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FIREFIGHTERS:
ATTITUDES, BELIEFS, AND BEHAVIORS THAT CONTRIBUTE TO HIGH-RISK
BEHAVIORS

BY

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DISSERTATION

Submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy in Educational Psychology
in the Graduate College of the
University of Illinois at Urbana-Champaign, 2010

Urbana, Illinois

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Abstract

This study investigated the attitudes, beliefs, and behaviors that contribute to risk-taking intentions among firefighters. To examine if attitudes have an effect on risk-taking intentions, the Theory of Planned Behavior by Ajzen (TPB; 1988, 1991, 2001) was applied. A questionnaire and scenarios were developed to assess the TPB. Further interest was if emotion-laden stimuli moderate firefighters' intentions to engage in risky scenarios. Two primes, one depicted a firefighter fighting a fire blast (hero), the other one depicted a firefighter handing candy to children (public servant) were used in the study. The study consisted of 155 firefighters who were randomly assigned to three groups: hero group, public servant group, and control group. It was assumed that firefighters primed with the picture of a hero will show higher risk-taking intentions than firefighters primed with the picture of a public servant. Further, firefighters in the control group will show less risk-taking intentions. The hypotheses were not supported in this study. Path model analyses, multivariate analysis of covariance (MANCOVA), and hierarchical linear modeling (HLM) were used to analyze the data. The path model showed that attitudes and subjective norms were strong predictors of intentions for firefighters' risk-taking intentions across five scenarios. The results of the MANCOVA detected the presence of an overall significant effect of condition on attitudes across all scenarios, except for scenario 5, and a significant priming effect on subjective norms in scenario 5. The HLM demonstrated that firefighters differed systematically in their intentions of risk-taking, depending on whether or not they were primed. Age, years of education, and lengths of service had no influence on firefighters' risk-taking intentions. The results of the study are limited to other occupational groups by the underrepresentation of diversity in ethnicity, gender, and occupational background of firefighters.

*For my grandparents Marianne and Heinz Kessler,
my son Shavit Maximilian Kessler Amir, and
meinem weiser Lebensbegleiter Holger Rumm.*

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Chapter I

Firefighting and the Accessibility to Survive

“Everyone Goes Home” was the theme of the 83rd annual Fire College Training Program presented by the University of Illinois Fire Service Institute in 2007. However, more than 100 firefighters are killed in the line of duty in the United States and approximately 80,000 firefighter injuries are reported by the United States Fire Administration annually (USFA, 2004, 2006, 2007, 2008). By December 30th in 2009, ninety-three firefighters perished and 80,100 total injuries were reported (USFA, 2008). Due to the large number of fatalities, the USFA has adopted goals of reducing firefighter fatalities by 25% within the next five years and 50% within the next ten years.

Firefighters perform service work for the community in fire profession and prevention. They respond to alarms, operate equipment and apparatus to suppress fires and rescue people, animals, and property from all types of accident and disasters. Firefighting has been recognized as a dangerous and strenuous profession and the unique health hazards increase firefighters risk for line-of-duty injuries and death (Matticks, Westwater, Himel, Morgan, & Edlich, 1992; Smith, Petruzzello, Kramer, Warner, Bone, & Misner, 1995).

The strenuous physical work of firefighting is often performed in a hostile environment that exposes firefighters to risk for injury and death. The risk of a fatal incident for a firefighter is three times greater than for any other workers compared to a similar profession (Clarke & Zak, 1999). The Federal Emergency Management Agency (FEMA, 2004) reports that the leading causes of fatal injuries for firefighters en route or at the scene are heart attacks (44%), the other leading causes are internal and head injuries (27%), asphyxiation and burns account for 20% of fatal injuries.

FEMA published a statistical portrait of the fire problems in the United States and presented trends over a 10-year period (1992-2001). The report focused on causes, property types, smoke alarm performance, and casualty characteristics. The agency reported that a total of 449 firefighters perished in 2001. The report showed that the death and injury rate increased 30% within 10 years. In 2007, 42 firefighters had already died at the scene. Nearly all of the injuries (96%) occurred when extinguishing fire, neutralizing an incident, or in general when providing suppression support. Considering the USFA and FEMA reports, leaders in the fire service profession are calling for research that leads to interventions and programs that will help decrease death and incident rates for firefighters.

The National Fallen Firefighters Foundation established a research agenda (National Fallen Firefighters Foundation, 2005) to identify and prioritize areas where research efforts should be directed to support improvements in firefighter's safety. The members of this symposium developed the Firefighter Life Safety Initiatives to identify key strategies to reduce risks associated with firefighting and emergency service. The product of the symposium was a comprehensive fire service research agenda with recommendations for accomplishing these initiatives in six identified areas: structural fire suppression, wild land fire suppression, research and training, vehicles and equipment, health, wellness and physical fitness, and incident reduction (National Fallen Firefighters Foundation, 2005).

Though there have been tremendous improvements in firefighters' clothing, equipment, and training there is relatively little research on psychological variables that can influence firefighters injury and death (Smith, Manning, & Petruzzello, 2001; Smith, Petruzzello, Kramer, & Misner, 1997). Fire service culture is widely recognized as a culture that often places bravado or a misunderstood heroism ahead of firefighter's safety (FEMA, 2008; Waldron, D., 2008). In

general, research suggests that the leading causes for injuries for older firefighters are strains and sprains, and inhalation, exhaustion, and bravado behavior for younger firefighters (FEMA, 2008). It is especially bravado and 'heroism' that leads to the behaviors that neglects safety requirements, and leaders in the firefighting service assume that these cultural attitudes are key factors for injuries and fatalities (FEMA, 2008).

The fatalities report (FEMA, 2008) demonstrated that research is often focused on understanding how age, gender, time of the day/month, or career versus volunteer status influence injury and fatality rate. However, although leaders in the fire service are aware of *attitudes* that can lead to risk-taking intentions, there is a paucity of research that aims to study psychological variables in the firefighting service. This research study focuses on studying firefighter's attitudes toward high risk behaviors. The focus on psychological factors that can help understanding risk-taking intentions is a unique approach in the firefighter service. If we are able to understand how attitudes affect risk-taking intentions, we may be able to meet the USFA's goal, "Everyone Goes Home."

The Present Study

There has been tremendous improvement in clothing, equipment, and training for firefighters but why does the injury and death rate still increase? To answer this question, I chose a research area stemming from the National Fire Service Research Agenda (2005). The research question stated in the agenda is, "Identify attitudes, beliefs, and behaviors that contribute to high-risk behaviors and resistance to changes that would improve health and safety. Also identify effective motivators to promote positive changes." This issue is believed to be one of the key factors in reducing firefighter's injuries and fatalities and is ranked with top priority by the

symposium members (National Fire Service Research Agenda, 2005). To meet the requested research question, this study investigated attitudes that lead to risk-taking intentions by applying Ajzen's Theory of Planned Behavior (TPB; 1988, 1991, 2001). To further investigate and to make a valuable suggestion regarding positive changes, priming of emotion-laden stimuli in conjunction with the TPB were used. It was of interest if emotion-laden stimuli moderate risk-taking intentions.

The theory of planned behavior. The Theory of Planned Behavior was used in this research study to investigate risk-taking intentions among firefighters. The TPB has 1036 research articles in the PsycINFO database and has been widely used to predict health-related behavior. The TPB has been shown to predict a variety of behaviors in health-related fields in general (Ajzen, Albarracin, & Hornik, 2007; Armitage & Conner, 2001; Sheppard & Hartwick, 1988) or specific health related fields such as cancer (DeVellis, Blalock, & Sandler, 1990; Montano & Taplin, 1991), smoking cessation (Norman, Connor, & Bell, 1999), risk-taking among taxi drivers (Bruns & Wilde, 1995), and condom use (Sheeran & Taylor, 1999; Sutton, McVey, & Glanz, 1999). Less frequently, the TPB has also been used to predict occupational safety and health among firefighters (Welbourne & Booth-Butterfield, 2005). The TPB is a predictive model for explaining human behavior and states that human action is guided by three kinds of considerations: beliefs about the possible consequences of the goal behavior (behavioral beliefs), beliefs about the normative expectations that others hold (normative beliefs), and beliefs about the possible factors that may further or hinder the execution of the goal behavior (control beliefs). These beliefs are, in general, described as knowledge which influences a person's attitude towards a behavior, subjective norms, and perceived behavioral control. Applied to this study, attitudes towards risk-taking intentions refers to a firefighter's favorable or unfavorable

evaluation to engage in risk-taking intentions; subjective norms refer to the perceived social pressure by other firefighters (or society in general) to engage in risk-taking intentions; perceived behavioral control refers to the easiness or difficulty to engage in risk-taking intentions. In essence, the more favorable an attitude, the more desired a subjective norm, and the greater the perceived behavioral control, the greater is the intention to engage in the behavior, whereas intention is assumed to be a function of three independent variables. The schematic presentation of the TPB model (Ajzen, 1991) is:

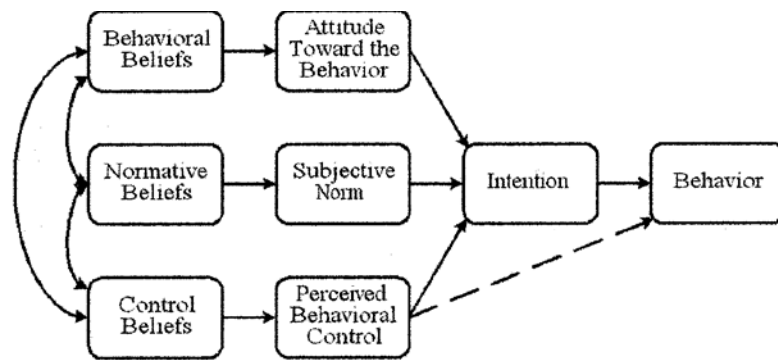


Figure 1. The Theory of Planned Behavior (TPB)

To investigate risk-taking intentions among firefighters, a questionnaire based on the TPB was developed in this study. To my knowledge there is no questionnaire based on the TPB that measures risk-taking intentions among firefighters. To stimulate and elicit responses in the TPB questionnaire, a set of high risk firefighting/rescuing scenarios were developed. All scenarios were written as high risky scenarios that can lead to injuries and/or death of a firefighter. The goal of these high risk scenarios was to create feelings of cognitive dissonance. Cognitive dissonance is defined as an uncomfortable feeling caused by holding two contradictory ideas simultaneously (Festinger, 1957; Van Overwalle & Jordens, 2002). In this study, a firefighter experienced cognitive dissonance when s/he had to decide to engage or not to engage in risky scenarios. It was expected that firefighters whose intent is to engage in risk-taking

intentions as measured by high scores in the TPB questionnaire towards the set of risk-taking scenarios, are more likely to engage in risk-taking intentions in real situations on the job. This research approach is an innovative contribution to the psychological field because the TPB had not been linked to risk-taking intentions among firefighters.

The priming paradigm. The priming paradigm was applied to investigate if emotion-laden stimuli affect firefighter's intention to engage in risk-taking intentions. Research has shown that priming a value makes a variety of value-relevant attitudes accessible (Thomsen, Lavine, & Kounios, 1996). As previously described, firefighters identify themselves as heroes (FEMA, 2008). Coleman (2007), a 40-year old veteran in the fire service and Fire Marshall for the State of California said, "We have the trust of the American public; we are America's heroes." However, firefighters are also designated as first responders and therefore, serve a role as public servants in the community. The term "Public Servant" departs from the term "Hero" in the sense that public servants are not on their job for fame, attention, or glory, but rather they strive to do a good job in order to serve public needs and to ensure public security (Dunn, 1990). Both terms, hero and public servant, play an influential and identifying role in the life of a firefighter. For this study, I used two emotion-laden prime stimuli which was a picture of a firefighter depicted as the hero and a picture of a firefighter depicted as the public servant. It was assumed that the identification as either the hero or the public servant formed a firefighter's attitudes, which would have been activated during the experimental phase in this study through the exposure to emotion-laden priming. Attitudes lead into a firefighter's intentions to execute a behavior, namely either to engage or to refrain from risk-taking actions. The priming paradigm is an innovative contribution to the psychological field because priming has not been applied to risk-taking intentions among firefighters.

Summary of Research Questions

The present study investigated attitudes, beliefs, and behaviors that contribute to risk-taking intentions among firefighters. To investigate the research question, the study used the Theory of Planned Behavior and emotion-laden priming.

Significance of the Study

The study plays a significant role in the demanded research for safety and well-being of firefighters as stated in the National Fire Research Agenda (2005). To understand why firefighters engage in risk-taking intentions may benefit firefighters, their families, as well as the firefighter services and the community at large.

Statement of the Problem

In the following, the hypotheses for the present study are presented.

Hypothesis 1

Emotional-laden primes influence firefighters' intentions to engage in risk-taking intentions.

Hypothesis 2

Firefighters primed with emotional-laden stimuli are more willing to engage in risk-taking intentions than firefighters with who receive no priming.

Hypothesis 3

Firefighters primed under the experimental condition 'hero' show higher risk-taking intentions than firefighters under the experimental condition 'public servant.'

Hypothesis 4

Age, lengths of service, and years of education are covariates and influence firefighters risk-taking intentions.

Hypothesis 5

Firefighters above 35 years of age show lower intentions to engage in risk-taking intentions than firefighters under 35 years of age.

Hypothesis 6

Senior firefighters who have been in the firefighting service for more than 10 years have developed habits and automated behavior that leads to more risk-taking intentions than firefighters who have been in the service for less than 10 years.

Hypothesis 7

Firefighters with a higher degree of education show less risk-taking intentions than firefighters with a lower degree of education.

Chapter II

Literature Overview

The purpose of this chapter is to provide an overview of the current firefighting research. First, current literature of firefighting research is presented. Second, the current literature is presented in connection with the Theory of Planned Behavior and the priming paradigm. The leaders of the Fire Departments in the United States are interested in finding explanations for risk-taking intentions that jeopardizes firefighter's health, well-being, and safety (National Fallen Firefighters Foundation, 2005). Prevention strategies such as training, emphasis on physical fitness and a more stringent adherence to Standard Operating Procedures (SOPs) helped prevent injury and deaths for firefighters. Nevertheless, although research, training, and development of new technologies helped reduce the number of firefighters' deaths and injury, the firefighter retrospective study shows that between the years of 1977 to 2000, 1085 firefighters lost their lives while on duty. Furthermore, the incidence of on-duty firefighter fatalities shows an increase of seven percent since 1990 (FEMA, 2008).

It is worth acknowledging that most of the implemented programs focus on training of equipment such as rope and trench rescue, whereas education focus on physiological variables such as dehydration and exercise. In contrast, the assessment of cognitive variables and interventions are scarce in the field of firefighting.

Gonzalez (2002) investigated the relationship between risk-taking intentions and the frequency and severity of line-of-duty injuries among firefighters. Gonzalez operationally defined risk-taking intentions of firefighters (i.e., wearing a seatbelt, unsafe sex practices, alcohol and substance abuse, poor nutrition) with high scores in a Life Style Survey. However, the results of the study indicated that high scores on the Life Style Survey did not predict the

frequency or severity of injury and death of firefighters. Gonzalezs' results suggest that in order to measure firefighter's risk-taking intentions, the questions measuring risk need to be distinct and well-defined rather than broad and general such as questions asking for lifestyles.

Bouwsema (2007) listed several factors that can contribute to firefighters' injuries and deaths. The author stated that firefighting occurs in a high-stress environments and inappropriate decision that are based on primary factors including ambiguity, underestimating risk, goal conflicts, and unanticipated consequences. According to Bouwsema, ambiguity occurs when the situation on the scene deteriorates and the situational assessment is delayed. Past success with firefighting can influence risk-taking intentions because it might shift the person's baseline of a novel dangerous situation since past similar situations have become increasingly familiar. Social factors such as peer pressure may further encourage firefighters to take risks. Based on his results, the author concluded that when past success and peer pressure start to outweigh safety goals in ambiguous situations, firefighters can make disastrous decisions. Bouwsema research provides important suggestions for this study. According to his results, past success and peer pressure are factors that can lead to risk-taking behavior and outweigh safety requirements. This study controls for the social factor by applying the Theory of Planned Behavior. This model accounts for social factors such as peer pressure and other people's expectations.

A variety of personality traits has been related to the frequency of injuries of firefighters on the scene. Hansen (1991) found support that general social maladjustment such as sociopathic attitudes, drinking, authority problems, and neuroticism are associated with workplace accidents. Liao, Arvey, Butler, and Nutting (2001) examined workplace injuries suffered by 171 firefighters over a 12-year period who obtained workman's compensation. The researchers used the Minnesota Multiphasic Personality Inventory-2 (MMPI-2) to evaluate whether any MMPI-2

scales were significant predictors for injuries among firefighters. The results indicated that specific elevated MMPI-2 scales (Hysteria, Psychopathic Deviate, and Social Introversion) were positively related to injury frequency and duration. Based on the results, Liao et al. provided the hypotheses that firefighters with elevated scores on the Hysteria (Hy) scale tend to feel overwhelmed under stress and neglect careful interaction in the environment, which was founded to be related to more injuries. Firefighters with elevated scores on the Psychopathic Deviate (Pd) scale tend to neglect safety rules and hence suffer more severe injuries; firefighters with elevated scores on the Social Introversion (Si) scale are less likely to engage in social interaction which may result in a hesitation to call for assistance. Based on their study, the researchers suggested implementing the MMPI-2 for personal selection and to screen out candidates who would be ill-suited to the high risk job of a firefighter. Because the data supported only a small fraction of explained variance in the injury frequency model, the researchers suggested that studies should seek to determine other psychological correlates such as attitude models to understand why firefighters engage in risk-taking behavior.

