

## ABSTRACT

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The present study attempted to identify the antecedents of texting while driving. Specifically, this study looks at the relationship between personality traits (i.e., the Big-Five), trait risk taking, and the cognitive rationalizations of such behavior. Overall, of the 1028 participants, 59.8% indicated a willingness to text while driving at least some of the time. Moreover, results indicated that the more extraverted, neurotic, and high in health risk taking an individual is, the more likely he/she is to text while driving. Furthermore, a set of cognitive rationalizations used to justify the behavior were found to have the strongest relationship.



THE PERSONALITY CORRELATES OF DRIVING WHILE INTEXTICATED

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by

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## CHAPTER I: INTRODUCTION

Distracted driving is extremely risky, as noted by the National Highway Safety Traffic Administration (NHSTA), and is responsible for approximately 500,000 accidents every year (NHSTA, 2009). Characterized as any non-driving task or event that takes an individual's attention away from driving, several different forms of potential driving distractions have been identified: (1) Visual, (2) manual, and (3) cognitive. Visual distractions are events that cause an individual to remove his/her eyes from the road (e.g., sightseeing); manual distractions are events that cause the driver to remove his/her hands from the wheel (e.g., eating a sandwich); and cognitive distractions are events that cause the driver's attention to shift away from the task at hand (e.g., daydreaming or talking to passengers). Alone, any of these distractions are potentially dangerous for a driver. The NHSTA reported that distracted driving was responsible for 448,000 injuries and 5,474 deaths, of which 995 were the result of driver distraction induced by cell phone use.<sup>1</sup>

Cell phone usage while driving, specifically sending and receiving text messages, involves all three of these forms of distraction (NHSTA, 2009). The Insurance Institute for Highway Safety (IIHS, 2010) noted that using a hand-held device, such as a cell phone, makes a driver four times more likely to injure themselves in an automobile accident. Moreover, research has noted that when drivers use a cell phone it slows down their reaction time as much as if they had a blood alcohol level of .08 percent – the legal limit in many states (NHSTA). This is not limited to hand-held phones; it also includes any hands-free cell phones or devices, including the use of a headset or speakerphone to have conversations while driving.

Despite these alarming numbers, there is little understanding of the antecedents of driver induced distractions. More specifically, what leads an individual to be more or less likely to text

while driving? Various motivations and perceptions of risk have been assessed with regards to texting while driving (Nelson, Atchley, & Little, 2009). However, the individual differences related to this behavior have been relatively ignored. The purpose of the proposed study is to address the gaps in the literature regarding antecedents of texting while driving; specifically, the personality correlates and cognitive justifications of texting while driving. Subsequently, this study aims to explore the relationship between choosing to text while driving and (1) the Five Factor Model of personality, (2) trait risk-taking, and (3) the cognitive rationalizations facilitating this behavior.

### **Cell Phone Use While Driving**

In 2007 the Motor Vehicle Occupant Safety Survey (MVOSS) noted that 85% of drivers reported that they keep their cell phones on and in their vehicle most of the time, if not all the time. Of these drivers, 64% report answering incoming phone calls either most of the time or all of the time. When on the road, 16% of the drivers who report keeping their cell phones in the car also speak on their phones while they are driving. It was also noted that only 37% of drivers wait until they get to a stopping point to speak on the phone, with 19% actually pulling off the road to speak. In 2009 the NHTSA reported that there are approximately 800,000 drivers using a hand-held device at any given moment. Atchley, Atwood, and Boulton (2011) referred to these activities that take a driver's attention away from the road and compromise their ability to drive the car safely as a dual task driving activities.

### **Text Messaging Related Driver Distraction**

**Dual Task Errors.** Hazards that occur as a result of text messaging while driving are increasing as texting forces the driver to take their eyes off the road four times longer than other tasks (Atchley et al., 2011). This dual task of texting and driving simultaneously leads to errors

such as incorrect lane changes, greater fluctuations in speed, and disruptions in braking speed. Lack of control of the vehicle has also been found through the act of texting while driving involving these dual task errors. When younger, more inexperienced drivers are confronted with a complex driving situation, the danger increases because they are less likely to delay reading or sending a text message. NHSTA (2009) projected that 1.6 million crashes every year are the result of engaging in texting while driving. That is, it also makes driving more than 20 times more dangerous than if an individual were not to engage in the behavior (VTTI, 2009).

**Attentional Demands.** The errors made by drivers on the road can often be attributed to the attentional demands required by the tasks that are not attended to properly. Recent research has noted that a driver's ability to focus on multiple stimuli when in complex situations is important to maintaining a competent level of performance (McCarley, Vais, Pringle, Kramer, Irwin, & Strayer, 2004). Although most individuals believe that they are uninterrupted in their comprehension of their surroundings, this research has shown that often times individuals' lack of perception of their environment and their repeated inattention can come with severe consequences and inaccuracies while driving. Moreover, it has been reported that an experience of change blindness can occur when even clear changes are unsuccessful at reaching one's consciousness. Furthermore, McCarley et al. evaluated individuals' visual performance on a change detection task while engaging in a cell phone conversation. They utilized two age groups consisting of young adults and older adults. For both groups, the amount of undetected changes grew when engaged in a cell phone conversation. These undetected changes are mostly due to an inability to process the visual cues during an eye fixation. Specifically, rapid eye movements, or saccades, are essential for identifying changes in the environment. Aside from the salience and meaningfulness of the changing object, the amount of saccades in the younger participants

increased during conversation. The average fixation time consistently lessened for the younger and older participants while engaged in conversation. Throughout a visual search of natural scenes, young adults were found to be more efficient than their older counterparts in determining the importance of an object. Thus, the level of danger is higher for older adults who choose to use a cell phone while driving.

Strayer and Johnston (2001) expanded on the research of attentional demands to include the effect that different types of conversations has on a driver. They reported that deficient driving performance while speaking on the cell phone is not a function of utilizing the cell phone itself, but more so due to the attention necessary to maintain the discussion. Cell phone companies have asserted that cell phone use while driving is similar to holding a conversation with passengers. Previous research has assumed that the discrepancies between these two groups, cell phone versus passenger conversations, are based on the awareness a passenger has of the driving conditions that allows them to alter the conversation accordingly. However, Hunton and Rose (2005) explored this by assessing a comparison between attentional demands and driving performance among cell phone conversations and conversations with passengers. Furthermore, they noted that, when speaking on a cell phone, there is no face to face contact between those involved in the conversation. Consequently, a great deal of cognitive resources is exerted in order to gather the nonverbal cues that are not readily available without the face to face contact. Nonverbal cues typically involved in conversations are facial expressions and hand gestures. These complement verbal communication in order to deliver complex messages in a more straightforward way. Nonverbal communication also contributes to obtaining feedback during a conversation. For effective communication through a cell phone, a person has to be able to make up for the absent nonverbal cues. Therefore, understanding the messages and organizing the

conversation is more difficult, which increases cognitive load of the cell phone user. The amount of attention necessary – which would be allocated to the task of driving – is thus consumed by this additional load. According to Kane, Bleckley, Conway, and Engle (2001), reacting to an obstruction and controlling one's attention is aided by working memory. When working memory demands are increased, it lessens the control possible for attention and allows for more interference. Subsequently, driving distractions are less capable of being blocked when working memory is reduced.

**Risk Perceptions.** Assessments of an individual's risk perceptions have been utilized to better understand the likelihood of using a cell phone while driving (Nelson et al., 2009). Risk perceptions are described as judgments formed about relative riskiness and consequences of certain actions (Weber, Blais, & Betz, 2002). White, Eiser, Harris, and Pahl (2007) used comparative utility to assess one's risk perceptions. Specifically, they noted that the weight of the benefits of using technology are larger for people who use cellular phones while driving than those who do not. This is related to optimism bias, where an individual may think that it is generally safer for them to use their cell phone when they are driving than for others. As previous research has noted, 100% of the people talked on their cell phone at least some of the time when they were driving (Nelson et al.). This can at least be partially explained by an individuals' perceptions of risk. If individuals do not perceive the dual task of talking on the phone and driving to be risky, then they are more likely to do it. Moreover, regardless of cell phone type, either handheld or hands-free, drivers view talking on these devices while driving to have a low perceived risk and high levels of perceived frequency.

As the preceding research has shown, driver distraction is a leading cause of vehicle crashes (NHSTA, 2009). The amount of attentional demands required to multi-task and drive

safely is startling (Hunton & Rose, 2005). Moreover, with the overwhelming prevalence of cell phone use and texting while driving, this is a growing problem (NHSTA, 2009). The extensive research on the dangers of distracted driving has been a driving force in the federal and state regulations on this behavior.

### **Legislation Against Text Messaging While Driving**

One of the first laws targeting texting while driving was enacted in 2009. Executive Order 13513, the Federal Leadership on Reducing Text Messaging While Driving, made the use of a cell phone to text while driving illegal when on official Government business and extends to using any Government furnished electronic equipment while driving. Moreover, it applies to every agency of the executive branch, with government contractors, subcontractors, recipients and subrecipients encouraged to implement this policy as well. This policy defined “Texting” or “Text Messaging” as:

Reading from or entering data into any handheld or other electronic device, including for the purpose of SMS texting, e-mailing, instant messaging, obtaining navigational information, or engaging in any other form of electronic data retrieval or electronic data communication (Executive Order No 13513, 2009).

