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Empirical Analysis to Investigate the Influence of Cultural Dimensions on Risk-Taking Behavior among Hispanic and Non-Hispanic Construction Workers in United States

Kaveri Ajit Thakur
University of Tennessee - Knoxville, kthakur@vols.utk.edu

To the Graduate Council:

I am submitting herewith a dissertation written by Kaveri Ajit Thakur entitled "Empirical Analysis to Investigate the Influence of Cultural Dimensions on Risk-Taking Behavior among Hispanic and Non-Hispanic Construction Workers in United States." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Industrial Engineering.

Rapinder Sawhney, Major Professor

We have read this dissertation and recommend its acceptance:

Xueping Li, Joan R. Rentsch, Joseph R. Stainback

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

Empirical Analysis to Investigate the Influence of Cultural Dimensions on Risk-Taking Behavior among Hispanic and Non-Hispanic Construction Workers in United States

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Degree

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Kaveri Ajit Thakur

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Dedication

To my parents, for what I am today.

To my sister Shamila, for her unwavering and enduring support.

To Ninad, for being my constant in the labyrinth of this journey.

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Abstract

The focus of this research was to investigate the influence of cultural dimensions on risk-taking behavior among construction workers. Following a comprehensive literature review, a conceptual model was presented to evaluate 'Intended Behavior in Risky Situations' in construction work environment. While the differences in risk-taking behaviors is generally acknowledged, the influence of culture is overlooked very easily. A total of 94 responses were collected from construction sites in the Knoxville Tennessee area by means of a questionnaire based on the conceptual model factors. The final sample consisted of 89 responses was evaluated using Partial lease Square - Structural Equation Modeling. The constructs were tested for their reliability, convergent validity and discriminant validity. Prior to testing the research questions, the conceptual model was tested for its reliability and predictability based on established criterion. Mediation analysis was conducted to test whether cultural dimensions (IDV, PDI, UAI, LTO, MAS) influence the relationship (path linkages) between the following factors. Moderation-mediation analysis was conducted to whether there is a difference in influence of cultural dimensions between Hispanic and Non-Hispanic construction workers. The results revealed that Masculinity and Long vs. Short Term Orientation have a significant impact on the factor relationships. Additional, the influence of cultural dimensions is different for Hispanic and Non-Hispanic construction workers. Contemporary construction industry should, despite the need for meeting project deadline and monitoring worker compensations, be aware of national culture's effect on individual behavior in general and workers' risk-taking behavior in particular. The assessment and perception of risk by a worker is always dependent on the situation. Understanding of national culture preferences which are frequently overlooked can improve the work environment and safety on-site.

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Chapter 1

Introduction

Construction industry safety has been under close scrutiny for a long time. Construction workers are among the most likely workers to experience serious occupational injuries (Salminen, 1994). Based on reports of occupational injury statistics, construction workers accounted for 1 in 5 on-the-job fatalities and 1 in 10 nonfatal workplace injuries and illness as reported in year 2004 (Meyer and Pegula, 2006). In 2009, the construction industry incurred the most number of fatal injuries in private sector as compared to fifteen other industrial areas as shown in Figure 1.1 (Dong et al., 2009; BLS, 2010). The 2010 U.S. Bureau of Labor Statistics, Census of Fatal Occupational Injuries reported that 16.5% of occupational fatalities in the United States were accounted for by construction industry, while it employs 7% of the national workforce (BLS, 2010). In addition to human life and injuries, fatalities cause project delay, lost hours of work and other costs towards worker compensations. The estimated cost of fatalities and injuries each year result in over $15 billion in direct costs (Handbook, 2011).

Despite strong advancements in construction safety performance and comprehensive safety programs over the past few decades, injuries still occur at an unacceptable rate (Howell et al., 2002). Researchers have shown that risk-taking behavior, originating mainly from inaccurate perception and unacceptable tolerance of safety risk, is a significant factor in a majority of construction injuries (Garavan and O'Brien, 2001; Fleming and Lardner, 2002; Chan et al., 2005; Hinze et al., 2006; Garrett and Teizer, 2009). The risk-taking behavior is consequence of workers' inability to adequately perceive risk in hazardous situations (Carter and Smith, 2006). Thus, the understanding of factors that influence risk-taking behavior and risk perception is necessary for a long-term improvement in construction safety. The present study addresses the need by developing and

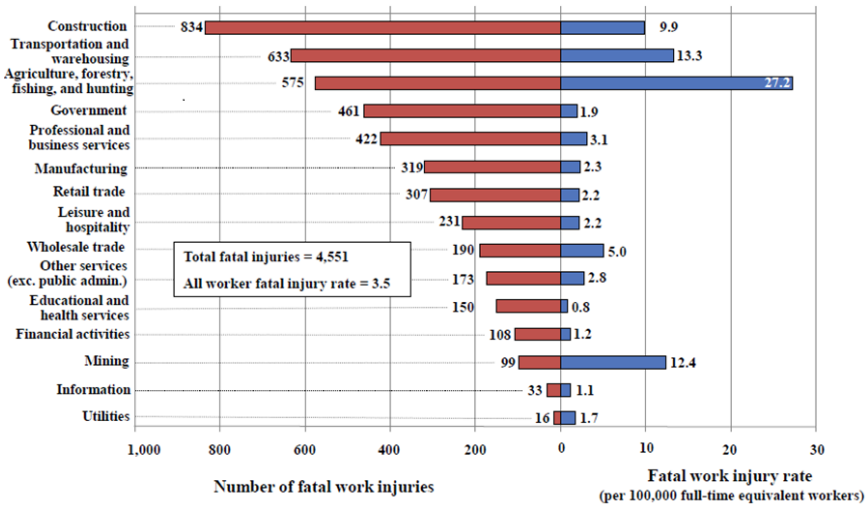


Figure 1.1: Number and rate of fatal occupational injuries, by industry sector, 2009 [Data Source: U.S. Bureau of Labor Statistics, (Handbook, 2011)]

testing a model that attempts to explain the underlying complexity of risk-taking behavior via cultural dimensions to improve and sustain construction safety training programs.

1.1 Construction Industry Overview

The construction industry comprises of multiple organizations, of different size with highly specialized professionals and independent skilled traders which also include people from various cultures and backgrounds. The work in construction industry consists of building, repair, maintain, renovate, modify and demolish houses, office buildings, temples, factories, hospitals, roads, bridges, tunnels, stadiums, docks, airports and more. The industry is classified into three main categories: residential, commercial, heavy and civil construction. Sometimes, clean hazardous waste sites are also included as a separate category.

Organizational Structure and Workforce Turnover

The activity and assignments in the construction industry are based on projects and contracts. There are around 9.1 million workers with 3.39 million construction establishments, as reported in the year 2010 (Dong et al., 2013). The projects are a blend of complex work assignments, dynamic locations and management. Different companies and contractors may simultaneously work on a construction site as the projects advances into different phases. For instance, the general contractors involving the laborer group are present throughout the project, excavating companies start early, then framers, carpenters, electricians, and plumbers, followed by floor workers, painters, landscaping

crews, and masons. The organizations can work smoothly with temporary workforce since it allows them to meet the work demand by scaling up and down. These workers are hired on the basis of each project requirement and may spend only a limited time at any one project site. There is a frequent change in the number of workers and the composition of workforce for a particular project at a site. As a consequence the employer as well as the employees have to develop and reform safe productive working habits and relationships with other workers in addition to adjustment to new location. There is an absence of a long lasting safety or organizational culture between these contracted employees. This change in the workforce sometimes leads to a large proportion of inexperienced, transient and unskilled workers who may not recognize the intensity and severity of the work place.

Subcontracting

Subcontracting third party workers or self-employed individuals are inherent practices in construction work dynamics. Moreover, one in six individuals in construction are self employed as per the survey statistics (Dong et al., 2013). These self employed worker accidents or incidents often go unreported during the overall collected data. The communication and implementation of rights and responsibilities under health and safety regulations becomes difficult in such conditions. The primary contractors do not provide health benefits, worker compensation, unemployment insurance and other benefits to their subcontractors. This leaves the responsibility of providing effective mandated benefits to individuals who are either self employed or small contractors. This results in lack of health and safety training, ineffective safety programs, and use of nonfunctional safety equipments.

Health Hazards on Construction Sites

Several research studies have concurred that construction work environment is one of the most hazardous workplace (Camino López et al., 2008; Carter and Smith, 2006; Handbook, 2011). The workers are exposed to a wide variety of hazards due to job-site, co-worker behavior, work pressure, policies and lack of understanding of procedures. As the work progresses on a project into different phases, the work environment changes, as building walls are erected, weather changes, structures get taller, the ambient conditions such as temperature, ventilation, and height varies too. The exposure to any one type of hazard changes from trade to trade, site to site and even by hour. Construction project characteristics play a significant role in causing high accident rates. Besides, the changing workforce on site also poses a threat to a worker as the coworker may take an erroneous decision. These conditions induce a factor of uncertainty in the daily routine of a construction worker.

Fatal Injuries

Falls from height including slips, trips or falls from same level (36.9%); being struck by a moving/falling object (10.3%) followed by electrical (8.9%) and caught in/between (2.6%) are the major contributors of fatalities in construction industry (Robinson et al., 1996; Chua and Goh, 2004). These four types of events account for two-third of the fatal injuries among construction workers in the United States (Pollack et al., 1996; Meyer and Pegula, 2006). A special issue of Applied Ergonomics (Hoonakker et al., 2005; Chi et al., 2005) describes the situation in other countries, revealing a similar pattern.

Demographics

The workforce in the construction industry is a male dominated, where 96 % of the workers are men. The construction industry also has the highest percentage of foreign-born workers of any industry sector(Center, 2009; Dong et al., 2009). Figure 1.2 shows the percentage of Hispanic workers in construction industry has been higher as compared to other industries and is increasing exponentially. This is the second largest percentage of foreign workforce in an industry sector after agriculture and farming. Approximately 84% of these foreign-born workers come from the Hispanic background which primarily is dominated by Mexico but also other parts of Latin America. Addressing the safety needs of such a diverse population is a very demanding task. Goodrum and Dai (2005) in their work on differences in occupational injuries and fatalities among Hispanic and non-Hispanic construction workers concluded that there is a need to develop a detailed understanding of safety perception to uncover the differences in fatalities of this fast growing population.

Tragically, non-native Hispanic workers die from falls at a rate 30% greater than native Hispanics and 58% greater than white, non-Hispanic workers (Dong et al., 2010). The Center for Construction Research and Training (CPWR) report identifies several issues in the context of the Hispanic workforce (Dong et al., 2009). The report tracks the rate of change in proportion of Hispanic population and identifies the work group characteristics. Greenhouse (2001) reported that, in many parts of the country, Latino immigrants are being hired because they will accept lower wages and poorer working conditions than the U.S. born worker. A similar study on occupational injuries found that Latino workers were at relatively high risk for severe injuries as compared to US workers (Pransky et al., 2002).

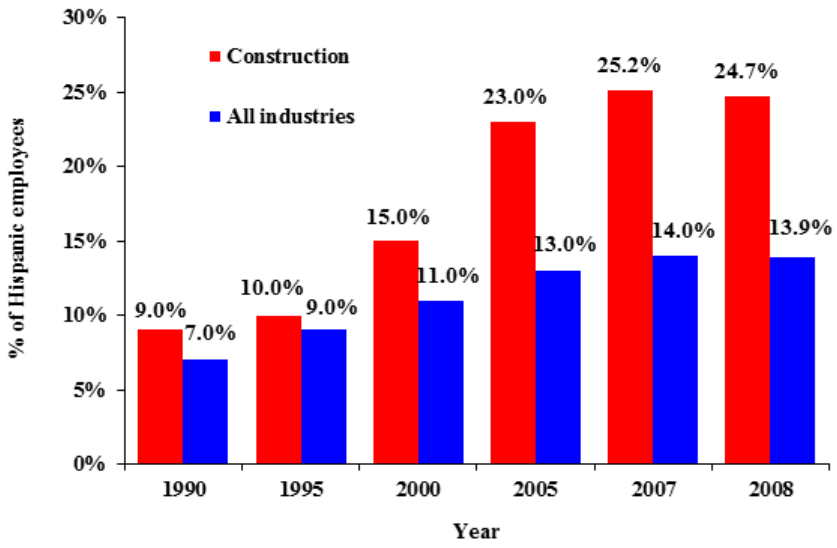


Figure 1.2: Hispanic employees as a percentage of construction and all industries, selected years, 1990-2008 (All types of employment) (Dong et al., 2013)

Training and Education

Lack of trade-specific education, employer prejudices and poor proficiency in English are few of the factors attributed to the high risk injury pattern of Hispanic workers (Pransky et al., 2002). However, receiving safety training does not necessarily correlate with reduced incident rate. It is suggested that few Latinos that do undergo training may not comprehend the expected learned content. (Vásquez and Stalnaker, 2004) built upon these results by stating that low literacy skills may prevent comprehension of safety training material. Employment patterns of Hispanic construction workers indicate that Hispanic workers are disproportionately employed in less skilled trades (Anderson et al., 2000).

The vast majority of research on these fatalities focuses on providing information to construction workers to mitigate the fatalities. However, there is an underlying assumption that this information becomes knowledge that modifies the employee behavior. The factors that influence this understanding of knowledge are not taken into account, especially given the cultural differences. Prior research has also identified the variation in perception of safety on construction sites at different types of projects and level of operation, namely, laborers, supervisors, engineers, and management (Mohamed, 2002; Saunders, 2013). An exploratory analysis of the Occupational Safety and Health Administration (OSHA) 2007 fatality database housed at the University of Tennessee Construction Industry Research and Policy Center (CIRPC), revealed that misjudgment,

mis-perception, and faulty equipment use are among the top contributing factors for construction fatalities. Thus channelizing this research towards a better understanding of risk-taking behavior and perception of risk among construction workers.

1.2 Research Motivation

The construction industry is reported to be among the leading contributors of job growth as well as one of the largest individual contributors to GDP in the country (Jorgenson et al., 2014). The combination of such a large industry along with the challenges in construction intensifies the scale of the issue of worker health and safety. Additionally, as stated earlier the workforce is becoming more diverse due to continuous entry of immigrants. Increase of immigrants in US labor force is rapid particularly in construction. The proportion of workers identifying themselves as Hispanic has doubled for all industries and tripled for construction, comprising more than one-fourth of this industry (Dong et al., 2008). According to the U.S. Census Bureau (2008), between 2000 and 2006, Hispanics accounted for one-half of the nation's growth. Hispanic population growth rate (24.3%) was almost 4 times the growth rate of the total U.S. population (6.1%) (Passel and Cohn, 2008). Coupled with the growing Hispanic population the dis-proportionality in the fatality rates among construction worker groups needs to be addressed.

Hispanic construction workers are typically young, lack English-speaking abilities, not highly educated, and employed in low-skill and high-risk occupations (Anderson et al., 2000; Kouyoumdjian et al., 2003; Dong and Platner, 2004; Jorgensen et al., 2007; Dong et al., 2008). These factors have made Hispanic workers more vulnerable when they are employed in construction, one of the most dangerous industries in the United States. From 1992 to 2005, the death rate for Hispanic construction workers has been consistently higher than the rate for, non-Hispanic workers (Dong et al., 2008). The disparity in fatality rates between Hispanic and non-Hispanic construction workers suggests the need to examine the problem by comparing cultural differences among these two groups.

The actions or intended behavior that lead to injury or fatality in construction are based on certain judgments, biases and past experiences. Social principles guide behavior which affect judgments that include the kind of situations that are most feared, risks that are worth taking and who is allowed to take risks. The focus and concern regarding particular set of dangers or hazards differ between societies are a result of their own selected view of the natural environment.

The characteristics of social life which evokes different responses to dangers are useful to understand worker behavior. Thus cultural biases integral to the social arrangement are important to understand which risks are elevated and which risks are depressed. The decision to engage in a choice of action, which often happens on a construction site, depends on alternatives, values, and beliefs (Fischhoff et al., 1978). Common values lead to common fears and to a common agreement not to fear other things. Each social arrangement elevates some risks to a high peak and depresses others below sight. The acknowledgment of these biases out into the open we will help us understand how worker groups of different cultural background respond to risks and proposed safety procedures.

Cultural analysis shows how a given set of values and beliefs makes sense out of various decisions workers take and the actions they employ in their day to day work environment. Besides the fact that the construction industry is characterized by small self owned businesses with a high turnover rate and part-time workers, it is also noted for its dynamic locations, workers and environment thus a cohesive organizational culture is absent. The US government OSHA regulations have time and again emphasized the importance of vulnerable worker population and its hardships. However, the rules, regulation and policy development focuses on the general topic of fatalities and hazards. Thus it is essential to study the cultural factors that influence individual worker's reason behind risk-taking behavior in hazardous situations that could lead to an accident.

1.3 Conceptual Framework

Theory of Planned Behavior (TPB) (Ajzen, 1991) model forms the fundamental structure for investigating the research questions for this study. The primary focus of this study is to evaluate the factors affecting intended risk-taking behavior among construction workers and test the impact of cultural dimensions on factors affecting the behavior. Considering the construction industry background it is important to assess the awareness and understanding of safety and/or risk at an individual level. With perennial change in workforce composition in construction industry the study focuses on effect of individual values and beliefs on risk-taking behaviors. Differences in culture lead to different perception of things and situations. Studies have reported differences in risk perception among construction workers about safety and hazards across different construction sectors, jobs, and ethnic groups (Kouabenan, 2009; Bormann, 2012). The framework developed in this study can help researchers and practitioners better understand the influence of cultural

diversity in training, strategy and customizing safety programs for construction workers. The framework presents the relative importance of factors which predict the intended behavior in a risky situation. The conceptual framework for this study is shown in Figure 1.3. It states that the differences in fatality rates are directly connected to the risk-taking behavior among workers. This risk-taking behavior can be further represented by intended behavior in risky situations as stated in traditional decision making models/theory. The intended behavior is affected by attitude towards risky situation, construction safety climate, and worker health respectively. Attitude is explained by risk assessment of tasks and risk consequences.

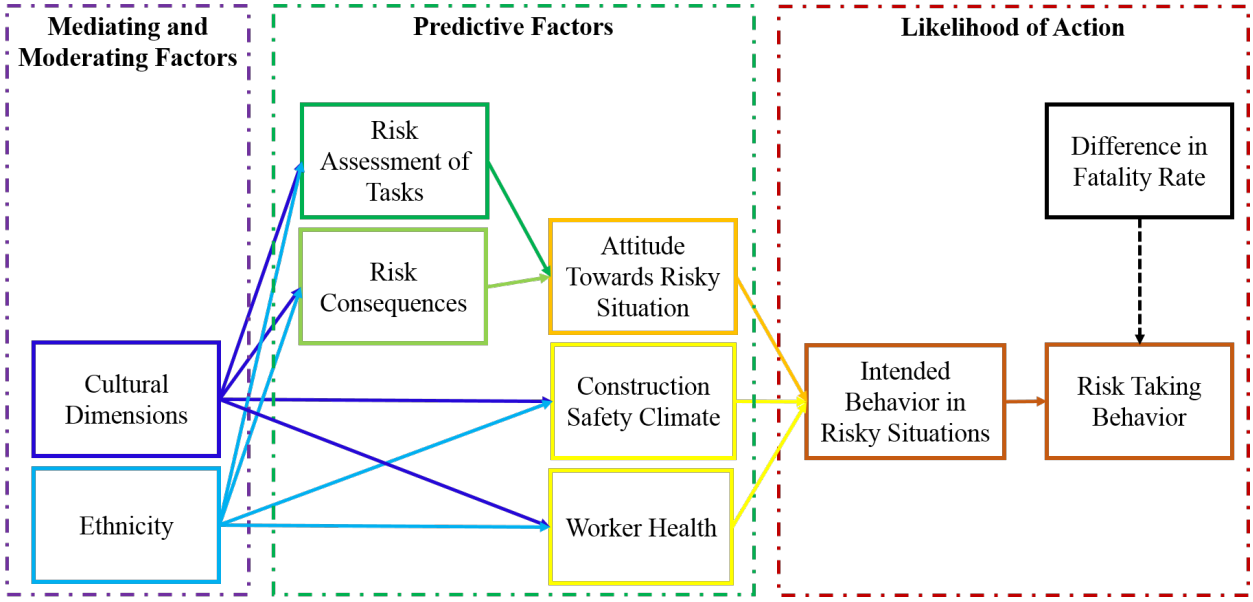


Figure 1.3: Conceptual model framework

The definitions of the models components are listed below.

Intended Behavior in Risky Situations: Is described as selecting to engage in a choice of action (behavior) at a specific time and place.

Attitude Towards Risky Situation: Is the level of favorable or unfavorable feelings an individual has towards a particular behavior (Ajzen, 1991). It considers an evaluation of the desirability of outcomes resulting from the behavior (Chang, 1998).

Construction Safety Climate: The term "safety climate" is used to describe the employees' perception of the role that safety plays within the organization (Zohar, 2000).

Worker Health: It is a self assessment of the physical and psychological health of worker.

Risk Assessment of Tasks: The degree to which the individual evaluates the task in question

based on the factors like: voluntariness, immediacy of effect, knowledge of risk, chronic vs. catastrophic, common vs. dread, controllable, fatal and nonfatal consequences, known or exposed, newness of risk (Fischhoff et al., 1978).

Risk Consequences: It is the assessment of probability of an effect on an action in a risky situation.

The resultant dependencies between preferred behavior, risk dimensions and cultural dimensions help in understanding the dimensions of risk associated with preferred behavior and the cultural dimensions that explain the specific risk profile. The cultural analysis of risk-taking behavior helps us understand how people use socially embedded world-views to navigate complex, uncertain and sometimes hazardous situations. This study proposes to incorporate cultural variation in the perception of safety to allow insight into construction fatalities. The disparity in fatality rates among Hispanic construction workers in hazardous situations is hypothesized to originate from cultural difference in risk perception.

The cultural influence on the perception of safety is analyzed using Hofstede's cultural dimensions (Hofstede et al., 1991; Hofstede and Hofstede, 2001; Hoftede et al., 2010). The national culture is explained using five dimensions, namely: Individualism/Collectivism (IDV), Power Distance Index (PDI), Uncertainty Avoidance Index (UAI), Masculinity/Femininity (MAS), and Long-term/Short-term Orientation (LTO). The non-Hispanic population is represented by the American construction workers, while the Hispanic population is represented by the Latino construction workers.

Table 1.1: Cultural dimensions as evaluated by Hofstede

	Individualism (IDV)	Power Distance Index (PDI)	Long vs short orientation (LTO)	Uncertainty Avoidance Index (UAI)	Masculinity (MAS)
Hispanic	30	81	24	82	69
Non-Hispanic	91	40	29	46	62

- Individualism vs. Collectivism (IDV): The degree to which individuals are integrated into groups. Personal achievements and individual rights are given more importance in the culture which scores high on IDV. The fundamental issue addressed by this dimension is the degree of interdependence a society maintains among its members.

The non-Hispanic culture scores 91 on IDV and emphasis on equal rights among individuals. Organizations within the United States, hierarchy is established for convenience, superiors are accessible and managers rely on individual employees and teams for their expertise. Both managers and employees expect to be consulted and information is shared frequently. The Hispanic culture scores 30 on IDV and is considered a collectivist society. Loyalty in a collectivist culture is paramount, and over-rides most other societal rules and regulations. The society fosters strong relationships where everyone takes responsibility for fellow members of their group.

- Power Distance Index (PDI): Power distance is the extent to which the less powerful members of organizations and institutions accept and expect that power is distributed unequally". This dimension deals with the fact that all individuals in societies are not equal. One of the most salient aspects of inequality is the degree of power each person exerts or can exert over other persons.

  The non-Hispanic culture with low PDI of 40 relate to one another more as equals regardless of formal positions. The Hispanic culture scores 81 on PDI. This means that people accept a hierarchical order in which everybody has a place and which needs no further justification. Hierarchy in an organization is seen as reflecting inherent inequalities, centralization is popular, subordinates expect to be told what to do and the ideal boss is a benevolent autocrat.

- Uncertainty Avoidance Index (UAI): a society's tolerance for uncertainty and ambiguity. Low uncertainty avoidance cultures accept and feel comfortable in unstructured situations or changeable environments and try to have as few rules as possible. This is more commonly seen in behaviors among workers who do not tend to follow the exact procedure and are comfortable with the uncertainty of the situation. The dimension UAI has to do with the way that a society deals with the fact that the future can never be known: should we try to control the future or just let it happen? The extent to which the members of a culture feel threatened by ambiguous or unknown situations and have created beliefs and institutions that try to avoid these is reflected in the score on Uncertainty Avoidance.

  The non-Hispanic culture scores 46, on UAI. This culture is more tolerant of ideas and opinions from anyone and allows freedom of expression. Furthermore, the do not require a lot of rules and are less emotionally expressive than higher-scoring cultures.

The Hispanic culture scores a 82 on UAI and has a very high preference on uncertainty avoidance. They maintain a rigid code of beliefs and behaviors and also have an an emotional need for rules. Time is money and people have an inner urge to be busy and work hard.

- Masculinity vs. Femininity (MAS): The distribution of emotional roles between the genders. Masculine culture's values as defined by Hofstede are competitiveness, assertiveness, materialism, ambition and power, whereas feminine cultures place more value on relationships and quality of life. This dimension can be a common characteristic of construction workers in general as majority of them tend to build a tenacious image. A high score (Masculine) on this dimension indicates that the society will be driven by competition, achievement and success, with success being defined by the winner or best-in-the-field. A low score (Feminine) on the dimension means that the dominant values in society are caring for others and quality of life. Both non-Hispanic and Hispanic cultures score high on MAS at 62 and 69 respectively.

- Long-term vs. Short-term Orientation (LTO): it describes society's time horizon. Long-term oriented societies attach more importance to the future. Cultures with low score on LTO promote values related to the past and the present, including steadiness, respect for tradition, preservation of one's face, reciprocation and fulfilling social obligations. Cultures which score low on LTO are characterized as normative societies. They prefer to maintain time-honored traditions and norms while viewing societal change with suspicion. Those with a culture which scores high, on the other hand, take a more pragmatic approach: they encourage thrift and efforts in modern education as a way to prepare for the future.

  Both non-Hispanic (26) and Hispanic (24)cultures score low on LTO. People in such societies have a strong concern with establishing the absolute Truth; they are normative in their thinking. They exhibit great respect for traditions, a relatively small propensity to save for the future, and a focus on achieving quick results.

1.4 Problem Statement

The central idea of this research is to investigate the influence of cultural dimensions (IDV, PDI, UAI, LTO, MAS) on risk perception and intended risk-taking behavior, and whether there are differences in the magnitude of influence between Hispanic and non-Hispanic construction workers.

The aim is to explain the disparity in fatality rates among Hispanic and non-Hispanic workers in United States via understanding the risk perception.

Against the background of construction industry management style, workforce dynamics and work environments mentioned above, the specific research questions are classified into two parts.

1. First, the risk-taking behaviors among construction workers is explained as a function of their attitude towards risk, their perception about safety norms at work, their health, and their understanding of risky tasks based on consequences and perception. As workers come from different backgrounds and social environments, the question is to whether these factors are influenced by their cultural disposition. This research aims to add to the existing knowledge by analyzing how different cultural dimensions affect the relationships (path linkages) between factors presented in the conceptual model. Therefore the first research question is:

Cultural Dimension Influence:

Research Question 1: *Whether cultural dimensions (IDV, PDI, UAI, LTO, MAS) influence the relationship (path linkages) between the following factors.*

- Attitude Towards Risky Situation and Intended Behavior in Risky Situations
- Construction Safety Climate and Intended Behavior in Risky Situations
- Worker Health and Intended Behavior in Risky Situations
- Risk Task Assessment and Attitude Towards Risky Situation
- Risk Consequence and Attitude Towards Risky Situation

2. The second part of the research is focused on comparing the influence of cultural dimensions on risk-taking behavior among the non-Hispanic and the fast growing Hispanic worker group in the construction industry. The effect of national culture on individual behavior is studied by many researchers since a very long time (Douglas, 1978; Mearns et al., 2001). The literature provides a wide range of empirical evidence to explain how national culture affects risk-taking behavior, attitude towards risk-taking, perception of risk, and acceptance of risk in different situations (Leela, 2013; Trompenaars and Hampden-Turner, 1994; Hofstede et al., 1991; Slovic et al., 1982; Bormann, 2012). Even though past research has conducted and advocated the importance of national culture in risk-taking behavior, cross-cultural analysis to understand the differences in relationship between factors lacks empirical testing. This gap research becomes more crucial specifically for the construction industry relating to the changing workforce compositions. The

research question addressing this argument is:

Group Differences:

Research Question 2: *Whether there is a difference in influence of cultural dimensions between Hispanic and Non-Hispanic construction workers.*

An empirical survey is developed to address these research questions. The research hypotheses to evaluate and provide adequate answers to the research questions are discussed in detail in Section 3.6.

1.5 Impact of Results

The output of this study will show cultural factors as the mediators predicting the relationships between risk assessment, risk perception and risk-taking behaviors of a construction worker. The cultural variables are introduced such that they directly influence the worker's involvement and understanding of an accident. This rationale is proposed because the construction worker holds final line of defense between the environment, equipment, work type, organizational factors and the result of an accident. The results can help develop effective procedures and policies to educate project personnel on cultural dimensions. The understanding of risk perception in construction workers will further improve methods for eliciting opinions about risks, comprehend and anticipate worker responses in hazardous situations (Slovic et al., 1982). They will also help determine the best medium for conveying this information and build a group environment that will nurture safe working habits in workplaces for construction workers.

1.6 Organization of the Study

This document is organized into six chapters. Following the introduction chapter, the next section examines the existing literature related to the research question. Chapter 2 reviews thesis and journal articles related to construction safety climate, risk perception theories and concept of national culture in risk perception. Chapter 3 presents the theoretical foundations for developing the conceptual model that predicts the intended risk behavior. Thereafter, the concept of national culture will be defined and explained, followed by a theoretical evaluation of how it affects relationships in the conceptual model. Chapter 4 outlines the research methodology, including survey population, sample size, data collection, model evaluation and validation as well as hypothesis testing procedure. The results of the data analysis, measurement and structural model

evaluation, hypothesis testing will be assessed in Chapter 5. It covers the statistical outcomes that include descriptive statistics, reliability analysis, convergent and discriminant validity of constructs, structural equation modeling, mediation and moderation analysis. Discussions and explanation of results will be summarized at the end of the chapter. Finally, Chapter 6 reviews the implications of the findings for construction safety and assess the limitations that might potentially constraint the generality of the finding. It also identifies areas of improvement and future work to apply this research to practice.

Chapter 2

Literature Review

2.1 Introduction

Worker safety has been a concern in the construction industry for a long period of time. Construction safety research has spread across a wide range of topics. To provide an overview of the current stage of research, the literature review is categorized into four areas as shown in Figure 2.1. This chapter presents selected literature related to the research questions in the areas of factors affecting worker safety, safety behavior, national culture, and analytical methods in construction safety research. The literature provided the groundwork for developing the conceptual framework for this study.

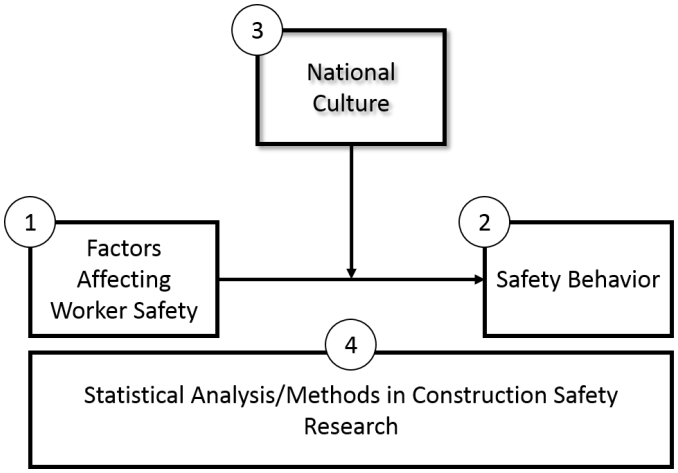


Figure 2.1: Focus areas for the literature review

The first section reviews the empirical and historical studies that address and identifies the factors that affect worker safety in construction and other industries. This includes various error

or accident classification methods, epidemiological studies, and predictive models. The second area focuses on various behavior models, risk perception studies and the concept of safer climate. The third section looks at the influence and appropriateness of concept of national culture in the construction safety research. Finally, the last section reviews the statistical methods used in the field of safety analysis in construction.

2.2 Factors Affecting Worker Safety

Accident investigation techniques and reporting systems in safety research have been used for quite some time. Large portion of research is dedicated to reporting and extracting meaningful fatality data statistics in terms of ranking, frequency and trends from the accident report database like FARS (Fatality Analysis Reporting Systems), OSHA reports, etc. These type of studies identify what types of accidents occur and how they occur in a form of passive investigation (Abdelhamid and Everett, 2000). In early studies on accident causation models many pioneering researchers advocated a systems view at accident analysis involving people, management and policies (Heinrich et al., 1941; Brown, 1990; Rasmussen, 1982; Reason, 1990; Petersen, 1984). Measurement is the fundamental aspect of conducting survey related research. Historically, many studies have been conducted to investigate human error rather than organizational issues in terms of managerial and organizational communications level (Hinze et al., 1998; Kartam and Bouz, 1998; Feyer and Williamson, 1991; Sawacha et al., 1999).

The taxonomies developed by Bird et al. (1996) and Gordon et al. (2005) are relatively comprehensive. Human error researchers Reason (1990) and Rasmussen (1982) have their classification system concerned with cognitive information which is often missing or inconclusive in construction accident investigation report. Research studies have also looked at human error classification based on behavioral aspects in studies like Swain and Guttmann (1983) which can be more easily adapted into the construction environment. Sawacha et al. (1999) investigated historical, economical, psychological, technical, procedural, organizational and environmental factors while assessing safety performance among construction workers. Organizational policy towards safety was reported as the most influential factor affecting safety performance. A wide variety of accident investigation taxonomies were developed to identify and categorize injury and fatalities which fall under one of the four major factors: 1) organizational, 2) environmental and project level, 3) human factors and 4) type of injury/fatality. While studying the effect of rapid

construction projects, Kleiner et al. (2008) stated that factors like planning process, project and site-safety plan, safety monitoring, site responsibility, safety signage, job aids, safe building process per-planning, OSHA training, sate-hazard control ans safety culture management were influential in minimizing the incident rate.

Petersen (1978) proposed improved inspection procedures, training, job responsibility and planning by supervisors to avert accidents. A wide variety of accident investigation taxonomies were developed catering to different focus. Failure to identify unsafe conditions, proceed work in existing unsafe conditions, and violations were recognized as root causes for many accidents according to the Accident Root Cause Tracing Model (ARCTM) (Abdelhamid and Everett, 2000). A modified Loss Causation model was presented by Chua and Goh (2004) based on the previous research by Bird et al. (1996). The fatality report analysis has been looked at from several perspectives, namely, different production techniques, work force turnover, crew management, available tools and workers attitude [9,10]. Studies have reported that factors like production schedules, budget constraints also effect the project conditions and in the sense working conditions for individuals [11]. Training and human awareness programs such as HEAT (Human Error Awareness Training), OSHA outreach training, etc., have been initiated to reduce the fatality rate among workers (Garrett and Teizer, 2009).

2.2.1 Organizational Factors

As in aviation, human errors account for majority of the accidents caused in construction industry as the direct cause. However, the underlying factors leading to occurrences of human action failure are present across multiple levels within organizations, as apparent within the construction industry. The importance of the organizational factors; namely size and organizational structure of employer, short term contracting and temporary employment, multiple employer work-sites and multi-cultural personnel which are inherent to the construction industry have also been reviewed (Gillen and Gittleman, 2010). Most construction companies are differently organized and managed Levitt (1975) and can thus significantly vary in the safety culture that is in place (Molenaar et al., 2002; Mohamed, 2002).

In an effort to address some of the supervisor concerns, Suraji et al. (2001) explained the impact of economic, social and political pressure at the development phase of a construction project. These factors indirectly affect control procedures, site conditions and lead to inappropriate worker actions. Behavior Based Safety (BBS) program achieved better results in improving site safety when

compared to legislations, engineering approaches, safety awareness and safety training intervention methods (Cooper Ph. D, 2000). Management commitment and communication of safety policy has been reported to reduce injury incident rates (Jannadi, 1996).

2.2.2 Environmental and Project Factors

A Spanish effort studied the influence of worker age, type of contract, time of accident, length of service in company, company size, day of the week and other variables on the seriousness of accidents (López et al., 2008). The study reported that, in Spain, as the size of the company decreased the frequency rates of accidents increased. This is considered an essential part of the analysis since it reveals the underlying causes for inadequately trained worker characteristics, use of defective equipment, insufficient or lack of personal protection equipment, etc. The main types of breakdown events were lack of balance (31.3%) followed by collapse of temporary structures (22.1%). Execution of structural work and architectural/renovation/finishing work are the factors that accounts for 60% of the fatal accidents. Neglecting the basic safety measures like wearing of Personal Protective Equipments (PPE) and checking for vehicle's rear before reversing accounted for 42 % of the substandard acts. Improper usage of equipment accounted for 22% of the accidents. Some of the examples for improper usage of equipment are using defective mobile scaffolds for work, and using employee lifts to transport materials.. The three most frequently cited factors concerned failure to ensure proper work practices/monitor site work (13.9%), inadequate inspection (13.1%) and failure to obtain/allocate adequate/proper physical resources (11.5%). Lack of supervision and deficiency in PPE can lead to accident prone conditions. Inadequate training and knowledge about hazards is also one of the leading causes of the accidents.

2.2.3 Human Factors

A combination of random contributing factors, traditionally categorized as unsafe conditions and unsafe practices were reported to cause majority of accidents (Chan et al., 2005). Approximately 80% of the accidents were attributed to human behavior according the the health and safety Executives (Fleming and Lardner, 2002). Another study reported that unsafe work practices of workers lead to majority accidents and injuries than unsafe working conditions (Garavan and O'Brien, 2001). In a similar vein, Mullen (2004) identified that human behavior is influenced by organizational and social factors. Cause of accidents were broadly classified into physical incidents or situation posing threat to a worker and behavioral incidents leading to unsafe acts (Kartam and

Bouz, 1998). Employee characteristics and safety performance has been studied to predict behavior, hazard and safety related attitude and beliefs (Cox and Cox, 1991; Dedobbeleer and German, 1987; Leather, 1988); personality dimensions and risk taking tendencies (Jones and Wuebker, 1985; Landeweerd et al., 1990; Salminen et al., 1999); subjective risk assessment (Edwards and Bowen, 1998; Goldberg et al., 1991); job demands and other stressors (Cooper and Sutherland, 1987; DeJoy et al., 2000).

2.2.4 Types of Injuries and Accidents

Hinze (1997) and Mohan and Zech (2005) classified the construction injuries and fatalities into five major groups, falls, struck-by, electric shock, caught in or between and other. Falls have been the leading cause of construction fatalities and show a minuscule decline in recent years (Kisner and Fosbroke, 1994; Bell et al., 1990; Jenkins, 1993; Council, 1991). Serious injuries in construction related to fall from roofs require long period of treatment and recovery and cost lot of medical dollars (Gillen et al., 1997).

Duncan and Bennett (1991) reviewed the performance of various fall protection systems and concluded that both active and passive measures are useful in reducing fall injuries. Weisgerber and Wright (1999) discussed the safety through design approach, which is particularly appropriate for construction, and provided the outline of a comprehensive program to prevent falls at the design phase. Hinze and Gambatese (1996) similarly developed a software program that would help designers address safety in the design phase.

2.3 Safety Behavior

Major risk exists to the lives and safety of large numbers of construction workers because of behavior misadventure from risk taking propensities. There is a need to achieve the capacity to predict and implement techniques of intervention. In the past few decades, behavior aspect and safety climate had a great impact on construction safety research. A number of studies have investigated the effect of safety climate on employee's occupational safety behavior and worker injuries across difference industries.

2.3.1 Safety Climate

Studies in multiple industries have reported that safety climate is positively associated with greater compliance of safety standards and safety behavior (Zohar, 2000; M. Goldenhar* et al., 2003; Prussia et al., 2003; Griffin and Neal, 2000). Relationship of safety climate and number of workplace incidents also reported reduced accidents (Clarke, 2006; Mattila et al., 1994; Morrow and Crum, 2004; Probst, 2004). The term "safety climate" is used to describe the employees' perception of the role that safety plays within the organization (Zohar, 2000). According to Lindell (1993) it represents the workers' interpretation of site features, events on site and procedures to be followed.

Safety climate has been decomposed into several constructs, namely, management commitment, safety procedures, psychological features, economic feature, self-esteem, experience, performance pressure, perceived risk, working environment, job security and education, safety orientation and training . Studies confirm that safety climate is indeed a critical factor predicting the occurrence of self-reported occupational injury (Brown and Holmes, 1986; Dedobbeleer and Béland, 1991; Griffin and Neal, 2000; Zohar, 2000)

As indicated by Pransky et al. (2002), emphasis on return-to-work policies may not only reduce negative disability outcomes in the long run, but also serve as a good indicator to the employees that safety is a priority in the company. Employees may in turn be more safety conscious and, thereby, reduce the occurrences of injury at work. Therefore, this study proposed return-to-work policies and post-injury administration (the execution of the return-to-work policy) as part of the safety climate which may have direct and positive influence on work safety.

Safety control is a person's perception of the ability or opportunity to manage work situations to avoid injuries and accidents Anderson et al. (2004). Control over the outcomes of ones behavior is a key determinant of coping in a workplace (Karasek Jr, 1979; Karasek and Theorell, 1990). The job stain model described by Karasek and Theorell (1990), states that job strain is a function of demands at work, perceived control and freedom of decision making and not from the work environment. Prior research has consistently shown that a high level of job control is positively associated with health and well-being (Glass and McKnight, 1996), and with job satisfaction and motivation (Spector, 1986). Some studies have analyzed the indirect effect of safety control between safety climate and outcomes (Siu et al., 2004). The employee safety control mediated the relationship between corporate safety policies and safety outcomes and job satisfaction (Huang et al., 2004).

2.3.2 Behavior Models

The prediction of safety behavior by mean of behavior models have been applied very rarely in construction. The application of such theoretical models to explain behavior have been common in social context such as pollution reduction (Cordano and Frieze, 2000), tax compliance (Bobek and Hatfield, 2003), completion of high school (Davis et al., 2002) and hunting (Hrubes et al., 2001). Additionally, the choice of health related safety behaviors have been studied for use of safety helmets (Quine et al., 1998), hand hygiene habits (Jenner et al., 2002), risky motorcyclist behavior (Rutter et al., 1998), and chronic back pain (Carroll and Whyte, 2003).

In the construction setting, Johnson and Hall (2005) has applied behavior models to predict safe lifting behaviors. Even though safety behavior research has looked at various intervention strategies to reduce injury rates or unsafe behaviors, there has been very few models which explain safety-related behaviors in the literature.

2.4 National Culture

Native culture of construction workers can impact risk-taking behaviors. Many studies have attempted to develop training materials for Hispanic workers, the number of studies that consider the impact of native culture on safety behavior is minimal. While studying the importance of safety climate among Hispanic workers, Jorgensen et al. (2007) concluded that safety behavior of this population also depends on safety climate measures. Grosskopf et al. (2014) developed a framework to test the influence of national culture on effectiveness of safety training. The framework consists of four factors, namely, hazard identification, risk perception, safety climate and situation awareness.

The difference in job satisfaction and work beliefs, perception in fairness and employee outcome between multiple races was compared to understand the multicultural environment at work. The relationship between safety behavior and national culture is been studied using Hofstede's cultural dimensions for the petrochemical industry in Saudi Arabia (Alshahrani et al., 2015). Richardson and Smith (2007) tested the influence of culture on choices in mode of communication. Cultural differences in language, religion, customs, norms, and values pose a challenge to implement policies and training strategies appropriate for the entire worker population.

This raises the question of whether workers of Hispanic background fear a certain situation than worker of a non-Hispanic background? Maybe or maybe not. Could there possibly be segments of

workers who value the same things across multiple cultures? If there are, there may be opportunities to target the common values.

2.4.1 Cultural Dimensions in Risk Taking

The evidence of cultural bias influencing perception of safety provided insight into factors like organizational characteristics, job type, individual characteristics that change based on group affinity (Cooper, 1997). The practice of developing safe organizational culture was also studied and review to improve safety practices in high-consequence industries (Cooper and Sutherland, 1987). Smith-Jackson and Essuman-Johnson (2002) studied the discrepancies between user perception of hazard symbols among workers from different industries. This research highlighted the need for culturally centered implementation of codes, rules and training when a technology is transfered.

2.4.2 Cultural Analysis in Construction

Even with the increase in the diversity of worker population, culture has rarely been recognized as a varaible of influence in the construction safety literature. The industry wide culture in the construction sector is primarily been recognized as a core influence on worker behavior. The influence of national culture was studied using Hofstede's cultural dimensions for the Pakistan construction industry (Mohamed et al., 2009). This study highlighted the inclination of certain risk perception behavior to the characteristics of cultural dimensions in Pakistan construction industry. It did not assess the direct link between factors and cultural dimensions that could affect the behavior. other studies have compared the difference in risk perception, safety behavior, job stressors and incident rates across different ethnic groups. There have not been many studies who empirically and mathematically modeled and compared the difference in risk-taking behaviors between groups of different ethnicity.

2.5 Analytical Methods in Construction Safety Research

Multivariate analysis allows to assess and analyze multiple variables simultaneously. Table 2.1 displays some of the leading statistical methods associated with multivariate data analysis. Even though the first-generation techniques have been widely used in research, the application of second-generation techniques have increased to overcome the weaknesses.

Table 2.1: Organization of multivariate methods (Hair Jr et al., 2013)

	Primarily Exploratory	Primarily Confirmatory
First-generation techniques	Cluster analysis	Analysis of variance
	Exploratory factor analysis	Logistic regression
	Multidimensional scaling	Multiple regression
Second-generation techniques	PLS-SEM	CB-SEM
		Confirmatory factor analysis

2.5.1 Principal Component Analysis (PCA)

Principal Component Analysis (PCA) has been used to benchmark organizational safety and cultural paradigm by (Mohamed, 2003). PCA is a way to find pattern in data with higher dimensions. It highlights the similarities and differences among factors or variables in data to be grouped in specific identities. The advantage of this type of analysis is that once you find the pattern in the data, it is easy to compress the data by reducing the dimensions without losing much information. Principal component method with varimax rotation was used to categorize the 51 item questionnaire on perception of risk among safety managers. In one of the research papers studying perceived influence of safety management practices on project performance criterion principal component analysis was used to extract factors, measure by multiple items. The results of this step were later used for hierarchical regression analysis.

2.5.2 Correspondence Analysis

Correspondence analysis is used to describe the pattern and relationship between occupational groups and nature of the accident precursor sequence (Lu et al., 2012). This is an exploratory graphical analysis technique which is analogous to the principal component analysis (Greenacre, 1984; Hoffman and Franke, 1986). The strength of this technique lies beneath its simultaneous representation of the rows and columns of the data matrix in a way that reveals the underlying pattern and relationships. Although underlying patterns and relationships are revealed by this technique, it is not possible to summarize all inter-profile information in a two dimensional graphical interface. The measure of completeness of the summary provided by this map is given by the variance explained by the two dimensions. Correspondence analysis is also used in the Spanish construction safety models to facilitate risk-assessment and decision making regarding safety decisions.

2.5.3 Structural Equation Modeling (SEM)

The use of SEM has been convenient tool to access models related to safety in multiple industries (Fogarty, 2004; Johnson and Hall, 2005; Huang et al., 2006). However, its application in to study construction safety research has been rarely cited (Mohamed, 2002). The application of SEM is substantially smaller in construction or safety related research as compared to disciplines like marketing or management information systems. SEM allows researchers to examine the effect of unobserved latent variables on the dependent variables. SEM methods are of two types, namely Covariance-based SEM (CB-SEM) and Partial Least Squares SEM (PLS-SEM). While CB-SEM is primarily used to confirm (or reject) theories, PLS-SEM is used to develop theories in exploratory research. PLS-SEM is an evolving modeling technique and has been used in many published articles (Chin, 2010; Haenlein and Kaplan, 2004; Hair et al., 2011, 2012; Hair Jr et al., 2013; Henseler et al., 2009; Ringle et al., 2009; Henseler et al., 2012). Additionally, PLS-SEM makes no assumptions about the data being normally distributed as it is usually desired in CB-SEM (Hair Jr et al., 2013).

Simultaneous assessment of construct measurements (latent variable measurement) and testing hypothesis on the relationships among the constructs within the same analysis is implemented using PLS path modeling. PLS modeling is designed to explain the variance in data and is applicable for predictive modeling and theory building. The graphical representation of an SEM model is shown in Figure 2.2.

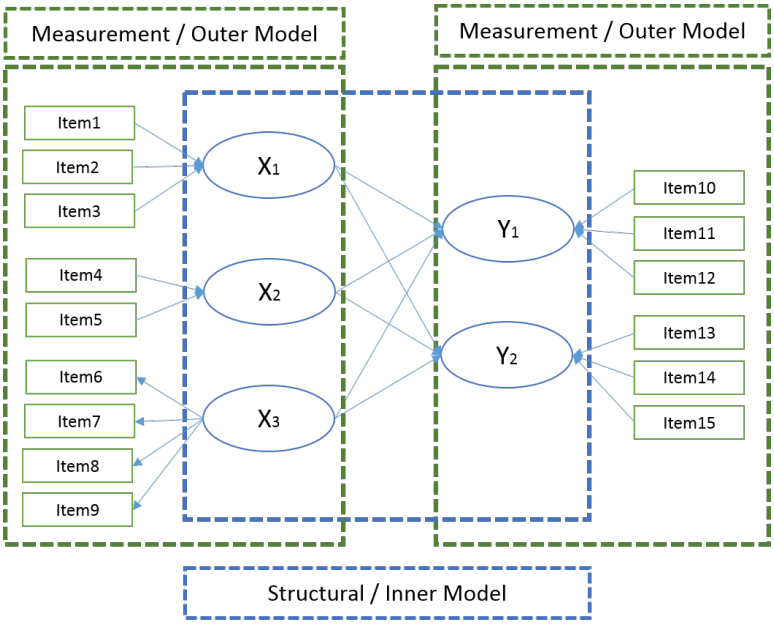


Figure 2.2: Measurement and structural model

The selection of PLS-SEM over the CB-SEM is based on the research objectives, data characteristics, and model set-up (Roldán and Sánchez-Franco, 2012). PLS-SEM implementation is also popular when data characteristics consists of small/minimum sample size, non-normal data and different scale of measurement (Hair et al., 2012; Henseler et al., 2009). The use small sample size in PLS-SEM has been systematically evaluated and validated by several studies (Chin and Newsted, 1999; Hui and Wold, 1982; Reinartz et al., 2009). Table 2.2 gives an overview of the key characteristics of PLS-SEM and its advantages as presented in Hair Jr et al. (2013).

2.6 Summary

This chapter provided an overview of the current state of research regarding factors affecting worker safety, safety behavior, national culture, and analytical methods in construction safety research. Based on the findings, there has been an elaborate research conducted in determining the effect of several factors affecting worker safety in construction. The outcome of these studies have reported unsafe actions, misjudgment of hazardous situations as the leading cause of accidents. However, a few researchers have examined whether workers cultural background has any effect on their understanding and implications of performing the work unsafely.

Table 2.2: Key characteristics of PLS-SEM (Hair Jr et al., 2013)

	Data Characteristics
Sample Sizes	No identification issues with sample sizes Generally achieves high levels of statistical power with small sample sizes Large sample sizes increase the precision (i.e., consistency)of PLS-SEM estimations
Distribution	No distributional assumptions; PLS-SEM is a nonparametric method
Missing values	Works with metric data, quasi-metric (ordinal) scaled data, and binary coded variables (with certain restrictions) Some limitations when using categorical data to measure endogenous latent variables
Scale of measurement	Highly robust as long as missing values are below a reasonable level
	Model Characteristics
Number of items in each construct measurement model	Handles constructs measured with single and multi-item measures
Relationship between constructs and their indicators	Easily incorporates reflective and formative measurement models
Model complexity	Handles complex models with many structural model relations Large numbers of indicators are helpful in reducing the PLS-SEM bias
Model setup	No causal loops allowed in the structural model (only recursive models)
	PLS-SEM Algorithm Properties
Objective	Minimizes the amount of unexplained variance (i.e., maximizes the R^2 values)
Efficiency	Converges after a few iterations (Even in situations with complex models and.or large sets of data to the optimum solutions; efficient algorithm)
Construct scores	Estimated as linear combinations of their indicators Used for predictive purposes Can be used as input for subsequent analyses Not affected by data adequacies
Parameter estimates	Structural model relationship s are generally underestimated (PLS-SEM bias) Measurement model relationships are generally overestimated (PLS-SEM bias) Consistency at large High levels of statistical powers
	Model Evaluation Issues
Evaluation of overall model	No global goodness-of-fit criterion
Evaluation of the measurement models	Reflective measurement models: reliability and validity assessments by multiple criteria Formative measurement models: validity assessment, significance and relevance of indicators weights, indicator collinearity
Evaluation of the structural model	Collinearity among sets of constructs significance of path coefficients, coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2)
Additional analysis	impact-performance matrix analysis Mediating effects Hierarchical component models Multi-group analysis Moderating effects

Chapter 3

Framework Development and Hypothesis

3.1 Introduction

The focus of this research is to develop a predictive model based on a behavioral perspective of risk-taking in construction industry. The theoretical foundation for the conceptual framework and survey are presented in this chapter. In this section, the concepts of Theory of Planned Behavior and Risk Perception are brought together to understand the association between risk-taking behavior and the factors that influence worker perception of risky situations. The factors or latent variables that represent the conceptual framework are identified along with the formulation of research hypothesis. The socio-demographic variables that could impact the intended behavior are also presented.

3.2 Models of Unsafe Behaviors

Behavioral issues like action slips, errors, mis-judgments, and violations have been recorded as precursors to events that lead to injury and fatal accidents in construction industry (Williamson et al., 1996; Williamson and Feyer, 1998; Hinze et al., 1998; Botvinick and Bylsma, 2005; Hinze et al., 2006). Thus an understanding of the factors that affect these behaviors in risky situations can help mitigate number of injuries and fatal accidents in the industry. Behavioral research has been guided by number of theoretical models and conceptual frameworks. Prominent among them are: 1) Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980), 2) Theory of Planned Behavior

(TPB) (Ajzen, 1991), 3) Expectancy Theory (ET) (Vroom, 1964), 4) Miniard and Cohen Model (MCM) (Miniard and Cohen, 1983), 5) Health Belief Model (HBM) (Becker, 1974), 6) Prospect Theory (PT) (Kahneman and Tversky, 1979), and 7) Integrated Model of Behavioral Prediction (IMBP) (Fishbein and Yzer, 2003).

The influence of perceived risk, perceived control, and attitude over intended behavior has been studied for a very long time (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980; Ajzen, 1991). Most of the models (TRA, MCM, HBM, and IMBP) listed above are grounded within the fundamental elements of TPB. Empirical studies have validated the strength of TPB's ability to predict behavioral intention as the immediate antecedent of violational behavior (Ajzen, 1991). In a comparative study, TPB performed better in terms of predictive ability of intended behavior than rest of the models (Netemeyer et al., 1993). TPB has been operationalized in a number of settings: health related behavioral intention (Ceccato et al., 2007; Henning et al., 2013), application of new knowledge and skills (Singh et al., 2014), choices in organic farming (Herath and Wijekoon, 2013), public relations (Knabe, 2012), advertising campaigns (Stead et al., 2005), financial investment models (East, 1993), sensation seeking behaviors like alcohol use (Burns et al., 1993) and many more.

However, its use in predicting unsafe behaviors in the construction industry has been limited (DeJoy, 1996; Johnson and Hall, 2005; Fogarty and Shaw, 2010). DeJoy (1996) reviewed self-protective behavior in context of health related behavioral intention. Where as Johnson and Hall (2005) investigated the use of engineering controls for safe-lifting behaviors. Lastly, Fogarty and Shaw (2010) considered the effects on unsafe behaviors in general which included perception of management attitude to safety. The dynamic nature of construction worker population was overlooked in the above models. The high accuracy in prediction of intention behaviors, attitude, and perception brings the concept of safe behavior well within the scope of TPB. The following section presents a short introduction of this theory.

