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Risk Propensity, Self-Efficacy and Driving Behaviors Among Rural, Off-Duty Emergency Services Personnel

Michelle Yvonne McLernon
Southern Illinois University Carbondale, mlernon@siu.edu

RISK PROPENSITY, SELF-EFFICACY, AND DRIVING BEHAVIORS AMONG RURAL, OFF-DUTY EMERGENCY SERVICES PERSONNEL

by

Michelle Yvonne McLernon

B.A., Southern Illinois University Carbondale, 1988
M.S., Southern Illinois University Carbondale, 1992
M.S.Ed., Southern Illinois University Carbondale, 1999

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Approved by:

Dr. Kathleen Welshimer, Chair

Dr. Dhitinut Ratnapradipa

Dr. Peggy Wilken

Dr. Paul Bennett, MD

Dr. Michael Hepner

Capt. Rob Lyerla, PhD

Graduate School
Southern Illinois University Carbondale
March 3, 2014

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MICHELLE YVONNE McLERNON, for the Doctor of Philosophy Degree in Health Education, presented on March 3, 2014 at Southern Illinois University Carbondale.

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MAJOR PROFESSOR: Dr. Kathleen Welshimer

Emergency medical services personnel work in a fast-paced, stressful environment requiring rapid, efficient response to critical situations, creating unique safety considerations within the workforce. With an occupational fatality rate notably higher than average, most of which are attributed to vehicular crashes, compounded by risks faced on rural roadways, rural EMS personnel face unique driving challenges that may be exacerbated by the very traits, self-efficacy and risk propensity, that may have initially drawn them to the profession.

The purpose of this study was to identify the extent to which rural EMS personnel engage in off-duty, risky driving behaviors and to examine the relationship between these behaviors and their levels of risk propensity as well as their self-efficacy relative to driving.

A cross-sectional, quantitative study was conducted to explore the relationship between the variables. A 63-item survey was completed by 227 rural EMS personnel. The statistical model emerging from this study identifies risky-driving self-efficacy and risk propensity as significant predictors of engaging in risky driving behaviors.

The predictive model fit well within the Social Cognitive Theory construct of triadic reciprocity, providing a platform from which to develop mitigating strategies to foster systemic as well as behavioral changes, while tailoring interventions to highly self-efficacious, risk-taking individuals who gravitate toward risky professions, including rural EMS personnel.

DEDICATION

First and foremost, I dedicate this body of work to my children, Josh and Nina, who have supported me throughout my many pursuits, exhibiting a patience and understanding beyond their years. Thank you, Josh, for your voice of reason, for your undying encouragement, and for sharing your standing desk! Peanut, your diligence and tenacity have been a source of inspiration for me; your gentle prodding, a motivator. Thank you both for your enduring support and love.

Additionally, I dedicate this document to my family. Specifically, I dedicate this to my late mother, Judy, to my late grandmother, Helen, and to my late grandfather, John. My mom instilled in me the value of hard work, perseverance in the face of adversity, and hope. My grandmother, on a daily basis, demonstrated the power of love, optimism, and dedication. My grandpa taught me the value of loving what I do and the importance of doing it well. It is these core values that have propelled me forward.

Last, but not least, I dedicate this dissertation to the men and women who commit their lives to help and care for others in their hour of need.

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I extend the utmost gratitude and respect to my committee members for generously sharing their expertise, encouragement, and precious time. As a testament to her commitment, while seriously injured, Dr. Welshimer 'wheeled' through icy condition to my defense, for which I am most grateful. Sincere thanks to Dr. Wilken for her insights from the field that kept it real. Dr. DT's subtle yet constant support was much appreciated. The humbly-expressed expertise of Dr. Bennett was more invaluable than he could ever know. I cannot express enough gratitude for the direct and unwavering support of Dr. Hepner. Guiding words of wisdom imparted by Capt. Lyerla were precious to me; "stay the course", were the most compelling words that saw me through this venture and served as my mantra when the process was most challenging.

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CHAPTER 1

INTRODUCTION

Background of the Problem

Emergency service personnel are often among the first persons to encounter the detrimental outcomes of high-risk behaviors, including risky driving behaviors, on a day-to-day basis in their professional activities. As a result, reason would suggest that their routine exposure to the adverse consequences would influence their decisions, resulting in risk-reducing or risk-aversive behaviors. Yet, research indicates that emergency services personnel may not be as cautious as one would expect of a person consistently exposed to negative outcomes resulting from personal choices. Counter-intuitively, EMS personnel often engage in risk behaviors at a higher rate than that exhibited by the general population. This is exemplified in the low rates of influenza vaccination (Hubble, Zontek, & Richards, 2011), low seat belt usage rates (Blau, Gibson, Hochner, & Portwood, 2012; National Highway Transportation Safety Administration [NHTSA], 2010), and even lack of compliance with precautionary behaviors (e.g., handwashing, personal protective equipment use) to reduce exposure risk among EMS personnel (Smyser, Bryce, & Joseph, 1990). In fact, a recent national study found that 89% of EMS providers reported safety-compromising behaviors, such as excessive speeding while driving, both on and off-duty (Weaver, Wang, Fairbanks, & Patterson, 2012).

Research also suggests that individuals who choose to work in critical occupations, professions in which workers perform critical duties to protect and serve the public, have personality traits that allow them to successfully cope and potentially thrive in these high-stress

occupations (Meadows, Shreffler, & Mullins-Sweatt, 2011; Casey & Leger, 2000). For example, in a 2009 study, police and firefighters scored higher on excitement-seeking, a facet of the extraversion factor of personality, than did the general population (Salters-Pedneault, Ruef, & Orr, 2010). Yet, these traits are also the very characteristics of individuals who have a tendency to engage in high-risk behaviors. In addition, professionals in critical occupations have a strong sense of self-efficacy (Rios Riquez, Sanchez-Meca, & Fernandez, 2010; Barnett et al., 2008; Hunter, 2005), a belief that they have the skills and power to successfully accomplish tasks and maintain a sense of control over their environment (Bandura, 2006; Hobfoll, 2002).

Emergency service personnel are called upon to respond to extreme crisis events that present tremendous challenges for them. They develop coping strategies to deal with the often highly-intense, traumatic scenarios in which they must efficiently and proficiently function. One of the most frequently-cited coping mechanisms employed by emergency personnel is detachment (Adams, Anderson, Turner, & Armstrong, 2011; Regehr, Goldberg, & Hughes, 2002). Detachment is, in fact, part of the training curriculum for emergency responders. This leads to desensitization after an adverse event, impacting the normal reaction to take safety precautions to avoid such adverse events. Additionally, successful coping in response to intensive challenges further strengthens the sense of self-efficacy. Increased self-efficacy resulting from successful management of risky and stressful tasks may lead to a sense of invincibility (Hubble, Zontek, & Richards, 2011). Combining the inherent nature of individuals who tend toward critical occupations to be risk-takers (e.g., emergency services personnel) with the commonly-utilized coping strategy of detachment and the strong sense of self-efficacy (Hunter, 2005), first responders and EMS personnel may have a higher propensity to engaging

in risk-taking behaviors. This strong sense of self-efficacy, combined with a tendency toward risk-taking, may have created a reinforcing loop of characteristics that feed upon one another.

One of the most prevalent high-risk activities today, accessible to most populations beginning in adolescence, is driving. In fact, it is not only accessible, it is nearly a societal expectation. Driving is inherently dangerous, even among the most cautious and risk-aversive individuals. Drivers are required to control a nearly 4,000 pound vehicle as it propels down one of the 4 million miles of public roads (National Atlas of the United States, 2012), navigating the roadways and other roadway users, and at times traveling at speeds in excess of 60 miles per hour. This monumental task is performed by thousands of drivers each day with apparent ease and success sufficient to increase the level of most drivers' self-efficacy.

Despite the positive perception most drivers have of their own driving proficiency, transportation deaths are the leading cause of work-related deaths in the United States (National Institute for Occupational Safety and Health [NIOSH], 2012). Driving, often aggressively and at high rates of speed with many distractions, is a key job-related task for most emergency service personnel. Emergency service workers, therefore, are at an increased risk for vehicular collision while on duty, particularly ambulance workers (Sanddal, Albert, Hansen, & Kupas, 2008). Emergency medical services personnel have an occupational fatality rate that is nearly 2.5 times greater than the national average; and nearly three-fourths of these are the result of road collisions (Gormley, Walsh, & Fuller, 2008). Furthermore, ambulance crashes cost over an estimated $500 million dollars each year in the United States (Eckstein, 2004).

Many prevention efforts, from federal policy to individual behavior-change strategies have been implemented to address this public health threat among EMS personnel (NIOSH,

2012; Sanddal et al., 2008). Although information exists about work-related transportation risks, there is a lack of research on the potential transference of the risky driving behavior while on the job among EMS personnel to off-duty driving behaviors, as well as off-duty traffic fatality rates among this population.

The Social Ecological Model and Driving Behaviors

The social-ecological model serves as a framework to examine the interplay between the environment, social conditions, and individual cognitions and behaviors with regard to a specific phenomenon (Sallis, Owen, & Fisher, 2008). The experience of driving illustrates the complex and dynamic interconnectivity of such factors that influence health outcomes. The relationship between the driver and the vehicle is so symbiotic that the driver and vehicle can be perceived as a form of a social being (Dant, 2004). The complex act of driving is governed by strict societal laws and influenced by community and relational expectations as well as individual knowledge and perceptions of risk. It is impractical to address driving risk reduction without addressing environmental, societal, and personal factors.

Driving primarily occurs within a physical environment that has been designed under relatively rigid federal, state and local standards. Much effort has been made to reduce risk with driving, including decreasing speeding behaviors, increasing use of restraints, and deterring distracted behavior. These efforts have been made at environmental and community levels of influence, from mandating environmental mitigation strategies (NHTSA, 2012), such as automatic seatbelt engagement, to instituting worksite transportation policies, such as removing radios from company vehicles. Yet, according to Kanfer and Schefft (1988), human actions and experiences are the greatest mystery and least conquered force of nature (Glanz,

Rimer, & Viswanath, 2008). Effecting change at the intrapersonal level, which is influenced by one's values and beliefs, attitudes, personality traits, knowledge and behavioral capacity, is perhaps the most difficult and least understood endeavor.

The importance of addressing the various levels of constructs within the social-ecological model is unmistakably evident when looking at risk reduction with driving. Each level of influence within the social-ecological model plays a role in the phenomenon of engaging in risky driving behaviors. For instance, the decision to engage in the risky behavior of distracted driving is influenced by laws governing the behavior (e.g., it is illegal to talk on the phone while driving in a school zone), the level of community support for or against the behavior (e.g., the community accepts people who eat while driving), policies that may be in place at an individual's worksite (e.g., radios are not permitted in work-owned vehicles), level of acceptance of the behavior by influential others (e.g., a popular celebrity is seen on public service announcements denouncing texting while driving) as well as vicarious reinforcement from modeled behaviors (e.g., teenagers witness their parents using their global positioning system while driving), and one's own values and beliefs about the risks associated with distracted driving (e.g., multi-tasking is an essential part of daily life).

Social Cognitive Theory and Driving Behaviors

Albert Bandura's Social Cognitive Theory can help to explain and predict behavior as well as serve as a framework to enhance behaviors and self-efficacy (McAlister, Perry, & Parcel, 2008). The constructs of the theory include the triadic reciprocity of cognition, behavior, and environment, with a major focus on the importance of self-efficacy to behavior acquisition (Bandura, 1997). Self-efficacy is a person's belief in his/her own capability to perform a given

task to attain a desired outcome. According to Bandura, perceived self-efficacy is characterized as three combined components: competence-based, prospective and action-related (1997). When viewed through the lens of the Social Cognitive Theory, both health-enhancing and health-compromising behaviors can be assessed and potentially manipulated.

Each of the constructs within the Social Cognitive Theory, including self-efficacy, helps to explain how people learn to drive, and can help to enhance safe driving behaviors. For example, reading a book about how to drive a car (cognition) is insufficient to properly learn the actual function of driving; yet, when this knowledge is combined with vicarious learning (observation) and the actual repeated performance of the task (behavior), a sense of mastery or "self-efficacy" can result. Interestingly, the same principles can apply to driving behaviors that increase risk, including speeding and simultaneously engaging in unrelated behaviors while driving. For instance, theory suggests that texting while driving without an adverse outcome, such as having an accident, would likely result in increased self-efficacy related to texting and driving.

The nature of the field of emergency response requires workers to engage in multiple tasks rapidly and simultaneously, including the use of relatively sophisticated technology. A fast-paced, fluid reaction to an emergency event is often necessary to maximize a victim's outcome. According to Queller, Fisher, Washor, Fuchs, & Kool, there is an "almost exponential" increase in distractions emergency workers face inside the vehicle (2010). Driving in a safe manner is cognitively, physically, and visually demanding (National Safety Council, 2010). The driving environment within an emergency response vehicle is fraught with distractions that can compromise these functions. Cognitive distractions common to emergency response include

thoughts about stabilizing and efficiently transporting a victim of a medical emergency as well as overcoming excessive noise created by sirens. Examples of mechanical distractions include the use of technological equipment such as geographic positioning systems and radios. Visual distractions include flashing lights used during rapid emergency transport. Texting while driving encompasses cognitive, mechanical, and visual distractions. Unfortunately, this work environment ultimately requires rapid response (e.g., fast driving) and multi-tasking (e.g., engaging in more than one behavior at once while driving, also known as distracted driving), despite agency policies which may be in effect and that are designed to reduce these risky driving behaviors.

These behaviors are compounded in rural EMS systems in which resources are limited, roads are usually more narrow, without shoulders and often unlit, sight distance is limited due to curves in the road, and the number of miles driven per capita and the average speed at which these miles are traveled exceeds those driven in urban areas. According to the Federal Highway Administration (2010), the fatality rate within the general population for rural crashes is more than twice the fatality rate for urban crashes; rural traffic fatalities accounted for 55% of all traffic fatalities, yet only 19% of the U.S. population resided in rural areas in 2010 (NHTSA, 2012).

Adequate delivery of pre-hospital emergency medical services in rural areas is compounded by a reliance on minimally-trained volunteers, limited financial capacity, aging equipment, long geographic distances, gaps in telecommunications, and longer response times (Rawlinson & Crews, 2003). Characteristics associated specifically with rural culture, including lower perception of risk among rural residents, resulting in health-compromising behaviors

such as lower seatbelt use, more frequent lane changing, and more frequent rates of driving while under the influence, have also shown to have an impact on increased risk for traffic fatalities in rural areas (Rakauskas, Ward , Gerberich, & Alexander, 2009), and may also apply to rural emergency personnel themselves.

As indicated by the Social Cognitive Theory, repeated and successful performance of a behavior enhances self-efficacy and often results in maintenance of the behavior. In the case of rural emergency medical service personnel, risky driving behaviors may be influenced not only by job-related functions (e.g., driving an ambulance) but also by the rural culture in which they function on and off-duty. Rural emergency medical services personnel, therefore, may very well have developed a strong sense of self-efficacy related to risky driving behaviors given the frequent, consistent and expected practice of driving fast amidst the myriad distractions in the field within a rural driving culture.

Need for the Study

The literature indicated that EMS personnel experience a far greater incidence of traffic accidents while on-duty than do members of other professions, and rural residents are at increased risk for traffic fatalities than their urban counterparts, yet little information existed about the driving behaviors of off-duty, rural EMS personnel. Furthermore, to date, no research existed that comprehensively evaluates correlates and predictors of risky driving behaviors among emergency services workers while off-duty. With personality traits that may indicate a tendency toward risk-taking, a high level of self-efficacy, and the ability to emotionally detach from negative outcomes, emergency services personnel may be at increased risk to engage in health-compromising behaviors. Given the job-related duties

potentially reinforcing risky driving behaviors, e.g., driving at high rates of speed while engaging in more than one task at a time, it was important for the safety of all road users to assess this population's driving behaviors while off-duty. Identification of the contributing factors affecting risky driving behaviors may lead to the development of tailored intervention strategies to create behavioral and systemic changes that ultimately improve the safety of our nation's roadways.

Purpose of the Study

The purpose of this study was to identify the extent to which rural emergency medical services personnel engage in off-duty, risky driving behaviors and to examine the relationship between these behaviors and their personality traits associated with risk propensity as well as their self-efficacy relative to risky driving. It was the intent of this study to inform population-specific, tailored intervention strategies to mitigate harms associated with risky driving behaviors and ultimately improve the safety of rural roadways. Results of this study may also be applicable to other similar professionals who engage in risky behaviors as a result of their job-related duties (e.g., extreme sport athletes, police officers, fire fighters), and whose self-efficacy to engage in driving behaviors perceived as risky may be elevated to the point of posing a safety threat to both themselves and to others.

Hypotheses and Research Questions

The following research questions and hypotheses were used to guide the development of the research instrument and the research design. The two hypotheses were:

H1: Risk-taking propensity is a significant independent predictor of risky driving behaviors while off-duty.

H2: Driving self-efficacy is a significant independent predictor of risky driving behaviors while off-duty.

Research questions included:

1. To what extent do EMS personnel engage in risk-taking driving behaviors?
2. How self-efficacious are EMS personnel relative to risky driving?
3. Is there a significant interaction between risk propensity and self-efficacy, over-and-above their individual estimates, when predicting risky driving behaviors?

Significance to Health Education

Understanding the relationships between self-efficacy relative to risky driving behaviors and propensity to engage in risky driving behaviors provide insight into risk-taking tendencies among specific populations, such as emergency services personnel. Results of this study provide baseline data that will aid in the understanding of risk propensity among emergency medical services personnel. This study also provides practical information to effectively develop and implement behavioral interventions that are tailored to emergency medical services personnel to reduce risky driving behaviors while off-duty. The potential exists for these strategies to be utilized with other populations who exhibit similar tendencies, such as people who engage in extreme sports.

Research Design and Methodology

A cross-sectional, quantitative study was conducted to explore the relationship between off-duty risky driving behaviors and risk propensity and risky driving self-efficacy of emergency medical service personnel serving in rural communities. A descriptive and predictive correlational research design was used in this study.

Survey Instrument

A 63-item survey instrument was developed, containing three distinct measures: a 17-item Risk Propensity Assessment consisting of the Big Five Inventory-10 (BFI-10) and two subscales of the Self Control Scale (impulsivity and risk-taking), a 10-item risky driving self-efficacy assessment, and a 24-item risky driving behavior assessment. Twelve additional items were used to obtain demographic and driving history information.

Five personality traits measured with the BFI-10 instrument and two characteristics measured by the Self Control Scale have been associated with risk propensity; therefore, these two instruments were used independently to assess risk propensity. The BFI-10 instrument has been previously tested for validity and reliability (Rammstedt & John, 2007) as has the Self Control Scale (Laiju & Yoon, 2007).

The risky driving self-efficacy assessment items were adapted from standardized general self-efficacy scales and tailored for the specific skill of driving, as recommended by Bandura (2006). Risky driving behavior assessment items were derived from various risky driving instruments (AAA Foundation for Traffic Safety, 2013; Centers for Disease Control and Prevention, 2012; Rakauskas, Ward, Gerberich & Alexander, 2009; Tison, Chaudhary & Cosgrove, 2011; Ozkan & Lajunen, 2005).

After testing and subsequently adjusting to maximize instrument readability, both researcher-developed measures, the risky driving self-efficacy assessment and the risky driving behavior assessment, were piloted using a heterogeneous population of licensed drivers to test for validity and reliability prior to administration of the survey to the study sample. An expert panel of regional Emergency Medical Services Medical Directors, as well as an expert in traffic

safety, reviewed the entire survey instrument for face validity and provide feedback prior to implementation. Cronbach's coefficient Alpha and Pearson product moment score-total coefficients were used to test for internal consistency and reliability.

A sample of emergency medical services personnel who are employed by agencies serving within the primarily rural Illinois Regions V and VI EMS/Trauma Systems were solicited. The Region V system consists of over 400 employees, ranging from full-time and part-time paid employees to volunteers who report for duty as needed, covering the 20 southeastern counties and serving 10 hospitals through six separate EMS systems. St. Louis University Hospital serves as the Level I Trauma Center; Deaconess Hospital, Incorporated, serves as the Level II Trauma Center. Two ambulance services within Region VI were recruited to provide access to the 64 employees working within their agencies. Region VI system consists of 15 hospitals; Carle Foundation Hospital in Urbana, Illinois, serves as the region's Level 1 Trauma Center.

Data Collection

Upon approval from the Human Subjects Committee at Southern Illinois University Carbondale, the survey instrument was administered via email to EMS personnel within the Illinois Region V and Region VI EMS/Trauma Systems. Directors of the EMS systems within Regions V and VI provided access to the research participants through assistance in the distribution of the paper survey. A segment of the population in Region V was accessed through provision of email addresses of some employees within Region V.

Data Analysis

Quantitative data was collected and analyzed. Data were analyzed utilizing Microsoft Excel 2007 and the Statistical Package for the Social Sciences 19.0 (SPSS, Inc., 2010). Variables

were described using frequency tables, percentages, measures of central tendency and measures of dispersion. Scores on the BFI-10 instrument and the Self Control Scale subscales were compared independently with their respective normative data (Srivastava, John, Gosling, & Potter, 2003; Tittle, Ward, & Grasmick, 2003) to establish a measure for risk propensity. Pearson's product-moment coefficient correlations were used to determine if risk propensity and self-efficacy relative to risky driving are independently predictive of risky driving behaviors. Risk propensity and risky driving self-efficacy were included in a simultaneous multivariate linear regression model to help determine if these predictors make an individual contribution while controlling for the other. A multiple regression model utilizing the enter method was also used to help determine the strength of each predictor (Kabacoff, 2011). An interaction term was included in the data analysis to test for an interaction between risk propensity and risky driving self-efficacy, over-and-above their independent estimates. Statistical significance of driving self-efficacy and risk propensity as predictors of risky driving behavior was determined by an alpha level of .05 (Lenth, 2012).

Assumptions

The following assumptions were made in conducting the research:

1. The instrument to be used in this study is reliable and valid resulting in accurate measurement of the intended constructs.
2. Research subjects will understand each survey item as was intended by the researcher.
3. Research subjects will respond honestly.
4. Research subjects will respond accurately reflecting actual behaviors and perceptions.

5. Research subjects in the study will be representative of other EMTs working in rural areas.

Limitations

The limitations to this study were as follows:

1. Responses by the research subjects may reflect bias, as respondents may respond in a socially-desirable manner.
2. The generalizability of this study is limited to rural EMS personnel. The higher rate of accidents in the rural setting may not generalize to an urban setting.
3. The length of the survey instrument may influence some respondents to not complete all answers on the survey.
4. Responses will reflect only those who are still practicing in the field; no information will be gathered about those who have already left the field.

Delimitations

This study was affected by the following delimitations:

1. Participation in this study is delimited to EMS personnel employed within the Illinois Regions IV and V EMS/Trauma systems.
2. Risky driving behaviors to be measured were delimited to those included in the survey instrument and self-declared by EMS personnel.
3. Only those questions that were approved by an expert panel were included in the survey.

Definition of Terms

Advanced Life Support (ALS) – pre-hospital emergency care and non-emergency medical services, including basic life support, cardiac monitoring, defibrillation, electrocardiography, intravenous therapy, medication administration, trauma care, and other authorized procedures (Illinois General Assembly, 2012).

Agreeableness – a personality dimension that reflects an individual's tendency to cooperate with, show concern for, and trust others.

Basic Life Support (BLS) – a basic level of pre-hospital and inter-hospital emergency care and non-emergency medical services, including airway management, cardiopulmonary resuscitation (CPR), control of shock and bleeding and splinting of fractures (Illinois General Assembly, 2012).

Conscientiousness – a personality dimension indicating a tendency to be ambitious, self-disciplined, organized, task or goal-oriented, compulsive, and dutiful.

Emotional Detachment – Intentional avoidance of engaging in emotional connections; serves as a dissociative coping mechanism to tolerate stress.

Emergency Medical Responder (EMR) – any person who successfully completed a course of instruction, is licensed to initiate immediate lifesaving care to critical patients, and performs basic interventions with minimal equipment (NHTSA, 2007).

Emergency Medical Technician (EMT) – any person who successfully completed a course of instruction and is licensed to perform emergency medical services in a pre-hospital environment at a prescribed level of care (EMT-Basic, EMT-Intermediate, EMT-Paramedic).

Emergency Medical Services (EMS) – the practice of medicine involving evaluation and management of patients with acute traumatic and medical conditions in a pre-hospital environment (NHTSA, 2012).

Extraversion – a personality dimension that encompasses the tendency to being primarily focused on conditions outside of oneself.

First Responders – any person, 18 years of age or older, who has been trained and certified to provide immediate emergency support services, such as pre-hospital care for medical emergencies, prior to the arrival of an ambulance or specialized EMS vehicle.

Multi-tasking – the perception of engaging in two or more tasks simultaneously.

Neuroticism – a personality dimension, also known as emotional stability, characterized by the ability to remain emotionally stable and balanced.

Openness – a personality dimension characterized by one's level of openness to experience, including intellectual curiosity, creativity and preference for novelty and variety.

Personality – set of characteristics possessed by an individual that influences cognitions and behaviors in different contexts.

Risk – potential for an undesired outcome resulting from a decision to participate in a specific activity or engage in a specific behavior.

Risk Aversion – strong reluctance of a person to take a risk.

Risk Proclivity – strong inclination of a person to take a risk.

Risk Propensity – the tendency of a decision-maker to either take or to avoid risks.

Self-Efficacy – a person's belief in his or her capacity to perform a given behavior required to attain a desired outcome.

Summary

The duties required of emergency service personnel are complex, requiring rapid performance of multiple tasks in a short period of time. It would seem that someone who chooses to take on such a job would possess a high sense of self-efficacy and, may even be characterized as someone with a sensation-seeking personality who is prone to risk-taking. Research indicates that this population may also have a high sense of general self-efficacy. With driving at high rates of speed while being attentive to multiple other tasks, one could posit that emergency services personnel have a well-developed sense of self-efficacy associated with risky driving as well. It would be interesting and useful to know if these characteristics exist to the level that risky driving behaviors transfer into their personal lives. Yet, no research exists to date that investigates the propensity of off-duty risky driving behaviors among emergency services personnel. Given the phenomenon of an increase in the frequency and types of risky driving behaviors, including distracted driving, among members of the general public, and its significant threat to public health, it is incumbent upon those practicing prevention and health promotion to investigate unique at-risk groups and their dynamics in order to develop effective, population-specific strategies to minimize risks.

CHAPTER 2

LITERATURE REVIEW

Purpose Statement

The purpose of this study was to identify the extent to which rural emergency medical services personnel engage in off-duty risky driving behaviors and to examine the relationship between these behaviors and their personality traits associated with risk propensity as well as their self-efficacy relative to risky driving.