Smith, Manning, and Petruzzello (2001) studied the effect of live-fire drills on physiological and psychological responses of male firefighters. Since the researchers raised concerns about the paucity of studies on psychological factors and how these factors impact cognitive functions and the ability to make decisions quickly, a measurement of cognitive functioning was implemented in their study. Cognitive functioning was assessed by the measure of response time (reaction time) and by a measure of response accuracy (number of errors) to a task. The data implicated impairment of cognitive function with an increase of incorrect responses on a cognitive task. Smith et al. cited that only one other study has documented changes of cognitive function during firefighter activities. Kivimaki and Lusa (1994) study

complements Smith et al.'s results. Kivimaki et al.'s results showed that firefighters' verbal reports of task-focused thinking decreased with increased stress in a smoke-diving simulation. Smith et al. stated that changes in cognitive function can affect firefighters' decision making and the researchers suggested more studies that investigate psychological variables.

Based on these findings, it is striking that most of the research and training programs tend to neglect psychological variables. Considering the high incident and fatality rate among firefighters research on psychological variables such as attitudes can be a worthwhile venue to pursue.

The Theory of Planned Behavior

The present study applied the Theory of Planned Behavior (TPB; Ajzen, 1988, 1991, 2001; Ajzen, Albarracin, & Hornik, 2007; Ajzen & Fishbein, 1980; Fishbein, 1980; Fishbein & Ajzen, 1975, Fishbein & Ajzen, 2010) to study risk-taking intentions in the fire service profession. The TPB is one of the most important social psychological theories for predicting and understanding human behavior and has received substantial support across a number of behavioral domains in its applications to health-related behavior (Armitage & Conner, 2001; Conner & Sparks 1999). The TPB has been widely used to predict an array of behaviors and intentions and has been shown to predict a broad variety of health-related behaviors, such as cancer screening (DeVellis, Blalock, & Sandler, 1990), smoking cessation (Norman, Connor, & Bell, 1999), condom use (Sheeran & Taylor, 1999; Sutton, McVey, & Glanz, 1999), and mammography (Montano & Taplin, 1991).

The TPB is a widely used model that helps to explain human behavior across a variety of behavioral domains but a neglected approach regarding its utility in the firefighting service.

There is paucity on research that links psychological models such as the TPB to the population of firefighters. To my knowledge, Welbourne and Booth-Butterfield (2005) were the only researchers who used the TPB in conjunction with the fire service profession. The researchers conducted their study to evaluate the effectiveness of a National Institute for Occupational Safety and Health (NIOSH) safety message to examine predictors of safety intentions among firefighters and examined the ability of TPB to predict the behavioral intentions for fire chiefs who received the NIOSH alert to use structural fire safety recommendations. The survey used in the study focused on the TPB variables assessing fire chiefs' attitudes, subjective norms, perceived behavioral control, and intentions, in respect to follow the safety recommendation. The data suggested that attitudes, subjective norms, and perceived behavioral control were significant predictors for the intention to follow the safety message. The researcher explained that fire chiefs who held the beliefs about themselves and others (e.g., other fire chiefs) that they should follow safety recommendation and who perceived following the safety recommendation as easy, indicated their intentions to engage in safety behavior and to follow safety recommendations. Therefore, the study supports the usefulness of developing fire safety interventions that directly target TPB variables and the authors stated that the development of interventions focusing on the TPB provides a worthwhile direction for future research in the field of firefighting.

This study predicted that firefighters' attitudes, subjective norm, and perceived behavioral control would predict intentions to engage in risk-taking intentions. The TPB suggests that the intention to perform a behavior is a function of three conceptually independent variables: (a) attitude towards the behavior, (b) subjective norms, and (c) perceived behavioral control. These independent variables themselves are determined by salient underlying knowledge defined

as behavioral, beliefs, normative beliefs, and control beliefs. In the following, each variable of the TPB model is described (Ajzen, 1988, 1991, 2001).

Intentions. Intentions predict and explain human behavior and intentions are the immediate determinant of a goal behavior. Therefore, the stronger the intention is to perform a behavior, the greater the likelihood that an individual will actually engage in the goal behavior.

Attitude towards behavior. Attitude towards behavior is the degree to which a certain behavior is positively or negatively valued. The TPB predicts that the more favorably an individual evaluates a behavior, the more the individual is likely to perform that behavior.

Subjective norm. Subjective norm is an individual's perception of whether most people important to the person think that h/she should/should not perform the intended behavior. Therefore, the more an individual perceives that important others think s/he should engage in the behavior, the more likely the individual intends to engage in the behavior.

Perceived behavioral control. Perceived behavioral control is the perceived easiness or difficulty to perform the goal behavior. The TPB assumes that perceived behavioral control reflects past experiences and anticipated obstacles or barriers in the.

Behavioral beliefs. Behavioral beliefs underlie attitudes towards the behavior and consist of two components: outcome belief and outcome evaluation.

Normative beliefs. Normative beliefs underlie subjective norms and consist of two components: referent beliefs and motivation to comply.

Control beliefs. Control beliefs underlie perceived behavioral control and determine the global perception of a person's control over his/her behavior.

Priming

Priming studies are used to investigate personality, attitudes, motivations, and behavior of individuals or groups. In priming studies, the researcher manipulates the participants' exposure to a word or image which is related to a construct (a prime) and measures the extent to which the participants' interpretation of a stimulus is influenced by the primed construct (Berkowitz & Alioto, 1973; Bruner, 1957, 1990). The important design feature in the priming studies is that the prime is presented to participants as part of an unrelated experiment where the participants are not aware of its influence in the interpretive task. Priming effects occur when a person is shown a stimulus which makes memory more accessible by evoking particular concepts or ideas but with the person's unawareness and inability to accurately report the prime (Uhlmann, Pizarro, & Bloom, 2008).

Berkowitz and Alioto's (1973) study is a classic example of a priming study. Two groups of college students were exposed to a prize fight. The participants were told prior to watching a fist fight that the 'loser' had either very positive or very negative characteristics. At the end of the fight the 'loser' was rated more positively or more negatively depending on the type of priming that the subjects received prior to the experiment. Participants under the condition that the 'loser' is actually a nice guy, felt bad about when he lost the fight; participants under the condition that the 'loser' was a bad guy felt great when he lost the fight. Berkowitz et al. study shows that the perception of the 'loser' was associated with the prior priming of either positive or negative characteristics of the person.

Hong, Morris, Chiu, and Benet-Martinez (2000) primed participants either with pictures of a masculine man and a feminine woman or with gender-unrelated (control) pictures. Later on, the participants were asked to interpret ambiguous behavior of people. Participants primed with

gender related pictures constructed interpretations that showed an influence of gender stereotypes. The researchers concluded that gender-related pictures activate stereotypes, which guide participants' inferences about social situations.

From a cultural perspective, Markus and Kitayama (1991), Shore (1996), Triandis (1989), Trafimov, Silverman, Mei-Tai Fan, and Shui Fun Law (1997), and Trafimov, Triandis, and Goto (1991) explain that behavior is the result of situational cues that people encounter in their cultural environment. Therefore, a person's feeling and thinking are embedded in the particular context with its cultural practices and assumptions where cultural stimuli in the environment prime the culturally normative responses in the person. This is complemented by Bargh and Chartrand (1999) statement that suggested that most of a person's everyday life is determined by mental processes that operate outside of conscious awareness.

Trafimov et al. (1997) found that participants primed with English language endorsed more adjectives related to individualistic roles, whereas participants primed with Chinese language endorsed more adjectives related to social roles measured in an adjective-item list. Based on these findings, the researchers stated that language can be a powerful device to reinforce culturally normative self-construals or cultural self-schemata in a person.

However, not only words can be used as prime but also pictures. Betsky (1997) labeled icons as "magnets of meaning." Icons, emblems, and pictures are elements of a culture and connect to a person's cultural knowledge. Cultural icons, emblems, and pictures are powerful designs to evoke a particular mind frame in an observer. For example, since September 11th the American Flag became an enduring icon when it was raised by three firefighters over the ruins of the World Trade Center. The distinctiveness and belongingness of icons, emblems, and pictures to a defined culture makes them valuable candidates for a priming study.

The present study is inspired by priming studies as presented in the above paragraph. I was interested if emotion-laden priming had an influence on firefighters' risk-taking intentions. Ajzen (2001) explains that automatic attitude activation is produced by primes representing well-known positive or negative person types (e.g. genius, bully) but not by primes representing newly acquired attitude objects (e.g., fictitious persons who performed positive or negative behaviors). Given the previous findings and statements by researchers in priming studies, a prime for firefighters should: (a) be speaking to their cultural self-schemata and identification as a firefighter (b) be familiar and well-known to firefighters, (c) be a cultural icon that represents belongingness to the firefighter service, (d) be ambiguously designed to evoke stereotypical reference, and (e) be embedded in social situations. Because this study was interested in if emotion-laden priming can moderate firefighters' risk-taking intentions, the primes used in the study were culture-related pictures that: (a) were speaking to their identification, (b) were familiar and well-known, (c) were representing belongingness and familiarity, (d) were ambiguously designed, and (e) were embedded in a social situation of daily firefighters duties.

The approach taken in the study was designated to demonstrate that priming can be a sophisticated tool for tight-knit cultures such as the firefighter service. Priming can have the advantage over preexisting methods (e.g., experimental design) that it can help to explore the content of cultural knowledge that is often implicit and unconscious but yet determines a person's attitudes, motivation, volition, and perception (Greenwald & Pratkanis, 1984; Higgins, 1996). Moreover, experiments under the priming method allow using true random assignments and provide stronger validity and reliability than the questionnaire taken alone (Grimm & Yarnold, 1995).

Definition of Risk-Taking Intentions

The definition of risk-taking intentions is a difficult task for the firefighting profession. This occupation is inherently associated with risk-taking actions. However, a definition of risk-taking intentions needs to be defined to set parameters in this study. Fuller (1984) stated when risk-taking is intrinsically rewarding or rooted in values and attitudes, decisions about taking risk can obey unconscious processes and Brenner (1983) argued that risk refers to situations where the estimate of an outcome is uncertain. Fuller's and Brenner's definitions of risk are fundamental for the definition of risk-taking intentions in this study. I operationally defined risk-taking intentions among firefighters in this study as: *Risk-taking intentions are any conscious or unconscious behavior with a perceived uncertainty about its outcome, and its possible benefits or costs for the physical well-being of oneself or others.*

Summary

The present study investigated intentions towards high risk behavior based on the TPB. To measure the TPB variables, a questionnaire and scenarios were developed. To investigate if emotional-laden priming modifies firefighters' risk-taking intentions, pictures presenting a firefighter either as hero or as public servant were presented prior to the questionnaire (priming phase). It was conceptualized that priming with emotion-laden stimuli evokes firefighter's cultural self-schema and moderates their intentions to engage in high risk behavior. It was assumed that firefighters who identify themselves as heroes are more likely to engage in risk-taking intentions than firefighters who identify themselves as public servants. Firefighters in the control group were expected to show a random pattern or low risk-taking intentions due to the lack of a modifying prime.

Chapter III

Methods

This chapter outlines the methods of the study. First, I discuss the sample and data collection for this study. Second, I describe the scenarios and primes used in this study. Third, I describe the measures in detail.

Every year firefighters lose their lives in the line of service. Although there has been improvement in equipment and training, psychological variables that lead to risk-taking intentions and hence, injuries and deaths have been underrepresented in the literature. This study focused on psychological variables and investigated attitudes that can lead to risk-taking intentions among firefighters. Data for this study were collected in Champaign-Urbana, Illinois, a middle sized town in the Midwest. The data was collected at an annual training seminar at the Fire Service Institute in Champaign which made it convenient to access a large group of firefighters. A small portion of the sample was collected from fire stations in Champaign and Urbana. The current study intended to measure if firefighters who identify themselves as heroes engage in more risk-taking intentions than firefighters who identify themselves as public servants. Risk-taking intentions was measured through the TPB questionnaire statements towards a set of risk scenarios. Firefighters were randomly assigned to three experimental groups.

Sample

Initially, the sample consisted of 157 firefighters; however, two subjects were taken out from the study since they stated the awareness of the prime. Therefore, the present study consists of 155 firefighters, 154 men and one woman. The sample was recruited in summer of 2007 from a training session held at the Fire Service Institute in Champaign. Firefighters from all over the

country attended the training sessions. An additional part of the sample in this study was recruited from fire departments in Champaign and Urbana. The age ranged from 18 and 64 years ($M = 36.9$, $SD = 9.9$). In terms of years of education, the mean was $M = 13.56$ ($SD = 2.26$) and lengths of service consisted of a mean of $M = 13.46$ ($SD = 8.54$). The sample entails Caucasian males with the exception of one Asian American male, one African American male, and one Caucasian female firefighter.

Data Collection

The data was collected in 2007 at the Fire Service Institute in Champaign, IL. Every year, the Fire Service Institute in Champaign holds the annual firefighter training where firefighters from Illinois and all over the country participate in education and training. The data collection for this study took place during the annual training session, conducted in classrooms in the Fire Service Institute. On entering the classroom, firefighters were asked to sign a consent form for the participation in the study. I explained that I am interested in one's comfort level regarding a set of firefighting scenarios. I stated that the participation was voluntary and that the agreement or the decline of the participation had no effect on their employment or promotion in the fire service. The anonymity of the firefighters was secured in the consent form. The participants were randomly assigned to the groups. After the introduction, firefighters were asked to open the booklet that was placed in front of them. A firefighter would then see either a picture with a firefighter as hero, a picture with a firefighter as public servant, or no picture (Appendix A). This was the priming phase of the study. Afterwards, firefighters were asked to work through the booklet that contained the TPB questionnaire and a set of five scenarios. At the end of the questionnaire, firefighters were asked to answer the demographics indicating age, gender, racial

identity, years of education, rank, and lengths of service. To evaluate if firefighters became aware of the prime, a question was asked if they remembered the theme of the booklet. Finally, firefighters were asked if they had any suggestions for the study. On average, it took about 45 minutes for a person to fill out the questionnaire. Table 1 shows the experimental design.

Table 1

Experimental Design of the Present Study

Experimental Groups	Emotion-laden Prime	TPB-Questionnaire
Hero	Prime	Questionnaire
Public Servant	Prime	Questionnaire
Control	No Prime	Questionnaire

Scenarios

The study used five high risk scenarios that were designed to evoke firefighter's intention to take risk in each one of these scenarios (Appendix C). These scenarios served as case vignettes and presented firefighting/rescue scenarios. All scenarios were written as high in risk-taking with the possibility of injury or death for a firefighter. The scenarios were written as risk-taking events with the goal to create cognitive dissonance in firefighters. Further, firefighters were asked about their comfort level with each assignment. Presenting occupational-relevant scenarios and asking participants about their comfort level with each scenario is common procedure to measure risk-taking, decision-making, and ethical dilemmas (Driskill, Weismuller, Quebe, Hand, Dittmar, & Hunter, 1997; Hunter, Martinussen, & Wiggins, 2003; Huon, Hesketh, Frank, McConkey, & McGrath, 1995; Randall & Gibson, 1991). Comfort level was operationally defined as the level of comfort that firefighters would have firefighting/rescuing under the specified conditions described in the scenarios. The question about the comfort level served as a

measure for firefighters' risk-taking intentions in the analysis for the pilot study as well as an additional risk-taking intentions measure for the final analyses in this study. The idea to ask specifically for one's comfort level instead of asking overtly if one feels comfortable taking risk respecting each one of the scenarios is based on Peterson's (2004) experiences in the firefighting service. Peterson, a 23-year old firefighter and coordinator for the Regional Hazardous Incident Team, assessed risk-taking intentions of firefighters in hazardous emergencies. Peterson used a comfort level scale that measured firefighter's emotional and subjective feelings of risk towards hazardous materials situations. Peterson explained that many firefighters had difficulty stating their risk level towards an assignment because the concept of risk is perceived as either nebulous or intangible. Firefighters have to take risk on a daily basis and risk-taking is just part of the profession. Peterson said firefighters seemed to find it easier when asked about their comfort level with an assignment because a question about comfort level seems to create a different frame around a situation where firefighters feel more confident about their statements. Further, when I talked to senior firefighters during the development of the research question, they univocally agreed that the word 'risk' holds a negative connotation for firefighters. That is, the word 'risk' may evoke social desirability where firefighters hide their actual risk-taking intentions because they fear losing their jobs once labeled as 'risk-taking rambos' on the scene. Finally, the comfort level measures an interval scale, which can be more informative than a rank ordered category. The item, "What is your comfort level with this assignment?" was anchored on a 10-point scale ranging from low comfort (1) to high comfort (10).

Primes

The present study used emotion-laden primes across three experimental groups: hero, public servant, and control group. The hero group was primed with a picture of a firefighter fighting a blast of fire surrounded by the sentence “*Firefighters are Heroes*” whereas the public servants group was primed with a picture of a firefighter handing candies to children surrounded by the sentence “*Firefighters are Public Servants.*” The control group was used to show the difference in priming and remained without a prime. Crawford (2007) stated if there is one term that has become synonymous with American firefighters and the profession itself; it would be the term hero. The term is used by the public and the fire service in everyday language and is used to characterize firefighters. Firefighters have “No Fear” stickers on their cars and T-shirts with a skull surrounded by a sentence “Fire Fighter Service” are highly valued items among firefighters Hoff, 2007). Besides heroism, firefighters are first responders and therefore defined as public servants. Crawford believes that the term public servant departs from the term hero because public servants are not on their job for fame, attention or glory but rather because they try to do the best job to serve public needs and to ensure public security (see also Dunn, 1990).

Designing the scenarios and primes. The designing of the scenarios and the priming material were conducted in collaboration with two senior firefighters from the Fire Service Institute. These two firefighters held the rank of officers with five and more years of working experience in the fire service. Both firefighters helped voluntarily writing these scenarios. In collaboration, we developed a set of 15 firefighting/rescuing scenarios for this study. The pictures used for the priming phase were chosen by the two senior firefighters. These pictures stem from a firefighter magazine and were borrowed without violation of copyrights. In a further expert rating, these pictures were presented to five experienced senior firefighters and asked if

these pictures present stereotypes of firefighters defined as a hero and as a public servant. Consistently, the five senior firefighters agreed that the two pictures presented well stereotypes of firefighters.