3.3 Theory of Planned Behavior (TPB)

The basic principals of TPB have evolved from TRA where it predicts the individual's intention to engage in a behavior at a specific time and place (Ajzen, 1991). The TPB extends the TRA which was designed to predict pure violation behavior. Ajzen and Madden (1986); Thomas Sarver (1983) suggest that everyday routine behaviors are influenced by factors beyond one's control. Thus

there exists some degree of uncertainty associated with the chance of success in an action which relies on factors beyond the intended behavior. The inclusion of perceived behavior control to account for external and internal control provides the capability of predicting different behaviors. TPB theory postulates that intention is the main determinant of behavior. The key factors that influence behavioral intention are attitude towards the behavior, subjective norm and perceived control over behavior. These factors that shape behavioral intention are built upon an underlying belief structure. Figure 3.1 illustrates the TPB model. The constructs that form the TPB model are described below along with the modification to adapt the features of construction industry.

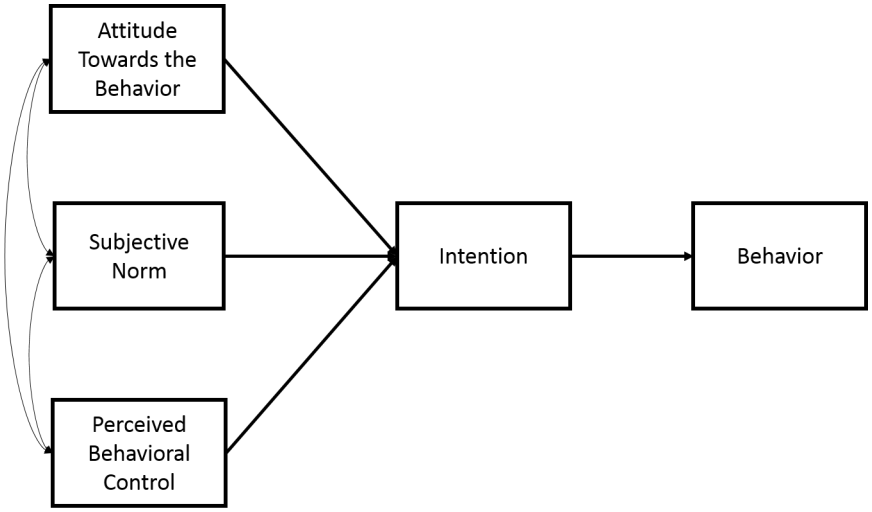


Figure 3.1: The Theory of Planned Behavior (Ajzen, 1991)

Behavior intention is the selection of choice of action (behavior) at a specific time and place. Applying this definition to construction industry, it measures a worker's selection or choice of action in a risky situation. The study contains four narrative scenarios where participants have to select a choice of action based on their judgment. Four most common causes of injury and fatal accidents (falls, electrocution, collapsed trench, scaffolding) were identified to develop narrative scenarios, by emulating a real life work environment where an accident is likely to occur. The options presented for selection vary in their degree of risk-taking behavior.

Attitude towards the behavior refers to the favorable or unfavorable feelings an individual has towards a particular behavior (Ajzen, 1991). It considers an evaluation of the desirability of outcomes resulting from the behavior (Chang, 1998). In the context of construction industry, it is a measure of worker's evaluation of a risky situation in a favorable or unfavorable feeling in

accord with the probability of its outcome. Attitude towards behavior also evaluated using the same scenarios as being very safe to very risky.

Subjective norm refers to the social pressure on an individual with respect to completion of the task (Ajzen, 1991). It describes a person's beliefs about whether his/her peers and coworkers think about his/her engagement in the task. In a construction environment, the source of these subjective norms is linked to supervisors and co-workers who work closely with an individual. For instance, if a worker believes that his supervisors or co-worker do not care about safety, his/her actions would reflect safety as unimportant. An individual's perception of group and organizational level safety attitude is often used as a marker variable for safety climate (Mearns et al., 2001). The norms developed by these groups to which the individuals belong influences the behavior. Inclusion of the safety climate factors addresses the role of subjective norms in safety behaviors (Zohar, 2000; Mohamed, 2002).

Perceived control over behavior refers to the perceived ease or difficulty of performing the behavior (Ajzen, 1991). It refers to the degree to which the individual feels that the performance (or non-performance) of the task in question is under his/her control. Construction workers have to make choices in hazardous situations on a day-to-day basis. An individuals assessment in his/her ability or skills to perform a task describes the perceived control over behavior. In the present study, the controllability dimension of Fischhoff et al. (1978) risk perception study is used to substitute perceived control over behavior. It is included along with rest of the six risk perception dimensions. Risk perception is explained in detail in the following section.

TPB has continued to evolve, as new variables are introduced as external factors to accommodate different applications, environment, and behaviors. Among the most frequently referenced are knowledge of task, sensation seeking, independence, self efficacy, environmental aspects and personal characteristics (Burns et al., 1993; Fogarty and Shaw, 2010; Herath and Wijekoon, 2013).

3.4 Limitations of TPB

The TPB model was originally developed to describe and explain an individual's behavior in a social environment. Its application to a work environment where an individual is subject to rules, regulations and work pressure resulted in the addition of subjective norms as inherent characteristics of the industry. In some of the studies that have applied TPB to safety behaviors, Johnson and Hall

(2005) investigated the safe-lifting behavior, Fogarty and Shaw (2010) incorporated management attitude towards safety, and Fugas et al. (2012) included self-reported safety behaviors. The above studies do not take into consideration the effect of worker's physical and psychological health on his/her ability to perform a task. In early studies worker health has been a subject of investigation to identify root cause of accidents (Cooper and Sutherland, 1987; Abdelhamid and Everett, 2000). The present study will extent the TPB by suggesting that worker health both physical and psychological affect the behavior intention in a specific situation.

The influence and popularity of TPB as a conceptual framework has risen over the years for the study of human behavior along with considerable literature support to confirm the efficacy of the theory and predictability of both intentions and behavior (Armitage and Conner, 2001; Schneider and Bowen, 1985; Tornow and Wiley, 1991). However, the original TPB model neglects the multi-dimensionality of attitudes. Ajzen and Fishbein (2005) themselves recognized the multifaceted nature of attitude and introduced moderating factors such as self monitoring tendency, self-consciouses or self-awareness. As the application of attitude towards behavior for construction industry falls in the domain of risk, a more robust theory on risk perception was selected to encompass the multi-dimensionality of attitudes (Fischhoff et al., 1978). In relevance to TPB, risk perception dimensions act as antecedents of attitude towards behavior. Risk perception is defined as the subjective judgments and evaluations of the probability and consequence of hazards (Fischhoff et al., 1978; Rohrmann, 2008). Such perceptions steer decisions about attitude towards acceptability of risk and thus influence behaviors. Risk perception comprised of 9 dimensions, namely, voluntariness, immediacy of effect, knowledge of risk, chronic vs. catastrophic, common vs. dread, controllable, fatal and nonfatal consequences, known or exposed, newness of risk as shown in Figure 3.2. Consequently, explaining the attitude by decomposing it into nine dimensions.

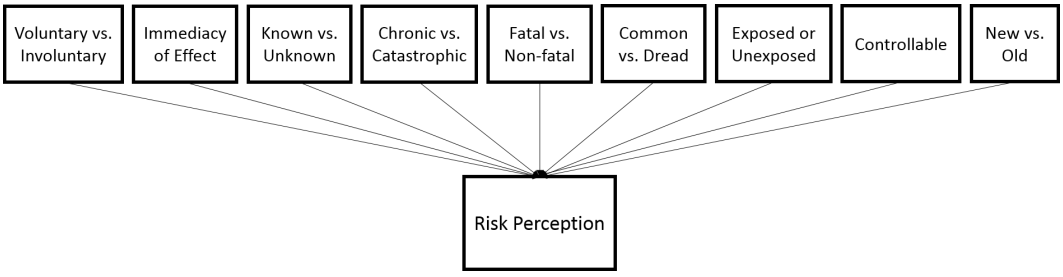


Figure 3.2: Dimensions of risk perception (Fischhoff et al., 1978)

Additionally, even though the concept of safety climate proposes the key components that identify the differences between fatalities, incidents, etc, the underlying relationships between and among these factors are not explained. Lack of detail and explanation of the safety climate leads to the usefulness of its application. Exploring the cultural influence within the construction safety research will advance the research area and practice by improving evaluations, identifying relative importance of constructs and suggesting new interventions for behavior change. Another commonly reported deficiency in the TPB model is that responses of groups or individuals from different background, culture, or ethnicity is not taken into account in the structure. Mearns et al. (2001); Alshahrani et al. (2015) demonstrated that people often prefer some risk probabilities over others, making it difficult to generalize a model for different groups and cultures. In the past, Ajzen and Fishbein (1980) and Fishbein and Ajzen (1975) have also stated that immediate antecedents to behavior are a function of underlying information or beliefs. The inclusion of cultural factors becomes relevant for applying TPB in the field of construction industry as there is a growing percentage Hispanic population in the workforce.

Based on the review of behavior models, TPB provides a suitable framework to understand risky behaviors in construction industry. However, to understand the differences in risk-taking behaviors between different ethnic groups, between Hispanic and non-Hispanic construction workers in specific, apt modifications of the original TPB model is necessary. The TPB model is extended so as to integrate variables related to worker health, risk perception and cultural dimensions. To test the role of cultural dimensions a mediation analysis is proposed to clarify the basic relationship between the existing factors in the model. The most replicated and cited Hofstede et al. (1991) cultural dimensions in cross-cultural research is used to define culture. Individualism, power distance, uncertainty avoidance, masculinity vs. femininity and long vs. short term orientation form the cultural dimensions. The following section describes the conceptual research framework in detail.

3.5 Conceptual Framework

The conceptual framework in this research is framed using the TPB as s basis. As the research identifies and examines the network of relationships between variables, it is necessary to first specify and understand the variables that are involved. The variables represent abstract concepts termed

as latent variables, factors, or constructs. These latent variables are measured indirectly using indicators, items or questions related to the construct.

The conceptual framework based on TPB is shown in Figure 3.3. According to the TPB, there exists a strong link between intention and behavior. Safety behaviors or risk-taking behaviors in the construction industry can be explained as a function of intended behavior in risky situations. The behavioral intentions are further shaped by attitude towards risky situation, construction safety climate, and controllability depicting attitudes, subjective norms, and perceived behavioral control factors of TPB. Controllability is later defined and absorbed into risk assessment of tasks in accord with the risk perception theory. Based on literature, worker health is added as a construct to the original TPB model as a precursors of intended behavior.

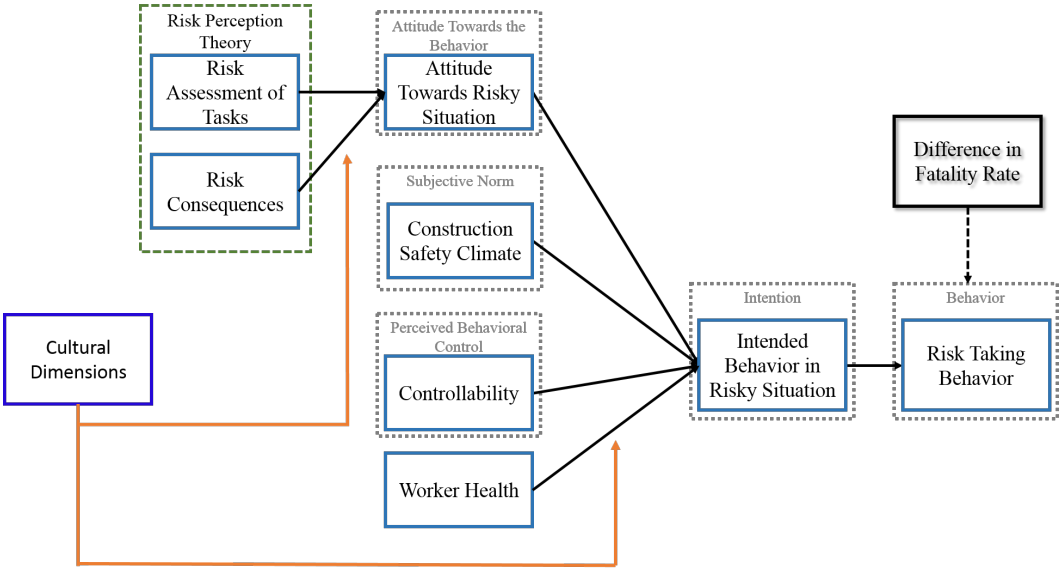


Figure 3.3: TPB model in the context of predicting construction safety behavior

The attitude towards risk is further explained by risk assessment of tasks and perception of risk consequences based on the risk perception theory. These factors are further decomposed based on the dimensions of risk perception. To test the research questions, the study proposes mediation via cultural dimensions to explain the relationship between risk perception factors and attitude as well as risk-taking behavior and its predecessors. Figure 3.4 presents the conceptual framework with the measures for each latent construct. The following list presents the description and rationale for each construct. The specific questions of each construct are in the final survey instrument both in English and Spanish language presented in Appendix A.2 and A.2.

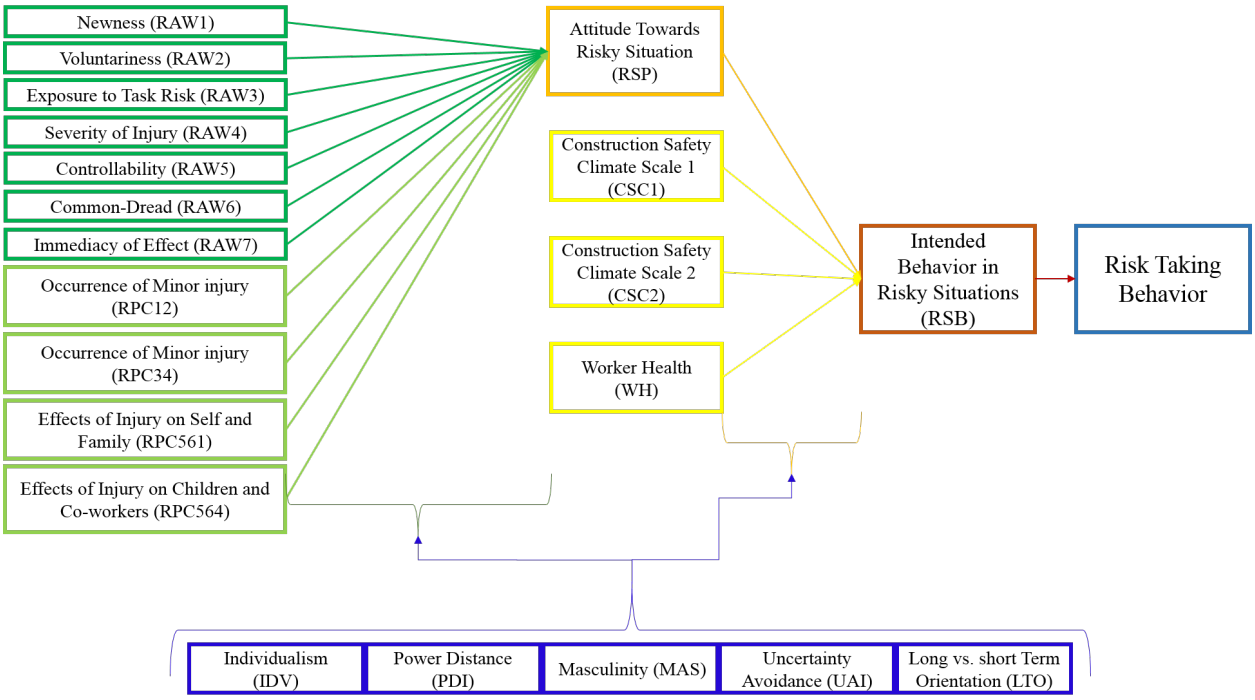


Figure 3.4: Conceptual framework with specific constructs

• **Intended Behavior in Risky Situations (RSB)** was measured by four items representing the choice of risk-taking behavior in four different situations. Thomas (2006) tested the method of narrative scenarios to capture worker safety behaviors. As mentioned in the previous section narrative scenarios describing four most common causes of injury or accidents (falls, electrocution, collapsed trench, scaffolding) were developed. The narrative scenarios allows the workers to assess a hazardous situation and make a selection of a choice of action based on their judgment of the given information (Alexander and Becker, 1978; Veloski et al., 2005). The choices scales from a low risk behavior (score = 1) to a high risk behavior (score = 5).The options presented for selection vary in their degree of risk-taking behavior.

• **Attitude Towards Risky Situation (RSP)** was measured by four items related to the four narrative scenarios. For example, "How would you rate you response to the situation described above?" was typical of the items for this construct. Scores ranged from "a very safe choice" (score = 1) to "a very risky choice, but I am experienced" (score = 5). Research has shown a positive relationship between attitude and intended behavior (Schneider and Bowen, 1985; Tornow and Wiley, 1991). The relationship between attitude and intended behavior can be explained as attitude goes from "a very safe choice" to "a very risky choice, but I am experienced" behavior

tends to high risk-taking behavior. Unjustified lower level of perceived risk leads to more risky behavior (Sheehy and Chapman, 1987).

• **Construction Safety Climate 1 (CSC1)** captures the workers' perception of the role that safety plays within organization (Zohar, 2000). It was measured by the 10 item safety climate scale presented in Mohamed (2002). For example, "Safety practice in my current workplace contributed to my work satisfaction." was typical of the items for this construct. Scores ranged from "strongly disagree" (score = 1) to "strongly agree" (score = 5). High score on safety climate indicates a low risk-taking behavior.

• **Construction Safety Climate 2 (CSC2)** also captures the workers perception of the role that safety plays within organization (Zohar, 2000). The items measured in this scale are more related to coworker and supervisory safety norms It was measured by the 11 item safety climate scale presented in DeJoy et al. (2000). For example, "I feel free to report safety violations where I work." was typical of the items for this construct. Scores ranged from "strongly disagree" (score = 1) to "strongly agree" (score = 5). High score on safety climate indicates a low risk-taking behavior.

• **Worker Health (WH)** was measured by seven items covering both physical and psychological health of worker. For example, "In the past year, how often have you experienced the following: Felt tense due to issues related to your job?" was typical of the items for this construct. Scores ranged from "never" (score = 1) to "always" (score = 5). High score on worker heath construct indicates a high risk-taking behavior.

The following seven constructs represent the dimensions of risk perception as stated by (Fischhoff et al., 1978). Six activities were selected specific to hazards relevant to the construction industry (Thomas, 2006). Participants were asked to rate these six activities on each of the dimensions mentioned below. These dimensions were measure on a 7 point Likert scale.

• **Newness (RAW1)** of risk is a measure of whether the risk is new ones or old, familiar ones. For example, "How often have you seen/noticed such a situation at your work-site?" was typical of the items for this construct. Scores ranged from never (score = 1) to always (score = 7). High score on newness construct indicates that workers are always notice a particular kind of risk and their attitude towards that risk tends to be more casual thus increasing their chances of risk-taking behavior.

• **Voluntariness (RAW2)** of risk is a measure of whether people get into risky situations voluntarily. For example, "For each of the following situations, have you completed a task in a similar situation without hesitation?" was typical of the items for this construct. Scores ranged

from "never" (score = 1) to "always" (score = 7). High score on voluntariness construct indicates workers willingly participate in a risky activity and their attitude towards that risk tends to be more casual thus increasing their chances of risk-taking behavior.

• **Knowledge about Risk (RAW3)** is a measure of the extent to which the risks are known by the people who are exposed to those risks. For example, "What are the chances that you will be injured while engaged in such an activity?" was typical of the items for this construct. Scores ranged from "never" (score = 1) to "always" (score = 7). High score on knowledge construct indicates that workers are frequently exposed to a particular kind of risk and their attitude towards that risk tends to be more casual thus increasing their chances of risk-taking behavior.

• **Severity of Injury (RAW4)** is a measure of the extent to which people are affected, from one person or to a large number of people at once. For example, "How severe an injury would an accident involving one of the following hazard usually produce?" was typical of the items for this construct. Scores ranged from "negligible severity" (score = 1) to "catastrophic severity" (score = 7). High score on severity construct indicates that the worker comprehends the severity of the risk and their attitude towards that risk tends to be more casual thus increasing their chances of risk-taking behavior.

• **Controllability (RAW5)** is a measure of the extent to which people believe that, by personal skill or diligence, can avoid death or injury while engaging in the activity. For example, "To what extent can you, by personal skill or diligence, avoid being hurt while engaging in the the following situations?" was typical of the items for this construct. Scores ranged from "uncontrollable" (score = 1) to "controllable" (score = 7). High score on controllability construct indicates a higher confidence on individual skills thus their attitude towards that risk tends to be more casual thus increasing their chances of risk-taking behavior.

• **Common-Dread (RAW6)** is a measure of the extent to which people have learned to live with risk and think about it in a calm way or have a great dread. For example, "How risky is this situation?" was typical of the items for this construct. Scores ranged from "not risky at all" (score = 1) to "extremely risky" (score = 7). High score on common-dread construct indicates that the attitude towards risk is not very casual and they tend to make very safe choices, thus leading to low risk-taking behavior.

• **Immediacy of Effect (RAW7)** is a measure of the extent to which people think that the risk of death is immediate on a particular task. For example, "How do you think this situation can lead to immediate death or fatal injury?" was typical of the items for this construct. Scores ranged

from "never" (score = 1) to "always" (score = 7). High score on immediacy of effect construct indicates that the worker understand the extent of the risk and their attitude towards that risk tends to be more casual thus increasing their chances of risk-taking behavior.

The following four constructs describe the probability of occurrence of consequences related to the four scenarios and a measure of risk perception. These items are measured on a 5 point Likert scale.

• **Occurrence of Minor Injury (RPC12)** was measured by eight items representing probability of occurrence of consequences leading to minor injury in four different situations. For example, "The ladder would break and I might get a small bruise." was typical of the items for this construct. Scores ranged from "this will not occur at all" (score = 1) to "there is a very high possibility that this will occur" (score = 5). High score on occurrence of minor injury construct indicates that the attitude towards risk is not very casual and they tend to make very safe choices, thus leading to low risk-taking behavior.

• **Occurrence of Major Injury (RPC34)** was measured by eight items representing probability of occurrence of consequences leading to major injury in four different situations. For example, "The ladder would break and I might get multiple injuries." was typical of the items for this construct. Scores ranged from "this will not occur at all" (score = 1) to "there is a very high possibility that this will occur" (score = 5). High score on occurrence of major injury construct indicates that the worker understand the extent of the risk and their attitude towards that risk tends to be more casual thus increasing their chances of risk-taking behavior.

• **Effects of Injury to Self and Family (RPC561)** was measured by six items representing effect injury to self and family. For example, "If you had been injured, how worried would you be of the following? Pain of the injury." was typical of the items for this construct. Scores ranged from "no worry at all" (score = 1) to "I care/worry a lot about it" (score = 5). High score on effects of injury to self and family construct indicates that the attitude towards risk is not very casual and they tend to make very safe choices, thus leading to low risk-taking behavior.

• **Effect of Injury to Project and Co-workers (RPC564)** was measured by six items representing effect injury to project and co-workers. For example, "Who would be the most affected if an accident had occurred in the scenario above?" was typical of the items for this construct. Scores ranged from "not affected" (score = 1) to "most affected" (score = 5). High score on effects of injury to project and co-workers construct indicates that the attitude towards risk is not very casual and they tend to make very safe choices, thus leading to low risk-taking behavior.

• **Cultural Dimensions** were measured using Value Survey Module (VSM 94) (**?**Hofstede and Hofstede, 2001). The items for cultural dimensions contained statements measuring five dimension, namely, Individualism/Collectivism (IDV), Power Distance Index (PDI), Uncertainty Avoidance Index (UAI), Masculinity/Femininity (MAS), and Long-term/Short-term Orientation (LTO). The questions regarding cultural dimensions construct are listed in the Section 2 of the survey presented in Appendix A.2 and A.2. Scores range from of "utmost importance" (score = 1) to of "very little importance" (score = 5). The interpretation of high and low scores for each cultural dimension is same as explained in Section 1.3.

3.6 Hypotheses Testing

The primary objective of this research is to explore the influence of cultural dimensions on perception of safety to explain the disparity in fatality rates among Hispanic and non-Hispanic construction worker in United States. The TPB and risk perception theory have provided robust evidence for predicting and investigating intended risk behavior, attitude towards the behavior, subjective norms, perceived control and worker perception in risky situations (Albarracin et al., 2001; Armitage and Conner, 2001; Godin and Kok, 1996; Hagger et al., 2002; Sheeran and Taylor, 1999; Sheppard et al., 1988; Johnson and Hall, 2005). As shown in the Figure 3.5 each of the fifteen (15) relationships were subjected to mediation analysis with each of the five (5) cultural dimension separately. Therefore, initially there were 75 mediation related hypothesis which examined the effect of each cultural dimension on the SEM framework relationships. The introduction of cultural variables as mediators will help explain the cause behind the relationship between two factors. The study would test the following hypothesis:

Cultural Dimension Influence: (Research Question 1)

H_{M1}: The relationship between Construction Safety Climate 1 and Intended Behavior in Risky Situation is mediated by Cultural dimensions.

$$H_{M1} : P_{CSC1->RSB} \neq P^{k}_{CSC1->RSB}$$

H_{M2}: The relationship between Construction Safety Climate 2 and Intended Behavior in Risky Situation is mediated by Cultural dimensions.

$$H_{M2} : P_{CSC2->RSB} \neq P^{k}_{CSC2->RSB}$$

H_{M3}: The relationship between Worker Health and Intended Behavior in Risky Situation is mediated by Cultural dimensions.

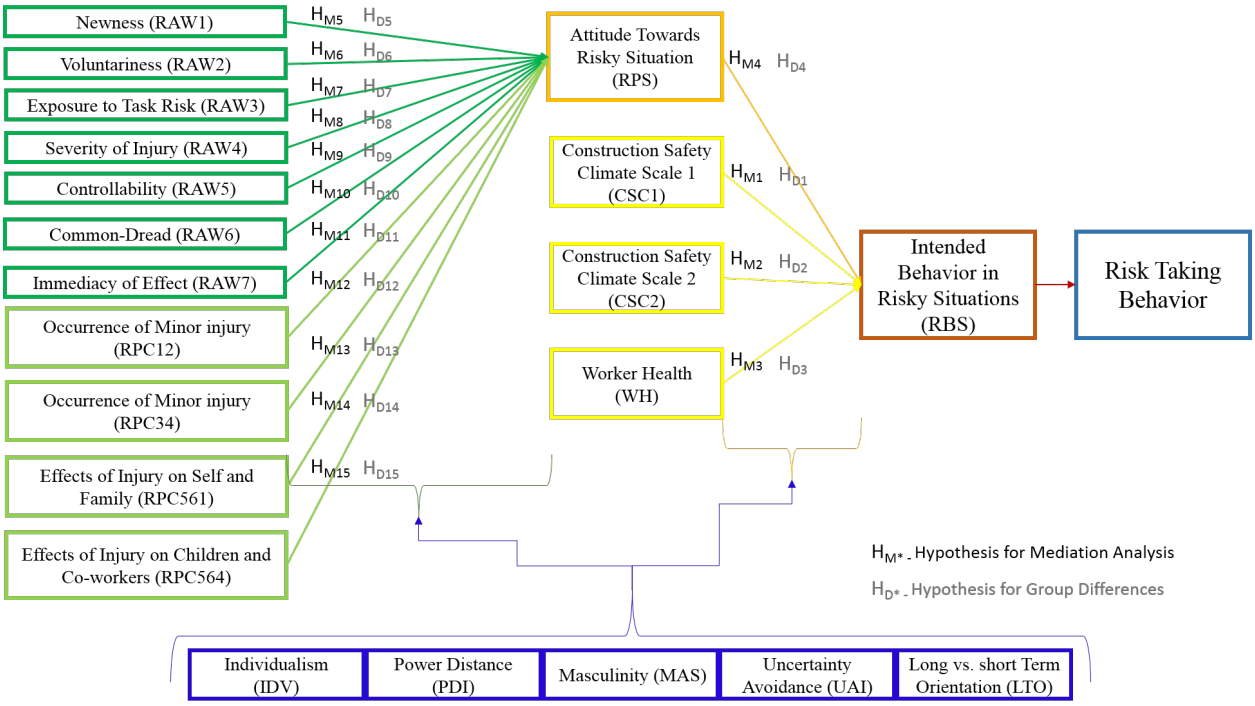


Figure 3.5: Research hypotheses in relation to the framework constructs

$H_{M3} : P_{WH->RSB} \neq P^{k}_{WH->RSB}$

H_{M4}: The relationship between Attitude Towards Risky Situation and Intended Behavior in Risky Situation is mediated by Cultural dimensions.

$H_{M4} : P_{RSP->RSB} \neq P^{k}_{RSP->RSB}$

H_{M5}: The relationship between Newness and Attitude Towards Risky Situation is mediated by Cultural dimensions.

$H_{M5} : P_{RAW1->RSP} \neq P^{k}_{RAW1->RSP}$

H_{M6}: The relationship between Voluntariness and Attitude Towards Risky Situation is mediated by Cultural dimensions.

$H_{M6} : P_{RAW2->RSP} \neq P^{k}_{RAW2->RSP}$

H_{M7}: The relationship between Knowledge about Risk and Attitude Towards Risky Situation is mediated by Cultural dimensions.

$H_{M7} : P_{RAW3->RSP} \neq P^{k}_{RAW3->RSP}$

H_{M8}: The relationship between Severity of Injury and Attitude Towards Risky Situation is mediated by Cultural dimensions.

$H_{M8} : P_{RAW4->RSP} \neq P^{k}_{RAW4->RSP}$

H_{M9}: The relationship between Controllability and Attitude Towards Risky Situation is mediated by Cultural dimensions.

$H_{M9} : P_{RAW5->RSP} \neq P^{k}_{RAW5->RSP}$

H_{M10}: The relationship between Common-Dread and Attitude Towards Risky Situation is mediated by Cultural dimensions.

$H_{M10} : P_{RAW6->RSP} \neq P^{k}_{RAW6->RSP}$

H_{M11}: The relationship between Immediacy of Effect and Attitude Towards Risky Situation is mediated by Cultural dimensions.

$H_{M11} : P_{RAW7->RSP} \neq P^{k}_{RAW7->RSP}$

H_{M12}: The relationship between Occurrence of Minor Injury and Attitude Towards Risky Situation is mediated by Cultural dimensions.

$H_{M12} : P_{RPC12->RSP} \neq P^{k}_{RPC12->RSP}$

H_{M13}: The relationship between Occurrence of Major Injury and Attitude Towards Risky Situation is mediated by Cultural dimensions.

$H_{M13} : P_{RPC34->RSP} \neq P^{k}_{RPC34->RSP}$

H_{M14}: The relationship between Effects of Injury to Self and Family and Attitude Towards Risky Situation is mediated by Cultural dimensions.

$H_{M14} : P_{RPC561->RSP} \neq P^{k}_{RPC561->RSP}$

H_{M15}: The relationship between Effect of Injury to Project and Co-workers and Attitude Towards Risky Situation is mediated by Cultural dimensions.

$H_{M15} : P_{RPC564->RSP} \neq P^{k}_{RPC564->RSP}$

Where, k represents the cultural dimensions (IDV, PDI, UAI, LTO, MAS).

Group Differences in Cultural Influence:(Research Question 2)

To test the effect of group differences between Hispanic and non-Hispanic, the model has to test whether the mediating effect of cultural dimensions is different for the two groups. H_{D1}: There is a difference in mediation of cultural dimension on Construction Safety Climate 1 and Intended Behavior in Risky Situation between Hispanics and Non-Hispanics.

$H_{D1} : P^{k}_{CSC1->RSB}(H) \neq P^{k}_{CSC1->RSB}(NH)$

H_{D2}: There is a difference in mediation of cultural dimension on Construction Safety Climate 2 and Intended Behavior in Risky Situation between Hispanics and Non-Hispanics.

$H_{D2} : P^k_{CSC2->RSB}(H) \neq P^k_{CSC2->RSB}(NH)$

H_{D3}: There is a difference in mediation of cultural dimension on Worker Health and Intended Behavior in Risky Situation between Hispanics and Non-Hispanics.

$H_{D3} : P^k_{WH->RSB}(H) \neq P^k_{WH->RSB}(NH)$

H_{D4}: There is a difference in mediation of cultural dimension on Attitude Towards Risky Situation and Intended Behavior in Risky Situation between Hispanics and Non-Hispanics.

$H_{D4} : P^k_{RSP->RSB}(H) \neq P^k_{RSP->RSB}(NH)$

H_{D5}: There is a difference in mediation of cultural dimension on Newness and Attitude Towards Risky Situation between Hispanics and Non-Hispanics.

$H_{D5} : P^k_{RAW1->RSP}(H) \neq P^k_{RAW1->RSP}(NH)$

H_{D6}: There is a difference in mediation of cultural dimension on Voluntariness and Attitude Towards Risky Situation between Hispanics and Non-Hispanics.

$H_{D6} : P^k_{RAW2->RSP}(H) \neq P^k_{RAW2->RSP}(NH)$

H_{D7}: There is a difference in mediation of cultural dimension on Knowledge about Risk and Attitude Towards Risky Situation between Hispanics and Non-Hispanics. $H_{D7} : P^k_{RAW3->RSP}(H) \neq P^k_{RAW3->RSP}(NH)$

H_{D8}: There is a difference in mediation of cultural dimension on Severity of Injury and Attitude Towards Risky Situation between Hispanics and Non-Hispanics..

$H_{D8} : P^k_{RAW4->RSP}(H) \neq P^k_{RAW4->RSP}(NH)$

H_{D9}: There is a difference in mediation of cultural dimension on Controllability and Attitude Towards Risky Situation between Hispanics and Non-Hispanics.

$H_{D9} : P^k_{RAW5->RSP}(H) \neq P^k_{RAW5->RSP}(NH)$

H_{D10}: There is a difference in mediation of cultural dimension on Common-Dread and Attitude Towards Risky Situation between Hispanics and Non-Hispanics.

$H_{D10} : P^k_{RAW6->RSP}(H) \neq P^k_{RAW6->RSP}(NH)$

H_{D11}: There is a difference in mediation of cultural dimension on Immediacy of Effect and Attitude Towards Risky Situation between Hispanics and Non-Hispanics.

$H_{D11} : P^k_{RAW7->RSP}(H) \neq P^k_{RAW7->RSP}(NH)$

H_{D12}: There is a difference in mediation of cultural dimension on Occurrence of Minor Injury and Attitude Towards Risky Situation between Hispanics and Non-Hispanics.

$H_{D12} : P^k_{RPC12->RSP}(H) \neq P^k_{RPC12->RSP}(NH)$

H_{D13}: There is a difference in mediation of cultural dimension on Occurrence of Major

Injury and Attitude Towards Risky Situation between Hispanics and Non-Hispanics. H_{D13} : $P^k_{RPC34->RSP}(H) \neq P^k_{RPC34->RSP}(NH)$

H_{D14}: There is a difference in mediation of cultural dimension on Effects of Injury to Self and Family and Attitude Towards Risky Situation between Hispanics and Non-Hispanics..

$H_{D14} : P^k_{RPC561->RSP}(H) \neq P^k_{RPC561->RSP}(NH)$

H_{D15}: There is a difference in mediation of cultural dimension on Effect of Injury to Project and Co-workers and Attitude Towards Risky Situation between Hispanics and Non-Hispanics.

$H_{D15} : P^k_{RPC564->RSP}(H) \neq P^k_{RPC564->RSP}(NH)$

Where, k represents the cultural dimensions (IDV, PDI, UAI, LTO, MAS).

3.7 Summary

This chapter illustrates the TPB and risk perception theory to understand the risk-taking behavior in construction industry. The two theories serve as the underlying theoretical foundation to develop the conceptual framework and formulate the research hypothesis. Specific constructs and questions associated with construction safety behavior were identified through review of relevant research and literature. The TPB was modified and extended with new variables like, worker health, risk perception, and cultural dimensions to support the research question. In conclusion, two sets of hypothesis were presented, one assessing the mediation effect of cultural dimensions and the other assessing the moderation effect of ethnic groups respectively. The next chapter will follow from this research model and hypotheses for statistical analysis and empirical testing.

Chapter 4

Methodology

4.1 Introduction

Following the theoretical and conceptual findings, this chapter illustrates the methodological foundations (research design) of the study. The following subsections address questions concerning the data collection procedure (population under review, sampling method, data coding, data screening), model development (content, reliability, and validity of the measurement instrument - survey), predictive capabilities of the structural model and hypothesis testing (mediation and moderation analysis). The survey data was analyzed using Structural Equation Modeling (SEM).

4.2 Research Design and Planning

The study employed a quantitative cross-cultural survey to test the relationship between cultural dimensions and risk perception measured as independent variables and behavioral responses as dependent variables. The study data was collected from on-site surveys of construction workers in and around Knox county area. A cross-sectional study design was used to gather information from the population of interest at a single point of time (Lavrakas, 2008). The advantage of cross-sectional studies is that they are relatively inexpensive and take up less time to conduct. Added feature of this type of study is that it can be repeated to compare results over a period of time, thus providing continuity to compare results over time. Additional advantages are that estimating prevalence of outcome of interest as the sample is commonly taken from the entire population and estimate of many outcome and risk factors can be assessed simultaneously (Levin, 2006).

4.2.1 Intended Study Population

The construction industry is comprised of 9.1 million workers with 3.39 million construction establishments as reported for the year 2010 (Dong et al., 2013). The number of establishments which did not have any payroll procedures accounted for 2.66 million. Additionally, about 80% of the construction payroll establishments had 1 to 9 employees. These unstructured and small establishments are primarily engaged in residential sub-contracting assignments and other specialty trade contractors assignments. Moreover, residential construction sector accounts for the second highest number of construction establishments in addition to being the top of the dollar value of work produced as shown in Fig 4.1. Thus the population of interest for this study were workers involved in residential single family housing and other specialty trade construction projects who were either employed by a company, specific trade subcontractor or self employed.

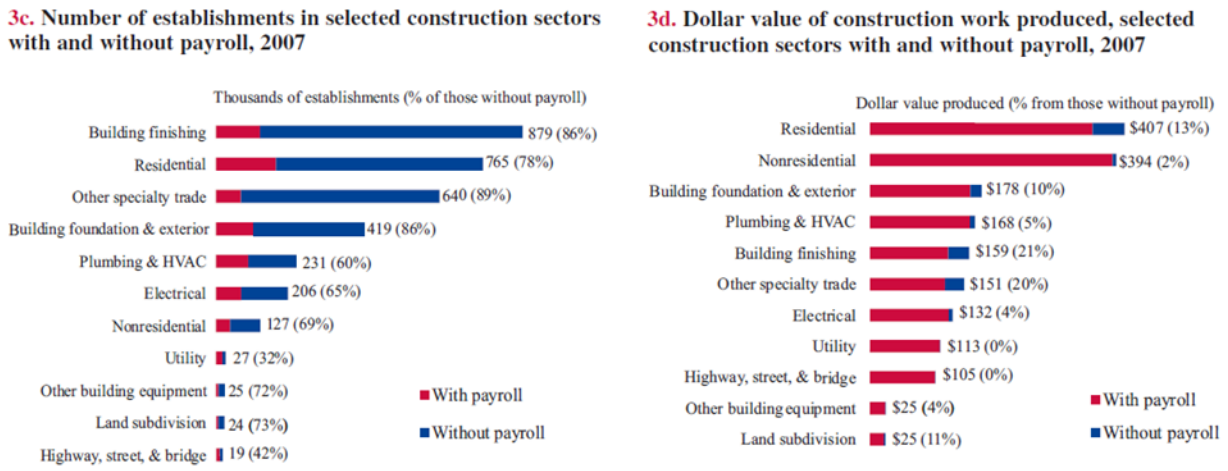


Figure 4.1: Proportion of residential construction industry (Dong et al., 2013)

As the goal of this research is to identify the impact of culture on perception of risk, the main division of the sample population is 50% Hispanic and 50% non-Hispanic workers. Table 4.1 shows the distribution of intended sample based on age classification as listed by CPWR Chart Book 2013. The sample will include some of the prominent job categories based on the Chart Book (Dong et al., 2013), namely, laborer-13.4%, carpenters 11.9%, painter-5.8%, electrician-4.9%, followed by plumber, repairer, roofer, drywall, etc.

Table 4.1: Intended data sample distribution

Total Population sample Size = 100				
Residential -Single Family House & Specialty Trade Contractors Employed/Sub-contractor/Self-Employed				
	Hispanic		**Non - Hispanic**	
Age	# of workers	Percent	# of workers	Percent
< 18 years	1	2%	1	2%
18 - 25 years	4	8%	3	6%
26 - 30 years	9	18%	4.5	9%
31 - 35 years	9	18%	5.5	11%
36 - 40 years	8.5	17%	6	12%
41 - 45 years	6	12%	6	12%
46 - 50 years	5.5	11%	7.5	15%
51 - 55 years	2.5	5%	7	14%
56 - 60 years	2	4%	6	12%
> 65 years	2.5	5%	3.5	7%
Total	50	100%	50	100%

4.2.2 Survey Instrument

The final survey instrument was based on previous literature in construction safety, risk perception, and cultural dimensions described in Chapter 3 - Section 1.3. The original survey had a total of 160 items. The distribution of these items is shown in Table 4.2. The survey was primarily divided into five sections: Risk Narrative, Risk Attitude Questionnaire, Cultural Dimension Questionnaire, Construction Safety Climate, Demographic and Socio-economic information. The survey questions in sections A,B,C,D,E,F were measured with 5-point Likert scale and in section G were measured using 7-point Likert scale. Independent test interviews were conducted to verify that all questions in the survey were understandable and of practical relevance to the respondents (Reynolds et al., 1993). The survey was translated into Spanish using a back-translation technique to ensure the meaning and intent of the questions remained the same (Brislin, 1970). The survey instrument both in English and Spanish language are presented in Appendix A.2 and A.2.

4.2.3 Ethical Considerations

The survey instrument and the data collection procedure was approved by University of Tennessee-Knoxville Institutional Review Board (IRB) (see Appendix B). The participants were informed that the survey was voluntary and there would be no risk involved. They were also informed that they could contact the researcher for any questions related to the study or the University of Tennessee-Knoxville IRB. A signed consent form by the participant was required for participating in the study as it contained socio-demographic information. Participants were assured that their

Table 4.2: Questionnaire and items

	Section	Items
A,B,C	Risk-Taking Behavior Profile	32
D	Cultural Dimensions	31
E	Construction Safety Climate	21
F	Worker Health	6
G	Worker Risk Assessment of Tasks	42
H	Demographic	10
I	Job Description	8
J	Training	4
K	Accident History	6
	Total	**160**

responses would remain confidential and there would be no identification of them or their company's name in relation to any specific response, nor would their responses be shared with anyone outside of our research team. They were also informed that there were no direct or implied solicitations or offers of products or services associated with this survey. The consent form was part of the web-based survey and the responses were stored as part of the data file.

As the research was quantitative in nature, quantitative methods were used to analyze the survey data, identify factors affecting workers risk perception and relationship between these factors, compare group differences across categories of race/ethnicity. Figure 4.2 depicts a schematic representation of the research activities and their expected output followed by this methodology.

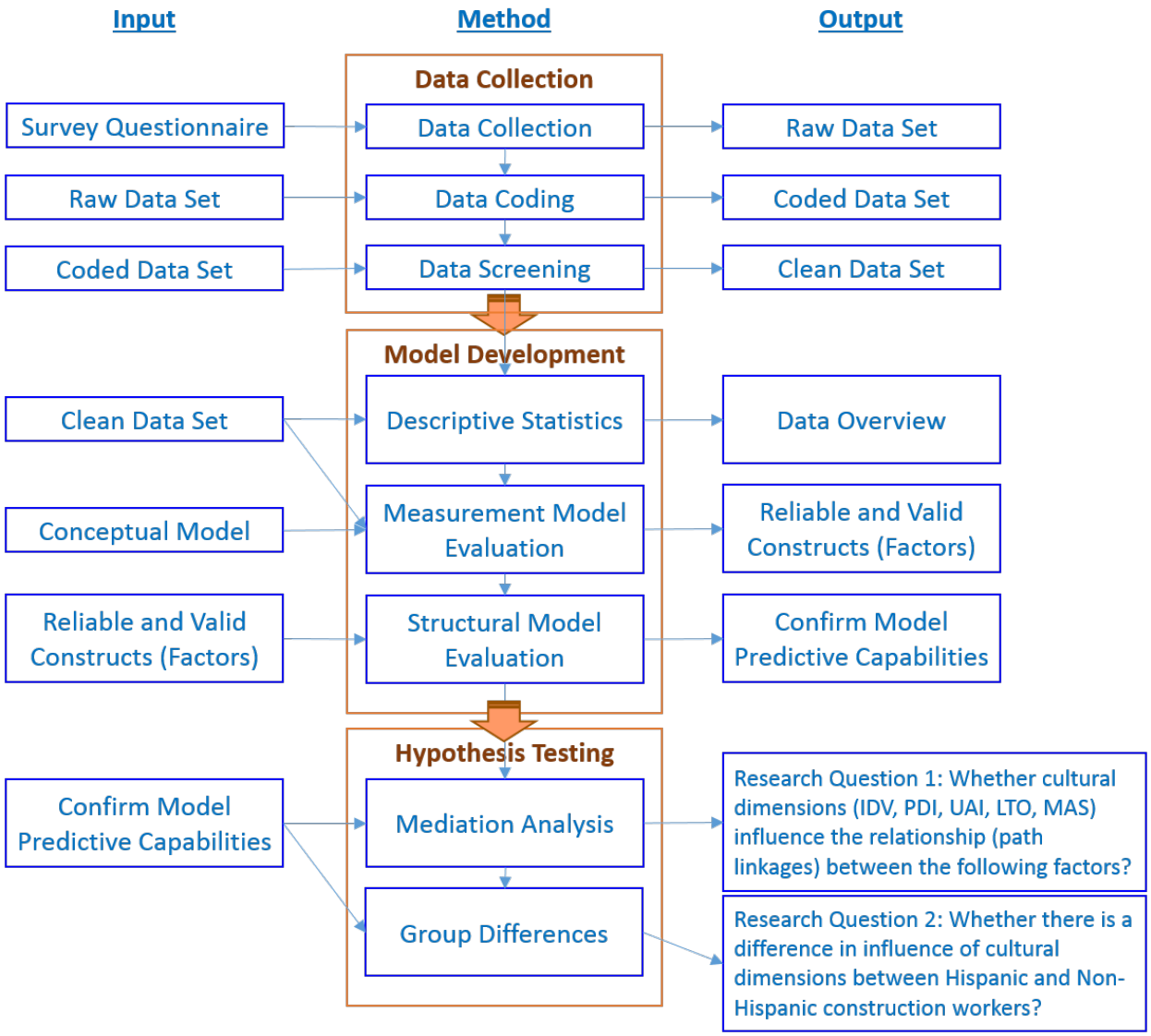


Figure 4.2: Research methodology and expected output

4.3 Data Collection and Sample

The data was collected on construction sites in and around the Knox county area and spanned a period of three months. The final survey instrument (Appendix A.2 & A.2) was administered using electronic tablets with Internet connections. The survey would take approximately 25-30 minutes to complete. A team of two graduate students would approach the site supervisor for permission to interview their employees on-site. All sites expect one declined the permission to interview its employees due to project time constraints. Rest of the construction sites were welcoming and introduced their employees and encourage them to participate in the surveys. A visiting scholar from Columbia assisted in conducting interviews in Spanish for many of the Hispanic construction workers. To avoid confusion and to maintain consistency participants were briefed with a short description and intent of the study as mentioned below.

"The University of Tennessee's Industrial & Systems Engineering Department is conducting a study on perception of safety among construction industry workers like yours. Results of this study will be useful to demonstrate the need for customized training programs for increasing cultural diverse population in the construction industry."

Each participant was compensated for their time and effort with $10.00 upon completion of the survey. This amount was also approved by the University of Tennessee-Knoxville IRB. The protocol followed for conducting the survey is as represented in Fig 4.3. Some of the participants declined to answer the survey as they did not completely comprehend the purpose. Some more deferred the interview date to other infeasible dates and were not able to complete due to time constraints. A total of 93 responses were collected from residential construction workers.

Figure 4.3: Survey procedure protocol

4.3.1 Sample

The population for the survey included construction workers from residential construction sites in and around Knox county, Tennessee. Many of these construction workers work in team of specialty trades which travel from one state to another based on job availability. Even though the

geographical area of the sites was not very widespread the workers came from various different locations, such as Georgia, Kentucky and Virginia. Stratified sampling (Hunt and Tyrrell, 2004) was selected as the sampling method where the population is broken down into different groups, often by demographic variables such as gender, race, etc. This is relevant for this study as the primary objective is to assess the differences between Hispanic and Non-Hispanic construction workers. Stratified sampling provides advantages over simple random sampling, such as higher precision than a simple random sample, thus requiring a smaller sample size. It also guards against unrepresentative samples.

4.3.2 Sample Size

The PLS-SEM method imposes less emphasis on the sample size requirement despite the overall complexity of the structural model. The sample size criterion for PLS-SEM based on the rule of thumb is the often-cited 10 times rule (Barclay et al., 1995). This rule indicates that the sample size should be equal to the larger of,

1. 10 times the largest number of formative indicators used to measure a single construct, or
2. 10 times the largest number of structural paths directed at a particular construct in the structural model.

The PLS-SEM algorithm uses Ordinary Least Square (OLS) regression to estimate the models partial regression relationships. The sample size recommendations are also verified using Cohen table based on minimum R^2 values, the significance levels, and commonly used statistical power (Cohen, 1992). Cohen (as cited in Hair Jr et al. (2013), p.21) also provides sample size guidelines for multiple regression models, as long as the measurement models have an acceptable quality in terms of outer loadings (outer loading values are greater than 0.70) as shown in Table: 4.3.

In the conceptual model presented in Chapter 3 - Section 3.5: Figure 3.4 we have two constructs 'Attitude Towards Risky Situation' (RSP) and 'Intended Behavior in Risky Situations' (RSB), each having 4 indicators. Moreover, the structural model has 9 exogenous constructs that explain the single construct RSP. The maximum number of arrows that point at a particular latent variable is 9. Therefore, according to the 10 times rule, 9 * 10 = 90 represents the minimum number of observations needed to estimate the PLS-SEM model. Additionally, following Cohen's recommendations for multiple OLS regression analysis, we need 88 data points to detect R^2 values of around 0.25, assuming a significance level of 5% and a statistical power of 80 % (Table: 4.3).

The resultant 93 responses from the data collection process satisfy all the above conditions and is considered large enough to analyze the cultural differences.

Table 4.3: Sample size recommendation in PLS-SEM for statistical power of 80 % - Cohen J. (as cited in Hair Jr et al. (2013), p.21)

	Significance Level											
	1%				5%				10%			
	Minimum R^2				Minimum R^2				Minimum R^2			
Maximum Number of Arrows Pointing at a Construct	0.10	0.20	0.50	0.75	0.10	0.20	0.50	0.75	0.10	0.20	0.50	0.75
2	158	75	47	38	110	52	33	26	88	41	26	21
3	176	84	53	42	124	59	38	30	110	48	30	25
4	191	91	58	46	127	65	42	33	111	53	34	27
5	295	98	62	50	147	70	45	36	120	58	37	30
6	217	103	66	53	157	75	48	39	128	62	40	32
7	228	109	69	56	166	80	51	41	136	66	42	35
8	238	114	73	59	174	84	54	44	143	69	45	37
9	247	119	76	62	181	88	57	46	150	73	47	39
10	256	123	79	64	189	91	59	48	156	76	49	41

Other sample size recommendation in literature are based on various criterion. The following recommendations are listed to report the wide range of criterion, however the actual sample size is based on the PLS-SEM criterion mentioned above. Some researchers advocate a constant number approach of 100 (Gorsuch, 1983; Kline, 1979), 200 (Guilford, 1954), 250 (Colgan, 1981), and 500 (Comrey and Lee, 2013) participants. While other researchers recommend using $N : p$ ratio, where, N = sample size and p = number of items included in analysis. Ratio recommendations vary from 3 to 6 (Colgan, 1981), at least 5 (Gorsuch, 1983), and at least 10 (Everitt, 1975). Furthermore, ratio of $P : r$, where, p = number of items and r = number of factors is used in conjunction with communality values (MacCallum et al., 1999).

4.3.3 Data Coding

The survey data was administered with the help of the University of Tennessee (UT), Office of Information and Technology(OIT), via the University of Tennessee's Qualtrics survey software package. The survey responses were stored in the UT OIT Qualtrics server. As a result, the downloaded data required a certain level of formatting and remove unused columns and recoded values. The data coding steps listed below were followed to make the data ready for screening.

1. Save As Survey_mmddyyyy.sav. Saving files with a particular format offers a simple yet effective way to track changes in the dataset as well as serve as a useful backup.

2. Delete the following columns. The columns are generated as a result of the syntax used by the UT OIT Qualtrics server. Therefore it is desirable to delete excess data not useful for the analysis.

   V1, V2, V4, V5, V6, V7, V8, V9, V10, Q69, Q68, LocationLatitude, LocationLongitude, Location Accuracy.

3. Transform the columns listed below. The following variables/columns had descriptive response and hence had to be recoded based on the response.

   Training → Training_Type, JD8 (Medical expenses), D3 (Education)

4. Delete the columns listed below after review. The following variables/columns were deleted after their descriptive response was incorporated into the main variable and if the variable did not have any variation at all.

   D2 (Gender), D3_TEXT, D4_TEXT, D10_TEXT, JD3 (Union Member), JD2 (Full time/part time), T4_1_Text - T4_6_Text, D5_TEXT, Q76 after merging with JD5.

5. Review, transform and delete the variables listed below. The following variables/columns had descriptive response and hence had to be recoded based on the response.

   RSP1B, RSP2B, RSP3B, RSP4B, ACCHA, ACCHB, ACCH6,

6. Delete JD1_Text after resolving the categories of Job Title.

   (a) 8 Carpenter

   (b) 9 Mason

   (c) 10 Framer/siding

   (d) 7 (other) Ceramic, machine operator, contractor.

4.3.4 Data Screening

Data screening is a necessary part of the process as it ensures the data to be clean, ready for analysis and valid for testing conceptual theory. This section of the chapter will address the issues related to blanks or unengaged responses, missing responses, outliers, skewness and kurtosis of data.

Unengaged or Blank Responses: It is necessary to flag and remove the un-engaged response points as they will affect the results. Detection of un-engaged responses requires examination of the standard deviation for scale items. If the standard deviation of scale responses for each respondent is less than 0.5 for a five point Likert scale it is flagged as a problem data point (Gaskin, 2012).

1. Blank responses

   Detecting blank responses requires case screening in which the threshold of missing values for a particular respondent is less than 5% or 10% as reported by (Hair Jr et al., 2013) and (Gaskin, 2012) respectively. The following three steps were executed to identify blank responses in the data.

   (a) Copy data in excel sheet with variables names

   (b) Blanks [=COUNTBLANK(A3:EH3)]

   (c) Delete case 121: 31 blank responses.

2. Un-engaged responses

   Detection of un-engaged responses requires examination of the standard deviation for scale items. If the standard deviation of scale responses for each respondent is less than 0.5 for a five point Likert scale it is flagged as a problem data point (Gaskin, 2012).

   (a) For scales other than RAW [=STDEV.P(B2:CR2)]

   (b) Delete case 125: Std Dev for rest of the scale = 0.5941 and additional observation while collecting data.

   (c) For RAW scales [=STDEV.P(CS2:EH2)]

   (d) Delete case 144: Std Dev for RAW scale = 0.3905 and additional observation while collecting data.

   (e) Delete case 169: Disengaged response.

In total four cases were deleted using this process.

Missing Data: Missing data appear when a respondent either purposely or inadvertently fails to answer one or more question(s). Missing values were replaced and imputed using the SPSS - Transform → Replace Missing Values function. The values were imputed after dividing the dataset in Hispanic and non-Hispanic subsets. This helps to maintain the integrity of each subset of data. The list of imputed values is in Appendix C.

Outliers: The outliers analysis for survey items using Likert-scales do not really exhibit any deviating behavior. Selecting one of the extreme options (1 or 5) is not really indicative of outliers behavior (Gaskin, 2012). However, outliers analysis for socio-demographic data eliminates unwanted skewed responses. Figure 4.4 shows the box-plot distribution of data for each of the demographic variable.

