	14.91%	6	1.09%
sn_fun	267	48.55%	150	27.27%	68	12.36%	57	10.36%	8	1.45%
sn_exciting	271	49.27%	155	28.18%	68	12.36%	52	9.45%	4	0.73%
sn_inc_security	343	62.36%	151	27.45%	34	6.18%	16	2.91%	6	1.09%
sn_frightening	46	8.36%	43	7.82%	60	10.91%	158	28.73%	243	44.18%
sn_mp_informed	61	11.09%	64	11.64%	117	21.27%	272	49.45%	36	6.55%
sn_mp_fomo	42	7.64%	40	7.27%	61	11.09%	278	50.55%	129	23.45%
sn_mp_fear_lc	26	4.73%	69	12.55%	71	12.91%	204	37.09%	180	32.73%
sn_mp_fear_sh_d	26	4.73%	59	10.73%	54	9.82%	198	36.00%	213	38.73%
sn_mp_fear_sh_nm	20	3.64%	66	12.00%	61	11.09%	203	36.91%	200	36.36%

Appendix C. Factor Analysis Results

This appendix presents the tables highlighting factor loading matrix and the structure matrix.

Table C1: Pattern Matrix: Loadings Less Than 0.35 Suppressed

	Factor								
	Overall positive attitude, includes both behaviors	Overall attitude about most peoples' motivation to not perform the target behaviors due to negative influence on driving ability, both behaviors	Perceived social and work benefits from performing the target behaviors, predominantly email related	Overall negative attitude toward emailing while driving	Perception of other peoples' motivation to perform the target behaviors due to information gain, both behaviors	Overall negative attitude toward social networking while driving	Overall attitude about the target behaviors lack of negative influence on driving ability, both activities	Perceived distraction from work activities, social networking only	Perception of both activates influence on increasing speeding/ reducing alertness
Sending/receiving emails while driving is pleasant	.749								
Sending/receiving emails while driving is interesting	.697								
Sending/receiving emails while driving is fun	.773								
Sending/receiving emails while driving is exciting	.704								
Sending/receiving emails while driving increases sense of security	.431								
Viewing/posting content on social media while driving is pleasant.	.833								
Viewing/posting content on social media while driving is interesting.	.814								
Viewing/posting content on social media while driving is fun.	.830								
Viewing/posting content on social media while driving is exciting.	.797								

	Factor								
	Overall positive attitude, includes both behaviors	Overall attitude about most peoples' motivation to not perform the target behaviors due to negative influence on driving ability, both behaviors	Perceived social and work benefits from performing the target behaviors, predominantly email related	Overall negative attitude toward emailing while driving	Perception of other peoples' motivation to perform the target behaviors due to information gain, both behaviors	Overall negative attitude toward social networking while driving	Overall attitude about the target behaviors lack of negative influence on driving ability, both activities	Perceived distraction from work activities, social networking only	Perception of both activates influence on increasing speeding/ reducing alertness
Viewing/posting content on social media while driving increases the sense of security.	.399								
Most people do not send/read emails while driving out of fear of losing control		.728							
Most people do not send/read emails while driving out of fear of creating a safety hazard for other drivers.		.873							
Most people do not send/read emails while driving out of fear of creating a safety hazard for non-motorists		.911							
Most people do not view/post on social networking sites while driving from fear of losing control.		.801							
Most people do not view/post on social networking sites while driving from fear of creating safety hazard for other drivers.		.893							
Most people do not view/post on social networking sites while driving from fear of creating safety hazard for non-motorists.		.887							
Sending/receiving emails while driving improves productivity			.711						

	Factor								
	Overall positive attitude, includes both behaviors	Overall attitude about most peoples' motivation to not perform the target behaviors due to negative influence on driving ability, both behaviors	Perceived social and work benefits from performing the target behaviors, predominantly email related	Overall negative attitude toward emailing while driving	Perception of other peoples' motivation to perform the target behaviors due to information gain, both behaviors	Overall negative attitude toward social networking while driving	Overall attitude about the target behaviors lack of negative influence on driving ability, both activities	Perceived distraction from work activities, social networking only	Perception of both activates influence on increasing speeding/ reducing alertness
Sending/receiving emails while driving improves efficiency			.696						
Sending/receiving emails while driving increases social connectivity			.749						
Sending/receiving emails while driving helps coordinate social activities			.734						
Sending/receiving emails while driving increases work connectivity			.861						
Sending/receiving emails while driving helps coordinate work activities			.867						
Sending/receiving emails while driving helps me be more responsive			.754						
Sending/receiving emails while driving will increase the amount of time at home.			.579						
Viewing/posting content on social media while driving helps coordinate social activities.			.551						
Sending/receiving emails while driving is harmful				.841					
Sending/receiving emails while driving is unwise				.852					
Sending/receiving emails while driving is bad				.921					
Sending/receiving emails while driving is worthless				.543					