Measures

To measure the constructs in the TPB, I developed a questionnaire to assess firefighter's intention to engage in risk-taking intentions (Appendix C). The development of the questionnaire followed Ajzen's (2006) recommendation on how to construct a TPB questionnaire and the items were adapted to measure firefighters' duties. The questionnaire was presented to five lieutenants who voluntarily participated and who were asked to identify whether the TPB items were authentic and realistic. To identify and correct problems with the questionnaire, I regularly met with these experts and made use of cognitive interviewing. Cognitive interviewing is an approach to design questionnaires where a researcher collects verbal information about the questionnaire to evaluate the quality of the questions and to help determine whether the question was generating the information that this researcher intended (DeMaio & Rothgeb, 1996; Willis, Royston, & Bercini, 1991).

Ajzen (2006) suggests anchoring items on a unipolar scale ranging from 1 to 7, with higher numbers reflecting a more favorable evaluation (and reversed scoring for items with negative endpoint). In total, the questionnaire contained a set of 30 items for each scenario. The questionnaire was designed for firefighters to create relevant and meaningful items that can assess risk-taking intentions and to identify beliefs that influence intentions towards risk-taking intentions. It was expected that especially subjective norms are a strong predictor for intentions due to the fact that firefighters work in close knit teams that foster loyalty, reliability, and

dependability and where it is so important what others firefighters think of an individual. In the following, the statements in the questionnaire are presented (Appendix C).

Intentions. Intentions were measured with two items. The first item stated, “I would follow the assignment as described in the scenario” (1 = very unlikely to 7 = very likely) and the second item stated, “If I would encounter this kind of scene, I intend to complete the assignment as described in the scenario” (1 = strongly disagree to 7 = strongly agree).

Attitude toward the behavior. Attitudes toward behavior was measured with the same stem, “For me as a firefighter, I believe the assignment as describe in the scenario is” with four items on 7-point scales ranging from 1 = harmful to 7 = beneficial; 1 = based on good judgment to 7 = based on bad judgment 1 = pleasant to 7= unpleasant and 1 = worthless to 7 = useful.

Subjective norms. Subjective norms were measured with four items. The first scale asked, “Most firefighters who are important to me believe that I (1 = should to 7 = should not) go along with the assignment in the scenario.” The second item was, “The firefighters in my life whose opinion I value would (1 = approve to 7 = disapprove) completing the assignment as described in the scenario.” The third scale asked, “I feel under peer pressure to go along with the assignment as described in the scenario” (1= strongly disagree to 7 =strongly agree). The fourth statement asked, “Most firefighters who are important to me would go along with the assignment as described in the scenario” (1 = definitely false to 7 = definitely true).

Perceived behavioral control. Perceived behavioral control was measured with five items. The first scale stated, “I believe that going along with the assignment as described in the scenario will lead to a positive outcome” (1 = strongly disagree to 7 = strongly agree). The second item stated, “If I wanted to, I could easily refuse to go along with assignment as

described in the scenario” (1 = definitely false to 7 = definitely true). The third item stated, “It is difficult for me to go along with the assignment as described in the scenario” (1 = very difficult to 7 = very easy). The fourth item asked, “I am confident that I could go along with the assignment as described in the scenario if I wanted to” (1 = strongly disagree to 7 = strongly agree). The fifth item stated, “The decision to go along with the assignment as described in the scenario is beyond my control” (1 = strongly disagree to 7 = strongly agree).

Behavioral beliefs. Behavioral beliefs were measured with six items. The first item asked, “I believe that my refusal to go along with the assignment as described in the scenario would be regarded as disloyal by my fellow firefighter” (1 = definitely false to 7 = definitely true). The second item stated, “Not going along with the assignment as described in the scenario is” (1 = very bad to 7 = very good). The third item stated, “I believe if I went along with the assignment as described in the scenario, my fellow firefighters would approve” (1 = very unlikely to 7 = very likely). The fourth item stated, “The approval of me as a firefighter by my fellow firefighters is” (1 = very unimportant to 7 = very important). The fifth item stated, “I believe I could be injured if I went along with the assignment as described in the scenario” (1 = very unlikely to 7 = very likely). The sixth item stated, “Being injured in the line of duty as a part of my job is” (1 = very unacceptable to 7 = very acceptable).

Normative beliefs. Normative beliefs were measured with five items. The first item asked, “I think my family would approve of me completing the assignment as described in the scenario” (1 = very unlikely to 7 = very likely). The second item asked, “I think my friends would approve of me completing in the assignment as described in the scenario” (1 = very unlikely to 7 = very likely). The third item asked, “My company expects me to complete the assignment as described in the scenario” (1 = very unlikely to 7 = very likely). The fourth item

stated, “The investigator of the Office of the State Fire Marshal expects me to complete the assignment as described in the scenario” (1 = very unlikely to 7 = very likely). The fifth item asked, “I think my chief would approve going along with the assignment as described in the scenario” (1 = strongly disagree to 7 = strongly agree).

Control beliefs. Control beliefs were measured with four items. The first item stated, “I have seen firefighter who were injured in this kind of scenario” (1 = strongly disagree to 7 = strongly agree). The second item asked, “I expect that firefighting and/or rescues as described in the scenario will be difficult” (1 = strongly disagree to 7 = strongly agree). The third item stated, “I have the knowledge and skills to complete the assignment in the scenario” (1 = strongly disagree to 7 = strongly agree). The fourth item stated, “It would take me a lot of effort to complete the assignment in the scenario” (1 = strongly disagree to 7 = strongly agree).

Control variables. The TPB assumes that human social behavior is reasonable and that beliefs may be biased but attitudes, subjective norms, and perceived behavioral control are rational derivatives of these beliefs and consistent with the goal behavior (Ajzen, 1991). However, this assumption has been challenged by researchers who assume that human behavior can be automatic and habitual (Aarts & Dijksterhuis, 2000; Aarts, Verplanken, van Knippenberg, 1998; Ajzen, 1991; Bagozzi, 1981; Fazio, 1990; Fredricks & Dossett, 1983; Verplanken, Aarts, van Knippenberg, & van Knippenberg, 1994; Ouellette & Wood, 1998) and this assumption is complemented by organization psychologists and researchers in Germany. Zapf, Frese, and Brodbeck (1999) explain automatic and habitual behavior with the theory of action memory. The researchers cite the example of the Chernobyl accident in 1986 and explain that the accident did not happen based on ill decision making but moreover based on routine and habitual, automatic behavior of the nuclear power workers. As mentioned in previous paragraphs, the

USFA report shows that one-third of injuries occurred to more experienced firefighters between the ages of 30 to 39 with most common injuries of strains and sprains for this age group. The USFA report suggested relating these injuries to habit strengths and automatic behavior.

To control for risk-taking intentions based on habit strengths and automatic behavior, age was included as a covariate in the study. It was of interest if age and within if senior or novice firefighters show significant differences in risk-taking intentions. To control for past experience and the question if past success influences risk-taking intentions, two questions, “Over the course of your career, how often did you follow the instruction as described or similar to the presented scenario?” and “Over the course of the past year, how frequently were you involved in situations as described or similar to the scenarios?” were added in the questionnaire. To control for level of education and lengths of service and the question if they can affect risk-taking intentions, three open-ended questions, “How many years of education?”, “Your rank in the fire service?”, and “Lengths of service” were added in the questionnaire. To control for the priming effect, firefighters were asked, “Do you remember the theme of the booklet?” at the end of the questionnaire.

Comfort level. To measure firefighters comfort level towards the scenarios, a 10-point scale measuring the comfort level was included in the questionnaire. The measure was used in two steps in this study. First, the measure was used in the pilot study to investigate the face validity of the scenarios. Second, the measure was used in the final analysis to investigate an association between the comfort level and risk-taking intentions in the TPB questionnaire. I conceptualized that firefighters who endorse a high comfort level towards the scenarios are more likely to endorse a high level of risk-taking intentions in the questionnaire. The question stated,

“What is your comfort level with this assignment?” and was measured on a 10-point scale ranging from low comfort level (1) to high comfort level (10).

Chapter IV

Results

Pilot Study of Scenarios

A pilot study for the scenarios was conducted to test the measures' (a) accuracy and authenticity and (b) variance and normal distribution. In collaboration with two senior firefighters, an initial set of 15 firefighting/rescuing scenarios was developed. These 15 scenarios were tested with a convenient sample of 29 firefighters. The sample differed in age, educational background, and lengths of service. The 29 firefighters were asked to indicate their comfort level on a 10-point scale ranging from 1 = *low comfort level* to 10 = *high comfort level* for each scenario. It was conceptualized that the indication of high comfort levels towards the scenarios marks firefighters' risk-taking intentions. Cognitive interviewing was used by asking the 29 firefighters to state the accuracy and authenticity of each scenario. Based on accuracy and authenticity the firefighters picked eight of the 15 scenarios. Then, the frequency of firefighters' responses towards the comfort levels were added up and plotted into histograms (Appendix A). The histograms showed that seven out of 15 scenarios had normal distribution and variance that can account for differences among firefighters. That is, some firefighters endorsed a high, some firefighters endorsed a medium, and some firefighters endorsed a low comfort level towards the scenarios. After establishing accuracy and authenticity and adding and plotting the frequency responses of firefighters towards the comfort levels of each scenario into histograms, all those scenarios that overlapped with both firefighters' statements in the interview and scenarios that showed variance and normal distribution in the histograms were included in this study. In total, five scenarios were used in this study (scenarios 2, 5, 6, 9, and 12; see Appendix A).

Preliminary Analyses

To test the influence of priming, a multivariate analysis of covariance (MANCOVA) was conducted using intentions across all five scenarios as the dependent variables (Grimm & Yarnold, 1995; Porter & Raudenbush, 1987). This technique is more robust than traditional analysis of variance in that it detects overall significant contributions of predictor variables on an entire variate (the set of dependent variables tested in the model). Further, MANCOVA accounts for the presence of other, peripheral variables, within the same model. Thus, in the same model, MANCOVA provides information about relations between predictor variables on single dependent variables as well as a set of dependent variables; above and beyond the effects of control variables. The predictor variable was the experimental condition which firefighters had been assigned (that is, hero and public servant and control). The analysis did not detect the presence of an overall significant effect of condition on intentions, Wilks's $\lambda = .904$, $F = 1.477$, $p = .147$. Therefore, differences in the variate of intentions across all five scenarios were not significantly different depending on experimental condition. In terms of univariate effects prime was not significant in any scenarios, $F = 2.833$, $p = .062$; $F = .704$, $p = .497$; $F = 2.780$, $p = .065$, $F = 1.662$, $p = .193$, $F = 1.021$, $p = .363$, $df = 2, 146$ for all scenarios, respectively. No significant differences were found between the hero and public servant conditions. Then a secondary thought came to mind and I looked at the means of hero, public servant, and control group. The descriptive statistics showed that the means for both hero and public servant group were lower than the means for the control group, that is in scenario 1 (control $M = 5.635$, hero $M = 4.770$, public servant $M = 5.382$), in scenario 2 (control $M = 5.677$, hero $M = 5.210$, public servant $M = 5.529$), in scenario 3 (control $M = 6.667$, hero $M = 6.420$, public servant $M = 6.206$), and in scenario 4 (control $M = 5.958$, hero $M = 5.320$, public servant $M = 5.402$) but not in scenario 5

(control $M = 3.198$, hero $M = 2.930$, public servant $M = 3.549$). Because of this, the decision was made to collapse across priming condition and to assess prime versus no prime.

Scale Reliability Across all Scenarios

Reliability analyses were conducted to establish the internal consistency of each scale across all five scenarios. First, the direction of each item was coded based on Ajzen's (2006) recommendation on how to construct a TPB questionnaire. That is, higher numbers reflect a positive attitude towards the behavior and items that have negatively worded endpoints are reversed coded. The scales of control beliefs, behavioral beliefs, and perceived behavioral control showed poor reliability. Next, poor items were deleted to increase the reliability of each scale. Since the scales still did not display adequate reliability, items that were negatively correlated with total score were reversed coded such that each of the scale items would positively covary. Table 2 shows the items that were retained to compute the final reliability. Reverse-coded items are denoted by an (r).

Table 2

Retained Items to Compute Final Reliability

Retained Items to Compute Final Reliability
PBC (items 2 and 5)
<ul style="list-style-type: none"> • If I wanted to, I could easily refuse to go along with the assignment as described in the scenario. • The decision to go along with the assignment as described in the scenario is beyond my control.
BB (items 1, 2, and 3)
<ul style="list-style-type: none"> • I believe that my refusal to go along with the assignment as described in the scenario would be regarded as disloyal by my fellow firefighters. • Not going along with the assignment as described in the scenario is: (r) • I believe if I went along with the assignment as described in the scenario, my fellow firefighters would approve.
CB (items 1, 2, and 3)
<ul style="list-style-type: none"> • I have seen firefighters who were injured in this kind of scenario. • I expect that firefighting and/or rescues as described in the scenario will be difficult. (r) • I have the knowledge and skills to complete the assignment in the scenario.

After deleting and reversed scoring the items, the results of the reliability analysis still showed low reliability for some scales across all scenarios. That is, perceived behavioral control showed $\alpha = -0.38$ for scenario 2 and $\alpha = .50$ for scenario 3, behavioral beliefs showed $\alpha = 0.13$ for scenario 2, and especially control belief showed low reliability across all five scenarios, $\alpha = .36$ for scenario 1, $\alpha = 0.55$ for scenario 2, $\alpha = 0.10$ for scenario 3, $\alpha = 0.49$ for scenario 4, and $\alpha = 0.38$ for scenario 5. Attitudes, subjective norms, intentions, and normative beliefs showed high reliability across all five scenarios, except for subjective norms in scenario 3 ($\alpha = 0.37$) and attitudes in scenario 3 ($\alpha = 0.57$). Table 3 shows the final reliability estimates for all variables across the five scenarios.

Table 3

Final Reliability (Alpha Coefficient) Estimates for All Variables by Five Scenarios

Variables	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
ATT	0.79	0.81	0.57	0.74	0.87
SN	0.68	0.75	0.37	0.70	0.84
PBC	0.76	-0.38	0.50	0.72	0.82
BB	0.74	0.13	0.69	0.82	0.83
NB	0.82	0.80	0.79	0.89	0.89
CB	0.36	0.55	0.10	0.49	0.38
INT	0.95	0.97	0.83	0.90	0.92

Psychometric characteristics of the scenarios. The five scenarios showed variance and normal distribution across all variables, except for scenario 3. The mean for intentions ranged from $M = 3.21$ to 6.41 with a negative skewness of -2.46 for scenario 3 intentions; the mean for attitudes ranged from $M = 2.96$ to 5.00 ; the mean for subjective norms ranged from $M = 3.08$ to 5.57 ; the mean for perceived behavioral control ranged from $M = 3.11$ to 5.56 ; the mean for control beliefs ranged from $M = 2.78$ to 4.59 ; the mean for normative beliefs ranged from $M = 3.08$ to 5.51 , and the mean for behavioral beliefs ranged from $M = 3.32$ to 5.97 . Scenario 3 shows negative skewness for intentions. The measures indicate that most of the scores for intentions occurred toward the upper end of the scale with fewer scores occurred toward the lower end. Therefore, most firefighters indicated risk-taking intentions in scenario 3 and fewer firefighters indicated less risk-taking intentions. The analyses suggest that across all scenarios and variables, scenario 3 can be considered as an ‘outlier’ scenario because it seems to activate firefighters’ values such as responsibility, loyalty, and dependability more so than other scenarios did. Table 4 shows the descriptive statistics across all five scenarios.