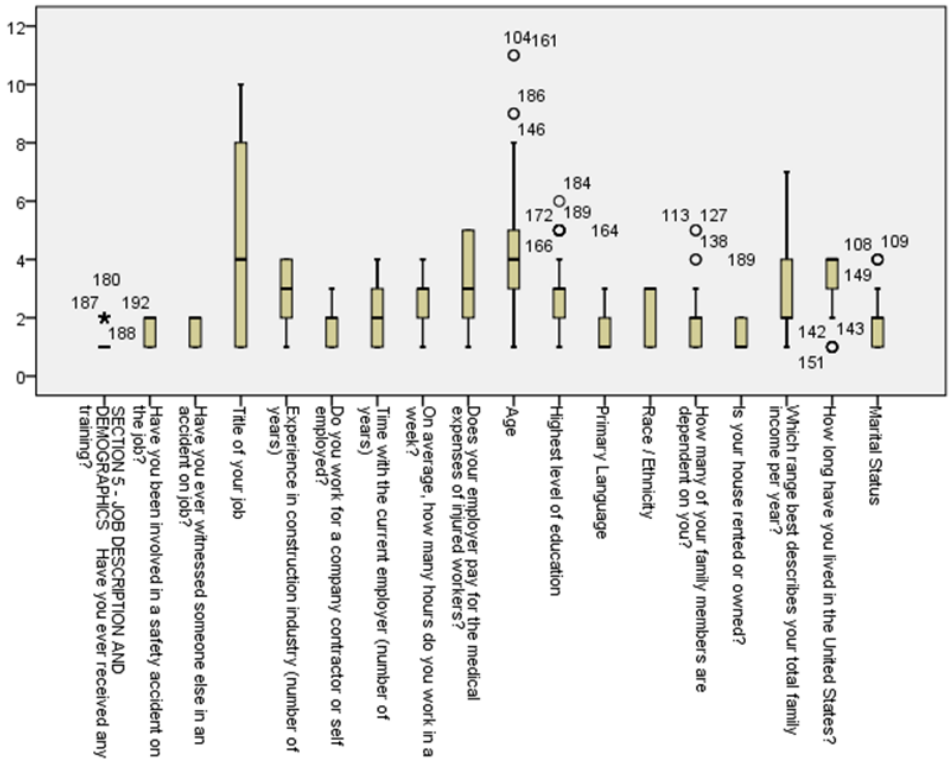


Figure 4.4: Outlier data analysis

The results of outliers analysis is enumerated below.

1. Age:

   ID #: 104, 161, 186, 146: not really outliers, they are simply older people.

2. Highest level of education:

   ID #: 164, 166, 172, 184, 189: These items were replaced with medians of the groups (Hispanic and Non-Hispanic).

   Replacement of 166 and 189 with Hispanic mean of D3 as in Table 4.4.

Table 4.4: Hispanic data set: Replace missing data

	Result Variable	N of Replaced Missing Values	N of Valid Cases	Creating Function
1	D3	2	42	MEDIAN(D3,ALL)

184- Changed the selection to 3 because GED = High school.

164 and 172 changed to 4 for vocational training and other courses.

3. How many of your family members are dependent on you?

   ID #: 113, 127, 138, 189: These cases mentioned that they have to support between 7-8 or > 8 people. Therefore the cases were not regarded as outliers.

4. How long have you lived in the United States?

   ID #: 142, 143, and 151: These cases have lived in the USA for less than 1 year. Therefore the cases were not regarded as outliers.

5. Marital Status

   ID #: 108, 109, and 149: these cases mentioned that they chose not to answer

6. Have you been involved in a safety accident on the job?

   ID #: 180, 187, 188, 190: Not an outlier. There are many cases who have mentioned that they have not received any training.

4.4 Descriptive Statistics

This section illustrates the overall behavior and describes basic features of the data set. It provides a simple summary of the sample and the measures. The descriptive statistics for this study includes measures of mean, mean, minimum, maximum, standard deviation, skewness and kurtosis, frequency and percentage of responses.

Skewness and Kurtosis can affect the model performance as it determines the peakedness or flatness of the distribution of data. These are the two main indicators of univariate normality. Most values of skewness and kurtosis fall within the recommended range of $\pm$ 1.0. There are a few values which fall within the range of $\pm$ 2.0 and above. This limit is regarded as acceptable according to (George and Mallery, 2007). The variables listed below exhibit high skewness and kurtosis values, Appendix C.2. A detail statistics of survey items consisting of mean, minimum, maximum, standard deviation, skewness and kurtosis is summarized in Appendix D.2.

RSP2_B, RSP2_P, RPS6_C2_1,RPS6_C2_2, CD1_4, CD10_2, CSC2_11, RAW6_13, ACCH3, D5, D6, D9, D10.

Moreover, according to the central limit theorem, the arithmetic mean of the sample will be approximately normally distributed for a large sample size (over 40), regardless of the underlying distribution. This effect of large sample size on normality is also mentioned in (Hair, 2005). As the sample size increases, the effect of normality violation is reduced. At this point in the analysis we simply conduct the skewness and kurtosis as the data screening step and flag the variables which have skewness or kurtosis above $\pm$ 2.0.

4.5 Evaluation of Measurement Model

In this section, the validity and reliability of the relationship between items (indicators) and the constructs (latent variables) is assessed. Measurement models, also referred to as the outer models, represent the relationships between the items and the constructs. Multivariate analysis and multivariate measurements helps in identifying the measurement error more precisely thus accounting for it in the research findings. The survey data is used to estimate the path relationships in the model with the objective of minimizing the error terms of the latent variables. In PLS-SEM, weights, loading, and path coefficients are initially unknown and are estimated by the algorithm. The algorithm uses the known elements from the survey dataset to determine the scores of the constructs, that are later used as inputs for (single and multiple) partial regression models within the path model. The construct scores in this process are a linear combination of the items (indicators). Weights and loadings are estimated using an iterative process followed by the structural models path coefficients and R^2 in the second stage (Henseler et al., 2012).

In order to sustain the quality of the model and the factor structure, the following criteria were applied to assess individual items.

- Items with factor loading < 0.50 will be removed. Furthermore, items with factor loading $<$ 0.70 will flagged.
- Items that load on more than two factors will be removed.
- Items that have a high variance inflation factor (VIF) will be flagged for further analysis.

In addition to the above criterion, Table 4.5 shows the two stage evaluation of measurement model for both reflective and formative constructs. Section 5.3.1 and 5.3.2 will describe in detail

the assessment process for PLS-SEM.

Table 4.5: Criterion for evaluation of measurement models

Evaluation of Measurement Models	
A. Reflective Measurement Models	B. Formative Measurement Models
• Internal consistency	• Convergent validity (Average Variance Extracted)
• Indicator reliability	• Collinearity among indicators
• Convergent validity	• Significance and relevance of outer weights
• Discriminant validity	

4.5.1 Reflective Measurement Models

Reflective constructs consists of items which are representative of the construct definition or domain. Therefore, all items are highly correlated and are interchangeable. Deletion of an item is acceptable as it does not change the meaning of the construct, as long as it maintains the required reliability criterion. The assessment of reflective measurement models consists of evaluation of internal consistency, convergent validity, and discriminant validity of constructs. Reflective measurement models are based on classical test theory and have been common practice in social science for a long time.

4.5.1.1 Internal Consistency Reliability

The internal consistency reliability is an estimate of the reliability based on the inter-correlations of the observed indicator variables. PLS-SEM measures the internal consistency reliability using **composite reliability** (ρ_c). This criterion is in addition to the traditional Cronbach's alpha's which is sensitive to the number of items in the scale. It takes into account different outer loadings of indicator variables and varies between 0 and 1. Values between 0.70 and 0.90 are regarded as satisfactory measure of composite reliability (Nunally and Bernstein, 1994).

$$\rho_c = \frac{(\Sigma_i l_i)^2}{(\Sigma_i l_i)^2 + \Sigma_i var(e_i)}$$

Where, l_i = the standardized outer loading of the indicator variable i of a specific construct.

e_i = measurement error of indicator variable i.

$var(e_i$ = variance of the measurement error, defined as $1 - var(l_i)^2$

Cronbach's alphas were also examined to assess the internal consistency reliability of constructs.

It is a function of the average inter-correlation among items within a construct. A good alpha value is considered to be between 0.7 and 0.9 range.

4.5.1.2 Convergent Validity (Reflective Constructs)

The extent to which an item correlates positively with the rest of the items of the same construct is measured by convergent validity. Indicator reliability is a measure of convergent validity and calculated as the square of the standardized indicators' outer loading. A high outer loading on a construct demonstrates that the associated items have much in common with the construct. As a rule of thumb significant and strong outer loadings are considered to be any value above 0.70.

Average Variance Extracted (AVE) also indicates the convergent validity of a construct. It measures the grand mean value of the squared loadings of a the indicators associated with the construct. It is equivalent to the communality of a construct. Pertaining to the similar understanding, the AVE values of a construct has to be greater than 0.50 which indicates that the construct explains more than half of the variance of its indicators.

4.5.1.3 Discriminant Validity

Discriminant validity measures the extent to which a construct is different form other constructs. One of the measures is to examine the cross loadings of indicators. Where the indicators outer loading with its latent variable should be greater than the loadings on all other factors (Hair et al., 2011). The second measure is the Fornell-Larcker criterion (Fornell and Larcker, 1981b). This measure compares the square root of the AVE values with the latent variable correlations. The argument for this criterion is based on the idea that a construct shares more variance with its associated indicators than with other construct.

4.5.2 Formative Measurement Models

Indicators cause the construct in formative measurement models. Formative indicators are not interchangeable, as they may change the meaning of the construct if eliminated. It is important to capture an exhaustive set of indicators rather than a sample for formative models (Diamantopoulos and Winklhofer, 2001; Bollen and Lennox, 1991). However, it is very difficult to compile such a set of indicators as a researcher cannot be certain whether all the possible causes related to the formative construct have been accounted by the items (Diamantopoulos, 2006). Thus is it necessary

to establish a acceptable level of measurement validity before proceeding for evaluation of structural model (Hair Jr et al., 2013).

4.5.2.1 Convergent Validity (Formative Constructs)

Convergent validity in formative measurement models involves correlating the formative construct with a reflective measure of the same construct. It is also called as redundancy analysis are requires a reflective measure of the same construct (Chin, 1998). However, including additional indicators results in increasing the number of questions and hence length of the survey. Consequently, it results in respondent fatigue, decrease in response rates, and affects survey quality. Besides, it is laborious to find an established reflective measure or create a new one for the same construct (Hair Jr et al., 2013). The inclusion of additional questions for convergent validity was realized later for this study and this analysis is concluded not fit for this study.

4.5.2.2 Collinearity Issues

Collinearity examines whether any indicator exhibits high correlation with other indicators of the same construct. Collinearity in formative measures cause variation inflation issues and can result into a unstable and non-significant construct. In PLS-SEM, a variance inflation factor (VIF) of 5 or higher indicate a potential collinearity problem and such indicators should be removed from the construct (Hair et al., 2011).

4.5.2.3 Significance and Relevance

Finally, indicators are assessed based on their contribution to the construct both relatively and absolutely. The outer weights of formative indicators can be compared with each other to determine the relative contribution to the construct. Additionally, bootstrapping procedure is used to determine whether each indicators is significantly different from zero based on t-values. The critical values for significance levels of 1% ($\alpha = 0.01$), 5% ($\alpha = 0.05$), and 10% ($\alpha = 0.10$) probability of error are 2.57, 1.96, and 1.65 respectively. However, non-significant indicators are not directly removed from the model.

4.6 Evaluation of Structural Model

The evaluation of structural model involves examining the model's predictive capabilities and the relationship between constructs. It follows after the construct measures are confirmed to be reliable ad valid. The fit-statistic in PLS-SEM focuses on the discrepancy between the observed/approximated values of the dependent variables and values predicted b the model in question (Hair Jr et al., 2013). One of the first checks is collinearity assessment as the structural model is based on OLS regressions of each endogenous latent variable on its corresponding predecessor construct. PLS-SEM follows four steps to assess the structural model, significance of path coefficients, level of R^2 values, the f^2 effect size, and predictive relevance Q^2.

4.6.1 Collinearity Assessment of Structural Model

The collinearity assessment for structural models is analogous to the measures used for the evaluation of formative measurement models in section 4.5.2.2. However, in this case we examine the each set of predictor construct for each subpart of the structural model. Collinearity problem in a structural model can be addressed by eliminating constructs, merging predictors into single construct or creating higher order constructs.

4.6.2 Size and Significance of Path Coefficients

The size of path coefficients are obtained after running the PLS-SEM algorithm. The path coefficients have standardized values between -1 and +1. The values can interpreted as +1 representing strong positive (and vice versa for negative values) relationship between constructs. Table 4.6 lists the path coefficient relationships, their description and expected sign which were tested for conceptual model. The significance of the coefficient depends on its standard error which is obtained by running the bootstrapping algorithm. The bootstrap algorithm computes the empirical t-value for each of the path coefficients. The critical values for significance levels are similar to that mentioned in section 4.5.2.3.

4.6.3 Coefficient of Determination R^2

The amount of variance explained by the model is measured by coefficient of determination and is computed as the squared correlation between a constructs predicted and actual values. It represents the combined effect of exogenous (independent) latent variables on the endogenous (dependent)

Table 4.6: Path coefficients relationships

Relationship	Description	Expected sign
Relationships Associated with Intended Behavior in Risky Situations		
RSP -> RSB	Attitude goes from safe to risky = increase in intended risky behavior	"+ ve"
CSC1 -> RSB	High perception of safety climate = low intended risky behavior	"- ve"
CSC2 -> RSB	High perception of safety climate = low intended risky behavior	"- ve"
WH -> RSB	More health issue = increase in intended risky behavior	"+ ve"
Relationships Associated with Attitude Towards Risky Situation		
RAW12 -> RSP	Greater willingness to take risk = increases the riskiness of attitude	"+ ve"
RAW3 -> RSP	;More exposure to risk = increase the riskiness of attitude	"+ ve"
RAW4 -> RSP	Better understanding of risk = increase the riskiness of attitude	"+ ve"
RAW5 -> RSP	More control over action = decreases the riskiness of attitude	"- ve"
RAW6 -> RSP	Better task risk assessment = decreases the riskiness of attitude	"- ve"
RAW7 -> RSP	Higher fear of fatal injury = increase the riskiness of attitude	"+ ve"
RPC12 -> RSP	Higher occurrence of minor injury = decreases the riskiness of attitude	"- ve"
RPC34 -> RSP	Higher occurrence of minor injury = increase the riskiness of attitude	"+ ve"
RPC561 -> RSP	Higher effect on self and family = decreases the riskiness of attitude	"- ve"

latent variable. R^2 is commonly used to evaluate the structural model similar to any other regression models. The R^2 value ranges from 0 to one, where the higher value indicates higher level of predicting accuracy. There is not a specific rule of thumb which indicates a acceptable R^2 as the values depend on model complexity and research discipline. Consumer behavior studies R^2 of 0.20 is considered as high, where as success driver research R^2 of 0.75 is acceptable. Several marketing studies have described R^2 values of 0.75, 0.50 and 0.25 as substantial, moderate and weak (Hair et al., 2011; Henseler et al., 2009). However, selecting a model purely based on the R^2 values is not a good approach. Adjusted R^2 values provide a suitable measure to avoid bias towards complex models. Additional corroborative measures to assess model capabilities are explained in the following two sections.

4.6.4 Effect Size f^2

The effect size f^2 represents the change in R^2 value when a specified exogenous construct is omitted from the model. It explains whether that omitted construct has a substantive impact on the dependent construct. The effect size is calculated as,

$$f^2 = \frac{R^2_{included} - R^2_{excluded}}{1 - R^2_{included}}$$

The effect size values are assessed as small, medium and large effects is the f^2 values are 0.02, 0.15, and 0.35 respectively (Cohen, 2013).

4.6.5 Predictive Relevance Q^2

The models' predictive relevance is measured using Stone-Geisser's Q^2 value (Geisser, 1974; Stone, 1974). The prediction accuracy of indicators in reflective measurement models of endogenous constructs improves when a PLS-SEM model exhibits predictive relevance. If the Q^2 values if larger than 0 for a certain reflective endogenous latent variable it shows the path models' predictive relevance for that specific construct. The Q^2 value is calculated using the blindfolding procedure specified in the SmartPLS software for a certain omission distance D. This procedure omits every Dth data point from the endogenous constructs indicators and reuses the sample to estimate the parameters (Chin, 1998; Henseler et al., 2009; Tenenhaus et al., 2005).

4.7 Research Question 1: Hypothesis Testing Influence of Cultural Dimension

The main aim of this study was to build a model that captures the differences in intended risk-taking behavior between Hispanic and non-Hispanic construction workers. Before attempting this step, however, it was first necessary to analyze the mediating effect of cultural variables by themselves. The first research question associated is, "Whether cultural dimensions (IDV, PDI, UAI, LTO, MAS) influence the relationship (path linkages) between the following factors.

- Attitude Towards Risky Situation and Intended Behavior in Risky Situations
- Construction Safety Climate and Intended Behavior in Risky Situations
- Worker Health and Intended Behavior in Risky Situations
- Risk Task Assessment and Risk Consequences with Attitude Towards Risky Situation

The previous section tests the predictive capabilities of the structural model. The resultant relationships between factors are tested for change in the presence of cultural variables. Figure 4.5 gives a diagrammatic representation of mediator influence over relationship between two variables. The independent (IV) and dependent (DV) variables will change as different path linkages are tested. Section 3.6 presents a detailed description of the hypothesis. Table 4.7 shows list of path linkages, where a set of IV is predicting a DV. The path coefficients of IV -> DV are compared with and without cultural variable acting mediators.

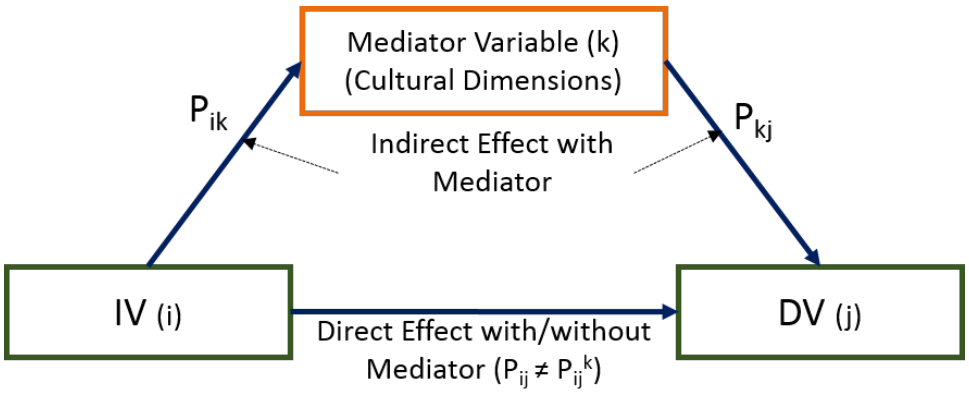


Figure 4.5: Mediation analysis

Table 4.7: Research question 1: Mediation hypothesis

Mediation Hypothesis	Independent Variable (IV)		Dependent Variable (DV)
	Relationships Associated with Intended Behavior in Risky Situations		
$\mathbf{H}_{M1}$	Construction Safety Climate 1 (CSC1)	->	Intended Behavior in Risky Situations (RSB)
$\mathbf{H}_{M2}$	Construction Safety Climate 2 (CSC2)	->	Intended Behavior in Risky Situations (RSB)
$\mathbf{H}_{M3}$	Worker Health (WH)	->	Intended Behavior in Risky Situations (RSB)
$\mathbf{H}_{M4}$	Attitude Towards Risky Situation (RSP)	->	Intended Behavior in Risky Situations (RSB)
	Relationships Associated with Attitude Towards Risky Situation		
$\mathbf{H}_{M5}$	Newness (RAW1)	->	Attitude Towards Risky Situation (RSP)
$\mathbf{H}_{M6}$	Voluntariness (RAW2)	->	Attitude Towards Risky Situation (RSP)
$\mathbf{H}_{M7}$	Knowledge about Risk (RAW3)	->	Attitude Towards Risky Situation (RSP)
$\mathbf{H}_{M8}$	Severity of Injury (RAW4)	->	Attitude Towards Risky Situation (RSP)
$\mathbf{H}_{M9}$	Controllability (RAW5)	->	Attitude Towards Risky Situation (RSP)
$\mathbf{H}_{M10}$	Common-Dread (RAW6)	->	Attitude Towards Risky Situation (RSP)
$\mathbf{H}_{M11}$	Immediacy of Effect (RAW7)	->	Attitude Towards Risky Situation (RSP)
$\mathbf{H}_{M12}$	Occurrence of Minor Injury (RPC12)	->	Attitude Towards Risky Situation (RSP)
$\mathbf{H}_{M13}$	Occurrence of Major Injury (RPC34)	->	Attitude Towards Risky Situation (RSP)
$\mathbf{H}_{M14}$	Effects of Injury to Self and Family (RPC561)	->	Attitude Towards Risky Situation (RSP)
$\mathbf{H}_{M15}$	Effect of Injury to Project and Co-workers (RPC564)	->	Attitude Towards Risky Situation (RSP)

The mediation analysis for all cultural dimensions and path linkages follows the following steps.

- Introduce single culture dimension at a time between two constructs.
- Test the change in value of path linkages between constructs.
  For example: $H_{M1} : P_{CSC1->RSB} \neq P^{k}_{CSC1->RSB}$,
  Where, k represents the cultural dimensions (IDV, PDI, UAI, LTO, MAS).
  - t-statistic is used to test the change in the value of path linkages between constructs.
  - The critical values for significance levels of 1% ($\alpha = 0.01$), 5% ($\alpha = 0.05$), and 10% ($\alpha = 0.10$) probability of error are 2.57, 1.96, and 1.65 respectively.
- Repeat the test for each of the remaining four culture dimensions.
- Rerun the first three steps for all 15 path linkages.

4.8 Research Question 2: Hypothesis Testing of Group Differences

The primary goal of the study is tested in this section. The differences in the influence of cultural variables between Hispanic and non-Hispanic construction workers over the other model relationships are tested. The second research question, " Whether there is a difference in influence of cultural dimensions between Hispanic and Non-Hispanic construction workers." is assessed. Section 3.6 presents a detailed description of the hypothesis. Figure 4.6 gives a diagrammatic representation of comparison of direct effect (P^{k}_{ij}) between IV (i) -> DV (j) in presence of a cultural variable mediator (k) across two groups (Hispanic and non-Hispanic constriction workers). Table 4.8 shows list of fifteen path linkages to be compared between Hispanic and non-Hispanic group. The path coefficients of IV -> DV are compared with cultural variable acting mediators between groups.
The mediation analysis for all cultural dimensions and path linkages follows the following steps.

- Divide the dataset based on ethnicity.
- Conduct mediation analysis for each subset.
- Test the difference in value of path linkages between components for Hispanic and non-Hispanic groups. For example: $H_{D1} : P^{k}_{CSC1->RSB}(H) \neq P^{k}_{CSC1->RSB}(NH)$
  Where, k represents the cultural dimensions (IDV, PDI, UAI, LTO, MAS).

- t-statistic is used to test the change in the value of path linkages between constructs.
- The critical values for significance levels of 1% ($\alpha = 0.01$), 5% ($\alpha = 0.05$), and 10% ($\alpha = 0.10$) probability of error are 2.57, 1.96, and 1.65 respectively.

- Repeat the test for each of the remaining four culture dimensions.
- Rerun the first three steps for all 15 path linkages.

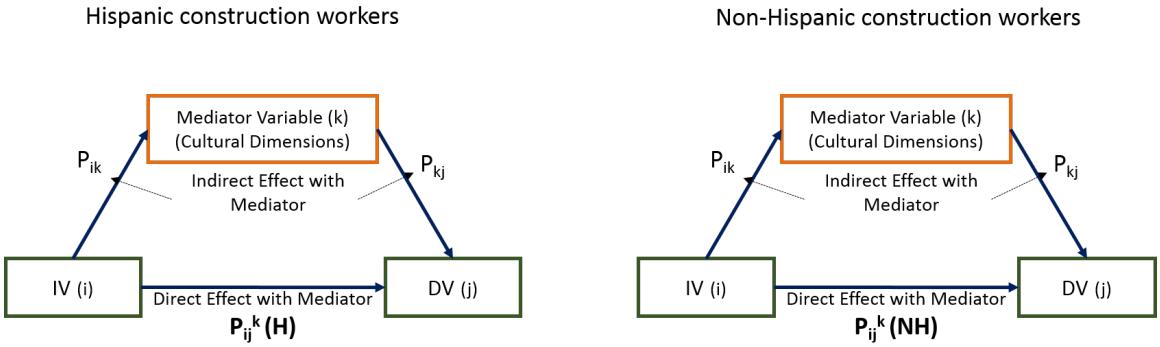


Figure 4.6: Group differences - Moderation

The output of this analysis will suggest which cultural dimensions (IDV, PDI, UAI, LTO, MAS) significantly affect the model relationships for Hispanic and non-Hispanic construction workers. The differences in the values between the two groups can be of the following type.

1. Difference in the value of path linkage between constructs.
2. Difference in the sign of path linkage between constructs.
3. Difference in the significance of value of path linkage between constructs.

4.9 Summary

In summary, cross-cultural survey design with stratified sampling was employed for data collection. Data was collected on-site using web-based Qualtrics survey software package. The data was cleaned and screened based on blank, un-engaged and missing responses. The dataset was also tested for outliers, skewness and kurtosis. This chapter presents the a clean dataset and method for testing hypothesis of the research. The output of this chapter is a reliable dataset which is used for data analysis as presented in Chapter 5.

Table 4.8: Research question 2: Moderation-mediation hypothesis

Mediation Hypothesis	Hispanic Worker		Non-Hispanic Worker
H_{D1}	CSC1 -> RSB	$\neq$	CSC1 -> RSB
H_{D2}	CSC2 -> RSB	$\neq$	CSC2 -> RSB
H_{D3}	WH -> RSB	$\neq$	WH -> RSB
H_{D4}	RSP -> RSB	$\neq$	RSP -> RSB
H_{D5}	RAW1-> RSP	$\neq$	RAW1-> RSP
H_{D6}	RAW2 -> RSP	$\neq$	RAW2 -> RSP
H_{D7}	RAW3 -> RSP	$\neq$	RAW3 -> RSP
H_{D8}	RAW4 -> RSP	$\neq$	RAW4 -> RSP
H_{D9}	RAW5 -> RSP	$\neq$	RAW5 -> RSP
H_{D10}	RAW6 -> RSP	$\neq$	RAW6 -> RSP
H_{D11}	RAW7 -> RSP	$\neq$	RAW7 -> RSP
H_{D12}	RPC12 -> RSP	$\neq$	RPC12 -> RSP
H_{D13}	RPC34 -> RSP	$\neq$	RPC34 -> RSP
H_{D14}	RPC561 -> RSP	$\neq$	RPC561 -> RSP
H_{D15}	RPC564 -> RSP	$\neq$	RPC564 -> RSP

Chapter 5

Results

5.1 Introduction

Data analysis, measurement and structural model are presented in this chapter. The data analysis includes descriptive statistics, frequency tables, factor analysis, and structural equation modeling to determine the relationship between variables and bootstrapping t-tests to compare group effects in the model. The data analysis was conducted using IBM SPSS22 software for descriptive analysis and factor analysis and Smart PLS software for structural equation modeling.

5.2 Descriptive Statistics

The sample population for this research study consisted of construction workers working on single family home residential construction sites around the Knoxville, TN area. The data was treated for missing values and disengaged responses as described in Chapter 4. The final valid data responses consisted of 89 respondents. Tables 5.1, 5.2, and 5.3 report the frequencies among respondents with regard to their socio-demographic data, training experience and accident history. The variables in these tables would be further used in the moderation analysis to determine their effect on perception or intended behavior and were therefore included in the survey. Table 5.4 includes frequencies related to job information describing their current job, work experience and daily work hours in the construction industry.

As reported in Table 5.1, 96.63% of the respondents were males and 3.37% were females. Approximately two-third (62.92%) of the total respondents were between the age range of 18-40 years. Education levels of the respondents was reported as follows: 8.99% Primary school (1-6

grades), 35.96% Part or all of high school (7-9 grades), 39.33% College or + 2 years after high school (10-12 years), 13.48% Vocational or Technical training or certificate and 2.25% University or graduate degree. The respondents included 47.19% Hispanic workers and 52.8% non-Hispanic workers. This proportion also reflects in preferred primary language where Spanish - 43.83%, English - 53.93% and Other - 2.25%. A majority of workers (74.16%) reported that they have lived in the United States for over 10 years. Almost half of all the respondents (52.81%) reported that their annual family income was less than $ 40,000, and 80.90% reported having up-to 4 dependent members in their family.

Training experience statistics in Table 5.2 show that 77.5% of the respondents had received training in some or the other form. However, about 40% of those respondents did not receive training for more than six months. About 71% of the these respondents who have received training reported a formal training method. Most of the training activities reported included instructions for using personal protective equipment, equipment inspection and workplace hazards. The accident history stats in Table 5.3 reveal that 25% of respondents have been involved in an accident as compared to the 44% of respondents who have witnessed an accident at their workplace. When asked for when was the last time they had been either involved or witnessed an accident, majority of the respondents replied either greater than 6 months (40%) or greater than an year (50%) .

The types of job ranged from 28.1% as day laborers, 19.1% as framer/siding workers, 14.6% as electricians, 11.2% as plumbers followed by dry wall installer, ceramic worker, mason, carpenter, etc. as shown in Table 5.4. Full time workers account for 94.4% of the total respondents, where as 96.6% of the total number of respondents do not hold any union membership. While 66% of the respondents have over 6 years of experience in the construction industry, approximately same percentage of respondents work for a contractor or are self employed. A high percentage of workers (73%) spent less than 5 years at their current employment. Many of these workers also indicated being employed by a contractor or self employed. This statistic coincides with the construction industry's peculiarity of having dynamic locations, workers and environment leading to a lack of cohesive organizational culture. More than half of the workers (65.1%) work between 40 hours a week likely indicating their extended exposure to hazards on the job.

Appendix D reports the descriptive statistics for all items. Frequency tables for all items are listed in Appendix D.1 and detailed statistics such as mean, minimum, maximum, standard deviation, skewness and kurtosis are summarized in Appendix D.2.

Table 5.1: Frequencies tables of demographic information

Gender		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	86	96.63	96.63	96.63
	Female	3	3.37	3.37	100.00
	Total	89	100.00	100.00	
Age		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	< 18 years	1	1.12	1.12	1.12
	18 - 25 years	18	20.22	20.22	21.35
	26 - 30 years	18	20.22	20.22	41.57
	31 - 35 years	20	22.47	22.47	64.04
	36 - 40 years	12	13.48	13.48	77.53
	41 - 45 years	5	5.62	5.62	83.15
	46 - 50 years	9	10.11	10.11	93.26
	51 - 55 years	2	2.25	2.25	95.51
	56 - 60 years	2	2.25	2.25	97.75
	> 65 years	2	2.25	2.25	100.00
	Total	89	100.00	100.00	
Education		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Primary school (1-6 grades)	8	8.99	8.99	8.99
	Part or all of high school (7-9 grades)	32	35.96	35.96	44.94
	College or + 2 years after high school (10-12 years)	35	39.33	39.33	84.27
	Vocational / Technical training or Certificate	12	13.48	13.48	97.75
	University or graduate degree	2	2.25	2.25	100.00
	Total	89	100.00	100.00	
Race / Ethnicity		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hispanic	42	47.19	47.19	47.19
	Non-Hispanic	47	52.81	52.81	100.00
	Total	89	100.00	100.00	
House / Apartment		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rented	59	66.29	66.29	66.29
	Owned	30	33.71	33.71	100.00
	Total	89	100.00	100.00	
Language		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	English	48	53.93	53.93	53.93
	Spanish	39	43.82	43.82	97.75
	Other	2	2.25	2.25	100.00
	Total	89	100.00	100.00	

Table 5.1 Continued: Frequencies tables of demographic information

Lived in United States		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	< 1 year	6	6.74	6.74	6.74
	< 5 years	6	6.74	6.74	13.48
	< 10 years	11	12.36	12.36	25.84
	> 10 years	66	74.16	74.16	100.00
	Total	89	100.00	100.00	
Annual family income		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	< $20,000	20	22.47	22.47	22.47
	$20,000 - $30,000	27	30.34	30.34	52.81
	$31,000 - $40,000	17	19.10	19.10	71.91
	$41,000 - $50,000	8	8.99	8.99	80.90
	$51,000 - $60,000	6	6.74	6.74	87.64
	$61,000 - $70,000	4	4.49	4.49	92.13
	> $70,000	7	7.87	7.87	100.00
	Total	89	100.00	100.00	
Dependent family members		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 2 people	27	30.34	30.34	30.34
	2 - 4 people	45	50.56	50.56	80.90
	5 - 6 people	13	14.61	14.61	95.51
	7 - 8 people	2	2.25	2.25	97.75
	Greater than 8 people	2	2.25	2.25	100.00
	Total	89	100.00	100.00	
Marital Status		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Single	44	49.44	49.44	49.44
	Married	38	42.70	42.70	92.13
	Other	3	3.37	3.37	95.51
	Choose not to answer	4	4.49	4.49	100.00
	Total	89	100.00	100.00	

Table 5.2: Frequencies tables of training information

Received Training		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	69	77.5	77.5	77.5
	No	20	22.5	22.5	100.0
	Total	89	100.0	100.0	
Latest Training		**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	In the past month	20	22.5	29.4	29.4
	In the past 6 months	18	20.2	26.5	55.9
	Greater than 6 months	27	30.3	39.7	95.6
	Never	3	3.4	4.4	100.0
	Total	68	76.4	100.0	
Missing	System	21	23.6		
Total		89	100.0		
Form of Training		**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Formal	49	55.1	71.0	71.0
	Informal	20	22.5	29.0	100.0
	Total	69	77.5	100.0	
Missing	System	20	22.5		
Total		89	100.0		
Number of Training		**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	1	25	28.1	36.2	36.2
	2	11	12.4	15.9	52.2
	3	8	9.0	11.6	63.8
	4	13	14.6	18.8	82.6
	5	10	11.2	14.5	97.1
	6	2	2.2	2.9	100.0
	Total	69	77.5	100.0	
Missing	System	20	22.5		
Total		89	100.0		

Table 5.3: Frequencies tables of accident history

Accident History		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	23	25.8	25.8	25.8
	No	66	74.2	74.2	100.0
	Total	89	100.0	100.0	
Last time involved in an accident		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	in past week	4	4.5	17.4	17.4
	in the past month	4	4.5	17.4	34.8
	in past six months	5	5.6	21.7	56.5
	greater than 6 months	1	1.1	4.3	60.9
	greater than a year	9	10.1	39.1	100.0
	Total	23	25.8	100.0	
Missing	System	66	74.2		
Total		89	100.0		
Witnessed accident		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	40	44.9	44.9	44.9
	No	49	55.1	55.1	100.0
	Total	89	100.0	100.0	
Last time witnessed an accident		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	in past week	3	3.4	5.6	5.6
	in the past month	6	6.7	11.1	16.7
	in past six months	8	9.0	14.8	31.5
	greater than 6 months	10	11.2	18.5	50.0
	greater than a year	27	30.3	50.0	100.0
	Total	54	60.7	100.0	
Missing	System	35	39.3		
Total		89	100.0		

Table 5.4: Frequencies tables of job information

Type of job		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Day Laborer	25	28.1	28.1	28.1
	Roofer	1	1.1	1.1	29.2
	Plumber	10	11.2	11.2	40.4
	Electrician	13	14.6	14.6	55.1
	Drywall installer	7	7.9	7.9	62.9
	Painter	2	2.2	2.2	65.2
	Ceramic, Machine Operator, Contractor, Etc.	6	6.7	6.7	71.9
	Carpenter	3	3.4	3.4	75.3
	Mason	5	5.6	5.6	80.9
	Framer / Siding	17	19.1	19.1	100.0
	Total	89	100.0	100.0	
Full Time / Part Time		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Full Time	84	94.4	94.4	94.4
	Part Time	5	5.6	5.6	100.0
	Total	89	100.0	100.0	
Union Member		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	3	3.4	3.4	3.4
	No	86	96.6	96.6	100.0
	Total	89	100.0	100.0	
Experience in construction industry		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 1 year	8	9.0	9.0	9.0
	1 - 5 years	22	24.7	24.7	33.7
	6 - 10 years	25	28.1	28.1	61.8
	Greater than 10 years	34	38.2	38.2	100.0
	Total	89	100.0	100.0	

Table 5.4 Continued: Frequencies tables of job information

Employer		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Company	30	33.7	33.7	33.7
	Contractor	40	44.9	44.9	78.7
	Self Employed	19	21.3	21.3	100.0
	Total	89	100.0	100.0	
Time in current employment		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 1 year	29	32.6	32.6	32.6
	1 - 5 years	36	40.4	40.4	73.0
	6 - 10 years	15	16.9	16.9	89.9
	Greater than 10 years	9	10.1	10.1	100.0
	Total	89	100.0	100.0	
Hours of work in week		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	2.2	2.2	2.2
	2	29	32.6	32.6	34.8
	3	44	49.4	49.4	84.3
	4	14	15.7	15.7	100.0
	Total	89	100.0	100.0	
Medical insurance by employer		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	21	23.6	23.6	23.6
	Rarely	11	12.4	12.4	36.0
	Always	16	18.0	18.0	53.9
	4	7	7.9	7.9	61.8
	5	34	38.2	38.2	100.0
	Total	89	100.0	100.0	

5.3 Evaluation of Measurement Model

The conceptual model has fifteen latent variables with reflective measurement models and five latent variables with formative measurement models. The factors that represent the cultural dimensions are specified as formative measurement models. Preliminary factor analysis included elimination of individual items (questions) from the model based on the criterion specified in section 4.5. Table 5.5 shows a list of items eliminated from the final factor solution and the criteria for elimination. Constructs 'Newness' (RAW1) and 'Voluntariness' (RAW2) were merged into a single construct 'Voluntariness' (RAW12) as items converged to form a single construct. Construct 'Effect of Injury to Children and Co-workers' (RPC564) was entirely eliminated during this process. This initial assessment helps obtain a cohesive model and factor structure. The final structural model attained from this process is further assessed for reliability and validity of constructs.

5.3.1 Reflective Measurement Models

Table E.1 in Appendix E shows the resultant factor structure with loading or correlations between items and constructs. All outer loadings for the reflective constructs CSC1, CSC2, RAW12, RAW3, RAW4, RAW5, RAW6, RAW7, RPC12, RPC34, RPC561, RSB, RSP and WH are well above the threshold value of 0.50. The item RSP1_P (outer loading: 0.573) has the smallest value and item RAW7_13 (outer loading: 0.954) has the highest value. Table 5.6 summarizes the mean factor scores, number of items and mean item scores for each construct. Additionally, the average loading for the each construct is greater than 0.70 as shown in Table 5.8.

The revised structural model has fourteen latent variables (constructs) with reflective measurement models matching the conceptual research model. Moreover, individual items (questions) exhibited distinct higher factor loading on a single construct than on other constructs. The following subsections examine the validity and reliability of the resultant factors.

5.3.1.1 Internal Consistency Reliability

The first of the evaluations measures is the internal consistency, which provides an estimate of the reliability based on the inter-correlations of items. Composite reliability is one of the measures which is assessed using 0.70 as the cutoff point criterion. All reflective constructs in the model demonstrate a high levels of composite reliability as shown in Table 5.8. The composite reliability values range from 'Intended Behavior in Risky Situations' (RSB) with a value of 0.755 to 'Construction Safety

Table 5.5: Eliminated items

Factor	Eliminated Item	Criterion for Elimination	Explanation
Construction Safety Climate Scale 1 (CSC1)	CSC1_5 CSC2_1	Factor loading less than 0.50	This item had a negative meaning.
Construction Safety Climate Scale 2 (CSC2)	CSC2_2 CSC2_8 CSC2_9 CSC2_10	Factor loading less than 0.50	These items are related to individual safety consideration.
Voluntariness (RAW12)	RAW1_2 RAW1_6 RAW1_10 RAW2_2	Factor loading less than 0.50	These items occur quite often on site.
Exposure to Task Risk (RAW3)	RAW3_10 RAW3_13	Variance Inflation Factor Factor loading less than 0.50	These factors relate to damaged fall protection.
Severity of Injury (RAW4)	RAW4_2 RAW4_6 RAW4_12	Cross loading Factor loading less than 0.50 Variance Inflation Factor	One of this item was more related to Riskiness of Task. The other two had same meaning.
Controllability (RAW5)	RAW5_2 RAW5_13	Factor loading less than 0.50 Variance Inflation Factor	These items may reflect complete control of actions.
Immediacy of Effect (RAW7)	RAW7_2 RAW7_4 RAW7_6	Cross loading Cross loading Factor loading less than 0.50	These items may not result in dreadful consequences.
Occurrence of Minor Injury (RPC12)	RPS1_C_1 RPS2_C_1 RPS4_C_2 RPS3_C_1	Cross loading Factor loading less than 0.50	These items describe the probability of "no accident".
Occurrence of Major Injury (RPC34)	RPS1_C_3 RPS2_C_3 RPS2_C_4 RPS3_C_2	Factor loading less than 0.50	Most of the workers deny the occurrence of major injuries.
Intended Behavior in Risky Situations (RSB)	RPS3_B	Factor loading less than 0.50	This item indicated a very specific job title.
Effects of Injury to Self and Family (RPC561)	RPS5_C1_2 RPS5_C1_3	Factor loading less than 0.50 Cross loading	Cost of injury is not a high priority for workers.
Effects of Injury to Children and Co-workers (RPC564)	RPC5_C1_4 RPS6_C2_3 RPS6_C2_4 RPS6_C2_5 RPS6_C2_6	Factor loading less than 0.50	These items relate to external factors that affect worker.
Worker Health (WH)	WH_1 WH_3	Factor loading less than 0.50	These items describe the psychological health of the workers.

Table 5.6: Resultant factor summary

Factor	Mean Score	Number of Items	Item Mean Score
Construction Safety Climate Scale 1 (CSC1)	34.21	9	3.80
Construction Safety Climate Scale 2 (CSC2)	23.70	6	3.95
Voluntariness (RAW12)	19.49	8	2.44
Exposure to Task Risk (RAW3)	15.30	4	3.83
Severity of Injury (RAW4)	14.87	3	4.96
Controllability (RAW5)	17.48	4	4.37
Common-Dread (RAW6)	33.38	6	5.56
Immediacy of Effect (RAW7)	14.46	3	4.82
Occurrence of Minor Injury (RPC12)	9.43	3	3.14
Occurrence of Major Injury (RPC34)	17.28	5	3.46
Effects of Injury to Self and Family (RPC561)	7.17	5	4.17
Intended Behavior in Risky Situations (RSB)	20.87	3	2.16
Attitude Towards Risky Situation (RSP)	6.49	4	1.79
Worker Health (WH)	11.52	4	2.30

Climate Scale 1' (CSC1) with a value of 0.942. Cronbach's alpha is a second measure for internal consistency and is assessed using the same cutoff criterion as composite reliability (0.70) (Litwin, 1995). Cronbach's alpha values obtained for each of the constructs are also listed in Table 5.8. Twelve out of fourteen constructs have an acceptable level of internal consistency. The Cronbach's alpha for 'Occurrence of Minor Injury' (RPC12) and 'Intended Behavior in Risky Situations' (RSB) were below the cutoff point at 0.627 and 0.524 respectively. Even though these values for newly developed constructs are slightly less than 0.70, they are acceptable as stated in (Churchill Jr, 1979). Thus all constructs satisfy the requirements for internal consistency.

5.3.1.2 Convergent Validity

Following internal consistency convergent validity is assessed with Average Variance Extracted (AVE) and indicator reliability. Table 5.8 lists AVE values for individual constructs and Table ?? presents indicator reliability values for each item (question). All constructs satisfy the AVE cutoff criterion of 0.50 (Fornell and Larcker, 1981a). Some of the items do not meet the indicator reliability criterion (> 0.50). However, the low values are still acceptable as the average factor loadings are above 0.70. These values indicate that all constructs have a satisfactory level of convergent validity. This illustrates that items that form a construct converge or share a high proportion of variance.

Table 5.7: Factor loading and indicator reliability measures

Latent Variables	Indicators	Loadings	Indicator Reliability
CSC1	**CSC1_1**	0.824	0.679
	CSC1_10	0.821	0.674
	CSC1_2	0.805	0.649
	CSC1_3	0.649	0.421
	CSC1_4	0.677	0.458
	CSC1_6	0.833	0.694
	CSC1_7	0.849	0.721
	CSC1_8	0.813	0.660
	CSC1_9	0.844	0.712
CSC2	**CSC2_1**	0.652	0.426
	CSC2_10	0.631	0.399
	CSC2_11	0.744	0.553
	CSC2_3	0.835	0.697
	CSC2_4	0.688	0.473
	CSC2_5	0.859	0.737
	CSC2_6	0.756	0.572
	CSC2_7	0.872	0.761
RAW12	**RAW1_12**	0.751	0.564
	RAW1_4	0.804	0.647
	RAW2_10	0.652	0.425
	RAW2_13	0.706	0.499
	RAW2_2	0.683	0.467
	RAW2_4	0.884	0.782
RAW3	**RAW3_10**	0.804	0.646
	RAW3_12	0.907	0.822
	RAW3_2	0.849	0.721
	RAW3_4	0.910	0.828
RAW4	**RAW4_10**	0.848	0.720
	RAW4_12	0.960	0.922
	RAW4_4	0.768	0.589
RAW5	**RAW5_10**	0.923	0.853
	RAW5_12	0.812	0.660
	RAW5_4	0.755	0.571
	RAW5_6	0.946	0.894
RAW6	**RAW6_10**	0.819	0.671
	RAW6_12	0.838	0.702
	RAW6_2	0.741	0.549
	RAW6_4	0.807	0.651
	RAW6_6	0.922	0.850

Table 5.7 Continued: Factor loading and indicator reliability measures

Latent Variables	Indicators	Loadings	Indicator Reliability
RAW7	**RAW7_10**	0.839	0.704
	RAW7_12	0.926	0.857
	RAW7_13	0.958	0.917
RPC12	**RPS1_C_2**	0.796	0.634
	RPS2_C_2	0.733	0.537
	RPS3_C_1	0.733	0.537
	RPS4_C_1	0.630	0.397
RPC34	**RPS1_C_4**	0.757	0.573
	RPS3_C_2	0.625	0.391
	RPS3_C_4	0.882	0.778
	RPS4_C_3	0.812	0.659
	RPS4_C_4	0.709	0.503
RPC561	**RPS5_C1_1**	0.656	0.430
	RPS5_C1_5	0.725	0.525
	RPS5_C1_6	0.817	0.667
	RPS6_C2_1	0.801	0.641
RPC564	**RPS6_C2_3**	0.789	0.622
	RPS6_C2_5	0.784	0.614
WH	**WH_2**	0.832	0.692
	WH_4	0.765	0.586
	WH_5	0.734	0.538
	WH_6	0.803	0.644
	WH_7	0.762	0.580

5.3.1.3 Discriminant Validity

Discriminant validity tests whether a construct is truly different from other constructs using Fornell-Larcker criterion analysis and item cross loadings (Fornell and Larcker, 1981b). Table E.2 shows the correlation matrix, which includes the correlation between constructs in the lower left off-diagonal elements, and the square root of AVE along the diagonal. As all the diagonal element are greater than any other in the corresponding row and column it implies adequate discriminant validity. Equivalently, the absence of cross loading of items of constructs other than their intended constructs indicate adequate discriminant validity (Table E.1).

The evaluation of reflective measurement model is summarized in Table 5.8. As seen, all model assessment criteria have been met, supporting the constructs reliability and validity except RPC564 which will be eliminated from the final hypothesis testing.

Table 5.8: Results summary for reflective measurement models

Latent Variable	Composite Reliability	Cronbach's' Alpha	AVE	Discriminant Validity	Average Loading
CSC1	0.938	0.937	0.630	Yes	0.790
CSC2	0.915	0.897	0.577	Yes	0.755
RAW12	0.885	0.847	0.564	Yes	0.747
RAW3	0.925	0.901	0.754	Yes	0.867
RAW4	0.896	0.849	0.744	Yes	0.859
RAW5	0.920	0.893	0.744	Yes	0.859
RAW6	0.915	0.892	0.685	Yes	0.825
RAW7	0.934	0.899	0.826	Yes	0.908
RPC12	0.815	0.700	0.526	Yes	0.723
RPC34	0.872	0.842	0.581	Yes	0.757
RPC561	0.860	0.800	0.554	Yes	0.742
RPC564	0.764	0.383	0.618	Yes	0.786
WH	0.886	0.846	0.608	Yes	0.779

5.3.2 Formative Measurement Models

The cultural variables used for the mediation analysis are structured as formative measurement models (Hofstede et al., 1991). Specifically, the constructs that represent cultural dimensionality are Individualism/Collectivism (IDV), Power Distance Index (PDI), Uncertainty Avoidance Index (UAI), Masculinity/Femininity (MAS), and Long-term/Short-term Orientation (LTO). These five formative constructs are individually measured by four indicators as specified in previous studies by Hofstede. Ordinarily, convergent validity would have been the first evaluation measure tested for formative models. However, due to the survey length constraints listed in section 4.5.2.1 this assessment is considered unsuitable for this study. Nonetheless, Hofstede's cultural dimensions have been reported and used in several culture related studies and are regarded as an established measures to assess cultural differences.

5.3.2.1 Collinearity Issues

Collinearity between formative indicators is a crucial issue as they impact the estimation of weights and statistical significance. It is measured using linear regression module in the SPSS software. Indicators (items)of each formative construct are regressed with any other unrelated indicator to obtain the variance inflation factor (VIF). Table 5.9 shows that collinearity does not reach critical levels in any of the formative constructs and is not an issue for estimation of the PLS path model. The highest VIF value was 1.443 for MAS_CD1_5_R.

5.3.2.2 Significance and Relevance of Outer Weights

In the next step, bootstrapping was used to analyze the outer weights of formative measurement models for their significance and relevance. Table 5.10 summarizes the results of the cultural constructs by showing the original outer weight estimates, t values, corresponding significance levels, and p values. The p values of formative items indicate that all items except IDV_CD1_1_R, PDI_CD9_R, and PDI_CD10_3_R satisfy the significance levels for either 2-tailed or 1-tailed distribution. Moreover, prior research provides a strong support for the relevance of these indicators for capturing 'Individualism/Collectivism' (IDV) and 'Power Distance Index' (PDI). Hence we retain the indicators for further analysis even though they are not significant.

The analysis of both outer loadings and outer weights concludes the evaluation of measurement models. Considering the results from section 5.3.1 and 5.3.2 it can be concluded that all reflective and formative constructs exhibit satisfactory levels of quality. In the next section we commence the evaluation of the structural model.

Table 5.9: Variance inflation factor for formative measures

IDV		PDI		UAI		LTO		MAS	
Indicators	VIF	Indicators	VIF	Indicators	VIF	Indicators	VIF	Indicators	VIF
IDV_CD1_1_R	1.192	PDI_CD1_2_R	1.143	UAI_CD4_R	1.028	LTO_CD3_R	1.021	MAS_CD1_3_R	1.310
IDV_CD1_4_R	1.196	PDI_CD1_7_R	1.184	UAI_CD6_R	1.050	LTO_CD5_R	1.019	MAS_CD1_5_R	1.443
IDV_CD1_6_R	1.263	PDI_CD9_R	1.036	UAI_CD10_1_R	1.031	LTO_CD10_2_R	1.023	MAS_CD1_8_R	1.154
IDV_CD1_9_R	1.358	PDI_CD10_3_R	1.035	UAI_CD10_4_R	1.032	LTO_CD10_5_R	1.015	MAS_CD1_10_R	1.421

Table 5.10: Outer weights significance testing results

				Significance Level		P-Value		
Formative Constructs	Formative Indicators	Outer Weights (Outer Loadings)	t-value	(P=value 2T)	(P=value LT/RT)	2T	LT	RT
IDV	IDV_CD1_1_R	-0.349 (-0.601)	0.810	NS		0.418	0.286	0.210
	IDV_CD1_4_R	-0.720 (0.851)	1.348		*	0.178	0.160	0.091
	IDV_CD1_6_R	1.096 (0.919)	1.798	*	**	0.072	0.080	0.038
	IDV_CD1_9_R	0.850 (0.808)	1.778	*	**	0.076	0.083	0.039
PDI	PDI_CD1_2_R	0.960 (0.930)	2.287	**	**	0.022	0.030	0.012
	PDI_CD1_7_R	0.925 (0.962)	1.559		*	0.119	0.118	0.061
	PDI_CD9_R	0.599 (-0.565)	1.197	NS		0.231	0.194	0.117
	PDI_CD10_3_R	-0.503 (0.522)	1.004	NS		0.316	0.240	0.159
UAI	UAI_CD4_R	0.669 (0.670)	1.598		*	0.110	0.111	0.057
	UAI_CD6_R	-0.719 (-0.720)	1.522		*	0.128	0.125	0.066
	UAI_CD10_1_R	0.631 (0.123)	1.685	*	**	0.092	0.097	0.048
	UAI_CD10_4_R	0.979 (0.871)	2.462	**	***	0.014	0.021	0.008
LTO	LTO_CD3_R	0.635 (0.526)	1.375		*	0.169	0.154	0.086
	LTO_CD5_R	0.424 (0.420)	1.910	*	**	0.056	0.065	0.030
	LTO_CD10_2_R	-0.583 (-0.564)	1.768	*	**	0.077	0.084	0.040
	LTO_CD10_5_R	0.655 (0.727)	2.716	***	***	0.007	0.011	0.004
MAS	MAS_CD1_3_R	0.669 (0.670)	1.598		*	0.110	0.111	0.057
	MAS_CD1_5_R	-0.719 (-0.720)	1.522		*	0.128	0.125	0.066
	MAS_CD1_8_R	0.631 (0.123)	1.375	*	**	0.169	0.154	0.086
	MAS_CD1_10_R	0.979 (0.871)	2.462	**	***	0.014	0.021	0.008

Note: NS = not significant
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5.4 Evaluation of Structural Model

Fourteen factors (constructs) were derived from the measurement model evaluation method. For the next step in model assessment, key results, namely, path coefficients, collinearity and R^2 values of the structural model are examined. Thereafter, the predictive relevance of the model is assessed to determine how well the empirical data supports the theory behind the conceptual model.

5.4.1 Collinearity Assessment

The collinearity assessment for structural model is based on the same measures as the evaluation of formative measurement models in section 4.5.2.2. The VIF values for all the predictor constructs were clearly below the threshold value of 5 as shown in Table 5.11. 'Common-Dread' (RAW6) had the highest VIF value of 2.242. Therefore, it is concluded that collinearity among predictor constructs in not an issue in the structural model.

Table 5.11: Collinearity assessment of structural model constructs

Latent Variables	**VIF**
CSC1	1.322
CSC2	1.419
RAW12	1.108
RAW3	1.568
RAW4	1.878
RAW5	1.276
RAW6	2.242
RAW7	1.648
RPC12	1.216
RPC34	1.286
RPC561	1.138
RSP	1.087
WH	1.038

5.4.2 Size and Significance of Path Coefficients

The relationships between factors are represented by path coefficients obtained after running the PLS-SEM algorithm. T-statistic for the path coefficients is calculated using the bootstrapping method and the significance is determined by the p-value. the significance of path coefficients depends on its standard error. Table 5.12 shows the estimated path coefficients and significance levels for both 2-tailed and 1-tailed distributions. The path coefficient relationships show the show the same signs as expected in section 4.6.2. Comparing the relative importance of factors that affect

'Intended Behavior in Risky Situations' (RSB), it is observed that 'Construction Safety Climate Scale 2' (CSC2), 'Attitude Towards Risky Situation' (RSP), and 'Worker Health' (WH) were most important. Likewise, the understanding of 'Immediacy of Effect' (RAW7), 'Occurrence of Minor Injury' (RPC12), and 'Effects of Injury to Self and Family' (RPC561) factors is important for 'Attitude Towards Risky Situation' (RSP), followed by 'Common-Dread' (RAW6), 'Controllability' (RAW5), and other factors.

The analysis of structural model relationships showed that several path coefficients had rather low values. After applying the bootstrapping method, it is found that all relationships in the structural model are significant, except CSC1 → RSB, RAW3 → RSP, RAW4 → RSP, RAW6 → RSP, and RPC34 → RSP. These results suggest that construction worker training should be focused on improving the perception of safety climate on site, workers' approach towards risks, and worker health. Additionally, factors like 'Immediacy of Effect' (RAW7), 'Occurrence of Minor Injury' (RPC12), and 'Effects of Injury to Self and Family' (RPC561) can be used to develop the risk perception of workers.

Table 5.12: Significance testing results of the structural model path coefficients

	Original Sample (O)	T Statistics (O/STDEER)	Significance Level (P=value 2T)	(P=value LT/RT)	P Values 2T	LT	RT
CSC1 -> RSB	-0.048	0.346	NS	NS	0.729	0.374	0.365
CSC2 -> RSB	-0.297	2.519	**	***	**0.012**	**0.018**	**0.007**
WH -> RSB	0.227	2.086	**	**	**0.037**	**0.046**	**0.020**
RSP -> RSB	0.202	1.478		*	0.140	0.134	**0.071**
RAW12 -> RSP	0.189	1.294		*	0.196	0.172	**0.100**
RAW3 -> RSP	0.092	0.706	NS	NS	0.480	0.309	0.241
RAW4 -> RSP	0.003	0.028	NS	NS	0.978	0.398	0.489
RAW5 -> RSP	-0.182	1.856		**	0.064	**0.072**	**0.033**
RAW6 -> RSP	-0.204	1.203	NS	NS	0.229	0.193	0.116
RAW7 -> RSP	0.222	1.651	*	*	**0.099**	0.102	0.051
RPC12 -> RSP	-0.194	1.596		*	0.111	0.112	**0.057**
RPC34 -> RSP	0.144	1.054	NS	NS	0.292	0.228	0.147
RPC561 -> RSP	-0.352	2.793	***	***	**0.005**	**0.009**	**0.003**

Note: NS = not significant
For Two-Tailed Test - * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
For One-Tailed Test - ‡ $p < 0.10$, ‡‡ $p < 0.05$, ‡‡‡ $p < 0.01$

Figure 5.1 displays the relationships between modifying factors and 'Intended Behavior in Risky Situations' (RSB). The relationship between each factor is interpreted as follows.

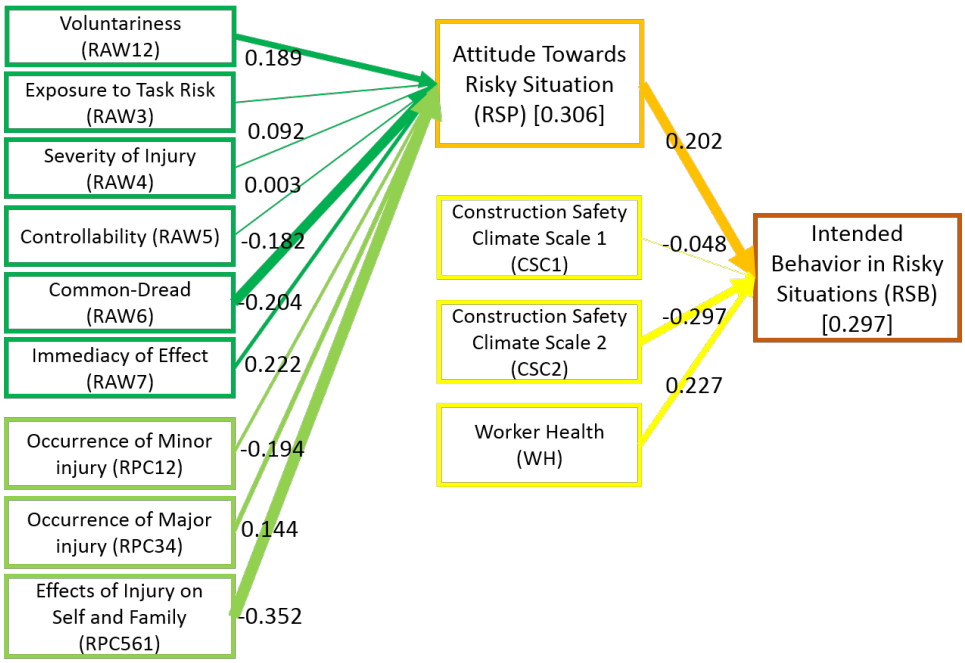


Figure 5.1: Structural model path coefficient

Effect on Intended Behavior

- 'Attitude Towards Risky Situation' (RSP) is positively related to 'Intended Behavior in Risky Situations' (RSB). As 'Attitude Towards Risky Situation' (RSP) goes from safe to risky in a situation, 'Intended Behavior in Risky Situations' (RSB) goes from safe to risky.
- 'Construction Safety Climate 1' (CSC1) is negatively related to 'Intended Behavior in Risky Situations' (RSB). As perception of 'Construction Safety Climate' goes from low to high in a situation, 'Intended Behavior in Risky Situations' (RSB) goes from risky to safe.
- 'Construction Safety Climate 2' (CSC2) is negatively related to 'Intended Behavior in Risky Situations' (RSB). As perception of 'Construction Safety Climate' goes from low to high in a situation, 'Intended Behavior in Risky Situations' (RSB) goes from risky to safe.
- 'Worker Health' (WH) is positively related to 'Intended Behavior in Risky Situations' (RSB). As 'Worker Health' goes from good to worse, 'Intended Behavior in Risky Situations' (RSB) goes from safe to risky.

Effect of Risk Task Assessment on 'Attitude Towards Risky Situation' (RSP)

- 'Voluntariness' (RAW12) is positively related to 'Attitude Towards Risky Situation' (RSP). As 'Voluntariness' goes from never to always, 'Attitude Towards Risky Situation' (RSP) goes from safe to risky.

- 'Exposure to Risk' (RAW3) is positively related to 'Attitude Towards Risky Situation' (RSP). As 'Exposure to Risk' goes from never to always, 'Attitude Towards Risky Situation' (RSP) goes from safe to risky.

- 'Severity of Injury' (RAW4) is positively related to 'Attitude Towards Risky Situation' (RSP). As 'Severity of Injury' goes from negligible to catastrophic, 'Attitude Towards Risky Situation' (RSP) goes from safe to risky.

- 'Controllability' (RAW5) is negatively related to'Attitude Towards Risky Situation' (RSP). As 'Controllability' goes from controllable to uncontrollable, 'Attitude Towards Risky Situation' (RSP) goes from safe to risky. People who believe that they have the skills and other resources needed to perform the behavior or overcome barriers are likely to develop a strong sense of self-efficacy or perceived behavioral control, whereas people who believe that they lack some of the requisite resources are likely to have a much weaker sense of personal agency. Pilots who have a exaggerated sense of their personal capabilities, may lead them to venture into situations beyond their skill levels (Hunter, 1995). Lawyers, physicians have a higher accident rate with the common personality traits of aggression, independence and self sufficiency (Booze Jr, 1977).

- 'Common-Dread' (RAW6) is negatively related to 'Attitude Towards Risky Situation' (RSP). As 'Common-Dread' goes from extreme to not at all risky, 'Attitude Towards Risky Situation' (RSP) goes from safe to risky.

- 'Immediacy of Effect' (RAW7) is positively related to 'Attitude Towards Risky Situation' (RSP). As 'Immediacy of Effect' goes from never to always, 'Attitude Towards Risky Situation' (RSP) goes from safe to risky.

- 'Occurrence of Minor injury' (RPC12) is negatively related to 'Attitude Towards Risky Situation' (RSP).

- 'Occurrence of Major injury' (RPC34) is positively related to 'Attitude Towards Risky Situation' (RSP).

- 'Effects of Injury on Self and Family' (RPC561) is negatively related to 'Attitude Towards Risky Situation' (RSP).

5.4.3 Coefficient of Determination (R^2)

The coefficient of determination determines how well the model fits the data. The R^2 values for 'Attitude Towards Risky Situation' (RSP) - 0.306 and 'Intended Behavior in Risky Situations' (RSB) - 0.297 were considered moderate as per the rule of thumb mentioned in section 4.6.3. Figure 5.1 shows the R^2 values for the two dependent constructs. Exploratory research in behavior studies consider a R^2 of 0.20 as high (Hair et al., 2011; Henseler et al., 2009).

5.4.4 Effect Size (f^2)

The relevance of constructs in explaining dependent variables was analyzed assessing the value of effect size (f^2). Table 5.13 reports the effect sizes of all the predicting constructs. 'Effects of Injury on Self and Family' (RPC561) had a above medium effect size indicating that it could be one of the influential factors affecting 'Attitude Towards Risky Situation' (RSP). Therefore, safety officers and training coordinators need to pay special attention to the effects of injury to self and family which designing the safety syllabus. Furthermore, all other constructs except CSC1, RAW3, RAW4, RAW6, and RPC34 have medium effect size. These results build additional confidence in interpretation of results.

Table 5.13: Results of effect size values

Latent Variables	Effect Size f^2
CSC1	0.002
CSC2	0.084
RAW12	0.047
RAW3	0.008
RAW4	0.000
RAW5	0.038
RAW6	0.027
RAW7	0.043
RPC12	0.045
RPC34	0.023
RPC561	**0.158**
RSP	0.051
WH	0.067

5.4.5 Predictive Relevance (Q^2)

The predictive relevance of the path model is assessed with blindfolding procedure. The Q^2 values for RSB and RSP were 0.101 and 0.136 respectively. The path model is said to have predictive relevance if the Q^2 value is above zero. The Q^2 values presented in Table 5.12 below indicate that the model has predictive relevance for the listed constructs.

5.5 Hypothesis Testing Influence of Cultural Dimension - Mediation

The main aim of this study was to build a model that captures the differences in relationships between Hispanic and non-Hispanic construction workers. Before attempting this step, however, it was first necessary to analyze the mediating effect of cultural variables by themselves.

5.5.1 Effect of Individualism (IDV) on Path Coefficients Relationships

To assess the effect of Individualism (IDV) on each of the path coefficients, the mediator variable IDV was included separately between each of the path relationships. Table 5.14 presents the results of mediation analysis of IDV on each of the relationships. Column three in the table represents the direct effect between factors which were calculated when no mediator varaible was included in the analysis. Column four represents the refitted direct effect between factors after addition of the mediator varaible. Column five presents the indirect effect accounted or explained by the mediator varaible (IDV). Column six presents the strength of mediation by using Variance Accounted For (VAF) calculation. The last column shows whether the total effect between factors is still significant.

Construction Safety Climate

As evident from Table 5.14, the indirect effect of CSC1 on RSB via mediator IDV is not significant. The VAF value indicates that IDV explains 78% of the relationship between CSC1->RSB. The original direct effect of CSC1 did not have a greater impact on RSB. However, accounting for the VAF value individualism characteristics could play an important role in increasing the effect of 'Construction Safety Climate 1' (CSC1) on 'Intended Behavior in Risky Situations' (RSB).

As evident from Table 5.14, the indirect effect of CSC2 on RSB via mediator IDV is not significant. The VAF value indicates that IDV explains 5% of the relationship between CSC2->RSB. The original direct effect of CSC2 had the largest impact on RSB. Thus there is a plausible chance that

a small VAF value and strong direct effect may suggest an influence of individualism characteristics on the relationship between 'Construction Safety Climate 2' (CSC2) and 'Intended Behavior in Risky Situations' (RSB).

Worker Health

As evident from Table 5.14, the indirect effect of WH on RSB via mediator IDV is not significant. The VAF value indicates that IDV explains 12% of the relationship between WH->RSB. The original direct effect of WH had the second largest impact on RSB. Similar to CSC2, the strong direct effect of WH may suggest an influence of individualism characteristics on the relationship between 'Worker Health' (WH) and 'Intended Behavior in Risky Situations' (RSB).

Attitude Towards Risky Situation (RSP)

As evident from Table 5.14, the indirect effect of RSP on RSB via mediator IDV is not significant. The VAF value indicates that IDV explains 1% of the relationship between RSP->RSB. The original direct effect of RSP on RSB is strong and significant. However, the insignificant indirect effect and low VAF value indicates that the overall influence of IDV on RSP->RSB is not significant.

Risk Task Assessment

As evident from Table 5.14, the indirect effects of all risk task assessment factors RAW12, RAW3, RAW4, RAW5, RAW6, and RAW7 on RSP via mediator IDV are not significant. The VAF values ranged from 2% for RAW5 at the lowest to 64% for RAW4 at highest. Factors RAW3, RAW4, RAW5, and RAW7 have a combination of insignificant indirect effect and low VAF value which denotes that the overall influence of IDV on those factors is not significant. Factor RAW12 has a strong original direct effect and a VAF value of 17%. Also, factor RAW7 has a combination of strong original direct effect and a VAF value of 6%. Thus the influence of individualism characteristics on the relationships between both these factors and RSP could be plausible.

Risk Consequences

As evident from Table 5.14, the indirect effects of the three risk consequence factors RPC12, RPC34, and RPC561 on RSP via mediator IDV are not significant. The VAF values ranged from 0% for RPC12 at the lowest to 10% for RPC34 at highest. Factors RPC12 and RPC34 have a combination of insignificant indirect effect and low VAF value which denotes that the overall influence of IDV on those factors is not significant. However, Factor RPC561 has a strongest original direct effect in the overall model and a VAF value of 5%. Similar to CSC2 and WH, the strong direct effect of RPC561 may suggest an influence of individualism characteristics on the relationship between

'Effects of Injury on Self and Family' (RPC561) and 'Attitude Towards Risky Situation' (RSP).

Table 5.14: Mediation analysis of Individualism (IDV)

Hypothesis	IV	Direct effect without mediator	Direct effect with mediator IDV	Indirect effect with mediator IDV	VAF	Total Effect
H_{M1}	**CSC1 -> RSB**	-0.047	0.001	-0.009	**0.78**	-0.007
H_{M2}	**CSC2 -> RSB**	-0.297 **	-0.263 * ‡ ‡	-0.015	0.05	-0.277 **
H_{M3}	**WH -> RSB**	0.227 **	0.188 ‡	0.024	0.12	0.212 * ‡ ‡
H_{M4}	**RSP -> RSB**	0.201 ‡	0.200 ‡	0.002	0.01	0.211
H_{M56}	**RAW12 -> RSP**	0.189 ‡	0.154	0.032	0.17	0.186
H_{M7}	**RAW3 -> RSP**	0.091	0.080	-0.010	0.11	0.070
H_{M8}	**RAW4 -> RSP**	0.002	0.012	-0.023	**0.64**	-0.010
H_{M9}	**RAW5 -> RSP**	-0.182 ‡‡	-0.185 * ‡ ‡	-0.004	0.02	-0.190 * ‡ ‡
H_{M10}	**RAW6 -> RSP**	-0.203	-0.165	-0.019	0.10	-0.185
H_{M11}	**RAW7 -> RSP**	0.222 *	0.227 * ‡ ‡	-0.016	0.06	0.212 ‡
H_{M12}	**RPC12 -> RSP**	-0.193 ‡	-0.191 ‡	0.000	0.00	-0.191
H_{M13}	**RPC34 -> RSP**	0.144	0.088	-0.009	0.10	0.078
H_{M14}	**RPC561 -> RSP**	-0.351 ***	-0.358 **	0.016	0.04	-0.342 ***

For Two-Tailed Test - * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
For One-Tailed Test - ‡ $p < 0.10$, ‡‡ $p < 0.05$, ‡ ‡ ‡ $p < 0.01$

5.5.2 Effect of Power Distance Index (PDI) on Path Coefficients Relationships

To assess the effect of Power Distance Index (PDI) on each of the path coefficients, the mediator variable PDI was included separately between each of the path relationships. Table 5.15 presents the results of mediation analysis of PDI on each of the relationships. The columns in the table follow the same sequence as that described in section 5.5.1.

Construction Safety Climate

As evident from Table 5.15, the indirect effect of CSC1 on RSB via mediator PDI is not significant. The VAF value indicates that PDI explains 51% of the relationship between CSC1->RSB. The original direct effect of CSC1 did not have a greater impact on RSB. However, accounting for the VAF value power distance characteristics could play an important role in increasing the effect of 'Construction Safety Climate 1' (CSC1) on 'Intended Behavior in Risky Situations' (RSB).

As evident from Table 5.15, the indirect effect of CSC2 on RSB via mediator PDI is not significant. The VAF value indicates that PDI explains 6% of the relationship between CSC2->RSB. The original direct effect of CSC2 had the largest impact on RSB. Thus there is a plausible chance that a small VAF value and strong direct effect may suggest an influence of power distance characteristics

on the relationship between 'Construction Safety Climate 2' (CSC2) and 'Intended Behavior in Risky Situations' (RSB).

Worker Health

As evident from Table 5.15, the indirect effect of WH on RSB via mediator PDI is not significant. The VAF value indicates that PDI explains 17% of the relationship between WH->RSB. The original direct effect of WH had the second largest impact on RSB. Similar to CSC2, the strong direct effect of WH may suggest an influence of power distance characteristics on the relationship between 'Worker Health' (WH) and 'Intended Behavior in Risky Situations' (RSB).

Attitude Towards Risky Situation (RSP)

As evident from Table 5.15, the indirect effect of RSP on RSB via mediator PDI is not significant. The VAF value indicates that PDI explains 18% of the relationship between RSP->RSB. The original direct effect of RSP on RSB is strong and significant. Similar to CSC2, the strong direct effect of RSP may suggest an influence of power distance characteristics on the relationship between 'Attitude Towards Risky Situation' (RSP) and 'Intended Behavior in Risky Situations' (RSB).

Risk Task Assessment

As evident from Table 5.15, the indirect effects of all risk task assessment factors RAW12, RAW3, RAW4, RAW5, RAW6, and RAW7 on RSP via mediator PDI are not significant. The VAF values ranged from 1% for RAW7 at the lowest to 32% for RAW4 at highest. Factors RAW12, RAW3, RAW4, RAW5, and RAW7 have a combination of insignificant indirect effect and low VAF value which denotes that the overall influence of PDI on those factors is not significant. Factor RAW5 has a strong original direct effect and a VAF value of 8%. Thus the influence of power distance characteristics on the relationships between RAW6 and RSP could be plausible. Moreover, RAW3 shows an increase in direct effect after the mediator variable is included. Thus this relationship could have a plausible influence of PDI.

Risk Consequences

As evident from Table 5.15, the indirect effects of the three risk consequence factors RPC12, RPC34, and RPC561 on RSP via mediator PDI are not significant. The VAF values ranged from 3% for RPC561 at the lowest to 24% for RPC34 at highest. Factor RPC34 have a combination of insignificant indirect effect and low VAF value which denotes that the overall influence of PDI on this factor is not significant. However, factor RPC561 has a strongest original direct effect in the overall model and a VAF value of 3%. The VAF value to very weak to be considered for an possible effect. Also, factor RPC12 has a strong direst effect and a VAF value of 7%. Similar to CSC2 and

WH, the strong direct effect of RPC12 may suggest an influence of power distance characteristics on the relationship between 'Occurrence of Minor injury' (RPC12) and 'Intended Behavior in Risky Situations' (RSB).

Table 5.15: Mediation analysis of Power Distance Index (PDI)

Hypothesis	IV	Direct effect without mediator	Direct effect with mediator PDI	Indirect effect with mediator PDI	VAF	Total Effect
H_{M1}	**CSC1 -> RSB**	-0.047	-0.018	-0.019	**0.51**	-0.038
H_{M2}	**CSC2 -> RSB**	-0.297 **	-0.286 **	-0.020	0.06	-0.306 **
H_{M3}	**WH -> RSB**	0.227 **	0.173 ‡	0.035	0.17	0.208 ∗ ‡ ‡
H_{M4}	**RSP -> RSB**	0.201 ‡	0.173 ‡	0.038	0.18	0.201 ‡
H_{M56}	**RAW12 -> RSP**	0.189 ‡	0.166	0.009	0.05	0.175
H_{M7}	**RAW3 -> RSP**	0.091	0.180	-0.010	0.05	0.065
H_{M8}	**RAW4 -> RSP**	0.002	-0.023	0.011	**0.32**	-0.012
H_{M9}	**RAW5 -> RSP**	-0.182 ‡‡	-0.162 ‡	-0.019	0.10	-0.181∗ ‡ ‡
H_{M10}	**RAW6 -> RSP**	-0.203	-0.159	-0.013	0.08	-0.172
H_{M11}	**RAW7 -> RSP**	0.222 *	0.215 ‡	0.003	0.01	0.217 ∗ ‡ ‡
H_{M12}	**RPC12 -> RSP**	-0.193 ‡	-0.179 ‡	-0.013	0.07	-0.191 ∗ ‡ ‡
H_{M13}	**RPC34 -> RSP**	0.144	0.051	0.016	**0.24**	0.067
H_{M14}	**RPC561 -> RSP**	-0.351 ***	-0.339 **	-0.012	0.03	-0.351 **

For Two-Tailed Test - * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
For One-Tailed Test - ‡ $p < 0.10$, ‡‡ $p < 0.05$, ‡ ‡ ‡ $p < 0.01$

5.5.3 Effect of Masculinity (MAS) on Path Coefficients Relationships

To assess the effect of Masculinity (MAS) on each of the path coefficients, the mediator variable MAS was included separately between each of the path relationships. Table 5.16 presents the results of mediation analysis of MAS on each of the relationships. The columns in the table follow the same sequence as that described in section 5.5.1.

Construction Safety Climate

As evident from Table 5.16, the indirect effect of CSC1 on RSB via mediator MAS is not significant. The VAF value indicates that MAS explains 74% of the relationship between CSC1->RSB. The original direct effect of CSC1 did not have a greater impact on RSB. However, accounting for the VAF value masculinity characteristics could play an important role in increasing the effect of 'Construction Safety Climate 1' (CSC1) on 'Intended Behavior in Risky Situations' (RSB).

As evident from Table 5.16, the indirect effect of CSC2 on RSB via mediator MAS is not significant. The VAF value indicates that MAS explains 13% of the relationship between CSC2->RSB. The original direct effect of CSC2 had the largest impact on RSB. Thus there is a plausible chance

that even with a small VAF value, a strong direct effect may suggest an influence of masculinity characteristics on the relationship between 'Construction Safety Climate 2' (CSC2) and 'Intended Behavior in Risky Situations' (RSB).

Worker Health

As evident from Table 5.16, the indirect effect of WH on RSB via mediator MAS is not significant. The VAF value indicates that MAS explains 9% of the relationship between WH->RSB. The original direct effect of WH had the second largest impact on RSB. Similar to CSC2, the strong direct effect of WH may suggest an influence of masculinity characteristics on the relationship between 'Worker Health' (WH) and 'Intended Behavior in Risky Situations' (RSB).

Attitude Towards Risky Situation (RSP)

As evident from Table 5.16, the indirect effect of RSP on RSB via mediator MAS is not significant. The VAF value indicates that MAS explains 22% of the relationship between RSP->RSB. The original direct effect of RSP on RSB is strong and significant. Similar to CSC2 and WH, the strong direct effect of RSP may suggest an influence of masculinity characteristics on the relationship between 'Attitude Towards Risky Situation' (RSP) and 'Intended Behavior in Risky Situations' (RSB).

Risk Task Assessment

As evident from Table 5.16, the indirect effects of all risk task assessment factors RAW12, RAW3, RAW4, RAW5, RAW6, and RAW7 on RSP via mediator MAS are not significant, out of which RAW6 is a borderline not significant. The VAF values ranged from 1% for RAW5 at the lowest to 75% for RAW4 at highest. Factors RAW12, RAW3, and RAW5 have a combination of insignificant indirect effect and low VAF value which denotes that the overall influence of MAS on those factors is not significant. Factor RAW4, accounting for high VAF value of 75% could be considered for being influenced by masculinity characteristics. Factor RAW6 has a strong original direct effect, borderline significant indirect effect and a VAF value of 59%. Also, factor RAW7 has a combination of strong original direct effect and a VAF value of 8%. Thus the influence of masculinity characteristics on the relationships between the three factors and RSP could be plausible.

Risk Consequences

As evident from Table 5.16, the indirect effects of the three risk consequence factors RPC12, RPC34, and RPC561 on RSP via mediator MAS are not significant. The VAF values ranged from 6% for RPC12 at the lowest to 41% for RPC34 at highest. Factors RPC12 and RPC34 have a combination of insignificant indirect effect and low VAF value which denotes that the overall influence of MAS

on those factors is not significant. However, Factor RPC561 has a strongest original direct effect in the overall model and a VAF value of 19%. Similar to CSC2 and WH, the strong direct effect of RPC561 may suggest an influence of masculinity characteristics on the relationship between 'Effects of Injury on Self and Family' (RPC561) and 'Intended Behavior in Risky Situations' (RSB).

Table 5.16: Mediation analysis of Masculinity (MAS)

Hypothesis	IV	Direct effect without mediator	Direct effect with mediator MAS	Indirect effect with mediator MAS	VAF	Total Effect
H_{M1}	**CSC1 -> RSB**	-0.047	0.008	-0.024	**0.74**	-0.015
H_{M2}	**CSC2 -> RSB**	-0.297 **	-0.253 **	-0.039	0.13	-0.292 **
H_{M3}	**WH -> RSB**	0.227 **	0.264 ∗ ‡ ‡	-0.027	0.09	0.237 ∗ ‡ ‡
H_{M4}	**RSP -> RSB**	0.201 ‡	0.159	0.046	**0.22**	0.205‡
H_{M56}	**RAW12 -> RSP**	0.189 ‡	0.198 ‡	0.000	0.00	0.198‡
H_{M7}	**RAW3 -> RSP**	0.091	0.040	-0.035	**0.46**	0.005
H_{M8}	**RAW4 -> RSP**	0.002	0.023	-0.068	**0.75**	-0.045
H_{M9}	**RAW5 -> RSP**	-0.182 ‡‡	-0.207 ∗ ‡ ‡	0.003	0.01	-0.205 ∗ ‡ ‡
H_{M10}	**RAW6 -> RSP**	-0.203	-0.057	**-0.082**	**0.59**	-0.139
H_{M11}	**RAW7 -> RSP**	0.222 *	0.187 ‡	-0.016	0.08	0.171 ‡
H_{M12}	**RPC12 -> RSP**	-0.193 ‡	-0.164	0.011	0.06	-0.153
H_{M13}	**RPC34 -> RSP**	0.144	0.110	-0.078	**0.41**	0.032
H_{M14}	**RPC561 -> RSP**	-0.351 ***	-0.284 **	-0.068	0.19	-0.353 ***

For Two-Tailed Test - * p < 0.10, ** p < 0.05, *** p < 0.01
For One-Tailed Test - ‡ p < 0.10, ‡‡ p < 0.05, ‡ ‡ ‡ p < 0.01

5.5.4 Effect of Long-term Orientation (LTO) on Path Coefficients Relationships

To assess the effect of Long-term Orientation (LTO) on each of the path coefficients, the mediator variable LTO was included separately between each of the path relationships. Table 5.17 presents the results of mediation analysis of LTO on each of the relationships. The columns in the table follow the same sequence as that described in section 5.5.1.

Construction Safety Climate

As evident from Table 5.17, the indirect effect of CSC1 on RSB via mediator LTO is not significant. The VAF value indicates that LTO explains 99% of the relationship between CSC1->RSB. The insignificant direct and indirect effect indicates that the overall influence Long-term Orientation characteristics on the relationship between 'Construction Safety Climate 1' (CSC1) and 'Intended Behavior in Risky Situations' (RSB) is not significant.

As evident from Table 5.17, the indirect effect of CSC2 on RSB via mediator LTO is not significant. The VAF value indicates that LTO explains 9% of the relationship between CSC2->RSB. The

original direct effect of CSC2 had the largest impact on RSB. Thus there is a plausible chance that even with a small VAF value, a strong direct effect may suggest an influence of Long-term Orientation characteristics on the relationship between 'Construction Safety Climate 2' (CSC2) and 'Intended Behavior in Risky Situations' (RSB).

Worker Health

As evident from Table 5.17, the indirect effect of WH on RSB via mediator LTO is not significant. The VAF value indicates that LTO explains 7% of the relationship between WH->RSB. The original direct effect of WH had the second largest impact on RSB. Similar to CSC2, the strong direct effect of WH may suggest an influence of Long Term Orientation characteristics on the relationship between'Worker Health' (WH) and 'Intended Behavior in Risky Situations' (RSB).

Attitude Towards Risky Situation (RSP)

As evident from Table 5.17, the indirect effect of RSP on RSB via mediator LTO is not significant. The VAF value indicates that LTO explains 11% of the relationship between RSP->RSB. The original direct effect of RSP on RSB is strong and significant. Similar to CSC2 and WH, the strong direct effect of RSP may suggest an influence of Long-term Orientation characteristics on the relationship between 'Attitude Towards Risky Situation' (RSP) and 'Intended Behavior in Risky Situations' (RSB).

Risk Task Assessment

As evident from Table 5.17, the indirect effects of all risk task assessment factors RAW12, RAW3, RAW4, RAW6, and RAW7 on RSP via mediator LTO are not significant. Factor RAW5 has a significant indirect effect via mediator LTO. The VAF values ranged from 0% for RAW12 at the lowest to 49% for RAW6 and RAW7 at highest. Factors RAW12, RAW3, and RAW4 have a combination of insignificant indirect effect and low VAF value which denotes that the overall influence of LTO on those factors is not significant. Factors RAW5, RAW6, and RAW7 have a strong original direct effect and a VAF value greater than 35%. Therefore, the influence of Long-term Orientation characteristics on the relationships between both these factors and RSP could be plausible.

Risk Consequences

As evident from Table 5.17, the indirect effects of the three risk consequence factors RPC12, RPC34, and RPC561 on RSP via mediator LTO are not significant. The VAF values ranged from 15% for RPC12 at the lowest to 26% for RPC34 at highest. Factor RPC34 have a combination of insignificant indirect effect and low VAF value which denotes that the overall influence of LTO on

those factors is not significant. Factors RAW12 and RPC561 has a strongest original direct effect in the overall model and a VAF value of 19%. Similar to CSC2 and WH, the strong direct effect of RPC561 may suggest an influence of Long-term Orientation characteristics on the relationship between 'Effects of Injury on Self and Family' (RPC561) and 'Intended Behavior in Risky Situations' (RSB).

Table 5.17: Mediation analysis of Long-term Orientation (LTO)

Hypothesis	IV	Direct effect without mediator	Direct effect with mediator LTO	Indirect effect with mediator LTO	VAF	Total Effect
H_{M1}	**CSC1 -> RSB**	-0.047	0.000	-0.022	**0.99**	-0.021
H_{M2}	**CSC2 -> RSB**	-0.297 **	-0.274 **	-0.028	0.09	-0.302 **
H_{M3}	**WH -> RSB**	0.227 **	0.219 ∗ ‡ ‡	0.016	0.07	0.235 **
H_{M4}	**RSP -> RSB**	0.201 ‡	0.181	0.022	0.11	0.203 ‡
H_{M56}	**RAW12 -> RSP**	0.189 ‡	0.210 ‡	0.000	0.00	0.210 ‡
H_{M7}	**RAW3 -> RSP**	0.091	0.048	-0.015	**0.23**	0.033
H_{M8}	**RAW4 -> RSP**	0.002	0.075	-0.059	**0.44**	0.016
H_{M9}	**RAW5 -> RSP**	-0.182 ‡‡	-0.127	-0.076 ‡	**0.38**	-0.203 ∗ ‡ ‡
H_{M10}	**RAW6 -> RSP**	-0.203	-0.084	-0.081	**0.49**	-0.165
H_{M11}	**RAW7 -> RSP**	0.222 *	-0.084 ∗‡	-0.081	**0.49**	-0.165
H_{M12}	**RPC12 -> RSP**	-0.193 ‡	0.229 +	-0.041	0.15	0.188 ‡
H_{M13}	**RPC34 -> RSP**	0.144	0.072	0.026	**0.26**	0.099
H_{M14}	**RPC561 -> RSP**	-0.351 ***	-0.281 **	-0.065	0.19	-0.346 ***

For Two-Tailed Test - * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
For One-Tailed Test - ‡ $p < 0.10$, ‡‡ $p < 0.05$, ‡ ‡ ‡ $p < 0.01$

5.5.5 Effect of Uncertainty Avoidance Index (UAI) on Path Coefficients Relationships

To assess the effect of Uncertainty Avoidance Index (UAI) on each of the path coefficients, the mediator variable UAI was included separately between each of the path relationships. Table 5.18 presents the results of mediation analysis of UAI on each of the relationships. The columns in the table follow the same sequence as that described in section 5.5.1.

Construction Safety Climate

As evident from Table 5.18, the indirect effect of CSC1 on RSB via mediator UAI is not significant. The VAF value indicates that UAI explains 6% of the relationship between CSC1->RSB. The original direct effect of CSC1 did not have a greater impact on RSB. A combination of insignificant indirect effect and low VAF value denotes that the overall influence of UAI on the relationship between 'Construction Safety Climate 1' (CSC1) and 'Intended Behavior in Risky Situations' (RSB)

is not significant.

As evident from Table 5.18, the indirect effect of CSC2 on RSB via mediator UAI is not significant. The VAF value indicates that UAI explains 10% of the relationship between CSC2->RSB. The original direct effect of CSC2 had the largest impact on RSB. Thus there is a plausible chance that a small VAF value and strong direct effect may suggest an influence of UAI characteristics on the relationship between 'Construction Safety Climate 2' (CSC2) and 'Intended Behavior in Risky Situations' (RSB).

Worker Health

As evident from Table 5.18, the indirect effect of WH on RSB via mediator UAI is significant. The VAF value indicates that UAI explains 47% of the relationship between WH->RSB. The original direct effect of WH had the second largest impact on RSB. The significant indirect effect of WH may suggest an strong influence of uncertainty avoidance characteristics on the relationship between 'Worker Health' (WH) and 'Intended Behavior in Risky Situations' (RSB).

Attitude Towards Risky Situation (RSP)

As evident from Table 5.18, the indirect effect of RSP on RSB via mediator UAI is not significant. The VAF value indicates that UAI explains 9% of the relationship between RSP->RSB. The original direct effect of RSP on RSB is strong and significant. Similar to CSC2, the strong direct effect of RSP may suggest an influence of uncertainty avoidance characteristics on the relationship between 'Attitude Towards Risky Situation' (RSP) and 'Intended Behavior in Risky Situations' (RSB).

Risk Task Assessment

As evident from Table 5.18, the indirect effects of all risk task assessment factors RAW12, RAW3, RAW4, RAW5, RAW6, and RAW7 on RSP via mediator UAI are not significant. The VAF values ranged from 2% for RAW12 at the lowest to 46% for RAW4 at highest. Factors RAW12, RAW3, and RAW4 have a combination of insignificant indirect effect and low VAF value which denotes that the overall influence of UAI on those factors is not significant. Factors RAW5, RAW6, and RAW7 have a strong original direct effect and a VAF value greater than 10%. Thus the influence of uncertainty avoidance characteristics on the relationships between RAW6 and RSP could be plausible. Thus this relationship could have a plausible influence of UAI.

Risk Consequences

As evident from Table 5.18, the indirect effects of the three risk consequence factors RPC12, RPC34, and RPC561 on RSP via mediator UAI are not significant. The VAF values ranged from 3% for RPC12 at the lowest to 14% for RPC34 at highest. Factor RPC34 have a combination

of insignificant indirect effect and low VAF value which denotes that the overall influence of UAI on this factor is not significant. However, factor RPC561 has a strongest original direct effect in the overall model and a VAF value of 4%. The VAF value to very weak to be considered for an possible effect. Also, factor RPC12 has a strong direst effect and a VAF value of 3%. Similar to CSC2 and WH, the strong direct effect of RPC12 may suggest an influence of uncertainty avoidance characteristics on the relationship between 'Occurrence of Minor injury' (RPC12) and 'Intended Behavior in Risky Situations' (RSB).

Table 5.18: Mediation analysis of Uncertainty Avoidance Index (UAI)

Hypothesis	IV	Direct effect without mediator	Direct effect with mediator UAI	Indirect effect with mediator UAI	VAF	Total Effect
H_{M1}	**CSC1 -> RSB**	-0.047	-0.054	0.003	0.06	-0.051
H_{M2}	**CSC2 -> RSB**	-0.297 **	-0.257 **	-0.027	0.10	-0.284 **
H_{M3}	**WH -> RSB**	0.227 **	0.101	0.090 ‡	**0.47**	0.192 ‡
H_{M4}	**RSP -> RSB**	0.201 ‡	0.196 ‡	0.020	0.09	0.216 *‡ ‡
H_{M56}	**RAW12 -> RSP**	0.189 ‡	0.203 ‡	-0.005	0.02	0.198
H_{M7}	**RAW3 -> RSP**	0.091	0.090	-0.028	**0.24**	0.061
H_{M8}	**RAW4 -> RSP**	0.002	0.035	-0.029	**0.46**	0.006
H_{M9}	**RAW5 -> RSP**	-0.182 ‡ ‡	-0.159	-0.034	0.18	-0.193 *‡ ‡
H_{M10}	**RAW6 -> RSP**	-0.203	-0.157	-0.033	0.18	-0.191
H_{M11}	**RAW7 -> RSP**	0.222 *‡	0.244 *‡ ‡	-0.030	0.11	0.214 *‡ ‡
H_{M12}	**RPC12 -> RSP**	-0.193 ‡	-0.239 ‡	0.008	0.03	-0.231 *‡ ‡
H_{M13}	**RPC34 -> RSP**	0.144	0.123	0.020	0.14	0.143
H_{M14}	**RPC561 -> RSP**	-0.351 ***	-0.334 **	-0.015	0.04	-0.349 **

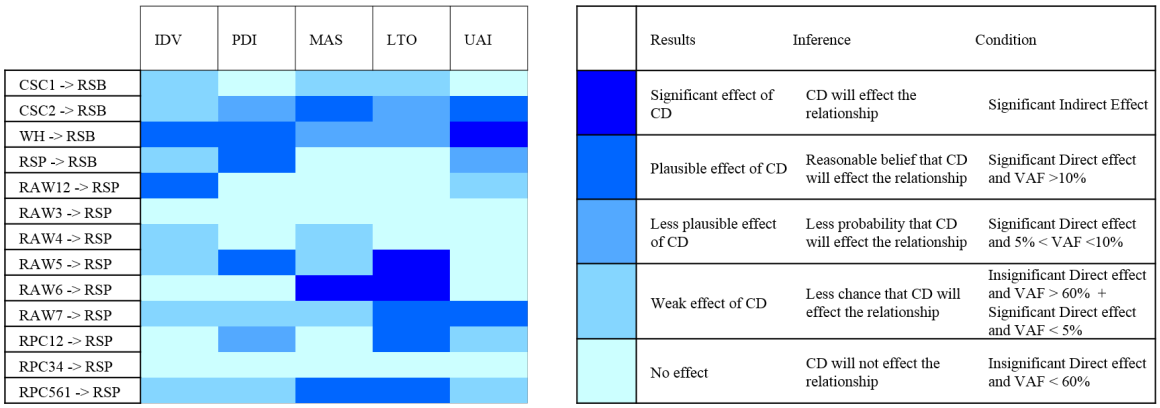
5.5.6 Summary of Mediation Analysis

The results of mediation analysis are summarized by categorizing the direct effect values as listed below.

- Significant effect of cultural dimensions (CD): When there is a significant indirect effect.
- Plausible effect of cultural dimensions (CD): When there is a significant Direct effect and VAF $> 10\%$.
- Less plausible effect of cultural dimensions (CD): When there is a significant Direct effect and $5\% <$ VAF $< 10\%$.
- Weak effect of cultural dimensions (CD): When there is a insignificant Direct effect and VAF $> 60\%$ + significant Direct effect and VAF $< 5\%$.

- No effect of cultural dimensions (CD): Insignificant Direct effect and VAF $< 60\%$.

Figure 5.2 shows the heat map of the summary of mediation analysis. Factors 'Construction Safety Climate 2' (CSC2) and 'Worker Health' (WH) were influenced by all the cultural dimensions. Long-term Orientation (LTO) has the maximum influence on the factor relationships followed by Masculinity (MAS) and Uncertainty Avoidance Index (UAI).



	Results	Inference	Condition
	Significant effect of CD	CD will effect the relationship	Significant Indirect Effect
	Plausible effect of CD	Reasonable belief that CD will effect the relationship	Significant Direct effect and VAF >10%
	Less plausible effect of CD	Less probability that CD will effect the relationship	Significant Direct effect and 5% < VAF <10%
	Weak effect of CD	Less chance that CD will effect the relationship	Insignificant Direct effect and VAF > 60% + Significant Direct effect and VAF < 5%
	No effect	CD will not effect the relationship	Insignificant Direct effect and VAF < 60%

Figure 5.2: Summary of mediation analysis

5.6 Hypothesis Testing Moderating Effect of National Culture (Group Differences)

The moderating effect of national culture on individual behavior is attributed to the fact that it provides a common basis for evaluation. To assess the influence of national culture as a moderating variable on the relationships in the conceptual model, the total data sample was split by ethnicity. Table 5.19 provides the cultural dimension index scores for both worker groups studied in this dissertation. The cultural dimension scores were calculated as reported in Hofstede et al. (1991). The values in brackets were the ones reported by Hofstede in his research. Individualism/Collectivism (IDV), Uncertainty Avoidance Index (UAI), and Masculinity/Femininity (MAS) show the same trend as reported by Hofstede. Power Distance Index (PDI), shows an opposite trend in this population of construction workers. The Hispanic worker group PDI score matches the original Hofstede score. The large score of PDI for non-Hispanic worker group can be linked to the high proportion of temporary labor in residential construction who intent to follow the instruction given by their supervisors. Long-term/Short-term

Orientation (LTO) was not computed by Hofstede for Mexico hence there is no comparable score to assess the difference in values. Masculinity shows a minor difference in values between worker groups. The following subsections provide a multi-group analysis for each of the cultural dimension.

Table 5.19: Cultural Dimension index score measured using VSM 94 (Values reported by Hofstede, 2001)

	Individualism (IDV)	Power Distance Index (PDI)	Long vs short orientation (LTO)	Uncertainty Avoidance Index (UAI)	Masculinity (MAS)
Hispanic	31 (30)	82 (81)	17	68 (82)	57 (69)
Non-Hispanic	67 (91)	116 (40)	31 (29)	47 (46)	61 (62)
Difference in Scores	36	35	14	21	4

5.6.1 Difference in Effect of Individualism (IDV) on Path Coefficients Relationships

To assess the difference in effect of Individualism (IDV) on each of the path coefficients, a multi-group analysis was conducted with the mediator variable IDV included separately between each of the path relationships. Table 5.20 presents the results of multi-group analysis with IDV as mediator on each of the relationships. Column three in the table represents the direct effect between factors which were calculated when no mediator varaible was included in the analysis. Column four represents the refitted direct effect between factors after addition of the mediator varaible. Column five and nine presents the direct effect between factors after addition of the mediator varaible for Hispanic and non-Hispanic worker groups respectively. Column six and ten presents the indirect effect accounted or explained by the mediator varaible (IDV) for Hispanic and non-Hispanic worker groups respectively. Column seven and eleven presents the total effect between factors for Hispanic and non-Hispanic worker groups respectively. Column eight and twelve presents the strength of mediation by using Variance Accounted For (VAF) calculation for Hispanic and non-Hispanic worker groups respectively. Table E.1 in Appendix E.2 presents a detailed analysis of the differences in groups for the effect of Individualism (IDV).

Construction Safety Climate

The results in Table 5.20 show that there is a difference in the direct effect values of CSC1 on RSB via mediator IDV between Hispanic (H) and non-Hispanic (NH) worker groups. The direct effect

in the group with low IDV score ($CSC1 \rightarrow RSB(H) = -0.179$) is large as compared to the group with high IDV score ($CSC1 \rightarrow RSB(NH) = -0.085$). The difference between the direct effect of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D1}: $P_{CSC1 \rightarrow RSB(IDV)}(H) \neq P_{CSC1 \rightarrow RSB(IDV)}(NH)$ is not supported. Additionally, it is necessary to note that both groups show increase in direct effect of CSC1 on RSB.

The results in Table 5.20 show that there is a difference in the direct effect values of CSC2 on RSB via mediator IDV between Hispanic (H) and non-Hispanic (NH) worker groups. The direct effect in the group with low IDV score ($CSC2 \rightarrow RSB(H) = -0.210$) is bigger as compared to the group with high IDV score ($CSC2 \rightarrow RSB(NH) = -0.154$). The difference between the direct effect of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D2}: $P_{CSC2 \rightarrow RSB(IDV)}(H) \neq P_{CSC2 \rightarrow RSB(IDV)}(NH)$ is not supported.

Worker Health

As evident from Table 5.20, there is a difference in the direct effect values of WH on RSB via mediator IDV between Hispanic (H) and non-Hispanic (NH) worker groups. The direct effect in the group with low IDV score ($WH \rightarrow RSB(H) = 0.045$) is much smaller as compared to the group with high IDV score ($WH \rightarrow RSB(NH) = 0.210$). The difference between the direct effect of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D3}: $P_{WH \rightarrow RSB(IDV)}(H) \neq P_{WH \rightarrow RSB(IDV)}(NH)$ is not supported.

Attitude Towards Risky Situation (RSP)

As evident from Table 5.20, there is a difference in the direct effect values of RSP on RSB via mediator IDV between Hispanic (H) and non-Hispanic (NH) worker groups. The direct effect in the group with low IDV score ($RSP \rightarrow RSB(H) = 0.273$) is large as compared to the group with high IDV score ($RSP \rightarrow RSB(NH) = 0.092$). The difference between the direct effect of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D4}: $P_{RSP \rightarrow RSB(IDV)}(H) \neq P_{RSP \rightarrow RSB(IDV)}(NH)$ is not supported.

Risk Task Assessment

As evident from Table 5.20, the direct effects risk task assessment factors RAW4, RAW5, and RAW7 on RSP via mediator IDV are not significant and do not exhibit a notable difference Hispanic (H) and non-Hispanic (NH) worker groups. For factor RAW12, while the direct effect

in the group with low IDV score ($RAW12 \rightarrow RSP(H) = 0.377$) is significantly positive , RAW12 has no significant effect on 'Attitude Towards Risky Situation' (RSP) in the group with high IDV score ($RAW12 \rightarrow RSP(NH) = 0.048$). For factor RAW3, the direct effect in the group with low IDV score ($RAW3 \rightarrow RSB(H) = 0.043$) is positive, while the direct effect in the group with high IDV score is negative ($RAW3 \rightarrow RSB(NH) = -0.013$). Even though the individual direct effects are not significant the difference in the values between Hispanic and non Hispanic worker groups for factor RAW3 is significant. Therefore, hypothesis H_{D7}: $P_{RAW3 \rightarrow RSP(IDV)}(H) \neq P_{RAW3 \rightarrow RSP(IDV)}(NH)$ is supported. For factor RAW6, the direct effect in the group with low IDV score ($RAW6 \rightarrow RSP(H) = -0.261$) is large as compared to the group with high IDV score ($RAW6 \rightarrow RSP(NH) = 0.001$). The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D10}: $P_{RAW6 \rightarrow RSP(IDV)}(H) \neq P_{RAW6 \rightarrow RSP(IDV)}(NH)$ is not supported.

Risk Consequences

As evident from Table 5.20, the direct effect of factor RPC34 on RSP via mediator IDV is not significant and do not exhibit a notable difference Hispanic (H) and non-Hispanic (NH) worker groups. For factor RPC12, the direct effect in the group with low IDV score ($RPC12 \rightarrow RSP(H) = -0.065$) is much smaller than the group with high IDV score ($RPC12 \rightarrow RSP(NH) = -0.269$). The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D12}: $P_{RPC12 \rightarrow RSP(IDV)}(H) \neq P_{RPC12 \rightarrow RSP(IDV)}(NH)$ is not supported. For factor RPC561, while the direct effect in the group with low IDV score ($RPC561 \rightarrow RSP(H) = -0.248$) is not significant, RPC561 has a significantly negative effect on 'Attitude Towards Risky Situation' (RSP) in the group with high IDV score ($RPC561 \rightarrow RSP(NH) = -0.385$). The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D14}: $P_{RPC561 \rightarrow RSP(IDV)}(H) \neq P_{RPC561 \rightarrow RSP(IDV)}(NH)$ is not supported.

Table 5.20: Differences in mediation effect of Individualism (IDV) between Hispanic and Non-Hispanic workers

				Hispanic				Non-Hispanic			
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10	Column 11	Column 12
Hypothesis	**Individualism (IDV)**	Direct effect without mediator	Direct effect with mediator	Direct effect with mediator	Indirect effects	Total effects	VAF	Direct effect with mediator	Indirect effects	Total effects	VAF
H_{D1}	CSC1 -> RSB	-0.047	0.001	-0.179	-0.001	-0.180	0.01	0.085	-0.048	0.037	0.36
H_{D2}	CSC2 -> RSB	-0.297**	-0.263∗ ‡ ‡	-0.210	0.002	-0.208	0.01	-0.154	-0.055	-0.208	0.26
H_{D3}	WH -> RSB	0.227**	0.188‡	0.045	0.031	0.075	0.41	0.210	0.032	0.241‡	0.13
H_{D4}	RSP -> RSB	0.201‡	0.200‡	0.273	0.007	0.280	0.02	0.092	0.042	0.134	0.32
H_{D56}	RAW12 -> RSP	0.189‡	0.154	0.377‡	0.046	0.423∗ ∗ ‡‡	0.11	0.048	-0.016	0.032	0.25
H_{D7}	**RAW3 -> RSP**	0.091	0.080	0.043	-0.095	-0.052	0.69	-0.013	-0.022	-0.034	0.63
H_{D8}	RAW4 -> RSP	0.002	0.012	0.097	-0.041	0.057	0.29	0.052	-0.019	0.033	0.27
H_{D9}	RAW5 -> RSP	-0.182 ‡‡	-0.185∗ ‡ ‡	-0.205	-0.016	-0.220‡	0.07	-0.234	-0.038	-0.272‡	0.14
H_{D10}	RAW6 -> RSP	-0.203	-0.165	-0.261	0.035	-0.226	0.12	-0.001	-0.035	-0.036	0.98
H_{D11}	RAW7 -> RSP	0.222*	0.227∗ ‡ ‡	0.198	-0.014	0.184	0.06	0.223	-0.022	0.201	0.09
H_{D12}	RPC12 -> RSP	-0.193‡	-0.191‡	-0.065	-0.017	-0.082	0.21	-0.269	-0.014	-0.283‡	0.05
H_{D13}	RPC34 -> RSP	0.144	0.088	0.049	0.053	0.102	0.52	0.102	-0.024	0.078	0.19
H_{D14}	RPC561 -> RSP	-0.351***	-0.358**	-0.248	-0.032	-0.280	0.12	-0.385∗ ∗ ‡‡	-0.038	-0.423**	0.09

5.6.2 Difference in Effect of Power Distance Index (PDI) on Path Coefficients Relationships

To assess the difference in effect of Power Distance Index (PDI) on each of the path coefficients, a multi-group analysis was conducted with the mediator variable PDI included separately between each of the path relationships. Figure 5.3 presents results of multi-group analysis with PDI as mediator on each of the relationships. The columns in the table follow the same sequence as that described in section 5.6.1. Table E.2 in Appendix E.2 presents a detailed analysis of the differences in groups for the effect of Power Distance Index (PDI).

Construction Safety Climate

The results in Figure 5.3 show that there is a difference in the direct effect values of CSC1 on RSB via mediator PDI between Hispanic (H) and non-Hispanic (NH) worker groups. The direct effect in the group with low PDI score ($CSC1 \rightarrow RSB(H) = -0.134$) is negative and group with high PDI score is positive ($CSC1 \rightarrow RSB(NH) = 0.191$). The difference between the direct effect of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D1}: $P_{CSC1 \rightarrow RSB(PDI)}(H) \neq P_{CSC1 \rightarrow RSB(PDI)}(NH)$ is not supported.

The results in Figure 5.3 show that the direct effect of factor CSC2 on RSB via mediator PDI is not significant and do not exhibit a notable difference Hispanic (H) and non-Hispanic (NH) worker groups. Hence, hypothesis H_{D2}: $P_{CSC2 \rightarrow RSB(PDI)}(H) \neq P_{CSC2 \rightarrow RSB(PDI)}(NH)$ is not supported.

Worker Health

As evident from Figure 5.3, there is a significant difference in the direct effect values of WH on RSB via mediator PDI between Hispanic (H) and non-Hispanic (NH) worker groups. The direct effect in the group with low PDI score ($WH \rightarrow RSB(H) = -0.0185$) is much smaller as compared to the group with high PDI score ($WH \rightarrow RSB(NH) = 0.380$). Hence, hypothesis H_{D3}: $P_{WH \rightarrow RSB(PDI)}(H) \neq P_{WH \rightarrow RSB(PDI)}(NH)$ is supported.

Attitude Towards Risky Situation (RSP)

As evident from Figure 5.3, there is a difference in the direct effect values of RSP on RSB via mediator PDI between Hispanic (H) and non-Hispanic (NH) worker groups. The direct effect in the group with low PDI score ($RSP \rightarrow RSB(H) = 0.250$) is large as compared to the group with high PDI score ($RSP \rightarrow RSB(NH) = 0.122$). The difference between the direct effect of path

coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D4}: $P_{RSP \rightarrow RSB(PDI)}(H) \neq P_{RSP \rightarrow RSB(PDI)}(NH)$ is not supported.

Risk Task Assessment

As evident from Figure 5.3, the direct effects risk task assessment factors RAW3, RAW4, and RAW7 on RSP via mediator PDI are not significant and do not exhibit a notable difference Hispanic (H) and non-Hispanic (NH) worker groups. For factor RAW12, while the direct effect in the group with low PDI score ($RAW12 \rightarrow RSP(H) = 0.430$) is significantly positive, RAW12 has no significant effect on 'Attitude Towards Risky Situation' (RSP) in the group with high PDI score ($RAW12 \rightarrow RSP(NH) = -0.075$). The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is statistically significant. Hence, hypothesis H_{D56}: $P_{RAW12 \rightarrow RSP(PDI)}(H) \neq P_{RAW12 \rightarrow RSP(PDI)}(NH)$ is supported. For factor RAW5, while the direct effect in the group with low PDI score ($RAW5 \rightarrow RSP(H) = -0.132$) is not significant, RAW5 has a significantly negative effect on 'Attitude Towards Risky Situation' (RSP) in the group with high v score ($RAW5 \rightarrow RSP(NH) = -0.294$). The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D9}: $P_{RAW5 \rightarrow RSP(PDI)}(H) \neq P_{RAW5 \rightarrow RSP(PDI)}(NH)$ is not supported. For factor RAW6, the direct effect in the group with low PDI score ($RAW6 \rightarrow RSP(H) = -0.166$) is large as compared to the group with high PDI score ($RAW6 \rightarrow RSP(NH) = 0.016$). The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D10}: $P_{RAW6 \rightarrow RSP(PDI)}(H) \neq P_{RAW6 \rightarrow RSP(PDI)}(NH)$ is not supported.

Risk Consequences

As evident from Figure 5.3, the direct effects of factor RPC34 on RSP via mediator PDI is not significant and do not exhibit a notable difference Hispanic (H) and non-Hispanic (NH) worker groups. For factor RPC12, while the direct effect in the group with low PDI score is not significant ($RPC12 \rightarrow RSP(H) = -0.011$), RPC12 has a significantly negative effect on 'Attitude Towards Risky Situation' (RSP) in group with high PDI score ($RPC12 \rightarrow RSP(NH) = -0.356$). The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D12}: $P_{RPC12 \rightarrow RSP(PDI)}(H) \neq P_{RPC12 \rightarrow RSP(PDI)}(NH)$ is not supported. For factor RPC561, while the direct effect in the group

with low PDI score ($RPC561 \rightarrow RSP(H) = -0.271$) is not significant, RPC561 has a significantly negative effect on 'Attitude Towards Risky Situation' (RSP) in the group with high PDI score ($RPC561 \rightarrow RSP(NH) = -0.425$). The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D14}: $P_{RPC561 \rightarrow RSP(PDI)}(H) \neq P_{RPC561 \rightarrow RSP(PDI)}(NH)$ is not supported.

				Hispanic				Non-Hispanic			
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10	Column 11	Column 12
Hypothesis	**Power Distance (PDI)**	Direct Effect without mediator	Direct Effect with mediator	Direct Effect with mediator	Indirect Effects	Total Effects	VAF	Direct Effect with mediator	Indirect Effects	Total Effects	VAF
HD1	CSC1 -> RSB	-0.047	-0.018	-0.134	-0.033	-0.167	0.20	0.191	-0.042	0.149	0.18
HD2	CSC2 -> RSB	-0.297 **	-0.286 **	-0.210	-0.024	-0.234	0.10	-0.221	0.020	-0.201	0.08
HD3	**WH -> RSB**	0.227 **	0.173 †	-0.018	0.076	0.057	**0.81**	0.380 *++	-0.129	0.251+	**0.25**
HD4	RSP -> RSB	0.201 †	0.173 †	0.250	0.047	0.297* ++	0.16	0.122	0.002	0.124	0.02
HD56	**RAW12 -> RSP**	0.189 †	0.166	0.430* ++	-0.011	0.418 **	0.03	-0.075	0.105	0.030	**0.58**
HD7	RAW3 -> RSP	0.091	0.180	0.074	-0.053	0.021	**0.42**	-0.001	0.020	0.019	**0.94**
HD8	RAW4 -> RSP	0.002	-0.023	0.045	0.019	0.064	**0.30**	-0.004	0.043	0.039	**0.91**
HD9	RAW5 -> RSP	-0.182 † †	-0.162 †	-0.132	-0.073	-0.205	**0.35**	"-0.294 +	-0.016	-0.311	0.05
HD10	RAW6 -> RSP	-0.203	-0.159	-0.166	0.035	-0.131	0.17	0.016	-0.037	-0.020	**0.69**
HD11	RAW7 -> RSP	0.222 *	0.215 †	0.112	0.038	0.151	**0.25**	0.157	0.035	0.192	0.18
HD12	RPC12 -> RSP	-0.193 †	-0.179 †	-0.011	-0.061	-0.072	**0.84**	"-0.356 +	0.022	-0.334	0.06
HD13	RPC34 -> RSP	0.144	0.051	0.070	0.038	0.108	**0.35**	0.092	0.055	0.146	**0.37**
HD14	RPC561 -> RSP	-0.351 ***	-0.339 **	-0.271	-0.006	-0.277	0.02	"-0.425 **	-0.022	"-0.447**	0.05

Figure 5.3: Differences in mediation effect of Power Distance Index (PDI) between Hispanic and Non-Hispanic workers

5.6.3 Difference in Effect of Masculinity (MAS) on Path Coefficients Relationships

To assess the difference in effect of Masculinity (MAS) on each of the path coefficients, a multi-group analysis was conducted with the mediator variable MAS included separately between each of the path relationships. Figure 5.4 presents the results of multi-group analysis with MAS as mediator on each of the relationships. The columns in the table follow the same sequence as that described in section 5.6.1. Table E.3 in Appendix E.2 presents a detailed analysis of the differences in groups for the effect of Masculinity (MAS).

Construction Safety Climate

The results in Figure 5.4 show that there is a difference in the direct effect values of CSC1 on RSB via mediator MAS between Hispanic (H) and non-Hispanic (NH) worker groups. The direct effect in the group with high MAS score ($CSC1 \rightarrow RSB(H) = -0.097$) is negative and group with low MAS score score is positive ($CSC1 \rightarrow RSB(NH) = 0.185$). The difference between the direct

effect of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D1}: $P_{CSC1 \rightarrow RSB(MAS)}(H) \neq P_{CSC1 \rightarrow RSB(MAS)}(NH)$ is not supported.

The results in Figure 5.4 show that there is a difference in the direct effect values of CSC2 on RSB via mediator MAS between Hispanic (H) and non-Hispanic (NH) worker groups. The direct effect in the group with high MAS score ($CSC2 \rightarrow RSB(H) = -0.196$) is smaller as compared to the group with low MAS score ($CSC2 \rightarrow RSB(NH) = -0.258$). The difference between the direct effect of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D2}: $P_{CSC2 \rightarrow RSB(MAS)}(H) \neq P_{CSC2 \rightarrow RSB(MAS)}(NH)$ is not supported.

Worker Health

As evident from Figure 5.4, there is a significant difference in the direct effect values of WH on RSB via mediator MAS between Hispanic (H) and non-Hispanic (NH) worker groups. The direct effect in the group with high MAS score ($WH \rightarrow RSB(H) = -0.190$) is much smaller as compared to the group with low MAS score ($WH \rightarrow RSB(NH) = 0.285$). Hence, hypothesis H_{D3}: $P_{WH \rightarrow RSB(MAS)}(H) \neq P_{WH \rightarrow RSB(MAS)}(NH)$ is supported.

Attitude Towards Risky Situation (RSP)

As evident from Figure 5.4, there is a difference in the direct effect values of RSP on RSB via mediator MAS between Hispanic (H) and non-Hispanic (NH) worker groups. The direct effect in the group with high MAS score is significantly positive ($RSP \rightarrow RSB(H) = 0.265$) and large as compared to the group with low MAS score ($RSP \rightarrow RSB(NH) = 0.085$). The difference between the direct effect of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D4}: $P_{RSP \rightarrow RSB(MAS)}(H) \neq P_{RSP \rightarrow RSB(MAS)}(NH)$ is not supported.

Risk Task Assessment

As evident from Figure 5.4, the direct effects risk task assessment factors RAW3, RAW4, RAW5, and RAW6 on RSP via mediator MAS are not significant and do not exhibit a notable difference Hispanic (H) and non-Hispanic (NH) worker groups. For factor RAW12, while the direct effect in the group with high MAS score ($RAW12 \rightarrow RSP(H) = 0.430$) is significantly positive, RAW12 has no significant effect on 'Attitude Towards Risky Situation' (RSP) in the group with low MAS score ($RAW12 \rightarrow RSP(NH) = 0.065$). The difference between these direct effects of path coefficients

for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D56}: $P_{RAW12 \rightarrow RSP(MAS)}(H) \neq P_{RAW12 \rightarrow RSP(MAS)}(NH)$ is not supported. For factor RAW7, the direct effect in the group with high MAS score ($RAW3 \rightarrow RSB(H) = 0.188$) is positive, while the direct effect in the group with low MAS score is negative ($RAW7 \rightarrow RSB(NH) = -0.232$). Even though the individual direct effects are not significant the difference in the values between Hispanic and non Hispanic worker groups for factor RAW7 is significant. Therefore, hypothesis H_{D11}: $P_{RAW7 \rightarrow RSP(IDV)}(H) \neq P_{RAW7 \rightarrow RSP(IDV)}(NH)$ is supported.

Risk Consequences

As evident from Figure 5.4, the direct effects of factor RPC12 on RSP via mediator MAS is not significant and do not exhibit a notable difference Hispanic (H) and non-Hispanic (NH) worker groups. For factor RPC34, the direct effect in the group with high MAS score ($RPC34 \rightarrow RSB(H) = -0.009$) is much smaller as compared to the group with low MAS score ($RPC34 \rightarrow RSB(NH) = 0.186$). The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D13}: $P_{RPC34 \rightarrow RSP(MAS)}(H) \neq P_{RPC34 \rightarrow RSP(MAS)}(NH)$ is not supported. For factor RPC561, while the direct effect in the group with high MAS score ($RPC561 \rightarrow RSP(H) = 0.105$) is not significant, RPC561 has a significantly negative effect on 'Attitude Towards Risky Situation' (RSP) in the group with high MAS score ($RPC561 \rightarrow RSP(NH) = -0.335$). The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is statistically significant. Hence, hypothesis H_{D14}: $P_{RPC561 \rightarrow RSP(MAS)}(H) \neq P_{RPC561 \rightarrow RSP(MAS)}(NH)$ is supported.

5.6.4 Difference in Effect of Long-term Orientation (LTO) on Path Coefficients Relationships

To assess the difference in effect of Long-term Orientation (LTO) on each of the path coefficients, a multi-group analysis was conducted with the mediator variable LTO included separately between each of the path relationships. Figure 5.5 presents the results of multi-group analysis with LTO as mediator on each of the relationships. The columns in the table follow the same sequence as that described in section 5.6.1. Table E.4 in Appendix E.2 presents a detailed analysis of the differences in groups for the effect of Long Term Orientation (LTO).

				Hispanic				Non-Hispanic			
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10	Column 11	Column 12
Hypothesis	**Masculinity (MAS**	Direct Effect without mediator	Direct Effect with mediator	Direct Effect with mediator	Indirect Effects	Total Effects	VAF	Direct Effect with mediator	Indirect Effects	Total Effects	VAF
HD1	CSC1 -> RSB	-0.047	0.008	-0.097	-0.054	-0.151	**0.36**	0.185	-0.076	0.109	**0.29**
HD2	CSC2 -> RSB	-0.297 **	-0.253 **	-0.196	-0.072	-0.268	**0.27**	-0.258	0.063	-0.195	0.20
HD3	**WH -> RSB**	0.227 **	0.264 * † †	-0.190	0.101	-0.089	**0.35**	0.285 +	0.005	0.290 * ++	0.02
HD4	RSP -> RSB	0.201 †	0.159	0.265 +	0.044	0.309 * ++	0.14	0.085	0.046	0.130	**0.35**
HD56	RAW12 -> RSP	0.189 †	0.198 †	0.443 * ++	-0.027	0.417* ++	0.06	0.065	-0.105	-0.040	**0.62**
HD7	RAW3 -> RSP	0.091	0.040	0.159	-0.012	0.148	0.07	0.102	-0.060	0.042	**0.37**
HD8	RAW4 -> RSP	0.002	0.023	0.087	-0.052	0.035	**0.37**	0.032	-0.072	-0.040	**0.69**
HD9	RAW5 -> RSP	-0.182 † †	-0.207 * † †	-0.231	0.009	-0.222	0.04	"-0.288 +	-0.066	"-0.354+	0.19
HD10	RAW6 -> RSP	-0.203	-0.057	-0.023	-0.050	-0.073	**0.69**	0.095	-0.129	-0.034	**0.57**
HD11	**RAW7 -> RSP**	0.222 *	0.187 †	0.188	-0.050	0.138	**0.21**	-0.232	0.079	-0.152	**0.26**
HD12	RPC12 -> RSP	-0.193 †	-0.164	-0.118	0.043	-0.075	**0.27**	-0.187	-0.034	-0.221	0.15
HD13	RPC34 -> RSP	0.144	0.110	0.009	0.015	0.024	**0.61**	0.186	-0.115	0.070	**0.38**
HD14	**RPC561 -> RSP**	-0.351 ***	-0.284 **	0.105	-0.004	0.101	0.03	"-0.335 *++	-0.120	"-0.455 **+++	**0.26**

Figure 5.4: Differences in mediation effect of Masculinity (MAS) between Hispanic and Non-Hispanic workers

Construction Safety Climate

The results in Figure 5.5 show that there is a difference in the direct effect values of CSC1 on RSB via mediator LTO between Hispanic (H) and non-Hispanic (NH) worker groups. The direct effect in the group with low LTO score ($CSC1 \rightarrow RSB(H) = -0.135$) is negative and group with high LTO score is positive ($CSC1 \rightarrow RSB(NH) = 0.142$). The difference between the direct effect of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D1}: $P_{CSC1 \rightarrow RSB(LTO)}(H) \neq P_{CSC1 \rightarrow RSB(LTO)}(NH)$ is not supported.

The results in Figure 5.5 show that there is a difference in the direct effect values of CSC2 on RSB via mediator LTO between Hispanic (H) and non-Hispanic (NH) worker groups. The direct effect in the group with low LTO ($CSC2 \rightarrow RSB(H) = -0.097$) is smaller as compared to the group with high LTO score ($CSC2 \rightarrow RSB(NH) = -0.173$). The difference between the direct effect of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D2}: $P_{CSC2 \rightarrow RSB(LTO)}(H) \neq P_{CSC2 \rightarrow RSB(LTO)}(NH)$ is not supported.

Worker Health

As evident from Figure 5.5, there is a difference in the direct effect values of WH on RSB via mediator LTO between Hispanic (H) and non-Hispanic (NH) worker groups. The direct effect in the group with low LTO score ($WH \rightarrow RSB(H) = -0.066$) is much smaller as compared to the group with high LTO score ($WH \rightarrow RSB(NH) = 0.209$). Hence, hypothesis H_{D3}:

$P_{WH \to RSB(LTO)}(H) \neq P_{WH \to RSB(LTO)}(NH)$ is not supported.

Attitude Towards Risky Situation (RSP)

As evident from Figure 5.5, there is a difference in the direct effect values of RSP on RSB via mediator LTO between Hispanic (H) and non-Hispanic (NH) worker groups. The direct effect in the group with low LTO score ($RSP \to RSB(H) = 0.222$) is large as compared to the group with high LTO score ($RSP \to RSB(NH) = 0.131$). The difference between the direct effect of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D4}: $P_{RSP \to RSB(LTO)}(H) \neq P_{RSP \to RSB(LTO)}(NH)$ is not supported.

Risk Task Assessment

As evident from Figure 5.5, the direct effects risk task assessment factors RAW3 and RAW6 on RSP via mediator LTO are not significant and do not exhibit a notable difference Hispanic (H) and non-Hispanic (NH) worker groups. For factor RAW12, while the direct effect in the group with low LTO score ($RAW12 \to RSP(H) = 0.388$) is significantly positive, RAW12 has no significant effect on 'Attitude Towards Risky Situation' (RSP) in the group with high LTO score ($RAW12 \to RSP(NH) = 0.137$). The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D56}: $P_{RAW12 \to RSP(LTO)}(H) \neq P_{RAW12 \to RSP(LTO)}(NH)$ is not supported. For factor RAW4, the direct effect in the group with low LTO score ($RAW4 \to RSP(H) = -0.207$) is large as compared to the group with high LTO score ($RAW4 \to RSP(NH) = 0.067$). The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D8}: $P_{RAW4 \to RSP(LTO)}(H) \neq P_{RAW4 \to RSP(LTO)}(NH)$ is not supported. For factor RAW5, the direct effect in the group with low LTO score ($RAW5 \to RSP(H) = -0.134$) is small as compared to the group with high LTO score ($RAW5 \to RSP(NH) = -0.230$). The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D9}: $P_{RAW5 \to RSP(LTO)}(H) \neq P_{RAW5 \to RSP(LTO)}(NH)$ is not supported. For factor RAW7, the direct effect in the group with low LTO score ($RAW7 \to RSB(H) = 0.218$) is as compared to the group with high LTO score ($RAW7 \to RSB(NH) = 0.141$). The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant.

Hence, hypothesis H_{D11}: $P_{RAW7 \rightarrow RSP(LTO)}(H) \neq P_{RAW7 \rightarrow RSP(LTO)}(NH)$ is not supported.

Risk Consequences

As evident from Figure 5.5, the direct effects of factor RPC34 on RSP via mediator LTO is not significant and do not exhibit a notable difference Hispanic (H) and non-Hispanic (NH) worker groups. For factor RPC12, the direct effect in the group with low LTO score ($RPC12 \rightarrow RSP(H) = -0.109$) is much smaller than the group with high LTO score ($RPC12 \rightarrow RSP(NH) = -0.390$). The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D12}: $P_{RPC12 \rightarrow RSP(LTO)}(H) \neq P_{RPC12 \rightarrow RSP(LTO)}(NH)$ is not supported. For factor RPC561, while the direct effect in the group with low LTO score ($RPC561 \rightarrow RSP(H) = 0.039$) is not significant, RPC561 has a significantly negative effect on 'Attitude Towards Risky Situation' (RSP) in the group with high LTO score ($RPC561 \rightarrow RSP(NH) = -0.448$). The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is statistically significant. Hence, hypothesis H_{D14}: $P_{RPC561 \rightarrow RSP(LTO)}(H) \neq P_{RPC561 \rightarrow RSP(LTO)}(NH)$ is supported.

				Hispanic				Non-Hispanic			
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10	Column 11	Column 12
Hypothesis	**Long Term Orientation (LTO)**	Direct effect without mediator	Direct effect with mediator	Direct Effect with mediator	Indirect Effects	Total Effects	VAF	Direct Effect with mediator	Indirect Effects	Total Effects	VAF
HD1	CSC1 -> RSB	-0.047	0.000	-0.1357298	-0.098	-0.234	**0.42**	0.142	0.068	0.210	**0.32**
HD2	CSC2 -> RSB	-0.297 **	-0.2747 **	-0.0971548	-0.149	-0.246	**0.61**	-0.173	-0.045	-0.218	**0.21**
HD3	WH -> RSB	0.227 **	0.219 * ++	-0.0666742	0.121	0.054	**0.64**	0.209	0.078	0.287* ++	**0.27**
HD4	RSP -> RSB	0.201 †	0.181	0.22227237	0.088	0.310* ++	**0.28**	0.131	-0.013	0.118	0.09
HD56	RAW12 -> RSP	0.189 †	0.210 +	0.388+	0.034	0.422 *++	0.08	0.137	-0.019	0.118	0.12
HD7	RAW3 -> RSP	0.091	0.048	0.02359879	-0.076	-0.052	**0.76**	0.080	-0.026	0.054	**0.25**
HD8	RAW4 -> RSP	0.002	0.075	0.20773146	-0.105	-0.105	**0.34**	0.067	-0.040	-0.040	**0.38**
HD9	RAW5 -> RSP	-0.182 † †	-0.127	-0.134221	-0.091	-0.225	**0.40**	-0.230	-0.062	"-0.292+	**0.21**
HD10	RAW6 -> RSP	-0.203	-0.084	0.07744064	-0.118	-0.040	**0.60**	0.011	-0.055	-0.044	**0.84**
HD11	RAW7 -> RSP	0.222 *	-0.084 * +	0.21804887	-0.081	0.137	**0.27**	0.141	0.018	0.159	0.11
HD12	RPC12 -> RSP	-0.193 †	0.229 +	-0.1094085	0.035	-0.074	**0.24**	"-0.390 +	0.029	"-0.361+	0.07
HD13	RPC34 -> RSP	0.144	0.072	0.13981342	-0.133	0.006	**0.49**	0.047	0.076	0.124	**0.62**
HD14	**RPC561 -> RSP**	-0.351 ***	-0.281 **	0.03901273	-0.166	-0.166	**0.81**	"-0.448 **	0.003	0.003	0.01

Figure 5.5: Differences in mediation effect of Long Term Orientation (LTO) between Hispanic and Non-Hispanic workers

5.6.5 Difference in Effect of Uncertainty Avoidance Index (UAI) on Path Coefficients Relationships

To assess the difference in effect of Uncertainty Avoidance Index (UAI) on each of the path coefficients, a multi-group analysis was conducted with the mediator variable UAI included

separately between each of the path relationships. Figure 5.6 presents the results of multi-group analysis with UAI as mediator on each of the relationships. The columns in the table follow the same sequence as that described in section 5.6.1. Table E.5 in Appendix E.2 presents a detailed analysis of the differences in groups for the effect of Uncertainty Avoidance Index (UAI).

Construction Safety Climate

The results in Figure 5.6 show that there is a difference in the direct effect values of CSC1 on RSB via mediator UAI between Hispanic (H) and non-Hispanic (NH) worker groups. The direct effect in the group with low UAI score ($CSC1 \rightarrow RSB(H) = -0.216$) is negative and group with high UAI score is positive ($CSC1 \rightarrow RSB(NH) = -0.107$). The difference between the direct effect of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D1}: $P_{CSC1 \rightarrow RSB(UAI)}(H) \neq P_{CSC1 \rightarrow RSB(UAI)}(NH)$ is not supported.

The results in Figure 5.6 show that the direct effect of factor CSC2 on RSB via mediator UAI is not significant and do not exhibit a notable difference Hispanic (H) and non-Hispanic (NH) worker groups. Hence, hypothesis H_{D2}: $P_{CSC2 \rightarrow RSB(UAI)}(H) \neq P_{CSC2 \rightarrow RSB(UAI)}(NH)$ is not supported.

Worker Health

As evident from Figure 5.6, there is a significant difference in the direct effect values of WH on RSB via mediator UAI between Hispanic (H) and non-Hispanic (NH) worker groups. The direct effect in the group with low UAI score ($WH \rightarrow RSB(H) = -0.246$) is much smaller as compared to the group with high UAI score ($WH \rightarrow RSB(NH) = 0.173$). Hence, hypothesis H_{D3}: $P_{WH \rightarrow RSB(UAI)}(H) \neq P_{WH \rightarrow RSB(UAI)}(NH)$ is supported.

Attitude Towards Risky Situation (RSP)

As evident from Figure 5.6, there is a difference in the direct effect values of RSP on RSB via mediator UAI between Hispanic (H) and non-Hispanic (NH) worker groups. The direct effect in the group with low UAI score ($RSP \rightarrow RSB(H) = 0.344$) is large as compared to the group with high UAI score ($RSP \rightarrow RSB(NH) = 0.101$). The difference between the direct effect of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D4}: $P_{RSP \rightarrow RSB(UAI)}(H) \neq P_{RSP \rightarrow RSB(UAI)}(NH)$ is not supported.

Risk Task Assessment

As evident from Figure 5.6, the direct effects risk task assessment factors RAW4, and RAW5 on

RSP via mediator UAI are not significant and do not exhibit a notable difference Hispanic (H) and non-Hispanic (NH) worker groups. For factor RAW12, the direct effect in the group with low UAI score ($RAW12 \rightarrow RSP(H) = 0.412$) and with the group with high UAI score ($RAW12 \rightarrow RSP(NH) = -0.335$) is significantly positive. Hence, hypothesis H_{D56}: $P_{RAW12 \rightarrow RSP(UAI)}(H) \neq P_{RAW12 \rightarrow RSP(UAI)}(NH)$ is not supported. For factor RAW3, the direct effect in the group with low UAI score ($RAW3 \rightarrow RSP(H) = -0.047$) and with the group with high UAI score ($RAW3 \rightarrow RSP(NH) = 0.184$) are both not significant. The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D9}: $P_{RAW5 \rightarrow RSP(UAI)}(H) \neq P_{RAW5 \rightarrow RSP(UAI)}(NH)$ is not supported. For factor RAW6, the direct effect in the group with low UAI score ($RAW6 \rightarrow RSP(H) = -0.123$) is large as compared to the group with high UAI score ($RAW6 \rightarrow RSP(NH) = 0.033$). The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D10}: $P_{RAW6 \rightarrow RSP(UAI)}(H) \neq P_{RAW6 \rightarrow RSP(UAI)}(NH)$ is not supported. For factor RAW7, the direct effect in the group with low UAI score ($RAW7 \rightarrow RSP(H) = 0.127$) is large as compared to the group with high UAI score ($RAW7 \rightarrow RSP(NH) = 0.006$). The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D11}: $P_{RAW7 \rightarrow RSP(UAI)}(H) \neq P_{RAW7 \rightarrow RSP(UAI)}(NH)$ is not supported.

Risk Consequences

As evident from Figure 5.6, the direct effects of factor RPC34 on RSP via mediator UAI is not significant and do not exhibit a notable difference Hispanic (H) and non-Hispanic (NH) worker groups. For factor RPC12, while the direct effect in the group with low UAI score is not significant ($RPC12 \rightarrow RSP(H) = -0.090$), RPC12 has a significantly negative effect on 'Attitude Towards Risky Situation' (RSP) in group with high UAI score ($RPC12 \rightarrow RSP(NH) = -0.385$). The difference between these direct effects of path coefficients for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D12}: $P_{RPC12 \rightarrow RSP(UAI)}(H) \neq P_{RPC12 \rightarrow RSP(UAI)}(NH)$ is not supported. For factor RPC561, while the direct effect in the group with low UAI score ($RPC561 \rightarrow RSP(H) = -0.154$) is not significant, RPC561 has a significantly negative effect on 'Attitude Towards Risky Situation' (RSP) in the group with high UAI score ($RPC561 \rightarrow RSP(NH) = -0.534$). The difference between these direct effects of path coefficients

for Hispanic and non-Hispanic worker groups is not statistically significant. Hence, hypothesis H_{D14}: $P_{RPC561 \rightarrow RSP(UAI)}(H) \neq P_{RPC561 \rightarrow RSP(UAI)}(NH)$ is not supported.

				Hispanic				Non-Hispanic			
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10	Column 11	Column 12
Hypothesis	**Uncertainty Avoidance (UAI)**	Direct Effect without mediator	Direct Effect with mediator	Direct Effect with mediator	Indirect Effects	Total Effects	VAF	Direct Effect with mediator	Indirect Effects	Total Effects	VAF
H_{D1}	CSC1 -> RSB	-0.047	-0.054	-0.216	0.034	-0.182	0.14	-0.107	-0.031	-0.138	**0.22**
H_{D2}	CSC2 -> RSB	-0.297 **	-0.256 **	-0.214	0.018	-0.195	0.08	-0.173	-0.011	-0.183	0.06
H_{D3}	**WH -> RSB**	0.227 **	0.101	-0.246	0.066	-0.179	**0.21**	0.173	0.099	0.272 **	**0.36**
H_{D4}	RSP -> RSB	0.201 †	0.195 †	0.344 * † †	-0.040	0.304 †	0.10	0.101	0.052	0.153	**0.34**
H_{D56}	RAW12 -> RSP	0.189 †	0.202 †	0.412 * † †	0.011	0.423 * † †	0.03	0.335 * † †	0.060	0.395 * † †	0.15
H_{D7}	RAW3 -> RSP	0.091	0.089	-0.047	0.062	0.015	**0.57**	0.184	-0.091	0.093	**0.33**
H_{D8}	RAW4 -> RSP	0.002	0.034	0.147	-0.030	0.116	0.17	0.149	-0.095	0.054	**0.39**
H_{D9}	RAW5 -> RSP	-0.182 † †	-0.158	-0.185	-0.057	-0.242 †	**0.24**	-0.228	-0.083	-0.310 †	**0.27**
H_{D10}	RAW6 -> RSP	-0.203	-0.157	-0.123	0.002	-0.120	0.02	0.033	-0.105	-0.073	**0.76**
H_{D11}	RAW7 -> RSP	0.222 * †	0.244 * † †	0.127	0.005	0.132	0.04	0.006	0.050	0.057	**0.89**
H_{D12}	RPC12 -> RSP	-0.193 †	-0.238 †	-0.090	0.055	-0.035	**0.38**	-0.385 * † †	0.034	-0.350 * † †	0.08
H_{D13}	RPC34 -> RSP	0.144	0.123	0.059	-0.026	0.034	**0.30**	0.096	-0.064	0.032	**0.40**
H_{D14}	RPC561 -> RSP	-0.351 ***	-0.333 **	-0.154	-0.029	-0.183	0.16	-0.534 **	-0.027	-0.561 ***	0.05

Figure 5.6: Differences in mediation effect of Uncertainty Avoidance Index (UAI) between Hispanic and Non-Hispanic workers

5.6.6 Summary of Group Differences

Figures 5.7 and 5.8 show the differences in effect of cultural dimensions between Hispanic and non-Hispanic construction workers. Uncertainty Avoidance Index (UAI) and Masculinity (MAS) have a higher influence in Hispanic workers. Whereas, Individualism (IDV) and Masculinity (MAS) have a higher influence in non-Hispanic workers. Voluntariness of work and risk task assessment have a higher influence of 'Attitude Towards Risky Situation' (RSP) in Hispanic workers. Controllability, dreadful nature of work, occurrence of minor injury and effect on self and family have a higher influence on 'Attitude Towards Risky Situation' (RSP) in non-Hispanic workers. Risk perception has a higher influence on 'Intended Behavior in Risky Situations' (RSB) in Hispanic workers. Worker health has a higher influence on 'Intended Behavior in Risky Situations' (RSB) in non-Hispanic workers.

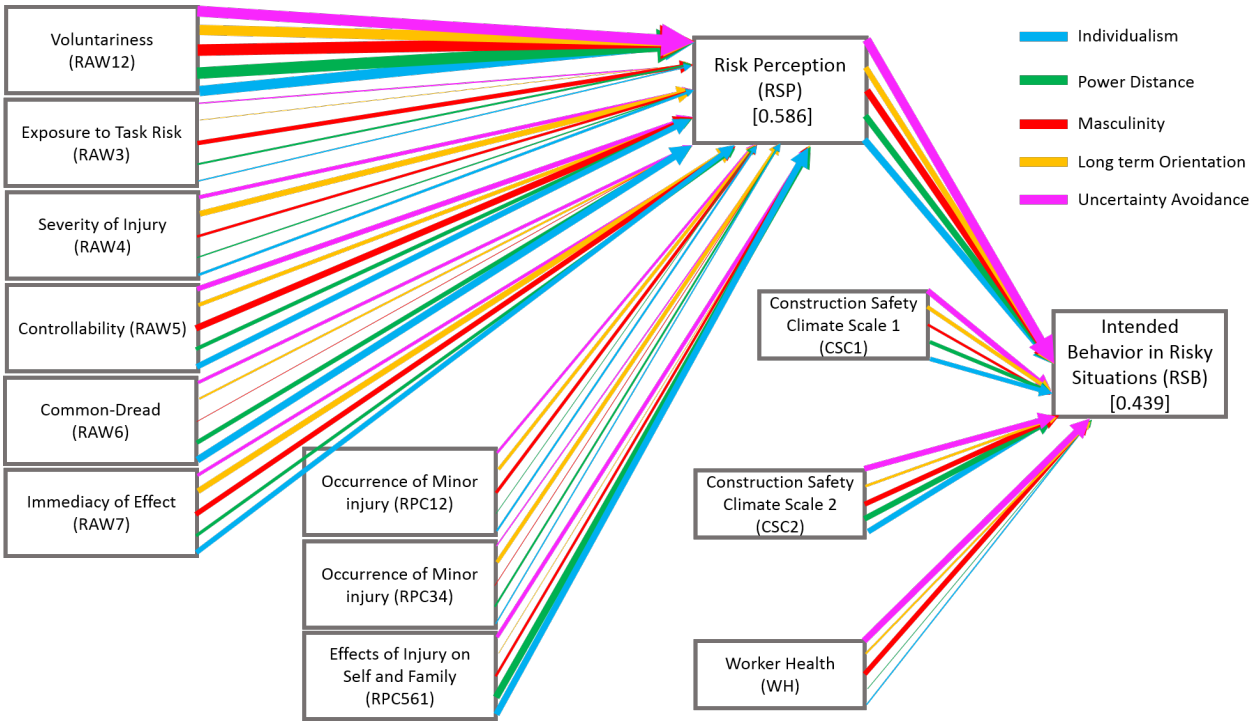


Figure 5.7: Path coefficients between factors for in presence of each cultural dimension for Hispanic construction workers

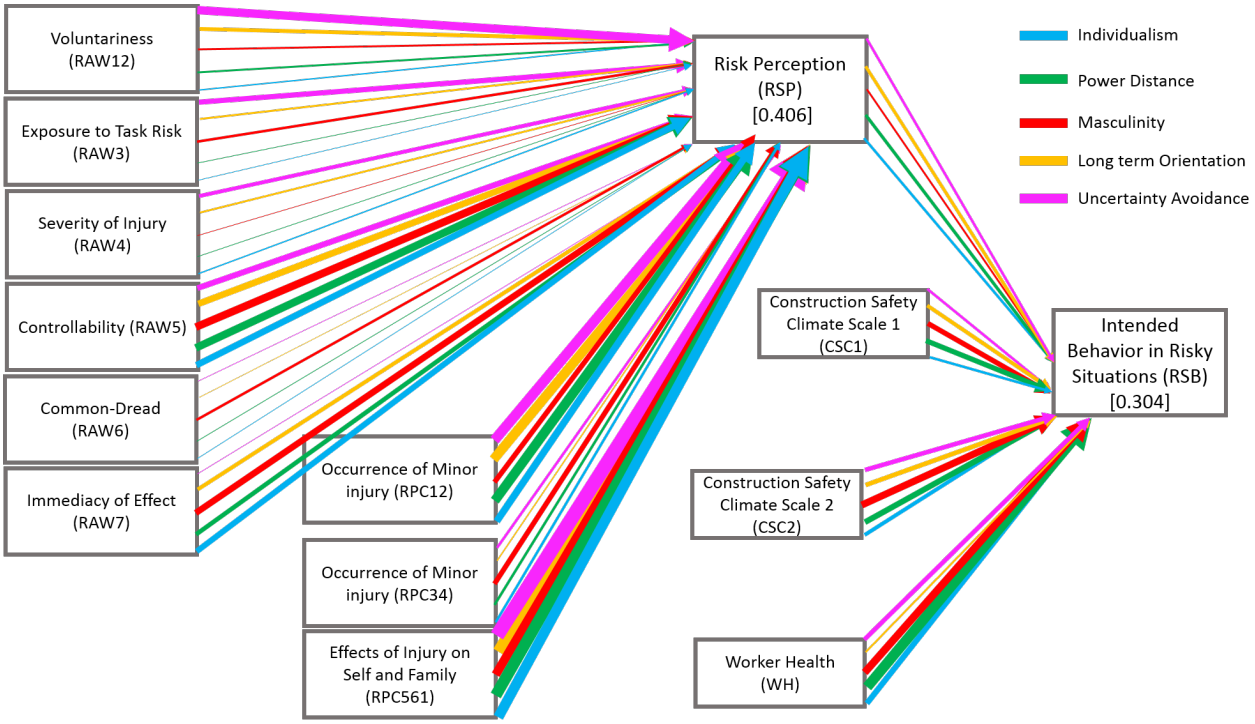


Figure 5.8: Path coefficients between factors for in presence of each cultural dimension for Non-Hispanic construction workers

Chapter 6

Summary and Conclusion

6.1 Introduction

This chapter summarizes the key findings of the survey results through a discussion of the theoretical and methodological contributions of this reach, its limitations, an assessment and suggestions for future research. The focus of this research was to investigate the importance of cultural dimension as a determinant of risk-taking behavior among construction workers. Following a comprehensive literature review, a conceptual framework was presented to evaluate 'Intended Behavior in Risky Situations' in construction work environment. While the differences in risk-taking behaviors is generally acknowledged, the influence of culture is overlooked very easily. Thus the prime aim of the research was to deepen the understating about the influence of national culture on 'Intended Behavior in Risky Situations' and factors affecting the same. This resulted into two basic research questions.

1. Whether cultural dimensions (IDV, PDI, UAI, LTO, MAS) influence the relationship (path linkages) between the following factors?

2. Whether there is a difference in influence of cultural dimensions between Hispanic and Non-Hispanic construction workers?

An empirical survey was conducted to answer the research questions. Data was collected on construction sites in the Knoxville, Tennessee area by means of a questionnaire based on the conceptual framework factors. A total of 94 responses were collected, the final sample consisting of 89 responses after data cleaning. Before conducting the statistical analysis the data was screened for outliers and disengaged responses. The data was then evaluated using Partial Lease Square

- Structural Equation Modeling, which followed the regular model valuation criterion such as, reliability, convergent validity and discriminant validity. Prior to the research questions the conceptual framework was tested for its reliability and predictability based on established criterion. The interpretation of research questions is summarized as follows:

Research Question 1: Whether cultural dimensions (IDV, PDI, UAI, LTO, MAS) influence the relationship (path linkages) between the following factors?

The first research question was concerned with the investigation of which cultural dimensions affect which factor relationships. Fifteen research hypotheses were developed to assess the influence of each cultural dimension on the fifteen relationships between factors in the model. Following that, the next step was to analyze whether there was any change in the direct effect of the fifteen path linkages after the addition of cultural dimensions sequentially. A mediation analysis along with boot strapping was used to evaluate the change. The results of this analysis reveal that cultural dimensions other than Masculinity and Long vs. Short Term Orientation did not have a significant impact on the factor relationships.

Table 6.1 shows the summary of relationships that are affected by cultural dimensions. The relationships that were affected were Controllability -> 'Attitude Towards Risky Situation' and Common-Dread -> 'Attitude Towards Risky Situation'. This can be generally explained by arguing that construction industry exhibits the Masculinity characteristics as well as the other end of Long vs. Short Term Orientation. The other relationships that had a plausible effect of cultural dimensions were Construction Safety Climate 2, Worker Health, 'Attitude Towards Risky Situation', Voluntariness, Immediacy of Injury, Occurrence of Minor Injury, and Effect of Injury on Self and Family. These factors had a significant direct effect in the original model without mediator, thus emphasizing the importance of these factors.

Research Question 2: Whether there is a difference in influence of cultural dimensions between Hispanic and Non-Hispanic construction workers?

The main concern of this research was to shed light on the question of which cultural dimensions affect risk-taking behavior among the non-Hispanic and the fast growing Hispanic worker group in the construction industry. The finding of this research provides first evidence of specific cultural dimensions affecting different factor relationships differently thus changing the 'Intended Behavior in Risky Situations'. Table 6.2 shows the specific factors affected by specific cultural dimensions and

Table 6.1: Influence of Cultural Dimensions on specific factor relationships

Cultural Dimensions	Affected Relationships
Individualism	WH -> RSB RAW12 -> RSP
Power Distance	WH -> RSB RSP -> RSB RAW5 -> RSP
Masculinity	CSC2 -> RSB **RAW6 -> RSP** RPC561 -> RSP
Long vs. Short Orientation	**RAW5 -> RSP** **RAW6 -> RSP** RAW7 -> RSP RPC12 -> RSP RPC561 -> RSP
Uncertainty Avoidance	WH -> RSB RSP -> RSB RAW5 -> RSP

worker characteristics. In particular factors such as 'Voluntariness' and 'Attitude Towards Risky Situation' are most influenced by cultural dimensions and unique for Hispanic construction workers. Where as 'Worker Health', 'Occurrence of Minor Injury', 'Effect of Injury on Self and Family' and 'Controllability' are most influenced by cultural dimensions for Non-Hispanic construction workers.

'Individualism' is a fairly weak explanatory varaible with regards to Hispanic construction workers. Long-term vs. Short-term Orientation have a strong effect on relationships defining 'Intended Behavior in Risky Situations' for Hispanic worker group. The normative nature of the culture which tends to achieve quick quick results correlate with the risk-taking behaviors among Hispanic construction workers. 'Power Distance' and 'Uncertainty Avoidance Index' have a strong influence on 'Intended Behavior in Risky Situations' for Non-Hispanic worker group. Ease of communication with supervisors and ability to work in unstructured environments without hesitation provides a positive influence to communicate and avoid hazardous situation among Non-Hispanic construction workers. Focusing on the worker characteristics that affect specific factors 'Intended Behavior in Risky Situations' enables us to provide specific interventions to avoid risky situations.

Table 6.2: Summary of worker characteristics and differences in factor relationships

Hispanic Construction Workers		Non-Hispanic Construction Workers	
Worker Characteristics	Factor Affected	Worker Characteristics	Factor Affected
Individualism (IDV)			
Team is like family	Voluntariness (RAW12)	Informal communication	Knowledge about Risk (RAW3)
Loyalty over-rides rules and regulations	Knowledge about Risk (RAW3)	Participative, Self reliant	Effects of Injury to Self and Family (RPC561)
Strong relationships		Teams	Common-Dread (RAW6)
		Seek information	
Power Distance Index (PDI)			
Accept Hierarchy	Worker Health (WH)	Free communication with supervisors	Worker Health (WH)
	Voluntariness (RAW12)		Knowledge about Risk (RAW3)
	Occurrence of Minor Injury (RPC12)		Severity of Injury (RAW4)
			Controllability (RAW5)
			Common-Dread (RAW6)
			Occurrence of Minor injury (RPC12)
			Effects of Injury to Self and Family (RPC561)
Masculinity (MAS)			
Competitive	Attitude Towards Risky Situation (RSP)	Precise target setting	Worker Health (WH)
Driven	Voluntariness (RAW12)	Driven	Voluntariness (RAW12)
Best in the field attitude	Common-Dread (RAW6)	Best in the field attitude	Severity of Injury (RAW4)
			Controllability (RAW5)
			Effects of Injury to Self and Family (RPC561)
Long-term vs. Short-term Orientation (LTO)			
Normative in thinking	Construction Safety Climate Scale 2 (CSC2)	Normative in thinking	Common-Dread (RAW6)
Small propensity to save for future	Effects of Injury to Self and Family (RPC561)	Practical	Effects of Injury to Self and Family (RPC561)
Achieving quick results	Knowledge about Risk (RAW3)	Short term gains	Occurrence of Minor injury (RPC12)
	Worker Health (WH)		
Uncertainty Avoidance Index (UAI)			
Structured environment	Attitude Towards Risky Situation (RSP)	Acceptance of new ideas	Worker Health (WH)
Time is money	Voluntariness (RAW12)	Comfortable in unstructured situations	Knowledge about Risk (RAW3)
Work hard, inner urge to be busy	Common-Dread (RAW6)	Changeable environments	Severity of Injury (RAW4)
		Few rules	Controllability (RAW5)
			Common-Dread (RAW6)
			Occurrence of Minor injury (RPC12)

6.2 Key Findings of Research

This research demonstrated that cultural dimensions have a significant impact on construction worker behavior. Understanding the determinant of risk-taking behavior can enable employers to incorporate culturally responsive training that will improve the knowledge and communication of hazards on construction sites. The results supported the need to include an extra training session in addition to the overall common training for the sub groups that focuses on culture specific biases and behaviors.

With the continual change in the construction workforce cultural composition, demand for designing a program where intervention are introduced at specific points in time that are more critical to safety would improve working conditions.

6.2.1 Theoretical Contribution

The results of the empirical analysis support the proposed conceptual framework of including cultural dimensions to enhance the understanding of factors affecting 'Intended Behavior in Risky Situations'. The addition of cultural dimension extended the existing construction safety literature and risk assessment models by delineating the key factors by facilitating the understanding the relationship between perception and behavior. Under the influence of cultural dimensions, the impact of variables on the intended behavior changes and this variation highlights the importance of certain variables over the other when different groups are considered.

The immigrant construction workers are at higher risk as reported by numerous studies. This study set forth a way to understand, "What safety and health challenges do these workers face?", "How do they obtain safety information?", and "What channels are most effective for reaching them?". Interestingly, even with the addition of cultural dimensions certain factors, such as Voluntariness or Effect of Injury on Self and Family, remain to be influential on 'Attitude Towards Risky Situation'. This implies that certain factors could be inherent to the worker behavior in the construction industry and could be addressed via a common platform.

6.2.2 Methodological Contribution

Cultural analysis is about establishing comprehensive platform, methods and models for analyzing worker risk-taking behavior, and its use in establishing good principles, training methods for

evaluating communicating and managing risk in work environment. This study demonstrated the following points as basis of methodically analyzing the research questions.

- A through understanding of system performance and validation methods. The constructs/factors defined in the framework are based on a robust theoretical and historical literature foundation.
- The extension of conceptual framework by addition of worker health and risk task assessment factors improved the interpretation capability of the model.
- Model used are sufficient accurate representation of the risk-taking behavior, this assessment is indicated by the high R^2 value for 'Attitude Towards Risky Situation' (RSP) - 0.306 and 'Intended Behavior in Risky Situations' (RSB) - 0.297.
- All observational quantities are precisely defined.
- Mediation analysis with cultural dimensions allowed to analyze the contribution of each dimension separately. Thus exhibiting recognizable influence of cultural dimensions on each relationship.
- Cross-cultural analysis provided empirical evidence of culturally distinct risk-taking behavior in the construction worker population.

6.2.3 Practical Implication

In addition to the empirical testing and methodological contributions, this study has several interesting practical implications. Traditionally, training in the United States has been conducted by grouping people in a the same training room and providing the same material to everyone ignoring the fact that people with different background perceive or understand things differently. This study indicates that application of a common strategy for safety training in multicultural workforce with may not result into improving safety behavior and achieving higher safety goals. Table 6.3 and 6.4 shows a summary of which cultural dimension influence which relationships in predicting 'Intended Behavior in Risky Situations'.

The first column represents the observed worker characteristic grouped into the five cultural dimensions for two worker groups. The usefulness of this summary table is that it can be converted into an assessment where the scores on each of the dimension can be translated into culture specific

training. Given the diversity in the workplace it is necessary for employers and practitioners to have a robust method and measure to assess culture so that our understanding of risk-taking decisions can sustain with the rapidly changing workforce.

Sample Assessment Interpretation:

The practical applicability of this work would be in the form of a cultural assessment where based on individual construction workers behavior and preferences the supervisor would be able to compile a list of potential risk-taking behaviors. Based on their responses, the individual workers will be assigned to specific training programs or groups which can restrain or reduce the risk-taking behaviors.Tables 6.3 and 6.4, the individuals will receive a specific module of training. An example of the observed behavior can be interpreted as follows .

- If the observed employee characteristics represents treating the team is like family, loyalty within group over-rides company rules and regulations and shows inclination towards strong relationship over task assigned. Then there is a potential of the employee volunteering to take a risky decision as a favor to or in exchange of other team members and take a risky decision to prove loyalty towards other team members. These behaviors can be altered by emphasizing on team communication, where a voluntary decision is reviewed before taking any action and re-establishing and reiterate the consequences of risky tasks to employees who have frequent exposure to risk.

There is a much larger scope of designing culturally responsive training and requires further strong evidence to understand the cultural dimensions and their effect on 'Intended Behavior in Risky Situations'.

Table 6.3: Evaluation of worker characteristics, risk-taking behavior and suggested training modifications for Hispanic construction workers

Worker Characteristic	**Potential Effect on Risk-Taking Behavior**	**Suggested Training Program Inclusions**
The observed employee characteristics represent that the team is like family, loyalty within group over-rides company rules and regulations and shows inclination towards strong relationship over task assigned.	Employee may volunteer to take a risky decision as a favor to or in exchange of other team members. Employee may consider to take a risky decision to prove loyalty towards other team members.	Emphasize on team communication, where a voluntary decision is reviewed before taking any action. Re-establish and reiterate the consequences of risky tasks to employees who have frequent exposure to risk. Point out goals to employees which reflect better performance.
The observed employee characteristics represent acceptance of inequalities of power/authority, favors participative management style, obeys supervisor orders and prefers indirect communication.	Employee may volunteer to take a risky decision to carry out supervisor instructions and make him/her vulnerable to make a decision which might lead to a risk-taking behavior. Employee may feel hesitant to communicate his/her opinion on potential injuries related to the task, thus continuing to work in hazardous conditions. Employee may override personal issues including health concerns to fulfill supervisor instructions and make him/her vulnerable to make a decision which might lead to a risk-taking behavior.	Make employees aware of the important factors in the specific performance record, where a voluntary decision is assessed before taking any action. Encourage employees to talk and understand the extent of risk involved in a situation. Make employees aware of the effect of ailing and distressed health on worker performance.
The observed employee characteristics represent assertive and competitive attitude towards task in addition to an aggressive and driven ambition to succeed.	Employees tend to take forceful decisions to prove their confidence, which may lead to risk-taking behavior. Employees may take hasty decisions to prove their ability over other team members. Employees may take unintentional steps as a compulsive action while determined to complete a task. Employees tend to have higher desire to engage in risky situation and tend to have learned to live with the risk.	Express confidence in team members ability to perform better in specific safety related performance indicators. Emphasize on team communication, where a voluntary decision is reviewed before taking any action. Point out steps to employees which requires more scrutiny and judgment to reflect better safety performance. Reestablish and reiterate the consequences of risky tasks to employees who have an frequent exposure to risk.

Table 6.3 Continued: Evaluation of worker characteristics, risk-taking behavior and suggested training modifications for Hispanic construction workers

Worker Characteristic	Potential Effect on Risk-Taking Behavior	Suggested Training Program Inclusions
The observed employee characteristic represent expectation of a short feedback, with a less time spent on proactive measure, inclination towards short-term gains and a small propensity to save for future.	Employee may tend to take short cuts in work procedures in order to achieve short term gains.	Develop company policy and safety environment, where employees are complimented for not taking short cuts and taking safe decisions.
	Employee values quicker results and thus overlooks minor risky situations.	Make employees aware of the effect of ailing and distressed health on worker performance.
	Employee tries to get more work done with saving time in preparation for work.	Reestablish and reiterate the consequences of risky tasks to employees who have an frequent exposure to risk.
	Employee may override completion of work as gains over risky decision which may result into injury.	Make employees aware of the long term effects of injury or fatality on self and family with respect to the short term gains on early work completion.
The observed employee characteristics represent lower tolerance of unstructured situations, inclination to rule oriented environment and tend to attribute accident to external and uncontrollable factors.	Employee tends to minimize role of factors involving their initiative	Express confidence in team members ability to perform better in specific safety related performance indicators.
	Employees may take inappropriate decisions when faced with sudden change in routine.	Balance the team with members who can tolerate uncertainty, where a voluntary decision is reviewed before taking any action.
	Employee may avoid deviating from procedure, even though risk is present.	Reestablish and reiterate the consequences of risky tasks to employees who have an frequent exposure to risk.

Table 6.4: Evaluation of worker characteristics, risk-taking behavior and suggested training modifications for Non-Hispanic construction workers

Worker Characteristic	**Potential Effect on Risk-Taking Behavior**	**Suggested Training Program Inclusions**
The observed employee characteristics represent preference to work individually, takes initiative and prefers autonomy while working.	Employees may consider to take risky decisions as they don't feel responsible for the group.	Balance the team with members who work in groups, where a decision is reviewed before taking any action. Reestablish and reiterate the consequences of risky tasks to employees who have an frequent exposure to risk. Make employees aware of the long term effects of injury or fatality on self and family with respect to the short term gains on early work completion.
The observed employee characteristics represent open communication channels regardless of authority, less restriction or no hesitation when dealing with authoritative figure such as supervisor	Employee may override supervisor instructions and make him/her vulnerable to make a decision which might lead to a risk-taking behavior. This helps in employee involvement in work related decisions.	Make employees aware of the effect of ailing and distressed health on worker performance. Point out steps to employees which requires more scrutiny and judgment to reflect better safety performance. Encourage employees to talk and understand the extent of risk involved in a situation. Reestablish and reiterate the consequences of risky tasks to employees who have an frequent exposure to risk. Encourage employees to review and assess the standard procedure for a given task and their ability to complete the task without being injured. Make employees aware of the long term effects of injury or fatality on self and family with respect to the short term gains on early work completion.
The observed employee characteristics represent assertive and competitive attitude towards task in addition to an aggressive and driven ambition to succeed.	Employees tend to take forceful decisions to prove their confidence, which may lead to risk-taking behavior. Employees may take hasty decisions to prove their ability over other team members. Employees may take unintentional steps as a compulsive action while determined to complete a task. Employees tend to have higher desire to engage in risky situation and tend to have learned to live with the risk.	Re-establish and reiterate the consequences of risky tasks to employees who have an frequent exposure to risk. Make employees aware of the effect of ailing and distressed health on worker performance. Encourage employees to review and assess the standard procedure for a given task and their ability to complete the task without being injured. Make employees aware of the long term effects of injury or fatality on self and family with respect to the short term gains on early work completion.

Table 6.4 Continued: Evaluation of worker characteristics, risk-taking behavior and suggested training modifications for Non-Hispanic construction workers

Worker Characteristic	Potential Effect on Risk-Taking Behavior	Suggested Training Program Inclusions
The observed employee characteristics represent considering practical solutions to a given situation, taking proactive action for hazards and also tend to short term gains.	Employees judge the situation make rational choices. Employees ensure ore-requisite conditions before completing the tasks. Employee may override completion of work as gains over risky decision which may result into injury.	Re-establish and reiterate the consequences of risky tasks to employees who have an frequent exposure to risk. Point out steps to employees which requires more scrutiny and judgment to reflect better safety performance. Make employees aware of the long term effects of injury or fatality on self and family with respect to the short term gains on early work completion.
The observed employee characteristics represent preference to unstructured situation and fewer rules, regarding uncertainty as challenge, and display of patience.	Employees tend to have higher desire to engage in a challenging and risky situation and tend to take risky decision. Employees tend to feel comfortable in new risky situation mis-judging the seriousness of the situation. Employees may tend to deviate from standard operating procedures due to an inclination to follow their own methods.	Re-establish and reiterate the consequences of risky tasks to employees who have an frequent exposure to risk. Make employees aware of the effect of ailing and distressed health on worker performance. Encourage employees to review and assess the standard procedure for a given task and their ability to complete the task without being injured. Point out steps to employees which requires more scrutiny and judgment to reflect better safety performance. Make employees aware of the long term effects of injury or fatality on self and family with respect to the short term gains on early work completion.

6.3 Limitations and Directions for Future Work

This research reveals the importance of cultural dimensions in understanding the risk-taking behavior of construction workers. It makes a valuable contributions to the existing literature by providing the theoretical understanding of construction worker behaviors as well as insight into the practical application of training and policy making. However, it is necessary to be aware of several limitations when drawing conclusions from the reported results. The research study has the following limitations:

- The use of self-rating scale for measuring individual behavior, as the dependent varaible in a structural model, could lead to biased mean values and lower inter-subject variance in the scores. Consideration of objective measures for survey questions for individual behavior can give unbiased opinion on risk-taking behavior.

- The objective of this research was to examine the influence of national culture by comparing two ethnic groups. A relatively small, but acceptable sample was used to answer the research question. The interpretation of results under these conditions required extra caution. The tight ratio of sample to the number of factors came at the cost of high standard error. Thus, a way forwards for this research would be to replicate this survey to a larger number of construction workers to minimize the standard error.

- Additionally, the effect of cultural dimensions in this research was introduces in the form of mediating effect. This increases the complexity of the model with the available sample size. Thus threatening the stability of the estimated parameters. Recommendation of a larger sample size can deal with this stability issue.

- As stated in the research question the comparison between groups was specific to Hispanic and non-Hispanic construction workers. Hispanic workers belong to different Latin American countries and themselves have a difference in culture within that subgroup. An extension of this work would be to redesign the sample based on within group difference.

- As focus of this research was comparing the differences between ethnic groups, the tests for other group differences like trades, ages groups, etc were not conducted. Also, the sample size necessary for conducting these group analysis was not sufficient. Future research can obtain a matched sample to review the effect of these group differences.

- Cross-cultural research in general is a difficult undertaking. The interpretation of cultural preferences cannot be generalized to the entire population in that specific group. Hofstede's contribution to the area of national culture is very valuable and is one of the most frequently applied and cited works. The popularity of his work is also subject to some serious critique and compared to other alternative approaches. The selection of Hofstede's cultural dimensions seemed suitable for the work environment in the construction industry at the time of the study. Future work could validate this application by performing a similar study using different cultural survey for comparison.

- This study raises awareness of risk-taking behavior from a cultural perspective, specific to the Hispanic construction worker population. The methodology used in this research is applicable to study safety behavior in other industries such as nuclear industry, oil and gas industry, specifically with the point of view of studying the influence of 'social dimensions' on decisions involving risks.

6.4 Conclusion

The increase in workforce diversity of the construction industry adds pressure on the health and safety agencies to acknowledge the impact of work dynamics caused by a multi-cultural groups in a work environment. Due to the dynamic nature of the work, organization and location workers have to rely on their personal instincts based on values, belief and experience to make a decision typically while working in a risky situation. Thus the question of whether or not the cultural orientation of workers impacts their behavior on work-site was hypothesized.

A valid measure and method of analyzing culture could enable us to explain why workers from different background react differently to various training formats and mechanisms. It could also help policy makers better understand why family related consequences affect the risk-taking of one culture more than the other, why voluntariness patterns among two groups differ across nationality, why expectations from supervisors vary across nations, etc.

The finding of this research show measurable differences in the magnitude of effects of cultural dimensions between Hispanic and non-Hispanic worker groups on Voluntariness, Controllability, Occurrence of Minor Injury, Effect of Injury on Self and Family, 'Attitude Towards Risky Situation' and Worker Health. The explained variance for both 'Intended Behavior in Risky Situations' and

'Attitude Towards Risky Situation' is also different for Hispanic and non-Hispanic models. Thus justifying the use of national culture in analyzing risk-taking behaviors.

A more detailed analysis of the influence of national culture demonstrated that value of this study. The analysis of each cultural dimension as a mediator varaible shows that certain type of perception, awareness or understanding affects risk-taking behaviors in some cultures, while the same can be unaffected in others. This observation allows for the preliminary conclusions and help lay the foundation for culturally responsive training materials that will enhance Hispanic workers preparedness to hazards and function safely on construction sites.

Even though further research is considered necessary to advance our understanding of national culture, this research empirically shows that, with a decent sample, cultural dimensions still play an important role. This dissertation paves a way for an enhanced understanding of the impact of native culture plays on unsafe behaviors withing a diverse workforce. Foreseeably, this understanding will play a significant role in developing culturally sensitive training materials for the future.

Contemporary construction industry should, despite the need for meeting project deadline and monitoring worker compensations, be aware of national culture's effect on individual behavior in general and workers' risk-taking behavior in particular. The assessment and perception of risk by a worker is always dependent on the situation. Understanding of national culture preferences which are frequently overlooked can improve the work environment and safety on-site.

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Appendix

Appendix A

Survey Instrument

A.1 Survey Instrument English

ISE UTK CONSTRUCTION SURVEY

The University of Tennessee's Industrial & Systems Engineering Department is conducting a study on perception of safety among construction industry workers like yours. Results of this study will be useful to demonstrate the need for customized training program for increasing cultural diverse population in the construction industry.