	Factor								
	Overall positive attitude, includes both behaviors	Overall attitude about most peoples' motivation to not perform the target behaviors due to negative influence on driving ability, both behaviors	Perceived social and work benefits from performing the target behaviors, predominantly email related	Overall negative attitude toward emailing while driving	Perception of other peoples' motivation to perform the target behaviors due to information gain, both behaviors	Overall negative attitude toward social networking while driving	Overall attitude about the target behaviors lack of negative influence on driving ability, both activities	Perceived distraction from work activities, social networking only	Perception of both activates influence on increasing speeding/ reducing alertness
Sending/receiving emails while driving is dangerous				.827					
Sending/receiving emails while driving is illegal				.383					
Most people send/read emails while driving makes them feel more informed					.517				
Most people send/read emails while driving out of fear of missing out on work related information.					.646				
Most people view/post on social networking sites while driving because it makes them feel informed.					.771				
Most people view/post on social networking sites while driving from fear of social exclusion or "missing out".					.808				
Viewing/posting content on social media while driving is harmful						.818			
Viewing/posting content on social media while driving is unwise						.900			
Viewing/posting content on social media while driving is bad						.892			
Viewing/posting content on social media while driving is worthless						.613			

	Factor								
	Overall positive attitude, includes both behaviors	Overall attitude about most peoples' motivation to not perform the target behaviors due to negative influence on driving ability, both behaviors	Perceived social and work benefits from performing the target behaviors, predominantly email related	Overall negative attitude toward emailing while driving	Perception of other peoples' motivation to perform the target behaviors due to information gain, both behaviors	Overall negative attitude toward social networking while driving	Overall attitude about the target behaviors lack of negative influence on driving ability, both activities	Perceived distraction from work activities, social networking only	Perception of both activates influence on increasing speeding/ reducing alertness
Viewing/posting content on social media while driving is dangerous						.843			
Viewing/posting content on social media while driving is illegal						.470			
Sending/receiving emails while driving does not affect driving ability							.532		
Sending/receiving emails while driving does not pose a safety hazards for other drivers.							.578		
Sending/receiving emails while driving does not pose a safety hazards for non-motorists							.575		
Viewing/posting content on social media while driving doesn't affect driving ability							.408		
Viewing/posting content on social media while driving doesn't pose a safety hazards for other drivers.							.387		
Viewing/posting content on social media while driving doesn't pose a safety hazards for non-motorists.							.382		
Viewing/posting content on social media while driving increases work connectivity.								-.672	

	Factor								
	Overall positive attitude, includes both behaviors	Overall attitude about most peoples' motivation to not perform the target behaviors due to negative influence on driving ability, both behaviors	Perceived social and work benefits from performing the target behaviors, predominantly email related	Overall negative attitude toward emailing while driving	Perception of other peoples' motivation to perform the target behaviors due to information gain, both behaviors	Overall negative attitude toward social networking while driving	Overall attitude about the target behaviors lack of negative influence on driving ability, both activities	Perceived distraction from work activities, social networking only	Perception of both activates influence on increasing speeding/ reducing alertness
Viewing/posting content on social media while driving helps coordinate work activities.								-.672	
Viewing/posting content on social media while driving increases work efficiency by eliminating distraction related to social networking sites at the workplace								-.530	
Sending/receiving emails while driving reduces tendency to speed.									-.620
Viewing/posting content on social media while driving will reduce tendency to speed.									-.879
Viewing/posting content on social media while driving helps keep someone mentally alert while driving.									-.410
Sending/receiving emails while driving will not increase my chances of being caught by the police.									
Sending/receiving emails while driving helps keep someone mentally alert.									
Sending/receiving emails while driving makes me feel apprehensive									
Viewing/posting content on social media while driving will not increase my chances of being caught by the police.									
Viewing/posting content on social media while driving is frightening.									

Table C2: Structure Matrix

	Factor								
	Overall positive attitude, includes both behaviors	Overall attitude about most peoples' motivation to not perform the target behaviors due to negative influence on driving ability, both behaviors	Perceived social and work benefits from performing the target behaviors, predominantly email related	Overall negative attitude toward emailing while driving	Perception of other peoples' motivation to perform the target behaviors due to information gain, both behaviors	Overall negative attitude toward social networking while driving	Overall attitude about the target behaviors lack of negative influence on driving ability, both activities	Perceived distraction from work activities, social networking only	Perception of both activates influence on increasing speeding/ reducing alertness
Sending/receiving emails while driving is pleasant	.862		.569	-.368		-.430	.359	-.382	-.454
Sending/receiving emails while driving is interesting	.842		.604	-.361		-.420		-.386	-.500
Sending/receiving emails while driving is fun	.887		.525	-.382		-.474	.446	-.437	-.436
Sending/receiving emails while driving is exciting	.822		.499			-.410	.416	-.430	-.427
Sending/receiving emails while driving increases sense of security	.722		.436	-.381		-.498	.561	-.480	-.412
Viewing/posting content on social media while driving is pleasant.	.876		.481			-.439		-.475	-.482
Viewing/posting content on social media while driving is interesting.	.853		.522			-.419		-.425	-.488
Viewing/posting content on social media while driving is fun.	.875		.490	-.351		-.476		-.471	-.481
Viewing/posting content on social media while driving is exciting.	.851		.473			-.450		-.498	-.477
Viewing/posting content on social media while driving increases the sense of security.	.678					-.479	.443	-.608	-.457

	Factor								
	Overall positive attitude, includes both behaviors	Overall attitude about most peoples' motivation to not perform the target behaviors due to negative influence on driving ability, both behaviors	Perceived social and work benefits from performing the target behaviors, predominantly email related	Overall negative attitude toward emailing while driving	Perception of other peoples' motivation to perform the target behaviors due to information gain, both behaviors	Overall negative attitude toward social networking while driving	Overall attitude about the target behaviors lack of negative influence on driving ability, both activities	Perceived distraction from work activities, social networking only	Perception of both activates influence on increasing speeding/ reducing alertness
Most people do not send/read emails while driving out of fear of losing control		.732							
Most people do not send/read emails while driving out of fear of creating a safety hazard for other drivers.		.863							
Most people do not send/read emails while driving out of fear of creating a safety hazard for non-motorists		.868							
Most people do not view/post on social networking sites while driving from fear of losing control.		.814							
Most people do not view/post on social networking sites while driving from fear of creating safety hazard for other drivers.		.888							
Most people do not view/post on social networking sites while driving from fear of creating safety hazard for non-motorists.		.869							
Sending/receiving emails while driving improves productivity	.578		.806			-.368			-.446
Sending/receiving emails while driving improves efficiency	.575		.799			-.425			-.456
Sending/receiving emails while driving increases social connectivity	.535		.843					-.386	-.437

	Factor								
	Overall positive attitude, includes both behaviors	Overall attitude about most peoples' motivation to not perform the target behaviors due to negative influence on driving ability, both behaviors	Perceived social and work benefits from performing the target behaviors, predominantly email related	Overall negative attitude toward emailing while driving	Perception of other peoples' motivation to perform the target behaviors due to information gain, both behaviors	Overall negative attitude toward social networking while driving	Overall attitude about the target behaviors lack of negative influence on driving ability, both activities	Perceived distraction from work activities, social networking only	Perception of both activates influence on increasing speeding/ reducing alertness
Sending/receiving emails while driving helps coordinate social activities	.557		.852					-.374	-.442
Sending/receiving emails while driving increases work connectivity	.504		.899					-.354	-.400
Sending/receiving emails while driving helps coordinate work activities	.528		.911					-.375	-.421
Sending/receiving emails while driving helps me be more responsive	.519		.833						-.463
Sending/receiving emails while driving will increase the amount of time at home.	.521		.687						-.392
Viewing/posting content on social media while driving helps coordinate social activities.	.516		.748		.404			-.543	-.441
Sending/receiving emails while driving is harmful				.842		.446			
Sending/receiving emails while driving is unwise	-.358			.888		.509			
Sending/receiving emails while driving is bad	-.378			.932		.511			
Sending/receiving emails while driving is worthless			-.393	.574					
Sending/receiving emails while driving is dangerous	-.355			.868		.500			