THE EMS System

According to the National Highway Traffic Safety Administration (2012), an Emergency Medical Services (EMS) system is a coordinated system which works in unison with other services and systems to ensure the health and safety of the community within which it functions (NHTSA, 2012). These systems are guided by specific protocols and procedures mandated at local, state and federal levels. The following are the distinct components that make up an EMS system, each of which plays an integral role in making the system efficient and seamless:

- Agencies and organizations (both private and public)
- Communications and transportation networks
- Trauma systems, hospitals, trauma centers, and specialty care centers
- Rehabilitation facilities
- Highly trained professionals
    - Volunteer and career pre-hospital personnel

- Physicians, nurses, and therapists
- Administrators and government officials

- An informed public that knows how to access emergency medical services

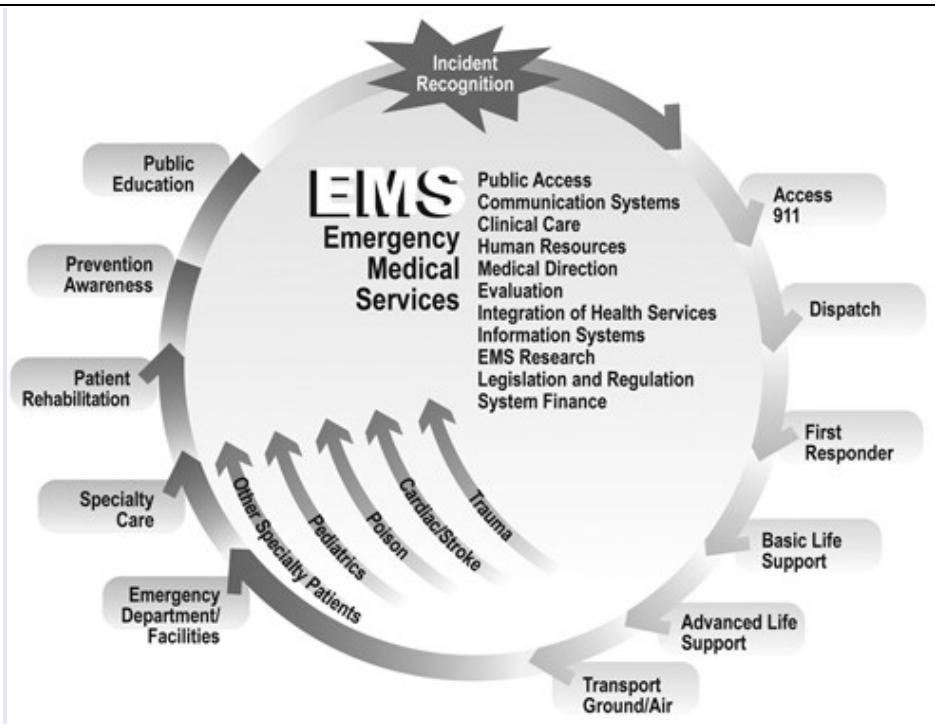


Figure 1. Emergency Medical Service s System (NHTSA, 2012)

The figure above illustrates the holistic, dynamic and systematic nature of the EMS system's function within a community, theoretically available to all citizens 24 hours a day, seven days a week, and 52 weeks each year.

Public Health and the EMS System

Unexpected, life-threatening trauma is often an emotionally-charged, dramatic event that can leave those needing assistance panicked, fearful, and extremely vulnerable. It is from this physical and emotional state that we engage with those who first come to our aid. The one reassuring perceived truth is that U.S. citizens have at their disposal an excellent emergency

response system with state-of-the-art emergency medical services. The first EMS providers on the scene are heavily relied upon to work miracles in their attempts to efficiently and effectively stabilize and transport victims to the nearest medical center. It is perhaps this expectation that may perpetuate the development of over-inflated and unrealistic levels of self-efficacy, a sense of invulnerability, and foster risk proclivity that transcends behaviors on the professional front and emerges in decisions and behaviors within the personal lives of EMS personnel.

EMS Personnel

The development of the current coordinated system of emergency medical services in the United States has a colorful past. The individuals providing care and service to the sick and injured have evolved from monks in the year 1080, to soldiers in the battlefield, and ultimately to the highly-trained medical professionals that exist today. The origins of providing care for the injured and wounded “in the field” can be traced as far back as pre-AD, as illustrated in the timeline in Table 1 (Robbins, 2005). A significant change in the system as we know it today occurred when the landmark document, Accidental Death and Disability: The Neglected Disease of Modern Society (Division of Medical Sciences, 1966). This paper has commonly been referred to as *The White Paper*, which revolutionized the EMS system and led to significant reforms in the response system. As a result, governmental standards were instituted that regulate the system and ensure coordinated, high quality care provided on-scene and in-transit by trained emergency services personnel with appropriate equipment.

Table 1

History of Emergency Medical Services

Time	Location	Event
Pre-AD	Rome	Transport of injured soldiers referred to in Roman & Greek Epochs
1080	Jerusalem	Monks caring for those on pilgrimage to the Holy Land
1487	Spain	Horse-drawn carts for transport and care of wounded from battlefield
1777	U.S.	Creation of “flying systems”, rudimentary semi-transient field hospitals
1793	Europe & Egypt	Napoleon’s chief surgeon, created first pre-hospital, comprehensive system of care, and transport devices (covered wagons/camel panniers)
1799	U.S.	Legislation enacted for formal structure to govern medical care
1840	Scotland	Specialized medical transport carriage with trained attendants
1861	U.S.	More formalized EMS system begins during Civil War
1880s	U.S.	Clara Barton provided field service and starts American Red Cross
1910s	U.S.	Ambulance services provided transport for WWI soldiers
1940s	U.S.	Specialty-trained corpsmen provided initial care to WWII soldiers
1950s	U.S.	Field medics and helicopter transport to MASH units
1966	U.S.	National and state-governed EMS system begin to be formalized
1970	U.S.	National Highway Traffic Safety Administration – created EMS symbol
1980s	U.S.	911 spread nationwide as the emergency access number in the U.S.
1999	U.S.	Wireless & Communications Public Safety Act – standardized/mandated 9,1,1 be used in U. S. for "reporting an emergency” and requesting aid

The National Highway Transportation Safety Administration (2012) provided a comprehensive overview of the EMS system within the United States. Below is a snapshot of

the national system, as delineated in the 2011 National EMS Assessment (Federal Interagency Committee on Emergency Medical Services [FICEMS], 2012); there are:

- Over 21,200 EMS systems in U.S. (averaging 9.2 per county) – Illinois >500 agencies
    - 51% function at the EMT-Basic level
    - 38% function at the EMT-Paramedic level
    - 9% function at the EMT-Intermediate level
- Near 37.7 million responses took place in the U. S., resulting in over 28 millions transports in 2009
- Nearly 82,000 vehicles nationwide (2.98 / 10,000 population) – Illinois >2500
    - 45% function at Basic Life Support (BLS) level
    - 55% function at the Advanced Life Support (ALS) level
- Over 826,000 licensed/credentialed EMS professionals in the U.S. (28.7 / 10,000 population)
    - 64% are licensed as EMT-Basic, 24% EMT-Paramedic, 6% EMT-Intermediate
    - 67% are male, 33% female
    - 70% are between the ages of 20 and 49 years
    - 75% are Caucasian, 8% African-American, 5% Asian, and 4% American Indian/Alaska Native
- Nearly 8,500 EMS Medical Directors nationwide
- Volunteerism has no standard definition from state to state
    - Over 50% of First Responders and EMT-Basic employees are volunteers

- 12 states (24%) that have formal Employee Wellness/Prevention Programs (Illinois does not have such a program)
- 32 states (73%) that indicated the majority of EMS agencies function in rural areas, including Illinois
    - Illinois permits an alternative rural staffing model for vehicle service providers that serve rural populations of 10,000 or fewer residents and exclusively uses volunteers and/or paid on-call EMS providers (Illinois General Assembly, 2012)
- 10 states (40%), including Illinois, that indicated they have multi-agency Emergency Medical Services systems (i.e., more than one agency covers a designated service area)
- The majority of EMS agencies function with 12-hour to 24-hour shifts, including Illinois.

Within the EMS system, there are four primary healthcare professionals identified, including: EMS first responders dispatched through the 911 system, emergency medical dispatch professionals, EMS Medical Directors, and credentialed EMS professionals (NHTSA, 2012). There are four primary levels of EMT training in the U. S., including Emergency Response Responder (also known as First Responder), EMT-Basic level, EMT-Intermediate level, and EMT-Paramedic level. The National Highway Transportation Safety Administration (2012) has established minimum training requirements for EMT-Basic and EMT-Paramedic, but the regulation of EMS personnel remains primarily at the state level.

The Illinois EMS system is divided into 11 distinct regions, five of which serve the Chicago metropolitan area (see Figure 2). There are nearly 70,000 EMS professionals with active licenses in Illinois, with over half of them licensed at the EMT-Basic (22,398) and the EMT-Paramedic (13,956) levels (Illinois Department of Public Health, 2012). The minimum number of hours of training for Emergency Response Technicians is 40, while 120 hours are required for EMT-Basic, 320 hours for EMT-Intermediate, and between 1000-1200 hours for EMT-Paramedic (IDPH, 2012).

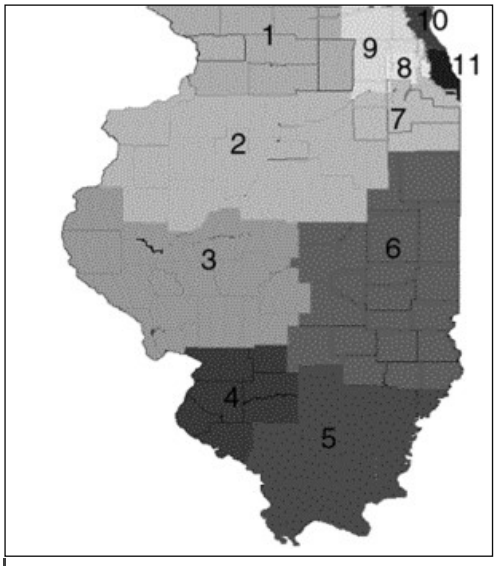


Figure 2. Map: Illinois EMS Regions

Throughout history, emergency service personnel are often among the first persons to encounter the detrimental outcomes of high-risk behaviors, including risky driving behaviors, on a day-to-day basis in their professional activities. As a result, reason would suggest that this group would tend toward engaging in risk-reducing or risk-aversive behaviors. Interestingly, research indicates that emergency services personnel may not be as cautious as one would expect, and that some significant predictive factors contributing to this risk propensity may exist.

Counter-intuitively, EMS personnel often engage in risk-behaviors higher than that exhibited by the general population. This is revealed by the results of various studies investigating safety practices among EMS personnel, including: low rates of influenza vaccination, (Hubble, Zontek, & Richards, 2011), low seat belt usage rates (Blau et al., 2012; NHTSA, 2010; Pirrallo, Levine & Dickison, 2005), and even lack of compliance with work-related precautionary behaviors, such as handwashing and use of personal protective equipment, to reduce exposure risk among EMS personnel (Smyser, Bryce & Joseph, 1990). A recent national study showed that 89% of EMS providers reported safety-compromising behaviors, such as reporting for work without getting adequate rest or exceeding speed limit when driving in a non-emergency mode (Weaver, Wang, Fairbanks, & Patterson, 2012). These behaviors may be related to characteristics, such as personality traits, that are unique to these individuals, traits that very well may have also influenced their decision to choose this intermittently fast-paced, high-stress occupation.

Personality and Occupation

The influence of personality traits on choosing an occupation has been studied for years and has been found to have a significant impact on occupation choice and persistence (Costa, McCrae, & Ray, 1995; Judge, Higgins, Thoresen, & Barrick, 1999; Nicholson, Soane, Fenton-O'Creevy, & Willman, 2005). Various personality models have been used in matching personality with career choices (Hussain, Abbas, Shahzad, & Bukhari, 2012). The Big Five Model, also known as the Five Factor Model (FFM), has become a standard in the field of personality research, providing a general taxonomy of personality traits (John, Naumann, & Soto, 2008).

The interrelated, high-order traits within the Big Five Personality Model include: openness, conscientiousness, extraversion, agreeableness, and neuroticism. As delineated by McCrae and Costa (2003), high and low scores within these traits describe various characteristics (Appendix A). Studies of twins have shown that, on average, heritable personality scores are distributed around these factors as follows: 57% heritability for openness, 54% extraversion, 49% conscientiousness, 48% neuroticism, and 42% agreeableness (Bouchard & McGue, 2003), yet environmental influences also play a role in personality development (Jang, McCrae, Angleitner, Riemann, & Livesley, 1998).

Kandler (2012) found that "genetic and environmental factors contribute to personality continuity and change" with environmental influences representing a source of individual differences in the development of one's personality throughout the lifespan. A longitudinal twin study looking at personality changes over a 13-year period suggested that the complex interplay between genetic and environmental factors explain patterns of continuity in personality across young and middle adulthood (Kandler, Bleidorn, Riemann, Spinath, Thiel, & Angleitner, 2010). Results of a large study of over 132,000 respondents also found that the Big Five personality traits do change well beyond adolescence, including increases in conscientiousness and agreeableness and decreases in neuroticism well into adulthood (Srivastava, John, Gosling & Potter, 2003), negating the frequently cited view that personality traits are genetically-based and stop changing by early adulthood.

The Big Five personality assessment tool has been used to explore the influence of personality on many issues, including those related to academics, work, relationships, and health-based decision-making (Nicholson, Soane, Fenton-O'Creevy, & Willman, 2005).

Characteristics of individuals who score on either the high or low end of each of the five personality traits can be found in Appendix A.

Personality and EMS Personnel

Despite the research indicating a relationship between personality and career choice, little research exists to determine if personalities of individuals who choose to work in emergency medical services professions differ significantly from those of the general population (Wagner, 2005). The concept of the existence of a "rescue personality" was posited in the early 1980s, suggesting that this categorization includes all members of the emergency services system (Mitchell, 1983). Individuals who exhibit traits characteristic of the "rescue personality" are described as having a "high need for stimulation, are risk takers, are highly dedicated, and have a need to help others" (Mitchell & Bray, 1990; Antonellis, 2006). Yet, the existence of this personality type has been questioned (Wagner, 2005; Gist & Woodall, 1998). Wagner (2005) suggested that caution be used when interpreting research findings as generalizable among all types of emergency services personnel (e.g., firefighters, police, military, emergency medical technicians and paramedics), and that differences between volunteer and professional workers may exist as well.

Pajonk et al., (2011) found that emergency physicians and paramedics scored higher in "readiness to take risks", and that they preferred difficult tasks, had a greater capacity to deal with conflicts, were willing to accept criticism, and possessed a tenacity and strength of will. A study conducted by Fannin and Dabbs (2003) found that choosing an occupation within the EMS is predicted by extraversion, meaning that individuals who gravitate toward these professions tend to be more extraverted than the general population. Additionally, greater

excitement-seeking, which is a characteristic within the extraversion domain, was evident among two types of emergency service professionals, firefighters and police officers (Salters-Pedneault, Ruef, & Orr, 2010).

Some studies have suggested that individuals who chose to work in critical occupations, professions in which workers perform critical duties to protect and serve the public, have personality traits that allow them to successfully cope and potentially thrive in these high-stress occupations (Meadows, Shreffler, & Mullins-Sweatt, 2011; Pajonk et al., 2011; Casey and Leger, 2000). Resilience has been shown to be a trait common to rescue workers (Pietratntoni & Prati, 2008; Bonanno, Galea, Bucciarelli, & Vlahov, 2006; Carver, 1998), as has excitement-seeking and sensation-seeking within the extraversion domain (Salters-Pedneault, Ruef, & Orr, 2010). Most of these studies refer to coping with stress and trauma, and may not be indicative of a particular personality type distinctly describing emergency services personnel. Pajonk et al., (2011) cautioned that "readiness to take risks" might be related to personalities that are characterized by responsibility and security, which may indicate a propensity toward "responsibility" rather than excitement or "adventure seeking".

Personality and Risk Propensity

Identifying and understanding determinants of health risk behaviors have been explored for years (Sitkin & Pablo, 1992), including the relationship between relatively stable personal characteristics such as personality traits and risk propensity (Castanier, Le Scanff, & Woodman, 2010; Deck, Lee, & Reyes, 2010; Anic, 2007; Nicholson, Soane, Fenton-O'Creevy, & Willman, 2005). Multiple factors play a role in health risks, including environmental, cultural, social,

psychological and behavioral factors. Personality traits have also been shown to play a role in risk-taking propensity relative to driving (Arthur & Doverspike, 2001; Arthur & Graziano, 1996).

In a study to demonstrate a newly-developed risk-taking scale, a clear five-factor pattern emerged for general risk propensity, described as a combination of high extraversion and openness with low neuroticism, agreeableness, and conscientiousness (Nicholson et al., 2005). Using a combination of traits to identify risk-taking propensity by type of risk taken, those with low conscientiousness combined with high extraversion and/or high neuroticism have been identified as individuals with risk-taking propensity (Castanier, Le Scanff, & Woodman, 2010). Low neuroticism alone has also been associated with an increase in risk taking (Vollrath, Knoch, & Cassano, 1999), yet this finding has been inconsistent in other studies (McGhee et al., 2012). Openness to experiences and extraversion have also been positively correlated to sensation-seeking (Costa and McCrae, 1992), which has been positively correlated with risk-taking behaviors (Mishra & Lalumiere, 2011; Cyders et al., 2009; Raynor & Levine, 2009; Booth-Kewely & Vickers, 1992) and more specifically with risky driving behaviors (Hennessy, 2011; Endriulaitiene & Marksaityte, 2007). It is evident that determining risk propensity using the five traits is complex and variable. Yet, as illustrated in Figure 3, Nicholson et al., (2005) reported that the pattern for general risk propensity holds constant for risks associated with safety, e.g., fast driving, with the weakest association being openness to experience.

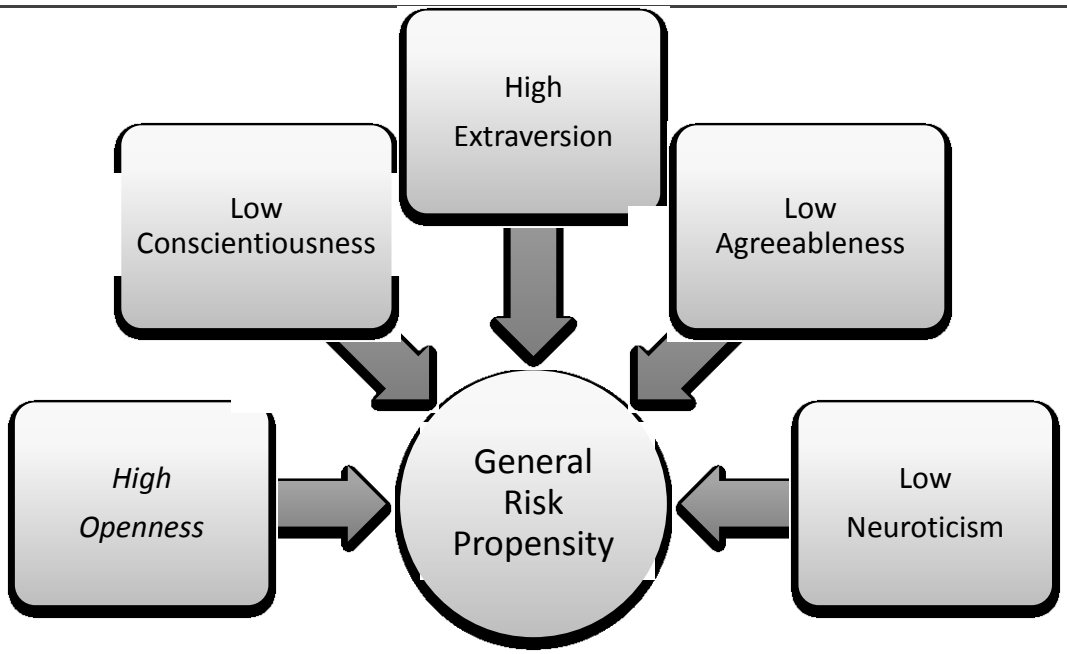


Figure 3. Patter of Five Factor Personality Traits for Risk Propensity

Grasmick and colleagues (1993) developed the widely-used 23-item Self Control Scale to measure six components of the trait, self control. Two of the subscales focus on the characteristics of impulsivity and risk-taking. Impulsivity relates to the tendency to choose actions the result in immediate gratification; risk-taking addresses the preference for thrilling or risk-seeking behaviors (Piquero & Rosay, 1998). A combination of these two traits has shown to be predictive of reckless behaviors (Wood, Cochran, Pfefferbaum, & Arneklev, 1995), such as risky driving. Use of these subscales can strengthen a measurement of risk propensity.

Professionals in critical occupations also have a strong sense of self-efficacy (Rios Riquez, Sanchez-Meca, & Fernandez, 2010; Barnett et al., 2008), a belief that they have the skills and power to successfully accomplish tasks and maintain a sense of control over their environment (Bandura, 1997). First responders, according to Pietrantoni and Prati (2008), have an elevated sense of self-efficacy, which may serve as a contributing factor to their resiliency.

This strong sense of self-efficacy, combined with a tendency toward risk-taking may have created a perpetually infinite loop of characteristics that feed upon one another, as depicted in Figure 4.

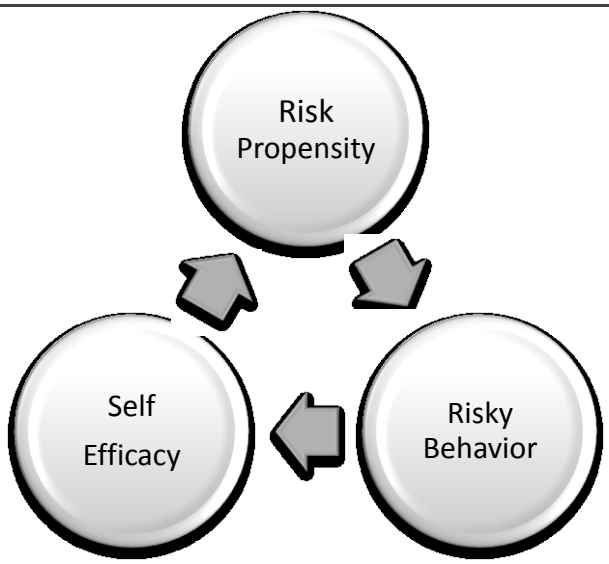


Figure 4. An Infinite Loop of Risk Propensity, Risky Behavior and Self-Efficacy

Emergency service personnel are called upon to respond to extreme crisis events that present inimitable challenges for them. They develop coping strategies to deal with the often highly-intense, traumatic scenarios in which they must efficiently and proficiently function. The ability to resist negative emotions positively correlated with the decision to persist in their respective professions (Pilarik & Sarmany-Sculler, 2011). This ability to detach is one of the most frequently-cited coping mechanisms employed by emergency personnel (Adams et al., 2011; Holland, 2008). Additionally, successful coping in response to intensive challenges further strengthens the sense of self-efficacy. Increased self-efficacy resulting from successful management of high-risk and high-stress tasks may lead to a sense of invincibility (Hubble, Zontek, & Richards, 2011). Combining the inherent nature of individuals who tend toward

critical occupations to be risk-takers (e.g., emergency services personnel) with the commonly-utilized coping strategy of detachment and the strong sense of self-efficacy, first responders and EMS personnel may have a higher propensity to engaging in risk-taking behaviors.

The Risk of Driving

One of the most prevalent high-risk activities today, accessible to most populations beginning in adolescence, is driving. In fact, it is not only accessible, it is nearly a societal expectation. The act of driving is inherently dangerous, even among the most cautious and risk-aversive individuals. Drivers are required to control a nearly 4,000 pound vehicle as it propels down one of the nearly 4 million miles of public roads (National Atlas of the United States, 2012), navigating the roadways and other roadway users, and at times traveling at speeds in excess of 60 miles per hours. This monumental task is performed by thousands of drivers each day with apparent ease and success sufficient to increase most drivers' self-efficacy, which may in turn, lead to a sense of casual regard for the task, and ultimately lowering one's singular vigilance while driving that nearly two-ton vehicle.

To maximize safety and mitigate risks, driving requires vigilant attention and relative precision. Despite the associated risks as well as physical and cognitive functioning required of this task, it is relatively easy to become a licensed driver. The majority of the U.S. population successfully secures a driver's license at some point in their lives. In fact, nearly 85% of the driving-age population in the United States possess a driver's license (Federal Highway Administration, 2011). Most drivers spend decades of their lives navigating the expansive U.S. roadways. Many precipitous events have contributed to the reduction of traffic fatalities in the last few decades, including reduced speed limits, increase in legal drinking age, development

and use of traffic control devices, increase in the cost of fuel, improved roadway construction, technological developments in vehicle design, the development and mandated use of restraining devices, such as seatbelts and child car seats. Some of these are shown in Figure 5.

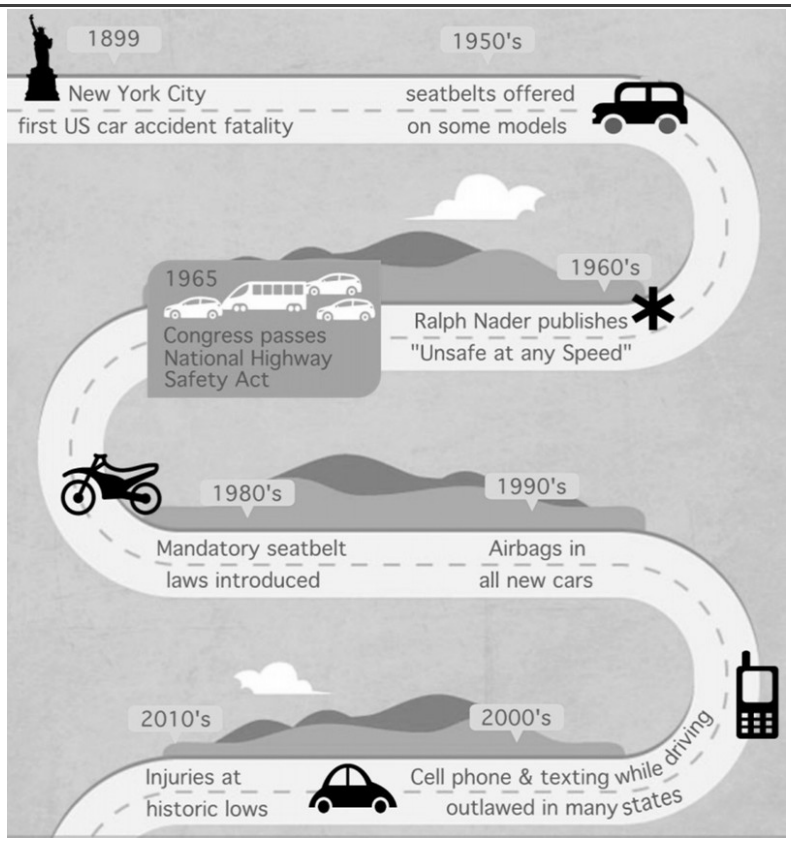


Figure 5. Precipitous Events Impacting Traffic Safety (Purcell, 2013)

Unfortunately, despite the success of compliance with laws such as increased usage of these protective devices, other risky driving conditions and behaviors have evolved and are reaching epidemic proportions.