PARTICIPATION

Your participation in this study is voluntary; you may decline to participate or withdraw from the study at any time without penalty. However, we sincerely hope that you will agree to support this important study by completing a brief questionnaire below. We will keep all responses confidential and will not identify you or your company's name in relation to any specific response, nor share your responses with anyone outside of our research team. There are no direct or implied solicitations or offers of products or services associated with this survey.

DURATION

Only aggregate results of the responses will be reported. This survey should take no longer than 30-35 minutes to complete.

COMPENSATION

The participants will be compensated for their time with the amount of $10 on completion of this survey.

CONTACT INFORMATION

If you have questions at any time about the study or the research, you may contact the researcher, Dr. Rupy Sawhney, at The Industrial & Systems Engineering Department, at 865-974-3333. If you have questions about your rights as a participant, contact the Office of Research Compliance Officer at (865) 974-3466

CONSENT

I have read the above information. I have received a copy of this form.

◯ Yes, I wish to continue

◯ No, I do not wish to continue

FOREWORD

Thank you for taking the time to participate in this survey to help us study perception of safety in construction industry environment. The survey should take no longer than 30-35 minutes to complete in one sitting.

This survey has five main sections, related to the following subjects (estimated time to complete each section is shown in parentheses

Section 1 - Narrative Scenarios (10 minutes)

Section 2 - Cultural Dimensions (5 minutes)

Section 3 - Construction Safety Climate (5 minutes)

Section 4 - Risk Appraisal (10 minutes)

Section 5 - Job Description and Demographics (5 minutes)

Please read each section carefully before answering. Where noted, you may also include your comments.

SECTION 1 - NARRATIVE SCENARIO

Scenario 1: You are working at a residential construction site as a drywall installer. Your supervisor asks you to help another team of workers who have been working on a different level of the building. You are not very familiar with that job but still have to help the team to complete the task. During this time one of the team members asks you to climb a ladder and hold a sheet of drywall in place while he takes a water break. Before climbing you notice that the ladder is faulty. What would you do? Mark your most likely response.

◯ Ask another team member to do that job.

◯ Report to the supervisor that the ladder is faulty.

◯ Climb the ladder and complete the task.

◯ Find another ladder in good condition, complete the task, and remove the faulty ladder from service.

◯ Other.

How would you rate your response to the situation described above?

◯ Very safe choice

◯ A decent choice to keep working

◯ An appropriate choice to save time

◯ A risky choice, but a necessary part of work

◯ A very risky choice, would not recommend to others but I am experienced.

How would you rate the occurrence of possible listed consequences? Mark one answer on the scale for each statement.

	This will not occur at all	This incident is very rare	This can be the outcome sometimes	There is a possibility that this will occur	There is a very high possibility that this will occur
The ladder would break and I might get a small bruise.	◯	◯	◯	◯	◯
The ladder would not break.	◯	◯	◯	◯	◯
The ladder would break and I might get multiple fractures.	◯	◯	◯	◯	◯
The ladder would break and I might hit my head and die.	◯	◯	◯	◯	◯

Scenario 2: You are working at a residential construction site scraping paint on the outside of a single family two story house. Your daily work-site has scaffolding installed and inspected by a separate team. Yesterday there was a small incident at your site where equipment fell from the second floor to the ground damaging some of the scaffolding. There were no fatalities or injuries involved. Your job at the site could end this afternoon, but if you fix the damaged scaffolding, you would have to take additional 4 hours. What would you do? Mark your most likely response.

◯ Continue to work and finish the job.

◯ Report to the supervisor that the scaffolding is faulty.

◯ Apply temporary fix and continue to work.

◯ Find other equipment (not appropriate for the task) to complete the job.

◯ Other.

How would you rate your response to the situation described above?

◯ Very safe choice

◯ A decent choice to keep working

◯ An appropriate choice to save time

◯ A risky choice, but a necessary part of work

◯ A very risky choice, would not recommend to others but I am experienced.

How would you rate the occurrence of possible listed consequences? Mark one answer on the scale for each statement.

	This will not occur at all	This incident is very rare	This can be the outcome sometimes	There is a possibility that this will occur	There is a very high possibility that this will occur
The scaffolding would break and I might get a small bruise.	◯	◯	◯	◯	◯
The scaffolding would not break.	◯	◯	◯	◯	◯
The scaffolding would break and I might get multiple fractures.	◯	◯	◯	◯	◯
The scaffolding would break and I might hit my head and die.	◯	◯	◯	◯	◯

Scenario 3: You are working as a plumber helper at a residential house. You have been on this job for the last 7 months. A metal pipe is leaking in the house basement. You enter the crawl space below the house to inspect the leaking metal pipe. It appears that it requires a simple repair and could be completed using an anti-leakage products in an hour. You notice some messy/unfinished electrical connections in the crawl space. It may take several hours to make sure that the space is safe to work. What would you do? Mark your most likely response.

◯ Continue to work assuming the wiring is good.

◯ Report to the supervisor/ co-worker about the messy connection.

◯ Personally check if the connections are good and then continue.

◯ Wait for the work-site to be inspected and then come back to work the next day.

◯ Other.

How would you rate your response to the situation described above?

◯ Very safe choice

◯ A decent choice to keep working

◯ An appropriate choice to save time

◯ A risky choice, but a necessary part of work

◯ A very risky choice, would not recommend to others but I am experienced.

How would you rate the occurrence of possible listed consequences? Mark one answer on the scale for each statement.

	This will not occur at all	This incident is very rare	This can be the outcome sometimes	There is a possibility that this will occur	There is a very high possibility that this will occur
The wiring is well grounded and I will not incur any injury.	◯	◯	◯	◯	◯
A bad ground would result in my being temporarily unconscious.	◯	◯	◯	◯	◯
Faulty wiring will result in a fatal electrocution.	◯	◯	◯	◯	◯
The wiring will fatally injure someone else.	◯	◯	◯	◯	◯

Scenario 4: You just finished laying an 8 inch water pipe in a trench with a depth of 10-12 feet at a residential construction site yesterday. Today the foreman noticed that the previously laid pipe had separated. Prior to making the repair the crew needs to determine whether there is any additional separation. The trench box used yesterday for the work has already been moved to the other end of the complex. While the foreman leaves to instruct other teams, you are left with the task to complete the repair. What would you do? Mark your most likely response.

◯ Ask another team member to do that job.

◯ Report to the supervisor that you are not comfortable.

◯ Use a make shift trench box and finish the work.

◯ Continue working to finish the job.

◯ Other.

How would you rate your response to the situation described above?

◯ Very safe choice

◯ A decent choice to keep working

◯ An appropriate choice to save time

◯ A risky choice, but a necessary part of work

◯ A very risky choice, would not recommend to others but I am experienced.

How would you rate the occurrence of possible listed consequences? Mark one answer on the scale for each statement.

	This will not occur at all	This incident is very rare	This can be the outcome sometimes	There is a possibility that this will occur	There is a very high possibility that this will occur
You ask the other team to finish the work and nothing happens further.	◯	◯	◯	◯	◯
The trench collapses and you incur a small injury.	◯	◯	◯	◯	◯
The trench collapses and you incur a disabling injury.	◯	◯	◯	◯	◯
The trench collapses and results into a fatality.	◯	◯	◯	◯	◯

If you had been injured in the previous scenarios, how worried would you be about the following? Mark one answer on the scale for each option.

	No worry at all	Little worry	Moderately worry	A fair amount of worry	I care/worry a lot about it
Days away from work	○	○	○	○	○
Cost of injury	○	○	○	○	○
Project is delayed	○	○	○	○	○
Losing the job	○	○	○	○	○
Pain of the injury	○	○	○	○	○
Disability (Temporary / Chronic)	○	○	○	○	○

Who would be the most affected if an accident had occurred in the scenario above? Mark one answer on the scale for each option.

	Not affected	Barely affected	No difference	Somewhat affected	Most affected
Myself	○	○	○	○	○
Family	○	○	○	○	○
Children	○	○	○	○	○
Co-workers	○	○	○	○	○
Employers	○	○	○	○	○
Project Contractors	○	○	○	○	○

SECTION 2 - CULTURAL DIMENSIONS

Please think of an ideal job, disregarding your present job, if you have one. In choosing an ideal job, how important would it be to you to ... (please mark one answer in each line across):

	Of utmost importance	Very important	Of moderate importance	Of little importance	Of very little importance
Have sufficient time for your personal or home life	○	○	○	○	○
Have a boss (direct superior) you can respect	○	○	○	○	○
Get recognition for good performance	○	○	○	○	○
Have security of employment	○	○	○	○	○
Have pleasant people to work with	○	○	○	○	○
Do work that is interesting	○	○	○	○	○
Be consulted by your boss in decisions involving your work	○	○	○	○	○
Live in a desirable area	○	○	○	○	○
Have a job respected by your family and friends	○	○	○	○	○
Have chances for promotions	○	○	○	○	○

In your private life, how important is each of the following to you: (please mark one answer in each line across):

	Of utmost importance	Very important	Of moderate importance	Of little importance	Of very little importance
being generous to other people	◯	◯	◯	◯	◯
modesty: looking small, not big	◯	◯	◯	◯	◯

If there is something expensive you really want to buy but you do not have enough money, what do you do?

◯ Always save before buying
◯ Usually save first
◯ Sometimes save, sometimes borrow to buy
◯ Usually borrow and pay off later
◯ Always buy now, Pay off later

How often do you feel nervous or tense?

◯ Always
◯ Usually
◯ Sometimes
◯ Seldom
◯ Never

Are you the same person at work and at home?

◯ Quite the same
◯ Mostly the same
◯ Don't know
◯ Mostly different
◯ Quite different

All in all, how would you describe your state of health these days?

◯ Very good
◯ Good
◯ Fair
◯ Poor
◯ Very poor

How important is religion in your life?

◯ Of utmost importance
◯ Very important
◯ Of moderate importance
◯ Of little importance
◯ Of no importance

How proud are you to be a citizen of your country?

◯ Not proud at all
◯ Not very proud
◯ Somewhat proud
◯ Fairly proud

◯ Very proud

How often, in your experience, are subordinates afraid to contradict their boss?

◯ Never
◯ Seldom
◯ Sometimes
◯ Usually
◯ Always

To what extent do you agree or disagree with each of the following statements? (Please mark one answer in each line across):

	Strongly agree	Agree	Undecided	Disagree	Strongly Disagree
One can be a good manager without having a precise answer to every question that a subordinate may raise about his or her work	◯	◯	◯	◯	◯
Persistent efforts are the surest way to results	◯	◯	◯	◯	◯
An organizational structure in which certain subordinates have two bosses should be avoided at all costs	◯	◯	◯	◯	◯
A company's or organization's rules should not be broken - not even when the employee thinks breaking the rule would be in the organization's best interest.	◯	◯	◯	◯	◯
We should honor our heroes from the past	◯	◯	◯	◯	◯
At work it is necessary to perform the task even if it is risky to outperform others.	◯	◯	◯	◯	◯
I do not like to switch from one type of job to another as it creates loss of concentration.	◯	◯	◯	◯	◯
I prefer a fixed work schedule	◯	◯	◯	◯	◯
Workers have to work harder than supervisors to convey any request to management	◯	◯	◯	◯	◯
Everyone on the team has to look after each other's safety.	◯	◯	◯	◯	◯
As long as I am safe at the job I do not make an extra effort to consult others for help.	◯	◯	◯	◯	◯
I feel uncomfortable when I am not sure what to do in a particular task.	◯	◯	◯	◯	◯

SECTION 3 - CONSTRUCTION SAFETY CLIMATE

Safety practice in my current workplace (Mark one answer on the scale for each statement.)

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly agree
Play an effective role in preventing accidents.	○	○	○	○	○
Reduces occupational risk.	○	○	○	○	○
Makes it possible to get the job done.	○	○	○	○	○
Is of high quality compared to other sites.	○	○	○	○	○
Is not restrictive and superficial.	○	○	○	○	○
Helps increase my productivity.	○	○	○	○	○
Contributes to my work satisfaction.	○	○	○	○	○
Inspires me to work more safely.	○	○	○	○	○
Has a positive influence on morale.	○	○	○	○	○
Makes me proud to tell others I am part of it.	○	○	○	○	○

Please indicate how much you agree or disagree with each of the following statements about safety on your most recent job. Mark one answer on the scale for each statement.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly agree
New workers quickly learn that they are expected to follow good safety practices.	○	○	○	○	○
There are no significant compromises or short cuts taken when workers safety is at stake.	○	○	○	○	○
Where I work, workers and supervisors work together to ensure the safest possible working conditions.	○	○	○	○	○
Workers are told when they do not follow good safety practices.	○	○	○	○	○
The safety of workers is a big priority with supervisors where I work.	○	○	○	○	○
I feel free to report safety violations where I work.	○	○	○	○	○
Safety remains a priority even when the job runs behind schedule.	○	○	○	○	○
I do fully understand current relevant legislation.	○	○	○	○	○
I am capable of identifying potentially hazardous situations.	○	○	○	○	○
My coworkers follow all of the safety procedures for the jobs that they perform.	○	○	○	○	○
I feel I am safe when I work with my co-workers.	○	○	○	○	○

In the past year, how often have you experienced the following? Mark one answer on the scale for each statement.

	Never	Rarely	Sometimes	Often	Always
Felt tense due to issues related to your job?	○	○	○	○	○
Felt angry due to issues related to your job?	○	○	○	○	○
Felt sad due to issues related to your job?	○	○	○	○	○
Experienced insomnia or had trouble sleeping?	○	○	○	○	○
Felt symptoms of nausea or stomach disorders?	○	○	○	○	○
Experienced headaches?	○	○	○	○	○
Experienced lower-back pain?	○	○	○	○	○

SECTION 4 - RISK ATTITUDE

How often have you **seen/noticed** such a situation at your work-site?

	Never	Rarely	Seldom	Sometimes	Frequently	Often	Always
Not wearing steel toe safety shoes in high risk environments where objects are known to fall.	○	○	○	○	○	○	○
Climbing from one ladder to another ladder at an elevated height	○	○	○	○	○	○	○
Wearing fall protection that does not fit properly.	○	○	○	○	○	○	○
Wearing fall protection that you have not inspected for damage.	○	○	○	○	○	○	○
Wearing fall protection but not attaching it.	○	○	○	○	○	○	○
Wearing damaged fall protection	○	○	○	○	○	○	○

For each of the following situations, **have you completed a task in a similar situation without hesitation?**

	Never	Rarely	Seldom	Sometimes	Frequently	Often	Always
Not wearing steel toe safety shoes in high risk environments where objects are known to fall.	○	○	○	○	○	○	○
Climbing from one ladder to another ladder at an elevated height	○	○	○	○	○	○	○
Wearing fall protection that does not fit properly.	○	○	○	○	○	○	○
Wearing fall protection that you have not inspected for damage.	○	○	○	○	○	○	○
Wearing fall protection but not attaching it.	○	○	○	○	○	○	○
Wearing damaged fall protection	○	○	○	○	○	○	○

What are the **chances** that you will be **injured while engaged** in such an activity?

	Never	Rarely	Seldom	Sometimes	Frequently	Often	Always
Not wearing steel toe safety shoes in high risk environments where objects are known to fall.	○	○	○	○	○	○	○
Climbing from one ladder to another ladder at an elevated height	○	○	○	○	○	○	○
Wearing fall protection that does not fit properly.	○	○	○	○	○	○	○
Wearing fall protection that you have not inspected for damage.	○	○	○	○	○	○	○
Wearing fall protection but not attaching it.	○	○	○	○	○	○	○
Wearing damaged fall protection	○	○	○	○	○	○	○

How **severe an injury** would an accident involving one of the following hazard usually produce?

	Negligible Severity						Catastrophic Severity
	1	2	3	4	5	6	7
Not wearing steel toe safety shoes in high risk environments where objects are known to fall.	○	○	○	○	○	○	○
Climbing from one ladder to another ladder at an elevated height	○	○	○	○	○	○	○
Wearing fall protection that does not fit properly.	○	○	○	○	○	○	○
Wearing fall protection that you have not inspected for damage.	○	○	○	○	○	○	○
Wearing fall protection but not attaching it.	○	○	○	○	○	○	○
Wearing damaged fall protection	○	○	○	○	○	○	○

To what extent can you, by **personal skill or diligence, avoid being hurt while engaging in the activity?**

	Uncontrollable						Controllable
	1	2	3	4	5	6	7
Not wearing steel toe safety shoes in high risk environments where objects are known to fall.	○	○	○	○	○	○	○
Climbing from one ladder to another ladder at an elevated height	○	○	○	○	○	○	○
Wearing fall protection that does not fit properly.	○	○	○	○	○	○	○
Wearing fall protection that you have not inspected for damage.	○	○	○	○	○	○	○
Wearing fall protection but not attaching it.	○	○	○	○	○	○	○
Wearing damaged fall protection	○	○	○	○	○	○	○

How **risky is this situation?**

	Not risky at all						Extremely Risky
	1	2	3	4	5	6	7
Not wearing steel toe safety shoes in high risk environments where objects are known to fall.	◯	◯	◯	◯	◯	◯	◯
Climbing from one ladder to another ladder at an elevated height	◯	◯	◯	◯	◯	◯	◯
Wearing fall protection that does not fit properly.	◯	◯	◯	◯	◯	◯	◯
Wearing fall protection that you have not inspected for damage.	◯	◯	◯	◯	◯	◯	◯
Wearing fall protection but not attaching it.	◯	◯	◯	◯	◯	◯	◯
Wearing damaged fall protection	◯	◯	◯	◯	◯	◯	◯

How do you think this situation can **lead to immediate death or fatal injury**?

	Never	Rarely	Seldom	Sometimes	Frequently	Often	Always
Not wearing steel toe safety shoes in high risk environments where objects are known to fall.	◯	◯	◯	◯	◯	◯	◯
Climbing from one ladder to another ladder at an elevated height	◯	◯	◯	◯	◯	◯	◯
Wearing fall protection that does not fit properly.	◯	◯	◯	◯	◯	◯	◯
Wearing fall protection that you have not inspected for damage.	◯	◯	◯	◯	◯	◯	◯
Wearing fall protection but not attaching it.	◯	◯	◯	◯	◯	◯	◯
Wearing damaged fall protection	◯	◯	◯	◯	◯	◯	◯

SECTION 5 - JOB DESCRIPTION AND DEMOGRAPHICS

Have you ever received any training?

◯ Yes

◯ No

When was the last time you received any training regarding safe working habits?

◯ In the past month

◯ In the past 6 months

◯ Greater than 6 months

◯ Never

In what form have you received your training?

◯ Formal

◯ Informal

What type of training in construction have you received? (Check all that apply)

◯ PPE (Personal Protective Equipment)

◯ Scaffolding

◯ Personal fall arrest systems

◯ Equipment inspection

◯ Workplace hazards

◯ Other

Have you been involved in a safety accident on the job?

◯ Yes

◯ No

Please describe the incident.

When was the last time that you were involved in an accident?

◯ in past week

◯ in the past month

◯ in past six months

◯ greater than 6 months

◯ greater than a year

Have you ever witnessed someone else in an accident on job?

◯ Yes

◯ No

Please describe the incident.

When was the last time that you witnessed an accident?

◯ in past week

◯ in the past month

◯ in past six months

◯ greater than 6 months

◯ greater than a year

What were the consequences of the last accident you have been involved in or witnessed?

◯ Injury without any days away from work.

◯ Injury with days away from work.

◯ Major injury treated at an outside clinic resulting into a chronic condition/disability.

◯ Caused any fatality

And how did you react to the last accident you have been involved in or witnessed?

◯ You have permanently changed your working habits.

◯ You work with teams and give the work to others in the team.

◯ You have avoided the type of environment conditions that got you into such a situation.

◯ You got worried about the situation but finally you did nothing about it.

◯ You ignored it and did not change your working habits.

Title of your job

◯ Day Laborer

◯ Roofer

◯ Plumber
◯ Electrician
◯ Drywall installer
◯ Painter
◯ Other

Employment Type
◯ Full Time
◯ Part Time

Union Member
◯ Yes
◯ No

Experience in construction industry (number of years)
◯ Less than 1 year
◯ 1 - 5 years
◯ 6 - 10 years
◯ Greater than 10 years

Do you work for a company contractor or self-employed?
◯ Company
◯ Contractor
◯ Self Employed

Time with the current employer (number of years)
◯ Less than 1 year
◯ 1 - 5 years
◯ 6 - 10 years
◯ Greater than 10 years

Time you have been self-employed (number of years)
◯ Less than 1 year
◯ 1 - 5 years
◯ 6 - 10 years
◯ Greater than 10 years

On average, how many hours do you work in a week?
◯ Less than 20 hours
◯ 21 - 40 hours
◯ 41 - 60 hours
◯ Greater than 61 hours

Does your employer pay for the medical expenses of injured workers?
◯ Never

◯ Rarely
◯ Sometimes
◯ Frequently
◯ Always

Age

◯ < 18 years
◯ 18 - 25 years
◯ 26 - 30 years
◯ 31 - 35 years
◯ 36 - 40 years
◯ 41 - 45 years
◯ 46 - 50 years
◯ 51 - 55 years
◯ 56 - 60 years
◯ 61 - 65 years
◯ > 65 years

Gender

◯ Male
◯ Female

Highest level of education

◯ Primary School (1 - 6 grades)
◯ Part or all of high school (7 - 9 grades)
◯ College or +2 years after high school (10 -12 years)
◯ Vocational / Technical Training or Certificate
◯ University or graduate degree
◯ Other

Primary Language

◯ English
◯ Spanish
◯ Other

Race / Ethnicity

◯ Hispanic (Specify)
◯ Non-Hispanic (Specify)

How many of your family members are dependent on you?

◯ Less than 2 people
◯ 2 - 4 people
◯ 5 - 6 people
◯ 7 - 8 people

◯ Greater than 8 people

Is your house rented or owned?

◯ Rented

◯ Owned

Which range best describes your total family income per year?

◯ < $20,000

◯ $20,000 - $30,000

◯ $31,000 - $40,000

◯ $41,000 - $50,000

◯ $51,000 - $60,000

◯ $61,000 - $70,000

◯ > $70,000

How long have you lived in the United States?

◯ < 1 year

◯ < 5 years

◯ < 10 years

◯ < 10 years

Marital Status

◯ Single

◯ Married

◯ Choose not to answer

◯ Other

A.2 Survey Instrument Spanish

ISE UTK CONSTRUCTION SURVEY

Departamento de Ingeniería Industrial & Sistemas de la Universidad de Tennessee está realizando un estudio sobre la percepción de seguridad entre trabajadores de la industria de construcción como el tuyo. Resultados de este estudio será útiles para demostrar la necesidad de un programa de entrenamiento personalizado para aumentar la diversidad cultural en la población en la industria de la construcción.

PARTICIPACIÓN

Su participación en este estudio es voluntaria; Usted puede negarse a participar sin pena. Sin embargo, esperamos sinceramente que estarán de acuerdo en apoyar este importante estudio completando un breve cuestionario.Todas las respuestas son confidenciales y no solicitaremos ni su nombre ni el de la empresa para lacual trabaja en ninguna de las preguntas ni compartiremos sus respuestas con nadie fuera de nuestro equipo de investigación. No hay ofertas de productos o servicios relacionados con esta encuesta ni solicitaciones directas o implícitas.

DURACIÓN

Sólo los resultados agregados de las respuestas serán reportados. Esta encuesta debe tomar no más de 30-35 minutos para completer.

COMPENSACIÓN

Los participantes serán compensados por su tiempo con la cantidad de $10 en la realización de esta encuesta.

INFORMACIÓN DE CONTACTO

Si usted tiene preguntas en cualquier momento sobre el estudio o la investigación, puede comunicarse con el investigador, el Dr. Rupy Sawhney, en el Departamento de Ingeniería de Industrial & Sistemas y 865-974-3333. Si usted tiene preguntas acerca de sus derechos como participante, comuníquese con la oficina de investigacin Compliance Officer al (865) 974-3466.

CONSENTIMIENTO

He leído la información anterior. He recibido una copia de este formulario.

◯ Sí, deseo continuar

◯ No, no deseo continuar

PRÓLOGO

Gracias por tomarse el tiempo para participar en esta encuesta para ayudarnos a estudiar la percepción de seguridad en el ambiente de la industria de construcción. La encuesta no tomará más de 30-35 minutos para completar en una sola session. Esta encuesta tiene cinco secciones principales, relacionadas con los temas siguientes (estimado de tiempo para completar cada sección se muestra entre paréntesis):

Seccin 1 - Escenarios Narrativa (10 minutos)

Seccin 2 - Valoures Culturales (10 minutos)

Seccin 3 - Construcción Seguridad Climática (5 minutos)

Seccin 4 - Evaluación del Riesgo (10 minutos)

Seccin 5 - Descripción del trabajo y Demografía (5 minutos)

Por favor lea cuidadosamente cada sección antes de contestar. Se señala, también puede incluir sus comentarios.

SECTION 1 - ESCENARIOS NARRATIVA

Escenario 1: Está trabajando en un edificio en construcción como un instalador de pneles de yeso. Su supervisor le pide ayudar a otro equipo de trabajadores que han estado trabajando en un nivel diferente del edificio. No está muy familiarizado con ese trabajo, pero todavía tiene que ayudar al equipo para completar la tarea. Durante este tiempo uno de los miembros del equipo le pide suba por una escalera y mantener una hoja de tablaroca en su lugar mientras toma un descanso para tomar agua. Antes de subir, nota que la escalera está defectuosa. ¿Qué haría? Marque su respuesta más probable.

◯ Pide a otro miembro del equipo para hacer ese trabajo.

◯ Informe al supervisor que la escalera está defectuosa

◯ Sube la escalera y completa la tarea.

◯ Encuentra otra escalera en buenas condiciones, completa la tarea y retira la escalera defectuosa de servicio.

◯ Otros

¿Cómo calificaría su respuesta a la situación descrita anteriormente?

◯ Elección muy segura.

◯ Una opción decente para seguir trabajando.

◯ Una elección apropiada para ahorrar tiempo.

◯ Una elección arriesgada, pero una parte necesaria del trabajo.

◯ Una opcin muy aventurada, no recomendaría a otras personas, pero tengo experiencia.

¿Cómo calificaría la ocurrencia de posibles consecuencias mencionadas? (Favor de señalar su la respuesta para cada uno de los enunciados.)

	Esto no ocurrirá en lo absoluto	Este incidente es muy raro	Esto a veces puede ser el resultado	Existe la posibilidad de que esto ocurrirá	Hay una muy alta posibilidad que esto ocurrirá
La escalera se rompería y yo podría sufrir un pequeño moretón	◯	◯	◯	◯	◯
La escalera no se rompería	◯	◯	◯	◯	◯
La escalera se rompería y yo podría sufrir múltiples fracturas	◯	◯	◯	◯	◯
La escalera se rompería y tal vez golpeé mi cabeza y moriría	◯	◯	◯	◯	◯

Escenario 2: Estás trabajando en un sitio de construcción residencial raspar la pintura en el exterior de una casa unifamiliar de dos plantas. Su lugar de trabajo diario tiene andamios instalados e inspeccionados por un equipo independiente. Ayer hubo un pequeño incidente en el sitio donde el equipo cayó desde el segundo piso al suelo dañando algunos de los andamios. No hubieron víctimas fatales ni heridos. Su trabajo en el sitio terminará pero si usted arregla el andamio, so le tomaria 4 horas adicionales.¿Qué haría? Marque su respuesta más probable.

◯ Continúa trabajando y termina el trabajo.

◯ Informe al supervisor que el andamio está defectuoso

◯ Aplica un arreglo temporal y sigue trabajando.

◯ Encuentra otro equipo (no es apropiado para la tarea) para completar el trabajo.

◯ Otros

¿Cómo calificaría su respuesta a la situación descrita anteriormente?

◯ Elección muy segura.

◯ Una opción decente para seguir trabajando.

◯ Una elección apropiada para ahorrar tiempo.

◯ Una elección arriesgada, pero una parte necesaria del trabajo.

◯ Una opcin muy aventurada, no recomendaría a otras personas, pero tengo experiencia.

¿Cómo calificaría la ocurrencia de posibles consecuencias mencionadas? (Favor de señalar su la respuesta para cada uno de los enunciados.)

	Esto no ocurrirá en lo absoluto	Este incidente es muy raro	Esto a veces puede ser el resultado	Existe la posibilidad de que esto ocurrirá	Hay una muy alta posibilidad que esto ocurrirá
El andamio se rompería y yo podría sufrir un pequeño moretón	◯	◯	◯	◯	◯
El andamio no se rompería	◯	◯	◯	◯	◯
El andamio se rompería y yo podría sufrir múltiples fracturas	◯	◯	◯	◯	◯
El andamio se rompería y tal vez golpeé mi cabeza y moriría	◯	◯	◯	◯	◯

Escenario 3: Está trabajando como ayudante de plomero en una casa residencial. Ha estado en este trabajo durante los ltimos 7 meses. Un tubo de metal tiene una fuga en el sótano de la casa. Entra en el pequeño espacio debajo de la casa para inspeccionar la tubería con la fuga. Aparentemente sólo se requiere de una reparación simple. Nota algunas conexiones eléctricas desordenadas o sin terminar en el pequeño espacio. Pudiera ser que se requieran varias horas para asegurarse de que el espacio es seguro para trabajar. ¿Qué haría? Marque su respuesta más probable.

◯ Continúa trabajando asumiendo que el cableado es bueno.

◯ Informa al supervisor que la etiqueta está desaparecida.

◯ Personalmente comprueba si los cables están en su lugar haciendo tierra y luego continúa.

◯ Espera a la obra ser inspeccionada y luego vuelve a trabajar al día siguiente.

◯ Otros.

¿Cómo calificaría su respuesta a la situación descrita anteriormente?

◯ Elección muy segura.

◯ Una opción decente para seguir trabajando.

◯ Una elección apropiada para ahorrar tiempo.

◯ Una elección arriesgada, pero una parte necesaria del trabajo.

◯ Una opcin muy aventurada, no recomendaría a otras personas, pero tengo experiencia.

¿Cómo calificaría la ocurrencia de posibles consecuencias mencionadas? (Favor de señalar su la respuesta para cada uno de los enunciados.)

	Esto no ocurrirá en lo absoluto	Este incidente es muy raro	Esto a veces puede ser el resultado	Existe la posibilidad de que esto ocurrirá	Hay una muy alta posibilidad que esto ocurrirá
El cableado está bien fundado haciendo tierra y no incurrirá en ninguna lesión	◯	◯	◯	◯	◯
Una mala tierra resultaría en que pudiera terminar temporalmente inconsciente	◯	◯	◯	◯	◯
El cableado defectuoso puede ocasionar una electrocución fatal	◯	◯	◯	◯	◯
El cableado puede herir fatalmente a alguien más.	◯	◯	◯	◯	◯

Escenario 4: Acabo de poner una tubode agua de 8 pulgadas en una zanja con una profundidad de 10-12 pies en una construcción residencial ayer. Hoy en día el capataz notó que se había separado el tubo previamente establecido. Antes de realizar la reparación la tripulación debe determinar si hay cualquier separación adicional. El cuadro de trinchera utilizado ayer por el trabajo ya ha sido trasladado al otro extremo del complejo. Mientras que el capataz deja para instruir a otros equipos,

se queda con la tarea de completar la reparación. ¿Qué haría? Marque su respuesta más probable.

◯ Pedir a otro miembro del equipo hacer ese trabajo.

◯ Informar al supervisor que no está cómodo.

◯ Uso hacer cambio de caja de zanja y terminar el trabajo.

◯ Continúa trabajando para terminar el trabajo. ◯ Otros

¿Cómo calificaría su respuesta a la situación descrita anteriormente?

◯ Elección muy segura.

◯ Una opción decente para seguir trabajando.

◯ Una elección apropiada para ahorrar tiempo.

◯ Una elección arriesgada, pero una parte necesaria del trabajo.

◯ Una opcin muy aventurada, no recomendaría a otras personas, pero tengo experiencia.

¿Cómo calificaría la ocurrencia de posibles consecuencias mencionadas? (Favor de señalar su la respuesta para cada uno de los enunciados.)

	Esto no ocurrirá en lo absoluto	Este incidente es muy raro	Esto a veces puede ser el resultado	Existe la posibilidad de que esto ocurrirá	Hay una muy alta posibilidad que esto ocurrirá
Pregunta al otro equipo revisar las reglas y señales con usted y no pasa nada más	◯	◯	◯	◯	◯
Pierde una señal e incurre en una pequeña lesión	◯	◯	◯	◯	◯
Pierde una señal e incurre en una lesión incapacitante	◯	◯	◯	◯	◯
Pierde una señal y es golpeado por el vehículo, resultadando en una fatalidad	◯	◯	◯	◯	◯

Si usted hubiera sido herido en los escenarios anteriores, ¿qué tan preocupado estaría sobre lo siguiente? (Favor de señalar su la respuesta para cada uno de los enunciados.)

	No se preocuparía en absoluto	Poca preocupación	Moderadamente preocupado	Una gran cantidad de preocupación	Me importa y preocupa demasiado
Días de ausencia del trabajo	◯	◯	◯	◯	◯
Costo de lesiones	◯	◯	◯	◯	◯
El proyecto se retrasa	◯	◯	◯	◯	◯
Perder el trabajo	◯	◯	◯	◯	◯
Dolor de la lesión	◯	◯	◯	◯	◯
Incapacidad (temporal o crónica)	◯	◯	◯	◯	◯

¿Quién sería el más afectado si hubiera ocurrido un accidente en el escenario anterior? (Favor de señalar su la respuesta para cada uno de los enunciados.)

	No se ve(n) afectado(s)	Apenas afectado(s)	Indiferente	Un poco afectado(s)	El(los) más afectado(s)
Yo mismo	○	○	○	○	○
Familia	○	○	○	○	○
Niños	○	○	○	○	○
Compañeros de trabajo	○	○	○	○	○
Empleadores	○	○	○	○	○
Contratistas	○	○	○	○	○

SECTION 2 -VALORES CULTURALES

Por favor, piense en un trabajo ideal, haciendo caso omiso de su empleo actual, en caso de tenerlo. ¿En la elección de un trabajo ideal, qué tan importante sería para usted...? (Favor de señalar la respuesta (número) con un mark seún corresponda a la siguiente convención:

	Absolutamente importante	Muy importante	De importancia moderada	De poca importancia	De muy poca o ninguna importancia
Tener suficiente tiempo para su vida personal o del hogar.	○	○	○	○	○
Tener un jefe (superior directo) que usted pueda respetar.	○	○	○	○	○
Obtener reconocimiento por el buen desempeo.	○	○	○	○	○
Tener un empleo seguro (estabilidad laboral).	○	○	○	○	○
Que haya gente agradable con quien trabajar.	○	○	○	○	○
Que el trabajo sea interesante.	○	○	○	○	○
Ser consultado por su jefe en las decisiones que involucran su trabajo.	○	○	○	○	○
Vivir en una zona privilegiada.	○	○	○	○	○
Tener un trabajo respetable por su familia y amigos.	○	○	○	○	○
Tener oportunidades de ascenso o promoción.	○	○	○	○	○

En su vida privada, qué tan importante es para usted cada una de las siguientes opciones: (Favor de señalar su la respuesta para

	Absolutamente importante	Muy importante	De importancia moderada	De poca importancia	De muy poca o ninguna importancia
Ser generoso con los demás.	○	○	○	○	○
Modestia: no ostentar grandeza	○	○	○	○	○

Si hay algo costoso que realmente desea comprar pero no tiene suficiente dinero, ¿qué hace usualmente?

○ Siempre ahorra antes de comprar

◯ Casi siempre ahorra antes de comprar
◯ A veces ahorra o a veces se endeuda para comprar
◯ Generalmente pide prestado y paga después
◯ Siempre compra ahora y paga después

¿Con qué frecuencia se siente nervioso o tenso?
◯ Siempre
◯ Casi siempre
◯ A veces
◯ Rara vez
◯ Nunca

¿Es usted la misma persona en el trabajo y en el hogar? Es decir, ¿se comporta igual en cualquier contexto?
◯ Siempre la misma
◯ Casi siempre la misma
◯ No sé
◯ Casi siempre diferente
◯ Siempre diferente

En general, ¿Cmo describiría su estado de salud estos días?
◯ Muy bueno
◯ Bueno
◯ Aceptable
◯ Mal
◯ Muy mal

¿Qué tan importante es la religión en su vida?
◯ Absolutamente importante
◯ Muy importante
◯ De importancia moderada
◯ De poca importancia
◯ De muy poca o ninguna importancia

¿Qué tan orgulloso se siente por ser un ciudadano de su país?
◯ Para nada orgulloso
◯ No muy orgulloso
◯ Algo orgulloso
◯ Bastante orgulloso
◯ Totalmente orgulloso

¿Con qué frecuencia, en su opinión, temen los subordinados contradecir a sus superiores?
◯ Nunca
◯ Rara vez
◯ A veces
◯ Casi siempre

◯ Siempre

¿En qué medida estáde acuerdo o en desacuerdo con cada una de las siguientes afirmaciones? (Favor de señalar su la respuesta para cada uno de los enunciados.):

	Totalmente de acuerdo	De acuerdo	Indeciso	En desacuerdo	Totalmente en desacuedo
Uno puede ser un buen gerente sin que sea necesario tener una respuesta precisa a cada pregunta.	◯	◯	◯	◯	◯
Los esfuerzos constantes son la forma más segura de obtener resultados.	◯	◯	◯	◯	◯
Una estructura organizacional en la que algunos empleados tienen dos jefes debe evitarse a toda costa.	◯	◯	◯	◯	◯
Las reglas dictaminadas por una empresa nunca deben ser quebrantadas, aunque su quebrantamiento por parte de algún empleado pueda ser beneficioso para los intereses de la empresa.	◯	◯	◯	◯	◯
Debemos honrar a nuestros hroes del pasado.	◯	◯	◯	◯	◯
En el trabajo es necesario realizar la tarea aun cuando sea riesgoso superar a los demás.	◯	◯	◯	◯	◯
No me gusta cambiar de un tipo de trabajo a otro que genere pérdida de concentracin.	◯	◯	◯	◯	◯
Prefiero un horario de trabajo fijo.	◯	◯	◯	◯	◯
Los trabajadores tienen que trabajar más duro que los supervisores para transmitir cualquier solicitud a la administracin.	◯	◯	◯	◯	◯
Cada uno en el equipo tiene que cuidar la seguridad de los dems.	◯	◯	◯	◯	◯
Mientras esté a salvo en el trabajo no haré un esfuerzo adicional para consultar si los demás necesitan ayuda.	◯	◯	◯	◯	◯
Me siento incmodo cuando no estoy seguro de qué hacer en una tarea en particular.	◯	◯	◯	◯	◯

SECTION 3 - SEGURIDAD EN EL TRABAJO DE CONSTRUCCION

Las prácticas de seguridad en mi trabajo actual

	Totalmente en desacuedo	En desacuerdo	Neutral - Ni en acuerdo no en desacuerdo	De acuerdo	Totalmente de acuerdo
Desempeñan un papel eficaz en la prevención de accidentes.	○	○	○	○	○
Reducen riesgos laborales.	○	○	○	○	○
Hacen posible poder terminar el trabajo.	○	○	○	○	○
Son de alta calidad en comparacin con otros sitios de trabajo.	○	○	○	○	○
No son restrictivas y superficiales.	○	○	○	○	○
Ayudan a aumentar mi productividad.	○	○	○	○	○
Contribuyen a la satisfacción de mi trabajo.	○	○	○	○	○
Me inspiran a trabajar de forma más segura.	○	○	○	○	○
Tienen una influencia positiva sobre la moral.	○	○	○	○	○
Me hacen sentir orgulloso de decirle a otros que soy parte de ella.	○	○	○	○	○

Por favor indique cuánto está deacuerdo o en desacuerdo con cada uno de los siguientes argumentos de seguridad en su trabajo más reciente. Seleccione solamente una respuesta para cada argumento.

	Totalmente en desacuedo	En desacuerdo	Neutral - Ni en acuerdo no en desacuerdo	De acuerdo	Totalmente de acuerdo
Los nuevos emleados entienden que las reglas de seguridad se deben de llevar acabo.	○	○	○	○	○
No hay atajos o evasiones cuando la seguridad de los trabajadores está en juego.	○	○	○	○	○
Donde yo trabajo, los trabajadores y supervisores trabajan en conjunto para asegurar las condiciones más seguras de trabajo.	○	○	○	○	○
Los trabajadores son informados cuando no siguen las prácticas de seguridad.	○	○	○	○	○
La seguridad de los trabajadores es una prioridad muy importante con los supervisores donde yo trabajo.	○	○	○	○	○
Me siento libre de reportar violaciones de seguridad donde yo trabajo.	○	○	○	○	○
La seguridad permanece como una prioridad a pesar de que el trabajo está atrasado.	○	○	○	○	○
Entiendo completamente la legislación actual relevante.	○	○	○	○	○
Soy capaz de identificar situaciones potencialmente dañinas.	○	○	○	○	○
Mis compañeros de trabajo respetan y siguen todos los procesos de seguridad para los trabajos que desempeñan.	○	○	○	○	○
Me siento seguro cuando trabajo con mis compañeros.	○	○	○	○	○

En el último año, ¿cuántas veces ha experimentado lo siguiente?

	Nunca	Raramente	En algún momento	Con frecuencia	Siempre
Tensión debido a cuestiones relacionadas con su trabajo?	○	○	○	○	○
Enojo debido a cuestiones relacionadas con su trabajo?	○	○	○	○	○
Tristeza debido a cuestiones relacionadas con su trabajo?	○	○	○	○	○
Experimentado insomnio o ha tenido problemas para dormir?	○	○	○	○	○
Síntomas de náuseas o trastornos estomacales?	○	○	○	○	○
Experimentado dolores de cabeza?	○	○	○	○	○
Experimentado dolor lumbar (espalda baja)?	○	○	○	○	○

SECTION 4 - EVALUACION DEL RIESGO

¿Cuántas veces has **visto/notada** tal situación en su lugar de trabajo? (Favor de señalar su la respuesta para cada uno de los enunciados.)

	Nunca	Muy raramente	Raramente	Ocasionalmente	Frecuentemente	Muy frecuentemente	Siempre
No usar zapatos de seguridad con punta de acero (casquillo) en entornos de alto riesgo donde se conoce que los objetos pueden caer.	○	○	○	○	○	○	○
Subir desde una escalera a otra escalera a una altura elevada.	○	○	○	○	○	○	○
Usar protectores contra caídas que no le quedan (ajustan) apropiadamente.	○	○	○	○	○	○	○
Usar protección contra caídas sin revisar previamente para asegurarse de que no esté dañado.	○	○	○	○	○	○	○
Usar protección contra caídas pero sin amarrar/colgar	○	○	○	○	○	○	○
Usar protección contra caídas a pesar de estar muy dañada.	○	○	○	○	○	○	○

Para cada una de las siguientes situaciones, ¿**ha completado una tarea en una situación similar sin dudarlo?**

	Nunca	Muy raramente	Raramente	Ocasionalmente	Frecuentemente	Muy frecuentemente	Siempre
No usar zapatos de seguridad con punta de acero (casquillo) en entornos de alto riesgo donde se conoce que los objetos pueden caer.	○	○	○	○	○	○	○
Subir desde una escalera a otra escalera a una altura elevada.	○	○	○	○	○	○	○
Usar protectores contra caídas que no le quedan (ajustan) apropiadamente.	○	○	○	○	○	○	○
Usar protección contra caídas sin revisar previamente para asegurarse de que no esté dañado.	○	○	○	○	○	○	○
Usar protección contra caídas pero sin amarrar/colgar	○	○	○	○	○	○	○
Usar protección contra caídas a pesar de estar muy dañada.	○	○	○	○	○	○	○

¿Qué **tan probable es que usted salga herido** mientras participa en una actividad de este tipo?

	Nunca	Muy raramente	Raramente	Ocasionalmente	Frecuentemente	Muy frecuentemente	Siempre
No usar zapatos de seguridad con punta de acero (casquillo) en entornos de alto riesgo donde se conoce que los objetos pueden caer.	○	○	○	○	○	○	○
Subir desde una escalera a otra escalera a una altura elevada.	○	○	○	○	○	○	○
Usar protectores contra caídas que no le quedan (ajustan) apropiadamente.	○	○	○	○	○	○	○
Usar protección contra caídas sin revisar previamente para asegurarse de que no esté dañado.	○	○	○	○	○	○	○
Usar protección contra caídas pero sin amarrar/colgar	○	○	○	○	○	○	○
Usar protección contra caídas a pesar de estar muy dañada.	○	○	○	○	○	○	○

¿Qué **tan grave sería la lesión producida por un accidente que involucre** alguno de los siguientes peligros?

	Severidad Insignificante						Gravedad catastrófica
	1	2	3	4	5	6	7
No usar zapatos de seguridad con punta de acero (casquillo) en entornos de alto riesgo donde se conoce que los objetos pueden caer.	○	○	○	○	○	○	○
Subir desde una escalera a otra escalera a una altura elevada.	○	○	○	○	○	○	○
Usar protectores contra caídas que no le quedan (ajustan) apropiadamente.	○	○	○	○	○	○	○
Usar protección contra caídas sin revisar previamente para asegurarse de que no esté dañado.	○	○	○	○	○	○	○
Usar protección contra caídas pero sin amarrar/colgar	○	○	○	○	○	○	○
Usar protección contra caídas a pesar de estar muy dañada.	○	○	○	○	○	○	○

¿En qué medida puede, **por habilidad personal o diligencia, evitar ser lastimado** al realizar la actividad?

	Uncontrollable						Controllable
	1	2	3	4	5	6	7
No usar zapatos de seguridad con punta de acero (casquillo) en entornos de alto riesgo donde se conoce que los objetos pueden caer.	○	○	○	○	○	○	○
Subir desde una escalera a otra escalera a una altura elevada.	○	○	○	○	○	○	○
Usar protectores contra caídas que no le quedan (ajustan) apropiadamente.	○	○	○	○	○	○	○
Usar protección contra caídas sin revisar previamente para asegurarse de que no esté dañado.	○	○	○	○	○	○	○
Usar protección contra caídas pero sin amarrar/colgar	○	○	○	○	○	○	○
Usar protección contra caídas a pesar de estar muy dañada.	○	○	○	○	○	○	○

¿Qué tan riesgosa es esta situación?

	No arriesgado en absoluto						Extremadamente riesgoso
	1	2	3	4	5	6	7
No usar zapatos de seguridad con punta de acero (casquillo) en entornos de alto riesgo donde se conoce que los objetos pueden caer.	○	○	○	○	○	○	○
Subir desde una escalera a otra escalera a una altura elevada.	○	○	○	○	○	○	○
Usar protectores contra caídas que no le quedan (ajustan) apropiadamente.	○	○	○	○	○	○	○
Usar protección contra caídas sin revisar previamente para asegurarse de que no esté dañado.	○	○	○	○	○	○	○
Usar protección contra caídas pero sin amarrar/colgar	○	○	○	○	○	○	○
Usar protección contra caídas a pesar de estar muy dañada.	○	○	○	○	○	○	○

¿Con qué frecuencia usted piensa que esta situación podría conducir a lesiones fatales o muerte inmediata?

	Nunca	Muy raramente	Raramente	Ocasionalmente	Frecuentemente	Muy frecuentemente	Siempre
No usar zapatos de seguridad con punta de acero (casquillo) en entornos de alto riesgo donde se conoce que los objetos pueden caer.	◯	◯	◯	◯	◯	◯	◯
Subir desde una escalera a otra escalera a una altura elevada.	◯	◯	◯	◯	◯	◯	◯
Usar protectores contra caídas que no le quedan (ajustan) apropiadamente.	◯	◯	◯	◯	◯	◯	◯
Usar protección contra caídas sin revisar previamente para asegurarse de que no esté dañado.	◯	◯	◯	◯	◯	◯	◯
Usar protección contra caídas pero sin amarrar/colgar	◯	◯	◯	◯	◯	◯	◯
Usar protección contra caídas a pesar de estar muy dañada.	◯	◯	◯	◯	◯	◯	◯

SECTION 5 - JOB DESCRIPTION AND DEMOGRAPHICS

¿Ha recibido algún entrenamiento?

◯ Si

◯ No

¿Cundo fue la última vez que recibió entrenamiento sobre hábitos de seguridad en el trabajo?

◯ En el último mes

◯ En los últimos seis meses

◯ Más de 6 meses

◯ Nunca

¿De qué forma recibió la capacitación?

◯ Formal

◯ Informal, "en el trabajo"

¿Qué tipo de entrenamiento en construcción ha recibido? (Marque todas las que apliquen)

◯ Equipo Personal

◯ Andamios

◯ Sistemas contra caídas

◯ Inspección de equipos

◯ Riesgos laborales

◯ Otros

¿Ha estado involucrado en un accidente de seguridad en el trabajo?

◯ Si

◯ No

En caso afirmativo, describa el incidente

¿Cundo fue la última vez que estuvo involucrado en un accidente?

◯ En la última semana
◯ En el último mes
◯ En los últimos seis meses
◯ Ms de 6 meses
◯ Ms de un ao

¿Ha sido testigo de otra persona involucrada en un accidente en el trabajo?

◯ Si
◯ No

En caso afirmativo, describa el incidente

¿Cuándo fue la última vez que usted fue testigo de un accidente?

◯ En la última semana
◯ En el último mes
◯ En los últimos seis meses
◯ Ms de 6 meses
◯ Ms de un ao

¿Cuáles fueron las consecuencias de los accidentes/incidentes?

◯ Lesiones sin ningún días fuera del trabajo
◯ Lesión con días de trabajo.
◯ Lesión mayor tratada en una clínica resultando en una condición crónica/discapacidad
◯ Ocasionado alguna muerte

¿Y cómo reaccionó al último accidente en el que ha estado involucrado o que ha presenciado?

◯ Permanentemente ha cambiado sus hábitos de trabajo
◯ Trabajar con los equipos y dar trabajo a otros en el equipo.
◯ Ha evitado el tipo de condiciones cuando el entorno le sugiere que está en un tipo de situación familiar.
◯ Se preocupó por la situación, pero finalmente no hizo nada.
◯ La ignoró y no cambió sus hábitos de trabajo.

Ttulo del trabajo

◯ Trabajador por hora
◯ Instalador de teja
◯ Plomero/fontanero
◯ Eléctrico
◯ Instalador de tablaroca
◯ Pintor
◯ Otros

¿Que tipo de contrato?

◯ Tiempo completo

◯ Medio tiempo

¿Pertenece a algún sindicato (unión)?

◯ Si

◯ No

Experiencia en la industria de la construcción (número de años)

◯ Menos de 1 año

◯ 1 - 5 años

◯ 6 - 10 años

◯ Ms de 10 años

¿Trabaja para una empresa, es contratista o auto empleado?

◯ Empresa

◯ Contratista

◯ Auto empleado

Tiempo con el empleador actual (número de años)

◯ Menos de 1 año

◯ 1 - 5 años

◯ 6 - 10 años

◯ Ms 10 años

Tiempo como auto empleado actual (número de años)

◯ Menos de 1 año

◯ 1 - 5 años

◯ 6- 10 años

◯ Ms 10 años

¿Cuántas horas en promedio está ocupado en una semana con una asignación de trabajo?

◯ Memos de 20 horas

◯ 21 - 40 horas

◯ 41 - 60 horas

◯ Mas de 61 horas

¿Su empleador paga por los gastos médicos de los trabajadores lesionados?

◯ Nunca

◯ Rara vez

◯ A veces

◯ Frecuentemente

◯ Siempre

Edad

◯ Menos de 18 años

◯ 18 - 25 años

◯ 26 - 30 años
◯ 31 - 35 años
◯ 36 - 40 años
◯ 41 - 45 años
◯ 46 - 50 años
◯ 51 - 55 años
◯ 56 - 60 años
◯ 61 - 65 años
◯ Mas de 65 años

Género
◯ Hombre
◯ Mujer

Nivel ms alto de educación
◯ Escuela primaria o su equivalente (grados 1-6)
◯ Parte o la totalidad de la educación secundaria o su equivalente (grados 7-9)
◯ Parte o la totalidad de la educación preparatoria (grados 10-12)
◯ Grado técnico
◯ Grado universitario
◯ Otros

Idioma primario
◯ Inglés
◯ Espaol
◯ Otros

Raza/origen étnico
◯ Hispano (Specify)
◯ Non-Hispano (Specify)

¿Cuántos miembros de su familia dependen de usted?
◯ Menos de 2 personas
◯ 2 - 4 personas
◯ 5 - 6 personas
◯ 7 - 8 personas
◯ Mas de 8 personas

¿Su vivienda es rentada o propia?
◯ Renta
◯ Propia

¿Cuál rango describe mejor su ingreso familiar anual aproximado en dólares?
◯ Menos de $20,000
◯ $20,000 - $30,000

◯ $31,000 - $40,000
◯ $41,000 - $50,000
◯ $51,000 - $60,000
◯ $61,000 - $70,000
◯ Mas de $70,000

¿Cuánto tiempo lleva radicando en los Estados Unidos?

◯ Menos de 1 año
◯ Menos de 5 años
◯ Menos de 10 años
◯ Mas de 10 años

Estado civil

◯ Soltero
◯ Casado
◯ Prefiero no responder
◯ Otro

Appendix B

IRB Approval and Survey

FORM A

Certification for Exemption from IRB Review for Research Involving Human Subjects

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A. **PRINCIPAL INVESTIGATOR(s) and/or CO-PI(s)** (For student projects, list both the student and the advisor.):
Student: Kaveri Ajit Thakur
Advisor: Dr. Rupy Sawhney

B. **DEPARTMENT:** Industrial and Systems Engineering

C. **COMPLETE MAILING ADDRESS AND PHONE NUMBER OF PI(s) and CO-PI(s):**
Dr. Rupy Sawhney
Industrial and Systems Engineering Department,
The University of Tennessee,
512 John D. Tickle Building,
851 Neyland Drive,
Knoxville, TN, 37996.
865-974-3333

D. **TITLE OF PROJECT:** Investigate and predict the influence of cultural dimensions on perception of safety among Hispanic and non-Hispanic construction workers in United States

E. **EXTERNAL FUNDING AGENCY AND ID NUMBER** (if applicable):

F. **GRANT SUBMISSION DEADLINE** (if applicable):

G. **STARTING DATE** (NO RESEARCH MAY BE INITIATED UNTIL CERTIFICATION IS GRANTED.):

H. **ESTIMATED COMPLETION DATE** (Include all aspects of research and final write-up.):

I. **RESEARCH PROJECT**

1. **Objective(s) of Project** (Use additional page, if needed.):
The purpose of this research is to develop a model to predict the risk profile of construction workers using cultural dimensions. Identified factors will be useful to demonstrate the need for a customized training program for the increasingly culturally diverse population in the construction industry. To achieve these results the study will have to determine whether there is a difference in the risk perception between European American and Hispanic construction laborers.

2. **Subjects** (Use additional page, if needed.):
The population of interest for the research is a subject pool of workers involved in residential single family housing and other specialty trade construction projects. The construction industry comprises of 9.1 million workers with 3.39 million construction establishments as reported for the year 2010. The number of establishments which did not have any payroll procedures accounted for 2.66 million. Additionally, about 80% of the construction payroll establishments had 1 to 9 employees. These unstructured and small establishments generally engage into residential sub-contracting assignments and other specialty trade contractors' assignments. Moreover residential construction sector accounts for the second highest number of establishments as well as is at the top of the dollar value of construction work produced. A structured survey interview of both Hispanic and non-Hispanic construction workers will be conducted for the study. Furthermore, 2.5 million construction workers were self-employed in the year 2010. Thus this study will include worker employed by a company who is directly involved in building a house, sub-contractor who is assigned a specific job and self-employed individuals. As the goal of this research is to identify the impact of culture on perception of risk, the main division of the population is 50% Hispanic and 50% non-Hispanic workers. The sub-division of each groups is further based on the distribution of occupational classification as listed by CPWR Chart Book 2013. Some of the prominent categories of the job titles are laborer-13.4%, carpenters – 11.9%, painter-5.8%, electrician-4.9%, followed by plumber, repairer, roofer, drywall, etc. Approximately 100

Figure B.1: IRB Form A

onsite survey instrument based interviews will be conducted to measure the workers perception of risk, injury risk attitude, cultural dimension, job safety related factors.