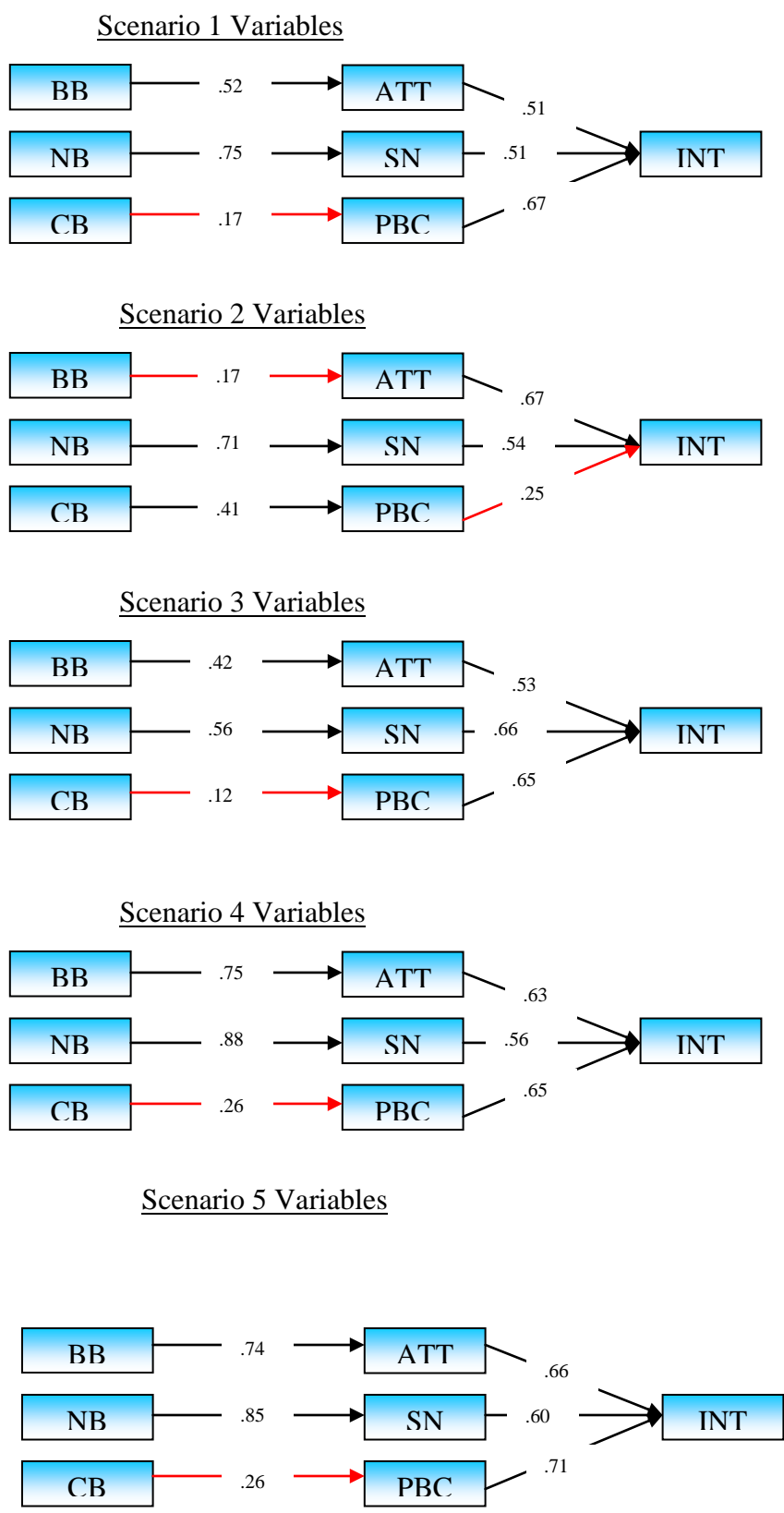
Table 4

Descriptive Statistics Across Five Scenarios

Variable	Scenario	Mean	SD	Skew	Kurt
<i>Intentions</i>	Scenario 1	5.26	1.86	-.91	-.37
	Scenario 2	5.44	2.01	-1.14	-.07
	Scenario 3	6.41	1.00	-2.46	7.47
	Scenario 4	5.57	1.87	-1.21	.24
	Scenario 5	3.21	2.18	.57	-1.21
<i>Attitudes</i>	Scenario 1	4.14	1.49	-.42	-.29
	Scenario 2	4.51	1.74	-.33	-.78
	Scenario 3	5.00	1.20	-.62	.51
	Scenario 4	4.55	1.61	-.70	-.26
	Scenario 5	2.96	1.77	.48	-1.00
<i>Subjective Norms</i>	Scenario 1	4.12	1.37	-.48	-.23
	Scenario 2	4.55	1.63	-.60	-.41
	Scenario 3	5.57	1.03	-.69	.11
	Scenario 4	4.93	1.53	-.79	-.01
	Scenario 5	3.08	1.66	.28	-1.11
<i>Perceived Behavioral Control</i>	Scenario 1	4.53	1.75	-.46	-.80
	Scenario 2	4.42	1.22	-.07	.50
	Scenario 3	5.56	1.33	-.75	-.08
	Scenario 4	5.04	1.73	-.68	-.50
	Scenario 5	3.11	1.93	.60	-.83
<i>Control Beliefs</i>	Scenario 1	4.16	1.08	.30	.18
	Scenario 2	4.59	1.26	-.06	-.43
	Scenario 3	3.23	.73	.41	1.10
	Scenario 4	3.83	1.16	.24	.11
	Scenario 5	2.78	1.27	.47	.27
<i>Normative Beliefs</i>	Scenario 1	4.29	1.48	-.28	-.57
	Scenario 2	4.78	1.54	-.53	-.52
	Scenario 3	5.51	1.35	-.89	.52
	Scenario 4	4.89	1.82	-.68	-.57
	Scenario 5	3.08	1.74	.44	-.95
<i>Behavioral Beliefs</i>	Scenario 1	4.52	1.45	-.51	.00
	Scenario 2	4.51	1.23	-.10	.58
	Scenario 3	5.97	1.26	-1.29	1.35
	Scenario 4	5.33	1.65	-.75	-.48
	Scenario 5	3.32	1.66	.17	-.78

Path Model Analysis

Path analysis was conducted to assess the relations among the variables used in the theoretical model to predict intentions of risk-taking intentions using maximum likelihood (LISREL 8.7; Joreskog & Sorbom, 2004; Schumacker & Lomax, 2004). Again, it was hypothesized that the model of the Theory of Planned Behavior would hold up across all five scenarios of firefighters' risk-taking intentions. Path analyses were conducted to test Ajzen's model across all five scenarios. Specifically, salient beliefs predicted attitudes towards behavior and subjective norms. While this model did converge, results indicated that this model was a poor fit for the data, $\chi^2 = 1612.95$, $p < .001$. RMSEA = .11, SRMR = .27, GFI = .63. The poor fit of this model was likely related to the poor reliability statistics of some of the variables in the model. Although some support was found for the model paths, the fit indicated that the data was not adequately explained by the predictors. Figure 1 shows the path model of the Theory of Planned Behavior across all five scenarios.



Note.
(-----) Denotes significant path at $p < .05$
(- - - - -) Denotes non-significant path

Figure 2. Path model of the Theory of Planned Behavior across all five scenarios.

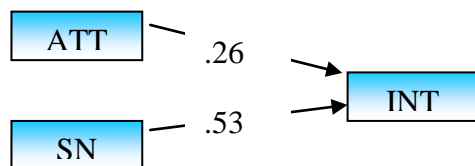
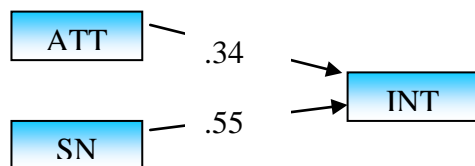
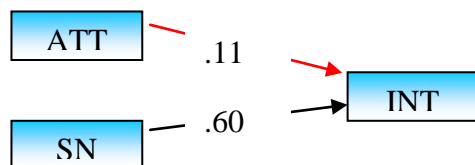
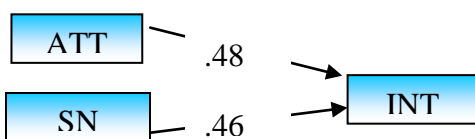
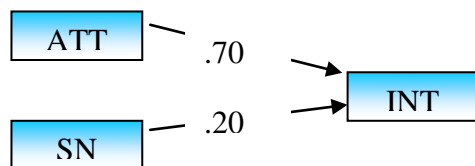
The path model in Figure 1, indicate non-significant paths for some TPB variables across all five scenarios. The model shows insignificant paths from control beliefs to perceived behavioral control for scenarios 1, 3, 4, and 5. Ajzen (2006) stated that perceived behavioral control is determined by a set of accessible control beliefs. Ajzen conceptually related perceived behavioral control to a person's self-efficacy (Bandura, 1994). In this study, it seems that firefighters perceived it as difficult to perform the behavior asked in these scenarios. Conceptually, it makes sense that firefighters' perceived low control over the scenarios since the scenarios were written as high risk-taking scenarios with the possibility of injury or death for the firefighters. Firefighters may have felt helpless and realized that there was nothing that they could do to save the victims or the residential structure as presented in these scenarios. Further, the model shows an insignificant path from behavioral beliefs to attitudes in scenario 2. Ajzen (2006) stated that attitudes are based on positively or negatively valued behavioral beliefs. Conceptually, the insignificant path from behavioral beliefs to attitudes seems plausible when considering firefighting policies such as 'two-in, two-out.' This policy mandates firefighters to never go into a dangerous situation alone. Instead there should always be two firefighters together when they enter a location and one of the firefighters cannot come out of the situation unless both firefighters do. For firefighters values such as team work and working with the crew as well as policies like two-in, two-out are positively valued in contrast to 'freelancing', that is, wandering off the scene on her/his own without following an assignment (Corbett, 2009).

However, the path analysis shows positive paths from behavioral beliefs to attitudes and from normative beliefs to subjective norms for scenarios 1, 3, 4, and 5. Therefore, firefighters' value to engage in the scenarios, and it is important for them what others think. Further, the model shows positive paths from normative beliefs to subjective norms and from control beliefs

to perceived behavioral control in scenario 2. Therefore, the responses towards scenarios 2 shows that firefighters valued what others think about them and felt that they are able to master the assignment.

A more simplified approach was taken to explain intentions. This time, the Theory of Reason Action (TRA; Ajzen, 1991) was used instead of the Theory of Planned Behavior (TPB; Ajzen, 2006). The TRA is the ancestor of the TPB and consists of attitudes and subjective norms towards intentions. Ajzen introduced the TPB by adding perceived behavioral control to cover volitional behavior. However, the data of this study did not support the construct perceived behavioral control but instead the data supported the forerunner, the TRA. Thus, only these measures were included in subsequent analyses. It would have been difficult to retain normative beliefs, behavioral beliefs, control beliefs and perceived behavioral beliefs when these scales show low reliability in this study.

Overall, the path model provided a good fit for the data according to the standards of Schumaker and Lomax (2004). That is, attitudes and subjective norms were better predictors of intentions for firefighters' risk-taking intentions across five scenarios; $\chi^2 = 72.16$, $df = 167$, $p < .05$; SRMR = .029; GFI = .94; CFI = .98. The path model results are used to examine the path coefficients, or the predicted relations among latent variables. The coefficients are analogous to beta weights in multiple regression. All paths that are statistically significant are distinguished in the diagrams. The data provides empirical support for the Theory of Reasoned Action in this study. Figure 2 shows the path model of the Theory of Reasoned Action across all five scenarios.

Scenario 1 VariablesScenario 2 VariablesScenario 3 VariablesScenario 4 VariablesScenario 5 Variables

Note.

(-----) Denotes significant path at $p < .05$

(-----) Denotes non-significant path

Figure 3. Path model of the Theory of Reasoned Action across all five scenarios.

The path model in Figure 2, shows the significant and insignificant path of the TRA across all five scenarios. The model shows an insignificant path from attitudes to intentions for scenario 3. In scenario 3, firefighters are asked to locate and remove firefighters in an apartment building after the floor collapsed. This is a risky situation for firefighters since they are asked to perform the behavior without a crew and without radio contact to the officer. This is a high risk situation and to follow the assignment seems to be negatively valued. However, the path analysis shows sufficient paths for attitudes and subjective norms towards intentions across scenarios 1, 2, 4, and 5. Therefore, firefighters valued the engagement in the assignment positively and as important what other might think about them. The results of the path analysis indicate that subjective norms tend to be a better predictor for intentions than attitudes. An overview over means, standard deviations, and correlations can be found in Table 6 (Appendix B). Because of the poor scale reliability of control beliefs, the items were investigated further. Comparing Ajzen's recommendations on how to construct a questionnaire with the control items in this study, it seems that the adaptation of the items was poor. Most likely, that caused the low reliability. Because control beliefs are the underlying affective and cognitive foundation for perceived behavioral control and because the path model showed significant path from perceived behavioral control to intentions for scenarios 1, 3, 4, and 5, control belief items were dropped and a path model was rerun. Although the control belief items were dropped, the fit did not improve (Chi-square = 1456.38, $p < .001$, SRMR = .12, RMSEA = .12, CFI = .80). Further, a path model was conducted on the combined scenarios. Previously, each scenario has been treated as a single study and it could have been of further interested to combine all five scenarios and to investigate the effect on intentions. However, the results showed that the overall fit was not good (Chi-square = 125.68, $p < .001$, SRMR = .17, RMSEA = .22, CFI = .86). Since these models did

not add any additional information, the path model investigating the TRA was retained in this study.

Multivariate Analysis of Covariance

To test the influence of priming, multivariate analysis of covariance (MANCOVA) was conducted using attitudes and subjective norms as the dependent variables controlling for age, lengths of service, years of education, and comfort level. (Grimm & Yarnold, 1995; Porter & Raudenbush, 1987). After examination of the questionnaire, it became evident that the firefighters failed to indicate their rank. None of the firefighters indicated their rank in this study, hence, this control variable was not added in the analysis. Firefighters' decision to conceal their rank may be based on the scenarios used in the study. Firefighters' decision to omit the question could be embedded in a type of socially desirable responding that is described as self-deceptive enhancement (Lalwani, Shrum, & Chiu, 2009). Therefore, it is possible that these scenarios imposed a threat and consequently, firefighters did not want to be identified.

The analysis detected the presence of an overall significant effect of condition on attitudes and subjective norms, Wilks's $\lambda = .748$, $F = 4.49$, $p < .001$. Effect size was measured by means of eta-squared values, where 25.2 % of the variance in the outcome variate was explained by the experimental condition, partial $\eta^2 = .252$. Whereas priming predicted less risk-taking attitudes in most scenarios, priming only predicted less subjective norm perceptions of risk-taking in Scenario 3. Further, the analysis showed for age, Wilks's $\lambda = .924$, $F = 1.088$, $p = .376$, for lengths of service, Wilks's $\lambda = .922$, $F = 1.123$, $p = .350$, for years of education, Wilks's $\lambda = .945$, $F = .780$, $p = .645$, and for comfort level Wilks's $\lambda = .504$, $F = 13.071$, $p < .001$. The significance of the comfort level is an important result and will be discussed further in the

section t-test for comfort levels. Table 5 shows the subsequent trend analyses of between-subjects effects.

Table 5

Univariate Analysis: Means and Standard Deviations.

Variables	<u>Control</u>		<u>Prime</u>		<u>Effect Size</u>
	Mean	SD	Mean	SD	
Attitudes Scen1**	4.88	1.84	3.89	1.47	0.08
Attitudes Scen2**	5.37	1.92	4.35	1.79	0.07
Attitudes Scen3**	5.52	0.93	4.79	1.25	0.09
Attitudes Scen4***	5.57	1.69	4.43	1.71	0.08
Attitudes Scen5	3.13	2.25	2.93	1.69	>.01
Subj Norms Scen1	4.88	1.72	4.31	1.71	0.02
Subj Norms Scen2	5.32	1.93	4.96	2.01	0.01
Subj Norms Scen3 [†]	6.47	0.86	6.04	1.28	0.03
Subj Norms Scen4	5.65	1.66	5.23	1.91	0.01
Subj Norms Scen5	2.97	1.83	3.23	1.89	>.01

Note. * $p < .05$, ** $p < .01$, *** $p < .001$, [†] $p < .10$.

The results of the MANOVA show statistically significant priming effects for attitudes across the scenarios 1, 2, 3, and 4. The means in the priming groups are lower than the mean in the control group and indicate that priming reduced firefighters' attitudes towards risk-taking intentions. However, priming did not affect attitudes towards risk-taking intentions in scenario 5. In scenario 5, firefighters are asked to rescue children capsized on a dam. That suggests that rescuing children is a positively valued behavior where firefighters are willingly to take risks and put their lives on the line. Further, the analysis shows that priming had no effect on subjective norms across all scenarios, except for scenario 3. That suggests that priming can be a powerful device for moderating attitudes but is less powerful for predicting subjective norms. Priming does not affect firefighters' perception of whether other firefighters think that s/he should/should not perform the intended behavior. However, priming did affect subjective norms in scenario 3.

In scenario 3, firefighters were asked to rescue other firefighters who went missing in a building. That indicates that it is important for firefighters to rescue their fellow firefighters. This is embedded in the firefighting cultures of loyalty and dependability. It is worth acknowledging that although the results showed significance, the effect sizes were not very large and none of the effect sizes were larger than .10.

T-test for comfort levels. T-test was performed to find out whether the means of the comfort level in the two experimental groups were statistically different from the means of the comfort level in the control group. As described before the two experimental groups were collapsed and tested against the control group across all scenarios. The results of the t-test showed a significant difference between the comfort levels of the two experimental groups compared to the comfort levels of the control group. The mean for the experimental groups was $M = 5.68$ and for the control group $M = 6.32$, $t_{(153)} = 1.961$, $p = .052$. The result indicated that firefighters who were primed endorsed lower comfort levels with the assignment than firefighters who received no prime. The results of the comfort level echoed the results of the analyses for attitudes and subjective norms and suggest that in this study, priming reduced firefighters comfort level as well as risk-taking intentions.

Hierarchical Model to Predict Intentions

A hierarchical model analyses was conducted to account for the presence of priming on intentions across all five scenarios. The hierarchical model analyses add to the path model by accounting for the variance within an individual across all five scenarios. Hierarchical model analyses can also account for systematic variance among the experimental groups in respect to priming. Similar to the approach used by Vignoles, Regalia, Manzi, Golledge, and Scabini

(2006), hierarchical model analyses to predict intentions were conducted. Attitudes and subjective norms were centered. Scores for these two variables were computed by subtracting the mean score, thus centering average attitude and subjective norms across the five scenarios. A multilevel model was used with attitudes and norms predicting intentions (Level 1) nested within priming condition (prime, no prime) and demographic characteristics (age, education, and length of service). Three within-persons multilevel models were tested using HLM Version 6.04 (Raudenbush & Bryk, 2002). Attitudes and subjective norms were entered into the first model as group-mean centered; predicting intentions (Level 1 predictors only). Finally, the full model was used to account for the presence of between-participant variance, where condition (prime, no prime), age, length of service, and education were entered as level-2 predictors of variance in the intercept. Level 1 and Level 2 equations for the full model are presented below.