Risky Driving Behaviors

Driving, in and of itself, is a complex endeavor requiring the driver to perform multiple tasks to engage in this behavior. Mechanically manipulating a vehicle requires performance of a

complex series of tasks, often done simultaneously, including acceleration and deceleration, steering, signaling and, in the case of manual transmission, shifting gears. The driver must be visually attentive to multiple points on the road, and must be cognitively present to safely perform these complex functions. Yet, the ability of humans to multi-task in such a manner is limited.

Science has demonstrated that the human brain, in fact, is incapable of attending fully to more than one task at a given time, but that it adapts to accommodate performance of multiple tasks at one time by rapidly shifting back and forth or toggling between tasks (National Safety Council, 2010; Rosen, 2008). This shifting occurs across all functions required to drive a car, across the cognitive, visual and mechanical functions. For instance, when driving, a hand may move from the steering wheel to turn on the windshield wipers when it starts to rain. The eyes look forward, but glance to the rearview mirror or to the side to look for approaching vehicles or pedestrians. The brain cognitively processes all the information being observed, such as reading a sign (visual) indicating a reduced speed limit and sending the information to the foot to step on the brake (mechanical) to slow down. Again, driving is a very complex behavior for individuals to master.

Many factors have contributed to the increased risks associated with driving, most of which can be categorized as distraction or inattentiveness. The prevalence of and perceived (apparent) human dependence on technological gadgets and communication devices have certainly created a more risky driving environment, (e.g., GPS systems, cell phones, digital music devices). These compelling devices, added to the complex vehicular environment which already contains myriad internal and external distractions (e.g., radios, passengers, pets,

electronic billboards, food, personal thoughts), have contributed to the creation of an overwhelming, chaotic driving environment. Driving behaviors are further compounded by the societal demand for perpetual multi-tasking behaviors, deceptively leading people to believe that they are expected to perform and are capable of executing multiple tasks within the same time period, and that they are more valued if they successfully do so.

Risky roadway behaviors have reached epidemic proportions with the exponentially-increasing number of available behaviors and conditions that serve to distract from the already complex task. Add the behaviors of speeding, lack of use of personal restraints, or aggressive driving (e.g., following too closely behind a vehicle, shifting lanes frequently, running a yellow or red light, rolling through a stop sign), and the roadways are an increasingly dangerous environment simply as a result of human behavior. Over 32,000 people died in motor vehicle accidents in 2010 (NHTSA, 2011). According to the 2012 Traffic Safety Culture Index, 52% of all drivers feel less safe today than 5 years ago, a 17% increase from 2009; nearly half of these drivers attribute driver distraction as the reason for this perception of unsafe roadways (AAA Foundation for Traffic Safety, 2013).

Nearly half of all Americans have been adversely affected by a serious motor vehicle crash, with over 20% being personally involved in a motor vehicle accident resulting in someone being hospitalized (AAA Foundation for Traffic Safety, 2013). Of the fatalities that occur each year in the United States as a result of motor vehicle accidents, 55% occur in rural areas, although only 19% of the U.S. population resides in rural areas (NHTSA, 2012). This discrepancy is explained by multiple contributing factors, including: longer distances traveled, the higher rates of speed on rural roads, rural culture and values, and, ironically, the longer response time

of EMS personnel to the scene of the accident as well as the limited access to trauma centers in these regions (Arias, 2010). Given the nature of the profession, rural emergency services personnel are disproportionately more affected by serious motor vehicle crashes than the general population. Illinois is at the forefront of the challenges faced by rural EMS providers with 82% of the 102 counties classified as rural.

Emergency Responders and Driving Behaviors

Transportation deaths are the leading cause of work-related deaths in the United States, according to the National Institute for Occupational Safety and Health (NIOSH, 2011). Driving, often at high rates of speed and aggressively, is a key job-related task for most emergency service personnel. Emergency service workers, therefore, are at an increased risk for vehicular collision while on duty. Emergency medical services personnel have an occupational fatality rate that is 2.5 times greater than the national average; and nearly three fourths of these are the result of road collisions (Gormley, Walsh, & Fuller, 2008). These risks have resulted in many efforts to develop and enforce standards of practice and transportation policies in the workplace where driving a motor vehicle is a required task on the job (NIOSH, 2012). Through research and collaboration, changes have been made and recommended practices have been instituted to improve equipment mounting, seating and restraint features in ambulances (NIOSH, 2011).

Emergency responders are “expected to use high-tech in-car equipment, often while traveling at high speeds, in and out of traffic with sirens activated” (De Graeve, Deroo, Calle, Vanhaute, & Buylaert, 2003). According to Queller et al., there is an “almost exponential” increase in distractions emergency workers face inside the vehicle (2010). Limited resources

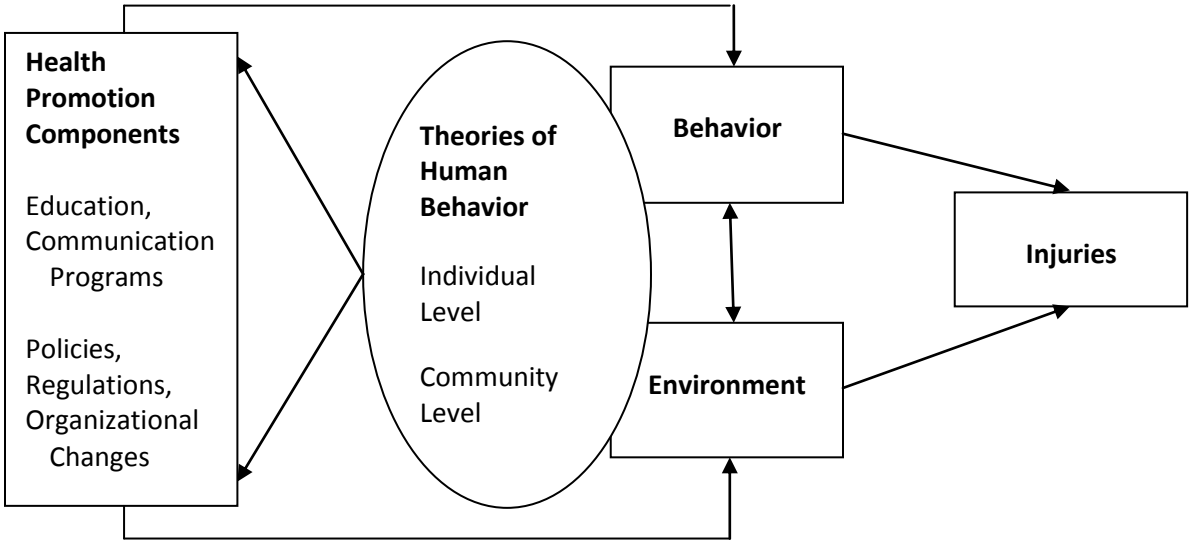
within agencies have limited staff available per shift; for instance, police officers no longer patrol in teams of two, but rather travel alone in a patrol car equipped with two or more radios, a laptop, cell phones, GPS, radar equipment, and recording devices such as cameras (Vila, 2011). All of these distractions contribute to the high rate of motor vehicle accidents experienced by emergency services personnel while on duty.

An increase in risky driving has been correlated with multiple factors, including gender, age, work position, and various personality traits. A high level of extraversion was positively correlated with risky driving behaviors (Endriulaitiene & Marksaityte, 2007). Culture also reflects shared norms, values, and customs in a group that influence behaviors (Hennessy, 2011). Thus, if one believes that there is a common acceptance as well as participation in risky driving behaviors, this may serve as justification for a person to adopt this behavior (Forward, 2009). A timely example of this influence was recently reported with the release of the results of the 2012 Liberty Mutual Insurance/SADD Teen Driving Survey (2012). According to the survey, teens mimic their parents' driving habits (cultural norm), including the risky driving behaviors (Students Against Destructive Decisions, 2012). Given the work-related culture of ambulance driving, which involves driving aggressively at high rates of speed while distracted, it is possible that ambulance drivers may adopt this behavior within their personal lives.

The Use of Theory and Models in Risk Reduction with Driving

Theories and models have served to describe, explain, or predict a particular phenomenon (Glanz et al., 2008). Theories and models of behavior change, however, have been underrepresented in the literature, particularly relative to injury prevention (Gielen & Sleet, 2003). In the case of injury prevention related to driving, theories and models can help

identify causes and contributing factors to behavioral choices and can also aid in the development of change mechanisms to help develop prevention programs tailored to specific constructs. As depicted in Figure 6, Gielen and Sleet (2003) adapted the health promotion framework developed by Green and Kreuter (1999) to create a framework specific to injury prevention, incorporating the multiple factors and illustrating the importance of taking behavioral, environmental and policy approaches to injury prevention. Although preventing injuries usually requires policy change and environmental mitigation, an understanding of knowledge, attitudes, behaviors, and even community norms that can influence decisions potentially leading to injuries is also an essential component of the injury prevention plan



(Sleet, Gielen, Diekman, & Ikeda, 2010)

Figure 6. Health Promotion Framework for Injury Prevention

The Ecological Model and Driving Behaviors

Few phenomena illustrate the complex and dynamic interconnectivity of factors that influence health outcomes than does the experience of driving. During the driving experience,

the symbiotic relationship between the driver and the vehicle is so intertwined, that the driver and vehicle can be perceived as a "form of a social being that brings about distinctive social actions" (Dant, 2004). Driving requires a constant, reciprocal interaction between the driver and the environment, which is governed by strict societal laws and influenced by community and relational expectations as well as individual knowledge and perceptions of risk. It is impractical to address risk reduction while driving without addressing environmental, societal, and personal factors. The Social Ecological Model (Figure 7) delineates these factors as follows: policy, community, organizational, interpersonal, and intrapersonal.

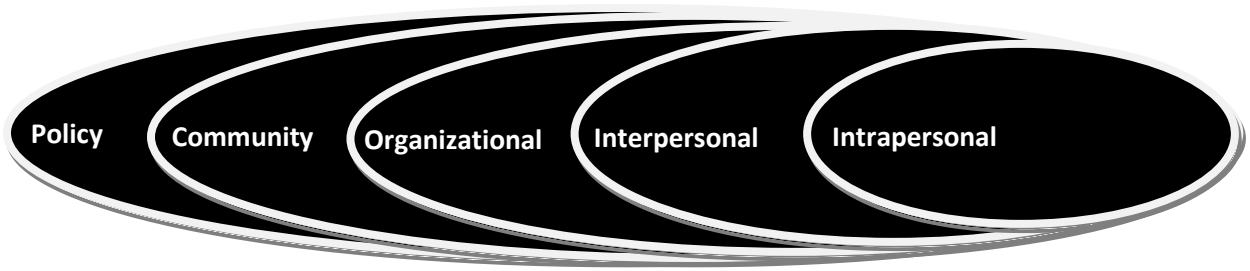


Figure 7. Social Ecological Model

Driving usually occurs within a physical environment that has been designed under relatively rigid federal, state and local standards that prescribe even the most negligible detail. Much effort to reduce risk with driving has been made at macro level of influence, from mandating environmental mitigation strategies (e.g., law requiring air bags in all vehicles) to laws intended to control behaviors (e.g, mandatory seat belt use) (NHTSA, 2012). Examples of community level strategies include use of urban planning in roadway design, and at the organizational level, institution of workplace transportation policies. Interpersonal influences on driving behaviors include perceived social norms and modeling by peers. Arguably, the most

difficult factor to influence is that of individual behavior. Kanfer and Schefft (1988) described human actions and experiences as the greatest mystery and least conquered force of nature (Glanz et al., 2008). The intrapersonal level is influenced by one's values and beliefs, attitudes, knowledge and behavioral capacity, as well as an individual's personal traits.

The importance of addressing all the constructs within the social-ecological model is unmistakably evident when looking at risk reduction with driving. Each level of influence within the social-ecological model plays a significant role in the phenomenon of engaging in distracted behavior while driving a car. As illustrated in Figure 8 below, the decision to engage in distracted driving behaviors is influenced by laws governing the behavior, the level of community support for or against the behavior, policies that may be in place at an individual's worksite, acceptance by influential others of the behavior as well as vicarious reinforcement from modeled behaviors, and one's own values and beliefs about the risks associated with distracted driving.

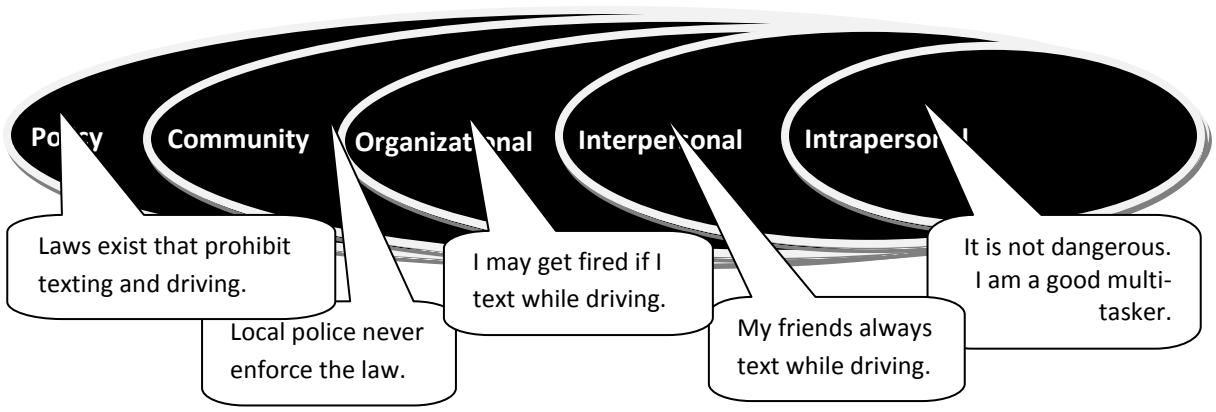


Figure 8. Social Ecological Model – Texting While Driving

The constructs of the Social Ecological Model are embedded in a widespread traffic safety strategy historically known as the Three Es of Injury Prevention: Environment

(Engineering), Enforcement, and Education (NHTSA, 2012; American College of Surgeons, 1999). A transportation system must be designed for the safety of the users, users must know how to navigate the system, and mechanisms must exist to ensure users can follow the rules within the system. Funding priorities of community grants for State Highway Safety Programs, including through the Illinois Department of Transportation (IDOT), continue to be guided by one or all of these three principles (NHTSA, 2012; IDOT, 2012), indicating support for the importance of each to injury prevention programming. Engineering and enforcement are community-level interventions, while education falls within the intrapersonal and interpersonal realms of the Social Ecological Model.

The reciprocal nature of the factors within each level of the Social Ecological Model and the Three Es of Injury Prevention is quite evident in injury prevention. The influences shown portray information at the various levels of the social ecological model that plays a part in an individual's decision-making process. Changing any of these factors, e.g., laws are strictly enforced or peers disapprove of the behavior, can influence the decision of the individual to engage in the behavior. According to Mark Rosenker (2008), former National Transportation Safety Board Chairperson, reduction in traffic deaths can be attributed to various environmental strategies, such as placing air bags in vehicles, child restraint systems, antilock brakes, and crash-absorbing vehicle frames, but these decreases have leveled off.

Injury reduction requires a partnership between the structural or "passive" strategies and behavioral change (Gielen & Sleet, 2003). Behavioral adaptations are required to effectively engage with newly-introduced environmental adaptations. For instance, a child safety seat is only as effective as the appropriate use of the device, and a law prohibiting

texting while driving is only as effective as an individual's compliance with the law. Utilizing behavior change theory to identify and mitigate behavioral determinants within the ecological framework, therefore, maximizes potential to attain the desired outcomes, injury prevention and risk reduction.

The Social Cognitive Theory and Driving Behaviors

Through the years, social scientists have postulated the antecedents of human behavior. Albert Bandura is an acknowledged leader in the field, and is credited with the development of the Social Learning Theory and the Theory of Self Efficacy, which were later unified into the Social Cognitive Theory (SCT) (Bandura, 2006). The theory suggests that learning and behavior are a result of a dynamic, reciprocal process among three main sources of influence: behavior, environment and personal factors (Bandura, 1998). This triadic reciprocal model of causation (See Figure 9), includes various constructs evolved from the development of the SCT, including: reciprocal determinism, behavioral capability, outcome expectations and expectancies, vicarious learning, reinforcements, and notably, self-efficacy (McAlister, Perry, & Parcel, 2008).

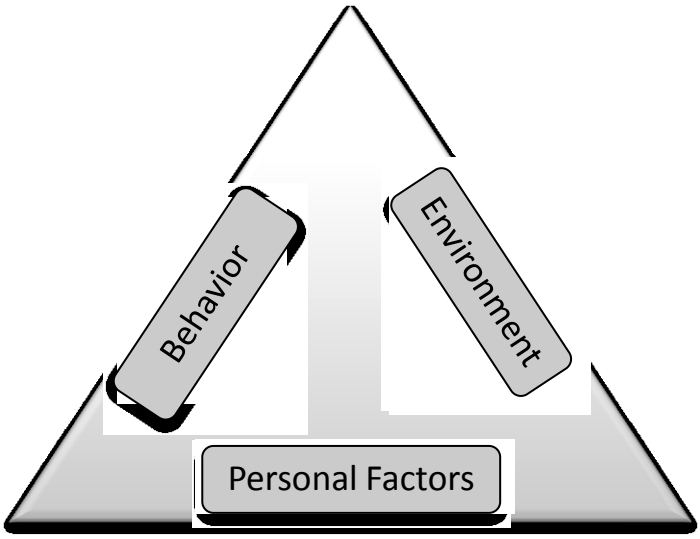


Figure 9. Triadic Reciprocality Model of Causation

Self-efficacy is the belief that one is capable of producing "designated levels of performance that exercise influence over events that affect their life" (Bandura, 1997). If one's self-efficacy is high, then there is a stronger likelihood that a behavior will occur; low self-efficacy usually results in a lesser likelihood that a behavior will occur. According to the Health Action Process Approach, a theory of health behavior change, the acquisition of self-efficacy can be divided into five phases: goal-setting, planning, initiation, action and maintenance (Schwarzer, Luszczynska, & Wiedemann, 2009). Self-efficacy is based on four principle sources of information: performance mastery, vicarious experiences, verbal persuasion, and physiological states related to the desired behavior (Bandura, 1997).

Learning to drive a car, an arguably daunting task, is a classic example of how these four information sources play out in the development of self-efficacy and the acquisition of a behavior. A 16-year-old high school student, Chris, who coincidentally has been having difficulty seeing from a distance, is nervous at the prospect of learning to drive. As Chris successfully completes the classroom portion of the driver's education course and is scheduled for the experiential portion, the feeling of nervousness strengthens. On the first day armed only with classroom-based knowledge and a new pair of eyeglasses (physiological state), Chris is extremely nervous, imagining the worst possible outcome—having an accident. To Chris' relief, there were no negative outcomes, and the instructor praises the driving performance (verbal persuasion). Chris observes other student drivers perform the multiple tasks required to drive a car, with performance notably improving daily (vicarious experience). By the end of the course, Chris has spent numerous hours driving a car and can perform all the cognitive, visual and mechanical functions required to drive the car with ease (performance mastery). Needless to

say, the nervous sensation originally experienced by Chris at the beginning of the course has become a distant memory. Chris, thus, has ultimately developed a strong sense of self-efficacy relative to driving a personal vehicle.

According to Bandura (1997), “people's level of motivation, affective states, and actions are based more on what they believe than on what is objectively true". The principles of the Social Cognitive Theory apply to the reinforcement of both health and unhealthy behaviors. Self-efficacy has proven to be a predictor of behavior and has helped to bridge the gap between behavioral intention and action (Schwarzer & Luszczynska, 2008). Research has revealed that self-efficacy also serves as a determinant of risk-taking behaviors including participation in extreme sports (Llewellyn et al., 2008; Slanger & Rudestam, 1997), business decision-making (Krueger & Dickson, 1994; McGee, Peterson, Mueller, & Sequeira, 2009), and even risk-taking behaviors while online (Livingstone, Haddon, & Gorzig, 2012). Therefore, an elevated sense of self-efficacy could, in fact, foster engagement in behaviors that are also health-compromising.

For instance, the new driver, Chris, may observe others, such as peers, drive aggressively without a negative consequence (vicarious experience), be encouraged to hurry to get to a destination while driving (verbal persuasion), and ultimately exceed the speed limit while driving without a negative consequence (performance mastery), all of which could result in increased self-efficacy relative to risky driving behaviors, as predicted by the Social Cognitive Theory. Therefore, risk-taking behaviors while driving may be influenced by a high sense of self-efficacy in performing the behaviors while successfully maneuvering a vehicle.

A divergent position to the effects of self-efficacy on engaging in risky behavior has been considered, wherein increased self-efficacy relative to a risky behavior serves as a protective

factor (Merritt, 2013). Merritt (2013) posited that individuals with higher levels of self-efficacy relative to a risky behavior may actually be less likely to engage in risk-taking behaviors and ultimately more attentive when choosing to engage in risky behaviors and did so more cautiously. Merritt and Tharp (2013) suggested that increased levels of self-efficacy correlates with the amount of time spent safely practicing the risky behavior, resulting in a better-prepared, more-mindful individual engaging in the behavior with improved performance capacity. It has been purported that higher levels of self-efficacy has a stronger association with calculated risk-taking rather than reckless risk-taking (Llewellyn & Sanchez, 2008). Gamblers, for instance, may often be perceived as those who are reckless risk-takers, yet trained athletes may be perceived as engaging in calculated risk taking. Making the distinction between reckless risk-taking and calculated risk-taking (Merritt & Tharp, 2013) could prove useful in developing risk reduction strategies for risky behaviors inherent to sanctioned job tasks.

Summary

The literature indicates that EMS personnel experience far greater traffic accidents while on-duty than do members of other professions, yet little information exists about the driving behaviors of off-duty EMS personnel. Furthermore, to date, no research exists that comprehensively evaluates correlates and predictors of risky driving behaviors among emergency services workers while off-duty. Research indicates that EMS personnel may share specific personal characteristics that may ultimately lead them to choose a dynamic, and often intense profession. Given personality traits that may tend toward risk-taking, a high level of self-efficacy that may transfer to self-efficacy relative to risky driving behaviors, and the

tendency to emotionally detach from negative outcomes, emergency services personnel may be at increased risk to engage in health-compromising behaviors. As indicated by the constructs within Social Cognitive Theory, job-related duties of EMS personnel may actually reinforce risky driving behaviors, e.g., driving at high rates of speed while engaging in more than one task at a time. The lack of evidence about off-duty driving-related behaviors and subsequent behavioral outcomes of EMS personnel indicates the need to assess this population's off-duty driving behaviors. By identifying the specific challenges and characteristics faced by this population, tailored harm-reduction strategies can be developed to foster increased safety behaviors among EMS personnel as well as to create behavioral and systemic changes that ultimately improve the safety of our nation's roadways.

CHAPTER 3

METHODOLOGY

The methodological procedures used to conduct the study to explore the relationship between the risky driving behaviors of off-duty rural emergency medical services personnel and their risk propensity, as well as their level of self-efficacy relative to risky driving, will be delineated in this chapter. Methods used to design the research, select the sample, collect the data, conduct the statistical analysis, and protect the participants will also be provided.

Purpose of the Study

The purpose of this study was to identify the extent to which rural emergency medical services personnel engage in off-duty, risky driving behaviors and to examine the relationship between these behaviors and their personality traits associated with risk propensity as well as their self-efficacy relative to driving. Through identification of contributing factors affecting health-compromising driving behaviors, tailored intervention strategies can be developed to create behavioral and systemic changes within the EMS culture that might ultimately improve the safety of rural roadways. Results of this study may also be transferable to other similar professionals who engage in risky behaviors as a result of their job-related duties (e.g., high-risk sport participants, police officers, firefighters), and whose self-efficacy to engage in driving behaviors perceived as risky by the general population may be elevated to the point of posing a safety threat to both themselves and to others.

Hypotheses and Research Questions

The following research questions and hypotheses were used to guide the development of the research instrument and the research design. The two hypotheses to be tested in this study were:

H1: Risk-taking propensity is a significant independent predictor of risky driving behaviors while off-duty.

H2: Driving self-efficacy is a significant independent predictor of risky driving behaviors while off-duty.

The research questions included:

1. To what extent do EMS personnel engage in risk-taking driving behaviors?
2. How self-efficacious are EMS personnel relative to driving?
3. Is there a significant interaction between risk-taking propensity and self-efficacy, over-and-above their individual estimates, when predicting driving behaviors?

Study Setting

The Illinois EMS System is comprised of 11 distinct regions, as depicted in Figure 10. The Illinois Region V EMS system provides pre-hospital emergency care to the lower southeast 20 counties in Illinois, covering 7,840 square miles of territory and approximately 435,260 residents (United States Census Bureau [USCB], 2012). All of these counties are categorized as rural (United States Department of Agriculture [USDA], 2012), and all are partially (13) or entirely (7) considered Health Professional Shortage Areas for primary care providers (Rural Assistance Center, 2012). The rural nature of the region is exemplified by the number of

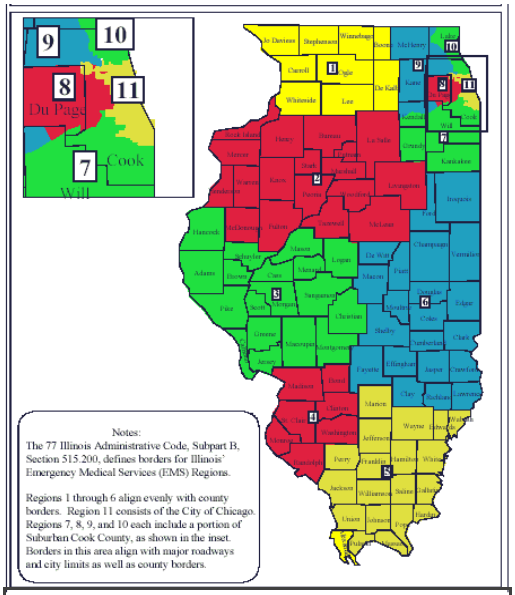


Figure 10. Illinois EMS Regions

residents per square mile, 55.5, compared to the Illinois rate of over 231 persons per square mile (USCB, 2012).