Contacts of the PI and the Construction Industry Research and Policy Center at the University of Tennessee will be informed regarding the study. Snowball sampling method will be used to reach out to more participants. Participants will be compensated with $10 for completing the interview survey.

This population is targeted because widening to the entire construction industry would introduce variability that would inhibit testing the attitude differences desired by the researchers.

3. **Methods or Procedures** (Use additional page, if needed.):

The effect and impact of cultural dimensions on construction workers' risk profile will be measured in presence of other variables related to the construction industry. The survey is primarily divided into five sections: Risk Narrative, Risk Attitude Questionnaire, Cultural Dimension Questionaire, Construciton Safety Climate, Demographic and Socio-economic information. These sections will take approximately 25-30 minutes to complete. The risk perception model will be evalueated based on the data collected from the participants. This structured survey interview will be anonymous and will be stored in the UT OIT Qualtrics server with a randomly generated database record. All participant will be provided with an informed consent form which will describe the purpose of the research and confidentiality of their informaiton.

Additionally, some non-personally identifiable demografic survey data will be requested from the subjects (E.g. age, gender, race, education, job title, experience, income, etc.) during by the survey.

The survey will be administered with the assistance of the UT OIT department, via The University of Tennessee's Qualtrics survey software package. Only aggregated results of the survey wil be reported. The reported information will not be personally identifiable. The survey response will reside in the UT OIT Qualtrics server and present in a suitable form for analysis only to the resercher. Additionally, only the research student (Kaveri A. Thakur), student advisor (Dr. Rupy Sawhney) , and UT OIT research statistical assistance staff (Ms. Cary Springer) will have access to the raw data. Conequently, there is no identifiable risk to the survey respondent in participating in the survey based structured interview.

A draft review copy of the survey instrument, cover page, and introduction is attached. This survey instrument has been reviewed by the student advisor (Dr. Rupy Sawhney) , organizational behavior survey expert (Dr.Joan Renstch), constuction industry experienced personnel (Mr. Edward Taylor) and UT OIT research statistical assistance staff (Ms. Cary Springer). Additional revisions are possible.

4. **CATEGORY(s) FOR EXEMPT RESEARCH PER 45 CFR 46 (See instructions for categories.):**

Exception of this research is claimed under 45 CFR 46.101(b) paragraph (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

J. CERTIFICATION: The research described herein is in compliance with 45 CFR 46.101(b) and presents subjects with no more than minimal risk as defined by applicable regulations.

Principal Investigator: Dr. Rupy Sawhney (Name) _____ (Signature) _____ 5-7-2014 (Date)

Student Advisor: Dr. Rupy Sawhney (Name) _____ (Signature) _____ 5-7-2014 (Date)

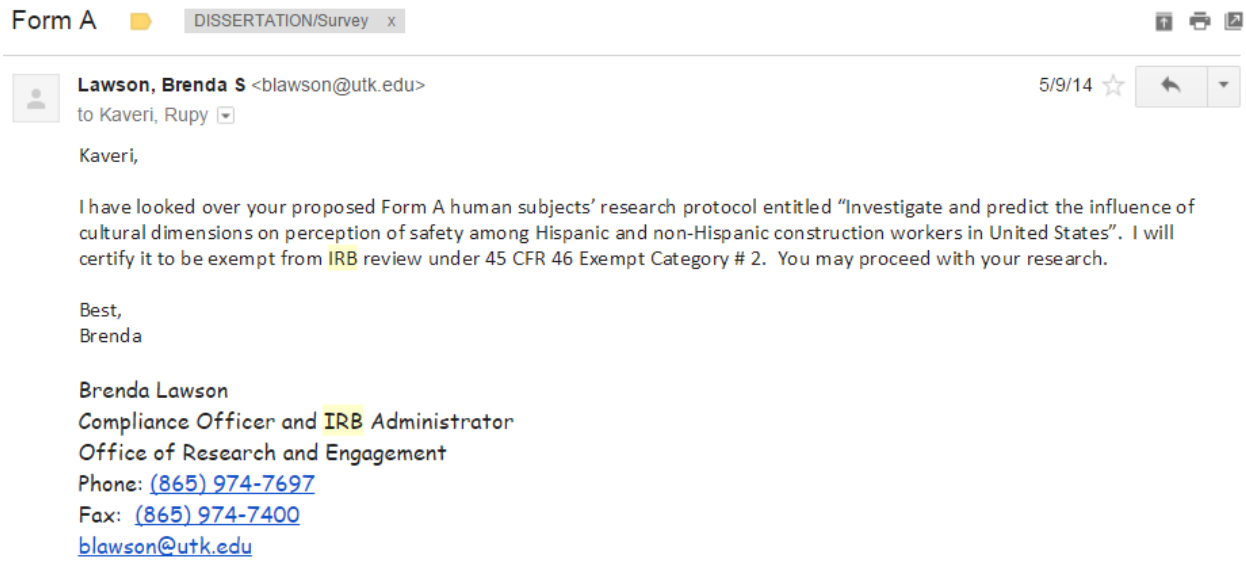
Department Review Committee Chair: Dr. Alberto Garcia (Name) Alberto Garcia (Signature) 5-7-2014 (Date)

APPROVED:
Department Head: Dr. John E Kobza (Name) _____ (Signature) _____ (Date)

COPY OF THIS COMPLETED FORM MUST BE SENT TO COMPLIANCE OFFICE IMMEDIATELY UPON COMPLETION.

Rev. 01/2005

Continued Figure B1: IRB Form A


Form A DISSERTATION/Survey x

Lawson, Brenda S <blawson@utk.edu> 5/9/14

to Kaveri, Rupy

Kaveri,

I have looked over your proposed Form A human subjects' research protocol entitled "Investigate and predict the influence of cultural dimensions on perception of safety among Hispanic and non-Hispanic construction workers in United States". I will certify it to be exempt from IRB review under 45 CFR 46 Exempt Category # 2. You may proceed with your research.

Best,
Brenda

Brenda Lawson
Compliance Officer and IRB Administrator
Office of Research and Engagement
Phone: (865) 974-7697
Fax: (865) 974-7400
blawson@utk.edu

Figure B.2: IRB approval email

Appendix C

Data Screening

C.1 Missing Data

Table C.1: Hispanic data set: Replace missing data

Result Variables				
	Result Variable	N of Replaced Missing Values	N of Valid Cases	Creating Function
1	RPS1_B	2	42	MEDIAN(RPS1_B,ALL)
2	RPS1_C_1	1	42	MEDIAN(RPS1_C_1,ALL)
3	RPS1_C_2	1	42	MEDIAN(RPS1_C_2,ALL)
4	RPS1_C_3	4	42	MEDIAN(RPS1_C_3,ALL)
5	RPS1_C_4	2	42	MEDIAN(RPS1_C_4,ALL)
6	RPS2_C_1	2	42	MEDIAN(RPS2_C_1,ALL)
7	RPS2_C_2	1	42	MEDIAN(RPS2_C_2,ALL)
8	RPS2_C_3	1	42	MEDIAN(RPS2_C_3,ALL)
9	RPS2_C_4	1	42	MEDIAN(RPS2_C_4,ALL)
10	RPS3_C_1	2	42	MEDIAN(RPS3_C_1,ALL)
11	RPS3_C_2	3	42	MEDIAN(RPS3_C_2,ALL)
12	RPS3_C_3	1	42	MEDIAN(RPS3_C_3,ALL)
13	RPS3_C_4	2	42	MEDIAN(RPS3_C_4,ALL)
14	RPS4_C_1	1	42	MEDIAN(RPS4_C_1,ALL)
15	RPS4_C_2	1	42	MEDIAN(RPS4_C_2,ALL)
16	RPS4_C_3	1	42	MEDIAN(RPS4_C_3,ALL)
17	RPS5_C1_1	1	42	MEDIAN(RPS5_C1_1,ALL)
18	RPS5_C1_2	1	42	MEDIAN(RPS5_C1_2,ALL)
19	RPS5_C1_3	4	42	MEDIAN(RPS5_C1_3,ALL)
20	RPS5_C1_4	1	42	MEDIAN(RPS5_C1_4,ALL)
21	RPS5_C1_5	1	42	MEDIAN(RPS5_C1_5,ALL)

Table C.1 Continued: Hispanic data set: Replace missing data

Result Variables				
	Result Variable	N of Replaced Missing Values	N of Valid Cases	Creating Function
22	RPS6_C2_1	2	42	MEDIAN(RPS6_C2_1,ALL)
23	RPS6_C2_3	3	42	MEDIAN(RPS6_C2_3,ALL)
24	RPS6_C2_4	2	42	MEDIAN(RPS6_C2_4,ALL)
25	RPS6_C2_5	3	42	MEDIAN(RPS6_C2_5,ALL)
26	RPS6_C2_6	1	42	MEDIAN(RPS6_C2_6,ALL)
27	CD1_6	2	42	MEDIAN(CD1_6,ALL)
28	CD2_1	1	42	MEDIAN(CD2_1,ALL)
29	CD2_2	1	42	MEDIAN(CD2_2,ALL)
30	CD5	1	42	MEDIAN(CD5,ALL)
31	CD8	1	42	MEDIAN(CD8,ALL)
32	CD10_6	1	42	MEDIAN(CD10_6,ALL)
33	CD10_9	2	42	MEDIAN(CD10_9,ALL)
34	CD10_10	1	42	MEDIAN(CD10_10,ALL)
35	CD10_11	1	42	MEDIAN(CD10_11,ALL)
36	CSC1_4	1	42	MEDIAN(CSC1_4,ALL)
37	CSC1_9	1	42	MEDIAN(CSC1_9,ALL)
38	CSC2_3	1	42	MEDIAN(CSC2_3,ALL)
39	CSC2_7	1	42	MEDIAN(CSC2_7,ALL)
40	CSC2_9	1	42	MEDIAN(CSC2_9,ALL)
41	RAW1_2	1	42	MEDIAN(RAW1_2,ALL)
42	RAW3_13	1	42	MEDIAN(RAW3_13,ALL)
43	RAW5_6	1	42	MEDIAN(RAW5_6,ALL)
44	RAW6_13	1	42	MEDIAN(RAW6_13,ALL)
45	JD7	1	42	MEDIAN(JD7,ALL)

Table C.2: Non-Hispanic data set: Replace missing data

Result Variables				
	Result Variable	N of Replaced Missing Values	N of Valid Cases	Creating Function
1	RPS1_B	1	47	MEDIAN(RPS1_B,ALL)
2	RPS1_C_2	2	47	MEDIAN(RPS1_C_2,ALL)
3	RPS1_C_3	1	47	MEDIAN(RPS1_C_3,ALL)
4	RPS2_C_4	1	47	MEDIAN(RPS2_C_4,ALL)
5	RPS3_B	1	47	MEDIAN(RPS3_B,ALL)
6	RPS3_C_3	2	47	MEDIAN(RPS3_C_3,ALL)
7	RPS4_C_1	1	47	MEDIAN(RPS4_C_1,ALL)
8	RPS6_C2_2	1	47	MEDIAN(RPS6_C2_2,ALL)
9	RPS6_C2_4	1	47	MEDIAN(RPS6_C2_4,ALL)
10	CD1_6	1	47	MEDIAN(CD1_6,ALL)
11	CD9	1	47	MEDIAN(CD9,ALL)
12	CD10_4	1	47	MEDIAN(CD10_4,ALL)
13	CD10_8	2	47	MEDIAN(CD10_8,ALL)
14	CD10_11	1	47	MEDIAN(CD10_11,ALL)
15	CD10_12	1	47	MEDIAN(CD10_12,ALL)
16	CSC1_3	2	47	MEDIAN(CSC1_3,ALL)
17	CSC1_4	2	47	MEDIAN(CSC1_4,ALL)
18	CSC1_7	1	47	MEDIAN(CSC1_7,ALL)
19	CSC2_3	1	47	MEDIAN(CSC2_3,ALL)
20	CSC2_7	2	47	MEDIAN(CSC2_7,ALL)
21	CSC2_8	1	47	MEDIAN(CSC2_8,ALL)
22	CSC2_9	1	47	MEDIAN(CSC2_9,ALL)
23	WH_6	2	47	MEDIAN(WH_6,ALL)
24	RAW1_2	1	47	MEDIAN(RAW1_2,ALL)
25	RAW1_4	1	47	MEDIAN(RAW1_4,ALL)
26	RAW1_6	1	47	MEDIAN(RAW1_6,ALL)
27	RAW1_10	1	47	MEDIAN(RAW1_10,ALL)
28	RAW1_12	1	47	MEDIAN(RAW1_12,ALL)
29	RAW1_13	1	47	MEDIAN(RAW1_13,ALL)
30	RAW3_6	1	47	MEDIAN(RAW3_6,ALL)
31	RAW4_10	2	47	MEDIAN(RAW4_10,ALL)
32	RAW5_6	1	47	MEDIAN(RAW5_6,ALL)
33	RAW5_10	1	47	MEDIAN(RAW5_10,ALL)
34	RAW7_12	1	47	MEDIAN(RAW7_12,ALL)
35	D8	1	47	MEDIAN(D8,ALL)
36	D9	1	47	MEDIAN(D9,ALL)

C.2 Skewness and Kurtosis

Table C.3: Skewness and kurtosis

	N		Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
	Valid	Missing				
RPS2_B	89	0	1.733	.255	3.890	.506
RPS2_P	89	0	1.869	.255	2.928	.506
RPS4_B	89	0	1.515	.255	2.728	.506
RPS6_C2_1	89	0	-2.274	.255	5.304	.506
RPS6_C2_2	89	0	-1.998	.255	3.126	.506
CD1_4	89	0	1.881	.255	3.961	.506
CD10_2	89	0	1.392	.255	2.328	.506
CSC2_11	89	0	-1.521	.255	2.034	.506
RAW6_13	89	0	-1.886	.255	3.363	.506
ACCH3	89	0	-.207	.255	-2.003	.506
D5	89	0	-.114	.255	-2.033	.506
D6	89	0	1.166	.255	2.220	.506
D9	89	0	-1.886	.255	2.397	.506
D10	89	0	1.380	.255	2.180	.506

Appendix D

Scale Frequency and Descriptive Statistics

Frequencies and descriptive statistics for x, y, and z items are not included since they were removed due to constant variance in the model analysis.

D.1 Scale Frequencies

Table D.1: Frequency table of RPS1_B

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Report to the supervisor that the ladder is faulty.	36.00	40.45	40.45	40.45
	Find another ladder in good condition, complete the task, and remove the faulty ladder from service.	41.00	46.07	46.07	86.52
	Ask another team member to do that job	4.00	4.49	4.49	91.01
	Climb the ladder and complete the task	8.00	8.99	8.99	100.00
	Total	89.00	100.00	100.00	

Table D.2: Frequency table of RPS1_P

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very safe choice	51.00	57.30	57.30	57.30
	A decent choice to keep working	18.00	20.22	20.22	77.53
	An appropriate choice to save time	8.00	8.99	8.99	86.52
	A risky choice, but a necessary part of work	3.00	3.37	3.37	89.89
	A very risky choice, would not recommend to others but I am experienced.	9.00	10.11	10.11	100.00
	Total	89.00	100.00	100.00	

Table D.3: Frequency table of RPS1_C_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	This will not occur at all	7.00	7.87	7.87	7.87
	This incident is very rare	10.00	11.24	11.24	19.10
	This can be the outcome sometimes	23.00	25.84	25.84	44.94
	There is a possibility that this will occur	23.00	25.84	25.84	70.79
	There is a very high possibility that this will occur	26.00	29.21	29.21	100.00
	Total	89.00	100.00	100.00	

Table D.4: Frequency table of RPS1_C_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	This will not occur at all	10.00	11.24	11.24	11.24
	This incident is very rare	19.00	21.35	21.35	32.58
	This can be the outcome sometimes	31.00	34.83	34.83	67.42
	There is a possibility that this will occur	13.00	14.61	14.61	82.02
	There is a very high possibility that this will occur	16.00	17.98	17.98	100.00
	Total	89.00	100.00	100.00	

Table D.5: Frequency table of RPS1_C_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	This will not occur at all	8.00	8.99	8.99	8.99
	This incident is very rare	12.00	13.48	13.48	22.47
	This can be the outcome sometimes	14.00	15.73	15.73	38.20
	There is a possibility that this will occur	35.00	39.33	39.33	77.53
	There is a very high possibility that this will occur	20.00	22.47	22.47	100.00
	Total	89.00	100.00	100.00	

Table D.6: Frequency table of RPS1_C_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	This will not occur at all	13.00	14.61	14.61	14.61
	This incident is very rare	14.00	15.73	15.73	30.34
	This can be the outcome sometimes	17.00	19.10	19.10	49.44
	There is a possibility that this will occur	25.00	28.09	28.09	77.53
	There is a very high possibility that this will occur	20.00	22.47	22.47	100.00
	Total	89.00	100.00	100.00	

Table D.7: Frequency table of RPS2_B

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Continue to work and finish the job.	63.00	70.79	70.79	70.79
	Report to the supervisor that the scaffolding is faulty.	1.00	1.12	1.12	71.91
	Find other equipment (not appropriate for the task) to complete the job.	18.00	20.22	20.22	92.13
	Other	7.00	7.87	7.87	100.00
	Total	89.00	100.00	100.00	

Table D.8: Frequency table of RPS2_P

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very safe choice	54.00	60.67	60.67	60.67
	A decent choice to keep working	23.00	25.84	25.84	86.52
	An appropriate choice to save time	4.00	4.49	4.49	91.01
	A risky choice, but a necessary part of work	4.00	4.49	4.49	95.51
	A very risky choice, would not recommend to others but I am experienced.	4.00	4.49	4.49	100.00
	Total	89.00	100.00	100.00	

Table D.9: Frequency table of RPS2_C_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	This will not occur at all	14.00	15.73	15.73	15.73
	This incident is very rare	15.00	16.85	16.85	32.58
	This can be the outcome sometimes	24.00	26.97	26.97	59.55
	There is a possibility that this will occur	22.00	24.72	24.72	84.27
	There is a very high possibility that this will occur	14.00	15.73	15.73	100.00
	Total	89.00	100.00	100.00	

Table D.10: Frequency table of RPS2_C_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	This will not occur at all	16.00	17.98	17.98	17.98
	This incident is very rare	14.00	15.73	15.73	33.71
	This can be the outcome sometimes	27.00	30.34	30.34	64.04
	There is a possibility that this will occur	18.00	20.22	20.22	84.27
	There is a very high possibility that this will occur	14.00	15.73	15.73	100.00
	Total	89.00	100.00	100.00	

Table D.11: Frequency table of RPS2_C_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	This will not occur at all	8.00	8.99	8.99	8.99
	This incident is very rare	13.00	14.61	14.61	23.60
	This can be the outcome sometimes	20.00	22.47	22.47	46.07
	There is a possibility that this will occur	24.00	26.97	26.97	73.03
	There is a very high possibility that this will occur	24.00	26.97	26.97	100.00
	Total	89.00	100.00	100.00	

Table D.12: Frequency table of RPS2_C_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	This will not occur at all	16.00	17.98	17.98	17.98
	This incident is very rare	10.00	11.24	11.24	29.21
	This can be the outcome sometimes	13.00	14.61	14.61	43.82
	There is a possibility that this will occur	28.00	31.46	31.46	75.28
	There is a very high possibility that this will occur	22.00	24.72	24.72	100.00
	Total	89.00	100.00	100.00	

Table D.13: Frequency table of RPS3_B

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Continue to work assuming the wiring is good.	31.00	34.83	34.83	34.83
	Personally check if the connections are good and then continue.	32.00	35.96	35.96	70.79
	Wait for the work-site to be inspected and then come back to work the next day.	19.00	21.35	21.35	92.13
	Other	7.00	7.87	7.87	100.00
	Total	89.00	100.00	100.00	

Table D.14: Frequency table of RPS3_P

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very safe choice	52.00	58.43	58.43	58.43
	A decent choice to keep working	21.00	23.60	23.60	82.02
	An appropriate choice to save time	6.00	6.74	6.74	88.76
	A risky choice, but a necessary part of work	5.00	5.62	5.62	94.38
	A very risky choice, would not recommend to others but I am experienced.	5.00	5.62	5.62	100.00
	Total	89.00	100.00	100.00	

Table D.15: Frequency table of RPS3_C_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	This will not occur at all	10.00	11.24	11.24	11.24
	This incident is very rare	11.00	12.36	12.36	23.60
	This can be the outcome sometimes	36.00	40.45	40.45	64.04
	There is a possibility that this will occur	14.00	15.73	15.73	79.78
	There is a very high possibility that this will occur	18.00	20.22	20.22	100.00
	Total	89.00	100.00	100.00	

Table D.16: Frequency table of RPS3_C_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	This will not occur at all	10.00	11.24	11.24	11.24
	This incident is very rare	15.00	16.85	16.85	28.09
	This can be the outcome sometimes	27.00	30.34	30.34	58.43
	There is a possibility that this will occur	25.00	28.09	28.09	86.52
	There is a very high possibility that this will occur	12.00	13.48	13.48	100.00
	Total	89.00	100.00	100.00	

Table D.17: Frequency table of RPS3_C_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	This will not occur at all	8.00	8.99	8.99	8.99
	This incident is very rare	5.00	5.62	5.62	14.61
	This can be the outcome sometimes	19.00	21.35	21.35	35.96
	There is a possibility that this will occur	25.00	28.09	28.09	64.04
	There is a very high possibility that this will occur	32.00	35.96	35.96	100.00
	Total	89.00	100.00	100.00	

Table D.18: Frequency table of RPS3_C_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	This will not occur at all	7.00	7.87	7.87	7.87
	This incident is very rare	12.00	13.48	13.48	21.35
	This can be the outcome sometimes	20.00	22.47	22.47	43.82
	There is a possibility that this will occur	25.00	28.09	28.09	71.91
	There is a very high possibility that this will occur	25.00	28.09	28.09	100.00
	Total	89.00	100.00	100.00	

Table D.19: Frequency table of RPS4_B

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Ask another team member to do that job.	49.00	55.06	55.06	55.06
	Report to the supervisor that you are not comfortable.	3.00	3.37	3.37	58.43
	Use a make shift trench box and finish the work.	1.00	1.12	1.12	59.55
	Continue working to finish the job.	6.00	6.74	6.74	66.29
	Other	30.00	33.71	33.71	100.00
	Total	89.00	100.00	100.00	

Table D.20: Frequency table of RPS4_P

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very safe choice	42.00	47.19	47.19	47.19
	A decent choice to keep working	30.00	33.71	33.71	80.90
	An appropriate choice to save time	8.00	8.99	8.99	89.89
	A risky choice, but a necessary part of work	6.00	6.74	6.74	96.63
	A very risky choice, would not recommend to others but I am experienced.	3.00	3.37	3.37	100.00
	Total	89.00	100.00	100.00	

Table D.21: Frequency table of RPS4_C_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	This will not occur at all	7.00	7.87	7.87	7.87
	This incident is very rare	12.00	13.48	13.48	21.35
	This can be the outcome sometimes	34.00	38.20	38.20	59.55
	There is a possibility that this will occur	14.00	15.73	15.73	75.28
	There is a very high possibility that this will occur	22.00	24.72	24.72	100.00
	Total	89.00	100.00	100.00	

Table D.22: Frequency table of RPS4_C_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	This will not occur at all	7.00	7.87	7.87	7.87
	This incident is very rare	20.00	22.47	22.47	30.34
	This can be the outcome sometimes	33.00	37.08	37.08	67.42
	There is a possibility that this will occur	20.00	22.47	22.47	89.89
	There is a very high possibility that this will occur	9.00	10.11	10.11	100.00
	Total	89.00	100.00	100.00	

Table D.23: Frequency table of RPS4_C_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	This will not occur at all	10.00	11.24	11.24	11.24
	This incident is very rare	16.00	17.98	17.98	29.21
	This can be the outcome sometimes	23.00	25.84	25.84	55.06
	There is a possibility that this will occur	27.00	30.34	30.34	85.39
	There is a very high possibility that this will occur	13.00	14.61	14.61	100.00
	Total	89.00	100.00	100.00	

Table D.24: Frequency table of RPS4_C_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	This will not occur at all	8.00	8.99	8.99	8.99
	This incident is very rare	14.00	15.73	15.73	24.72
	This can be the outcome sometimes	18.00	20.22	20.22	44.94
	There is a possibility that this will occur	24.00	26.97	26.97	71.91
	There is a very high possibility that this will occur	25.00	28.09	28.09	100.00
	Total	89.00	100.00	100.00	

Table D.25: Frequency table of RPS5_C1_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No worry at all	7.00	7.87	7.87	7.87
	Little worry	9.00	10.11	10.11	17.98
	Moderately worry	15.00	16.85	16.85	34.83
	A fair amount of worry	15.00	16.85	16.85	51.69
	I care/worry a lot about it	43.00	48.31	48.31	100.00
	Total	89.00	100.00	100.00	

Table D.26: Frequency table of RPS5_C1_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Little worry	10.00	11.24	11.24	11.24
	Moderately worry	11.00	12.36	12.36	23.60
	A fair amount of worry	30.00	33.71	33.71	57.30
	I care/worry a lot about it	38.00	42.70	42.70	100.00
	Total	89.00	100.00	100.00	

Table D.27: Frequency table of RPS5_C1_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No worry at all	12.00	13.48	13.48	13.48
	Little worry	17.00	19.10	19.10	32.58
	Moderately worry	25.00	28.09	28.09	60.67
	A fair amount of worry	16.00	17.98	17.98	78.65
	I care/worry a lot about it	19.00	21.35	21.35	100.00
	Total	89.00	100.00	100.00	

Table D.28: Frequency table of RPS5_C1_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No worry at all	8.00	8.99	8.99	8.99
	Little worry	10.00	11.24	11.24	20.22
	Moderately worry	13.00	14.61	14.61	34.83
	A fair amount of worry	17.00	19.10	19.10	53.93
	I care/worry a lot about it	41.00	46.07	46.07	100.00
	Total	89.00	100.00	100.00	

Table D.29: Frequency table of RPS5_C1_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No worry at all	5.00	5.62	5.62	5.62
	Little worry	11.00	12.36	12.36	17.98
	Moderately worry	11.00	12.36	12.36	30.34
	A fair amount of worry	27.00	30.34	30.34	60.67
	I care/worry a lot about it	35.00	39.33	39.33	100.00
	Total	89.00	100.00	100.00	

Table D.30: Frequency table of RPS5_C1_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No worry at all	2.00	2.25	2.25	2.25
	Little worry	2.00	2.25	2.25	4.49
	Moderately worry	15.00	16.85	16.85	21.35
	A fair amount of worry	15.00	16.85	16.85	38.20
	I care/worry a lot about it	55.00	61.80	61.80	100.00
	Total	89.00	100.00	100.00	

Table D.31: Frequency table of RPS6_C2_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not affected	3.00	3.37	3.37	3.37
	Barely affected	3.00	3.37	3.37	6.74
	No difference	1.00	1.12	1.12	7.87
	Somewhat affected	26.00	29.21	29.21	37.08
	Most affected	56.00	62.92	62.92	100.00
	Total	89.00	100.00	100.00	

Table D.32: Frequency table of RPS6_C2_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not affected	6.00	6.74	6.74	6.74
	Barely affected	3.00	3.37	3.37	10.11
	No difference	2.00	2.25	2.25	12.36
	Somewhat affected	21.00	23.60	23.60	35.96
	Most affected	57.00	64.04	64.04	100.00
	Total	89.00	100.00	100.00	

Table D.33: Frequency table of RPS6_C2_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not affected	10.00	11.24	11.24	11.24
	Barely affected	3.00	3.37	3.37	14.61
	No difference	9.00	10.11	10.11	24.72
	Somewhat affected	14.00	15.73	15.73	40.45
	Most affected	53.00	59.55	59.55	100.00
	Total	89.00	100.00	100.00	

Table D.34: Frequency table of RPS6_C2_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not affected	16.00	17.98	17.98	17.98
	Barely affected	11.00	12.36	12.36	30.34
	No difference	20.00	22.47	22.47	52.81
	Somewhat affected	34.00	38.20	38.20	91.01
	Most affected	8.00	8.99	8.99	100.00
	Total	89.00	100.00	100.00	

Table D.35: Frequency table of RPS6_C2_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not affected	16.00	17.98	17.98	17.98
	Barely affected	9.00	10.11	10.11	28.09
	No difference	19.00	21.35	21.35	49.44
	Somewhat affected	32.00	35.96	35.96	85.39
	Most affected	13.00	14.61	14.61	100.00
	Total	89.00	100.00	100.00	

Table D.36: Frequency table of RPS6_C2_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not affected	17.00	19.10	19.10	19.10
	Barely affected	11.00	12.36	12.36	31.46
	No difference	20.00	22.47	22.47	53.93
	Somewhat affected	23.00	25.84	25.84	79.78
	Most affected	18.00	20.22	20.22	100.00
	Total	89.00	100.00	100.00	

Table D.37: Frequency table of CD1_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of utmost importance	26.00	29.21	29.21	29.21
	Very important	40.00	44.94	44.94	74.16
	Of moderate importance	16.00	17.98	17.98	92.13
	Of little importance	4.00	4.49	4.49	96.63
	Of very little importance	3.00	3.37	3.37	100.00
	Total	89.00	100.00	100.00	

Table D.38: Frequency table of CD1_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of utmost importance	25.00	28.09	28.09	28.09
	Very important	44.00	49.44	49.44	77.53
	Of moderate importance	13.00	14.61	14.61	92.13
	Of little importance	3.00	3.37	3.37	95.51
	Of very little importance	4.00	4.49	4.49	100.00
	Total	89.00	100.00	100.00	

Table D.39: Frequency table of CD1_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of utmost importance	27.00	30.34	30.34	30.34
	Very important	36.00	40.45	40.45	70.79
	Of moderate importance	14.00	15.73	15.73	86.52
	Of little importance	6.00	6.74	6.74	93.26
	Of very little importance	6.00	6.74	6.74	100.00
	Total	89.00	100.00	100.00	

Table D.40: Frequency table of CD1_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of utmost importance	47.00	52.81	52.81	52.81
	Very important	32.00	35.96	35.96	88.76
	Of moderate importance	5.00	5.62	5.62	94.38
	Of little importance	2.00	2.25	2.25	96.63
	Of very little importance	3.00	3.37	3.37	100.00
	Total	89.00	100.00	100.00	

Table D.41: Frequency table of CD1_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of utmost importance	23.00	25.84	25.84	25.84
	Very important	44.00	49.44	49.44	75.28
	Of moderate importance	15.00	16.85	16.85	92.13
	Of little importance	6.00	6.74	6.74	98.88
	Of very little importance	1.00	1.12	1.12	100.00
	Total	89.00	100.00	100.00	

Table D.42: Frequency table of CD1_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of utmost importance	19.00	21.35	21.35	21.35
	Very important	40.00	44.94	44.94	66.29
	Of moderate importance	21.00	23.60	23.60	89.89
	Of little importance	9.00	10.11	10.11	100.00
	Total	89.00	100.00	100.00	

Table D.43: Frequency table of CD1_7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of utmost importance	19.00	21.35	21.35	21.35
	Very important	40.00	44.94	44.94	66.29
	Of moderate importance	20.00	22.47	22.47	88.76
	Of little importance	6.00	6.74	6.74	95.51
	Of very little importance	4.00	4.49	4.49	100.00
	Total	89.00	100.00	100.00	

Table D.44: Frequency table of CD1_8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of utmost importance	13.00	14.61	14.61	14.61
	Very important	33.00	37.08	37.08	51.69
	Of moderate importance	27.00	30.34	30.34	82.02
	Of little importance	13.00	14.61	14.61	96.63
	Of very little importance	3.00	3.37	3.37	100.00
	Total	89.00	100.00	100.00	

Table D.45: Frequency table of CD1_9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of utmost importance	19.00	21.35	21.35	21.35
	Very important	35.00	39.33	39.33	60.67
	Of moderate importance	22.00	24.72	24.72	85.39
	Of little importance	10.00	11.24	11.24	96.63
	Of very little importance	3.00	3.37	3.37	100.00
	Total	89.00	100.00	100.00	

Table D.46: Frequency table of CD1_10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of utmost importance	36.00	40.45	40.45	40.45
	Very important	36.00	40.45	40.45	80.90
	Of moderate importance	9.00	10.11	10.11	91.01
	Of little importance	6.00	6.74	6.74	97.75
	Of very little importance	2.00	2.25	2.25	100.00
	Total	89.00	100.00	100.00	

Table D.47: Frequency table of CD2_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of utmost importance	35.00	39.33	39.33	39.33
	Very important	42.00	47.19	47.19	86.52
	Of moderate importance	11.00	12.36	12.36	98.88
	Of little importance	1.00	1.12	1.12	100.00
	Total	89.00	100.00	100.00	

Table D.48: Frequency table of CD2_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of utmost importance	19.00	21.35	21.35	21.35
	Very important	38.00	42.70	42.70	64.04
	Of moderate importance	18.00	20.22	20.22	84.27
	Of little importance	12.00	13.48	13.48	97.75
	Of very little importance	2.00	2.25	2.25	100.00
	Total	89.00	100.00	100.00	

Table D.49: Frequency table of CD3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Always save before buying	48.00	53.93	53.93	53.93
	Usually save first	23.00	25.84	25.84	79.78
	Sometimes save, sometimes borrow to buy	10.00	11.24	11.24	91.01
	Usually borrow and pay off later	8.00	8.99	8.99	100.00
	Total	89.00	100.00	100.00	

Table D.50: Frequency table of CD4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Always	9.00	10.11	10.11	10.11
	Usually	3.00	3.37	3.37	13.48
	Sometimes	42.00	47.19	47.19	60.67
	Seldom	31.00	34.83	34.83	95.51
	Never	4.00	4.49	4.49	100.00
	Total	89.00	100.00	100.00	

Table D.51: Frequency table of CD5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Quite the same	34.00	38.20	38.20	38.20
	Mostly the same	34.00	38.20	38.20	76.40
	Don't know	8.00	8.99	8.99	85.39
	Mostly different	4.00	4.49	4.49	89.89
	Quite different	9.00	10.11	10.11	100.00
	Total	89.00	100.00	100.00	

Table D.52: Frequency table of CD6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very good	30.00	33.71	33.71	33.71
	Good	32.00	35.96	35.96	69.66
	Fair	23.00	25.84	25.84	95.51
	Poor	2.00	2.25	2.25	97.75
	Very poor	2.00	2.25	2.25	100.00
	Total	89.00	100.00	100.00	

Table D.53: Frequency table of CD7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of utmost importance	21.00	23.60	23.60	23.60
	Very important	26.00	29.21	29.21	52.81
	Of moderate importance	25.00	28.09	28.09	80.90
	Of little importance	6.00	6.74	6.74	87.64
	Of no importance	11.00	12.36	12.36	100.00
	Total	89.00	100.00	100.00	

Table D.54: Frequency table of CD8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not proud at all	4.00	4.49	4.49	4.49
	Not very proud	8.00	8.99	8.99	13.48
	Somewhat proud	6.00	6.74	6.74	20.22
	Fairly proud	20.00	22.47	22.47	42.70
	Very proud	51.00	57.30	57.30	100.00
	Total	89.00	100.00	100.00	

Table D.55: Frequency table of CD9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	10.00	11.24	11.24	11.24
	Seldom	22.00	24.72	24.72	35.96
	Sometimes	34.00	38.20	38.20	74.16
	Usually	18.00	20.22	20.22	94.38
	Always	5.00	5.62	5.62	100.00
	Total	89.00	100.00	100.00	

Table D.56: Frequency table of CD10_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	21.00	23.60	23.60	23.60
	Agree	28.00	31.46	31.46	55.06
	Undecided	16.00	17.98	17.98	73.03
	Disagree	17.00	19.10	19.10	92.13
	Strongly disagree	7.00	7.87	7.87	100.00
	Total	89.00	100.00	100.00	

Table D.57: Frequency table of CD10_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	39.00	43.82	43.82	43.82
	Agree	39.00	43.82	43.82	87.64
	Undecided	6.00	6.74	6.74	94.38
	Disagree	4.00	4.49	4.49	98.88
	Strongly disagree	1.00	1.12	1.12	100.00
	Total	89.00	100.00	100.00	

Table D.58: Frequency table of CD10_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	10.00	11.24	11.24	11.24
	Agree	27.00	30.34	30.34	41.57
	Undecided	32.00	35.96	35.96	77.53
	Disagree	19.00	21.35	21.35	98.88
	Strongly disagree	1.00	1.12	1.12	100.00
	Total	89.00	100.00	100.00	

Table D.59: Frequency table of CD10_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	25.00	28.09	28.09	28.09
	Agree	31.00	34.83	34.83	62.92
	Undecided	19.00	21.35	21.35	84.27
	Disagree	9.00	10.11	10.11	94.38
	Strongly disagree	5.00	5.62	5.62	100.00
	Total	89.00	100.00	100.00	

Table D.60: Frequency table of CD10_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	38.00	42.70	42.70	42.70
	Agree	26.00	29.21	29.21	71.91
	Undecided	11.00	12.36	12.36	84.27
	Disagree	10.00	11.24	11.24	95.51
	Strongly disagree	4.00	4.49	4.49	100.00
	Total	89.00	100.00	100.00	

Table D.61: Frequency table of CD10_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	10.00	11.24	11.24	11.24
	Agree	30.00	33.71	33.71	44.94
	Undecided	19.00	21.35	21.35	66.29
	Disagree	27.00	30.34	30.34	96.63
	Strongly disagree	3.00	3.37	3.37	100.00
	Total	89.00	100.00	100.00	

Table D.62: Frequency table of CD10_7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	21.00	23.60	23.60	23.60
	Agree	33.00	37.08	37.08	60.67
	Undecided	8.00	8.99	8.99	69.66
	Disagree	23.00	25.84	25.84	95.51
	Strongly disagree	4.00	4.49	4.49	100.00
	Total	89.00	100.00	100.00	

Table D.63: Frequency table of CD10_8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	31.00	34.83	34.83	34.83
	Agree	30.00	33.71	33.71	68.54
	Undecided	19.00	21.35	21.35	89.89
	Disagree	7.00	7.87	7.87	97.75
	Strongly disagree	2.00	2.25	2.25	100.00
	Total	89.00	100.00	100.00	

Table D.64: Frequency table of CD10_9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	12.00	13.48	13.48	13.48
	Agree	29.00	32.58	32.58	46.07
	Undecided	21.00	23.60	23.60	69.66
	Disagree	20.00	22.47	22.47	92.13
	Strongly disagree	7.00	7.87	7.87	100.00
	Total	89.00	100.00	100.00	

Table D.65: Frequency table of CD10_10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	50.00	56.18	56.18	56.18
	Agree	27.00	30.34	30.34	86.52
	Undecided	8.00	8.99	8.99	95.51
	Disagree	4.00	4.49	4.49	100.00
	Total	89.00	100.00	100.00	

Table D.66: Frequency table of CD10_11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	7.00	7.87	7.87	7.87
	Agree	15.00	16.85	16.85	24.72
	Undecided	17.00	19.10	19.10	43.82
	Disagree	40.00	44.94	44.94	88.76
	Strongly disagree	10.00	11.24	11.24	100.00
	Total	89.00	100.00	100.00	

Table D.67: Frequency table of CD10_12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	15.00	16.85	16.85	16.85
	Agree	38.00	42.70	42.70	59.55
	Undecided	19.00	21.35	21.35	80.90
	Disagree	13.00	14.61	14.61	95.51
	Strongly disagree	4.00	4.49	4.49	100.00
	Total	89.00	100.00	100.00	

Table D.68: Frequency table of CSC1_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	10.00	11.24	11.24	11.24
	Disagree	5.00	5.62	5.62	16.85
	Neither Agree nor Disagree	10.00	11.24	11.24	28.09
	Agree	34.00	38.20	38.20	66.29
	Strongly Agree	30.00	33.71	33.71	100.00
	Total	89.00	100.00	100.00	

Table D.69: Frequency table of CSC1_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5.00	5.62	5.62	5.62
	Disagree	9.00	10.11	10.11	15.73
	Neither Agree nor Disagree	4.00	4.49	4.49	20.22
	Agree	38.00	42.70	42.70	62.92
	Strongly Agree	33.00	37.08	37.08	100.00
	Total	89.00	100.00	100.00	

Table D.70: Frequency table of CSC1_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4.00	4.49	4.49	4.49
	Disagree	6.00	6.74	6.74	11.24
	Neither Agree nor Disagree	9.00	10.11	10.11	21.35
	Agree	38.00	42.70	42.70	64.04
	Strongly Agree	32.00	35.96	35.96	100.00
	Total	89.00	100.00	100.00	

Table D.71: Frequency table of CSC1_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5.00	5.62	5.62	5.62
	Disagree	6.00	6.74	6.74	12.36
	Neither Agree nor Disagree	22.00	24.72	24.72	37.08
	Agree	37.00	41.57	41.57	78.65
	Strongly Agree	19.00	21.35	21.35	100.00
	Total	89.00	100.00	100.00	

Table D.72: Frequency table of CSC1_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	8.00	8.99	8.99	8.99
	Disagree	12.00	13.48	13.48	22.47
	Neither Agree nor Disagree	29.00	32.58	32.58	55.06
	Agree	34.00	38.20	38.20	93.26
	Strongly Agree	6.00	6.74	6.74	100.00
	Total	89.00	100.00	100.00	

Table D.73: Frequency table of CSC1_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5.00	5.62	5.62	5.62
	Disagree	5.00	5.62	5.62	11.24
	Neither Agree nor Disagree	13.00	14.61	14.61	25.84
	Agree	45.00	50.56	50.56	76.40
	Strongly Agree	21.00	23.60	23.60	100.00
	Total	89.00	100.00	100.00	

Table D.74: Frequency table of CSC1_7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	7.00	7.87	7.87	7.87
	Disagree	7.00	7.87	7.87	15.73
	Neither Agree nor Disagree	11.00	12.36	12.36	28.09
	Agree	45.00	50.56	50.56	78.65
	Strongly Agree	19.00	21.35	21.35	100.00
	Total	89.00	100.00	100.00	

Table D.75: Frequency table of CSC1_8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4.00	4.49	4.49	4.49
	Disagree	5.00	5.62	5.62	10.11
	Neither Agree nor Disagree	15.00	16.85	16.85	26.97
	Agree	44.00	49.44	49.44	76.40
	Strongly Agree	21.00	23.60	23.60	100.00
	Total	89.00	100.00	100.00	

Table D.76: Frequency table of CSC1_9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3.00	3.37	3.37	3.37
	Disagree	7.00	7.87	7.87	11.24
	Neither Agree nor Disagree	11.00	12.36	12.36	23.60
	Agree	52.00	58.43	58.43	82.02
	Strongly Agree	16.00	17.98	17.98	100.00
	Total	89.00	100.00	100.00	

Table D.77: Frequency table of CSC1_10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5.00	5.62	5.62	5.62
	Disagree	7.00	7.87	7.87	13.48
	Neither Agree nor Disagree	16.00	17.98	17.98	31.46
	Agree	42.00	47.19	47.19	78.65
	Strongly Agree	19.00	21.35	21.35	100.00
	Total	89.00	100.00	100.00	

Table D.78: Frequency table of CSC2_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3.00	3.37	3.37	3.37
	Disagree	13.00	14.61	14.61	17.98
	Neither Agree nor Disagree	3.00	3.37	3.37	21.35
	Agree	44.00	49.44	49.44	70.79
	Strongly Agree	26.00	29.21	29.21	100.00
	Total	89.00	100.00	100.00	

Table D.79: Frequency table of CSC2_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5.00	5.62	5.62	5.62
	Disagree	14.00	15.73	15.73	21.35
	Neither Agree nor Disagree	11.00	12.36	12.36	33.71
	Agree	30.00	33.71	33.71	67.42
	Strongly Agree	29.00	32.58	32.58	100.00
	Total	89.00	100.00	100.00	

Table D.80: Frequency table of CSC2_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2.00	2.25	2.25	2.25
	Disagree	7.00	7.87	7.87	10.11
	Neither Agree nor Disagree	7.00	7.87	7.87	17.98
	Agree	41.00	46.07	46.07	64.04
	Strongly Agree	32.00	35.96	35.96	100.00
	Total	89.00	100.00	100.00	

Table D.81: Frequency table of CSC2_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2.00	2.25	2.25	2.25
	Disagree	7.00	7.87	7.87	10.11
	Neither Agree nor Disagree	10.00	11.24	11.24	21.35
	Agree	42.00	47.19	47.19	68.54
	Strongly Agree	28.00	31.46	31.46	100.00
	Total	89.00	100.00	100.00	

Table D.82: Frequency table of CSC2_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2.00	2.25	2.25	2.25
	Disagree	5.00	5.62	5.62	7.87
	Neither Agree nor Disagree	13.00	14.61	14.61	22.47
	Agree	42.00	47.19	47.19	69.66
	Strongly Agree	27.00	30.34	30.34	100.00
	Total	89.00	100.00	100.00	

Table D.83: Frequency table of CSC2_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	11.00	12.36	12.36	12.36
	Neither Agree nor Disagree	15.00	16.85	16.85	29.21
	Agree	34.00	38.20	38.20	67.42
	Strongly Agree	29.00	32.58	32.58	100.00
	Total	89.00	100.00	100.00	

Table D.84: Frequency table of CSC2_7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2.00	2.25	2.25	2.25
	Disagree	12.00	13.48	13.48	15.73
	Neither Agree nor Disagree	14.00	15.73	15.73	31.46
	Agree	35.00	39.33	39.33	70.79
	Strongly Agree	26.00	29.21	29.21	100.00
	Total	89.00	100.00	100.00	

Table D.85: Frequency table of CSC2_8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4.00	4.49	4.49	4.49
	Disagree	11.00	12.36	12.36	16.85
	Neither Agree nor Disagree	20.00	22.47	22.47	39.33
	Agree	34.00	38.20	38.20	77.53
	Strongly Agree	20.00	22.47	22.47	100.00
	Total	89.00	100.00	100.00	

Table D.86: Frequency table of CSC2_9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	8.00	8.99	8.99	8.99
	Neither Agree nor Disagree	8.00	8.99	8.99	17.98
	Agree	46.00	51.69	51.69	69.66
	Strongly Agree	27.00	30.34	30.34	100.00
	Total	89.00	100.00	100.00	

Table D.87: Frequency table of CSC2_10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2.00	2.25	2.25	2.25
	Disagree	11.00	12.36	12.36	14.61
	Neither Agree nor Disagree	15.00	16.85	16.85	31.46
	Agree	40.00	44.94	44.94	76.40
	Strongly Agree	21.00	23.60	23.60	100.00
	Total	89.00	100.00	100.00	

Table D.88: Frequency table of CSC2_11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	6.00	6.74	6.74	6.74
	Disagree	4.00	4.49	4.49	11.24
	Neither Agree nor Disagree	4.00	4.49	4.49	15.73
	Agree	47.00	52.81	52.81	68.54
	Strongly Agree	28.00	31.46	31.46	100.00
	Total	89.00	100.00	100.00	

Table D.89: Frequency table of WH_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	24.00	26.97	26.97	26.97
	Rarely	19.00	21.35	21.35	48.31
	Sometimes	27.00	30.34	30.34	78.65
	Often	13.00	14.61	14.61	93.26
	Always	6.00	6.74	6.74	100.00
	Total	89.00	100.00	100.00	

Table D.90: Frequency table of WH_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	18.00	20.22	20.22	20.22
	Rarely	21.00	23.60	23.60	43.82
	Sometimes	28.00	31.46	31.46	75.28
	Often	14.00	15.73	15.73	91.01
	Always	8.00	8.99	8.99	100.00
	Total	89.00	100.00	100.00	

Table D.91: Frequency table of WH_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	32.00	35.96	35.96	35.96
	Rarely	28.00	31.46	31.46	67.42
	Sometimes	19.00	21.35	21.35	88.76
	Often	7.00	7.87	7.87	96.63
	Always	3.00	3.37	3.37	100.00
	Total	89.00	100.00	100.00	

Table D.92: Frequency table of WH_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	46.00	51.69	51.69	51.69
	Rarely	16.00	17.98	17.98	69.66
	Sometimes	15.00	16.85	16.85	86.52
	Often	7.00	7.87	7.87	94.38
	Always	5.00	5.62	5.62	100.00
	Total	89.00	100.00	100.00	

Table D.93: Frequency table of WH_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	51.00	57.30	57.30	57.30
	Rarely	21.00	23.60	23.60	80.90
	Sometimes	9.00	10.11	10.11	91.01
	Often	2.00	2.25	2.25	93.26
	Always	6.00	6.74	6.74	100.00
	Total	89.00	100.00	100.00	

Table D.94: Frequency table of WH_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	31.00	34.83	34.83	34.83
	Rarely	20.00	22.47	22.47	57.30
	Sometimes	28.00	31.46	31.46	88.76
	Often	5.00	5.62	5.62	94.38
	Always	5.00	5.62	5.62	100.00
	Total	89.00	100.00	100.00	

Table D.95: Frequency table of WH_7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	22.00	24.72	24.72	24.72
	Rarely	15.00	16.85	16.85	41.57
	Sometimes	20.00	22.47	22.47	64.04
	Often	21.00	23.60	23.60	87.64
	Always	11.00	12.36	12.36	100.00
	Total	89.00	100.00	100.00	

Table D.96: Frequency table of RAW1_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	14.00	15.73	15.73	15.73
	Rarely	11.00	12.36	12.36	28.09
	Seldom	13.00	14.61	14.61	42.70
	Sometimes	28.00	31.46	31.46	74.16
	Frequently	11.00	12.36	12.36	86.52
	Often	5.00	5.62	5.62	92.13
	Always	7.00	7.87	7.87	100.00
	Total	89.00	100.00	100.00	

Table D.97: Frequency table of RAW1_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	28.00	31.46	31.46	31.46
	Rarely	20.00	22.47	22.47	53.93
	Seldom	16.00	17.98	17.98	71.91
	Sometimes	10.00	11.24	11.24	83.15
	Frequently	5.00	5.62	5.62	88.76
	Often	6.00	6.74	6.74	95.51
	Always	4.00	4.49	4.49	100.00
	Total	89.00	100.00	100.00	

Table D.98: Frequency table of RAW1_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	31.00	34.83	34.83	34.83
	Rarely	19.00	21.35	21.35	56.18
	Seldom	14.00	15.73	15.73	71.91
	Sometimes	10.00	11.24	11.24	83.15
	Frequently	8.00	8.99	8.99	92.13
	Often	3.00	3.37	3.37	95.51
	Always	4.00	4.49	4.49	100.00
	Total	89.00	100.00	100.00	

Table D.99: Frequency table of RAW1_10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	32.00	35.96	35.96	35.96
	Rarely	22.00	24.72	24.72	60.67
	Seldom	9.00	10.11	10.11	70.79
	Sometimes	7.00	7.87	7.87	78.65
	Frequently	12.00	13.48	13.48	92.13
	Often	3.00	3.37	3.37	95.51
	Always	4.00	4.49	4.49	100.00
	Total	89.00	100.00	100.00	

Table D.100: Frequency table of RAW1_12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	34.00	38.20	38.20	38.20
	Rarely	14.00	15.73	15.73	53.93
	Seldom	11.00	12.36	12.36	66.29
	Sometimes	9.00	10.11	10.11	76.40
	Frequently	11.00	12.36	12.36	88.76
	Often	6.00	6.74	6.74	95.51
	Always	4.00	4.49	4.49	100.00
	Total	89.00	100.00	100.00	

Table D.101: Frequency table of RAW1_13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	47.00	52.81	52.81	52.81
	Rarely	11.00	12.36	12.36	65.17
	Seldom	10.00	11.24	11.24	76.40
	Sometimes	5.00	5.62	5.62	82.02
	Frequently	11.00	12.36	12.36	94.38
	Always	5.00	5.62	5.62	100.00
	Total	89.00	100.00	100.00	

Table D.102: Frequency table of RAW2_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	25.00	28.09	28.09	28.09
	Rarely	15.00	16.85	16.85	44.94
	Seldom	14.00	15.73	15.73	60.67
	Sometimes	12.00	13.48	13.48	74.16
	Frequently	9.00	10.11	10.11	84.27
	Often	7.00	7.87	7.87	92.13
	Always	7.00	7.87	7.87	100.00
	Total	89.00	100.00	100.00	

Table D.103: Frequency table of RAW2_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	41.00	46.07	46.07	46.07
	Rarely	16.00	17.98	17.98	64.04
	Seldom	9.00	10.11	10.11	74.16
	Sometimes	6.00	6.74	6.74	80.90
	Frequently	5.00	5.62	5.62	86.52
	Often	9.00	10.11	10.11	96.63
	Always	3.00	3.37	3.37	100.00
	Total	89.00	100.00	100.00	

Table D.104: Frequency table of RAW2_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	52.00	58.43	58.43	58.43
	Rarely	9.00	10.11	10.11	68.54
	Seldom	8.00	8.99	8.99	77.53
	Sometimes	7.00	7.87	7.87	85.39
	Frequently	7.00	7.87	7.87	93.26
	Often	1.00	1.12	1.12	94.38
	Always	5.00	5.62	5.62	100.00
	Total	89.00	100.00	100.00	

Table D.105: Frequency table of RAW2_10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	46.00	51.69	51.69	51.69
	Rarely	12.00	13.48	13.48	65.17
	Seldom	8.00	8.99	8.99	74.16
	Sometimes	7.00	7.87	7.87	82.02
	Frequently	9.00	10.11	10.11	92.13
	Often	4.00	4.49	4.49	96.63
	Always	3.00	3.37	3.37	100.00
	Total	89.00	100.00	100.00	

Table D.106: Frequency table of RAW2_12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	52.00	58.43	58.43	58.43
	Rarely	4.00	4.49	4.49	62.92
	Seldom	9.00	10.11	10.11	73.03
	Sometimes	6.00	6.74	6.74	79.78
	Frequently	10.00	11.24	11.24	91.01
	Often	3.00	3.37	3.37	94.38
	Always	5.00	5.62	5.62	100.00
	Total	89.00	100.00	100.00	

Table D.107: Frequency table of RAW2_13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	57.00	64.04	64.04	64.04
	Rarely	11.00	12.36	12.36	76.40
	Seldom	4.00	4.49	4.49	80.90
	Sometimes	4.00	4.49	4.49	85.39
	Frequently	6.00	6.74	6.74	92.13
	Often	3.00	3.37	3.37	95.51
	Always	4.00	4.49	4.49	100.00
	Total	89.00	100.00	100.00	

Table D.108: Frequency table of RAW3_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	10.00	11.24	11.24	11.24
	Rarely	13.00	14.61	14.61	25.84
	Seldom	11.00	12.36	12.36	38.20
	Sometimes	31.00	34.83	34.83	73.03
	Frequently	12.00	13.48	13.48	86.52
	Often	6.00	6.74	6.74	93.26
	Always	6.00	6.74	6.74	100.00
	Total	89.00	100.00	100.00	

Table D.109: Frequency table of RAW3_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	11.00	12.36	12.36	12.36
	Rarely	15.00	16.85	16.85	29.21
	Seldom	13.00	14.61	14.61	43.82
	Sometimes	19.00	21.35	21.35	65.17
	Frequently	12.00	13.48	13.48	78.65
	Often	7.00	7.87	7.87	86.52
	Always	12.00	13.48	13.48	100.00
	Total	89.00	100.00	100.00	

Table D.110: Frequency table of RAW3_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	17.00	19.10	19.10	19.10
	Rarely	10.00	11.24	11.24	30.34
	Seldom	8.00	8.99	8.99	39.33
	Sometimes	22.00	24.72	24.72	64.04
	Frequently	16.00	17.98	17.98	82.02
	Often	7.00	7.87	7.87	89.89
	Always	9.00	10.11	10.11	100.00
	Total	89.00	100.00	100.00	

Table D.111: Frequency table of RAW3_10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	15.00	16.85	16.85	16.85
	Rarely	11.00	12.36	12.36	29.21
	Seldom	8.00	8.99	8.99	38.20
	Sometimes	26.00	29.21	29.21	67.42
	Frequently	8.00	8.99	8.99	76.40
	Often	11.00	12.36	12.36	88.76
	Always	10.00	11.24	11.24	100.00
	Total	89.00	100.00	100.00	

Table D.112: Frequency table of RAW3_12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	17.00	19.10	19.10	19.10
	Rarely	11.00	12.36	12.36	31.46
	Seldom	3.00	3.37	3.37	34.83
	Sometimes	22.00	24.72	24.72	59.55
	Frequently	11.00	12.36	12.36	71.91
	Often	11.00	12.36	12.36	84.27
	Always	14.00	15.73	15.73	100.00
	Total	89.00	100.00	100.00	