The within-person model is expressed by the following equation:

$$\text{Intentions} = \pi_{0j} + \pi_{1i} (\text{Attitudes}) + \pi_{2i} (\text{Subjective Norms}) + \varepsilon_{i.}$$

The between-persons model is expressed by the following equation:

$$\pi_{0j} = \beta_{0j} + \beta_{1i} (\text{condition}) + \beta_{2i} (\text{age}) + \beta_{3i} (\text{length of service}) + \beta_{4i} (\text{education}) + r_{qi}.$$

In the final model, attitudes ($\pi = .39$, $p < .001$) and subjective norms ($\pi = .72$, $p < .001$) were significant predictors of intentions to engage in risk-taking intentions. Specifically, the degree to which risk-taking intentions is positively valued, and the more firefighters perceived that important people endorsed risk-taking intentions, the greater their intentions to engage in risk-taking intentions. Since these Level-1 predictors were group-mean centered, the intercept should be interpreted as intentions to engage in risk-taking intentions when attitudes and subjective norms are at their average. Overall, the presence of Level 2 variables accounted for 2.01 % ($R^2_2 = .0201$; Bryk & Raudenbush, 1992) of the variance in between- persons increases in

intentions to engage in risk-taking intentions. Significant variability between participant means (τ_{00}) for intentions still remains to be explained, $\chi^2(147) = 592.82, p < .001$. Across participants (at Level 2), the only significant predictor was the experimental condition in which participants were assigned. Specifically, the experimental condition (prime-no prime) predicted variance in the intercept such that firefighters who were primed were significantly less likely to have intentions of engaging in risk-taking ($\beta = -.31, p < .05$). The hierarchical model analyses demonstrated that firefighters differed systematically in their intentions of risk-taking, depending on whether or not they were primed. This is true, when accounting for attitudes and subjective norms about each scenario (Level I – within persons) and when accounted for age, lengths of service, and years of education (Level 2 – between persons). Of interests was if there is a difference between the two primes, hero versus public servant, in respecting to priming firefighters' risk-taking intention. An additional HLM was conducted; however, the results showed no differences between hero and public servant prime on intentions ($p = .492$). Therefore, the only difference on firefighters' risk-taking intentions was the treatment they have been assigned to, experimental versus control group.

Chapter V

Discussion

The present study investigated the attitudes, beliefs, and behaviors that lead to risk-taking intentions among firefighters. To examine risk-taking intentions, the Theory of Planned Behavior (TPB) built the theoretical foundation for this study. To measure the TPB items, a questionnaire and scenarios were developed. Firefighters' risk-taking intentions were measured by the TPB questionnaire that asked for statements towards a set of scenarios. The scenarios were developed in collaboration with senior firefighters. Further interest was whether emotion-laden priming manipulates firefighters' risk-taking intentions. The study consisted of two experimental groups, defined as heroes and public servants, and one control group. Firefighters in the 'hero' group were exposed to a picture (prime) of a firefighter fighting a fire blast; firefighters in the 'public servant' group were exposed to a picture (prime) of a firefighter handing candies to children; firefighters in the control group did not receive a picture (no prime). After the priming phase, firefighters in the experimental and control group were asked to fill out the TPB questionnaire towards the scenarios. These scenarios were written as risk-taking scenarios, designed to elicit cognitive dissonance in firefighters. The scenarios described events that would lead to injuries and/or death of a firefighter when s/he decided to engage in and take action in the scenarios.

The analyses of the data yielded surprising results. First, the current study did not support the full model of the TPB. The TPB variables behavioral beliefs, control beliefs, and perceived behavioral control had low reliability. As mentioned in the result section, especially the low reliabilities for control beliefs and perceived behavioral control were surprising. Low reliabilities can have a variety of reasons: (a) some of the control belief items were reversed coded and it is possible that firefighters misunderstood the meaning of the reversed items, (b) some items,

especially control beliefs items, were placed at the end of the questionnaire and fatigue and exhaustion could have affected the outcome, or, (c) the items for perceived behavioral control, behavioral beliefs, and control beliefs were poorly written.

However, the data do support Ajzen's (1991) precursor model, the Theory of Reasoned Action (TRA). Both attitudes and subjective norms were strong predictors for behavioral intention and the willingness to engage in risk-taking intentions. The schematic presentation of the TRA (Ajzen, 1991) is:

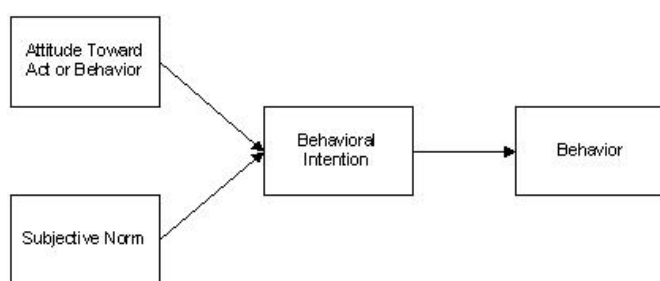


Figure 4. The Theory of Reasoned Action (TRA)

The major difference between the TPB and the TRA is the addition of perceived behavioral control in the later model (Ajzen, 2006). Ajzen implemented perceived behavioral control, which is determined by two factors, control beliefs and perceived power, generally described as a person's self-efficacy, which is the belief that one is capable of performing a behavior to attain goals (Bandura, 1994). Why do the data of this study only support the TRA? Ajzen extended the TRA by the addition of the predictor perceived behavioral control. Ajzen wanted to account for situations where people have the intention to carry out a behavior but the actual behavior is prevented due to the lack confidence or control over the behavior. The results of this study showed that control beliefs and perceived behavioral control as well as behavioral beliefs had low reliability. Therefore, these scales need to be revised in future studies. It is worth noting that firefighters in this study stated that the scenarios were well written but were dangerous for

firefighters. It is possible that firefighters felt helpless when they encountered the scenarios in this study, which would have affected their control beliefs and perceived behavioral control.

The results of the study supported hypothesis 1, priming moderates firefighters' risk-taking intentions, but did not support hypotheses 2 and 3, priming moderates firefighters' intentions in the direction to endorse higher risk-taking intentions. The results of the priming (hero versus public servant) showed that priming had an effect on firefighter's risk-taking intentions, namely both priming conditions *reduced* firefighters' risk-taking intentions in the scenarios compared to firefighters' risk-taking intentions in the control group. In comparison to the firefighters in the experimental groups, firefighters in the control group showed *higher* risk-taking intentions. It is possible that priming activates firefighter's responsibility and makes them think about their actions and makes them 'wanting to do the right thing'.

The results are surprising especially considering that the term 'hero' is used in public and in the fire service in every language when characterizing firefighters. When a firefighter begins his/her career, most of them have a preconceived notion about what the job involves. The images come through role models, TV, and movies where firefighters are presented as action-oriented individuals, running from one life-saving event to another. Some individuals might be attracted to the profession because of the inherent risk that comes along with the profession. Also, most firefighters have military and/or law enforcement background and they are familiar with risk-taking situations and therefore, gravitate towards firefighting.

However, a study by Nelson & Norton (2005) complements the results in this study. The researchers used priming to modify commitment to and engagement in future helping behavior by priming participants with the exemplar Superman and the category of superhero. Although the researchers expected that role models would lead to greater inspiration that positively influences

helping behavior, the positive exemplar of Superman actually led to *less* helping behavior. The researchers suggest that although role models can be inspiring, this inspiration can be undercut and lead to decreased performance when the participants are faced with actual evaluation. The researchers point out that this contrast effect can have disturbing implications when superheroes are used as role models; however, for the purpose of this study, the contrast effect can work in favor. Similar to Nelson's et al. study where priming with Superman decreased people's helping behavior, priming with hero/public servant decreased firefighter's risk-taking intentions. Echoed by Dijksterhuis, Spears, and Lepinasse (2001), abstract stereotypes promote assimilation of behavior to the primed construct but narrow, concrete examples cause behavior to contrast away from the primed construct. Weiner, Freedheim, Millon, and Lerner (2003) explain that when activated concepts are extreme, they can produce contrast effect. The author stated that contrast effect happens when an object is judged more extremely in the opposite direction to the activated concept. Therefore, the pictures in this study that showed firefighters as either a hero or a public servant were most likely perceived as narrow, concrete examples where the firefighters in the study compared themselves to and decided that their actual behavior is different from the ones in the pictures. Based on the findings in this study, it is possible that firefighters judged the scenarios as extreme and actually dangerous after the hero and public servant stereotypes were activated. Consequently, the scenarios were compared to the activated standard and perceived as more dangerous, given the standard of a hero and public servant.

An important outcome of this study is the development of the risk-taking scenarios. These scenarios can be used for future studies and/or training sessions based on their ability to contrast among firefighters. Further, the scenarios show the ability to discriminate well among firefighters that is, some firefighter feel comfortable to engage in risk-taking intentions whereas

other firefighters refrain from taking action towards the scenarios. Further, the interval-scaled measure of the comfort level towards the scenarios was able to discriminate among firefighters' comfort levels. These scenarios were developed with expert senior firefighters and seemed to resemble accurate and authentic scenarios encountered by firefighters. For future studies, it may be worthwhile to randomize the scenarios in the questionnaire or to give the scenarios in all possible orders to evaluate if firefighters' statements changes towards the scenarios.

The results did not support hypotheses 4, 5, 6, and 7 of this study which stated that covariates influence firefighters' risk-taking intentions. The covariates were age, lengths of service, and years of education and it was of importance if they influence firefighters' risk-taking intentions. However, the covariates age, lengths of service, and years of education had no effect on firefighter's risk-taking intentions in this study and the results showed no systematic difference on firefighters' risk-taking intentions across all age groups. Therefore, the data of this study do not support that senior firefighters endorse higher risk-taking intentions than younger firefighters. This finding is complemented with a study by Morrow, Soederberg, Ridolfo, Clifford, Fischer, Kokayeff, and Stine-Morrow (2009). The researchers examined if age differentiates between novice and expert pilots on decision making. In their study, expert and novice pilots discussed scenario problems and were asked to state how they would respond. The results showed that age was invariant in knowledge-based comprehension relevant to expert and novice pilot decision making.

Lengths of service and years of education were also covariates that controlled for unexplained variance in the study. It was of question if senior firefighters who had been in the service for more than 10 years have formed habits and automated behaviors that lead to risk-taking intentions by overruling safety requirements. The data of this study showed that there is

no significant difference among firefighters in their risk-taking intentions depending on the lengths of service. Further, the covariates years of education had no effect on firefighters' risk-taking intentions.

The data of this study support the priming effect. The analyses showed that priming can reduce firefighters' risk-taking intentions independent from age, lengths of service, and years of education. The primes used in this study showed stereotypical behaviors of firefighters and it seems that the heightened awareness of these stereotypes act as a spark, reminding firefighters of the importance to act responsible and cautious in the face of risky situations.

However, was the TRA the best approach for studying firefighter's risk-taking intentions? Batt & O'Hare (2005), Hunter, Martinussen, & Wiggins (2003), and Madhavan & Lacson (2006) provide frameworks of decision-making processes to explain pilots' decision-making in uncertain, deteriorating weather conditions. Pilots often fly in weather conditions that can affect visibility where pilots have to make decisions under extreme weather conditions with possible disastrous outcomes. However, although there seem to be similarities between the two occupational groups, there are differences in the application of the theoretical framework. Pilots flying under visual flight rules are usually required to stay at least a specified distance away from clouds and in areas where the visibility meets a minimum. In contrast, firefighters have to enter facilities that are full of smoke yet with radio contact but without a set of aviation regulations. Further, and maybe even more crucial, pilots operate an aircraft by themselves and/or with a co-pilot; firefighters on the other hand work in teams of multiple to fight fires and to serve and protect the public. Decision-making models as applied in studies mentioned above are relatively mechanic in nature and do not account for attitudes (a central component in this study) or subjective norms (a central component for the firefighting service).

Since this study intended to measure firefighters attitudes towards risk-taking intentions, models that can account for these psychological variables such as the TRA seem to be adequate measures to apply.

Limitations in the study suggest future research. Limitations stem result from the fact that firefighting is traditionally a male dominated occupation where diversity and minorities are underrepresented and where predominantly Caucasian males find employment. The sample in this study is no exception. Only one female, one African American and one Asian American firefighter were included in this study. Finally, the majority of firefighters have military or law enforcement background, which also departs from the standard population. Taken together, the underrepresentation of diversity in ethnicity, race, gender, and occupational background affect the generalizability of the results to other occupations.

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Appendix A

Figures

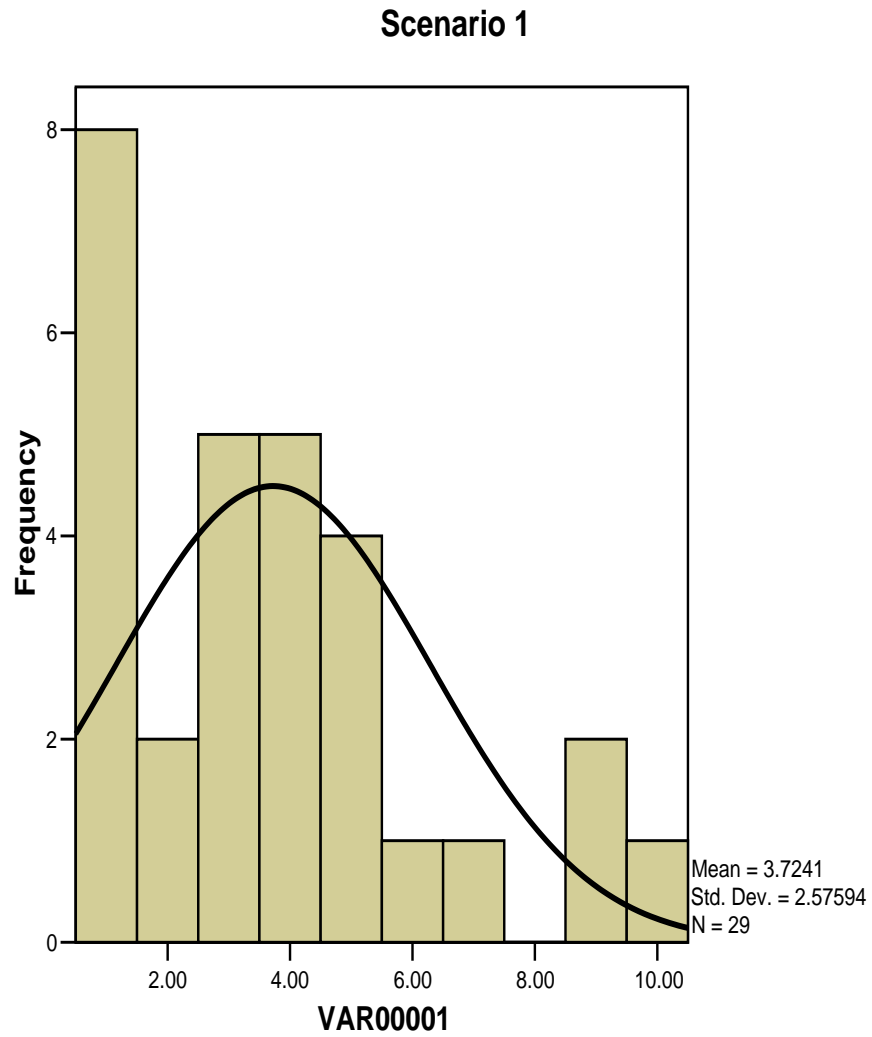


Figure A1. Histogram of scenario 1.

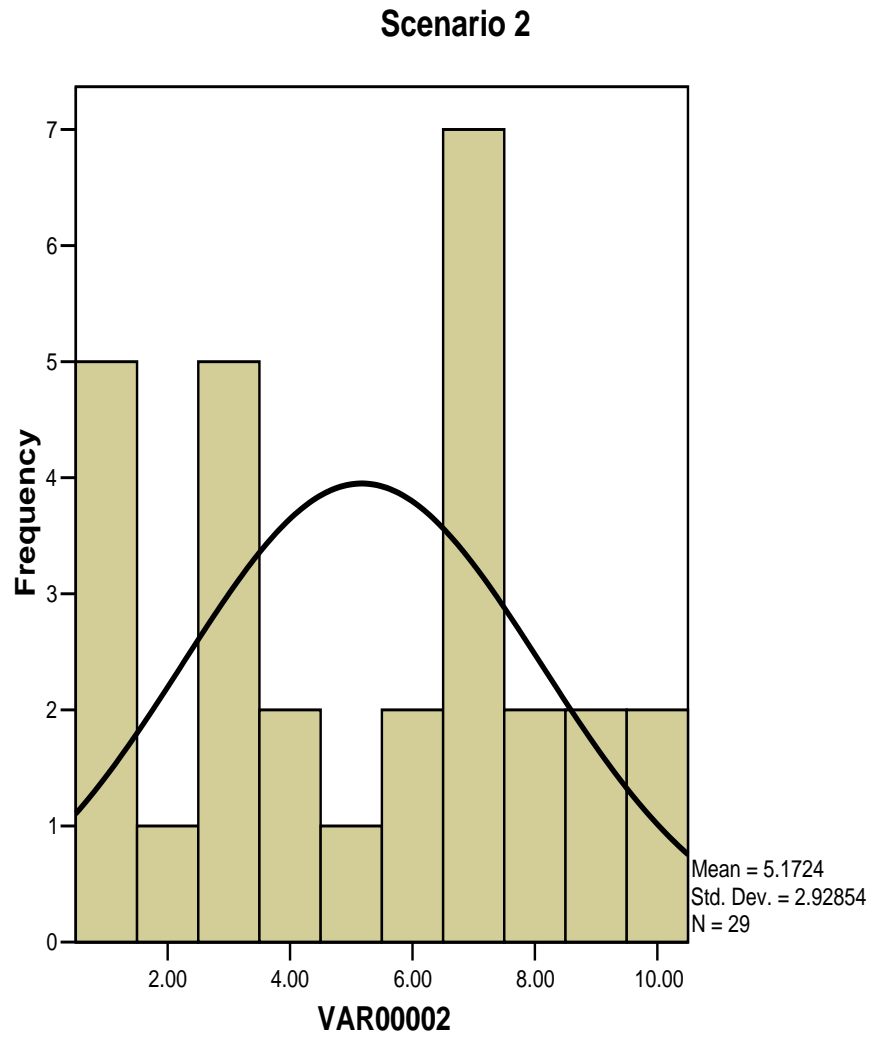


Figure A2. Histogram of scenario 2.