The southernmost Illinois region has been characterized as economically challenged. The per capita income for these residents in 2010 was $20,147, a significantly lower figure than the state's $28,782; nearly 17% of these residents live below the poverty line, which is much lower than the state percentage of 12.6% (USCB, 2012). To compound the economic situation, the U.S. Census Bureau reported that more than 18% of these southern Illinois residents are over age 65 compared to 12.7% for all of Illinois (2012), indicating both a higher proportion of people living on a fixed income as well as contributing to a greater need for health and medical resources in the region.

Nine of the 10 unhealthiest counties in Illinois are in this region, and all but one are ranked in the lower 50% of the state, as defined by the County Health Rankings 2013 publication (University of Wisconsin Population Health Institute, 2013). The Illinois Region V EMS/Trauma System consists of over 400 employees covering the 20 southeastern counties,

serving 10 hospitals with six separate EMS systems and three air medical services. St. Louis University Hospital in Missouri serves as the Level I Trauma Center; Deaconess Hospital, Inc., serves as the Level II Trauma Center. The six EMS systems included in the IDPH Region V EMS System are:

- Fairfield Memorial EMS System
- Heartland Regional EMS System
- Massac Memorial EMS System
- North Egypt EMS System
- St. Mary's EMS System
- Southern Illinois Regional EMS System

Collectively, these EMS workers provide pre-hospital emergency and trauma care 24 hours a day, seven days a week to citizens in the southern Illinois region. EMS personnel who accommodate the pre-hospital emergency medical needs of this rural region consisting of comparatively low-income, less healthy residents, are recruited from this same population. Although it can be expected that a large proportion of these individuals are volunteer and part-time employees, as is common in rural EMS systems, little data exist to describe the characteristics of the EMS personnel employed in this region.

Twenty-one primarily rural counties are served by the Region VI EMS System located in central Illinois. Coles County is centrally-located within Region VI and maintains similar socioeconomic characteristics to counties in southern Illinois. The per capita income for Coles County is $17,370, with 17.5% of the population living below the poverty line; 13.3% of

residents are age 65 and older (USCB, 2012). The two largest ambulance services serving Coles County, located in Mattoon and Charleston, function at the Paramedic level.

Study Sample

Upon approval from the Human Subjects Committee at Southern Illinois University Carbondale, the survey instrument was administered on paper and via email to EMS personnel within the Illinois Region V EMS/Trauma System and on paper to EMS personnel working in Coles County, which is located within the Region VI EMS System. Email addresses of potential research subjects were acquired from directors of EMS systems within Region V. The study was endorsed by the former regional EMS Medical Director to reinforce the importance of the research and to encourage participation. The EMS system workers' employment status ranged from full-time paid employees to volunteers. For the purposes of this study on driving behaviors, EMS personnel who provide air transport were not included.

Human Subjects Protection

All research materials were submitted to the Southern Illinois University Office of Sponsored Projects Administration for review and approval by the SIUC Human Subjects Committee prior to initiating the research. Assurances in the cover letter were made to participants that they would be at minimal risk as a result of this research; the probability and extent of harm or discomfort anticipated in the research would not be greater than any harm ordinarily encountered in daily life. Participants were informed that consent to participate was implied as a result of completion of the survey. Human subjects approval was granted by the Institutional Review Board on July 12, 2013.

The following measures were used to protect the confidentiality of respondents: 1) no information that could reveal a respondent's identity would be used; 2) physical data would be kept in the researchers' locked cabinet; 3) electronic data would be stored on the researcher's password-protected computer; and 4) respondents would have the opportunity to withdraw from participation at any time and all data collected to that point would be withdrawn. Additionally, the online survey tool used in this study, SurveyMonkey, employed security measures to protect data stored on their servers (www.surveymonkey.com, 2012). Human subjects approval to conduct the survey online was granted by the Institutional Review Board on October 3, 2013.

Research Design

A cross-sectional, descriptive and predictive correlational research design was used in this study. A self-administered survey was used to gather quantitative data on the relationship between risky driving behaviors and risk propensity as well as self-efficacy relative to risky driving among EMS personnel serving in rural communities. The dependent variables in the study were self-reported driving behaviors, including, but not limited to, aggressive and distracted driving. The control variables included personal characteristics, such as gender, age, and years on the job. Personality traits indicating risk propensity and level of self-efficacy also served as independent variables. Multivariate regression was used to determine if the independent variables of risk propensity and self-efficacy relative to risky driving behaviors can predict the frequency of engaging in risky driving behaviors.

Sample Size and Power Analysis

The approximate 400 people working in the Region V EMS System served as the sampling frame for this study. Sample size was determined based on three criteria: sampling error, estimated population size and 95% confidence level. For a ±5% sampling error, a sample size of 197 participants was required; for ±10% sampling error, 162 participants were needed. There were 227 participants in this study, resulting in ±5% sampling error with 95% confidence interval as well as enough power to statistically detect a significant difference when the R-square value is as low as 0.1 with two predictors (Lenth, 2012).

Data Collection

A 63-item survey instrument was developed, containing three separate measures: a risk propensity assessment, a risky driving self-efficacy assessment, and a risky driving behavior assessment. Questions to obtain information on demographic characteristics and participant's driving history were also included in the survey instrument. Upon approval from the SIUC Human Subjects Committee, the survey was distributed on paper as well as through use of the web-based survey tool, SurveyMonkey to EMS personnel who serve in the Region V and Region VI EMS Systems.

Research Instrument

The 63-item research instrument (Appendix B) consisted of four distinct sections: a) a 17-item risk propensity assessment consisting of two separate scales, the BFI-10 and two subscales of the Self-Control Scale, to ascertain risk-propensity, b) a 10-item risky driving self-efficacy scale, c) a 24-item driving behavior assessment, and d) a 12-item section to gather

demographic and driving history information. It was estimated that it would take approximately 10 to 15 minutes to complete the instrument.

Risk Propensity Measure: BFI-10 Personality Assessment

The Big Five Personality Assessment, also known as the Five Factor Model, has become one of the leading personality assessment tools used today (John, Naumann, & Soto, 2008). The assessment measures five distinct high-level personality traits: openness, conscientiousness, extraversion, agreeableness, and neuroticism. An abbreviated version of the Big Five Personality Assessment, the BFI-10 was used in this study.

The BFI-10 was designed to have two items for each of the five personality traits, one which is true-scored and the other false-scored, while avoiding content redundancy (Rammstedt & John, 2007). Rammstedt and John also attempted to select items that were unique to a single factor and not related to the other four factors (2007). The third item for the Agreeableness factor, "Is considerate and kind to almost everyone", was true-scored. Scoring of the BFI-10 scale would take into consideration the false-scored items and was, therefore, reverse-coded. Each item was associated with only one trait. These items and their associated trait are delineated in Appendix C.

According to Nicholson et al., (2005), an unequivocal pattern among the big five personality traits for general risk propensity emerged, indicating a "causal dynamic" exists between personality and risk taking (p. 18). High scores for extraversion and openness serve as motivational factors for taking risks, while low scores for neuroticism and agreeableness appear to inhibit concern about potential negative outcomes, and a low score for conscientiousness reflects a reduction of cognitive barriers for risk-taking (Nicholson et al., 2005).

Risk Propensity Measure: Self-Control Scale Subscales Assessment

The subscales used in this study as another measure of risk propensity were derived from a 23-item self-control scale, developed by Grasmick and colleagues (1993) to measure six identified components of the trait, self-control. The two components, impulsivity and risk-taking, coalesce into the single trait of risk propensity and were of particular importance to this study. Impulsivity is the tendency to choose actions that provide immediate gratification; risk-taking refers to the preference for thrilling or risk-seeking behaviors (Piquero & Rosay, 1998).

Risky Driving Self-Efficacy Scale

To accurately assess perceived self-efficacy with regards to risky driving behaviors, a behavior-specific assessment has been developed by the researcher. The development of the Risky Driving Self-Efficacy Scale was informed by studies on self-efficacy with regard to driving and risky driving (Morisset, Terrade & Somat, 2010; George, Clark & Crotty, 2007; Bandura, 2006; Ozkan & Lajunen, 2005). Behaviors often defined as "risky driving behaviors", particularly those that would commonly occur on an ambulance run and that might be particularly transferrable into off-duty driving (e.g., speeding, weaving in and out of traffic, using communication devices), were given priority for inclusion in this new instrument.

The rating scale for the instrument includes six response choices in a Likert-type scale, ranging from *never true = 0 to exactly true = 5*, as "multiple gradations of strength is a stronger predictor of performance than one with only a few choices" (Bandura, 2012, p. 16).

Risky Driving Behavior Assessment

The 24 items on the researcher-developed Risky Driving Behavior Assessment scale were derived from a combination of various driving measures, including: the NHTSA Distracted

Driving Telephone Survey (Tison, Chaudhary & Cosgrove, 2011), the 2011 Youth Risk Behavior Survey (CDC, 2012), and the 2012 Traffic Safety Culture Index (AAA Foundation for Traffic Safety, 2013). Research conducted on risky driving behaviors also provided information on types of items to include in the survey (Lansdown, 2011; Rakauskas, Ward, Gerberich & Alexander, 2009), as well as a list of distracted behaviors from the U.S. Government website about distracted driving (Distraction.gov, 2012). The rating scale for the instrument is a five-point Likert-type scale ranging from *never = 0* to *always = 4*. To minimize the potential to have response bias, including both acquiescence bias as well as extreme response bias, items 18, "Wore a seatbelt", and 19, "Required others to wear a seatbelt in your car", were reverse-worded.

Demographics and Driving History Measurements

Demographic information were collected, looking at gender, age, professional certifications and work experience. Employment status, relative to being paid or serving as a volunteer, was also ascertained. Additionally, each respondent was asked to respond to questions about driving history of accidents and moving violations (citations), while on and off-duty. These items described the target population and served as controls in the study.

Pilot Study

The survey instrument consisted of four sections; two of these sections were evaluated in the pilot test. The two measures of risk propensity (BFI-10 and the two subscales of the Self Control Scale) had previously been tested for validity and reliability, and will be described later in this chapter. The risky driving self-efficacy items were adapted from standardized general self-efficacy scales and tailored for the specific skill of driving, as recommended by Bandura

(2006). Risky driving behavior items had been derived from various risky driving instruments (AAA Foundation for Traffic Safety, 2013; Centers for Disease Control and Prevention, 2012; Rakauskas, Ward, Gerberich & Alexander, 2009; Tison, Chaudhary & Cosgrove, 2011; Ozkan & Lajunen, 2005). These two scales, the Risky Driving Self-Efficacy scale and the two-part (frequency of behavior and perception of risk) Risky Driving Behaviors Assessment, were evaluated for readability, reviewed by an expert panel for face validity, and subsequently, piloted and assessed for internal consistency using Cronbach's coefficient alpha.

Instrument Readability

Before administering the pilot test, the entire survey was evaluated for readability, using the Flesch-Kincaid Grade Level and Flesch Reading Ease tests, both of which are tools available within the Microsoft Word software program. The survey scored 5.7 on the Flesch-Kincaid Grade level test, which is just below the range of about 6th to 7th grade reading levels in the United States recommended by the National Institutes of Health as appropriate reading levels for health information (National Institutes of Health, 2013). The survey measured 68.9 on the Flesch Reading Ease tests 100-point scale; this score also indicates that the survey would be easily read by a 6th to 7th grade student in the United States, making it suitable for the intended sample of this study.

Tests for Validity and Reliability

Instrument validity was established using an expert panel to determine face validity and by running inter-item correlations and Corrected Item-Total Correlations using SPSS, Version 19.0. Tests of reliability to measure internal consistency, specifically Cronbach's coefficient alpha, were also run using SPSS 19.0.

Expert Panel Review

The instrument was reviewed by a panel of three experts, consisting of physicians who have worked closely with the Emergency Medical Services system, including a former regional Emergency Medical Services Medical Director, to provide face validity. Input from the panel members suggested that the instrument appeared to measure what it is intended to measure, indicating high face validity. Although the panel members' feedback signified no changes to individual items or the survey as a whole were needed, one panel member questioned the reverse-wording of two items on the Risky Driving Behaviors Assessment – Frequency of Behavior section. These items remained in their reverse-worded format for the purpose of minimizing extreme response bias and acquiescent bias. Another concern was expressed about survey participants' possible discomfort in answering the questions honestly due to potential negative repercussions in the workplace. This input was addressed in assurances of confidentiality during administration of the survey.

The pilot study, consisting of the 10-item Risky Driving Self-Efficacy scale and the 24-item Risky Driving Behaviors Assessment (measuring both Frequency of Behaviors and Perception of Risk), was administered to a relatively equal distribution of three distinct groups of licensed drivers who reside and work in the rural southern Illinois: 15 police officers, 14 fire fighters and 15 rural residents in the general population. Three of the 44 cases were excluded due to incomplete surveys, leaving 41 valid cases.

Internal consistency was measured using Cronbach's coefficient alpha. The 10-item Risky Driving Self-Efficacy scale had a Cronbach's coefficient alpha of 0.854; removal of any individual item would result in a reduction in the alpha, indicating that all 10 items be retained.

A Cronbach's coefficient alpha of 0.825 was obtained for the 24-item Risky Driving Behavior Assessment – Frequency of Behavior ($RDBA_{FB}$). Removal of any individual item, with the exception of question 19, "Required others to wear a seatbelt in your car", would result in a decrease in the alpha for this scale. The small increase resulting from removing question 19 was not sufficient to warrant its removal from the set given its contribution to the Risky Driving Behavior Assessment – Perception of Risk ($RDBA_{PR}$) scale. A Cronbach's coefficient alpha of 0.887 was obtained for the $RDBA_{PR}$; removal of any individual item would have resulted in a reduction of the alpha for this scale; therefore, all 24 items on the Risky Driving Behavior Assessment were retained.

Content validity was measured using inter-item correlations and Corrected Item-Total Correlations. Items falling outside the acceptable range of 0.20 and 0.75 within the Corrected Item-Total Correlations were considered for elimination. One item, question 19, fell to 0.05 within the $RDBA_{FB}$, but was included due to its contribution to the $RDBA_{PR}$ scale (Corrected Item-Total Correlation of 0.55 and slight reduction of Cronbach's alpha to 0.88). The range of Corrected Item-Total Correlations for each piloted scale is displayed in Table 2, as well as the Cronbach's alpha, ranging from 0.81 to 0.89, for each of the separate measures in the survey instrument, including the published reliability statistics for the Self Control Scale and the BFI-10 Inventory (Part-Whole Correlation).

Table 2

Cronbach's Alpha and Corrected Item-Total Correlations

Scale	Cronbach's Alpha (α)	Corrected Item-Total Correlations
Risky Driving Self-Efficacy Scale 10 items	0.85	0.39-0.71
Risky Driving Behavior Assessment–Frequency of Behavior 24 items	0.83	0.05-0.69
Risky Driving Behavior Assessment–Perception of Risk* 24 items	0.89	0.31-0.70
Self-Control Scale 24 items	0.81 (n=395)	
Big Five Inventory (BFI-10) 11 items	0.83 (Part-Whole Correlation) (n=2285)	

n=41

The BFI-10 scale, developed by Beatrice Rammstedt and Oliver P. John (2007), was designed for use when time is limited. The instrument has been tested for validity and reliability with the BFI-44 and the NEO-Personality Inventory – Revised (NEO-PI-R) personality assessment instruments. According to Rammstedt and John (2007), the BFI-10 scales collectively captures 70% of the full Big Five Inventory scale variance and retains 85% of the retest reliability; additionally, discriminant and structural validity remain constant.

The instrument has shown to provide an adequate assessment of personality with the exception of the measures for agreeableness (Rammstedt & John, 2007; Crede, Harms, Niehorster, & Gaye-Valentine, 2012). Adding one additional item to the agreeableness scale improved the part-whole correlation with the full-scale BFI from 0.74 to 0.81, the retest correlation coefficient from 0.68 to 0.70, and validity increased, with a correlation with the

NEO-PI-R agreeableness scale increasing from 0.58 to 0.63; external validity also increased from .40 to .50 (Rammstedt & John, 2007).

Validity and reliability of the Self-Control Scale as a whole and the individual subscales across different sample types have been well established (Laiju & Yoon, 2007). The scale has also proven to be predictive across a range of behaviors, including criminal and other imprudent behaviors (Piquero & Rosay, 1998). These subscales have independently been proven to be valid and reliable measures and to be predictive of imprudent behaviors (Wood, Cochran, Pfefferbaum & Arneklev, 1995). As a result of their study, Wood, Cochran, Pfefferbaum and Arneklev (1995) suggest that these measures be used independently in future studies. The subscales measuring impulsivity and risk-taking were, therefore, added as independent measures to strengthen the assessment of risk propensity.

Data Management and Analysis

Surveys were administered to EMS personnel in rural Illinois between July 2013 and October 2013. Two adjustments in data collection were made to accommodate difficulty in accessing sufficient numbers of participants. The study was expanded beyond Illinois EMS Region V to include two rural EMS services serving within the adjacent Illinois EMS Region VI. Additionally, the survey was converted to an online survey, using SurveyMonkey, and administered electronically to three EMS agencies located in Region V to increase the sample size. Completed paper surveys were kept in a secure location; surveys completed and submitted through SurveyMonkey were stored in secure servers managed by SurveyMonkey.

Paper surveys were directly administered by the researcher to three separate EMS agencies, including the largest agency in the region; additional surveys were administered by

the EMS coordinator in one of the systems covering 10 of the 20 counties in Illinois EMS Region V. Each participant was provided a survey, pencil and an envelope in which to seal the survey upon completion to ensure confidentiality.

Data Coding

To facilitate data entry as well as data analysis, scores were coded, as explained in the codebook (Appendix D). Scores for the Likert-type items were coded by assigning each a numeric value. Additionally, other categorical responses (e.g., responses to "Employment Status") were also assigned a numeric value. Rank responses and other numeric responses were entered as reported.

The Risky Driving Self-Efficacy Scale had seven response options, ranging from "Never True" to "Exactly True". Each response option was coded from 1 to 7, respectively, with lower scores indicating lower levels of self-efficacy relative to risky driving.

The five response options for the Risky Driving Behavior Assessment – Frequency of Behavior ($RDBA_{FB}$) ranged from "Always" to "Never", and were coded from 1 to 5 respectively. For ease of interpretation and to facilitate comparison of results with the behavioral measure of risky driving, all of the individual items, with the exception of the items 18 and 19 which were reverse-worded, were reverse-coded prior to analysis. Therefore, higher scores on this measure reflected higher frequency of risky driving behaviors. The Risky Driving Behavior Assessment – Perception of Risk ($RDBA_{PR}$) consisted of a rank score from 1 to 10, with lower scores indicating low perception of risk relative to the associated driving behavior. These scores were entered as submitted.

There were four response options for the two subscales of the Self-Control Scale, ranging from “Disagree Strongly” to “Agree Strongly”, and were coded from 1-4 respectively. Question 1: “I devote time and effort to preparing for the future” was reverse-worded, and therefore, was reverse-coded. Low scores on this measure indicated low levels of risk-taking and impulsivity. The first four questions on this scale measure impulsivity, so the scores of these four items were aggregated into one score indicating level of impulsivity. The last three questions on the Self-Control Scale measured risk-taking, requiring that these three scores be aggregated into one score indicative of level of risk-taking. All items on the Self-Control scale were combined into a single score as one measure of risk propensity.

There were five response options, ranging from “Disagree Strongly” to “Agree Strongly”, for the BFI-10 scale. Four of the items were reverse-scored, requiring each to be reverse-coded (See Appendix C). Two items represented each of the five personality factors; scores were combined to create one score for each of the five personality factors. To keep the scoring consistent with their meaning, all scores were then reverse-scored so that a high score for any one of the factors would indicate a strong association with that trait (e.g., a high score for extraversion would signify that the participant possesses traits more associated with extraversion, such as being social, talkative, and/or assertive).

Responses to items measuring driving history were numeric and were entered as reported. The demographic variables of gender, highest level of training, and employment status were assigned a numeric value; designated values are noted in the codebook (Appendix D). Average weekly call volume, average weekly number of shifts, years in profession and age were reported in numeric form and were entered into the database as reported. The open-

ended question “What is your primary profession?” required a non-numeric response which were categorized into one of two fields, “EMS-related profession” or “Other Than EMS-related profession”.

A database using Microsoft Excel was created using the data retrieved from SurveyMonkey, which included a total of 95 participants. Due to technical difficulties with the scanner, data from the 132 paper surveys submitted on scantron response sheets were entered manually, resulting in a total of 227 completed surveys compiled into one database. Data were reviewed for missing data, data entry errors, and other possible errors, and corrected accordingly. The data set was programmed so that missing items on each scale resulted in the omission of that particular case in the data set.

Data Analysis

Descriptive statistics were calculated using Microsoft Excel, and were described using frequency tables and percentages. The database was also imported into Statistical Package for the Social Sciences 19.0 (SPSS, Inc., 2010) for calculations of measures of central tendency and dispersion. Scatterplots were used to identify potential skewness.

Using the Microsoft Excel spreadsheet, scores on the BFI-10 were compared to normative scores identified in a large study of individuals who took the online Big Five Inventory scale (Srivastava, John, Gosling & Potter, 2003) to determine if the group means fit the risk propensity typology identified in the literature. Scores reported on the Self-Control Scale were also compared to scores from a set of normative scores created by experts in the field (Tittle, Ward & Grasmick, 2003).

Responses to the questions on the Risky Driving Behavior Assessment were summed to derive one score indicating the level of overall risk-taking behavior for each participant. All ten responses to the questions on the Risky Driving Self-Efficacy Scale were also summed to calculate a composite score indicating the level of self-efficacy relative to risky driving for each respondent. The summed scores for each participant were used in the calculation of the correlation coefficients and the regression equations.

Scores on each of the individual traits of the BFI-10 scale were aggregated into one composite score indicating risk propensity (Risk Propensity_{BFI}). Scores for neuroticism, agreeableness, and conscientiousness were reversed to match the risk propensity typology identified in the literature. The typology is defined as high scores for the extraversion and openness factors and low scores for neuroticism, agreeableness, and conscientiousness. Higher scores, therefore, reflected higher risk propensity, and conversely, low scores reflected low levels of risk propensity. Pearson's product-moment coefficient correlations between the risk propensity score, Risk Propensity_{BFI}, and the risky driving behavior assessment score were run to determine whether or not they were predictive of risky driving behaviors.

A mean score of the responses to the four items for the Impulsivity subscale and a mean score of the responses to the three items on the Risk-Taking subscale were calculated. Scores of each the two Self-Control Scale subscales, impulsivity and risk-taking, were combined into one score defining the second measure of risk propensity (Risk Propensity_{SC}). Pearson's product-moment coefficient correlations were run between the scores on each of the two subscales as well as on the one combined risk propensity score, Risk Propensity_{SC}, and the score calculated

from the risky driving behavior assessment to determine whether or not they were predictive of risky driving behavior.

Risk propensity and risky driving self-efficacy were included in a simultaneous multivariate linear regression analysis to help determine if one predictor made an individual contribution while controlling for the other, and help determine which predictor is strongest. To test for an interaction between risk propensity and risky driving self-efficacy, over-and-above their independent influence, an interaction term was included in the data analysis. Table 3 delineates the statistical procedure used for each research question and to test each hypothesis. A table describing the variables in depth, including their respective response options, data type, type of score for each variable, and variable type is located in Appendix E. The five steps of the regression equation are also delineated in Appendix E. Statistical significance was determined by an alpha level of .05 (Lenth, 2012).

Table 3

Summary of Statistics Used for Each Hypothesis and Research Question

Hypothesis	**Instrument Components Used to Answer Research Question**	**Statistics Utilized**
H1: Risk-taking propensity is a significant independent predictor of risky driving behaviors while off-duty.	BFI-10 Self-Control Scale (2 subscales*) Driving Behavior Assessment	Pearson Product Moment Correlation Coefficient
H2: Driving self-efficacy is a significant independent predictor of risky driving behaviors while off-duty.	Risky Driving Self-Efficacy Scale Driving Behavior Assessment	Pearson Product Moment Correlation Coefficient
Research Question	**Instrument Components Used to Answer Research Question**	**Statistics Utilized**
1. To what extent do EMS personnel engage in off-duty risk-taking driving behaviors?	Driving Behavior Assessment	Descriptive statistics: Means, Standard Deviations
2. How self-efficacious are EMS personnel relative to risky driving?	Risky Driving Self-Efficacy Scale	Descriptive statistics: Frequencies, Means, Standard Deviations
3. Is there a significant interaction between risk-taking propensity and self-efficacy, over-and above their individual estimates, when predicting driving behaviors?	BFI-10 Self-Control Scale (2 sub-scales*) Risky Driving Self-Efficacy Scale Diving Behavior Assessment	Simultaneous Multi-variate Linear Regression

*Self-Control Scale Subscales: impulsivity, risk-seeking

CHAPTER 4

RESULTS

Findings of the data analyses relative to the research questions and the demographic characteristics of the study participants are presented in this chapter. Demographic characteristics of the sample are described first, including: age, gender, employment status, weekly call volume and number of shifts, years of experience, primary occupation, highest EMS certification held, as well as indicators of their driving history related to vehicular crashes and moving violation citations both on and off the job. The next section will include descriptive analyses of the study variables, including risk propensity, self-efficacy, risk perception, and risky driving behaviors. The findings from analyses of the hypotheses and research questions will be reported in the final section of this chapter.

Description of the Sample

The sample consisted of EMS personnel working in agencies located in Illinois EMS Region V and two EMS agencies (Charleston Fire Department and Mattoon Fire Department) located in Region VI. A total of 227 EMS workers responded to the survey. Demographic characteristics of the sample are displayed in Table 4. The average age of participants was 36 years, ranging from 19 years to 71 years of age. The age distribution for the sample is consistent with national data on age, with the exception of the youngest age group. Nationally, nearly 10% of EMS professionals were less than 20 years of age according to the Federal Interagency Committee on Emergency Medical Services (FICEMS), while in this sample, only 2.3% were under age 20 years (2012). Over three fourths of the participants were male (77.6%), with two

EMS agencies (located in Region VI) skewing male with 97.6% of their participants (n=49). The sample without these two agencies resulted in a small change to 73.1% male and 26.9% female. This was still slightly below the representation of 33.2% female in the national data reported in the 2011 National EMS Assessment (FICEMS, 2012).