Table D.113: Frequency table of RAW3_13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	20.00	22.47	22.47	22.47
	Rarely	9.00	10.11	10.11	32.58
	Seldom	2.00	2.25	2.25	34.83
	Sometimes	18.00	20.22	20.22	55.06
	Frequently	11.00	12.36	12.36	67.42
	Often	11.00	12.36	12.36	79.78
	Always	18.00	20.22	20.22	100.00
	Total	89.00	100.00	100.00	

Table D.114: Frequency table of RAW4_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 = Negligible Severity	8.00	8.99	8.99	8.99
	2	12.00	13.48	13.48	22.47
	3	11.00	12.36	12.36	34.83
	4	20.00	22.47	22.47	57.30
	5	14.00	15.73	15.73	73.03
	6	8.00	8.99	8.99	82.02
	7 = Catastrophic Severity	16.00	17.98	17.98	100.00
	Total	89.00	100.00	100.00	

Table D.115: Frequency table of RAW4_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 = Negligible Severity	4.00	4.49	4.49	4.49
	2	12.00	13.48	13.48	17.98
	3	7.00	7.87	7.87	25.84
	4	14.00	15.73	15.73	41.57
	5	11.00	12.36	12.36	53.93
	6	15.00	16.85	16.85	70.79
	7 = Catastrophic Severity	26.00	29.21	29.21	100.00
	Total	89.00	100.00	100.00	

Table D.116: Frequency table of RAW4_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 = Negligible Severity	7.00	7.87	7.87	7.87
	2	7.00	7.87	7.87	15.73
	3	11.00	12.36	12.36	28.09
	4	12.00	13.48	13.48	41.57
	5	15.00	16.85	16.85	58.43
	6	13.00	14.61	14.61	73.03
	7 = Catastrophic Severity	24.00	26.97	26.97	100.00
	Total	89.00	100.00	100.00	

Table D.117: Frequency table of RAW4_10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 = Negligible Severity	8.00	8.99	8.99	8.99
	2	8.00	8.99	8.99	17.98
	3	5.00	5.62	5.62	23.60
	4	18.00	20.22	20.22	43.82
	5	10.00	11.24	11.24	55.06
	6	12.00	13.48	13.48	68.54
	7 = Catastrophic Severity	28.00	31.46	31.46	100.00
	Total	89.00	100.00	100.00	

Table D.118: Frequency table of RAW4_12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 = Negligible Severity	8.00	8.99	8.99	8.99
	2	4.00	4.49	4.49	13.48
	3	9.00	10.11	10.11	23.60
	4	8.00	8.99	8.99	32.58
	5	9.00	10.11	10.11	42.70
	6	14.00	15.73	15.73	58.43
	7 = Catastrophic Severity	37.00	41.57	41.57	100.00
	Total	89.00	100.00	100.00	

Table D.119: Frequency table of RAW4_13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 = Negligible Severity	7.00	7.87	7.87	7.87
	2	5.00	5.62	5.62	13.48
	3	10.00	11.24	11.24	24.72
	4	8.00	8.99	8.99	33.71
	5	10.00	11.24	11.24	44.94
	6	10.00	11.24	11.24	56.18
	7 = Catastrophic Severity	39.00	43.82	43.82	100.00
	Total	89.00	100.00	100.00	

Table D.120: Frequency table of RAW5_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 = Uncontrollable	12.00	13.48	13.48	13.48
	2	6.00	6.74	6.74	20.22
	3	10.00	11.24	11.24	31.46
	4	11.00	12.36	12.36	43.82
	5	17.00	19.10	19.10	62.92
	6	8.00	8.99	8.99	71.91
	7 = Controllable	25.00	28.09	28.09	100.00
	Total	89.00	100.00	100.00	

Table D.121: Frequency table of RAW5_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 = Uncontrollable	10.00	11.24	11.24	11.24
	2	2.00	2.25	2.25	13.48
	3	13.00	14.61	14.61	28.09
	4	15.00	16.85	16.85	44.94
	5	16.00	17.98	17.98	62.92
	6	11.00	12.36	12.36	75.28
	7 = Controllable	22.00	24.72	24.72	100.00
	Total	89.00	100.00	100.00	

Table D.122: Frequency table of RAW5_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 = Uncontrollable	15.00	16.85	16.85	16.85
	2	7.00	7.87	7.87	24.72
	3	10.00	11.24	11.24	35.96
	4	19.00	21.35	21.35	57.30
	5	13.00	14.60	14.60	71.90
	5	12.00	13.48	13.48	71.91
	6	9.00	10.11	10.11	82.02
	7 = Controllable	16.00	17.98	17.98	100.00
	Total	89.00	100.00	100.00	

Table D.123: Frequency table of RAW5_10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 = Uncontrollable	11.00	12.36	12.36	12.36
	2	9.00	10.11	10.11	22.47
	3	9.00	10.11	10.11	32.58
	4	16.00	17.98	17.98	50.56
	5	15.00	16.85	16.85	67.42
	6	8.00	8.99	8.99	76.40
	7 = Controllable	21.00	23.60	23.60	100.00
	Total	89.00	100.00	100.00	

Table D.124: Frequency table of RAW5_12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 = Uncontrollable	18.00	20.22	20.22	20.22
	2	2.00	2.25	2.25	22.47
	3	14.00	15.73	15.73	38.20
	4	7.00	7.87	7.87	46.07
	5	15.00	16.85	16.85	62.92
	6	11.00	12.36	12.36	75.28
	7 = Controllable	22.00	24.72	24.72	100.00
	Total	89.00	100.00	100.00	

Table D.125: Frequency table of RAW5_13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 = Uncontrollable	17.00	19.10	19.10	19.10
	2	4.00	4.49	4.49	23.60
	3	9.00	10.11	10.11	33.71
	4	12.00	13.48	13.48	47.19
	5	13.00	14.61	14.61	61.80
	6	14.00	15.73	15.73	77.53
	7 = Controllable	20.00	22.47	22.47	100.00
	Total	89.00	100.00	100.00	

Table D.126: Frequency table of RAW6_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 = Not risky at all	10.00	11.24	11.24	11.24
	2	5.00	5.62	5.62	16.85
	3	12.00	13.48	13.48	30.34
	4	11.00	12.36	12.36	42.70
	5	17.00	19.10	19.10	61.80
	6	12.00	13.48	13.48	75.28
	7 = Extremely risky	22.00	24.72	24.72	100.00
	Total	89.00	100.00	100.00	

Table D.127: Frequency table of RAW6_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 = Not risky at all	2.00	2.25	2.25	2.25
	3	7.00	7.87	7.87	10.11
	4	9.00	10.11	10.11	20.22
	5	11.00	12.36	12.36	32.58
	6	23.00	25.84	25.84	58.43
	7 = Extremely risky	37.00	41.57	41.57	100.00
	Total	89.00	100.00	100.00	

Table D.128: Frequency table of RAW6_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 = Not risky at all	3.00	3.37	3.37	3.37
	2	2.00	2.25	2.25	5.62
	3	8.00	8.99	8.99	14.61
	4	8.00	8.99	8.99	23.60
	5	15.00	16.85	16.85	40.45
	6	15.00	16.85	16.85	57.30
	7 = Extremely risky	38.00	42.70	42.70	100.00
	Total	89.00	100.00	100.00	

Table D.129: Frequency table of RAW6_10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 = Not risky at all	4.00	4.49	4.49	4.49
	2	3.00	3.37	3.37	7.87
	3	4.00	4.49	4.49	12.36
	4	10.00	11.24	11.24	23.60
	5	15.00	16.85	16.85	40.45
	6	16.00	17.98	17.98	58.43
	7 = Extremely risky	37.00	41.57	41.57	100.00
	Total	89.00	100.00	100.00	

Table D.130: Frequency table of RAW6_12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 = Not risky at all	2.00	2.25	2.25	2.25
	2	3.00	3.37	3.37	5.62
	3	6.00	6.74	6.74	12.36
	4	4.00	4.49	4.49	16.85
	5	10.00	11.24	11.24	28.09
	6	14.00	15.73	15.73	43.82
	7 = Extremely risky	50.00	56.18	56.18	100.00
	Total	89.00	100.00	100.00	

Table D.131: Frequency table of RAW6_13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 = Not risky at all	3.00	3.37	3.37	3.37
	2	1.00	1.12	1.12	4.49
	3	3.00	3.37	3.37	7.87
	4	3.00	3.37	3.37	11.24
	5	13.00	14.61	14.61	25.84
	6	16.00	17.98	17.98	43.82
	7 = Extremely risky	50.00	56.18	56.18	100.00
	Total	89.00	100.00	100.00	

Table D.132: Frequency table of RAW7_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	23.00	25.84	25.84	25.84
	Rarely	22.00	24.72	24.72	50.56
	Seldom	11.00	12.36	12.36	62.92
	Sometimes	17.00	19.10	19.10	82.02
	Frequently	5.00	5.62	5.62	87.64
	Often	5.00	5.62	5.62	93.26
	Always	6.00	6.74	6.74	100.00
	Total	89.00	100.00	100.00	

Table D.133: Frequency table of RAW7_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	3.00	3.37	3.37	3.37
	Rarely	10.00	11.24	11.24	14.61
	Seldom	12.00	13.48	13.48	28.09
	Sometimes	19.00	21.35	21.35	49.44
	Frequently	16.00	17.98	17.98	67.42
	Often	12.00	13.48	13.48	80.90
	Always	17.00	19.10	19.10	100.00
	Total	89.00	100.00	100.00	

Table D.134: Frequency table of RAW7_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	6.00	6.74	6.74	6.74
	Rarely	10.00	11.24	11.24	17.98
	Seldom	11.00	12.36	12.36	30.34
	Sometimes	22.00	24.72	24.72	55.06
	Frequently	16.00	17.98	17.98	73.03
	Often	12.00	13.48	13.48	86.52
	Always	12.00	13.48	13.48	100.00
	Total	89.00	100.00	100.00	

Table D.135: Frequency table of RAW7_10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	5.00	5.62	5.62	5.62
	Rarely	10.00	11.24	11.24	16.85
	Seldom	12.00	13.48	13.48	30.34
	Sometimes	18.00	20.22	20.22	50.56
	Frequently	15.00	16.85	16.85	67.42
	Often	14.00	15.73	15.73	83.15
	Always	15.00	16.85	16.85	100.00
	Total	89.00	100.00	100.00	

Table D.136: Frequency table of RAW7_12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	4.00	4.49	4.49	4.49
	Rarely	10.00	11.24	11.24	15.73
	Seldom	3.00	3.37	3.37	19.10
	Sometimes	13.00	14.61	14.61	33.71
	Frequently	19.00	21.35	21.35	55.06
	Often	12.00	13.48	13.48	68.54
	Always	28.00	31.46	31.46	100.00
	Total	89.00	100.00	100.00	

Table D.137: Frequency table of RAW7_13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	4.00	4.49	4.49	4.49
	Rarely	9.00	10.11	10.11	14.61
	Seldom	4.00	4.49	4.49	19.10
	Sometimes	19.00	21.35	21.35	40.45
	Frequently	13.00	14.61	14.61	55.06
	Often	13.00	14.61	14.61	69.66
	Always	27.00	30.34	30.34	100.00
	Total	89.00	100.00	100.00	

D.2 Scale Descriptive Statistics

Table D.138: Descriptive statistics of all survey items

Descriptive Statistics									
	N	Min	Max	Mean	Std. Dev	Skewness		Kurtosis	
						Statistic	Std. Error	Statistic	Std. Error
RPS1_B	89	1	5	1.96	1.186	1.593	.255	1.735	.506
RPS1_P	89	1	5	1.89	1.309	1.424	.255	0.819	.506
RPS1_C_1	89	1	5	3.57	1.242	-.517	.255	-.657	.506
RPS1_C_2	89	1	5	3.07	1.241	.088	.255	-.849	.506
RPS1_C_3	89	1	5	3.53	1.235	-.659	.255	-.547	.506
RPS1_C_4	89	1	5	3.28	1.365	-.334	.255	-1.104	.506
RPS2_B	89	1	5	1.93	1.498	1.071	.255	-0.701	.506
RPS2_P	89	1	5	1.66	1.065	1.869	.255	2.928	.506
RPS2_C_1	89	1	5	3.08	1.299	-.149	.255	-1.017	.506
RPS2_C_2	89	1	5	3.00	1.314	-.061	.255	-1.017	.506
RPS2_C_3	89	1	5	3.48	1.280	-.444	.255	-.854	.506
RPS2_C_4	89	1	5	3.34	1.430	-.475	.255	-1.116	.506
RPS3_B	89	1	5	2.67	1.355	-.056	.255	-1.273	.506
RPS3_P	89	1	5	1.76	1.158	1.599	.255	1.661	.506
RPS3_C_1	89	1	5	3.21	1.229	-.119	.255	-.692	.506
RPS3_C_2	89	1	5	3.16	1.196	-.229	.255	-.757	.506
RPS3_C_3	89	1	5	3.76	1.252	-.853	.255	-.156	.506
RPS3_C_4	89	1	5	3.55	1.252	-.508	.255	-.737	.506
RPS4_B	89	1	5	2.61	1.881	.391	.255	-1.808	.506
RPS4_P	89	1	5	1.85	1.061	1.349	.255	1.282	.506
RPS4_C_1	89	1	5	3.36	1.218	-.147	.255	-.780	.506
RPS4_C_2	89	1	5	3.04	1.086	.018	.255	-.532	.506
RPS4_C_3	89	1	5	3.19	1.224	-.261	.255	-.861	.506
RPS4_C_4	89	1	5	3.49	1.298	-.450	.255	-.916	.506
RPS5_C1_1	89	1	5	3.88	1.330	-.866	.255	-.507	.506
RPS5_C1_2	89	2	5	4.08	1.003	-.853	.255	-.348	.506
RPS5_C1_3	89	1	5	3.15	1.328	-.066	.255	-1.081	.506
RPS5_C1_4	89	1	5	3.82	1.361	-.827	.255	-.622	.506
RPS5_C1_5	89	1	5	3.85	1.230	-.877	.255	-.298	.506
RPS5_C1_6	89	1	5	4.34	.988	-1.450	.255	1.575	.506
RPS6_C2_1	89	1	5	4.45	.942	-2.274	.255	5.304	.506
RPS6_C2_2	89	1	5	4.35	1.139	-1.998	.255	3.126	.506
RPS6_C2_3	89	1	5	4.09	1.362	-1.353	.255	0.492	.506
RPS6_C2_4	89	1	5	3.07	1.266	-.400	.255	-1.003	.506
RPS6_C2_5	89	1	5	3.19	1.322	-.452	.255	-.954	.506
RPS6_C2_6	89	1	5	3.16	1.397	-.262	.255	-1.167	.506
CD1_1	89	1	5	2.08	.980	1.027	.255	1.119	.506
CD1_2	89	1	5	2.07	.986	1.244	.255	1.781	.506
CD1_3	89	1	5	2.19	1.147	1.002	.255	0.398	.506
CD1_4	89	1	5	1.67	.939	1.881	.255	3.961	.506
CD1_5	89	1	5	2.08	.895	.817	.255	.626	.506
CD1_6	89	1	4	2.22	.901	.393	.255	-.529	.506
CD1_7	89	1	5	2.28	1.022	.843	.255	.545	.506
CD1_8	89	1	5	2.55	1.023	.350	.255	-.383	.506
CD1_9	89	1	5	2.36	1.047	.565	.255	-.197	.506
CD1_10	89	1	5	1.90	.989	1.216	.255	1.200	.506

Table D.138 Continued: Descriptive statistics of all survey items

Descriptive Statistics									
	N	Min	Max	Mean	Std. Dev	Skewness		Kurtosis	
						Statistic	Std. Error	Statistic	Std. Error
CD2_1	89	1	4	1.75	.712	.593	.255	-.092	.506
CD2_2	89	1	5	2.33	1.031	.578	.255	-.313	.506
CD3	89	1	4	1.75	.980	1.111	.255	0.106	.506
CD4	89	1	5	3.20	.967	-.805	.255	.678	.506
CD5	89	1	5	2.10	1.253	1.224	.255	0.565	.506
CD6	89	1	5	2.03	.947	.753	.255	.513	.506
CD7	89	1	5	2.55	1.270	.565	.255	-.549	.506
CD8	89	1	5	4.19	1.176	-1.410	.255	0.918	.506
CD9	89	1	5	2.84	1.054	.025	.255	-.475	.506
CD10_1	89	1	5	2.56	1.261	.397	.255	-.947	.506
CD10_2	89	1	5	1.75	.857	1.392	.255	2.328	.506
CD10_3	89	1	5	2.71	.968	-.071	.255	-.710	.506
CD10_4	89	1	5	2.30	1.152	.701	.255	-.234	.506
CD10_5	89	1	5	2.06	1.190	.964	.255	-.082	.506
CD10_6	89	1	5	2.81	1.096	.020	.255	-1.054	.506
CD10_7	89	1	5	2.51	1.235	.394	.255	-1.118	.506
CD10_8	89	1	5	2.09	1.041	.745	.255	-.060	.506
CD10_9	89	1	5	2.79	1.172	.212	.255	-.884	.506
CD10_10	89	1	4	1.62	.833	1.307	.255	1.092	.506
CD10_11	89	1	5	3.35	1.129	-.581	.255	-.528	.506
CD10_12	89	1	5	2.47	1.078	.576	.255	-.325	.506
CSC1_1	89	1	5	3.78	1.286	-1.044	.255	0.073	.506
CSC1_2	89	1	5	3.96	1.157	-1.216	.255	0.664	.506
CSC1_3	89	1	5	3.99	1.071	-1.225	.255	1.099	.506
CSC1_4	89	1	5	3.66	1.065	-.784	.255	.320	.506
CSC1_5	89	1	5	3.20	1.057	-.535	.255	-.284	.506
CSC1_6	89	1	5	3.81	1.043	-1.142	.255	1.136	.506
CSC1_7	89	1	5	3.70	1.132	-1.056	.255	0.493	.506
CSC1_8	89	1	5	3.82	1.006	-1.065	.255	1.111	.506
CSC1_9	89	1	5	3.80	.944	-1.158	.255	1.420	.506
CSC1_10	89	1	5	3.71	1.068	-.933	.255	.499	.506
CSC2_1	89	1	5	3.87	1.099	-1.039	.255	0.261	.506
CSC2_2	89	1	5	3.72	1.234	-.706	.255	-.603	.506
CSC2_3	89	1	5	4.06	.981	-1.222	.255	1.275	.506
CSC2_4	89	1	5	3.98	.977	-1.077	.255	0.958	.506
CSC2_5	89	1	5	3.98	.941	-1.042	.255	1.159	.506
CSC2_6	89	2	5	3.91	.996	-.593	.255	-.661	.506
CSC2_7	89	1	5	3.80	1.079	-.696	.255	-.336	.506
CSC2_8	89	1	5	3.62	1.103	-.593	.255	-.309	.506
CSC2_9	89	2	5	4.03	.872	-.908	.255	.463	.506
CSC2_10	89	1	5	3.75	1.026	-.711	.255	-.087	.506
CSC2_11	89	1	5	3.98	1.076	-1.521	.255	2.034	.506
WH_1	89	1	5	2.53	1.226	.294	.255	-.847	.506
WH_2	89	1	5	2.70	1.219	.222	.255	-.793	.506
WH_3	89	1	5	2.11	1.092	.791	.255	-.036	.506
WH_4	89	1	5	1.98	1.234	1.046	.255	0.007	.506
WH_5	89	1	5	1.78	1.156	1.629	.255	1.920	.506
WH_6	89	1	5	2.25	1.161	.615	.255	-.301	.506
WH_7	89	1	5	2.82	1.370	.034	.255	-1.248	.506

Table D.138 Continued: Descriptive statistics of all survey items

Descriptive Statistics									
	N	Min	Max	Mean	Std. Dev	Skewness		Kurtosis	
						Statistic	Std. Error	Statistic	Std. Error
RAW1_2	89	1	7	3.61	1.730	.173	.255	-.582	.506
RAW1_4	89	1	7	2.75	1.766	.905	.255	-.117	.506
RAW1_6	89	1	7	2.66	1.738	.921	.255	-.042	.506
RAW1_10	89	1	7	2.66	1.802	.902	.255	-.319	.506
RAW1_12	89	1	7	2.81	1.900	.698	.255	-.774	.506
RAW1_13	89	1	7	2.35	1.816	1.200	.255	0.340	.506
RAW2_2	89	1	7	3.16	1.953	.541	.255	-.881	.506
RAW2_4	89	1	7	2.52	1.890	1.038	.255	-0.267	.506
RAW2_6	89	1	7	2.22	1.808	1.368	.255	0.779	.506
RAW2_10	89	1	7	2.38	1.812	1.086	.255	-0.071	.506
RAW2_12	89	1	7	2.40	1.947	1.074	.255	-0.201	.506
RAW2_13	89	1	7	2.06	1.780	1.621	.255	1.379	.506
RAW3_2	89	1	7	3.72	1.638	.100	.255	-.477	.506
RAW3_4	89	1	7	3.84	1.900	.190	.255	-.994	.506
RAW3_6	89	1	7	3.75	1.909	.012	.255	-1.005	.506
RAW3_10	89	1	7	3.83	1.926	.050	.255	-1.021	.506
RAW3_12	89	1	7	3.99	2.081	-.078	.255	-1.240	.506
RAW3_13	89	1	7	4.08	2.222	-.139	.255	-1.390	.506
RAW4_2	89	1	7	4.21	1.898	-.029	.255	-1.026	.506
RAW4_4	89	1	7	4.85	1.940	-.449	.255	-1.089	.506
RAW4_6	89	1	7	4.75	1.950	-.443	.255	-.966	.506
RAW4_10	89	1	7	4.82	2.020	-.502	.255	-.966	.506
RAW4_12	89	1	7	5.20	2.040	-.839	.255	-.623	.506
RAW4_13	89	1	7	5.19	2.044	-.763	.255	-.774	.506
RAW5_2	89	1	7	4.56	2.100	-.371	.255	-1.121	.506
RAW5_4	89	1	7	4.64	1.944	-.417	.255	-.830	.506
RAW5_6	89	1	7	4.11	2.034	-.099	.255	-1.120	.506
RAW5_10	89	1	7	4.38	2.042	-.215	.255	-1.143	.506
RAW5_12	89	1	7	4.35	2.211	-.293	.255	-1.302	.506
RAW5_13	89	1	7	4.37	2.171	-.342	.255	-1.238	.506
RAW6_2	89	1	7	4.62	1.997	-.418	.255	-.976	.506
RAW6_4	89	1	7	5.74	1.473	-1.219	.255	0.987	.506
RAW6_6	89	1	7	5.55	1.672	-1.045	.255	0.255	.506
RAW6_10	89	1	7	5.53	1.706	-1.137	.255	0.541	.506
RAW6_12	89	1	7	5.91	1.607	-1.497	.255	1.317	.506
RAW6_13	89	1	7	6.03	1.481	-1.886	.255	3.363	.506
RAW7_2	89	1	7	2.98	1.821	.750	.255	-.384	.506
RAW7_4	89	1	7	4.56	1.745	-.152	.255	-.953	.506
RAW7_6	89	1	7	4.30	1.748	-.140	.255	-.803	.506
RAW7_10	89	1	7	4.46	1.797	-.193	.255	-.954	.506
RAW7_12	89	1	7	5.03	1.855	-.651	.255	-.639	.506
RAW7_13	89	1	7	4.97	1.849	-.534	.255	-.774	.506

Appendix E

Measurement Model

E.1 Reflective Measurement Model

Table E.1: Cross loadings for reflective measurement model

	CSC1	CSC2	RAW12	RAW3	RAW4	RAW5	RAW6	RAW7	RPC12	RPC34	RPC561	RPC564	WH
CSC1_1		0.345	-0.239	0.274	0.191	0.046	0.349	0.288	-0.083	0.023	0.407	0.350	0.061
CSC1_10	0.821	0.450	-0.107	0.179	0.181	0.048	0.166	0.113	-0.059	0.041	0.395	0.131	-0.093
CSC1_2	0.805	0.346	-0.132	0.104	0.021	0.029	0.190	0.239	0.040	-0.098	0.310	0.117	0.135
CSC1_3	0.649	0.286	-0.081	0.130	0.049	-0.006	0.100	0.128	0.009	0.024	0.054	0.122	0.129
CSC1_4	0.677	0.437	-0.152	0.089	0.069	-0.126	0.093	0.159	0.099	-0.072	0.131	0.124	-0.036
CSC1_6	0.833	0.355	-0.106	0.311	0.102	-0.050	0.235	0.159	-0.008	-0.031	0.230	0.179	0.145
CSC1_7	0.849	0.459	-0.044	0.342	0.140	0.043	0.318	0.122	-0.085	-0.038	0.246	0.183	0.064
CSC1_8	0.813	0.427	-0.119	0.184	0.135	0.019	0.161	0.116	0.037	-0.098	0.186	0.126	0.017
CSC1_9	0.844	0.381	-0.107	0.150	0.110	-0.023	0.220	0.037	-0.125	0.013	0.291	0.051	-0.096
CSC2_1	0.402	0.652	-0.023	0.153	0.125	-0.120	0.129	0.100	-0.190	-0.056	0.289	0.100	-0.044
CSC2_10	0.228	0.631	-0.115	0.063	0.103	0.042	0.116	0.181	-0.155	0.119	0.266	0.263	0.051
CSC2_11	0.349	0.744	-0.097	0.219	0.239	0.123	0.322	0.235	-0.164	0.121	0.332	0.248	-0.069
CSC2_3	0.463	0.835	-0.277	0.160	-0.008	0.005	0.170	0.123	-0.083	-0.067	0.200	0.079	-0.077
CSC2_4	0.390	0.688	-0.125	0.114	0.089	0.110	0.149	0.184	-0.028	0.004	0.118	0.080	-0.099
CSC2_5	0.447	0.859	-0.265	0.146	0.152	0.042	0.203	0.145	-0.115	-0.082	0.230	0.026	-0.063
CSC2_6	0.313	0.756	-0.021	0.247	0.228	0.119	0.238	0.180	-0.097	0.023	0.194	0.071	-0.132
CSC2_7	0.400	0.872	-0.287	0.119	0.155	0.077	0.261	0.130	-0.064	0.007	0.306	0.119	-0.176
RAW1_12	-0.182	-0.193	0.751	0.284	0.195	0.037	-0.074	0.074	-0.088	0.226	-0.011	0.051	0.256
RAW1_4	-0.078	-0.185	0.804	0.116	0.049	-0.047	-0.009	0.172	-0.089	0.117	0.069	-0.044	0.224
RAW2_10	-0.164	-0.037	0.652	0.085	-0.010	-0.007	-0.168	0.009	-0.114	0.095	0.089	-0.077	0.341
RAW2_13	-0.164	-0.095	0.706	0.179	0.035	0.006	-0.114	-0.047	0.002	0.100	-0.078	0.019	0.222
RAW2_2	-0.098	-0.141	0.683	0.108	0.094	-0.069	-0.054	0.019	-0.052	-0.091	-0.080	-0.060	0.288
RAW2_4	-0.115	-0.244	0.884	0.014	-0.070	-0.069	-0.107	0.081	-0.015	-0.019	-0.045	-0.127	0.324
RAW3_10	0.249	0.219	0.171	0.804	0.388	-0.002	0.286	0.366	-0.220	0.251	0.261	0.274	-0.083
RAW3_12	0.237	0.215	0.172	0.907	0.450	0.032	0.297	0.409	-0.140	0.165	0.204	0.290	-0.073
RAW3_2	0.275	0.145	0.124	0.849	0.356	-0.124	0.448	0.330	-0.178	0.164	0.203	0.276	-0.093
RAW3_4	0.214	0.175	0.124	0.910	0.444	-0.056	0.333	0.330	-0.113	0.142	0.139	0.237	-0.147
RAW4_10	0.258	0.225	-0.035	0.339	0.848	0.127	0.476	0.396	-0.120	0.407	0.247	0.238	-0.177
RAW4_12	0.132	0.137	0.050	0.393	0.960	0.148	0.382	0.480	-0.146	0.352	0.154	0.237	-0.122
RAW4_4	0.194	0.231	0.082	0.510	0.768	0.041	0.497	0.502	-0.257	0.323	0.087	0.220	0.005
RAW5_10	0.056	0.067	-0.082	-0.152	0.098	0.923	0.286	0.034	0.066	-0.014	0.014	0.131	0.051

Table E.1 Continued: Cross loadings for reflective measurement model

	CSC1	CSC2	RAW12	RAW3	RAW4	RAW5	RAW6	RAW7	RPC12	RPC34	RPC561	RPC564	WH
RAW5_12	-0.106	-0.052	-0.016	-0.199	0.058	0.812	0.201	-0.028	0.089	-0.043	-0.226	0.001	0.153
RAW5_4	0.025	0.091	0.082	0.207	0.283	0.755	0.354	0.325	0.129	0.061	-0.051	0.127	0.174
RAW5_6	-0.007	0.066	-0.055	-0.066	0.043	0.946	0.286	0.028	0.041	0.002	-0.011	0.091	0.071
RAW6_10	0.226	0.117	-0.135	0.287	0.457	0.330	0.819	0.527	-0.193	0.345	0.082	0.187	-0.048
RAW6_12	0.282	0.264	0.017	0.430	0.464	0.289	0.838	0.590	-0.212	0.209	0.197	0.266	0.002
RAW6_2	0.111	0.060	0.078	0.370	0.349	0.236	0.741	0.364	-0.142	0.195	-0.017	0.323	-0.101
RAW6_4	0.300	0.355	-0.053	0.409	0.429	0.173	0.807	0.473	-0.224	0.225	0.160	0.201	-0.139
RAW6_6	0.297	0.244	-0.194	0.277	0.371	0.350	0.922	0.364	-0.162	0.275	0.179	0.301	-0.100
RAW7_10	0.218	0.217	0.090	0.343	0.429	0.178	0.529	0.839	-0.155	0.300	0.241	0.277	0.153
RAW7_12	0.257	0.270	0.036	0.445	0.513	0.025	0.517	0.926	-0.154	0.224	0.128	0.117	0.104
RAW7_13	0.094	0.114	0.098	0.336	0.505	0.116	0.407	0.958	-0.180	0.266	0.065	0.119	0.170
RPS1_C_2	-0.022	-0.110	-0.050	-0.067	-0.061	0.117	-0.129	-0.176	0.796	-0.260	-0.215	0.023	0.037
RPS2_C_2	-0.105	-0.109	-0.057	-0.030	-0.024	0.178	-0.170	-0.199	0.733	-0.262	-0.179	0.004	-0.140
RPS3_C_1	0.069	-0.058	-0.039	-0.304	-0.204	-0.009	-0.137	-0.175	0.733	-0.159	-0.132	-0.046	0.118
RPS4_C_1	-0.185	-0.132	-0.062	-0.076	-0.261	-0.039	-0.194	0.011	0.630	-0.154	-0.257	-0.118	0.201
RPS1_C_4	0.072	0.037	0.033	0.073	0.137	-0.104	0.254	0.187	-0.274	0.757	0.296	0.262	-0.026
RPS3_C_2	0.260	0.115	0.034	0.202	0.338	-0.027	0.207	0.296	-0.274	0.625	0.416	0.216	-0.092
RPS3_C_4	-0.162	-0.076	0.155	0.089	0.347	0.005	0.108	0.170	-0.220	0.882	0.147	0.141	0.085
RPS4_C_3	0.054	0.038	0.024	0.189	0.323	0.080	0.408	0.286	-0.214	0.812	0.281	0.353	-0.043
RPS4_C_4	0.119	0.148	-0.103	0.261	0.301	0.004	0.371	0.271	-0.220	0.709	0.244	0.235	-0.144
RPS5_C1_1	0.333	0.314	0.114	0.144	-0.018	0.005	0.096	0.120	-0.269	0.103	0.656	0.369	-0.017
RPS5_C1_5	0.356	0.194	0.007	0.232	0.255	-0.206	0.122	0.174	-0.206	0.324	0.725	0.399	0.045
RPS5_C1_6	0.209	0.151	-0.089	0.013	0.033	0.038	-0.007	0.017	-0.140	0.280	0.817	0.312	-0.110
RPS6_C2_1	0.380	0.357	-0.052	0.212	0.211	0.018	0.245	0.127	-0.343	0.242	0.801	0.358	-0.018
RPS6_C2_2	0.232	0.144	-0.021	0.195	0.114	0.027	0.138	0.072	-0.010	0.156	0.711	0.466	-0.085
RPS6_C2_3	0.227	0.175	-0.090	0.273	0.247	0.049	0.221	0.094	-0.062	0.314	0.539	0.789	-0.065
RPS6_C2_5	0.124	0.072	-0.002	0.208	0.161	0.150	0.274	0.163	-0.012	0.120	0.250	0.784	0.168
WH_2	-0.020	-0.104	0.332	-0.043	0.054	0.091	-0.051	0.229	-0.018	0.014	-0.035	0.061	0.832
WH_4	-0.073	-0.119	0.264	-0.108	-0.216	-0.083	-0.140	0.126	-0.041	-0.006	0.001	0.035	0.765
WH_5	0.062	-0.065	0.236	-0.139	-0.167	0.106	-0.102	0.054	0.110	0.021	0.001	0.004	0.734
WH_6	0.027	-0.085	0.368	-0.032	-0.096	0.132	-0.064	0.084	0.180	-0.033	-0.106	0.065	0.803
WH_7	0.022	-0.038	0.156	-0.167	-0.091	0.150	-0.077	-0.010	0.267	-0.040	-0.094	0.089	0.762

Table E.2: Discriminant Validity: Fornell-Larcker Criterion

	CSC1	**CSC2**	**RAW12**	**RAW3**	**RAW4**	**RAW5**	**RAW6**	**RAW7**	**RPC12**	**RPC34**	**RPC561**	**RPC564**	**WH**
CSC1	0.794												
CSC2	0.481	0.760											
RAW12	-0.168	-0.217	0.751										
RAW3	0.274	0.204	0.162	0.869									
RAW4	0.179	0.191	0.057	0.470	0.862								
RAW5	0.025	0.078	-0.039	-0.047	0.130	0.863							
RAW6	0.312	0.278	-0.107	0.401	0.471	0.335	0.827						
RAW7	0.192	0.206	0.081	0.408	0.534	0.105	0.511	0.909					
RPC12	-0.081	-0.142	-0.072	-0.164	-0.195	0.078	-0.215	-0.180	0.726				
RPC34	-0.008	0.014	0.084	0.179	0.389	0.009	0.293	0.280	-0.287	0.762			
RPC561	0.408	0.325	-0.019	0.211	0.160	-0.015	0.170	0.133	-0.275	0.293	0.744		
RPC564	0.224	0.158	-0.059	0.306	0.259	0.126	0.314	0.163	-0.047	0.277	0.502	0.786	
WH	-0.002	-0.111	0.361	-0.111	-0.102	0.097	-0.105	0.155	0.093	-0.005	-0.053	0.064	0.780

E.2 Group Differences

				Hispanic				Non-Hispanic				Comparison between Group Values									
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10	Column 11	Column 12	PLS-MGA		Parametric Test			Welch-Satterthwait Test				
Hypothesis	**Individualism (IDV)**	Direct effect without mediator	Direct effect with mediator IDV	Direct Effect with mediator	Indirect Effects	Total Effects	VAF	Direct Effect with mediator	Indirect Effects	Total Effects	VAF	Path Coefficients-difference	p-Value	Path Coefficients-difference	T-Value	p-Value	Path Coefficients-difference	T-Value	p-Value	P Values (LT)	P Values (RT)
H_{D1}	CSC1 -> RSB	-0.047	0.001	-0.179	-0.001	-0.180	0.01	0.085	-0.048	0.037	**0.36**	0.264	0.829	0.264	0.889	0.376	0.264	0.881	0.384	0.269	0.190
H_{D2}	CSC2 -> RSB	-0.297 **	0.263 * † †	-0.210	0.002	-0.208	0.01	-0.154	-0.055	-0.208	**0.26**	0.056	0.598	0.056	0.173	0.863	0.056	0.170	0.866	0.392	0.433
H_{D3}	WH -> RSB	0.227 **	0.188 †	0.045	0.031	0.075	**0.41**	0.210	0.032	0.241 +	0.13	0.165	0.710	0.165	0.559	0.578	0.165	0.553	0.583	0.341	0.291
H_{D4}	RSP -> RSB	0.201 †	0.200 †	0.273	0.007	0.280	0.02	0.092	0.042	0.134	**0.32**	0.182	0.248	0.182	0.584	0.561	0.182	0.578	0.566	0.336	0.282
H_{D56}	RAW12 -> RSP	0.189 †	0.154	0.377 +	0.046	0.423 ** +	0.11	0.048	-0.016	0.032	**0.25**	0.330	0.160	0.330	1.017	0.312	0.330	1.001	0.323	0.240	0.160
H_{D7}	**RAW3 -> RSP**	0.091	0.080	0.043	-0.095	-0.052	**0.69**	-0.013	-0.022	-0.034	**0.63**	0.589	**0.083**	0.589	1.567	0.121	0.589	1.560	0.126	0.118	**0.061**
H_{D8}	RAW4 -> RSP	0.002	0.012	0.097	-0.041	0.057	**0.29**	0.052	-0.019	0.033	**0.27**	0.045	0.430	0.045	0.150	0.881	0.045	0.147	0.884	0.394	0.442
H_{D9}	RAW5 -> RSP	-0.182 † †	0.185 * † †	-0.205	-0.016	"-0.220+	0.07	-0.234	-0.038	"-0.272 +	0.14	0.029	0.443	0.029	0.100	0.921	0.029	0.102	0.920	0.396	0.460
H_{D10}	RAW6 -> RSP	-0.203	-0.165	-0.261	0.035	-0.226	0.12	-0.001	-0.035	-0.036	**0.98**	0.260	0.780	0.260	0.759	0.450	0.260	0.756	0.454	0.298	0.226
H_{D11}	RAW7 -> RSP	0.222 *	0.227 * † †	0.198	-0.014	0.184	0.06	0.223	-0.022	0.201	0.09	0.025	0.546	0.025	0.087	0.931	0.025	0.088	0.930	0.396	0.465
H_{D12}	RPC12 -> RSP	-0.193 †	-0.191 †	-0.065	-0.017	-0.082	**0.21**	-0.269	-0.014	"-0.283+	0.05	0.204	0.239	0.204	0.677	0.500	0.204	0.681	0.500	0.315	0.249
H_{D13}	RPC34 -> RSP	0.144	0.088	0.049	0.053	0.102	**0.52**	0.102	-0.024	0.078	0.19	0.053	0.589	0.053	0.214	0.831	0.053	0.212	0.833	0.389	0.416
H_{D14}	RPC561 -> RSP	-0.351 ***	-0.358 **	-0.248	-0.032	"-0.280	0.12	"-0.385 ** -	-0.038	"-0.423**	0.09	0.137	0.333	0.137	0.436	0.664	0.137	0.431	0.669	0.362	0.334

Figure E.1: Differences in mediation effect of Individualism (IDV) between Hispanic and Non-Hispanic workers

				Hispanic				Non-Hispanic				Comparison between Group Values								
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10	Column 11	Column 12	PLS-MGA		Parametric Test			Welch-Satterthwait Test				
Hypothesis	**Power Distance (PDI)**	Direct effect without mediator	Direct effect with mediator IDV	Direct Effect with mediator	Indirect Effects	Total Effects	VAF	Direct Effect with mediator	Indirect Effects	Total Effects	VAF	Path Coefficients-difference	p-Value	Path Coefficients-difference	T-Value	p-Value	Path Coefficients-difference	T-Value	p-Value	P Values (LT)	P Values (RT)
H_{D1}	CSC1 -> RSB	-0.047	-0.018	-0.134	-0.033	-0.167	0.20	0.191	-0.042	0.149	0.18	0.325	0.882	0.325	1.143	0.256	0.325	1.138	0.262	0.208	0.129
H_{D2}	CSC2 -> RSB	-0.297 **	-0.286 **	-0.210	-0.024	-0.234	0.10	-0.221	0.020	-0.201	0.08	0.011	0.490	0.011	0.037	0.970	0.011	0.037	0.971	0.398	0.485
H_{D3}	**WH -> RSB**	0.227 **	0.173 †	-0.018	0.076	0.057	**0.81**	0.380 *++	-0.129	0.251+	**0.25**	0.399	0.921	0.399	1.442	0.153	0.399	1.446	0.156	0.140	**0.076**
H_{D4}	RSP -> RSB	0.201 †	0.173 †	0.250	0.047	0.297* ++	0.16	0.122	0.002	0.124	0.02	0.128	0.298	0.128	0.471	0.639	0.128	0.471	0.640	0.356	0.319
H_{D56}	**RAW12 -> RSP**	0.189 †	0.166	0.430* ++	-0.011	0.418 **	0.03	-0.075	0.105	0.030	**0.58**	0.505	**0.064**	0.505	1.600	0.113	0.505	1.587	0.120	0.113	**0.058**
H_{D7}	RAW3 -> RSP	0.091	0.180	0.074	-0.053	0.021	**0.42**	-0.001	0.020	0.019	**0.94**	0.075	0.405	0.075	0.260	0.795	0.075	0.260	0.796	0.384	0.398
H_{D8}	RAW4 -> RSP	0.002	-0.023	0.045	0.019	0.064	**0.30**	-0.004	0.043	0.039	**0.91**	0.049	0.422	0.049	0.178	0.859	0.049	0.176	0.861	0.392	0.430
H_{D9}	RAW5 -> RSP	-0.182 † †	-0.162 †	-0.132	-0.073	-0.205	**0.35**	"-0.294 +	-0.016	-0.311	0.05	0.162	0.261	0.162	0.589	0.557	0.162	0.597	0.554	0.332	0.276
H_{D10}	RAW6 -> RSP	-0.203	-0.159	-0.166	0.035	-0.131	0.17	0.016	-0.037	-0.020	**0.69**	0.182	0.708	0.182	0.532	0.596	0.182	0.536	0.595	0.344	0.297
H_{D11}	RAW7 -> RSP	0.222 *	0.215 †	0.112	0.038	0.151	**0.25**	0.157	0.035	0.192	0.18	0.044	0.566	0.044	0.157	0.875	0.044	0.158	0.875	0.393	0.437
H_{D12}	RPC12 -> RSP	-0.193 †	-0.179 †	-0.011	-0.061	-0.072	**0.84**	"-0.356 +	0.022	-0.334	0.06	0.345	0.130	0.345	1.115	0.268	0.345	1.123	0.268	0.211	0.132
H_{D13}	RPC34 -> RSP	0.144	0.051	0.070	0.038	0.108	**0.35**	0.092	0.055	0.146	**0.37**	0.022	0.534	0.022	0.084	0.933	0.022	0.084	0.934	0.396	0.467
H_{D14}	RPC561 -> RSP	-0.351 ***	-0.339 **	-0.271	-0.006	-0.277	0.02	"-0.425 **	-0.022	"-0.447**	0.05	0.154	0.331	0.154	0.442	0.659	0.154	0.435	0.666	0.362	0.332

Figure E.2: Differences in mediation effect of Power Distance Index (PDI) between Hispanic and Non-Hispanic workers

				Hispanic				Non-Hispanic				Comparison between Group Values									
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10	Column 11	Column 12	PLS-MGA		Parametric Test			Welch-Satterthwait Test				
Hypothesis	**Masculinity (MAS)**	Direct effect without mediator	Direct effect with mediator IDV	Direct Effect with mediator	Indirect Effects	Total Effects	VAF	Direct Effect with mediator	Indirect Effects	Total Effects	VAF	Path Coefficients-difference	p-Value	Path Coefficients-difference	T-Value	p-Value	Path Coefficients-difference	T-Value	p-Value	P Values (LT)	P Values (RT)
H_{D1}	CSC1 -> RSB	-0.047	0.008	-0.097	-0.054	-0.151	**0.36**	0.185	-0.076	0.109	**0.29**	0.282	0.798	0.282	0.810	0.420	0.282	0.801	0.428	0.288	0.213
H_{D2}	CSC2 -> RSB	-0.297 **	-0.253 **	-0.196	-0.072	-0.268	**0.27**	-0.258	0.063	-0.195	0.20	0.062	0.430	0.062	0.179	0.858	0.062	0.179	0.859	0.391	0.429
H_{D3}	**WH -> RSB**	0.227 **	0.264 * ††	-0.190	0.101	-0.089	**0.35**	0.285 +	0.005	0.290 * ++	0.02	0.476	0.927	0.476	1.481	0.142	0.476	1.466	0.150	0.136	**0.073**
H_{D4}	RSP -> RSB	0.201 †	0.159	0.265 +	0.044	0.309 * ++	0.14	0.085	0.046	0.130	**0.35**	0.181	0.241	0.181	0.642	0.522	0.181	0.651	0.519	0.321	0.258
H_{D56}	RAW12 -> RSP	0.189 †	0.198 †	0.443 * ++	-0.027	0.417* ++	0.06	0.065	-0.105	-0.040	**0.62**	0.378	0.106	0.378	1.280	0.204	0.378	1.269	0.211	0.177	0.104
H_{D7}	RAW3 -> RSP	0.091	0.040	0.159	-0.012	0.148	0.07	0.102	-0.060	0.042	**0.37**	0.057	0.432	0.057	0.198	0.843	0.057	0.196	0.845	0.390	0.422
H_{D8}	RAW4 -> RSP	0.002	0.023	0.087	-0.052	0.035	**0.37**	0.032	-0.072	-0.040	**0.69**	0.055	0.412	0.055	0.204	0.839	0.055	0.200	0.842	0.390	0.421
H_{D9}	RAW5 -> RSP	-0.182 ††	-0.207 * ††	-0.231	0.009	-0.222	0.04	"-0.288 +	-0.066	"-0.354+	0.19	0.058	0.415	0.058	0.198	0.844	0.058	0.199	0.843	0.390	0.421
H_{D10}	RAW6 -> RSP	-0.203	-0.057	-0.023	-0.050	-0.073	**0.69**	0.095	-0.129	-0.034	**0.57**	0.118	0.632	0.118	0.347	0.730	0.118	0.343	0.733	0.375	0.366
H_{D11}	**RAW7 -> RSP**	0.222 *	0.187 †	0.188	-0.050	0.138	**0.21**	-0.232	0.079	-0.152	**0.26**	0.420	**0.056**	0.420	1.519	0.132	0.420	1.525	0.135	0.125	**0.065**
H_{D12}	RPC12 -> RSP	-0.193 †	-0.164	-0.118	0.043	-0.075	**0.27**	-0.187	-0.034	-0.221	0.15	0.069	0.408	0.069	0.223	0.824	0.069	0.225	0.823	0.388	0.411
H_{D13}	RPC34 -> RSP	0.144	0.110	0.009	0.015	0.024	**0.61**	0.186	-0.115	0.070	**0.38**	0.176	0.739	0.176	0.646	0.520	0.176	0.635	0.529	0.325	0.264
H_{D14}	**RPC561 -> RSP**	-0.351 ***	-0.284 **	0.105	-0.004	0.101	0.03	"-0.335 *++	-0.120	"-0.455 **+	**0.26**	0.441	0.101	0.441	1.320	0.190	0.441	1.301	0.200	0.170	**0.098**

Figure E.3: Differences in mediation effect of Masculinity (MAS) between Hispanic and Non-Hispanic workers

				Hispanic				Non-Hispanic				Comparison between Group Values									
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10	Column 11	Column 12	PLS-MGA		Parametric Test			Welch-Satterthwait Test				
Hypothesis	**Long Term Orientation (LTO)**	Direct effect without mediator	Direct effect with mediator IDV	Direct Effect with mediator	Indirect Effects	Total Effects	VAF	Direct Effect with mediator	Indirect Effects	Total Effects	VAF	Path Coefficients-difference	p-Value	Path Coefficients-difference	T-Value	p-Value	Path Coefficients-difference	T-Value	p-Value	P Values (LT)	P Values (RT)
H_{D1}	CSC1 -> RSB	-0.047	0.000	-0.13573	-0.098	-0.234	**0.42**	0.142	0.068	0.210	**0.32**	0.277	0.871	0.277	1.053	0.295	0.277	1.044	0.302	0.22993	0.14954
H_{D2}	CSC2 -> RSB	-0.297 **	-0.2747 **	-0.097155	-0.149	-0.246	**0.61**	-0.173	-0.045	-0.218	**0.21**	0.075	0.392	0.075	0.264	0.793	0.075	0.260	0.796	0.38441	0.39755
H_{D3}	WH -> RSB	0.227 **	0.219 * ++	-0.066674	0.121	0.054	**0.64**	0.209	0.078	0.287* ++	**0.27**	0.276	0.848	0.276	1.026	0.308	0.276	1.016	0.315	0.23674	0.15616
H_{D4}	RSP -> RSB	0.201 †	0.181	0.2222724	0.088	0.310* ++	**0.28**	0.131	-0.013	0.118	0.09	0.091	0.354	0.091	0.328	0.744	0.091	0.328	0.745	0.37679	0.3719
H_{D56}	RAW12 -> RSP	0.189 †	0.210 +	0.388+	0.034	0.422 *++	0.08	0.137	-0.019	0.118	0.12	0.252	0.197	0.252	0.804	0.424	0.252	0.800	0.428	0.28819	0.21294
H_{D7}	RAW3 -> RSP	0.091	0.048	0.0235988	-0.076	-0.052	**0.76**	0.080	-0.026	0.054	**0.25**	0.056	0.586	0.056	0.202	0.840	0.056	0.202	0.841	0.38972	0.42026
H_{D8}	RAW4 -> RSP	0.002	0.075	0.2077315	-0.105	-0.105	**0.34**	0.067	-0.040	-0.040	**0.38**	0.141	0.297	0.141	0.477	0.635	0.141	0.467	0.643	0.35629	0.32072
H_{D9}	RAW5 -> RSP	-0.182 † †	-0.127	-0.134221	-0.091	-0.225	**0.40**	-0.230	-0.062	"-0.292+	**0.21**	0.096	0.353	0.096	0.348	0.729	0.096	0.351	0.727	0.3738	0.36318
H_{D10}	RAW6 -> RSP	-0.203	-0.084	0.0774406	-0.118	-0.040	**0.60**	0.011	-0.055	-0.044	**0.84**	0.067	0.420	0.067	0.190	0.850	0.067	0.190	0.850	0.39065	0.42498
H_{D11}	RAW7 -> RSP	0.222 *	-0.084 * +	0.2180489	-0.081	0.137	**0.27**	0.141	0.018	0.159	0.11	0.077	0.395	0.077	0.255	0.799	0.077	0.257	0.798	0.38474	0.39881
H_{D12}	RPC12 -> RSP	-0.193 †	0.229 +	-0.109408	0.035	-0.074	**0.24**	"-0.390 +	0.029	"-0.361+	0.07	0.281	0.203	0.281	0.790	0.432	0.281	0.794	0.432	0.28955	0.21463
H_{D13}	RPC34 -> RSP	0.144	0.072	0.1398134	-0.133	0.006	**0.49**	0.047	0.076	0.124	**0.62**	0.092	0.373	0.092	0.331	0.742	0.092	0.327	0.745	0.37684	0.37205
H_{D14}	**RPC561 -> RSP**	-0.351 ***	-0.281 **	0.0390127	-0.166	-0.166	**0.81**	"-0.448 **	0.003	0.003	0.01	0.488	**0.066**	0.488	1.586	0.116	0.488	1.573	0.123	0.11578	**0.0596**

Figure E.4: Differences in mediation effect of Long Term Orientation (LTO) between Hispanic and Non-Hispanic workers

				Hispanic				Non-Hispanic				Comparison between Group Values									
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10	Column 11	Column 12	PLS-MGA		Parametric Test			Welch-Satterthwait Test				
Hypothesis	**Uncertainty Avoidance (UAI)**	Direct effect without mediator	Direct effect with mediator	Direct Effect with mediator	Indirect Effects	Total Effects	VAF	Direct Effect with mediator	Indirect Effects	Total Effects	VAF	Path Coefficients difference	p-Value	Path Coefficients difference	T-Value	p-Value	Path Coefficients difference	T-Value	p-Value	P Value (LT)	P Value (RT)
H_{D1}	CSC1 -> RSB	-0.047	-0.054	-0.216	0.034	-0.182	0.14	-0.107	-0.031	-0.138	**0.22**	0.108	0.659	0.108	0.395	0.694	0.108	0.395	0.695	0.368	0.347
H_{D2}	CSC2 -> RSB	-0.297 **	-0.256 **	-0.214	0.018	-0.195	0.08	-0.173	-0.011	-0.183	0.06	0.041	0.582	0.041	0.147	0.883	0.041	0.144	0.886	0.394	0.443
H_{D3}	**WH -> RSB**	0.227 **	0.101	-0.246	0.066	-0.179	**0.21**	0.173	0.099	0.272 **	**0.36**	0.419	0.925	0.419	1.517	0.133	0.419	1.486	0.145	0.132	**0.070**
H_{D4}	RSP -> RSB	0.201 †	0.195 †	0.344 * † †	-0.040	0.304 †	0.10	0.101	0.052	0.153	**0.34**	0.243	0.197	0.243	0.838	0.404	0.243	0.842	0.404	0.278	0.201
H_{D56}	RAW12 -> RSP	0.189 †	0.202 †	0.412 * † †	0.011	0.423 * † †	0.03	0.335 * † †	0.060	0.395 * † †	0.15	0.077	0.375	0.077	0.266	0.791	0.077	0.263	0.794	0.384	0.397
H_{D7}	RAW3 -> RSP	0.091	0.089	-0.047	0.062	0.015	**0.57**	0.184	-0.091	0.093	**0.33**	0.231	0.808	0.231	0.866	0.389	0.231	0.862	0.394	0.274	0.195
H_{D8}	RAW4 -> RSP	0.002	0.034	0.147	-0.030	0.116	0.17	0.149	-0.095	0.054	**0.39**	0.002	0.495	0.002	0.007	0.994	0.002	0.007	0.994	0.398	0.497
H_{D9}	RAW5 -> RSP	-0.182 † †	-0.158	-0.185	-0.057	-0.242 †	**0.24**	-0.228	-0.083	-0.310 †	**0.27**	0.042	0.422	0.042	0.143	0.887	0.042	0.144	0.886	0.394	0.443
H_{D10}	RAW6 -> RSP	-0.203	-0.157	-0.123	0.002	-0.120	0.02	0.033	-0.105	-0.073	**0.76**	0.155	0.689	0.155	0.489	0.626	0.155	0.489	0.628	0.353	0.313
H_{D11}	RAW7 -> RSP	0.222 * †	0.244 * † †	0.127	0.005	0.132	0.04	0.006	0.050	0.057	**0.89**	0.120	0.349	0.120	0.405	0.687	0.120	0.400	0.691	0.367	0.345
H_{D12}	RPC12 -> RSP	-0.193 †	-0.238 †	-0.090	0.055	-0.035	**0.38**	-0.385 * † †	0.034	-0.350 * † †	0.08	0.295	0.148	0.295	1.003	0.319	0.295	1.005	0.320	0.239	0.159
H_{D13}	RPC34 -> RSP	0.144	0.123	0.059	-0.026	0.034	**0.30**	0.096	-0.064	0.032	**0.40**	0.037	0.567	0.037	0.146	0.884	0.037	0.144	0.886	0.394	0.443
H_{D14}	RPC561 -> RSP	-0.351 ***	-0.333 **	-0.154	-0.029	-0.183	0.16	-0.534 **	-0.027	-0.561 ***	0.05	0.381	0.123	0.381	1.150	0.253	0.381	1.138	0.262	0.208	0.129

Figure E.5: Differences in mediation effect of Uncertainty Avoidance Index (UAI) between Hispanic and Non-Hispanic workers

Vita

Kaveri Ajit Thakur was born in Thane, India, on October 6, 1983, daughter of Sandhya & Ajit Thakur. She completed her high school in year 2001 and enrolled at the K.J.Somaiya College of Engineering, Mumbai University, for her bachelors in Mechanical Engineering. She was admitted into the Masters program at the Department of Industrial Engineering in Clemson University, South Carolina for Fall 2005. Kaveri graduated with her Masters Degree in May 2007 and joined the North American Assemblies as a Quality Engineer to gain practical experience in the field. After gaining two years of work experience, she joined the Department of Industrial and Systems Engineering at the University of Tennessee, Knoxville to begin her PhD in the area of human factors in August 2009. She served as a Graduate Research Assistant in the department during her tenure as a PhD candidate and completed her Phd in Fall 2015.