	Factor								
	Overall positive attitude, includes both behaviors	Overall attitude about most peoples' motivation to not perform the target behaviors due to negative influence on driving ability, both behaviors	Perceived social and work benefits from performing the target behaviors, predominantly email related	Overall negative attitude toward emailing while driving	Perception of other peoples' motivation to perform the target behaviors due to information gain, both behaviors	Overall negative attitude toward social networking while driving	Overall attitude about the target behaviors lack of negative influence on driving ability, both activities	Perceived distraction from work activities, social networking only	Perception of both activates influence on increasing speeding/ reducing alertness
Sending/receiving emails while driving is illegal				.438					
Most people send/read emails while driving makes them feel more informed	.355				.561				
Most people send/read emails while driving out of fear of missing out on work related information.					.651				
Most people view/post on social networking sites while driving because it makes them feel informed.					.773				
Most people view/post on social networking sites while driving from fear of social exclusion or "missing out".					.766				
Viewing/posting content on social media while driving is harmful	-.442			.499		.873			.364
Viewing/posting content on social media while driving is unwise	-.419			.439		.888			
Viewing/posting content on social media while driving is bad	-.481			.512		.933			
Viewing/posting content on social media while driving is worthless	-.406		-.371	.384		.685			.421
Viewing/posting content on social media while driving is dangerous	-.434	.357		.500		.893	-.365		

	Factor								
	Overall positive attitude, includes both behaviors	Overall attitude about most peoples' motivation to not perform the target behaviors due to negative influence on driving ability, both behaviors	Perceived social and work benefits from performing the target behaviors, predominantly email related	Overall negative attitude toward emailing while driving	Perception of other peoples' motivation to perform the target behaviors due to information gain, both behaviors	Overall negative attitude toward social networking while driving	Overall attitude about the target behaviors lack of negative influence on driving ability, both activities	Perceived distraction from work activities, social networking only	Perception of both activates influence on increasing speeding/ reducing alertness
Viewing/posting content on social media while driving is illegal						.498			
Sending/receiving emails while driving does not affect driving ability	.627		.436	-.386		-.533	.700	-.389	-.503
Sending/receiving emails while driving does not pose a safety hazards for other drivers.	.511		.356	-.389		-.544	.721	-.378	-.440
Sending/receiving emails while driving does not pose a safety hazards for non-motorists	.530		.354	-.445		-.595	.730	-.379	-.454
Viewing/posting content on social media while driving doesn't affect driving ability	.556					-.530	.617	-.589	-.519
Viewing/posting content on social media while driving doesn't pose a safety hazards for other drivers.	.466			-.386		-.474	.591	-.529	-.542
Viewing/posting content on social media while driving doesn't pose a safety hazards for non-motorists.	.503			-.390		-.493	.600	-.576	-.569
Viewing/posting content on social media while driving increases work connectivity.	.548		.466			-.371		-.796	-.385
Viewing/posting content on social media while driving helps coordinate work activities.	.517		.504			-.372		-.789	-.387

	Factor								
	Overall positive attitude, includes both behaviors	Overall attitude about most peoples' motivation to not perform the target behaviors due to negative influence on driving ability, both behaviors	Perceived social and work benefits from performing the target behaviors, predominantly email related	Overall negative attitude toward emailing while driving	Perception of other peoples' motivation to perform the target behaviors due to information gain, both behaviors	Overall negative attitude toward social networking while driving	Overall attitude about the target behaviors lack of negative influence on driving ability, both activities	Perceived distraction from work activities, social networking only	Perception of both activates influence on increasing speeding/ reducing alertness
Viewing/posting content on social media while driving increases work efficiency by eliminating distraction related to social networking sites at the workplace	.560		.479			-.392		-.704	-.426
Sending/receiving emails while driving reduces tendency to speed.	.471		.470						-.727
Viewing/posting content on social media while driving will reduce tendency to speed.	.431		.364						-.865
Viewing/posting content on social media while driving helps keep someone mentally alert while driving.	.602					-.417	.413	-.507	-.641
Sending/receiving emails while driving will not increase my chances of being caught by the police.	.444		.354			-.379	.482	-.351	-.411
Sending/receiving emails while driving helps keep someone mentally alert.	.650		.507	-.368		-.514	.526	-.413	-.588
Sending/receiving emails while driving makes me feel apprehensive									
Viewing/posting content on social media while driving will not increase my chances of being caught by the police.	.448					-.394	.402	-.463	-.401