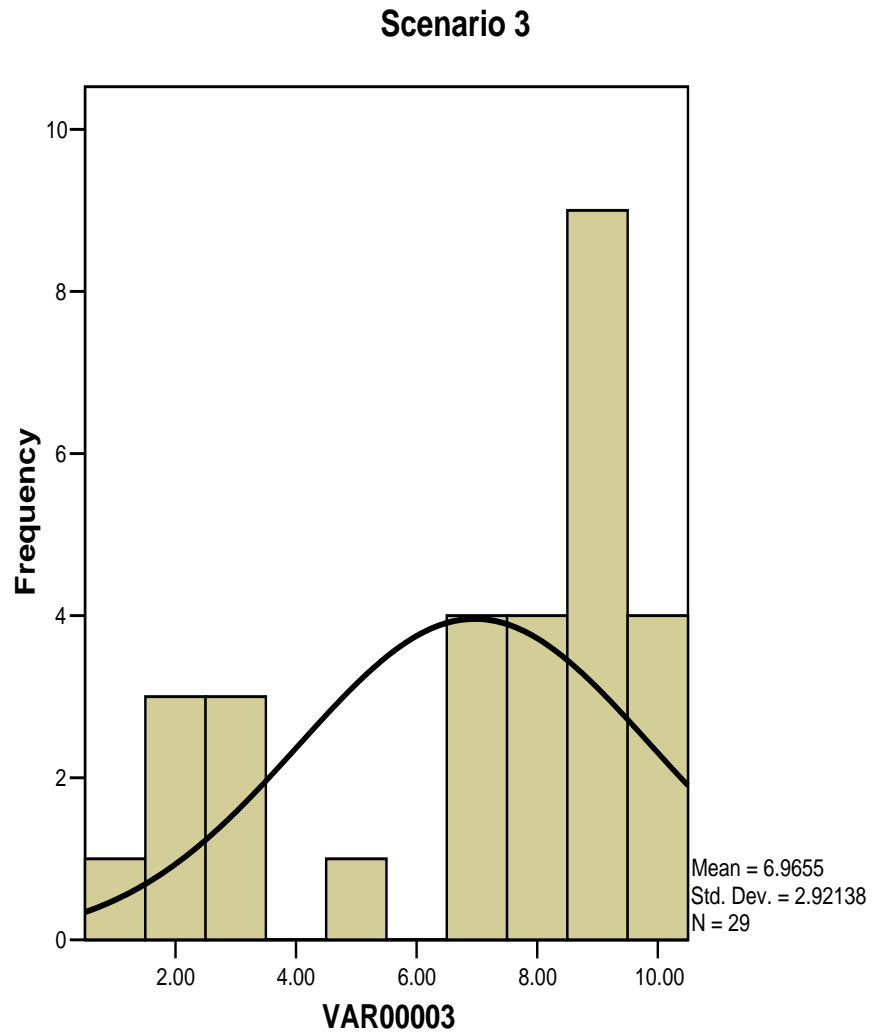


Figure A3. Histogram of scenario 3.

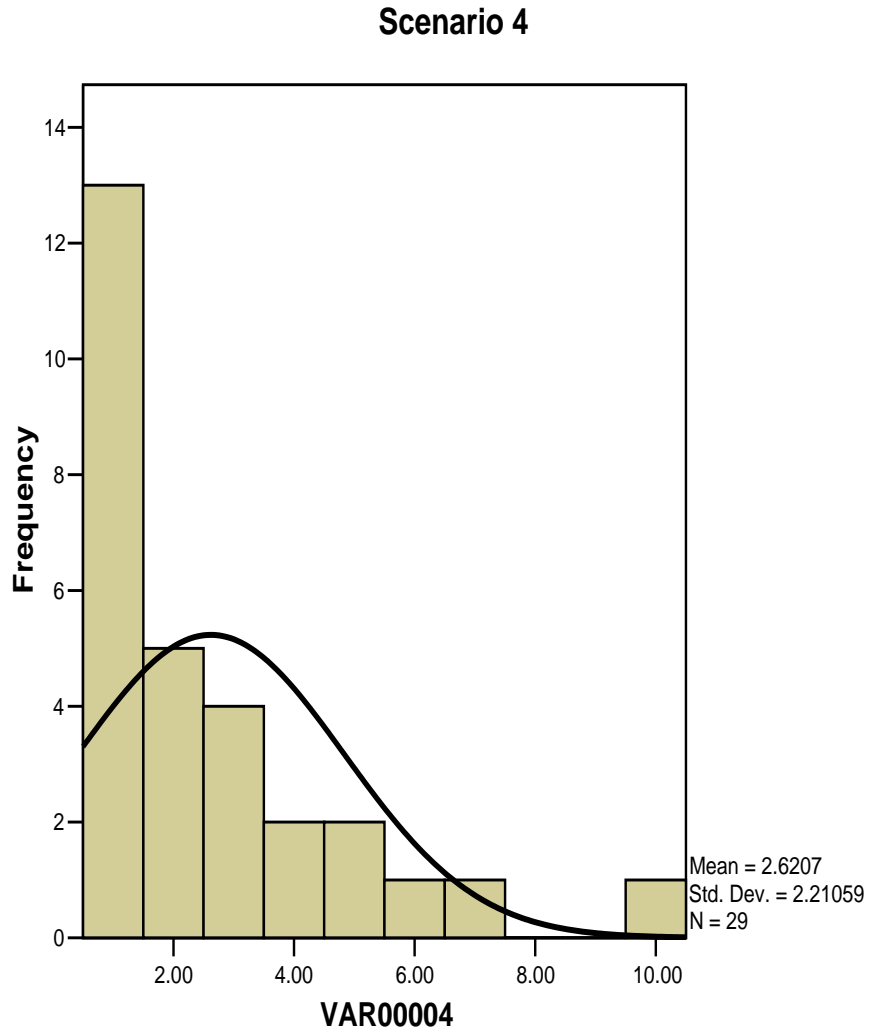


Figure A4. Histogram of scenario 4.

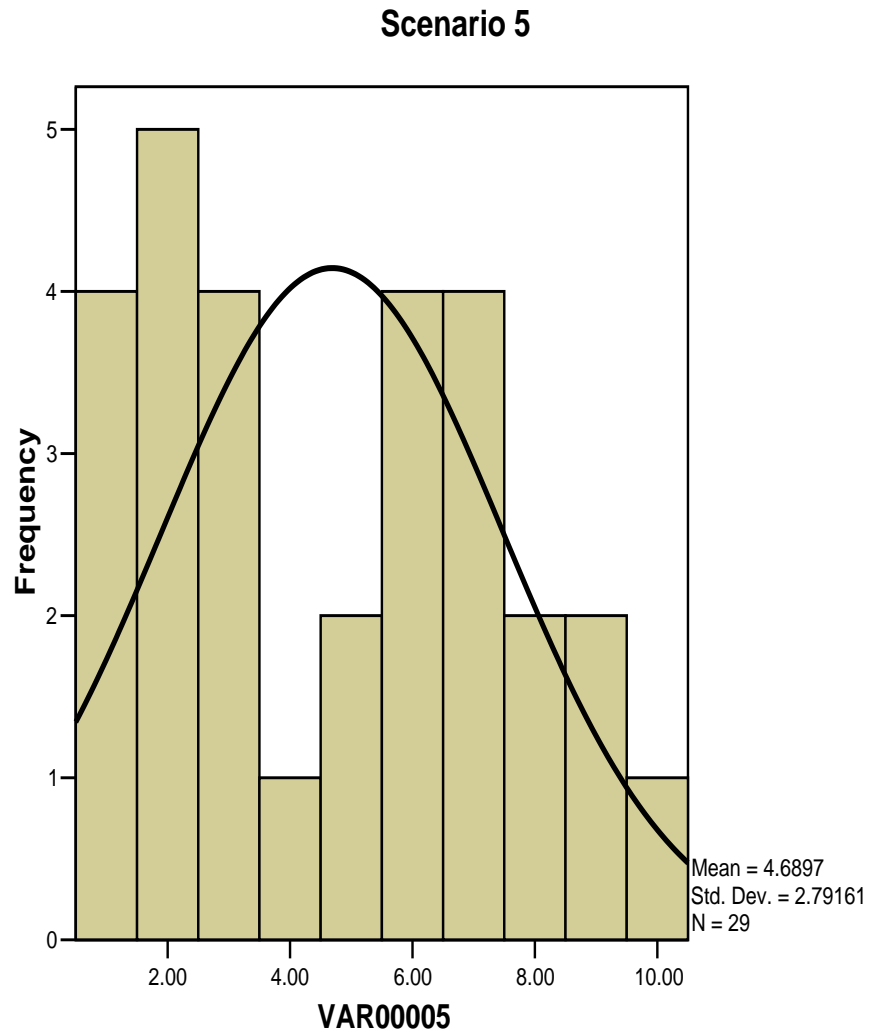


Figure A5. Histogram of scenario 5.

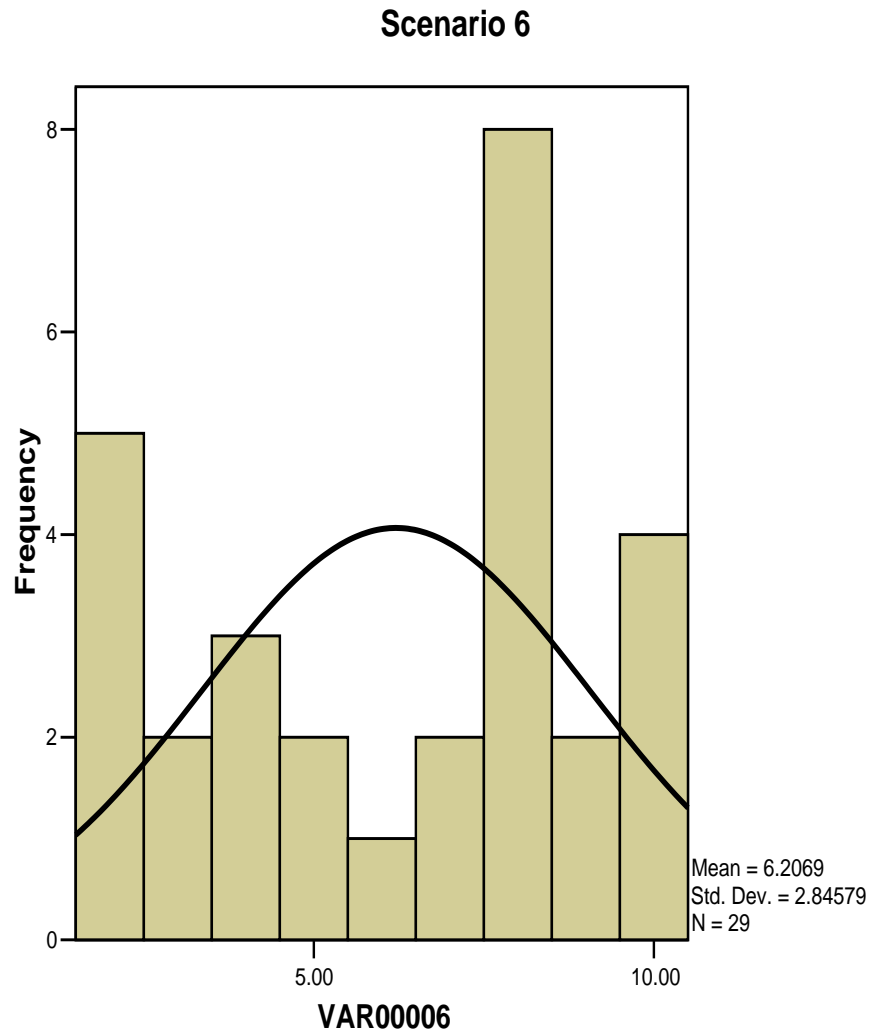


Figure A6. Histogram of scenario 6.

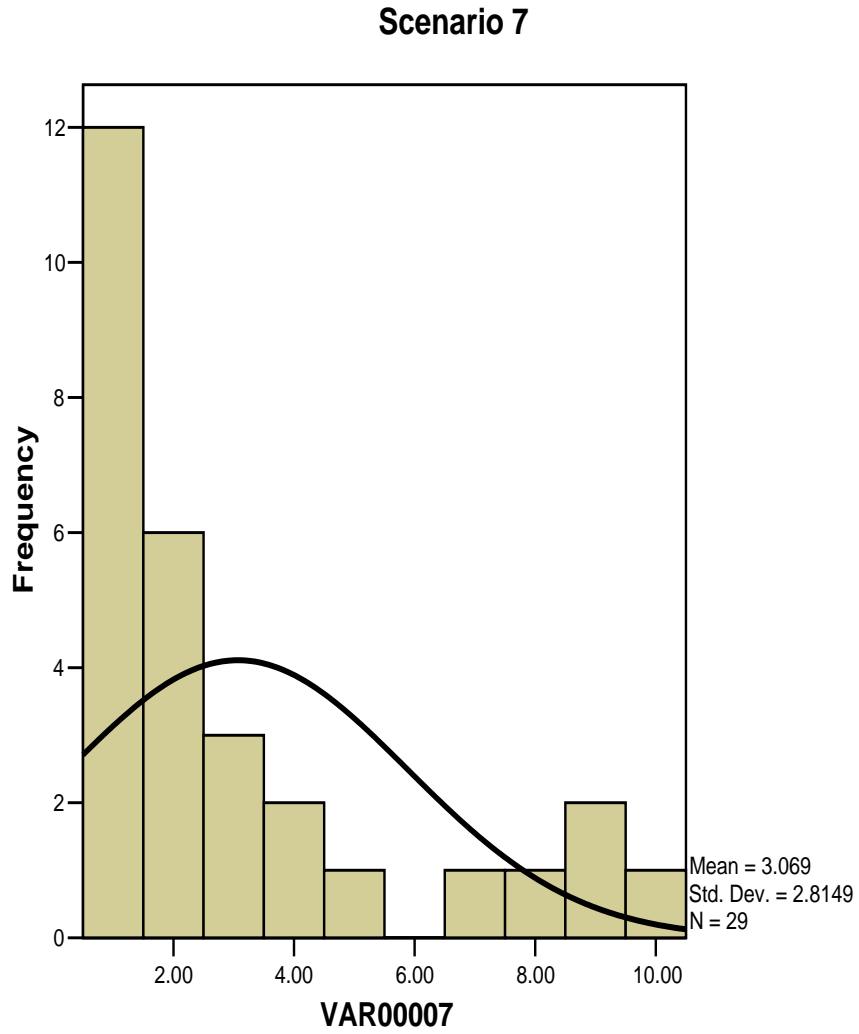


Figure A7. Histogram of scenario 7.

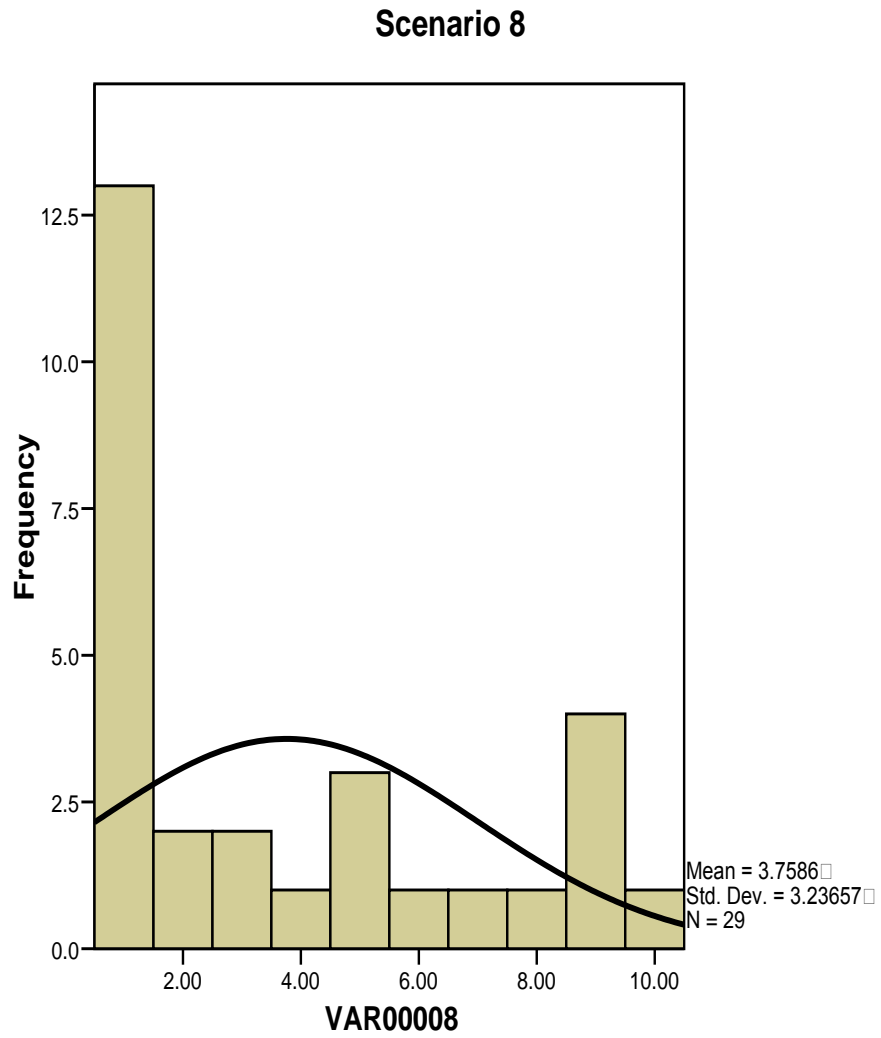


Figure A8. Histogram of scenario 8.