Table 4

Demographic Characteristics of the Sample (N=227)

Demographic Characteristic	*n*	%
Age Group	*n=223*	
<20	5	2.3%
20-29 years	67	31.3%
30-39 years	58	27.1%
40-49 years	54	25.2%
50-59 years	27	12.6%
60 years and over	3	1.4%
Gender (all participants)	*n=223*	
Male	173	77.6%
Female	50	22.4%
Gender (without Region VI)	n=182	
	133	73.1%
	49	26.9%

Employment Characteristics

A series of questions were asked pertaining to the participant's employment status, primary profession, years in their profession, average weekly call volume and average number of shifts each week. Responses to these items are reported in Table 5 and Table 6.

As displayed in Table 5, nearly half of all respondents (49.5%) indicated that their highest level of training was Paramedic, followed closely by those indicating their highest level was EMT-Basic (44.4%), and less than 1% indicated their highest level was EMT-Intermediate; 3.7% indicated "other" as their highest level of training, with the majority of whom reporting their highest level of training as First Responder. Consistent with national data looking at gender and highest level of training, gender disparity was evident in the sample, with the disparity more prevalent with higher levels of training (FICEMS, 2011). For instance, 54.2% of all males in this sample reported being trained as a Paramedic and 41.1% reported being trained at the EMT-Basic level, whereas only 33.3% of female participants are Paramedics and 56.3% are trained at the EMT-Basic level.

Table 5

Employment Characteristics: Highest Level of Training by Gender (n=216)

	Total Sample		Males		Females	
Employment Characteristic	*n*	%	*n*	%	*n*	%
Highest Level of Training						
Paramedic	107	49.5%	91	54.2%	16	33.3%
EMT-B	96	44.4%	69	41.1%	27	56.3%
Other	8	3.7%	3	1.8%	5	10.4%
EMT-I	5	2.3%	5	3.0%	0	0.0%

Over two-thirds (68.7%) of the participants indicated that they were full-time, paid employees, followed by 17.5% who indicated they were part-time, paid employees, while 12.0% reported they were volunteers (See Table 6). Consistent with national statistics, a gender

difference exists wherein only 50% of the females (male, 73.8%) in this sample reported being employed full-time and 31.3% (male, 13.7%) were part-time paid employees.

Just over three quarters of the participants (75.8%) indicated that their primary profession was as an EMS worker; of the other quarter of participants who indicated their primary profession was something other than as an EMS employee, 12 were in some type of health care field (e.g., nursing), 8 were students, 4 teachers, 3 police officers, 2 farmers, and the rest spanning anything from bus driver to utilities worker. The average number of years for all participants working in their primary profession was 12.58 years (See Table 6).

Also displayed in Table 6, the average weekly call volume reported by participants was 19.53, ranging from zero to 100 calls; the average number of shifts each week reported by participants was 3.15, ranging from zero to 11.

Table 6

Employment Characteristics of the Sample (N=227)

Employment Characteristic	*n*	%
Employment Status	*n=223*	
Full-time, Paid	149	68.7%
Part-time, Paid	38	17.5%
Volunteer	26	12.0%
Other	4	1.8%
Primary Profession	*n=211*	
EMS	160	75.8%
Other than EMS	51	24.2%
Number of Years in Profession	*n=198*	
All professions	12.58	
EMS profession	12.59	
Work Experience (Weekly)	*n=171*	
Average Call Volume	19.53	
	n=181	
Average Number of Shifts	3.15	

Driving History

Participants reported on the number of moving violations and number of vehicular crashes they had been involved in while driving both on the job and while off-duty, distinguishing between the time frames of “in the past year” and “in your lifetime”. These data are displayed in Table 7.

On average, nearly 10% of participants reported being in a vehicular crash while on the job in the past year, and similarly reported being in a vehicular crash while off duty in the past year (11.3%). A difference existed between being in a vehicular crash in their lifetime, with 30.9% reporting that they had been in a vehicular crash on the job in their lifetime, and 70.9% reporting having been in a vehicular crash while off-duty in their lifetime. According to the Property Casualty Insurers Association of America, the average driver in the United States has an accident every 17.9 years; this sample reported having an accident once every 13.4 years (Forbes, 2011). Over 41% of participants reported having 2 or more vehicular crashes in their lifetime while off-duty. Males reported a higher percentage of motor vehicular crashes in their lifetime while on the job (33.5%) than did females (22.0%). There was an insignificant negative relationship between age and vehicular crashes ($r = -0.166$, $p = 0.0122$) in the past year.

With regard to reported moving violations while on the job, 4.5% reported receiving a citation in the past year and 6.7% in their lifetime. While off duty, 12.1% reported having had a moving violation in the past year, and 71.6% reported receiving a citation in their lifetime; 43.6% reported having had two or more moving violations in their lifetime. There was a very weak negative relationship between age and reported number of moving violation citations ($r = -0.218$, $p < 0.001$) in the past year.

Table 7

Driving History of the Sample (N=227)

	In the Past Year		In Your Lifetime	
Driving Characteristic	*n*	%	*n*	%
Vehicular Crashes				
On the Job	*n=224*		*n=223*	
	22	9.8%	69	30.9%
Off-Duty	*n=222*		*n=213*	
	25	11.3%	151	70.9%
Moving Violations				
On the Job	*n=224*		*n=224*	
	10	4.5%	15	6.7%
Off-Duty	*n=223*		*n=211*	
	27	12.1%	151	71.6%

Descriptive Analysis of Study Variables

Means, standard deviations, and frequencies for all variables in the study, including the dependent variable (risky driving behaviors) and the independent variables (risk perception, self-efficacy, and risk propensity) are presented in this section. Tests of significance will also be reported, as indicated. These statistics will be delineated in various tables and charts.

Risky Driving Behaviors

A twenty-four item driving behavior assessment was created as a two-scale measurement tool, assessing the frequency of engaging in risky behaviors within the last 30 days while driving a vehicle when off-duty, and how risky participants perceived each behavior to be.

Frequency of Behavior

The frequency of risky driving behaviors was scored on a five-point, Likert-type scale, ranging from “Always” (100% of the time) to “Never” (0% of the time). Higher scores on this

measure reflected higher frequency of risky driving behaviors. The group mean score for all items measuring risky driving behavior was 2.57 (*SD* = 0.73). Individual mean scores ranged from 1.08 to 4.83, with low scores reflected participants reporting that they engaged in risky behaviors with less frequency. The possible range for summed scores was 24 to 120, with individual summed scores ranging from 24 to 113.

The behavior reported as most frequently engaged in, on average, was talking with a passenger (*M* = 3.79); the risky behavior cited as least frequently performed was driving under the influence (*M* = 1.50). Frequencies and standard deviations for each behavior, beginning to most frequently occurring behavior to least frequently occurring are reported in Table 8.

Table 8

Frequency of Behavior: Means and Standard Deviations (N=227)

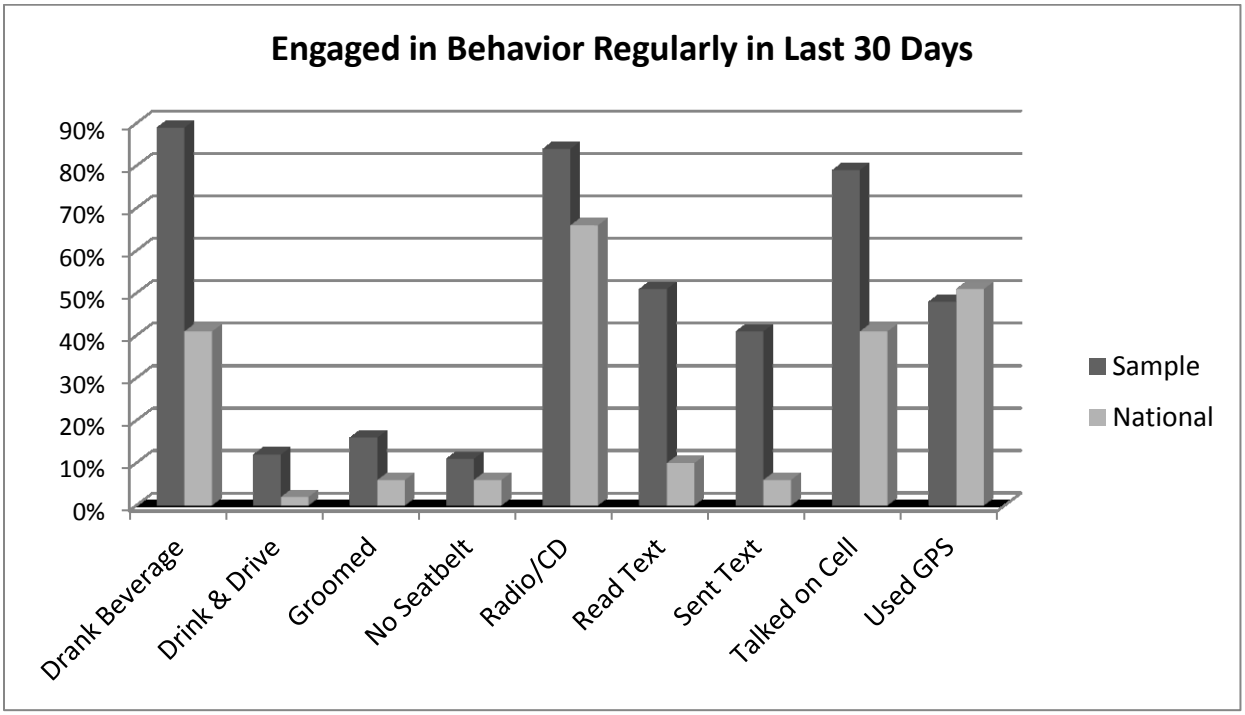
BEHAVIOR	Mean	*SD*
Talked with a passenger	3.79	0.92
Drank a beverage	3.64	0.94
Changed settings on a CD player/ radio	3.56	1.08
Drove over the posted speed limit	3.42	1.00
Answered/talked on a cell phone	3.29	0.94
Reached for something	3.10	1.09
Dialed a cell phone	3.03	1.08
Driven fatigued (feeling tired)	2.95	1.07
Eaten food	2.83	1.03
Read a text message	2.75	1.16
Driven drowsy (<6 hrs of sleep in 24-hr period)	2.71	1.13
Driven while agitated/ angry	2.62	1.10
Used a GPS system	2.54	1.21
Sent a text message	2.42	1.26
Steered with your knee	2.38	1.29
Changed settings on a hand-held device	2.29	1.23
Cared for/ checked on a child	2.22	1.30
Lit or smoked a cigarette/cigar	1.97	1.46

Read (map, book, paper, computer screen)	1.96	1.21
Did not require others to wear seatbelt in your car	1.80	1.27
Did not wear a seatbelt	1.67	1.17
Cared for a pet	1.65	1.08
Groomed (hair, make-up, shaved)	1.53	1.59
Driven under the influence (alcohol or drugs)	1.50	1.00

Comparable data reflecting the general population was available for nine of the 24 items on the risky driving behavior assessment. As illustrated in Chart 1, with the exception of using GPS technology while driving, a higher percentage of the sample reported performing risky driving behaviors than the general population.

Chart 1

Engaged in Risky Driving Behaviors Regularly in Last 30 Days



Risk Perception

The 24-item risky driving behavior assessment included a rating scale for perception of risk for each behavior. Forty-three participants (42 of whom received the paper survey) did not respond to the items on this scale; this may possibly be due to physical formatting of the paper survey which may have resulted in this section being inadvertently difficult to notice.

Participants ranked the behavior on a scale of 1 through 10, with 1 indicating low risk and 10 indicating high risk. Table 9 lists each behavior from lowest perceived level of risk to highest. Participants indicated that their perception of the least risky behaviors are requiring others to wear a seatbelt (M = 2.12), wearing a seatbelt (M = 2.15) and talking with a passenger (M = 2.45). Alternatively, the driving behaviors perceived to be most risky include driving under the influence of alcohol or drugs (M = 8.55), sending a text message (M = 7.66), and reading a map, book, or computer screen (M = 7.13).

Table 9

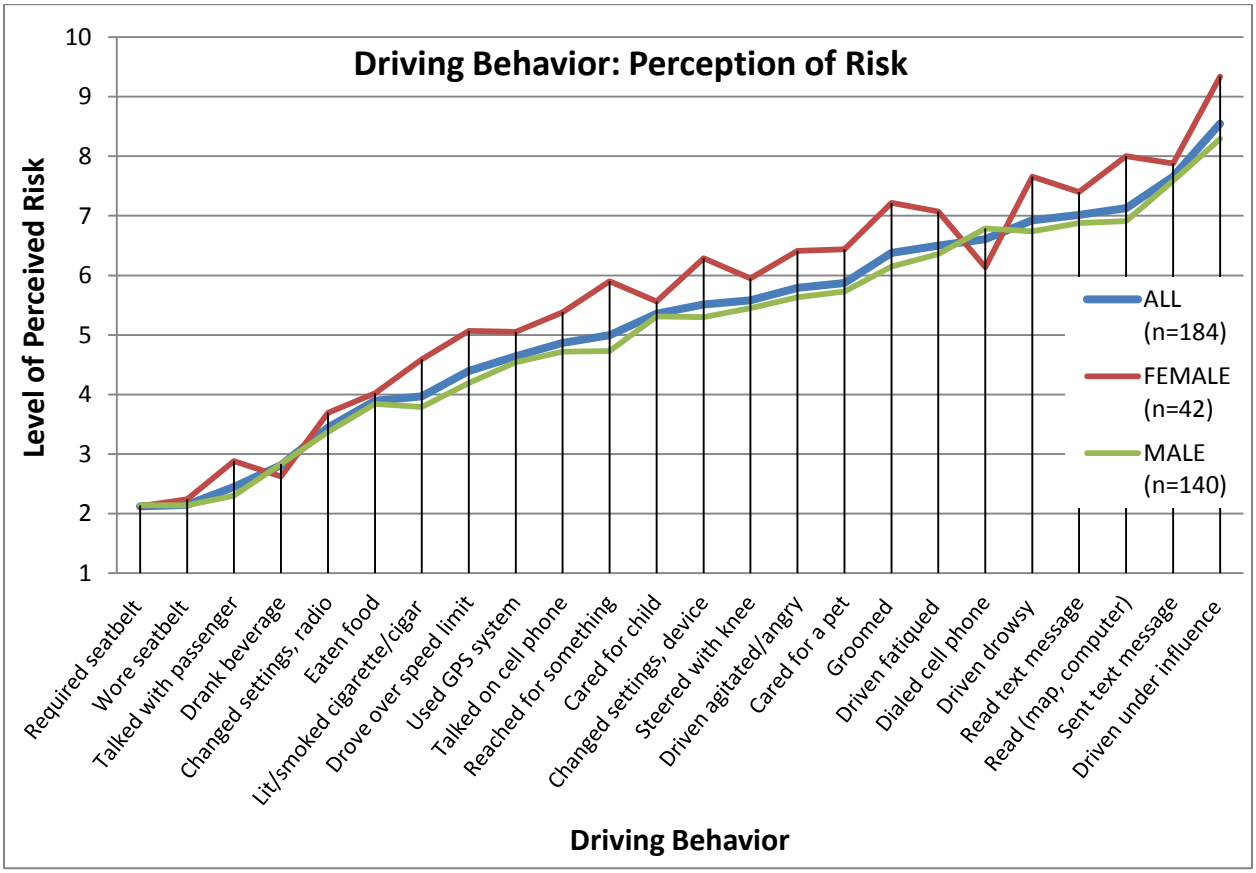
Risky Driving Behaviors – Perception of Risk (n = 184)

BEHAVIOR	Mean	*SD*
Required others to wear a seatbelt in your car	2.12	2.57
Wore a seatbelt	2.15	2.58
Talked with a passenger	2.45	1.93
Drank a beverage	2.81	2.18
Changed settings on a CD player/radio	3.44	2.24
Eaten food	3.89	2.29
Lit or smoked a cigarette/cigar	3.97	2.76
Drove over the posted speed limit	4.39	2.59
Used a GPS system	4.64	2.57
Answered/talked on a cell phone	4.87	2.52
Reached for something	4.99	2.54
Cared for/ checked on a child	5.36	2.58
Changed settings on a hand-held device	5.51	2.72
Steered with your knee	5.58	3.02
Driven while agitated/ angry	5.79	2.73
Cared for a pet	5.87	2.77
Groomed (hair, make-up, shaved)	6.38	3.05
Driven fatigued (feeling tired)	6.5	2.66
Dialed a cell phone	6.61	8.21
Driven drowsy (<6 hrs of sleep in 24-hr period)	6.92	2.74
Read a text message	7.02	2.89
Read (map, book, paper, computer screen)	7.13	2.97
Sent a text message	7.66	2.91
Driven under the influence (alcohol or drugs)	8.55	2.84

Overall, participants ranked the behaviors collectively at a 5.19 (*SD* = 1.81) risk level. Yet males and females differed, with males ranking the collective behaviors at a 5.07 (*SD* = 1.82) level of risk and females ranking these behaviors at 5.62 (*SD* = 1.65). As evidenced in Chart 2, with the exception of drinking a beverage and dialing a cell phone while driving, females perceived each individual behavior to be more risky than did their male counterparts.

Chart 2

Risky Driving Behaviors - Perception of Risk, by Gender



<u>Self-Efficacy – Risky Driving</u>

Self-efficacy relative to risky driving was measured using a 10-item scale, with six response options, ranging from “Never True” to “Exactly True”. This scale was completed by all 227 participants, resulting in a group mean score of 2.77 (*SD* = 1.16). All items on the scale were true-scored, therefore, reverse-coding was not necessary for this scale.

Table 10 lists the group means and their corresponding standard deviation statistic for items on the Risky Driving Self-Efficacy Scale in order from high to low. The questions each began with the statement, “In my personal vehicle, without causing harm to myself or others, I

CAN"; For added clarity, the phrase "(this reflects whether you believe you're ABLE TO, not whether or not you do the behavior)" was added to the introductory statement for this question. The item receiving the highest group mean score (*M* = 3.74, *SD* = 1.54) was "navigate unfamiliar, narrow roads at night", indicating the study participants reported feeling most capable of safely executing this behavior. The driving behavior that the participants collectively felt least capable of accomplishing safely was driving after consuming two or more alcoholic beverages within a one-hour period (*M* = 1.78, *SD* = 1.30), followed closely by driving through a red light (*M* = 1.84, *SD* = 1.35).

Table 10

Group Mean Scores for Items on Risky Driving Self-Efficacy Scale

Behavior	Mean	*SD*
Navigate unfamiliar, narrow roads at night	3.74	1.54
Drive over the posted speed limit	3.59	1.51
Talk on cell phone (not hands-free) while driving	3.41	1.53
Drive drowsy (<6 hrs of sleep in previous 24 hrs)	3.28	1.50
"Roll" through a stop sign	2.82	1.57
Text or use hand-held technological device while driving	2.59	1.66
Tailgate (follow <3 seconds behind) vehicle in front of me	2.46	1.53
Drive without wearing a seatbelt	2.25	1.70
Drive through a red light	1.84	1.35
Drive after consuming 2+ alcoholic drinks within a 1-hr period	1.78	1.30

Risk Propensity: BFI-10

Risky Propensity was measured using two separate scales. The first measure consisted of the Big Five Inventory-10 Item scale. Although the scale was intended to contain 11 items, as

discussed in Chapter 3, a procedural error resulted in one of the items being inadvertently omitted from the survey. The item that was omitted from the survey was one of the three items measuring agreeableness; this resulted in there still being two items per factor, perhaps allowing the instrument to still be a useful measure of risk propensity.

The means and standard deviations for each factor for both a comparison population (national sample) and the study sample are displayed in Table 11. The normative scores were obtained from the Gosling-Potter Internet Personality Project, in which participants were recruited over the World Wide Web (*N* = 132,515); over 90% of respondents lived in the United States and the remaining were from Canada (Srivastava, John, Gosling & Potter, 2003). The study sample was compared to the normative scores reported by age. The scores for the participants of this study who were age 36 years (*n* = 1506) were used to compare mean scores with the sample, as this was the average age of the participants in the sample.

Table 11

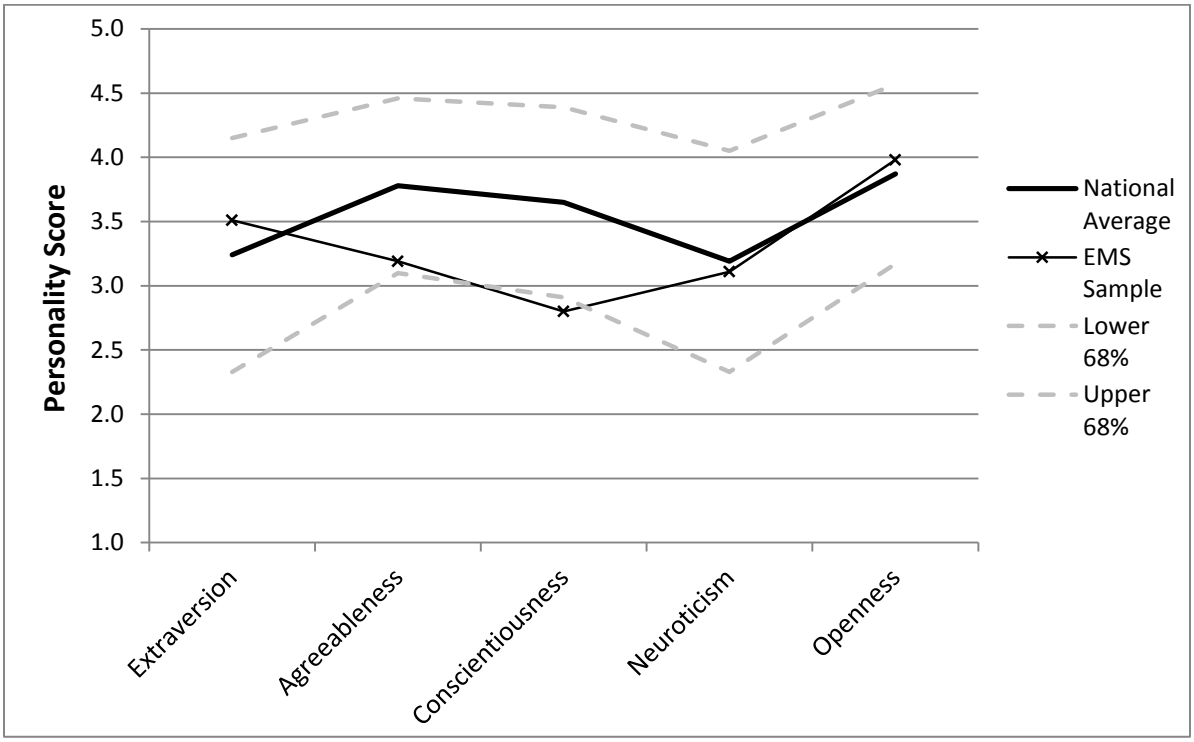
Comparison of BFI-10 Factors: National Sample vs. Study Sample

Personality Factor	**National Sample** (*n* = 1,509)		**Study Sample** (*n* = 225)	
	Mean	*SD*	Mean	*SD*
Extraversion	3.24	0.91	3.51	1.19
Agreeableness	3.78	0.68	3.19	0.97
Conscientiousness	3.65	0.74	2.80	1.03
Neuroticism	3.19	0.86	3.11	1.16
Openness	3.87	0.70	3.98	0.98

A personality-based, risk-propensity typology using the five factors within the Big Five Inventory – 10-Item scale emerged in the literature to define risk propensity. This typology indicating risk propensity was described in Chapter 2, with a pattern of factors described as follows: high scores for extraversion and openness, and low scores for neuroticism, agreeableness, and conscientiousness. Although there was little difference between the national sample and the study sample for the majority of the personality factors measured with the BFI-10, with the exception of conscientiousness, Chart 3 illustrates how the study sample's group means for each factor fit the risk-propensity typology, with all factors falling above or below the line for the national average in the predicted direction.

Chart 3

BFI-10 Scores: Study Sample vs. National Sample, Risk-Propensity Typology



Risk Propensity: Self-Control Scale

Two subscales of the Self-Control Scale, Impulsivity and Risk-Taking, were examined separately. Another typology representing risk propensity was created using a combination of both subscales, and a combined score was calculated to serve as another measure of risk propensity. Table 12 depicts the Mean for each of the three scores with their corresponding standard deviation for both the study sample and a normative sample of the general population (n = 741). Sample means were closely aligned with the means of the normative group for each subscale and the composite score, indicating that they are not significantly different than the general population.

Table 12

Comparison Between Means Measuring Risk Propensity

Self Control Scale Subscale	Sample Mean n = 226	Sample *SD*	Normative Mean n = 741	Normative *SD*
Combined (Risk Propensity)	2.09	0.96	2.45	0.91
Impulsivity	2.06	0.93	2.34	0.91
Risk Taking	2.12	1.00	2.59	0.92

The relationship between age and Self Control Scale – Risk Propensity Typology, was examined. A Pearson product-moment correlation was run between age and Risk Propensity (Self-Control), resulting in a weak negative linear relationship (r = -0.302, p < .001), indicating that the older a person is, the less risk propensity they tend to exhibit. This is consistent with the literature about age and risk taking.

Findings Relative to Hypotheses and Research Questions

Findings relative to the hypotheses and research questions are presented in this section. Correlations were run using the Pearson's product-moment correlation coefficient to determine the relationship between risk propensity and driving behaviors, and the relationship between risky driving self-efficacy and driving behaviors (Hypotheses 1 and 2). Research question one, "To what extent do EMS personnel engage in off-duty risky driving behaviors?" and research question two, "How self-efficacious are EMS personnel relative to risky driving?", were answered using descriptive statistics. A simultaneous multivariate linear regression was run to answer research question three, exploring the possibility of an interaction between risk-taking propensity and self-efficacy, over-and-above their individual estimates, when predicting driving behaviors.

Hypothesis 1

Risk-taking propensity is a significant independent predictor of risky driving behaviors while off-duty.

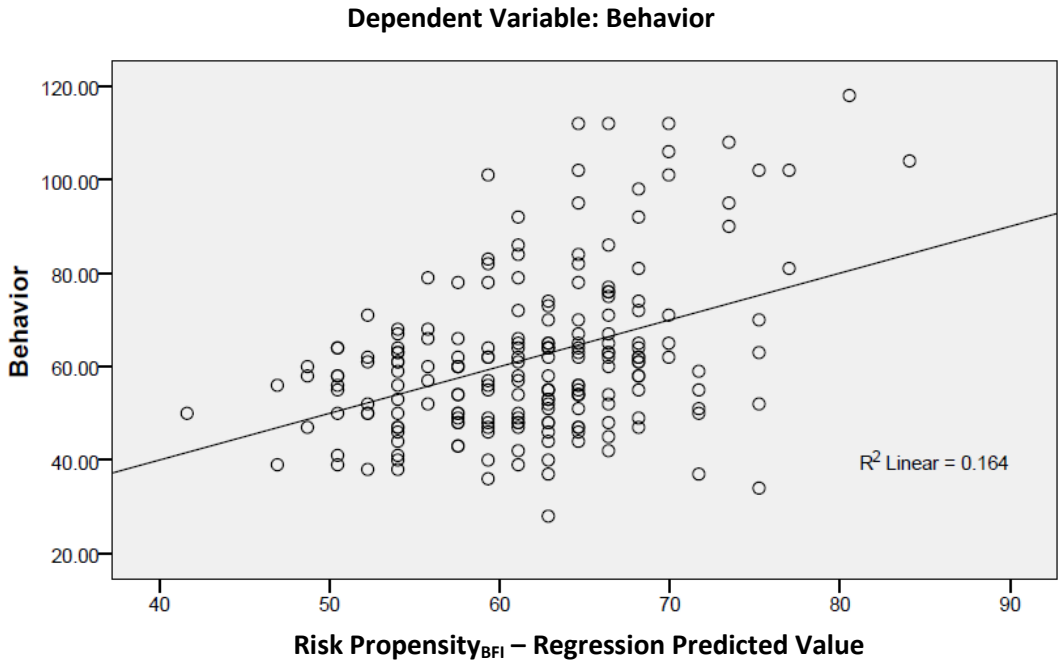
Risk Propensity – BFI-10 Typology

Risk-taking propensity was measured using two separate scales, each creating a typology for risk propensity. The correlation between the independent variable, Risk Propensity – BFI-10 typology (Risk Propensity$_{BFI}$), and the dependent variable of Risky Driving behaviors resulted in a relationship of $r = .405$, $p < 0.01$, indicating a moderate positive correlation. Results also indicated that Risk Propensity$_{BFI}$ independently explains 16.4% of the variance in risky driving behaviors, ($R^2 = .164$, $p < 0.01$). Chart 4 depicts a scatterplot of the linear

relationship between the independent variable, Risk Propensity$_{BFI}$ and the dependent variable, Risky Driving Behaviors.

Chart 4

Linear Relationship: Risk Propensity$_{BFI}$ and Risky Driving Behaviors



Risk Propensity – Self-Control Scale Typology

A combined score, using two subscales of the Self-Control Scale, defined the second measure of the independent variable, Risk Propensity$_{SC}$. A high composite mean score of all seven items on the two subscales indicates the participant has a high level of risk propensity. Correlation statistics examining the relationship between each of the two subscale scores as well as the independent variable, Risk Propensity$_{SC}$, and the dependent variable, Risky Driving Behaviors, are reported in Table 13. Each of the two subscales and the composite score showed a significant moderate positive relationship at the $p < 0.01$ level.

Table 13

Correlations: Risk Propensity (SC typology) and Risky Driving Behaviors

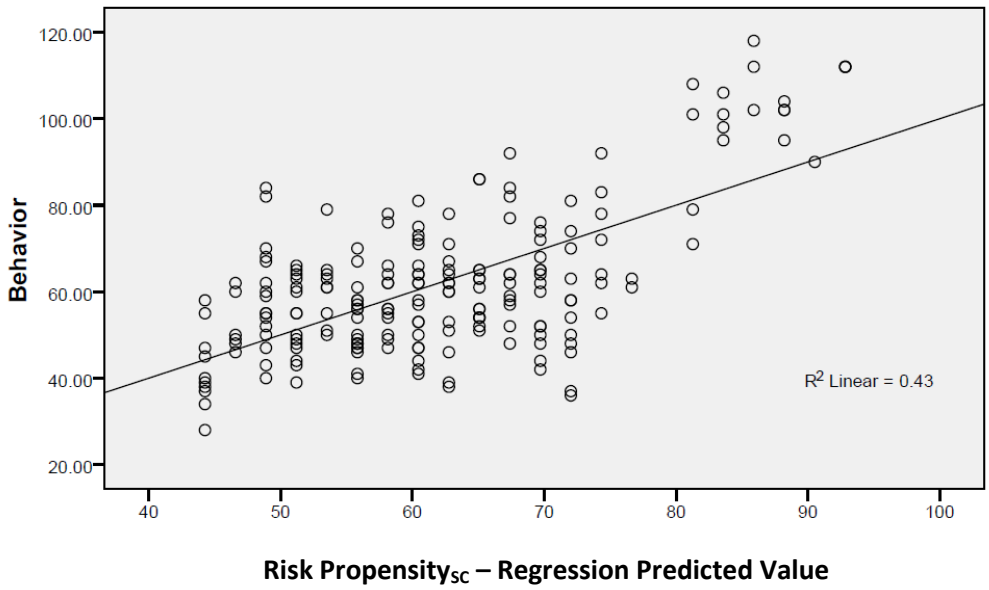
Independent Variable (n = 203)	Pearson's Correlation (r)
Risk Propensity$_{SC}$	.656
Impulsivity	.613
Risk Taking	.585

p<0.01

Although both scales representing Risk Propensity independently showed a moderately significant positive relationship with the dependent variable, Risky Driving Behaviors, the Risk Propensity$_{SC}$ had a stronger positive linear relationship. Chart 5 illustrates the linear relationship between Risk Propensity$_{SC}$ and risky driving behaviors, wherein the Risk Propensity$_{SC}$ typology explained 43% of the total variance in risky driving behaviors (R^2 = .430).

Chart 5

Linear Relationship: Risk Propensity$_{SC}$ and Risky Driving Behaviors



In summation, statistical tests run on Hypothesis 1 revealed that risk propensity, defined by the typologies generated from each of the two separate scales, was a significant independent predictor of risky driving behaviors while off duty.

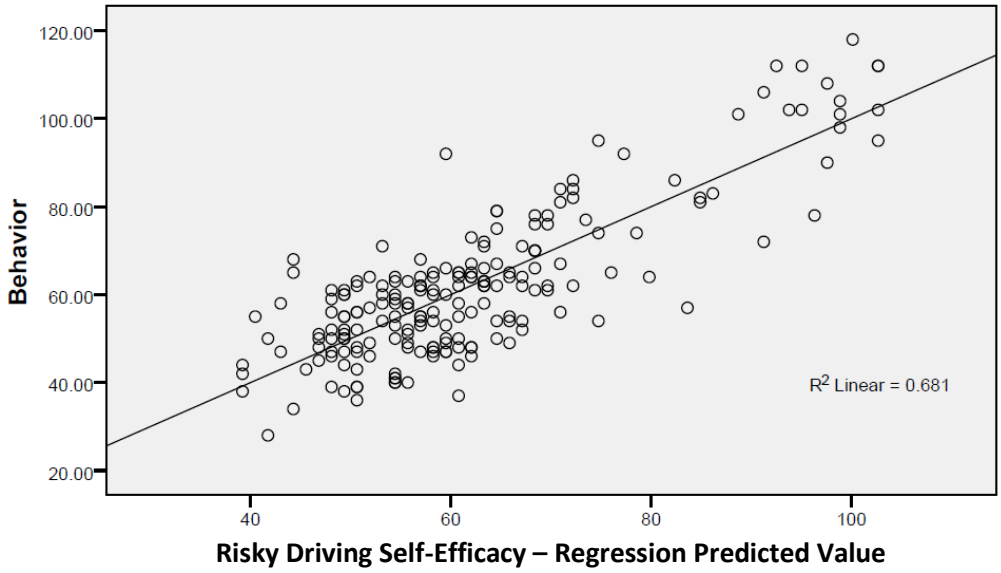
Hypothesis 2

Risky driving self-efficacy is a significant independent predictor of risky driving behaviors while off-duty.

The Risky Driving Self-Efficacy scale was developed to measure the extent to which participants report being able to engage in risky behaviors while driving when off duty without causing harm to themselves or to others. A Pearson's product-moment correlation coefficient was calculated, resulting in a strong positive relationship between risky driving self-efficacy and risky driving behaviors (r = .825). This variable accounted for 68% of the variance explained (R^2 = .681, $p < 0.01$), as depicted in the scatterplot in Chart 6.

Chart 6

Linear Relationship: Risky Driving Self-Efficacy and Risky Driving Behaviors



Statistical tests of Hypothesis 2 reveal that risky driving self-efficacy is a strong significant independent predictor of risky driving behaviors while off duty.

Research Question 1

To what extent do EMS personnel engage in off-duty risk-taking driving behaviors?

Twenty-four risky driving behaviors were assessed, examining the frequency of each behavior within the last 30 days while driving a vehicle when off-duty. Low scores on this scale reflect that participants reported they had engaged in risky driving behaviors with less frequency.

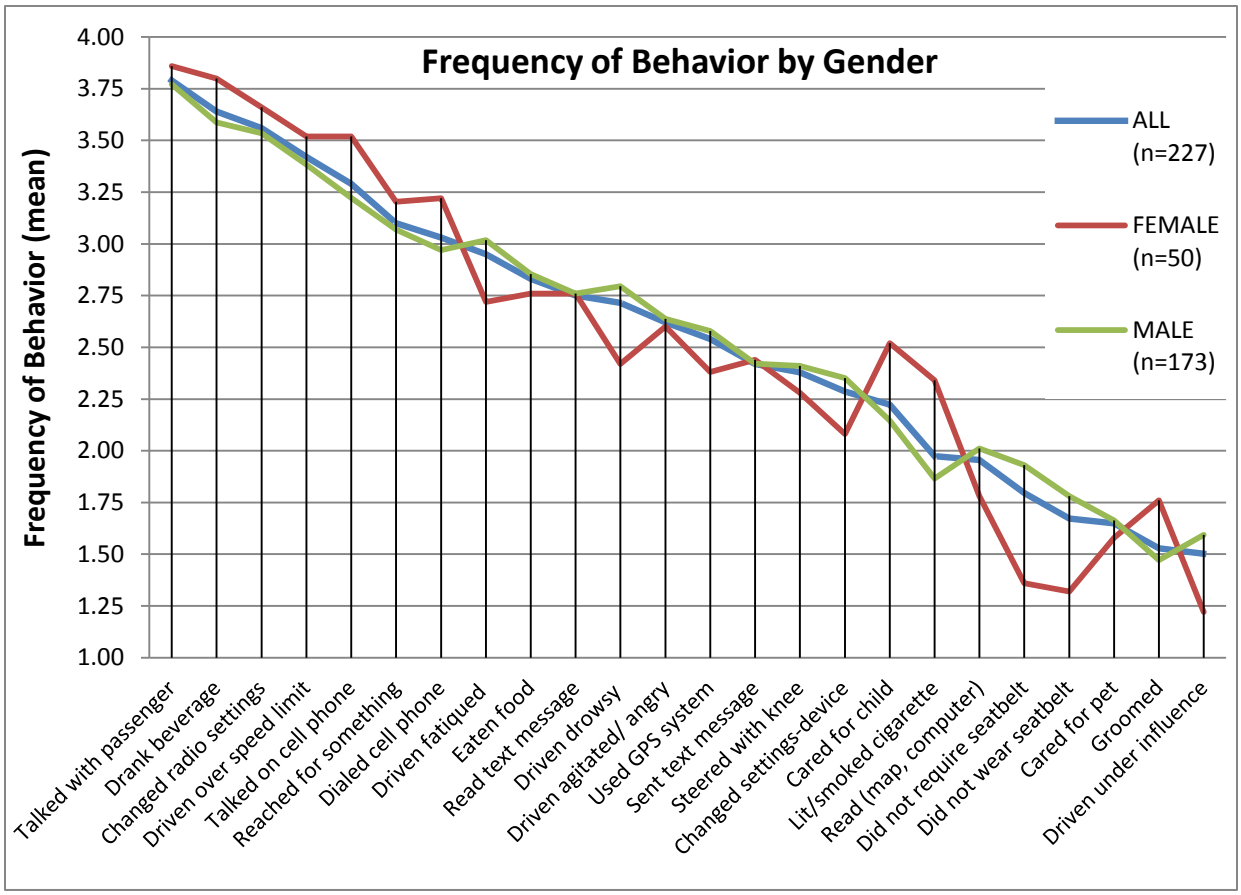
The behavior reported as most frequently engaged in, on average, was talking with a passenger (*M* = 3.79, *SD* = 0.92), followed by drinking a beverage (*M* = 3.64, *SD* = 0.94), and changing settings on a CD player or radio (M = 3.56, *SD* = 1.08). The risky behavior cited as least frequently engaged in was driving under the influence (*M* = 1.50, *SD* = 1.00) and groomed self (*M* = 1.53, *SD* = 1.59), and cared for a pet (*M* = 1.65, *SD* = 1.08). Frequencies and standard deviations for each behavior were reported earlier in this Chapter (See Table 8).

A marginal gender difference existed in frequency of some risky driving behaviors, as illustrated in Chart 7. Males were more likely to not wear their seatbelts (*M* = 1.78, *SD* = 1.23) and more likely to not require others to wear seatbelts (*M* = 1.93, *SD* = 1.34) while driving in their personal vehicle than females (*M* = 1.32, *SD* = 0.89; *M* = 1.36, *SD* = 0.94, respectively). Males were also more likely to drive drowsy (*M* = 2.80, *SD* = 1.12) and fatigued (*M* = 3.02, *SD* = 1.08) than females (*M* = 2.42, *SD* = 1.10; *M* = 2.72, *SD* = 1.01, respectively). Conversely, females were more likely to care for a child (*M* = 2.52, *SD* = 1.42), and to light or smoke a cigarette or cigar (*M* = 2.34, *SD* = 1.62) than were males (*M* =2.15, *SD* = 1.26; *M* = 1.87, *SD* = 1.39,

respectively). Overall, males reported engaging in risky behavior (*M* = 2.82, *SD* = 1.23) more frequently than females (*M* = 2.55, *SD* = 0.77).

Chart 7

Frequency of Risky Driving Behaviors by Gender



Of the other control variables in this study, perception of risk had the strongest negative linear relationship with frequency of risky driving behaviors ($r = -0.578$, $p < .001$). There was a moderate negative linear relationship between age and risky behaviors ($r = -0.370$, $p < .001$), indicating that the older a participant was, the less frequently risky behaviors occurred. A weaker negative linear relationship existed between years of experience in the profession and frequency of risky driving behaviors ($r = -0.262$, $p < .001$).

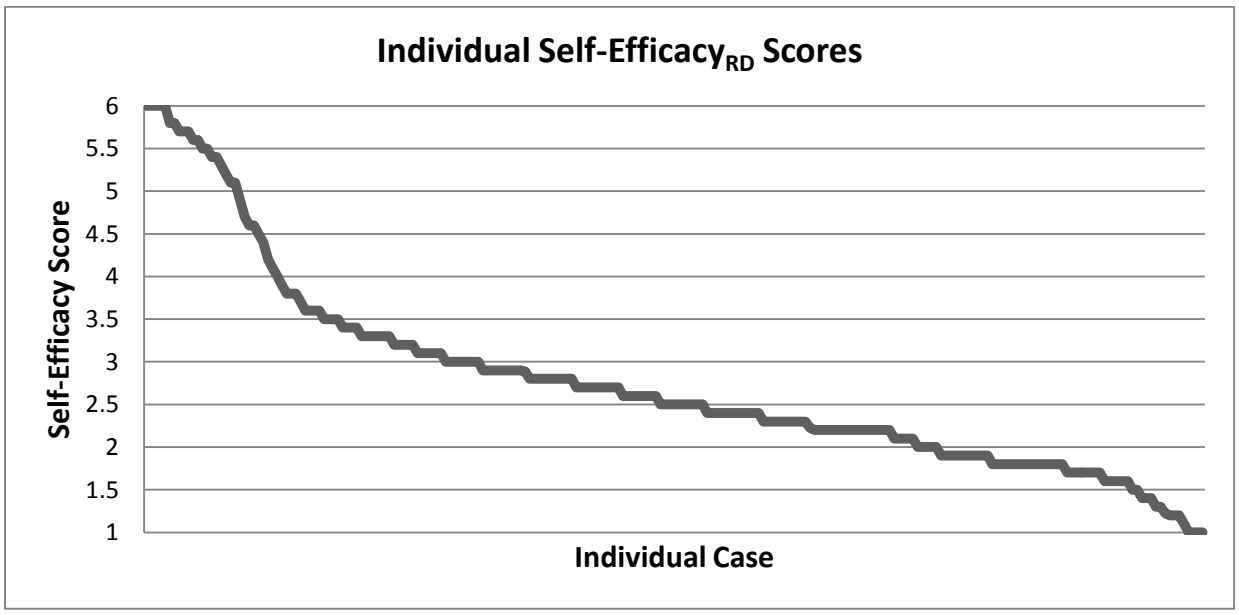
Research Question 2

How self-efficacious are EMS personnel relative to risky driving?

The Risky Driving Self-efficacy scale was completed by all 227 participants, resulting in a group mean score of 2.77 (*SD* = 1.16). As illustrated in Chart 8, the range of individual scores spanned from 1.00 to 6.00. A gender difference appeared, with males reporting being more self-efficacious relative to risky driving (*M* = 2.82, *SD* = 1.23) than females (*M* = 2.55, *SD* = 0.77), but it was not statistically different at the 95% confidence interval (male [3.00, 2.64], female [2.76, 2.34]). A significant difference did exist between the 95 participants who responded online (95% *CI* [2.82, 3.40]) and the 132 who responded using the paper survey (95% *CI* [2.39, 2.67]), indicating that those who responded online reported being more self-efficacious relative to risky driving behaviors. This may be due to the addition of a clarifying phrase on the introductory question on the online survey.

Chart 8

Line Chart of Individual Risky-Driving Self-Efficacy Scores



The group means and their corresponding standard deviation for items on the Risky Driving Self-Efficacy Assessment in order from high to low were listed earlier in this chapter in Table 8. Tests of significance reveal that mean scores on the three highest-scoring items, “navigate unfamiliar, narrow roads at night”, “drive over the posted speed limit”, and “talk on a cell phone (not hands-free) while driving”, were significantly different than the other items, indicating that the participants of this study believed that they were capable of engaging in these behaviors more than the others. Conversely, mean scores on the two lowest-scoring items, “drive after consuming 2 or more alcoholic drinks within a one-hour period” and “drive through a red light” were statistically different than the other items on the scale. Participants in this study, therefore, believed themselves to be significantly less capable of driving while intoxicated and running a red light without causing harm to themselves or to others than they were of performing the other behaviors. Confidence intervals at the 95% significance level for each item on the scale are reported in Table 14.

Table 14

Risky Driving Self-Efficacy Scale: Confidence Intervals of Individual Items (95% CI)

Driving Behavior	Risky Driving Self-Efficacy Scale Items Upper and Lower Confidence Intervals																			
Navigate	3.94			3.54																
Speed Limit		3.79				3.39														
Talk on Cell			3.61				3.21													
Drowsy					3.48			3.08												
"Roll" stop									3.02			2.62								
Texting										2.81				2.37						
Tailgate											2.66				2.26					
No seatbelt													2.47			2.03				
Red Light																	2.02		1.66	
Drink Drive																		1.95		1.61

Research Question 3

Is there a significant interaction between risk-taking propensity and self-efficacy, over-and-above their individual estimates, when predicting driving behaviors?

A simultaneous multivariate linear regression was performed to determine the independent contributions as well as the potential interaction between the two independent variables in the model, over-and-above their individual estimates, when predicting driving behaviors. Using the simultaneous enter method, emerging models were tested beginning with the independent variables, and subsequently loading the control variables.

Covariates were examined simultaneously, starting with the full model of predictors. The collinearity statistic on the excluded variable, Risk Propensity as measured by the BFI-10 instrument, reveals that although this was not a significant predictor within the model (change in R^2 = .014), it is still unique in that 76% of its variance (Tolerance = .757) is not explained by the other variables. Yet, despite its unique contribution, Risk Propensity_{BFI} did not improve the prediction and was, therefore, eliminated from the model.

Risky Driving Self-Efficacy was the stronger of the two remaining predictor variables, indicating that a change in Risky Driving Self-Efficacy would have the greatest effect on reported risky driving behaviors. Risk Propensity_{SC} significantly contributed to the strength of the model. The change in R^2 between the model with only Risky Driving Self-Efficacy (R^2 =.674, $p < 0.0005$) and the model that included Risk Propensity_{SC} (R^2 = .698, $p < 0.0005$) revealed a slight (2.4%), yet significant increase in the amount of variance explained in Risky Driving Behaviors. Table 15 depicts the Beta coefficients and their respective levels of significance for each predictor variable in the full regression model.

Table 15

Multivariate Relationships between Predictor Variables and Risky Driving Behaviors

Predictor Variable	R^2	R^2 Change	Beta	p
Self-Efficacy	.674	.674	.691	$p < 0.0005$
Risk Propensity_{SC}	.698	.024	.194	$p < 0.0005$
Risk Propensity_{BFI}[1]	.698	.000	.016	$p = .718$

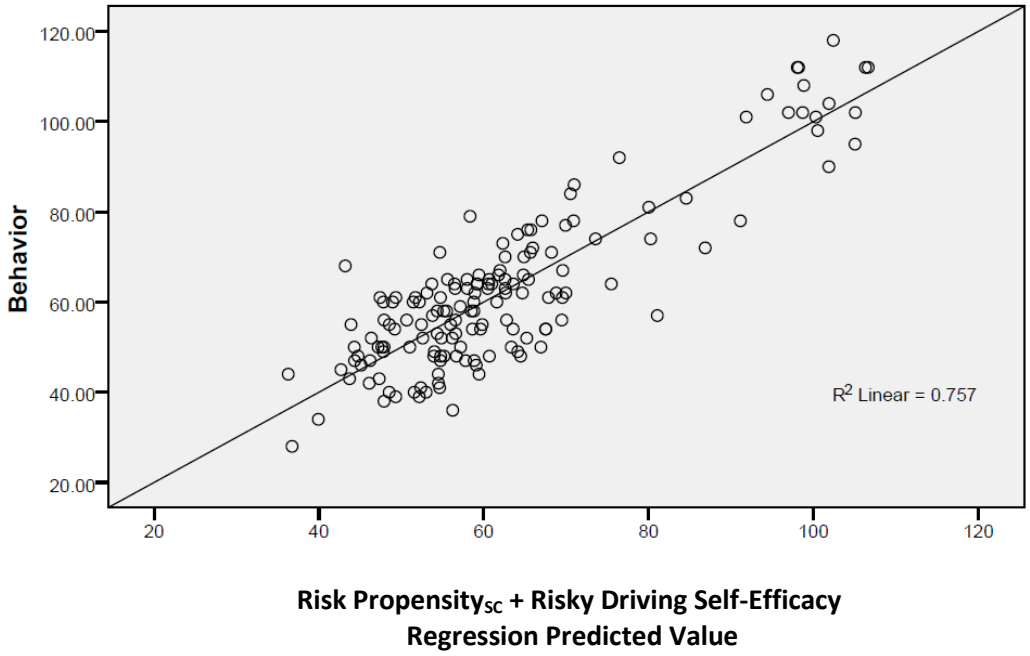
[1]Risk Propensity_{BFI} was not a significant predictor in this model.

To assess whether confounding existed and to account for potentially confounding variables, correlations were calculated between the dependent variable, Risky Driving Behaviors, and the following potential confounders: Years of Experience, Gender, Age, and Perception of Risk. Pearson's correlation coefficient for two of the controls, Years of Experience (r = -.367, $p < 0.01$) and Perception of Risk (r = -.580, $p < 0.01$), revealed a moderate negative linear relationship with the dependent variable, Risky Driving Behaviors, indicating that there will be fewer risky driving behaviors occurring when the years of experience in the profession and the perception of risk are greater. The model without the variables, Risk $\text{Propensity}_{\text{BFI}}$, Gender and Years of Experience fits better, reduces the number of outliers, and also reveals that Age and Perception of Risk are not significant predictors of risky driving. Overall, when tested simultaneously with the predictor variables, these potential confounders did not make a significant contribution to the model (change in R^2 = 0.13, p = 0.061).

Ultimately, a significant overall model emerged ($F_{1, 198}$ = 409.209, $p < 0.0005$. R^2 = .698). The emerging model included the two predictors variables, Risk $\text{Propensity}_{\text{SC}}$ and Risky Driving Self-Efficacy, which explained 75% of the total variation (R^2 = .753) in Risky Driving Behaviors. Chart 9 depicts the linear relationship between these two predictors and the dependent variable, Risky Driving Behaviors.

Chart 9

Model of Best Fit



An interaction term was created to test for a potential interaction between the two predictor variables, Risky Driving Self-Efficacy and Risk Propensity$_{SC}$. As depicted in Table 16, a small but significant interaction did occur between the variables (change in R^2 = .011, p = .009).

Table 16

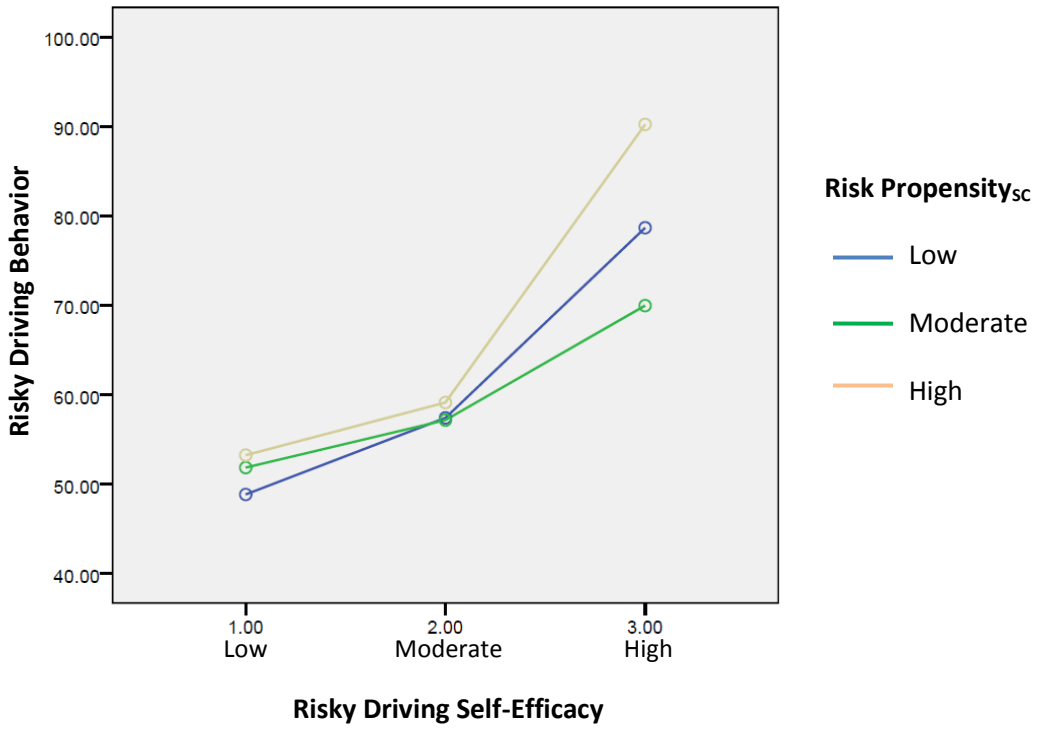
R^2 Values and Significance Levels of Predictors and Interaction Term

Predictor Variable	R^2	R^2 Change	p
Self-Efficacy	.635	.635	$p < 0.0005$
Risk Propensity$_{SC}$	.665	.031	$p < 0.0005$
Self-Efficacy * Risk Propensity$_{SC}$	.677	.011	$p < .01$

The interaction between the Risky Behavior Self-Efficacy and Risk Propensity$_{SC}$ is most evident when Self-Efficacy is high, and appears most prominent when Risk Propensity$_{SC}$ is also high. The Mean score for those low on Self-Efficacy and low on Risk Propensity (*M* = 48.8, *SD* = 2.27) gradually increases as Self-Efficacy increase to moderate (*M* = 57.4, *SD* = 2.31), but increases at twice the rate as Self-Efficacy increases to high (*M* = 78.7, *SD* = 6.81). Chart 10 illustrates the interaction of the two variables relative to risky driving behaviors.