	Factor								
	Overall positive attitude, includes both behaviors	Overall attitude about most peoples' motivation to not perform the target behaviors due to negative influence on driving ability, both behaviors	Perceived social and work benefits from performing the target behaviors, predominantly email related	Overall negative attitude toward emailing while driving	Perception of other peoples' motivation to perform the target behaviors due to information gain, both behaviors	Overall negative attitude toward social networking while driving	Overall attitude about the target behaviors lack of negative influence on driving ability, both activities	Perceived distraction from work activities, social networking only	Perception of both activates influence on increasing speeding/ reducing alertness
Viewing/posting content on social media while driving is frightening.		.411							

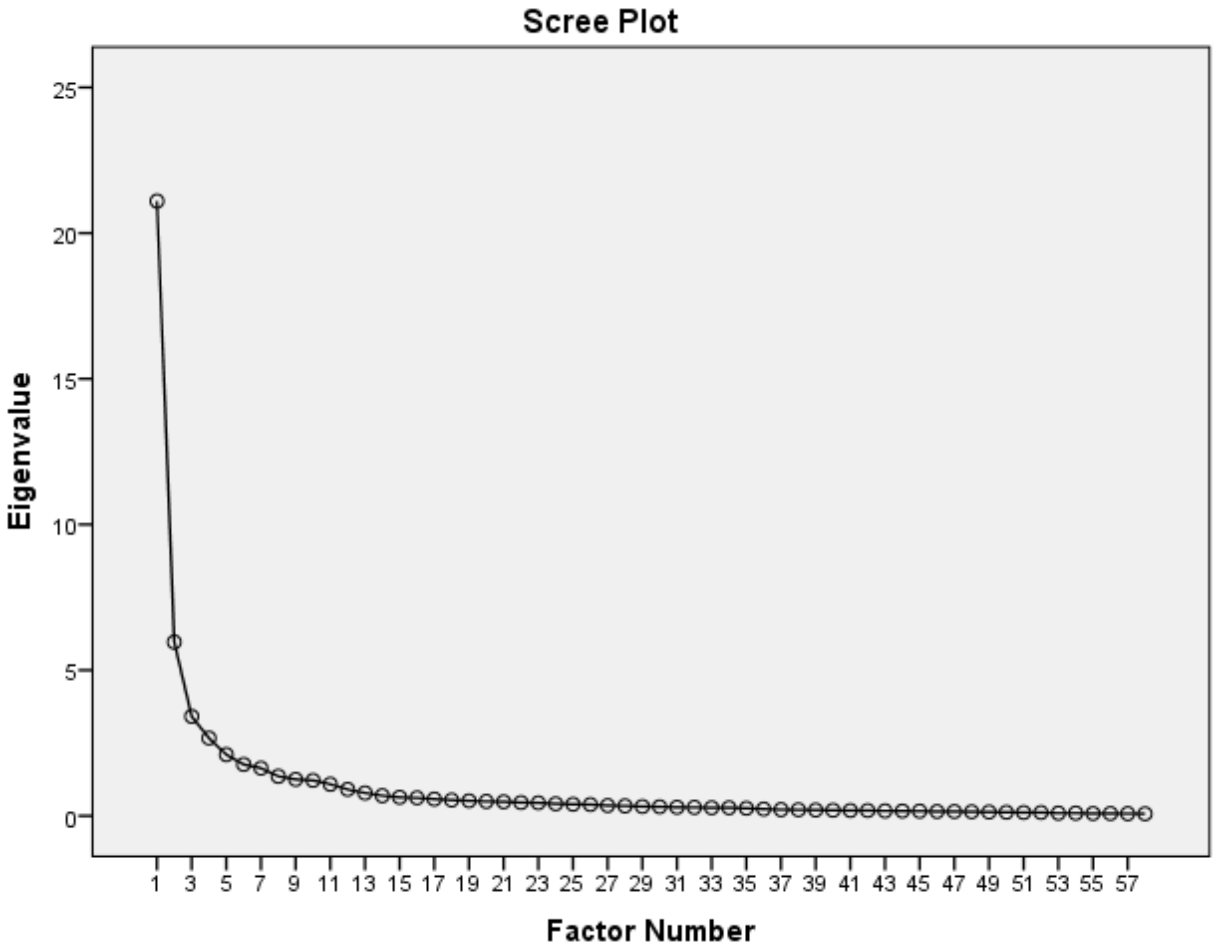

Figure C1: Final Exploratory Factor Analysis Scree Plot