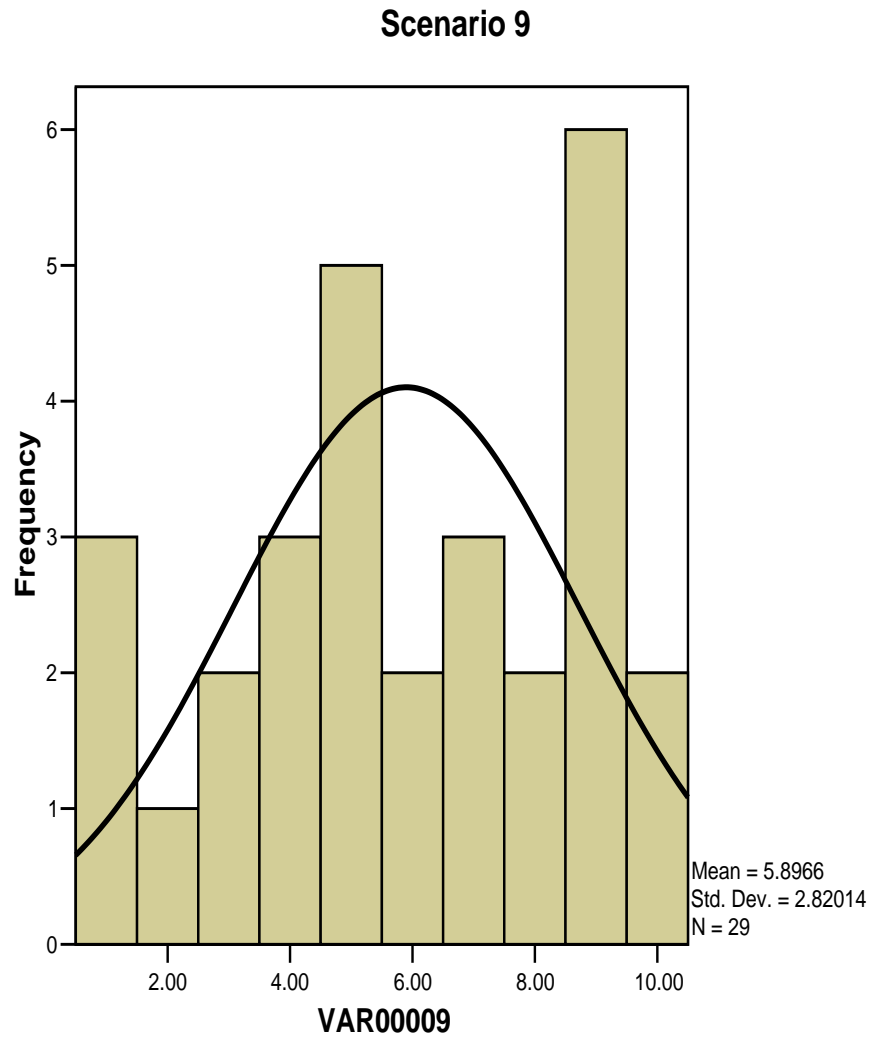


Figure A9. Histogram of scenario 9.

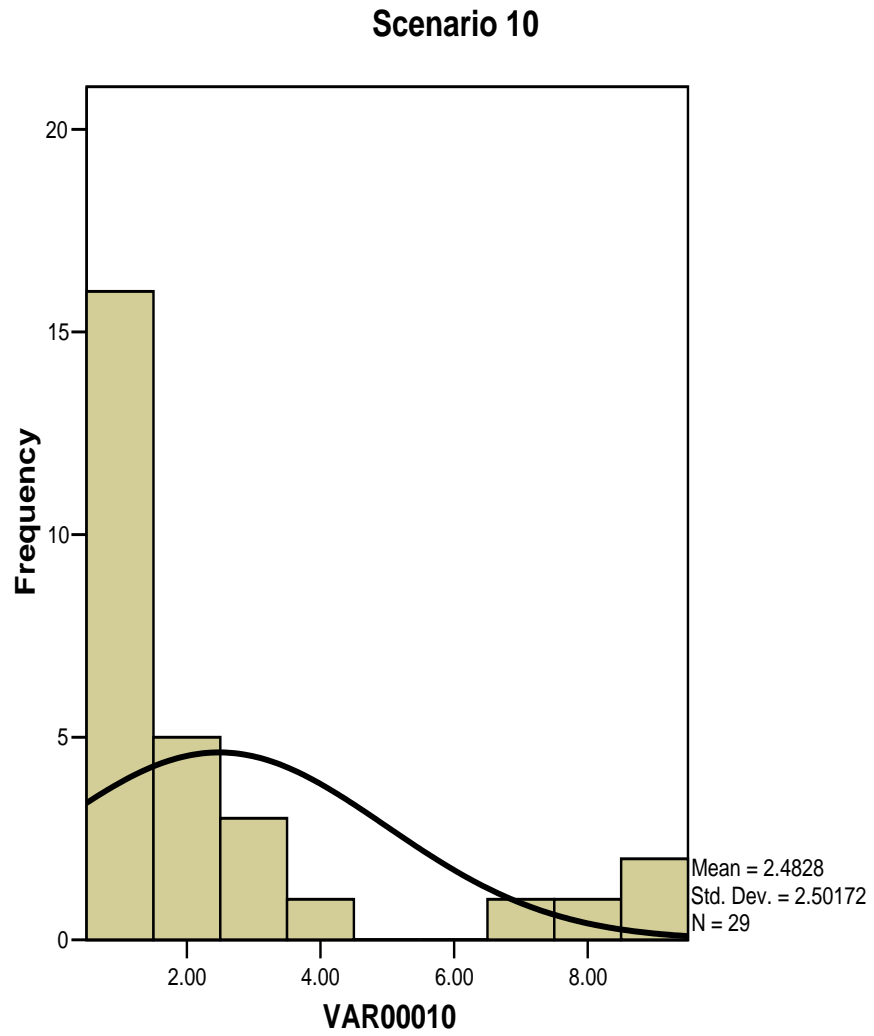


Figure A10. Histogram of scenario 10.

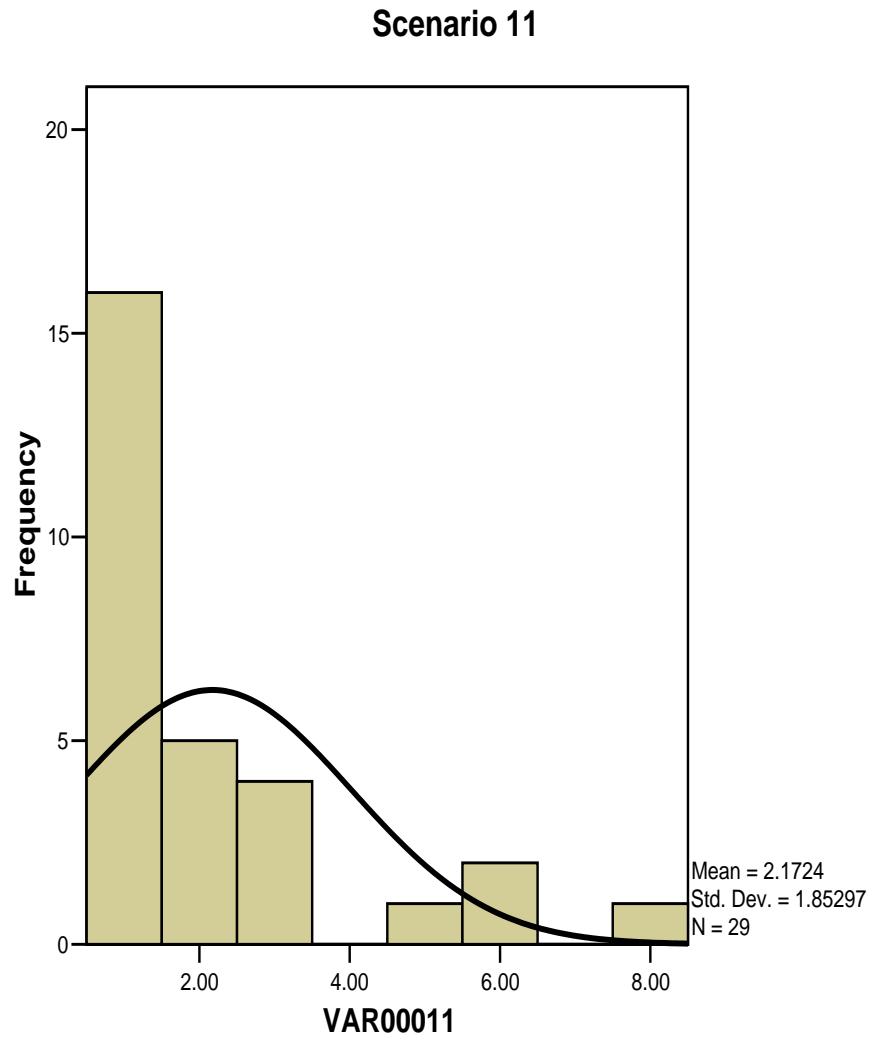


Figure A11. Histogram of scenario 11.

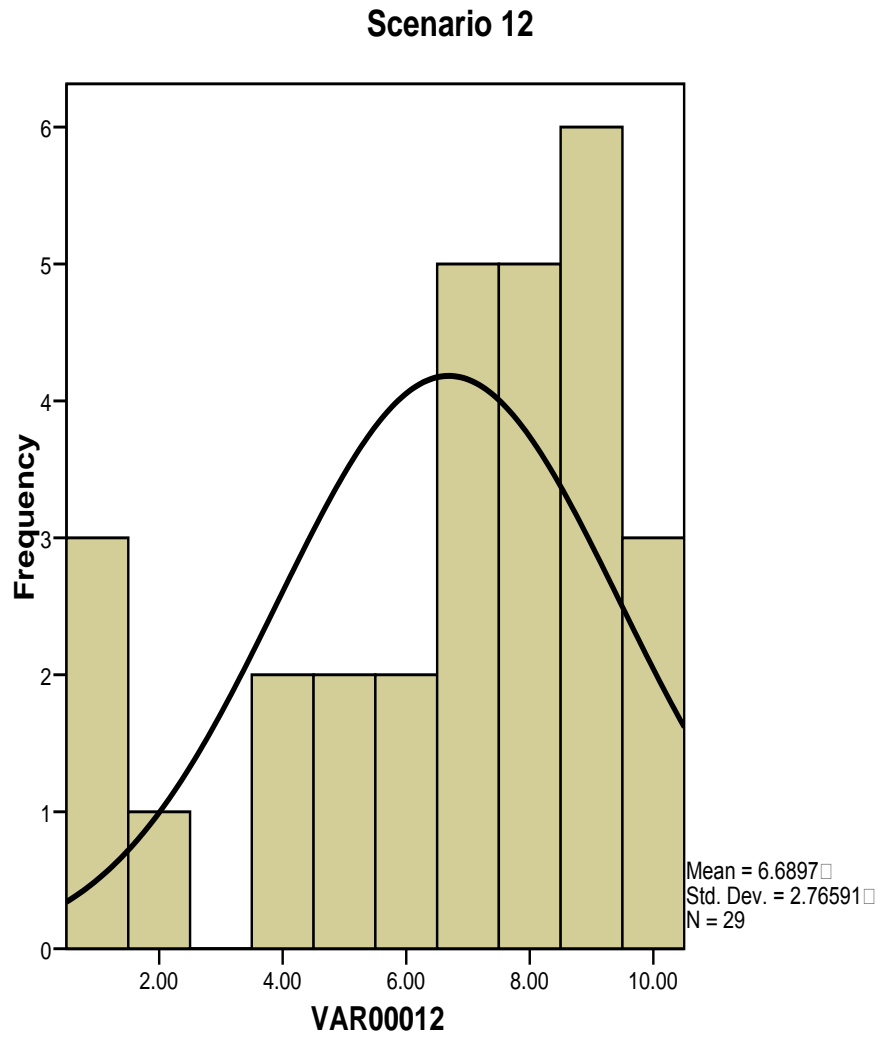


Figure A12. Histogram of scenario 12.

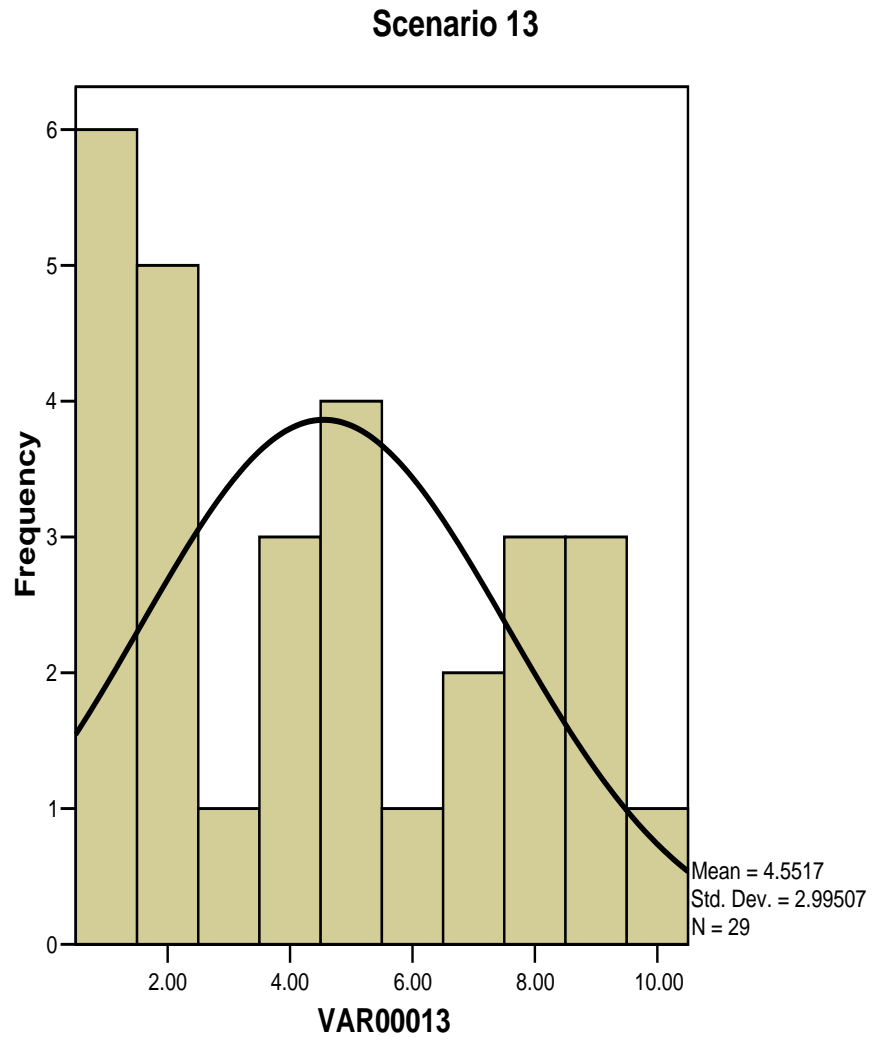


Figure A13. Histogram of scenario 13.

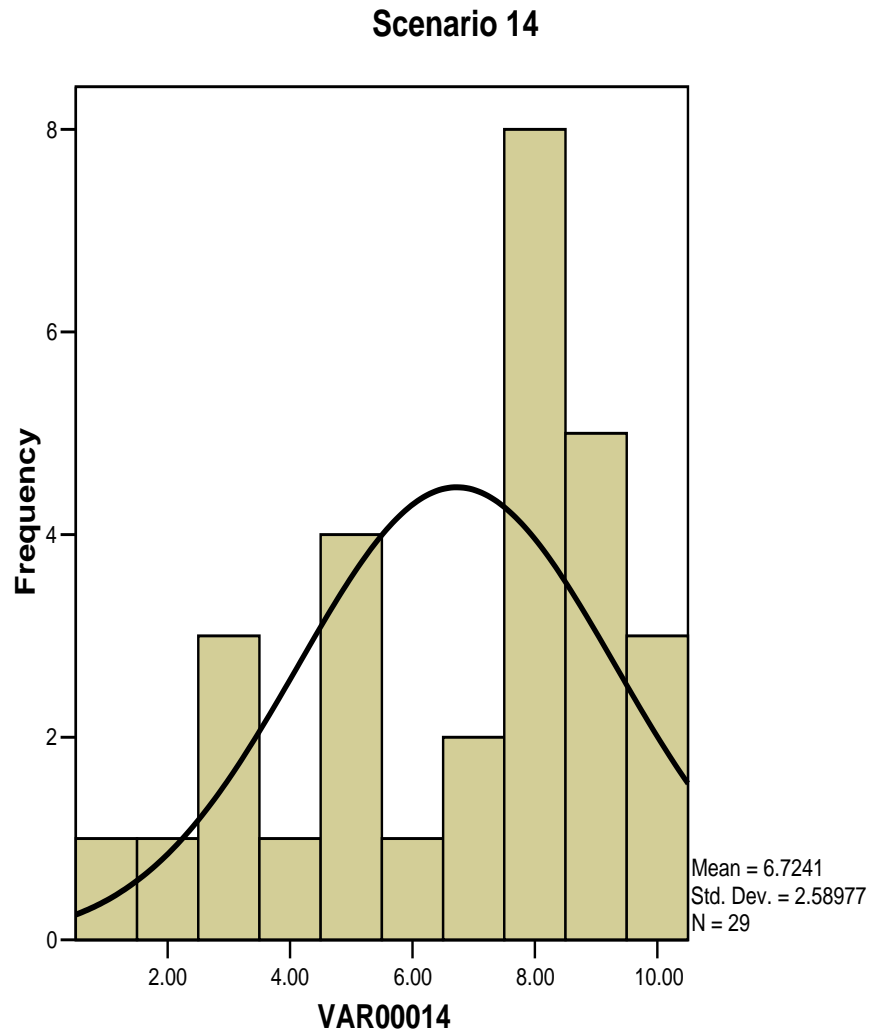


Figure A14. Histogram of scenario 14.