The majority of the states have adopted laws prohibiting cell phone use and texting while driving.<sup>2</sup> In September of 2011, the Governors Highway Safety Association (GHSA, 2011) reported that nine states, the District of Columbia, and the Virgin Islands have made it a primary offense for all drivers using a handheld cell phone. This empowers a police officer to write a ticket to a driver for using a cell phone without having committed any additional traffic offense.

Thirty states and the District of Columbia have made all cell phone use illegal for novice drivers (i.e., drivers who either have their learners permit or are under the age of 18). Moreover,

text messaging while driving has been made illegal in thirty-four states, the District of Columbia, and Guam, with 31 of those being primary offenses. Furthermore, distracted driving bans have been adopted by many localities. For example, North Carolina has not adopted a handheld ban, but has made all cell phone use a primary offense for school bus drivers and drivers that are under the age of 18. Texting while driving is banned for all drivers as a primary offense, although no crash data is compiled dealing with these topics. Violating this ban will result in a \$100 fine, on top of any additional court fees.

Despite this legislation, data gathered by the IIHS (2010) has shown that the bans on text messaging have not been effective in ceasing the problem of texting while driving. It was revealed that it could be perpetuating the problem further. The IIHS has recently concluded that since bans on texting have been placed, the number of accidents increased. Research was conducted in California, Louisiana, Minnesota, and Washington where bans on texting have been set. This study found that in three of these states the accident rates have increased between one and nine percent. This study goes on to hypothesize that it could be that drivers are holding their cell phones down low in their laps so they are not seen engaging in text messaging while driving. With laws enacted banning text messaging while driving, and the speculation that these laws may only be perpetuating the problem, it is important to research other areas that could deduce why individuals engage in this behavior. One explanation that is proposed is a person's proclivity to engage in risk taking behavior.

### **Risk Taking**

Levenson (1990) operationalized risk taking "as any purposive activity that entails novelty or danger sufficient to create anxiety in most people" (p. 1073). This can involve physical activities, socially driven events, or a mixture of both. One model of risk-taking

behavior is known as the risk-return model (Weber et al., 2002). This model assumes that risk-taking is content-specific. That is, an individual's risk taking may vary widely from one area (i.e., social) to the next (i.e., ethical). Moreover, this model suggests that domain and gender differences in risk-taking are rooted in variations in risk perception more so than discrepancies in attitude towards perceived risk. Much of risk-taking behavior is subsequently derived from an individual's risk attitude or risk perception (Weber et al.). Risk attitude deals with the utility function of the expected utility framework in relation to the person's choices that will lead to proposed outcomes. The risk attitude of a person can be described using a continuum from risk aversion to risk seeking, where risk aversion is characterized by reluctance to act on something that has an unexpected return and risk seeking describes individuals who are more likely to take a gamble even with the unexpected payoff.

### **Risk-Return Framework**

The risk-return framework requires weighing the expected benefit of a behavior to the risk involved (Weber et al., 2002). This framework allows for preferences to explain the discrepancies between two domains. The risk-return of engaging in a certain behavior may be seen as similar in two different domains, but the person may prefer one domain (e.g., social) over the other (e.g., health/safety). When considering the dual impact of the situation and individual differences of the "decision maker", the situational differences need to be controlled for before those individual differences are able to be evaluated (Weber et al.). The findings noting the difference in the risk preferences of individuals suggest that that risk-taking is complex and multidimensional. It also demonstrates the dispositional and contextual implications of this behavior (Weller & Tikir, 2011).

### **Gender Differences in Risk Taking**

The differences between men and women have been assessed on risk taking behaviors and it has been found that generally men take more risks (Weber et al., 2002). However, the degree of differences fluctuates across domains. According to Weber et al., significant gender differences were found in reported risk taking behaviors, with men reporting more risk taking in all domains but one. In the social domain, women were more likely to take greater risks. Specifically, this may include stating that your tastes are dissimilar from your friends. Additionally, gender was found to have a moderate effect on self-reported risky driving behaviors.

Zuckerman and Kuhlman (2000) found similar results, with men having higher totals than women. Women, however, had higher scores for neurotic and sociability scales, with sociability being associated with extraversion. Sociability was found have a strong relationship to a composite risk measure, with neuroticism not having any relation to the measures used. Individuals who are considered reckless drivers tend to lack anxious predispositions. On the other hand, individuals who are unlikely to take risks are more agreeable. For sociability, the high risk takers had only moderate to high on levels on this subscale. Conversely, those less likely to take risks are more extreme on their levels of introversion.

### **Reductionistic Model of Risk Taking**

Classifying the source of risk taking has been assessed using the reductionistic model of risk taking (Levenson, 1990). Because risk takers have an unusually low level of arousal, they often gravitate toward risky behavior that will increase this level, making these individuals somewhat fearless. Physiological traits were found to lack importance in identifying risk-taking behavior by the cognitive-social learning theory. Instead, these behaviors are found to be more inclined by social factors synchronized with predisposed personality traits. According to one

study of different groups on risk taking, Levenson found that it can be related to either physical or social activities. In addition, these actions could be attributed to lack of fear, courage that is not associated with being fearless, premeditation, impulse, antisocial, or prosocial tendencies.

### **Risk Taking and Individual Differences**

**Five Factor Model of Personality (FFM).** Support is gaining for the investigation into relationships between risky behaviors and the traits of the FFM (i.e., extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience), shifting the focus from specific personality aspects like sensation seeking (Skeel, Neudecker, Pilarski, & Pytlak, 2006). Research conducted by Skeel et al. noted that the traits of the FFM accounted for a large amount of variance in general risk taking behaviors. Specifically, 24% of the variance in general risk-taking behaviors could be explained by the FFM. They suggest that what is not accounted for by personality is accounted for through the cognitive process of behavioral aspects of a person.

**Risks Versus Benefits.** Assessing the potential risks and benefits of a behavior is important in determining whether to engage in a particular action (Gullone & Moore, 2000). For texting while driving, this could be weighing the cost of a crash or traffic citation with the benefit of answering an important question from your friend, parent, or boss. These decisions come at the very beginning of a risk-taking behavior. When an individual has many positive experiences when engaging in a particular risk behavior, it no longer requires a decision-making process to engage in that behavior again (Moore & Gullone, 1996). When it has a negative consequence, the individual must then return to making the decision of whether or not to participate in the risky behavior again. If the consequence is severe enough, a person may decide to avoid engaging in such a behavior again, or it may not change their thought process enough in order to cease the behavior. Both neuroticism and extraversion are important personality factors in these

behavioral decisions (Gullone & Moore, 2000). When examining behaviors in social situations, neuroticism is defined by inhibition, particularly with new experiences. Extraversion is characterized by taking risks, especially in social situations.

A subgroup of risk-taking is reckless behaviors (Gullone & Moore, 2000). These actions have a more negative social or health-related outcome compared to the general adult population. Within this category would be several driving behaviors like drinking and driving or speeding. As noted by Gullone and Moore, among adolescents between 11 and 18, the category of risk taking that they participated in less than any other was reckless behavior, with thrill-seeking being the most. Another significant finding was among the personality traits or openness and conscientiousness, both of which were found to have a negative relationship with reckless risk-taking. Moreover, judgments about the risk appear to have a significant negative relationship with risk behaviors for all four categories of risks (e.g., rebellious, reckless, antisocial, and thrill-seeking). When taking into account each risk factor, agreeableness was discovered to be the most related in comparison to the other four personality factors. The relationship was found to be weak, but positive with every risk factor except reckless risk-taking.

Extraversion was the personality factor that was found to have a positive relationship with thrill-seeking, whereas conscientiousness was highly associated with reckless risk-taking (Gullone & Moore, 2000). Furthermore, it is notable that, in comparison to the younger group of adolescents, the older group did not see much risk involved in the negative behaviors and took part in them more often. This older group, age 15-19, also had higher scores of both agreeableness and conscientiousness. It has been reported that for the majority of adults, they are more agreeable and conscientious (Gullone & Moore, 2000). They also appear to have lower levels of the other three factors of personality – neuroticism, extraversion and openness to

experience. It is thus speculated that as individuals grow older, they learn to conform more to adult norms and become more conscientious and agreeable. This is important to note because being high in conscientiousness means you are less likely to participate in reckless risks (e.g., text messaging while driving). Openness to experience was surprisingly the only factor that did not predict risk behavior, although this may be due to the age of the participants. The judgments made about the risks were found to be superior to personality factors. This has been found to be especially true for the reckless and rebellious risks.

### **Personality**

The relationship between cell phone usage and individual personality characteristics has only recently begun to be investigated (Gullone & Moore, 2000). The FFM of personality can be used to assess this relationship. The FFM is considered to be one of the most inclusive trait models to date. This support derives from utilizing multiple data sets with a variety of cultures as well. Five broadly defined domains – neuroticism, agreeableness, extraversion, conscientiousness, and openness to experience – have been established according to this model that consists of hundreds of subtraits (Poschl & Doring, 2007).

### **Neuroticism**

Most researchers agree fully on the classification of Neuroticism (McCrae & Costa, 1987). It can be defined by a tendency to worry, be insecure and self-conscious, as well as temperamental. Neuroticism contains the trait of anger and hostility and describes people that are considered anxious, impulsive, mistrusting, and defenseless (Gullone & Moore, 2000). Most researchers agree that neuroticism is centered on a negative affect (McCrae & Costa, 1987). This could be expanded to include a lack of coping skills, as well as troubled thoughts and actions that are associated with emotional distress. Additionally, it was discovered that lack of impulse

control, involving overeating, smoking, or drinking heavily were related to higher levels of neuroticism.

### **Extraversion**

Extraversion is defined by those who are bold, excitement-seeking, and sociable (Gullone & Moore, 2000). The majority of researchers agree that these components as well as cheerfulness, activity level, and assertiveness all loosely covary (McCrae & Costa, 1987). Surgency, classified by dominance and activity level, has been found to exemplify the trait of extraversion. Furthermore, an individual who is friendly, talkative, and affectionate may also be regarded as being extraverted.

### **Openness to Experience**

Openness to experience typifies those who have traits such as being open to feelings and values, and an interest in intellectual endeavors (Gullone & Moore, 2000). Although intelligence is considered a component of openness to experience, it is more likely that having a higher degree of intelligence could make an individual more inclined to be open, or having a high level of openness may actually extend someone's intelligence (McCrae & Costa, 1987). Overall, it is most appropriate to consider the two to be independent attributes of individual personality differences. Uniqueness, strong imagination, a wide range of interests, and being daring is the best way to classify someone high on the trait of openness to experience.

### **Agreeableness**

Agreeableness describes the degree to which individuals are trustworthy, straightforward, and cooperative (Gullone & Moore, 2000). More descriptors include modesty, altruism, and tender-mindedness (McCrae & Costa, 1987). High scores on the subscale of agreeableness corresponds to high levels of that trait (Gullone & Moore, 2000). Low scores indicate a lack of

agreeableness. However, McCrae and Costa (1987) posit that when this trait is characterized by very high scores it can be viewed as maladaptive. In this case, extremes of agreeableness can classify individuals who are sycophants and very dependent on others.

### **Conscientiousness**

The final factor is conscientiousness. This consists of a variety of subtraits like reflection, proficiency, self-control and keeping things neat and organized (Gullone & Moore, 2000). Two additional common descriptors of this trait are a propensity for caution and meticulous behavior (McCrae & Costa, 1987). An individual high on this trait is seen as having the ability to control impulses and is characterized as being somewhat moralistic. Conscientiousness was also considered at one point to include sticking to plans, as well as remaining on schedules, and following specific requirements. It has been shown that personality represents the act of participating in a certain behavior and on the other spectrum, the self-discipline to abstain from doing so (Hirsh, DeYoung, & Peterson, 2009). For many years now, the FFM classification of personality has been the most preferred and widely used by psychologists in the field (Hirsh et al.).

### **The FFM, Texting, and Cell Phone Use**

Extraversion and neuroticism could be related to problematic cell phone use. Examples include dialing and speaking on the cell phone while driving (Poschl & Doring, 2007). Introverts have also been found to be associated with elevated text messaging or SMS, or Short Message Service, use in comparison to extroverts who prefer speaking on the cell phone. A study by Poschl & Doring developed two personality prototypes, *Resilients* and *Overcontrollers*.

The Resilient group was described as having a low score on neuroticism, a high score on extraversion, openness to experience, and agreeableness, but only a slightly positive score on

conscientiousness. This group could be characterized as people that are laid back, emotionally stable, sociable, self-confident and able to get along well with others. The Overcontrolled group was described as having a high score on neuroticism and agreeableness, a slightly negative score on extraversion, a low score on openness, and a slightly low score on conscientiousness.

Emotional instability, being slightly introverted, not close-minded, lacking drive, but able to get along with others describes someone in this group. One factor in the measure related to lack of availability matched with a concern for the communication partner (e.g., “calling back as soon as possible after a missed call, or getting anxious when not being able to reach someone”).

Resilients scored slightly below average on this dimension, while Overcontrollers showed an above average level. Furthermore, Overcontrollers viewed cell phone use in general as being of greater significance when compared to Resilients.

### **The FFM and Risky Driving Behaviors**

Personality differences have been shown to affect risky driving behaviors, especially in inexperienced drivers (Machin & Sankey, 2007). Driving at high speeds is one aspect of risky driving behaviors. Research in this area found that inexperienced drivers who speed tend to see little risk in this behavior and also view their skill level as being higher than it really is. A study conducted by Machin & Sankey discovered that inexperience paired with young drivers that scored high on excitement-seeking (i.e., extraversion), low on altruism (i.e., agreeableness), and perceive the likelihood of an accident as high and have a lesser aversion to risk taking are also more likely to speed according to self-reports. Anxiety, or neuroticism, was negatively correlated with speeding.

Numerous research studies have found conscientiousness to be negatively related to risky driving behaviors (Arthur & Graziano, 1996; Dahlen, Martin, Ragan, & Kuhlman, 2005;

Schwebel, Severson, Ball, & Rizzo, 2006). Schwebel et al. conducted a study administering a personality test, a self-reported driving history questionnaire, and a virtual driving environment task. They found that conscientiousness is the only one of the five personality traits to moderately predict crash involvement on a consistent basis. The relationship between personality and driving style remained strong even when gender effects and driving experience, as measured by the amount of years they have had their license, was partialled out.

### **Current Study**

The purpose of this study was to explore the relationship between an individual's willingness to text while driving and both (1) personality traits, (2) trait risk taking, and (3) rationalizations for engaging in such behavior. Specifically, this study seeks to assess how dangerous college students perceive text messaging while driving to be and to explore the prevalence of texting while driving among college students. This will aid in understanding the relationship between the perceived danger of text messaging while driving and the frequency of such behavior. Moreover, this study hopes to identify the individual differences that serve as antecedents to texting while driving. With this information, it can be concluded whether or not recent laws are effective in controlling this behavior. Looking at the relationship between the FFM personality traits, risk taking behavior, and rationalizations with these actions will be a novel addition to the research base on the subject.

Levenson (1990) reported that because risk takers have an unusually low level of arousal, they gravitate toward risky behavior that will increase this level. As a result, these individuals are assumed to be somewhat fearless. Furthermore, Nelson et al. (2009) found that drivers view talking on their cell phone while driving to have a low perceived risk as well as high levels of perceived frequency. Subsequently,

*Hypothesis 1:* Text messaging while driving will be more prevalent among college students who perceive its danger to be low.

*Hypothesis 2:* Participants who report higher levels of risk-taking behaviors will be more likely to text while driving.

Furthermore, as noted by Zuckerman and Kuhlman (2000), individuals who were more prone to risk taking reported moderate to high levels of sociability, or extraversion, with those less likely to take risks being more extreme on their levels of introversion. Subsequently,

*Hypothesis 3:* Participants who report high levels of extraversion will be more likely to text while driving.

Gullone and Moore (2000) reported that high levels of conscientiousness are related to a lower likelihood of participating in reckless risks. Furthermore, Hirsh et al. (2009) found that the traits of conscientiousness and agreeableness are linked to higher levels of serotonin, which leads to impulse control and inhibiting effects on behavior. It was also reported in their research that conscientiousness is related to the regulation of distraction with Zuckerman and Kuhlman (2000), noting that individuals who are unlikely to take risks are also more agreeable. Subsequently,

*Hypothesis 4:* Participants who report high levels of conscientiousness will be less likely to text while driving.

*Hypothesis 5:* Participants who report high levels of agreeableness will be less likely to text while driving.

Additionally, anxiety, a large component of neuroticism, was negatively related to speeding (Machin & Sankey, 2007). Additionally, Zuckerman and Kuhlman (2000) noted that people who are considered reckless drivers have low levels of anxiety. Subsequently,

*Hypothesis 6:* Participants who report high levels of neuroticism will be less likely to text while driving.

Futhermore, openness to experience had mixed results in association to risk-taking tendencies. However, According to McCrae & Costa (1987), one of the best descriptors of an individual high on the trait of openness is someone who is daring. Subsequently,

*Hypothesis 7:* Participants who report high levels of openness to experience will be more likely to text while driving.

Finally, several studies have examined the propensity of adolescents to engage in new technologies so readily, which includes text messaging. Reasons for this were found to relate to its convenience and quicker delivery than other traditional technologies (Grinter & Eldridge, 2001, 2003; Lenhart, Madden, & Hitlin, 2005). Additionally, the costs related to texting compared to making a phone call are cheaper (Grinter, Pale, & Eldridge, 2006). Costs are fixed for text messaging and therefore a voice call remains a more uncertain form of communication when considering pricing. Furthermore, texting allows for an individual to feel more in control of their privacy.

*Hypothesis 8:* Participants who report higher levels of rationalizations will be more likely to text while driving.

## CHAPTER II: METHOD

### Participants

Participants were drawn from the Department of Psychology's undergraduate research participation pool via the online experiment management system (i.e., Experimentrak). No restrictions were made regarding eligibility for participation (any student may participate). Participants included 310 males and 718 females ( $N = 1028$ ). Ages ranged from 16 to 34 ( $M = 18.69$ ,  $SD = 1.32$ ). The majority of the participants were White ( $n = 797$ ), with the rest comprised of African American ( $n = 195$ ), American Indian or Alaska Native ( $n = 8$ ), Asian ( $n = 21$ ), and Pacific Islander ( $n = 7$ ). Participation in the study earned students credit towards their grade.

### Procedures

Participants completed all of the survey measures online. The first instrument was a basic survey of demographic characteristics. Participants were asked to disclose typical background information that is regularly reported in psychological research (i.e., age, sex, education, and ethnicity). Both the second and third survey instruments were designed to measure the texting while driving behaviors of the participants, one measuring perceptions and the other measuring frequency. The first of these was a 30-item measure asking participants to indicate whether or not they agree with the perceptions of texting while driving statements. The second of these was a 30-item measure asking participants to identify the frequency of their texting while driving behaviors as well as general information regarding their phone type and how they text and drive. The fourth survey was a FFM Personality measure (i.e. Mini IPIP scale) that was administered. Finally, there was a 47-item Risk Taking measure that assessed the likelihood of participants engaging in various social, financial, ethical, recreational, and health/safety activities. All five

measures were administered online via Qualtrics, the survey software currently subscribed to by East Carolina University. The data collection process took approximately forty-five minutes.

At the beginning of the data collection session, all participants were provided with informed consent information outlining the nature of their participation. This form notified participants that there was no known risk from participating in the study and that participation was completely voluntary. To indicate their consent to participate, individuals were required to click on a check box. Individuals who did not indicate their consent to participate were not allowed to participate in the study. Following the completion of the study, participants were provided with some basic information regarding the nature of this study and its value to the greater understanding of human nature.

Participants were not asked to fully disclose their identity on any of the four measures. Thus, their responses were completely anonymous. Following the completion of the surveys, participants were asked to provide their Pirate ID as well as last name so that credit could be granted for participating. There was no way to link participants' names with their responses.

## **Measures**

**Demographics Survey.** Participants were asked to disclose typical background information that is regularly reported in psychological research. This includes questions about age, race, gender, and marital status (i.e., “What is your age in years”; “What is your marital status?”). Additionally, questions were included about enrollment status in school, employment status, and work hours (i.e., “What is your current enrollment status in school?”; “Are you currently employed?”; “How many hours a week do you work?”). Participants' were also asked for their University ID in order to provide research credit (See Appendix A).

**Texting While Driving Perceptions Measure.** This questionnaire consists of 30 items asking participants to indicate whether or not they agree with the perceptions of texting while driving statements. The five domains included are perceived danger (e.g., “I am endangering the lives of others when I text while driving”), perceived punishment (e.g., “I will get pulled over if I text while driving”), invincibility (e.g., “Briefly looking at the phone to text is not distracting enough to affect my driving”), risk taking (e.g., “When driving at high speeds, texting is not dangerous”), and urgency/compulsivity (e.g., “Texts often contain important information that dictates a response even when driving”) with 6 questions for each. A 7-point Likert response scale ranging from Strongly Disagree (1) to Strongly Agree (7) will be utilized (See Appendix B).

**Texting While Driving Frequency Measure.** This questionnaire consists of 30 items asking participants to identify the frequency of their texting while driving behaviors (e.g., “How likely are you to text message while you are driving?”; “How frequently do you text message while you are driving?”). Questions also cover general information regarding their phone type (e.g., Does your cell phone have a full *qwerty* keyboard?”), and how they text and drive through descriptive picture options and questions (e.g., “What fingers do you use when sending a text message?”) see Appendix C).

**Rationalizations Measure.** This questionnaire contains nine items that ask participants about their rationalizations for texting while driving. These questions related to topics like convenience (e.g., “Text messaging while driving is more convenient than talking on the phone while driving”), cost (e.g., “I prefer text messaging while driving because it is cheaper than making a phone call”), and skill level (“I prefer text messaging while driving because I am so skilled at it, I will not crash”). Participants’ were asked to indicate the likelihood of engaging in

each activity using a 5-point Likert response scale ranging from Strongly Disagree (1) to Strongly Agree (5) (See Table 1).

**Risk Taking Measure.** The questionnaire consists of 47 items that contain five domains of risk: financial (e.g., “Lending a friend an amount of money equivalent to one month's income”), health/safety (e.g., “Regularly riding your bicycle without a helmet”), recreational (e.g., “Going whitewater rafting at high water in the spring”), ethics (e.g., “Driving home after you had three drinks in the last two hours”), and social (e.g., “Admitting that your tastes are different from those of your friends”)(Weber, 2002). Participants’ were asked to indicate the likelihood of engaging in each activity using a 5-point Likert response scale ranging from Extremely Unlikely (1) to Extremely Likely (5). When high scores are reported on a subscale, this signifies high levels of risk-taking in that category (Appendix D).

**Five Factor Model Personality Measure (Mini IPIP).** This questionnaire was developed from the NEO Personality Inventory (NEO-PI), which includes measures of five domains of personality: intellect/openness to experience (e.g., “Have a vivid imagination”), conscientiousness (e.g., “Like order”), extraversion (e.g., “Am the life of the party”), agreeableness (e.g., “Sympathize with others’ feelings”), and neuroticism (e.g., “Get upset easily”) (Donnellan, Oswald, Baird, & Lucas, 2006). The shortened version used includes five questions for each domain, where participants were asked if each question describes them on a 5-point Likert Response scale response ranging from Strongly Disagree (1) to Strongly Agree (5). When high scores are reported on a subscale, this signifies high levels of that particular trait (McCrae & Costa, 1987) (See Appendix E).

## Analyses

The surveys that were developed were initially analyzed looking at reliabilities. Data from the study was used to examine the descriptive statistics. Descriptive statistics were broken into dimensions such as frequency of text messaging while driving, speeds at which individuals are willing to text message while driving, and knowledge of the illegal nature of engaging in the behavior. Correlations were then analyzed to determine whether there is a relationship between the FFM personality traits and risk taking measures, as well as the various texting while driving perceptions and behaviors. Hierarchical regression analysis was used to predict text messaging while driving using the multiple predictor variables. Next, group comparisons were analyzed, specifically looking at gender, race, and age.

## CHAPTER III: RESULTS

### Scale Development

**FFM.** Means and coefficient alphas were established for each measure used. Additionally, group means were compared using an ANOVA and Fisher's Least Significant Difference (LSD) test. For the FFM of personality, the higher scores within each subscale represented a higher level of that personality variable. For example, a score of 20 on the neuroticism subscale would mean that individual is highly neurotic. The average score reported for neuroticism was 11.18, with a range of 4 to 20. The scale had an alpha of .59, which is fairly poor; however, the scale only consists of four items for each of the personality variables. As noted by Schmitt (1996), that there is not an official number that describes acceptable or unacceptable levels of alpha. Although the vast majority of researchers suggest a cutoff of .70, there are reasons why this is restricted. When a scale has a reliability as low as .49, the validity would then have an upper limit of .70. With other sought-after qualities, like significant content coverage of an area as well as sound unidimensionality, the lower reliability would not be a large hindrance to its utilization. The neuroticism scale's alpha would raise to .65 if the question "seldom feel blue" was removed. Thus, this value was not considered to be problematic.

The average score reported for extraversion was 13.79, with an alpha of .77 implying good internal reliability. If any item was dropped, the alpha would decrease. The average score reported for openness to experience was 14.78, with an alpha of .71. If any item was dropped, the alpha would decrease. Finally, Whites and Blacks as well as Blacks and American Indian or Alaska Natives were significantly different in openness to experience,  $F(4, 1027) = 3.736, p = .005$ . Specifically, Blacks were higher than Whites and American Indian or Alaska Natives in openness to experience. The average score reported for agreeableness was 15.78., with an alpha

of .72. If any item was dropped, the alpha would decrease. Additionally, there was a significant negative relationship between age and agreeableness,  $r = -.09, p < .01$ . The average score reported for conscientiousness was 13.94. The scale had an alpha of .68. If any item was dropped, the alpha would decrease.

**Risk Taking.** The average score reported for the social risk subscale was 30.06, with a possible range of 11 to 43. The scale had an alpha of .64. If any item was dropped, the alpha would decrease. A significant difference between Whites and Blacks, and Blacks and Pacific Islanders were found in social risks,  $F(4, 1027) = 5.297, p < .001$ . Specifically, Blacks are more likely to engage in social risks than Whites and Pacific Islanders. The average score reported for financial risk was 13.28, with a possible range of 7 to 30. The scale had an alpha of .69. If “Lending a friend an amount of money equivalent to one month’s income” was removed, the alpha would raise to .70.

The average score reported for health risk was 22.38, with a possible range of 10 to 46. The scale had an alpha of .68. If any item was dropped, the alpha would decrease. There was also a significant difference between Whites and Blacks and Blacks and American Indian or Alaska Native in health risks,  $F(4,1027) = 5.421, p < .001$ . Specifically, Whites were more likely to engage in health risks than Blacks, however, Blacks were more likely to engage in health risks than American Indians or Alaska Natives. There was a significant difference between males and females in ethical,  $F(4, 1027) = 45.21, p < .001$ , financial,  $F(4, 1027) = 57.86, p < .001$ , and health risk taking,  $F(4, 1027) = 75.71, p < .001$ . Specifically, males are more likely to engage in ethical, financial, and health risk taking than females. Age was not related to ethical risk taking,  $r = .04, p = .18$ , health risk taking,  $r = .06, p = .08$ , or social risk taking,  $r = .04, p = .25$ . Age was significantly positively related to financial risk taking,  $r = .10, p < .01$ , and recreational risk

taking,  $r = .11, p < .001$ . These three scales (i.e., social, financial, and health risk) have somewhat low alphas; however, this measure has been proven and widely used among other samples.

The average score reported for ethical risk was 19, with a possible range of 10 to 45. The scale had an alpha of .84. If any item was dropped, the alpha would decrease. The average score reported for recreational risk was 27.41, with a possible range of 10 to 49. The scale had an alpha of .82. If any item was dropped, the alpha would decrease. Recreational risks had significant differences between Whites and Blacks, Whites and American Indians or Alaska Natives, and Blacks and Asians,  $F(4, 1027) = 23.08, p < .001$ ). Specifically, Whites are more likely to engage in recreational risks than Blacks and American Indians or Alaska Natives. Furthermore, Asians are more likely to engage in recreational risks than Blacks.

**Rationalizations and Frequency.** The average score reported for the rationalizations for texting while driving was 19.86 (range 9-44). The scale had an alpha of .91. No item in the reasons scale was found to be problematic, with the scale's alpha falling around .90 for each item if it was removed (See Table 1). The average score reported for texting was 8.22 (range 3-15). The scale had an alpha of .87. There was a significant difference between Whites and Blacks in reports of texting while driving, as well as Whites and Asians,  $F(4, 1027) = 5.591, p < .001$ . Specifically, Whites texted while driving more than both Blacks and Asians. No significant differences were found between rationalizations for texting while driving,  $F(1, 1027) = 5.36, p = .02$ , or actually engaging in the behavior,  $F(1, 1027) = .22, p = .64$ . Age was not related to texting while driving,  $r = .03, p = .34$ . Age was related to reasons for texting while driving,  $r = .07, p < .05$ .

Table 1

*Rationalizations for Text Messaging Measure*

Statements	Proportion of Responses					Corrected Item-Total Correlations	Cronbach's Alpha if Item Deleted
	1	2	3	4	5		
Text messaging while driving is more convenient than talking on the phone while driving.	.39	.38	.14	.07	.02	.63	.91
I prefer text messaging while driving because I do not like talking on the phone.	.34	.34	.13	.14	.05	.71	.90
I prefer text messaging while driving because it is cheaper than making a phone call.	.43	.36	.17	.03	.01	.65	.91
I prefer text messaging while driving because people are less likely to pick up phone calls.	.31	.33	.14	.19	.03	.71	.90
I prefer text messaging while driving because it is an easier form of communication.	.31	.28	.16	.21	.05	.78	.90
I prefer text messaging while driving because I am so skilled at it, I will not crash.	.44	.35	.15	.05	.00	.61	.90
I prefer text messaging while driving because in relation to phone calls, texting allows you to stay connected without interrupting your own or others' current actions completely.	.32	.27	.18	.20	.04	.77	.90
I text message while driving because it does not allow others to overhear the conversation.	.30	.26	.16	.25	.03	.69	.90
I text message while driving because it is straight to the point.	.29	.24	.19	.25	.04	.73	.90

## Correlations

Correlations between predictors are reported in Table 2. Neuroticism was positively correlated with texting while driving,  $r = .17, p < .001$ . Thus, Hypothesis 6 was not supported. Therefore, the more neurotic an individual is, the more likely they are to text while driving. Extraversion is also positively correlated with texting while driving,  $r = .17, p < .001$ . Thus, Hypothesis 3 was supported. Consequently, the more extraverted an individual is, the more likely they are to text while driving. Openness to experience was also negatively correlated with texting while driving,  $r = -.09, p < .001$ . Thus, Hypothesis 7 was not supported. The more open to experience one is, the less likely they are to text while driving.

Conscientiousness was negatively correlated with texting while driving,  $r = -.11, p < .001$ . Thus, Hypothesis 4 was supported. Therefore, the more conscientiousness an individual is, the less likely they are to text while driving. Agreeableness was not correlated with texting while driving, so Hypothesis 5 was not supported. Thus, regardless of an individual's level of agreeableness, there is no relationship between likelihood to text while driving.

Ethical risk taking was positively correlated with texting while driving,  $r = .25, p < .001$ , as was financial risk taking,  $r = .12, p < .001$ , and health risk taking,  $r = .27, p < .001$ . Additionally, social risk taking was positively correlated with texting while driving,  $r = .11, p < .001$ , as well as recreational risk taking,  $r = .11, p < .001$ . Thus, Hypothesis 2 was supported. Overall, the more individual risk taking propensity, the more likely they are to text while driving.

Perceptions of danger relating to texting while driving were found to be significantly negatively correlated with the frequency of engaging in the behavior,  $r = -.07, p = .04$ . Thus, Hypothesis 1 was supported. When an individual perceives the dangers relating to texting while driving to be low, he/she will engage in the behavior more frequently. The cognitive

rationalizations were significantly positively correlated with texting while driving,  $r = .60, p < .001$ . Thus, Hypothesis 8 was supported. The more rationalizations provided for texting while driving, the more likely the individual to engage in the behavior.

Some other interesting findings are related to the speeds that individuals are willing to text while driving. Texting was significantly positively correlated at speeds less than 20 miles per hour (mph),  $r = .69, p < .001$ , and between 20 and 40 mph,  $r = .76, p < .001$ . Texting was also significantly positively correlated at speeds between 40 and 60 mph,  $r = .69, p < .001$ , and speeds more than 60 mph,  $r = .57, p < .001$ . Hold style was also significantly correlated with texting while driving,  $r = .12, p < .001$ , but not related to any law-specific question. Stopping on the side of the road to text is significantly negatively correlated with texting over 60 mph,  $r = -.07, p < .05$ , but significantly positively correlated with “There is a law in my state of residence that bans the use of text messaging while driving”,  $r = .09, p < .01$ , and “I will get pulled over if I text while driving”,  $r = .09, p < .01$ .

Table 2

*Correlation Matrix*

	1	2	3	4	5	6	7	8	9	10	11	12
1. Neuroticism	1.00											
2. Extraversion	-.09**	1.00										
3. Openness	-.08*	.21**	1.00									
4. Agreeableness	.01	.25**	.30**	1.00								
5. Conscientiousness	-.02	.03	.07*	.13**	1.00							
6. Ethical Risk	.06	.08**	-.07*	-.16**	-.29**	1.00						
7. Financial Risk	-.01	.04	-.01	-.10**	-.24**	.55**	1.00					
8. Health Risk	.06	.10**	-.04	-.13**	-.30**	.68**	.54**	1.00				
9. Social Risk	0	.18**	.13**	.06	-.20**	.39**	.38**	.36**	1.00			
10. Recreational Risk	-.06**	.16**	.12**	-.01	-.17**	.37**	.39**	.45**	.37**	1.00		
11. Rationalizations	.06	.04	-.06	-.01	-.14**	.29**	.19**	.29**	.13**	.13**	1.00	
12. Texting	.12**	.17**	-.09**	.02	-.11**	.25**	.12**	.27**	.11**	.11**	.60**	1.00

Note: \*\* p < .01, \* p < .05

## **Hierarchical Regression**

A hierarchical regression analysis was employed to predict texting while driving using multiple factors (see Table 3). Four groups of predictors are used to examine how much variance is accounted for by each variable in the model. Results are displayed in Table 2. The first model consisted of age, race, and sex. This model explained 2% of the variance in texting while driving with race being the only significant predictor in this model. The second model added the five factor model of personality (i.e., neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness) and increased the variance accounted for in texting while driving by 7%. Thus, the FFM provided incremental validity over age, race, and sex. Extraversion, Neuroticism, Conscientiousness, and Openness to experience were all significant predictors in the second step, as well as race. Individual risk taking was added in the third model, which includes ethical, financial, health, social, and financial risk taking. This step was found to increase the variance accounted for in texting while driving in the second step by an additional 6%. Thus, individual risk taking increased the relationship above the FFM personality variables. However, in this step, only the Ethical and Financial risk taking variables were significant predictors. Additionally, race, extraversion, neuroticism, and openness to experience remained significant predictors. The last step consisted of the reasons for texting while driving, which was found to increase the variance accounted for in texting while driving by an additional 27%, the largest amount of unique variance. Thus, the rationalizations indicated for texting while driving greatly increased the relationship above the individual risk taking variables. The reasons provided for texting while driving was a significant predictor in the fourth step, as was race, extraversion, neuroticism, openness to experience, and health risk taking. Overall, the full 4-step model predicts 41% of the variance in texting while driving.

Table 3

*Summary of Hierarchical Regression Analysis for Variables Predicting Texting While Driving (N = 1028)*

Variable	Step 1			Step 2			Step 3			Step 4		
	<i>B</i>	<i>SE B</i>	$\beta$									
Age	-.01	.001	-.03	.07	.07	.03	.08	.07	.04	.01	.06	.004
Race	-.55	.14	-.12**	-.42	.14	-.09**	-.37	.13	-.08**	-.28	.11	-.06*
Sex	-.09	.20	-.01	-.33	.21	-.05	.10	.21	.02	.09	.18	.01
Neuroticism				.13	.03	.13**	.10	.03	.10**	.08	.03	.08**
Extraversion				.19	.03	.20**	.14	.03	.16**	.14	.02	.15**
Openness				-.13	.03	-.12**	-.13	.03	-.12**	-.09	.03	-.09**
Agreeableness				.02	.04	.02	.06	.04	.05	.02	.03	.02
Conscientiousness				-.10	.03	-.10**	-.03	.03	-.03	.001	.03	.001
Risk Ethical							.07	.02	.15**	.03	.02	.06
Risk Health							.09	.02	.17**	.04	.02	.09*
Risk Money							-.04	.03	-.05	-.04	.02	-.06
Risk Social							-.002	.02	-.004	-.003	.02	-.004
Reasons										.21	.01	.55**
$R^2$		.02			.09			.14			.41	
$R^2$ change		.02			.07			.06			.27	
F for change in $R^2$		6.04**			15.42**			16.43**			463.50**	

Note: \*\*  $p < .01$

## CHAPTER IV: DISCUSSION

Although laws have been enacted to ban cell phone use while driving, a large number of drivers continue to engage in the behavior (IIHS, 2010). This is especially true for the younger drivers (NHSTA, 2009). Thus, college students are a great target group for this study not only for their age but for the amount of cell phone possession due to their social and economic standing (Nelson et al, 2009). This study looked at the contribution of individual risk taking, the five factor model of personality, as well as various reasons for predicting texting while driving. Although some of the dimensions of both the FFM and trait risk-taking were significantly related to texting while driving, it was the set of explicit rationalizations were found to be the most predictive set of variables related to texting while driving. Specifically, this means that the participants rationalize the negative behavior by justifying it through any number of reasons such as ease, skill, or convenience.

The statements made up of rationalizations for choosing to text while driving were designed to be comprehensive. These statements included topics relating to the cost, convenience, ease, and skill of text messaging while driving. Additionally, statements were included about the receiver of the text. These regarded the perception that the receiver would be more likely to answer a text than a phone call and that the participant would not feel as if he or she was interrupting activities as much. Furthermore, statements related to whether participants feel that texts are more straight to the point and private (i.e., people cannot overhear your conversation). Multiple studies found that adolescents have taken up technologies such as texting fairly rapidly because text messaging is more convenient, less expensive, and quicker than other more traditional technologies (Grinter & Eldridge, 2001, 2003; Lenhart, Madden, & Hitlin, 2005).

Another interesting finding was that 59.8% of the participants reported text messaging while driving at least some of the time. This number is fairly low compared to past research from Nelson et al. (2009) which found that 72.5 % of individuals reported texting and driving at least some of the time. This could be an issue of impression management with the participants trying to maintain a certain level of positive self-image. The majority of the participants also felt as though they were endangering the lives of others while driving. Furthermore, there was a negative correlation found between the two which suggests that when the riskiness of the behavior is brought to their attention, individuals will be less likely to text while driving.

Another unforeseen finding was that Neuroticism was found to have a significant relationship with texting while driving. The question is where the neuroticism lies. It could be anxiety stemming from a need for affiliation. Urgency and a need to respond immediately could also play a part in the neurotic thinking when deciding whether or not to text and drive. Another interesting finding was the negative correlation between openness to experience and texting while driving. In the literature review, it was discussed that there were mixed results in whether or not openness to experience was related to risk taking behaviors; however, a common descriptor of those who are high on openness to experience is being daring. The strong relationship between individual Health Risk Taking and the propensity to text while driving was another interesting finding. This suggests possibly relating to a feeling of invincibility. The personality variables that were positively correlated with texting while driving were also strongly positively correlated with many of the individual risk taking variables. Furthermore, the personality variables that were negatively correlated with texting while driving were negatively correlated with several individual risk taking variables.

Some interesting findings relate to the participants' reports of how they choose to hold their phone in the car when they are texting while driving. Participants were able to choose between three pictures that described their texting behaviors while driving with one holding the phone up high, one at the steering wheel but still visible, and the final option being in the lap. The more likely the participants were to text while drive and rationalize this behavior with the various reasons, the less likely they were to try and hide it. Furthermore, even with the knowledge of the illegal nature of engaging in such behavior, the participants do not attempt to hide it.

### **Future Research**

Future research should look into the urgency and compulsivity of needing to text when driving. Need for affiliation could be examined as a component relating to this. Need for affiliation is also an aspect to consider when predicting the inclination to text while driving. Need for affiliation can be defined simply as a need for companionship as well as social acceptance (Carrera, 1964). It was suggested that an individual can have a need for affiliation that is either positive or negatively oriented. This means that someone who has a positive need for affiliation is sociable and concerned with social activities. This is developed from prior learned experiences that interact with people to bring them pleasure and satisfaction. Negative need for affiliation is characterized as being affable and interested in social activities, but it is a defense against social rejection and isolation. Negative need for affiliation was also found to be strongly related to interpersonal behavior and was suggested to be related to neuroticism (Carrera). This could explain the strong positive relationship between neuroticism and texting while driving in the current study.

One study used four distinct need for affiliation subscales (Hill, 1987). The researchers found that the emotional support subscale was related the most to an orientation toward receiving stress reduction and comfort. The attention subscale was related to the intention to interact with others and receive recognition from them. The social comparison subscale was most highly related to intention to engage in social contact oriented toward uncertainty reduction. Finally, the positive stimulation subscale correlated most highly with intention to facilitate positive feelings associated with close, stimulating interpersonal contact. All of these could be related to a need to stay connected socially via text messaging even when driving.

Adolescents are using socially interactive technologies to enhance communication among friends and family, to make plans with one another, and to maintain social contact outside of their day –to–say face-to-face conversations (Grinter & Eldridge, 2001, 2003) Social norms and social desirability of using the cell phone while driving should also be explored as an essential element to understanding the frequency of texting while driving. The perception that texting while driving is the norm could influence the widespread nature of engaging in the behavior.

An individual's locus of control would to another factor to examine. Particularly, whether or not an individual is likely to attribute a crash or other driving impairments are due to their environment or even the other drivers on the road (i.e., external locus of control). Those with high levels of internal locus of control believe that they are in control of their actions and outcomes. These people may be less likely to text while driving because they are aware that this action may lead to distraction and possibly an accident. Kohler (1996) found a relationship between locus of control and risk taking. One study found that an adolescent with an external locus of control was more likely to take risks as seen through things like likelihood to get pregnant during this time period (McIntyre, Saudargas, & Howard, 1991). Furthermore, those

with an internal locus of control orientation acknowledged that using drugs was risky, while individuals with an external locus of control failed to understand they were susceptible to things like HIV. With risk taking being highly related to text messaging while driving, it is probable that locus of control is, too.

Two additional topics to examine would be building specifically off of this study. This would include a more in depth investigation into the relationship between neuroticism and texting while driving. Specifically, the explicit components of a neurotic personality that leads to the inclination to text while driving needs to be assessed. Additionally, more research needs to look into what leads to the rationalizations since they are such a good predictor. Viewing these rationalizations as justification mechanisms for engaging in texting while driving, a very dangerous behavior, needs to be examined further. This includes whether participants see engaging in texting while driving as logical because of these rationalizations. Furthermore, research should examine whether there are any individual differences in participants who rely more on these rationalizations to engage in this particular behavior.

### **Limitations**

One of the limitations of the current study was the use of a specific sample of college students from a southeastern university, which restricted the range of data. However, this sample may be most pertinent to study texting while driving, with NHSTA (2009) reporting that the majority of deadly crashes due to distractions occur with drivers under the age of 20. This study was also based on self-report and could have error due to impression management. Conducting the study online was another possible limitation. Problems with internet connections could occur, as well as having to depend on the participants' hardware capabilities. Furthermore, there is a lack of control on the part of the researchers. With the participants able to take the surveys from

any location, distractions are of significant concern. If participants fail to take their time and answer carefully, as may be more likely under a controlled condition, this leaves room for mistakes to be made. Furthermore, the participants may have under reported their frequency and likelihood of texting while driving because they do not realize how much they actually partake in the behavior.

### **Conclusion**

Overall, when taking into account the FFM personality variables, it was found that the more extraverted and neurotic an individual is the more likely they are to text while driving. For individual risk taking, health risk taking was found to have the strongest relationship with the likelihood of texting while driving. Furthermore, the more likely an individual is to rationalize their texting while driving behaviors through the reasons expressed, the more frequent and likely they are to text while driving. There was incremental validity with the FFM personality variables, to the individual risk taking variables, to the rationalizations for texting while driving. All together these factors strongly predict the likelihood of texting while driving.

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## Footnote

<sup>1</sup> Of these deaths, it was found that individuals under the age of 20 constitute the largest amount of distracted drivers. The problem of driver distraction, when involved in fatal crashes, has grown from 2005, when it was at 10 percent, to 16% in 2009 (NHSTA, 2009).

<sup>2</sup> A regional difference was found, with Southern States using hand-held devices while driving at a rate of 1% in relation to any other region in the United States, with the Midwest at 0.2% and the West at 0.5% (NHSTA, 2009). There was also a significant effect found among gender, where females were .2% more likely to drive while visibly using a hand-held device, with females at 0.7% and males at 0.5%.

## **Appendix A: Measures**

## Demographic Questionnaire

1. Please enter you University ID (e.g., smithj11). This information is used only to ensure you receive your research participation credit. Your University ID will not be associated with your responses and your confidentiality is guaranteed throughout your participation as well as after completion of the study. Again, please enter your University ID- NOT your Banner ID.
2. What is your age in years?
3. Are you of Hispanic, Latino, or Spanish origin?
  - a) No, not of Hispanic, Latino, or Spanish origin
  - b) Yes, Mexican, Mexican American, Chicano
  - c) Yes, Puerto Rican
  - d) Yes, Cuban
  - e) Yes, another Hispanic, Latino, or Spanish origin
4. What is your race?
  - a) White
  - b) Black, African American, or Negro
  - c) American Indian or Alaska Native
  - d) Asian (e.g., Asian Indian, Filipino, Japanese, Korean, Vietnamese, or other Asian)
  - e) Pacific Islander (e.g., Native Hawaiian, Guamanian, Chamorro, or other Pacific Islander)
5. What is your sex?
  - a) Male
  - b) Female
6. What is your marital status?
  - a) Single
  - b) Not Married, In a Relationship
  - c) Married
  - d) Divorced
  - e) Widowed
7. What year are you in school currently?
  - a) Freshman
  - b) Sophomore
  - c) Junior
  - d) Senior
  - e) Graduate Student
8. What is your current enrollment status in school?
  - a) Part-time
  - b) Full-time
9. Are you currently employed?
  - a) Yes
  - b) No
10. How many hours a week do you work?

- a) Not employed
- b) Less than 10 hours
- c) 10-20 hours
- d) 20-30 hours
- e) 30-40 hours
- f) More than 40 hours

11. What is your job/occupation?

## Texting While Driving Perceptions Measure

Indicate whether or not you agree with the statements below:

**Strongly Disagree Disagree Slightly Disagree Neither Agree nor Disagree Slightly Agree Agree Strongly Agree**

### **Perceived Danger**

1. I am endangering the lives of others when I text while driving.
2. I am likely to crash when I text while driving.
3. I am likely to die in a crash when I text while driving.
4. I feel safe as a passenger in a car when the driver is texting.
5. When I see the road sign that states “u txt, u drive, u die”, it deters me from texting while driving.
6. I personally know someone who has been involved in a crash from texting while driving.

### **Perceived Punishment**

7. There is a law in my state of residence that bans the use of text messaging while driving.
8. I will get pulled over if I text while driving.
9. Laws are effective in stopping people from texting while driving.
10. I could lose my license if I text while driving.
11. I will have to pay a fine if I am caught texting while driving.
12. I practice evasive texting to avoid legal issues.

### **Invincibility**

13. I am so skilled at texting that it will not endanger my driving if I text while driving.
14. I am able to keep my eyes on the road at all times while texting and driving.
15. Briefly looking at the phone to text is not distracting enough to affect my driving.
16. I am aware that people have wrecked due to texting while driving, but it will not happen to me.
17. I have seen public service announcements that deal with the dangers of texting while driving.
18. The advertisements about the dangers of texting while driving are not realistic.

### **Risk Taking**

19. I will text while driving even at high speeds.
20. When driving at high speeds, texting is not dangerous.
21. Illegally texting while driving is not a big deal.
22. Even though I am not skilled at texting while driving, I still do it.
23. I have texted while driving after I have been drinking.
24. I still text and drive even though I know it is a problem.

### **Urgency/Compulsivity**

25. When I receive a text message while driving, I feel guilty if I don't reply quickly.

26. Texting is the quickest form of communication when driving.
27. It only takes a few seconds to respond via text even when driving.
28. Texts often contain important information that dictates a response even when driving.
29. When receiving a text I have trouble waiting until I get somewhere to respond.
30. I am equally likely to respond to important texts and trivial texts while driving.

## Texting While Driving Frequency Measure

\*While completing this survey, please consider texting or text messaging to include any typing while driving (text messages, email, web use, etc.) Only include information relevant to while you are driving, not what you do as a passenger.

### TEXT MESSAGING – GENERAL

1. How likely are you to text message while you are driving?
  - a. Very unlikely
  - b. Unlikely
  - c. Neither likely nor unlikely
  - d. Likely
  - e. Very likely
  
2. How frequently do you text message while you are driving?
  - a. Never
  - b. Rarely
  - c. Sometimes
  - d. Often
  - e. Always
  
3. Approximately how many text messages do you send and read each day while driving?
  - a. 0
  - b. 1-5
  - c. 5-10
  - d. 10-20
  - e. More than 20
  
4. How often do you have the passengers in your car text message for you while you are driving?
  - a. Never
  - b. Rarely
  - c. Sometimes
  - d. Often
  - e. Always
  
5. For each of the following driving conditions, please indicate how likely you are to text message when driving under the noted condition:
  - a. When purposely stopped on the side of the road in order to text message
    - i. Very unlikely
    - ii. Unlikely
    - iii. Neither likely nor unlikely
    - iv. Likely
    - v. Very likely

- b. When stopped at stop signs or red lights
    - i. Very unlikely
    - ii. Unlikely
    - iii. Neither likely nor unlikely
    - iv. Likely
    - v. Very likely
  
  - c. When driving less than 20 mph
    - i. Very unlikely
    - ii. Unlikely
    - iii. Neither likely nor unlikely
    - iv. Likely
    - v. Very likely
  
  - d. When driving 20-40 mph
    - i. Very unlikely
    - ii. Unlikely
    - iii. Neither likely nor unlikely
    - iv. Likely
    - v. Very likely
  
  - e. When driving 40-60 mph
    - i. Very unlikely
    - ii. Unlikely
    - iii. Neither likely nor unlikely
    - iv. Unlikely
    - v. Very likely
  
  - f. When driving more than 60 mph
    - i. Very unlikely
    - ii. Unlikely
    - iii. Neither likely nor unlikely
    - iv. Likely
    - v. Very likely
  
  - g. Where is a safe place to text?
    - a) at a stoplight
    - b) waiting for a train
    - c) driving
    - d) pulled over on the side of the road
6. Which picture describes your texting position while driving:



a.



b.



c.

## TEXT MESSAGING - REASONS

7. How strongly do you agree with the following statement: "Text messaging while driving is more convenient than talking on the phone while driving?"
  - a. Strongly disagree
  - b. Disagree
  - c. Neither agree nor disagree
  - d. Agree
  - e. Strongly agree
  
8. How strongly do you agree with the following statement: "I prefer text messaging while driving because I do not like talking on the phone."
  - a. Strongly disagree
  - b. Disagree
  - c. Neither agree nor disagree
  - d. Agree
  - e. Strongly agree

9. How strongly do you agree with the following statement: "I prefer text messaging while driving because it is cheaper than making a phone call."
  - a. Strongly disagree
  - b. Disagree
  - c. Neither agree nor disagree
  - d. Agree
  - e. Strongly agree
  
10. How strongly do you agree with the following statement: "I prefer text messaging while driving because people are less likely to pick up phone calls."
  - a. Strongly disagree
  - b. Disagree
  - c. Neither agree nor disagree
  - d. Agree
  - e. Strongly agree
  
11. How strongly do you agree with the following statement: "I prefer text messaging while driving because it is an easier form of communication".
  - a. Strongly disagree
  - b. Disagree
  - c. Neither agree nor disagree
  - d. Agree
  - e. Strongly agree
  
12. How strongly do you agree with the following statement: "I prefer text messaging while driving because I am so skilled at it, I will not crash".
  - a. Strongly disagree
  - b. Disagree
  - c. Neither agree nor disagree
  - d. Agree
  - e. Strongly agree
  
13. How strongly do you agree with the following statement: "I prefer text messaging while driving because in relation to phone calls, texting allows you to stay connected without interrupting your own or others' current actions completely".
  - a. Strongly disagree
  - b. Disagree
  - c. Neither agree nor disagree
  - d. Agree
  - e. Strongly agree
  
14. How strongly do you agree with the following statement: "I text message while driving because it does not allow others to overhear the conversation".
  - a. Strongly disagree
  - b. Disagree

- c. Neither agree nor disagree
- d. Agree
- e. Strongly agree

15. How strongly do you agree with the following statement: "I text message while driving because it is straight to the point".
- a. Strongly disagree
  - b. Disagree
  - c. Neither agree nor disagree
  - d. Agree
  - e. Strongly agree

### **LEGAL ISSUES**

16. How effective do you believe laws have been in the past in stopping other dangerous driving behaviors (such as driving while intoxicated, driving without a seatbelt, etc)?
- a. Very Ineffective
  - b. Ineffective
  - c. Neither effective nor ineffective
  - d. Effective
  - e. Very effective

### **CELL PHONE & CAR INFORMATION**

17. What fingers do you use when sending a text message?
- a. One finger
  - b. Two thumbs
  - c. More than two fingers
18. What type of cell phone do you have?
- a. Blackberry
  - b. Android
  - c. Palm
  - d. Samsung
  - e. iPhone
  - f. Motorola
  - g. Nokia
  - h. LG
  - i. Other
19. Does your cell phone have a full *qwerty* keyboard?
- a. Yes
  - b. No
20. What would be your preferred phone to use for text messaging?
- a. Blackberry, Driod, iPhone, or other smart phone
  - b. touchpad
  - c. swiping keypad

- d. full *qwerty* keyboard
  - e. Standard keypad phone
21. Which description best matches the vehicle you drive most often?
- a. Compact car
  - b. Midsized sedan
  - c. Minivan
  - d. Small SUV
  - e. Large SUV
  - f. Motorcycle
22. Does your primary vehicle have a built in or portable (TomTom, Garmin, etc.) GPS?
- a. Yes
  - b. No
23. Do you wear a seatbelt while driving?
- a. Never
  - b. Rarely
  - c. Sometimes
  - d. Often
  - e. Always
24. Do you think all people should wear a seatbelt in a motor vehicle?
- a. Strongly Disagree
  - b. Disagree
  - c. Neither Agree nor Disagree
  - d. Agree
  - e. Strongly Agree

## Risk Taking Measure

For each of the following statements, please indicate the likelihood of engaging in each activity.  
Provide a rating, using the following scale:

Extremely unlikely   Unlikely   Not sure   Likely   Extremely likely

1. Admitting that your tastes are different from those of your friends. (S)
2. Arguing with a friend who has a very different opinion on an issue. (S)
3. Asking your boss for a raise. (S)
4. Betting a day's income at the horse races. (F)
5. Buying an illegal drug for your own use. (E)
6. Chasing a tornado by car to take photos that you can sell to the press. (R)
7. Cheating a fair amount on your income tax. (E)
8. Cheating on an exam. (E)
9. Co-signing a new car loan for a friend. (F)
10. Dating someone that you are working with. (S)
11. Deciding to share an apartment with someone you don't know well. (S)
12. Disagreeing with your father on a major issue. (S)
13. Driving home after you had three drinks in the last two hours. (E)
14. Eating 'expired' food products that still 'look okay'. (H)
15. Exploring an unknown city or section of town. (R)
16. Forging somebody's signature. (E)
17. Frequent binge drinking. (H)
18. Going camping in the wild. (R)
19. Going down a ski run that is too hard or closed. (R)
20. Going on a safari in Kenya. (R)
21. Going on a two-week vacation in a foreign country without booking accommodations ahead. (R)
22. Going whitewater rafting at high water in the spring. (R)
23. Ignoring some persistent physical pain by not going to the doctor. (H)
24. Illegally copying a piece of software. (E)
25. Taking a medical drug that has a high likelihood of negative side effects. (H)
26. Traveling on a commercial airplane. (R)
27. Plagiarizing a term paper. (E)
28. Engaging in unprotected sex. (H)
29. Investing in a business that has a good chance of failing. (F)
30. Lending a friend an amount of money equivalent to one month's income. (F)
31. Moving to a new city. (S)
32. Never using sunscreen when you sunbathe. (H)
33. Never wearing a seatbelt. (H)
34. Not having a smoke alarm in or outside of your bedroom. (H)
35. Openly disagreeing with your boss in front of your coworkers. (S)
36. Periodically engaging in a dangerous sport (e.g. mountain climbing or sky diving). (R)
37. Regularly riding your bicycle without a helmet. (H)
38. Shoplifting a small item (e.g. a lipstick or a pen). (E)

- 39. Smoking a pack of cigarettes per day. (H)
- 40. Speaking your mind about an unpopular issue at a social occasion. (S)
- 41. Spending money impulsively without thinking about the consequences. (F)
- 42. Stealing an additional TV cable connection. (E)
- 43. Taking a day's income to play the slot-machines at a casino. (F)
- 44. Taking a job where you get paid exclusively on a commission basis. (F)
- 45. Trying bungee jumping. (R)
- 46. Using office supplies for your personal business. (E)
- 47. Wearing unconventional clothes. (S)

*Note:* E = ethical, F = financial, H = health/safety, R = recreational, and S = social items.

## Five Factor Model of Personality (Mini IPIP)

Indicate whether or not the statements below describe you:

(1) **Strongly Disagree** (2) **Disagree** (3) **Neither Agree nor Disagree** (4) **Agree** (5) **Strongly Agree**

### **Extraversion**

1. Am the life of the party.
2. Don't talk a lot.
3. Talk to a lot of different people at parties.
4. Keep in the background.

### **Agreeableness**

5. Sympathize with others' feelings.
6. Am not interested in other people's problems.
7. Feel others' emotions.
8. Am not really interested in others.

### **Conscientiousness**

9. Get chores done right away.
10. Often forget to put things back in their proper place.
11. Like order.
12. Make a mess of things.

### **Neuroticism**

13. Have frequent mood swings.
14. Am relaxed most of the time.
15. Get upset easily.
16. Seldom feel blue.

### **Intellect/Openness**

17. Have a vivid imagination.
18. Am not interested in abstract ideas.
19. Have difficulty understanding abstract ideas
20. Do not have a good imagination

**APPENDIX B:**

**CONSENT TO PARTICIPATE  
DEPARTMENT OF PSYCHOLOGY  
EAST CAROLINA UNIVERSITY  
GREENVILLE, NORTH CAROLINA, 27858**

<b>Title</b>	The relationship between personality and texting while driving.
<b>Principle Investigator</b>	Dr. Mark Bowler 104 Rawl Department of Psychology East Carolina University Greenville, NC 27858 252-328-0013 bowlerm@ecu.edu
<b>Sub-investigator</b>	Ms. Chelsea Rekowski Department of Psychology East Carolina University Greenville, NC 27858 804-307-5023 rekowskic10@ecu.edu
<b>Purpose</b>	You have been asked to participate in a research study being conducted by Dr. Mark Bowler and Ms. Chelsea Rekowski. This research study is being conducted in an effort to examine the relationship between an individual's personality and their texting while driving perceptions and behaviors.
<b>Potential Risks &amp; Discomforts</b>	There are no known risks to participating in this study.
<b>Potential Benefits</b>	There is no direct personal benefit from your participation in this study; however, the knowledge received will be of value to field of psychology.
<b>Compensation</b>	For completing the study you will receive .75 credits towards your research participation requirement for PSYC1000/PSYC1060.
<b>Plan &amp; Procedure</b>	During the study you will complete four survey measures online via Experimentrak. All data and related information will be kept confidential.
<b>Privacy and</b>	All information collected about you will be completely anonymous.

<b>Confidentiality</b>	There will be no way to connect your name with any of the responses you provide on any of the measures.
<b>Freedom to withdraw</b>	Participation is completely voluntary. You may refuse to participate in this study or withdraw at any time. There is no penalty of any kind for either non-participation or withdrawal. However, if you choose to withdraw from the study before you complete the measures you will not receive your research participation credits. Alternative options include participating in another research study or taking a quiz based on one of the several research articles available via Experimentrak.
<b>Availability of results</b>	A summary of these results will be available from the researcher on or about 6/31/2012. The summary will include only aggregated (i.e., combined) data for the entire sample. No individual results will be available.
<b>Investigator availability</b>	The investigator will be available to answer any questions concerning this research, now or in the future. You may contact the investigators, Dr. Mark Bowler via phone (252-328-0013) or email (bowlerm@ecu.edu), or Ms. Chelsea Rekowski via phone (804-307-5023) or email (rekowskic10@ecu.edu).

**APPENDIX C:**

## **Debriefing Form Study:**

*Please read the information below. When you are finished answer the 80 likert scale questions via Qualtrics.*

Thank you for your participation in this study: The relationship between personality and texting while driving. This is a study examining how your personality relates to your perceptions and behaviors dealing with texting while driving. The purpose of this study is to clarify our understanding of the relationship between texting while driving behaviors and the “Big-5” personality dimensions. The “Big-5” is the most common personality taxonomy used today.

The hypothesis of this study is that individuals with higher levels of extroversion and openness, as well as lower levels of conscientiousness, neuroticism, and agreeableness will be less likely to perceive texting while driving as problem and more likely to do it often. Future studies will compare differences in this relationship with different personality measures.

There is no risk involved in participating in this study. Your participation will help psychologists to better understand the nature of human personality. Other than noting your participation in the study, you will not be identified and your responses cannot be linked to you.

**APPENDIX D:**



## EAST CAROLINA UNIVERSITY

University & Medical Center Institutional Review Board Office  
1L-09 Brody Medical Sciences Building • 600 Moye Boulevard • Greenville, NC 27834  
Office 252-744-2914 • Fax 252-744-2284 • [www.ecu.edu/irb](http://www.ecu.edu/irb)

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**Date:** September 9, 2011

**Principal Investigator:** Mark Bowler, Ph.D.  
**Dept./Ctr./Institute:** Department of Psychology  
**Mailstop or Address:** 104 Rawl Bldg.

**RE:** Exempt Certification  
**UMCIRB#** 11-0524  
**Funding Source:** Institutional funding

**Title:** "The Relationship Between Personality and Texting While Driving"

Dear Dr. Bowler:

On September 6, 2011, the University & Medical Center Institutional Review Board (UMCIRB) determined that your research meets ECU requirements and federal exemption criterion #2 which includes survey procedures.

It is your responsibility to ensure that this research is conducted in the manner reported in your Internal Processing Form and Protocol, as well as being consistent with the ethical principles of the Belmont Report and your profession.

This research study does not require any additional interaction with the UMCIRB unless there are proposed changes to this study. Any change, prior to implementing that change, must be submitted to the UMCIRB for review and approval. The UMCIRB will determine if the change impacts the eligibility of the research for exempt status. If more substantive review is required, you will be notified within five business days.

The UMCIRB Office will hold your exemption application for a period of five years from the date of this letter. If you wish to continue this protocol beyond this period, you will need to submit an Exemption Certification Request at least 30 days before the end of the five year period.

Sincerely,

Chairperson, University & Medical Center Institutional Review Board

Pc: NBE