Chart 10

Main Effects of the Predictive Variables and Their Interaction



In summation, there was a significant interaction between Risk Propensity$_{SC}$ and Risky Driving Self-Efficacy, above-and-beyond their individual estimates, when predicting risky driving behaviors among participants in this sample.

Summary

This study resulted in significant findings reported herein. The 63-item survey was administered both online and on paper to EMS personnel in two rural EMS regions in Illinois. Surveys were completed by 227 participants between the months of August and October, 2014. Participants were described as predominantly male with an average age of 36 years. Nearly half were trained paramedics, and over two-thirds were full-time, paid employees, while 12% served as volunteers. Three-quarters reported their primary profession being in the EMS system, with an average of almost 13 years in the profession. Over 70% of participants reported being involved in a vehicular crash and having received a moving violation citation in their lifetime while off-duty.

Participants reported that talking with a passenger was the risky driving behavior most frequently engaged in and, behind wearing a seatbelt and requiring others to do so, was perceived as least risky; while driving under the influence was the behavior cited as being done least frequently and being perceived as most risky. Male participants engaged in risky behaviors more frequently than females, and perceived less risk relative to the studied driving behaviors than did their female counterparts. Participants who perceived more risk, less frequently engaged in risky driving behaviors. Years of experience in a profession and age of the participants had a moderate and weak linear relationship, respectively, with frequency of risky driving behaviors, indicating that the longer a person was in a profession and the older they were, the less frequently they would engage in risky driving behaviors.

The scores on self-efficacy relative to risky driving revealed that participants reported being more capable of safely navigating unfamiliar, narrow roads at night and driving over the

posted speed limit and less capable of safely driving after consuming two or more alcoholic drinks within a one-hour period and driving through a red light. Overall, males reported being more self-efficacious than females relative to engaging in risky driving behaviors, and those responding via the online survey reported being more self-efficacious than those responding on paper.

Statistical significance was found between risky driving behaviors and the two predictors, risk propensity (as measured by the Self-Control Scale) and how capable participants believed they were relative to safely engaging in risky driving behaviors. Risky Driving Self-Efficacy independently maintains a large coefficient of determination and is the strongest of the two predictors, yet the model is significantly strengthened when the covariate, Risk Propensity_{SC} is present. Additionally, the model is influenced by the interaction that exists between the two predictor variables.

An extensive discussion of the key findings, study limitations, recommendations for future research, and implications for the field of health education for personnel working within the emergency medical services profession will be provided in Chapter 5.

CHAPTER 5

CONCLUSIONS AND DISCUSSION

The final chapter expounds upon the study with a general discussion, conclusions, implications for the profession of health education as well as recommendations for future inquiry. A summary of the study is presented, followed by conclusions resulting from this research endeavor. A discussion of the key findings of the study, including their strengths, limitations, consistency with existing research on risky behaviors among EMS personnel, and plausible interpretations are provided. Finally, the relevance of the study and its implications to the profession of health education, as well as recommendations for future research are presented.

Summary of the Study

Emergency medical services personnel work in a fast-paced, highly-stressful environment, requiring rapid, efficient cognitive and physical response to often-times critical situations, creating unique safety consideration within the workforce, particularly relative to driving. Working within a rural environment presents additional safety considerations relative to driving, including physical roadway conditions (e.g., long distances traveled along narrow roads), and compounded by behavioral characteristics within the driving culture among rural populations, e.g, lower compliance with safety-enhancing laws, as well as lower perception of risk (Rakauskas, Ward , Gerberich, & Alexander, 2009). Data supports the existence of unique driving risks relative to driving among rural EMS personnel. While on-duty, EMS personnel experience a far greater incidence of traffic accidents than do members of other professions

(Gormley, Walsh, & Fuller, 2008), and rural residents are at increased risk for traffic fatalities compared to their urban counterparts (NHTSA, 2012), indicating a compounded safety risk relative to driving among rural EMS personnel.

Despite being consistently exposed to negative outcomes resulting from personal choices to engage in risky behaviors, and perhaps as a result of developing coping mechanisms such as cognitive and emotional detachment, EMS personnel often engage in risk-taking behaviors at a higher rate than that exhibited by the general population. In fact, nearly 90% of EMS providers reported engaging in safety-compromising behaviors, including risky driving behaviors, both on and off-duty (Weaver, Wang, Fairbanks, & Patterson, 2012). These risk-taking behaviors may result from characteristics specific to individuals who choose to enter this profession.

EMS personnel have been characterized as individuals who are capable of coping with and even thriving in high-stress occupations (Meadows, Shreffler, & Mullins-Sweatt, 2011; Casey & Leger, 2000), who possess personality traits, such as excitement-seeking, that tend toward risk-taking (Salters-Pedneault, Ruef, & Orr, 2010), and who also have a strong sense of self-efficacy (Rios Riquez, Sanchez-Meca, & Fernandez, 2010; Barnett et al., 2008; Hunter, 2005). Additionally, contructs within Albert Bandura's Social Cognitive Theory, such as reciprocal determinism and vicarious learning, explain how job-related duties of EMS personnel may inadvertently reinforce risky driving behaviors (1998). Given personality traits that may tend toward risk-taking, a high level of general self-efficacy that may transfer to self-efficacy relative to risky driving behaviors, and the ability to detach from negative outcomes,

emergency services personnel may be at increased risk to engage in health-compromising behaviors.

To date, little information exists about the driving behaviors of off-duty, rural EMS personnel, and no research exists that evaluates correlates and predictors of risky driving behaviors among emergency services workers while off-duty. As a result, this cross-sectional and descriptive research study was designed to identify the extent to which rural emergency medical services personnel engage in off-duty, risky driving behaviors and to examine the relationship between these behaviors and their individual traits associated with risk propensity as well as their self-efficacy relative to risky driving.

A 63-item, four-section, survey was administered, either electronically and on paper, to EMS personnel in rural Illinois between July 2013 and October 2013. Section 1 was a 10-item survey assessing self-efficacy relative to risky driving; Section 2 was a two-scale assessment of 24 risky driving behaviors, assessing both frequency of behavior and perception of risk; Section 3 included a two-scale assessment of risk propensity, utilizing a shortened 10-item version of the Big Five Inventory Personality Scale as well as two subscales (Impulsivity – 4 items, and Risk-Taking – 3 items) of the Self-Control Scale; and Section 4 consisted of 12 items to gather information on demographic characteristics and driving history.

The study included 227 participants, consisting 95 participants who completed the survey online using SurveyMonkey, and 132 participants who completed the paper survey. Data were consolidated into one database, and subsequently analyzed using Microsoft Excel 2010 for descriptive analysis and Statistical Package for the Social Sciences 19.0 for additional descriptive analysis as well as for exploratory multivariate regression analysis.

The self-administered survey gathered quantitative data on the relationship between the dependent variable, risky driving behaviors, and two independent variables, risk propensity and self-efficacy relative to risky driving. Control variables included personal characteristics, such as gender, age, highest level of training, and years in the profession. The study was used to test the following two hypotheses and answer the following three research questions:

Hypothesis 1: Risk-taking propensity is a significant independent predictor of risky driving behaviors while off-duty.

Hypothesis 2: Driving self-efficacy is a significant independent predictor of risky driving behaviors while off-duty.

4. To what extent do EMS personnel engage in risk-taking driving behaviors?
5. How self-efficacious are EMS personnel relative to driving?
6. Is there a significant interaction between risk-taking propensity and self-efficacy, over- and above their individual estimates, when predicting driving behaviors?

Descriptive statistics included calculations of measures of central tendency and dispersion. Scatterplots were used to identify potential skewness. Pearson's coefficient correlations were run to determine if risk propensity and risky driving self-efficacy are independently predictive of risky driving behaviors. Risk propensity and risky driving self-efficacy were included in a simultaneous multivariate linear regression analysis to help determine if predictors make an individual contribution while controlling for the other, and help determine which predictor is strongest. To test for an interaction between risk propensity and risky driving self-efficacy, over-and-above their independent influence, an interaction term

was included in the data analysis. Statistical significance was determined by an alpha level of .05 (Lenth, 2012).

Conclusions

People's lives at times depend upon the quick reaction and competent care of EMS personnel, who respond to emergency situations and perform medical services and efficient transportation of patients to medical facilities. Unfortunately, these public servants are often in need of the very care they provide, having a much larger than average number of work-related injuries and illnesses (Bureau of Labor Statistics, 2013), including a significantly higher chance of being a victim of an occupational fatality, with nearly three-fourths of these fatalities resulting from road collisions (Gormley, Walsh, & Fuller, 2008). Yet, personal characteristics that may have led them to this profession, as well as job duties that may continuously reinforce these characteristics, indicate that they, themselves, are an at-risk population.

Based on the findings of this study that examined those personal characteristics, the following conclusions were drawn:

1. Rural EMS personnel fit the risk-propensity typology defined by the BFI-10 scale, suggesting that they are more prone to take risks than the general population.
2. Rural EMS personnel with a propensity toward risk taking engage in risky driving behaviors more frequently than those with lower levels of risk propensity.
3. Rural EMS personnel with high levels of self-efficacy relative to risky driving more frequently engage in these behaviors than their less self-efficacious peers.
4. Rural EMS personnel are most self-efficacious about navigating unfamiliar, narrow roads at night and speeding, and they report being less capable of safely drinking and driving.

5. Among the risky driving behaviors studied,
    a. driving after consuming alcohol is the behavior perceived to be the most risky, is the least frequently engaged in, and is the behavior rural EMS personnel feel least capable of performing safely;
    b. driving over the posted speed limit is one of the most frequently performed behaviors, though it is perceived as one of the most risky and one of the behaviors rural EMS personnel believe they can safely perform; and,
    c. although driving drowsy was perceived to be moderately risky and received a relatively low score on the self-efficacy scale, it is one of the most frequently performed behaviors.
6. The age of rural EMS personnel is not associated with risky driving behaviors.
7. Gender differences did indicate that, compared to their female counterparts, male EMS personnel:
    a. were more highly trained in the EMS field,
    b. were more self-efficacious relative to risky driving,
    c. perceived the studied driving behaviors to be less risky, and conversely,
    d. engaged in risky driving behaviors more frequently.
8. The emerging model, resulting from this research, reveals that an interaction occurs between risky-driving self-efficacy and risk propensity, and are, therefore, collectively strong predictors of engaging in risky driving behaviors among rural EMS personnel.

Discussion

Results of this study aligned well with the proposed hypotheses, yet unexpected findings were also discovered from this research. This section will include discussion on both the expected and unexpected findings. Specifically, risky driving behaviors, the influence of the explanatory constructs within the Social Cognitive Theory on acquisition of risky driving behaviors, the importance of both risk propensity and behavior-specific self-efficacy to predicting risky driving behaviors, and the influence of self-efficacy on potentially harmful behaviors will be discussed.

Risky Driving Behaviors

Over 90% of motor vehicular crashes and near-crashes (during which drivers exhibit the same physical reaction relative to braking and swerving, yet successfully perform the evasive maneuver) involve human error (Treat, et. Al., 1979; Hendricks, Fell & Freedman, 1999; AAA Foundation for Traffic Safety, 2006). Three-fourths of driver-related critical reasons associated with motor vehicle crashes are attributed to recognition errors, which include inattention and distraction, and decision errors, such as driving too fast for conditions and tailgating (NHTSA, 2008).

Two behaviors in particular, speeding and drowsy driving, have been associated with a significant increase in risk. Results of the 100-Car Naturalistic Study (AAA Foundation for Traffic Safety, 2006), revealed that speeding (OR = 2.9, 95% CI 1.7-4.8) as well as driving while drowsy (OR = 2.9, CI 2.0 – 4.3) were associated with nearly tripling the odds of being in a crash or near-crash. Yet, results of this study indicate that rural EMS personnel perceive driving over the posted speed limit as less risky than most other risky driving behaviors, believe they are capable

of performing the behavior safely, and one that they engage in relatively frequently. Additionally, Rural EMS personnel often drive, both on and off-duty, in a fatigued or drowsy state and are moderately confident in their ability to do so safely, despite perceiving the behavior to be relatively risky.

Drowsy and Fatigued Driving

Drowsiness and fatigue affect physical and mental alertness, resulting in a decrease in the ability to safely operate a motor vehicle and an increase in the potential for human error. Human errors have been evidenced in crashes with nearly all modes of transportation. The magnitude of the potential consequences are apparent in two of the most notorious transportation catastrophes attributed to human fatigue, the Space Shuttle Columbia tragedy and the crash of the Exxon Valdez (National Sleep Foundation, 2014). Similar to the effects of alcohol and drugs, drowsiness slows reaction times, decreases awareness, and impairs judgment (NHTSA, 2014).

According to the National Highway Transportation (2014), shift workers, as well as individuals who work in the transportation industry, are two workforce populations vulnerable to drowsy driving due to the disruption in sleep caused by working at night or working long or irregular hours. EMS personnel perform their job duties erratically, often resulting in intermittent sleep patterns due to the sporadic nature of the timing of calls as well as the need to provide 24/7 coverage. Drowsiness and fatigue, therefore, are inadvertent side effects inherent to performing EMS job duties.

Passenger Presence

The behavior most frequently performed and perceived to be the least risky by the study participants, talking with a passenger, possesses two opposing attributes. The first is its association with increased risk while driving. The act of driving requires the driver to simultaneously attend to three fundamental functions: visual, mechanical, and cognitive (National Safety Council, 2010). Minimally, talking with a passenger while driving requires cognitive functions, which distracts from the cognition required to attend singularly to the act of driving. Additionally, people often look at the person to whom they are speaking, further compromising the driving performance by adding a visual distraction.

On the other hand, passengers can serve as protective factors by adding to the visual and cognitive attentiveness realms, and by being mindful observers of the driving process and environment. In a 2008 study of older drivers, drivers with two or more passengers were 40% less likely to be injured in a crash, (OR = 0.60; CI: 0.36–1.01) compared to those driving alone at the time of the crash (Duncan, Classen, Hall, Garvan & Awadzi, 2008); the positive effect of having young passengers with young drivers was also found in a study conducted in 2012 of university students (Buckley & Foss, 2012). The presence of a passenger in the vehicle, therefore, can serve as a distraction to the driver, but also has the potential to mitigate harms associated with driver inattentiveness by adding another point of observation.

Social Cognitive Theory and Risky Driving

The Social Cognitive Theory predicates that behaviors result from a dynamic, reciprocal process involving three sources of influence: behavior, environment and personal factors (Bandura, 1998). For the purposes of this study, risky driving behaviors were the behavioral

factors, environmental influences include the rural roadways and ambulances, and personal factors are self-efficacy and risk propensity. Findings from this study, including the emerging statistical model resulting from this study, support major elements of the adapted Triadic Reciprocal Model of Causation for Risky Driving Among Rural EMS Personnel (see Figure 11). This will be discussed in detail in the next section.

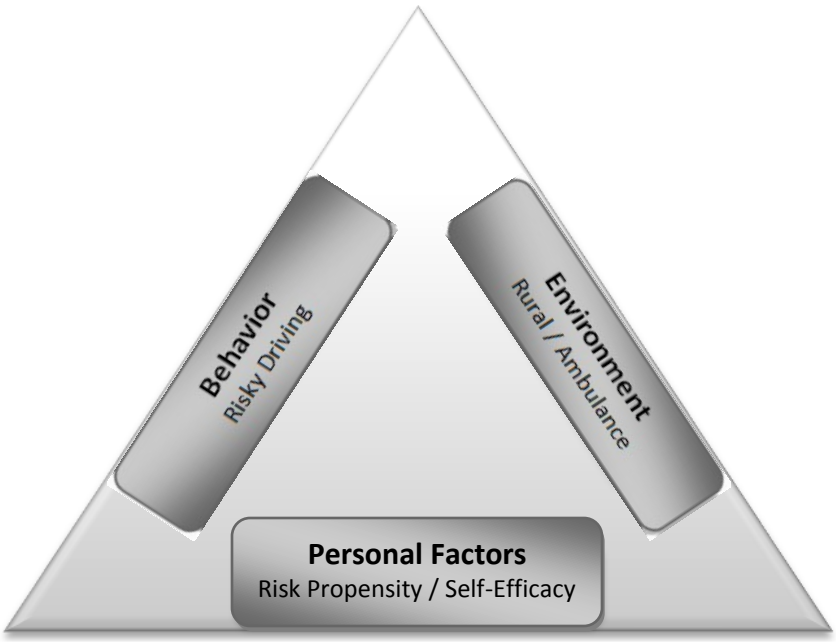


Figure 11. Triadic Reciprocal Model for Risky Driving - Rural EMS Personnel

Navigating unfamiliar, narrow roadways at night is a common occurrence for rural ambulance drivers. These roadways are often unlit, have little or no shoulder, and have uneven pavement or are covered with gravel. Other hazards common to rural roadways include the presence of slow moving farm vehicles and animal crossings, higher speed limits, and vehicles passing on two-lane roads where sight distances are often compromised by the many curves and hills dotting the rural landscape. These conditions could be daunting to many drivers, yet rural residents are more prone to risky driving behaviors, including

speeding, driving without wearing a seatbelt, and drinking and driving (Rakauskas, Ward, Gerberich & Alexander, 2009). Consistent with this rural driving culture and in support of the Triadic Reciprocal Model of Causation for Risky Driving Among Rural EMS Personnel, findings from this study indicate rural EMS personnel are most confident in their ability to safely navigate unfamiliar, narrow roads at night and drive over the posted speed limit without causing harm.

The Social Cognitive Theory proposes that repeated and successful performance of a behavior enhances self-efficacy and often results in maintaining a given behavior. For rural EMS personnel, risky driving behaviors may also be influenced by the job-related function of driving an ambulance. Rural EMS personnel, who possess a tendency toward risk propensity (personal factor), have a strong sense of self-efficacy (personal factor) related to risky driving behaviors (behavioral factor) given the frequent, consistent and expected practice of driving fast amidst the myriad distractions inside the ambulance (environmental factor) and in the rural landscape (environmental factor). The statistical model emerging from this study identifies both personal factors, risk propensity and self-efficacy, as significant predictors of risky driving behaviors.

Predicting Risky Driving Behaviors

The two constructs utilized in this study to examine their influence on engaging in risky driving behaviors were self-efficacy and risk propensity. Although extensive research has shown that these two constructs influence human behavior, self-efficacy is considered an evolving, malleable state, while risk propensity is viewed as a more consistent, stable trait. Examining the two independently as well as the interaction between the two variables relative to their

relationship to risky driving behaviors ultimately supported the two hypotheses posited in this research endeavor.

Self-Efficacy

Possessing a high level of self-efficacy is often considered a desirable trait leading to mastery and maintenance of constructive behaviors; however, when self-efficacy becomes associated with risk-taking behaviors, high levels of self-efficacy can become destructive. Findings from this study supported the hypothesis that self-efficacy relative to risky driving is positively correlated with risky driving behaviors and is a significant predictor of risky driving behaviors while off-duty. This would suggest that the more one believes in his or her own ability to safely engage in risky driving behaviors, the more frequently he or she will engage in this destructive behavior.

Literature shows that self-efficacy serves as a determinant of other risk-taking behaviors including participation in extreme sports (Llewellyn et al., 2008; Slanger & Rudestam, 1997), business decision-making (Krueger & Dickson, 1994; McGee, Peterson, Mueller, & Sequeira, 2009), and even online risk-taking behaviors among children (Livingstone, Haddon, & Gorzig, 2012). Findings in this study indicate that risky driving may be another risk-taking behavior to add to this list of risk-taking behaviors influenced by self-efficacy. The influence of self-efficacy relative to the frequency of engaging in risky driving behaviors is a robust finding, independently explaining 68% of the variance in risky driving behaviors.

A small number of participants (n=19) reported being significantly more self-efficacious than the rest of the sample. Seventeen of these participants were among the group that responded using the online survey. This group also appeared to engage in risky behaviors more

frequently. This deviation might be explained by the perception of increased confidentiality, and therefore lower fear of repercussions in the workplace, due to the method of survey administration.

During the analysis, it was noted that not all items listed in the Risky-Driving Self-Efficacy Scale were represented on the Risky Driving Behavior Assessment. These items included “drive through a yellow/red light”, “tailgate (<3 seconds behind) the vehicle in front of me”, “navigate unfamiliar, narrow roads at night”, and “’roll’ through a stop sign”. This was an unintentional omission, which may have limited the ability to compare the individual items on both scales. For consistency purposes, it is recommended that all items on the Risky-Driving Self-Efficacy Scale should be represented on the Risky Driving Behaviors Assessment to get a clearer picture of the interaction between the two measures.

Risk Propensity

Risk propensity has been defined as a natural inclination or “stable tendency to choose options with a lower probability of success, but greater rewards” (Sueiro Abad, Sánchez-Iglesias & Moncayo de Tella, 2011). Stability refers to the relatively unchanging nature of the construct throughout the lifespan. Much research has been done on risk propensity in myriad fields of study, including business and management, athletics, gambling and, as in this study, health behaviors. And, as was expected in this study, risk propensity was positively correlated with risk taking behaviors. In other words, the higher the level of risk propensity a person possessed, the more frequently the individual engaged in risky behaviors.

Interestingly, risk propensity has been found to be specific to certain types of behaviors; that is to say, someone may tend to take risks in their driving behaviors, but be risk-aversive in

their financial dealings. This phenomenon is referred to as domain-specific risk propensity. A domain-specific risk propensity model was created by Elke Weber, who proposed that everyone has a unique level of risk propensity specific to each of these five categories: health/safety, recreational, social, financial and ethical. Although an individual's level of risk propensity is different for each category, they are still inherent and unchanging; their patterns remain predictable (Weber, 2004). This study looked specifically at risky driving, a behavior that falls within the realm of health and safety.

For the purposes of this study, risk propensity was measured using two separate scales. Each scale was run independently to test the influence of risk propensity on risky driving behaviors. Independently, both did have a significant positive correlation, but risk propensity as measured by the subscales on the Self Control Scale (Risk Propensity_{SC}) proved to be a better predictor of risky driving behaviors than did the risk propensity typology generated from the Big Five Inventory –10-item scale, denoted as Risk Propensity_{BFI}. Results from the multivariate simultaneous regression, in fact, resulted in the elimination of Risk Propensity_{BFI} as a predictor from the statistical model. This could indicate that the Risk Propensity_{SC} measure was a better instrument for this study. It is recommended, however, that other instruments to measure risk propensity be considered in future studies.

Although Risk Propensity_{BFI} did not "make the cut" for this statistical model, the sample did fit the risk propensity typology using the Five Factor Model. Three of the factors were just slightly off the normative data, but tending in the direction of higher risk propensity; Agreeableness and Conscientiousness fell approximately one standard deviation below the national average. Low scores for agreeableness appear to inhibit concern about potential

negative outcomes and low scores on conscientiousness reduces cognitive barriers (Nicholson et al., 2005). Further exploration of this interesting finding may provide a clearer picture of this stable personal trait among rural EMS personnel.

Limitations

Generalizability of the findings of this study should be approached with caution due to a couple of factors. The sample size is relatively small (n=227), and therefore may not fairly represent the overall population of rural EMS personnel. However, a sample size of 197 was required for ±5% sampling error with a 95% confidence interval. A sample of 200 cases provides enough power to detect a small R-square value. With 147 cases, there is a 95% probability of statistically detecting a significant difference when the R-square value is as low as 0.1 with two predictors (Lenth, 2012).

Additionally, the sample was limited to those practicing in rural regions in Illinois. Ambulance services are often guided by state regulations, with each state having jurisdiction over the qualifications and training requirements of their EMS personnel. For instance, those who wish to drive ambulances in California must first pass a written Ambulance Driver Certification exam (California Department of Motor Vehicles, 2013). Illinois has no such certification. Thus, results are not generalizable to EMS personnel practicing in urban setting or to those licensed in other states.

Another important limitation to this study to be considered is the potential compromise to the accuracy of the responses. Responses by the research subjects may reflect bias, as participants may have responded in a socially-desirable manner. As asserted by Fernandes, Job and Hatfield (2007), inaccuracy in recall or report are common occurrences in self-report

measures, yet literature suggests that self-reports in this area of study are reasonably accurate. Further research to support the premise that responses to questions on this topic of study are reasonably accurate would help validate future studies on this subject matter.

Responses by the participants who responded on paper may have been affected by a concern that there could be workplace consequences resulting from the potential that employers might have access to their responses, despite efforts to ensure confidentiality. Due to the sporadic nature of agency meetings, a couple of the ambulance services requested that the surveys be left onsite for EMS personnel to complete when they reported for duty. Although individual envelopes were provided for participants to seal their completed surveys in, control over the administration of these surveys was reduced by this protocol and these participants may not have felt confident in the assurances of confidentiality.

Another caveat to this study to be considered is the length and formatting of the paper survey. Although most surveys were fully completed, the length of the survey instrument may have influenced some participants to not respond to all the survey questions. In addition, the format of the section on Risk Perception on the paper survey may have obscured the scale, resulting in fewer participants completing this specific section (n=184). Participants responding to the online survey were more likely to complete the entire survey as the questions are presented systematically.

Additionally, online participants responded significantly differently than those who responded using the paper survey, resulting in reports of being more self-efficacious relative to risky driving, more frequently performed risky driving behaviors, and perceived less risk among the studied driving behaviors. It is noteworthy, however, that online responses displayed the

same pattern as responses on paper. It is possible that online responses were more accurate than those responding on paper due to the added sense of confidentiality afforded by responding away from the worksite.

Finally, the inadvertent omission of one of the questions on the BFI-10 instrument may have influenced the scores on the measure of risk propensity. Although the omitted question was one of three questions on the agreeableness factor, this was the one factor that had an additional question to strengthen the validity of the agreeableness measure. The loss of one of the questions may have reduced the validity scores, but may still have captured a relatively accurate picture of the personality trait. This procedural error, however, should be considered when reviewing findings that utilized the BFI-10 personality scale.

Considerations Within the EMS System

This exploratory study provides insight into potential strategies that could be implemented within the EMS system to help reduce the number of vehicular crashes involving their personnel both on and off the job. Possessing an understanding of the nature of the type of employees who gravitate to the profession may help in management of daily operations as well as in establishing new protocols specific to driving and other potentially risky behaviors.

However, it is not necessarily undesirable to have personnel who are self-efficacious relative to risky driving and have a propensity toward risk-taking, particularly in fast-paced, intense work settings such as driving an ambulance while handling an emergency call. It is in those moments when a hardy personality is helpful in the execution of risky tasks. In fact, Rios-Riquez Sanchez-Meca & Fernandez (2010) discovered that self-efficacy is positively correlated with having a hardy personality which is a protective factor to better cope with distress in

emergency services work environments. Another potential benefit of having employees with high self-efficacy relative to risky driving, particularly when combined with 'calculated' risk taking, is they may prove to be better ambulance drivers who are willing to attentively do what it takes for efficient emergency transport of a critical patient.

Yet, in light of the tendency of some employees to take risks relative to driving, it would be prudent for the EMS system to invest in resources to maximize the safety of both the employee and the patient, particularly since driving in a stressful environment is often a required job duty. These measures could include, but are not limited to:

- Providing ambulance driver safety education and training, allowing credit for continuing education units for this training.
- Requiring a relatively clean, on-the-job and off-duty driving record of all ambulance drivers, regardless of their level of medical training.
- Incorporating ambulance driving training into the EMT training curriculum.
- Developing and implementing a state-run Ambulance Driver Certificate Program.
- Integrating crash avoidance technology in all response vehicles.
- Solicit funding from insurance industry to support interventions.

Significance to Health Education

Understanding the relationships between self-efficacy relative to risky driving behaviors and propensity to engage in risky driving behaviors may provide insight into risk-taking tendencies among specific populations, particularly in the populations that gravitate toward high risk professions. Other populations to consider include: extreme sport athletes, airline pilots, race car drivers, police officers, air traffic controllers, stunt persons, fire fighters, and

perhaps even military personnel. Individuals who enter these professions may be able to operationalize their tendency to take risks in an environment wherein it is socially (and professionally) acceptable. These individuals would most likely be health/safety risk takers rather than social risk takers. Interventions, therefore, would be domain-specific and target those falling within the health/safety risk-taker category specifically.

Bandura (2004) recommends using the constructs of the Social Cognitive Theory in health promotion efforts. Therefore, these constructs are integrated into the following implications for health education:

- Behavioral Factors
    - Develop strategies to address the cognitive dissonance experienced by those who take risks, despite persistent exposure to the negative outcomes associated with those risks.
- Environmental Factors
    - Identify and limit processes or behaviors within the workplace, such as multi-tasking while driving, which may foster risk-taking behaviors.
    - Recognize and address the influence of rural culture, e.g., lower perception of risk among rural residents, on driving behaviors.
- Personal Factors
    - Identify the risk-propensity levels of individuals who tend toward given professions to tailor programs to address their risk tendencies.
    - Capitalize on the self-efficaciousness of the population, by guiding the population to shift their self-efficacy toward healthier behaviors.

It is important that health educators consider not just the malleable but also the stable characteristics of the target population. Although risk propensity does not tend to change throughout a lifetime, it does inform program planners and mediators about interventions that may work, and those that may not, given the influence of the constant trait. Self-efficacy is a strong predictor of behavior, as evidenced in this study, and should be taken into consideration whenever behavioral interventions are developed.

Recommendations for Future Research

Given the sensitive nature of the topic being studied, and the potential implications in the workplace, future research on risky driving among individuals employed in a given field should be conducted away from the workplace. A difference existed between the online participants and those completing the paper survey. It is recommended that the online survey, which allows participants separation from their responses and their colleagues at work, and particularly their supervisors.

Two of the assessment scales used in this study were generated by the researcher. There were no normative data to which the scores from the sample could be compared. It is recommended that these two scales, the Risky Driving Behavior Assessment and the Risky-Driving Self-Efficacy Scale, be studied among the general population in order to establish baseline data for future comparative studies.

The Risky-Driving Self-Efficacy Scale was developed in response to the recommendation by leading experts in the field that measures of perceived self-efficacy be targeted toward specific domains of functioning when the study is related to a specific task or behavior (Schwarzer & Luszczynska, 2008; Bandura, 2006). However, general self-efficacy may offer

insight into the findings of this study. According to Pietrantoni and Prati (2008), "self-efficacy, collective efficacy and sense of community could be considered resilience factors that preserve first responders' work-related mental health."

Given the research, albeit limited, on the general self-efficacy of professionals in critical occupations, measures to assess general self-efficacy exist. One such measure is the General Self-Efficacy Scale (GSE), developed in 1992 to assess perceived self-efficacy regarding coping with daily activities as well as adaptation after experiencing isolated stressful events (Schwarzer & Jerusalem, 1995). The GSE scale has proven to be a valid and reliable instrument measuring a sense of general self-efficacy (Scholz, Gutiérrez-Doña, Sud, & Schwarzer, 2002), and has been widely used for the past 20 years in over 30 languages (Schwarzer, 2011). It is recommended that the general self-efficacy levels of EMS personnel be explored to add to the findings of this study.

One study, focused on practitioners of the high-risk sport of parkour (free-running), revealed an opposing stance to the effects of self-efficacy on engaging in risky behavior, wherein increased self-efficacy relative to a risky behavior serves as a protective factor (Merritt, 2013). Merritt found that individuals with higher levels of self-efficacy relative to a risky behavior were less likely to engage in risk-taking behaviors and were more attentive when engaging in risky behaviors and engaged in the risky behavior more cautiously. Merritt (2013) posited that increased self-efficacy correlates with the amount of time spent safely practicing the behavior, resulting in a better-prepared, more-mindful individual engaging in the behavior with improved performance capacity. Although this premise is beyond the scope of this study,

future research is warranted to ascertain whether increased self-efficacy relative to a risky behavior is actually protective rather than harmful.

What was not explored in this study, but should be a consideration for future research, is the distinction between reckless risk-taking and calculated risk taking (Merritt & Tharp, 2013). Gamblers, for instance, may often be perceived as those who are reckless risk-takers, yet athletes may be perceived as engaging in calculated risk taking. It has been posited that higher levels of self-efficacy has a stronger association with calculated risk-taking rather than reckless risk-taking (Llewellyn & Sanchez, 2008). While on the job, EMS personnel may be engaging in calculated risky driving behaviors. A question to consider is: Are the risky driving behaviors rural EMS personnel engage in while off duty equally calculated?

While this study was limited to rural EMS personnel, little is known about the risky driving behaviors of EMS personnel practicing in other areas either. Given the distinct differences between driving in rural compared with driving in urban environments, a replication of this study with urban EMS personnel is warranted. The information garnered from this type of study could provide additional insight into the population of EMS personnel as a whole. Additionally, comparisons between the two groups could inform targeted strategies to mitigate potential arms unique to each culture and environment.

Despite gender difference within specific elements of this research, gender was not a significant predictor in the model. However, gender did explain a small amount of the variance and does play a role in independent measures (e.g., gender differences exist in general risk perception as well as risk-taking behaviors). Further research is needed to further explore the impact of gender on risk-propensity.

Finally, given the strength of the influence of self-efficacy in this study, it is recommended that further investigation be conducted to explore the factors that play a role in the development of self-efficacy relative to risky behaviors. Comparing the influence of the many factors associated with the Social Cognitive Theory on self-efficacy relative to risky behaviors will inform the development of appropriate measures to address these influences.

Consider the evolving story of the fictional character, Chris, presented in Chapter 2. Chris was introduced as a nervous 16-year-old high school student who was learning to drive a car. Various constructs within the Social Cognitive Theory were visible in the process, including Chris' physiological state, responses to verbal persuasion, reinforcement through vicarious experience, and performance mastery. As Chris continued through the process of learning to drive, and successfully mastered simultaneously performing the visual, mechanical and cognitive functions required to drive, a strong sense of self-efficacy relative to the constructive behavior of driving a personal vehicle developed. Yet, as Chris' continued story illustrates, performance of a behavior is an evolving process, perpetually influenced by environmental, behavioral and personal factors.

Between commuting to and from school daily and speeding along country roads with friends for fun on weekends, Chris gained hundreds of miles of driving experience as graduation neared. Eventually, Chris not only lost all nervousness first experienced when learning to drive, but found driving to be pleasurable and even somewhat thrilling, particularly when driving fast.

This was the turning point as "driving self-efficacy" became "risky-driving self-efficacy". In this time period, only two negative driving events occurred before turning age 18. Chris received one citation for speeding in town, and also caused a minor motor vehicle crash as a

result of driving too close behind another vehicle abruptly stopping to avoid a collision with a deer in the road.

Contemplating the future and looking for a profession that is both challenging and exciting, Chris decided to enroll in the local community college to become a licensed Emergency Medical Technician.

Chris was excited to learn that only one EMT course was required to become eligible to take the state's EMT-Basic licensing exam. Upon completion of the course, which also provided the required number of contact hours, Chris successfully passed the licensing exam, amazed at how quickly the process transpired. Although concerned about the less than stellar driving record and the lack of ambulance driving experience received in training, Chris was relieved to learn that there were no driving requirements other than possessing a valid, state driver's license and being a licensed EMT. Accepting a job offer at a local, rural ambulance service, Chris eagerly anticipated the first run …

Summary

The purpose of this study was to identify the extent to which rural emergency medical services personnel engage in off-duty, risky driving behaviors and to examine the relationship between these behaviors and their levels of risk propensity as well as their self-efficacy relative to driving. The complexities inherent to predicting human behaviors are vast, given the diversity of conditions that influence the decision to engage in a behavior. These influences include, but are not limited to, biological, cognitive, emotional, environmental, experiential and social factors. Bandura captures many of these constructs in his Social Cognitive Theory.

Results of this study yielded a statistical model that provides insight into the predictors of risky driving behaviors among rural EMS personnel, risky driving behaviors while off duty are positively correlated with self-efficacy relative to risky driving and risk propensity. This model offers a platform from which to develop targeted interventions for individuals working in risky professions, including rural EMS personnel. The predictive model fit well within the Social Cognitive Theory construct of triadic reciprocity, which perfectly serves as the template from which to develop mitigating strategies.

By identifying the specific challenges and characteristics faced by this population, tailored harm-reduction strategies can be developed to foster increased safety behaviors among EMS personnel as well as to create behavioral and systemic changes. Given the extensive miles that rural EMS personnel drive both on and off-duty, it is imperative that driving behaviors be addressed to ultimately increase safety in the workplace as well as on our nation's roadways.

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APPENDICES

Appendix A

Characteristics of High and Low Scores in FFM Personality Traits

Personality Trait	Low Scorer	Higher Scorer
Openness **Lo: Consistent/cautious** **Hi: Inventive/curious**	• Favors conservative values • Judges in conventional terms • Uncomfortable with complexities • Moralistic	• Values intellectual matters • Rebellious, nonconforming • Usual thought processes • Introspective
Conscientiousness **Lo: Easy-going/careless** **Hi: Efficient/organized**	• Eroticizes situations • Unable to delay gratification • Self-indulgent • Engages in fantasy, daydreams	• Behaves Ethically • Dependable, responsible • Productive • Has high aspiration levels
Extraversion **Lo: Solitary/reserved** **Hi: Outgoing/energetic**	• Emotionally bland • Avoids close relationship • Over-control of impulses • Submissive	• Talkative • Gregarious • Socially poised • Behaves assertively
Agreeableness **Lo: Cold/unkind** **Hi: Friendly/ compassionate**	• Critical, skeptical • Shows condescending behavior • Tries to push limits • Expresses hostility directly	• Sympathetic, considerate • Warm, compassionate • Arouses liking • Behaves in a giving way
Neuroticism **Lo: Secure/confident** **Hi: Sensitive/nervous**	• Calm, relaxed • Satisfied with self • Clear-cut personality • Prides self on objectivity	• Thin-skinned • Basically anxious • Irritable • Guilt-Prone

Appendix B

EMS Driving Survey

In my personal vehicle, without causing harm to myself or to others, **I can**…	Never True	Rarely True	Some-times True	Often True	Mostly True	Exactly True
1. Drive over the posted speed limit	○	○	○	○	○	○
2. Drive drowsy (<6 hrs sleep in previous 24-hour period) . . .	○	○	○	○	○	○
3. Drive through a red light	○	○	○	○	○	○
4. Drive after consuming 2 or more alcoholic drinks within a one-hour period	○	○	○	○	○	○
5. Tailgate (follow <3 seconds behind) the vehicle in front of me	○	○	○	○	○	○
6. Talk on a cell phone (not hands-free) while driving	○	○	○	○	○	○
7. Text or use other hand-held technological device while driving	○	○	○	○	○	○
8. Drive without wearing a seatbelt	○	○	○	○	○	○
9. Navigate unfamiliar, narrow roads at night	○	○	○	○	○	○
10. “Roll” through a stop sign	○	○	○	○	○	○

PLEASE CONTINUE ON BACK SIDE

The following questions pertain to when you are **off-duty** and **driving a personal vehicle**. First, indicate the level of risk associated with each behavior, and then how often you do it.

*Level of Risk 1=LOW 10=HIGH	In the last 30 days while driving a vehicle when off-duty, how often have you…	Always 100% OF THE TIME	Frequently 75% OF THE TIME	Sometimes 50% OF THE TIME	Rarely 25% OF THE TIME	Never 0% OF THE TIME
10	*Example: Driven with your eyes closed.*	○	○	○	○	●
	1. Eaten food	○	○	○	○	○
	2. Drank a beverage	○	○	○	○	○
	3. Answered / talked on a cell phone	○	○	○	○	○
	4. Dialed a cell phone	○	○	○	○	○
	5. Sent a text message	○	○	○	○	○
	6. Read a text message	○	○	○	○	○
	7. Used a GPS system	○	○	○	○	○
	8. Lit a cigarette / cigar or smoked	○	○	○	○	○
	9. Reached for something	○	○	○	○	○
	10. Drove over the posted speed limit	○	○	○	○	○
	11. Changed settings on a CD player / radio	○	○	○	○	○
	12. Changed settings on a hand-held device	○	○	○	○	○
	13. Cared for a pet	○	○	○	○	○
	14. Cared for / checked on a child	○	○	○	○	○
	15. Read (map, book, paper, computer screen)	○	○	○	○	○
	16. Talked with a passenger	○	○	○	○	○
	17. Steered with your knee	○	○	○	○	○
	18. Wore a seatbelt	○	○	○	○	○
	19. Required others to wear a seatbelt in your car	○	○	○	○	○
	20. Groomed (hair, make-up, shaved)	○	○	○	○	○
	21. Driven under the influence (alcohol or drugs)	○	○	○	○	○
	22. Driven drowsy (<6 hours sleep in 24-hr period)	○	○	○	○	○
	23. Driven fatigued (feeling tired)	○	○	○	○	○
	24. Driven while agitated / angry	○	○	○	○	○

EMS Driving Survey Continued

	DISAGREE STRONGLY	DISAGREE A LITTLE	AGREE A LITTLE	AGREE STRONGLY
1. I devote time and effort to preparing for the future	○	○	○	○
2. I act on the spur of the moment without stopping to think. .	○	○	○	○
3. I do things that bring me pleasure here and now, even at the cost of some future goals	○	○	○	○
4. I base my decisions on what will benefit me in the short run, rather than in the long run	○	○	○	○
5. I test myself by doing things that are a little risky	○	○	○	○
6. I take risks just for the fun of it.	○	○	○	○
7. Excitement and adventure are more important to me than security	○	○	○	○

I see myself as someone who …	DISAGREE STRONGLY	DISAGREE A LITTLE	NEITHER DISAGREE NOR AGREE	AGREE A LITTLE	AGREE STRONGLY
is reserved	○	○	○	○	○
has few artistic interests	○	○	○	○	○
tends to be lazy.	○	○	○	○	○
is relaxed, handles stress well	○	○	○	○	○
is outgoing, sociable	○	○	○	○	○
tends to find fault with others.	○	○	○	○	○
does a thorough job	○	○	○	○	○
gets nervous easily	○	○	○	○	○
has an active imagination.	○	○	○	○	○
is considerate and kind to almost everyone. . .	○	○	○	○	○

PLEASE CONTINUE ON BACK SIDE

As a driver, how many times have you…	ON THE JOB	HOW MANY?	OFF DUTY	HOW MANY?
…been involved in a vehicular crash?				
in the last year?	○	_____	○	_____
in your lifetime?	○	_____	○	_____
…been ticketed for a moving violation?				
in the last year?	○	_____	○	_____
in your lifetime?	○	_____	○	_____

HIGHEST LEVEL OF TRAINING

- ○ EMT-B
- ○ EMT-I
- ○ Paramedic
- ○ Other: _____
  (please specify)

AVERAGE CALL VOLUME (Weekly) ____

AVERAGE # OF SHIFTS (Weekly) ____

EMPLOYMENT STATUS

- ○ Paid (full-time)
- ○ Paid (part-time)
- ○ Volunteer
- ○ Other: _____ (please specify)

What is your primary profession?

_____

How many years in your profession? ____

GENDER

- ○ Male
- ○ Female
- ○ Other

AGE ☐☐

Thank You!

Appendix C

Scoring of Ten-item Big Five Inventory (BFI-10)

Trait	Items	Direction of Score
Extraversion	1	Reverse
	6	True
Agreeableness	2	True
	7	Reverse
	11	True
Conscientiousness	3	Reverse
	8	True
Neuroticism	4	Reverse
	9	True
Openness	5	Reverse
	10	True

Appendix D

CODEBOOK

EMS Driving Survey

Low score = low self-efficacy

In my personal vehicle, without causing harm to myself or to others, **I can**…	[1] Never True	[2] Rarely True	[3] Some-times True	[4] Often True	[5] Mostly True	[6] Exactly True
1. Drive over the posted speed limit	○	○	○	○	○	○
2. Drive drowsy (<6 hrs sleep in previous 24-hour period.	○	○	○	○	○	○
3. Drive through a red light	○	○	○	○	○	○
4. Drive after consuming 2 or more alcoholic drinks within a one-hour period	○	○	○	○	○	○
5. Tailgate (follow <3 seconds behind) the vehicle in front of me	○	○	○	○	○	○
6. Talk on a cell phone (not hands-free) while driving. . . .	○	○	○	○	○	○
7. Text or use other hand-held technological device while driving	○	○	○	○	○	○
8. Drive without wearing a seatbelt	○	○	○	○	○	○
9. Navigate unfamiliar, narrow roads at night	○	○	○	○	○	○
10. “Roll” through a stop sign	○	○	○	○	○	○

PLEASE CONTINUE ON BACK SIDE

The following questions pertain to when you are **off-duty** and **driving a personal vehicle**. First, indicate the level of risk associated with each behavior, and then how often you do it.

Enter exact response. Low score = high frequency; reverse code.

*Level of Risk 1=LOW 10=HIGH	In the last 30 days while driving a vehicle when off-duty, how often have you…	(1) Always 100% OF THE TIME	(2) Frequently 75% OF THE TIME	(3) Sometimes 50% OF THE TIME	(4) Rarely 25% OF THE TIME	(5) Never 0% OF THE TIME
10	*Example: Driven with your eyes closed.*	○	○	○	○	●
	1. Eaten food	○	○	○	○	○
	2. Drank a beverage	○	○	○	○	○
	3. Answered / talked on a cell phone	○	○	○	○	○
	4. Dialed a cell phone	○	○	○	○	○
	5. Sent a text message	○	○	○	○	○
	6. Read a text message	○	○	○	○	○
	7. Used a GPS system	○	○	○	○	○
	8. Lit a cigarette / cigar or smoked	○	○	○	○	○
	9. Reached for something	○	○	○	○	○
	10. Drove over the posted speed limit	○	○	○	○	○
	11. Changed settings on a CD player / radio	○	○	○	○	○
	12. Changed settings on a hand-held device	○	○	○	○	○
	13. Cared for a pet	○	○	○	○	○
	14. Cared for / checked on a child	○	○	○	○	○
	15. Read (map, book, paper, computer screen)	○	○	○	○	○
	16. Talked with a passenger	○	○	○	○	○
	17. Steered with your knee	○	○	○	○	○
	18. Wore a seatbelt	○	○	○	○	○
	19. Required others to wear a seatbelt in your car	○	○	○	○	○
	20. Groomed (hair, make-up, shaved)	○	○	○	○	○
	21. Driven under the influence (alcohol or drugs)	○	○	○	○	○
	22. Driven drowsy (<6 hours sleep in 24-hr period)	○	○	○	○	○
	23. Driven fatigued (feeling tired)	○	○	○	○	○
	24. Driven while agitated / angry	○	○	○	○	○

EMS Driving Survey Continued

Low score = low impulsivity / low risk-taking.

Reverse code Item 1.

	[1] DISAGREE STRONGLY	[2] DISAGREE A LITTLE	[3] AGREE A LITTLE	[4] AGREE STRONGLY
1. I devote time and effort to preparing for the future	○	○	○	○
2. I act on the spur of the moment without stopping to think. .	○	○	○	○
3. I do things that bring me pleasure here and now, even at the cost of some future goals	○	○	○	○
4. I base my decisions on what will benefit me in the short run, rather than in the long run	○	○	○	○
5. I test myself by doing things that are a little risky	○	○	○	○
6. I take risks just for the fun of it.	○	○	○	○
7. Excitement and adventure are more important to me than security	○	○	○	○

I see myself as someone who …

Reverse code Items 1, 3, 4, 6.

	[1] DISAGREE STRONGLY	[2] DISAGREE A LITTLE	[3] NEITHER DISAGREE NOR AGREE	[4] AGREE A LITTLE	[5] AGREE STRONGLY
is reserved	○	○	○	○	○
has few artistic interests	○	○	○	○	○
tends to be lazy.	○	○	○	○	○
is relaxed, handles stress well	○	○	○	○	○
is outgoing, sociable	○	○	○	○	○
tends to find fault with others.	○	○	○	○	○
does a thorough job	○	○	○	○	○
gets nervous easily	○	○	○	○	○
has an active imagination.	○	○	○	○	○
is considerate and kind to almost everyone. . .	○	○	○	○	○

PLEASE CONTINUE ON BACK SIDE

As a driver, how many times have you…	ON THE JOB	HOW MANY?	OFF DUTY	HOW MANY?
…been involved in a vehicular crash?				
		Record values as reported.		
in the last year?	○	_____	○	_____
in your lifetime?	○	_____	○	_____
…been ticketed for a moving violation?				
in the last year?	○	_____	○	_____
in your lifetime?	○	_____	○	_____

HIGHEST LEVEL OF TRAINING

○ EMT-B [1]

○ EMT-I [2]

○ Paramedic [3]

○ Other: _____ [4]
(please specify)

Record values as reported.

AVERAGE CALL VOLUME (Weekly) _____

AVERAGE # OF SHIFTS (Weekly) _____

EMPLOYMENT STATUS

○ Paid (full-time) [1]

○ Paid (part-time) [2]

○ Volunteer [3]

○ Other: _____ [4]

What is your primary profession?

EMS-related profession=1; all others =2.
_____

Record value as reported.

How many years in your profession? _____

GENDER

○ Male [2]

○ Female [1]

○ Other [0]

Record value as reported.

AGE [ ][ ]

Thank You!

Appendix E

Regression Equation

Step 1: $\hat{Y} = a_0 + b_1x_1 + e$

$[B_{RD} = a_0 + b_1*RP + e]$

Step 2: $\hat{Y} = a_0 + b_2x_2 + e$

$[B_{RD} = a_0 + b_2*SE_{RD} + e]$

Step 3: $\hat{Y} = a_0 + b_1x_1 + b_2x_2 + e$

$[B_{RD} = a_0 + b_1*RP + b_2*SE_{RD} + e]$

Step 4: $\hat{Y} = a_0 + b_1x_1 + b_2x_2 + b_3x_1 *x_2 + e$

$[B_{RD} = a_0 + b_1*RP + b_2*SE_{RD} + b_3*RP*SE_{RD} + e]$

Step 5: $\hat{Y} = a_0 + b_1x_1 + b_2x_2 + b_3x_1 *x_2 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + e$

$[B_{RD} = a_0 + b_1*RP + b_2*SE_{RD} + + b_3*RP*SE_{RD} + b_4*AGE + b_5*GEN + b_6*YE + b_7*RPer + e]$

Variable	Section of Instrument	Response Options	Data Type	Score	Variable Type
Independent					
Risk Propensity [RP]	BFI-10	Likert (1-5)	Interval	Summative	Continuous
	SCS subscales	Likert (1-4)	Interval	Summative	Continuous
Self-Efficacy$_{RD}$ [SE_{RD}]	Risky Driving Self-Efficacy Assessment	Likert (1-6)	Interval	Summative	Continuous
Control (Covariate)					
Age [AGE]	Demographics	Open-ended	Ratio	Fixed score	Continuous
Gender [GEN]	Demographics	Multiple Choice	Dichotomous	Dummy-coded	Nominal
Years of Experience [YE]	Demographics	Open-ended	Ratio	Fixed score	Continuous
Risk Perception [RPer]	Risky Driving Behavior Assessment	Rating (1-10)	Ordinal	Summative	Continuous
Dependent					
Behavior$_{RD}$ [B_{RD}]	Risky Driving Behavior Assessment	Likert (1-5)	Interval	Summative	Continuous

VITA

Graduate School

Southern Illinois University

Michelle Yvonne McLernon

Mlernon@siu.edu

Southern Illinois University

Bachelor's of Liberal Arts, Spanish, May 1988

Southern Illinois University

Master of Science, Community Development, May 1990

Southern Illinois University

Master of Science, Therapeutic Recreation, May 2000

Dissertation Title:

Risk Propensity, Self-Efficacy, and Driving Behaviors Among Rural,

Off-Duty Emergency Services Personnel

Major Professor: Kathleen Welshimer, PhD