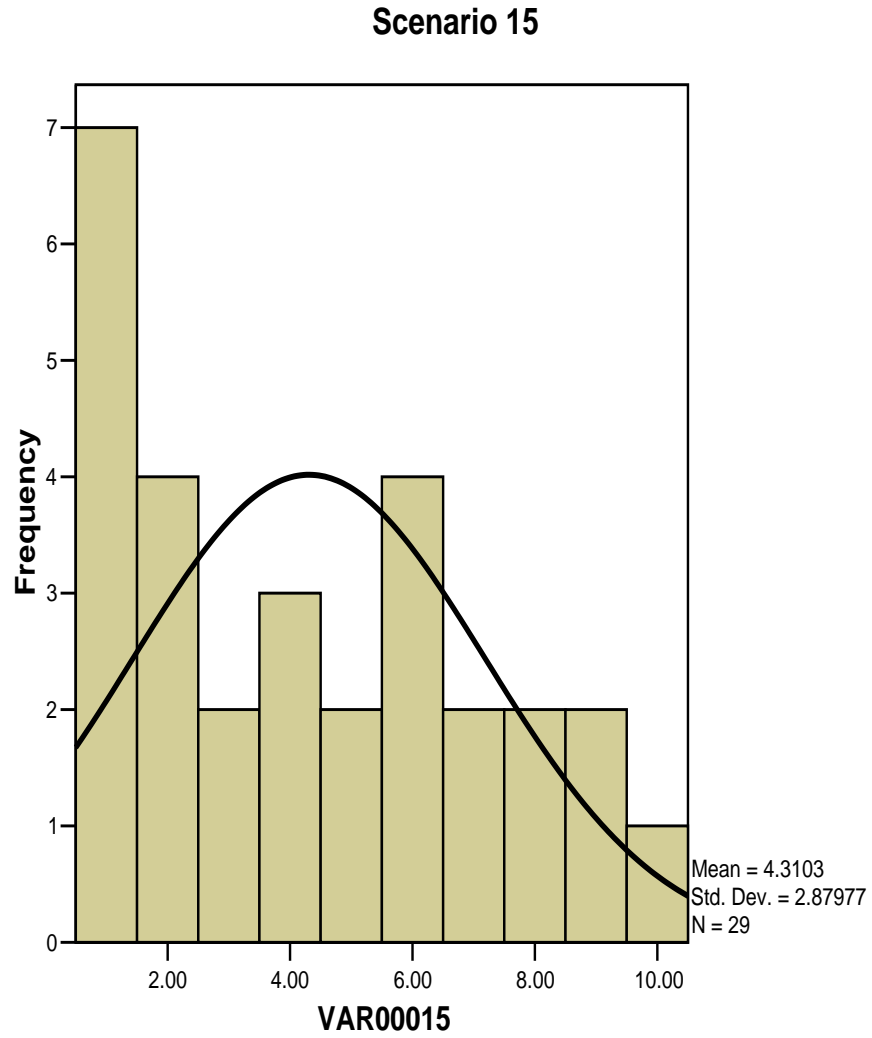


Figure A15. Histogram of scenario 15.



Figure A16. Firefighters are heroes. Picture presented to the hero experimental group.



Figure A17. Firefighters are public servants. Picture presented to the public servant experimental group.

Appendix B**Tables**

Table A1

Means, Standard Deviations, and Correlations

Variable	Mean	SD	Correlations																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1 Attitudes1	4.23	1.64	1																			
2 Attitudes2	4.64	1.87	.21**	1																		
3 Attitudes3	5.00	1.20	.15	.18*	1																	
4 Attitudes4	4.78	1.78	-.01	.11	.28*	1																
5 Attitudes5	2.99	1.88	.16	.24**	.01	.02	1															
6 SNorms1	4.52	1.71	.72**	.05	.03	.00	.07	1														
7 SNorms2	5.03	1.98	.07	.78**	.03	.12	.21*	.10	1													
8 SNorms3	6.15	1.18	.00	.13	.41**	.12	-.09	-.02	.14	1												
9 SNorms4	5.34	1.84	-.07	.12	.11	.76**	.05	-.01	.20	.25	1											
10 SNorms5	3.14	1.86	.13	.18*	-.10	.03	.84**	.09	.19*	.03	.12	1										
11 Intentions1	5.26	1.86	.64**	.15	.15	.04	.05	.73**	.11	.09	.00	.07	1									
12 Intentions2	5.44	2.01	.11	.78**	.07	.15	.23**	.10	.81**	.13*	.20*	.18*	.20*	1								
13 Intentions3	6.41	1.00	.04	.10	.45**	.12	-.14	-.04	.02	.54**	.08	-.09	.18*	.11	1							
14 Intentions4	5.41	1.89	-.02	.14	.16*	.73**	.03	.01	.11	.13	.80**	.06	.10	.19	.18	1						
15 Intentions5	3.03	2.12	.09	.18*	.04	.00	.82**	.09	.12	.03	.03	.79**	.08	.17*	.01	.05	1					
16 Education	13.57	2.26	.05	-.06	-.10	-.04	-.07	.01	.00	-.16	-.07	-.04	-.01	-.02	-.09	-.04	-.12	1				
17 Years Service	13.46	8.55	-.24*	-.06	-.19*	-.10	-.05	-.22	-.07	-.03	-.05	.03	-.21	-.09	-.01	.00	-.04	.15	1			
18 Age	36.93	9.91	-.23*	-.08	-.16	.00	-.07	-.11	-.06	.05	.05	.01	-.15	-.06	.00	.05	-.07	.14	.81	1		
19 Condition	0.69	0.46	-.11	-.12	-.29	-.06	.02	-.11	-.10	-.15	-.11	.06	-.14	-.08	-.18	-.14	.00	-.07	.04	-.05	1	
20 Comfort	5.88	1.88	.94**	.16	.11	-.04	.03	.65**	.07	-.02	-.08	.08	.62**	.12	.14	-.03	.02	.13	-.25*	-.24*	-.20*	1

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

Appendix C
Questionnaire

Firefighter Scenarios

This questionnaire assesses attitudes, beliefs, and behaviors of firefighters in a set of **five** scenarios. Each scenario describes a typical scene that you may have encountered in your career as a firefighter or that you may encounter in the future in line of duty. Attached to each one of the five scenarios is a questionnaire. Each question in the questionnaire is placed on a 6-point or a 7-point scale. Please read each question carefully and circle the appropriate number.

Your participation is on a volunteer basis and you may stop answering the questionnaire at any time without repercussions. Your answers are confidential and anonymous. To make sure that your confidentiality is protected, your booklet will be stored in a locked cabinet in the Fire Service Institute in Champaign, Illinois. Only the doctoral student and the Assistant Director of the Fire Service Institute, Brian Brauer, have access to the information.

Thank you very much for your participation in advance.

You may now start with the scenarios and questionnaire.

Firefighter Scenario #1

Residential Structure

2-story wood frame residential, heavy fire showing from 2nd floor.

Report of residents possibly still in the house:

1. You are a firefighter on the first arriving truck company. Your truck is staffed with a firefighter, an officer and an engineer. You and your officer throw an extension ladder to the eaves of the house. Your officer orders you to ascend the ladder and make a 4' x 4' hole in the roof using a chainsaw. You note heavy black smoke coming out of the gable, and fire showing from several second floor windows.

What is your comfort level with this assignment?

Low Comfort Level 1 2 3 4 5 6 7 8 9 10 **High Comfort Level**

Circle the number

Over the course of ***your career***, how often did you follow the instruction as described or similar to the presented scenario? Check one.

- Once a week
 Once a month
 Once within 6 months
 Twice a year
 Once a year
 More than twice during my career
 Never on duty

Over the course of the ***past year***, how frequently were you involved in situations as described or similar to the scenario?

How many times? _____

On the following pages, you have a number of scales.

These scales ask questions (1 to 27) regarding scenario #1 on this page.

*Please **CIRCLE** the appropriate number on each one of the scales.*

26. I have the knowledge and skills to complete the assignment in the scenario.

Strongly disagree: _____:_____:_____:_____:_____:_____:_____ : Strongly agree
1 2 3 4 5 6 7

27. It would take me a lot effort to complete the assignment in the scenario.

Strongly disagree: _____:_____:_____:_____:_____:_____:_____ : Strongly agree
1 2 3 4 5 6 7

**Thank you very much! You have completed the scenario #1.
Please proceed to scenario #2 on the next page.**

Firefighter Scenario #2

Residential Structure

2-story wood frame residential, heavy fire showing from 2nd floor.

Report of residents possibly still in the house:

2. You are a firefighter on the second arriving engine company. Your engine is staffed with a firefighter, an officer and an engineer. The first due engine advanced a 2 ½" line through the front door, and extinguished moderate fire in the living room and stairwell area. However, as they advanced the line up the interior stairs two of their members went on the bell. They advanced the line to the top of the stairs, but were then forced to leave the building. Your officers orders you to take the nozzle of the 2 ½" and begin the attack the fire on 2 while he assists with vertical ventilation.

What is your comfort level with this assignment?

Low Comfort Level 1 2 3 4 5 6 7 8 9 10 **High Comfort Level**

Circle the number

Over the course of **your career**, how often did you follow the instruction as described or similar to the presented scenario? Check one.

- Once a week
 Once a month
 Once within 6 months
 Twice a year
 Once a year
 More than twice during my career
 Never on duty

Over the course of the **past year**, how frequently were you involved in situations as described or similar to the scenario?

How many times? _____

On the following pages, you have a number of scales.

These scales ask questions (1 to 27) regarding scenario #2 on this page.

*Please **CIRCLE** the appropriate number on each one of the scales.*

1. I would follow the assignment as described in the scenario.
 Very unlikely: _____: Very likely
 1 2 3 4 5 6 7
2. If I would encounter this kind of scene, I intend to complete the assignment as described in the scenario.
 Strongly disagree: _____: Strongly agree
 1 2 3 4 5 6 7
3. For me as a firefighter, I believe the assignment as described in the scenario is:
 Harmful: _____: Beneficial
 1 2 3 4 5 6 7
- Based on good judgment: _____: Based on bad judgment
 1 2 3 4 5 6 7
- Pleasant: _____: Unpleasant
 1 2 3 4 5 6 7
- Worthless: _____: Useful
 1 2 3 4 5 6 7
4. Most firefighters who are important to me would believe that I should: _____: I should not go along with the assignment in the scenario.
 1 2 3 4 5 6 7
5. The firefighters in my life whose opinions I value would Disapprove: _____: Approve completing the assignment as described in the scenario.
 1 2 3 4 5 6 7
6. Most firefighters who are important to me would go along with the assignment as described in the scenario.
 Definitely false: _____: Definitely true
 1 2 3 4 5 6 7
7. I feel under peer pressure to go along with the assignment as described in the scenario.
 Strongly disagree: _____: Strongly agree
 1 2 3 4 5 6 7

26. I have the knowledge and skills to complete the assignment in the scenario.

Strongly disagree: _____:_____:_____:_____:_____:_____:_____ : Strongly agree
1 2 3 4 5 6 7

27. It would take me a lot effort to complete the assignment in the scenario.

Strongly disagree: _____:_____:_____:_____:_____:_____:_____ : Strongly agree
1 2 3 4 5 6 7

**Thank you very much! You have completed the scenario #2.
Please proceed to scenario #3 on the next page.**

Firefighter Scenario #3

Multifamily Occupancy

8 story type III apartment building, with heavy fire showing from 2 windows on the 6th floor. Numerous reports of civilians still on the fire floor:

3. As numerous companies are operating on the interior of this incident, there is a catastrophic failure of the engineered wood I-beams, causing the floor of part of the 7th floor to collapse. There are three firefighters unaccounted for. Your truck has been given the RIT assignment, and you have been ordered to proceed with your officer to locate and remove the downed firemen.

What is your comfort level with this assignment?

Low Comfort Level 1 2 3 4 5 6 7 8 9 10 **High Comfort Level**

Circle the number

Over the course of **your career**, how often did you follow the instruction as described or similar to the presented scenario? Check one.

- Once a week
 Once a month
 Once within 6 months
 Twice a year
 Once a year
 More than twice during my career
 Never on duty

Over the course of the **past year**, how frequently were you involved in situations as described or similar to the scenario?

How many times? _____

On the following pages, you have a number of scales.

These scales ask questions (1 to 27) regarding scenario #3 on this page.

*Please **CIRCLE** the appropriate number on each one of the scales.*

1. I would follow the assignment as described in the scenario.
Very unlikely: _____: Very likely
1 2 3 4 5 6 7
2. If I would encounter this kind of scene, I intend to complete the assignment as described in the scenario.
Strongly disagree: _____: Strongly agree
1 2 3 4 5 6 7
3. For me as a firefighter, I believe the assignment as described in the scenario is:
Harmful: _____: Beneficial
1 2 3 4 5 6 7
- Based on good judgment: _____: Based on bad judgment
1 2 3 4 5 6 7
- Pleasant: _____: Unpleasant
1 2 3 4 5 6 7
- Worthless: _____: Useful
1 2 3 4 5 6 7
4. Most firefighters who are important to me would believe that I should: _____: I should not go along with the assignment in the scenario.
1 2 3 4 5 6 7
5. The firefighters in my life whose opinions I value would Disapprove: _____: Approve completing the assignment as described in the scenario.
1 2 3 4 5 6 7
6. Most firefighters who are important to me would go along with the assignment as described in the scenario.
Definitely false: _____: Definitely true
1 2 3 4 5 6 7
7. I feel under peer pressure to go along with the assignment as described in the scenario.
Strongly disagree: _____: Strongly agree
1 2 3 4 5 6 7

26. I have the knowledge and skills to complete the assignment in the scenario.

Strongly disagree: _____:_____:_____:_____:_____:_____:_____ : Strongly agree
1 2 3 4 5 6 7

27. It would take me a lot effort to complete the assignment in the scenario.

Strongly disagree: _____:_____:_____:_____:_____:_____:_____ : Strongly agree
1 2 3 4 5 6 7

**Thank you very much! You have completed the scenario #3.
Please proceed to scenario #4 on the next page.**

Firefighter Scenario #4

Rescue

4. You are a firefighter on a four-man engine company. You are the second-due engine on an ionization alarm activation. Upon your arrival, you are unable to gain radio contact with the first due engine. The alarm activation occurred at a large industrial complex, which makes components for jet engines. Approaching the building, you see two members of the first-in engine lying face down on the floor of the warehouse. They are not wearing their SCBA. You are unable to see or smell any smoke or other obvious IDLH contaminants. Your officer suggests that you notify the HazMat team, then don your SCBA and drag the downed firefighters out of the building.

What is your comfort level with this assignment?

Low Comfort Level 1 2 3 4 5 6 7 8 9 10 **High Comfort Level**

Circle the number

Over the course of ***your career***, how often did you follow the instruction as described or similar to the presented scenario? Check one.

- Once a week
 Once a month
 Once within 6 months
 Twice a year
 Once a year
 More than twice during my career
 Never on duty

Over the course of the ***past year***, how frequently were you involved in situations as described or similar to the scenario?

How many times? _____

On the following pages, you have a number of scales.

These scales ask questions (1 to 27) regarding scenario #4 on this page.

*Please **CIRCLE** the appropriate number on each one of the scales.*

1. I would follow the assignment as described in the scenario.
 Very unlikely: _____: Very likely
 1 2 3 4 5 6 7
2. If I would encounter this kind of scene, I intend to complete the assignment as described in the scenario.
 Strongly disagree: _____: Strongly agree
 1 2 3 4 5 6 7
3. For me as a firefighter, I believe the assignment as described in the scenario is:
 Harmful: _____: Beneficial
 1 2 3 4 5 6 7
- Based on good judgment: _____: Based on bad judgment
 1 2 3 4 5 6 7
- Pleasant: _____: Unpleasant
 1 2 3 4 5 6 7
- Worthless: _____: Useful
 1 2 3 4 5 6 7
4. Most firefighters who are important to me would believe that I should: _____: I should not go along with the assignment in the scenario.
 1 2 3 4 5 6 7
5. The firefighters in my life whose opinions I value would Disapprove: _____: Approve completing the assignment as described in the scenario.
 1 2 3 4 5 6 7
6. Most firefighters who are important to me would go along with the assignment as described in the scenario.
 Definitely false: _____: Definitely true
 1 2 3 4 5 6 7
7. I feel under peer pressure to go along with the assignment as described in the scenario.
 Strongly disagree: _____: Strongly agree
 1 2 3 4 5 6 7

26. I have the knowledge and skills to complete the assignment in the scenario.

Strongly disagree: _____:_____:_____:_____:_____:_____:_____ : Strongly agree
1 2 3 4 5 6 7

27. It would take me a lot effort to complete the assignment in the scenario.

Strongly disagree: _____:_____:_____:_____:_____:_____:_____ : Strongly agree
1 2 3 4 5 6 7

**Thank you very much! You have completed the scenario #4.
Please proceed to scenario #5 on the next page.**

Firefighter Scenario #5

Rescue

5. You are a firefighter on a four-man engine company. You have been dispatched to a report of teenagers trapped on a low-head dam. Upon arrival, you see that a small boat has capsized on the dam, and three individuals are stranded on the dam. Your officer orders you to tie off with a rope and swim out to the dam to rescue the kids.

What is your comfort level with this assignment?

Low Comfort Level 1 2 3 4 5 6 7 8 9 10 **High Comfort Level**

Circle the number

Over the course of ***your career***, how often did you follow the instruction as described or similar to the presented scenario? Check one.

- Once a week
 Once a month
 Once within 6 months
 Twice a year
 Once a year
 More than twice during my career
 Never on duty

Over the course of the ***past year***, how frequently were you involved in situations as described or similar to the scenario?

How many times? _____

On the following pages, you have a number of scales.

These scales ask questions (1 to 27) regarding scenario #5 on this page.

*Please **CIRCLE** the appropriate number on each one of the scales.*

26. I have the knowledge and skills to complete the assignment in the scenario.

Strongly disagree: _____: _____: _____: _____: _____: _____: _____: Strongly agree
 1 2 3 4 5 6 7

27. It would take me a lot effort to complete the assignment in the scenario.

Strongly disagree: _____: _____: _____: _____: _____: _____: _____: Strongly agree
 1 2 3 4 5 6 7

Thank you very much!
You have completed the scenarios and the questionnaire.

Now, please answer the following questions about yourself:

Age: _____

Gender: Male: _____

Female: _____

Racial identity:

Caucasian / Non-Hispanic: _____

Hispanic: _____

African American: _____

Asian American: _____

Native American: _____

Other: _____ (please specify)

How many years of education: _____

Your rank in the firefighter service: _____

Lengths of years in the firefighting service: _____

Do you remember the theme of the booklet? Please describe: _____

Do you have suggestions regarding the test or the booklet? Please describe:
