2015-12-01

Effect of Gender, Guilt, and Shame on BYU Business School Students' Innovation: Structural Equation Modeling Approach

Rasha Mohsen Qudisat
Brigham Young University - Provo

Effect of Gender, Guilt, and Shame on BYU Business School Students' Innovation:

Structural Equation Modeling Approach

Rasha Mohsen Qudisat

A dissertation submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

Richard R. Sudweeks, Chair
Joseph A. Olsen
Lane Fischer
Ross Larsen
Kristie K. Seawright

Educational Inquiry, Measurement, and Evaluation

Brigham Young University

December 2015

ABSTRACT

Effect of Gender, Guilt, and Shame on BYU Business School Students' Innovation: Structural Equation Modeling Approach

Rasha Mohsen Qudisat
Educational Inquiry, Measurement, and Evaluation, BYU
Doctor of Philosophy

Innovative people seize the opportunity to make lives better and more comfortable, which contribute to economy growth and financial gain. Stakeholders study innovativeness of business students, in depth, to understand gender differences, and the factors affecting students' innovativeness. Literature explains how males and females differ in their proneness to guilt and shame. However, a model that explains the dynamic of guilt, shame, and gender on innovativeness will help make policies to improve students' innovativeness. This study describes factor analysis approach to examine the TOSCA-3 subscales guilt, shame, and the DNA instrument of innovativeness. It also describes the measurement invariance across gender for each construct, and for the full measurement model to identify the differences between genders. Moreover, this study examines the total effect of gender on innovativeness, which includes the direct effect, and indirect effect via guilt and shame. The results indicated that guilt is positively associated with innovativeness, and shame and gender are negatively associated with innovativeness. This dissertation can be freely accessed and downloaded from (/http://etd.byu.edu).

Keywords: innovativeness, exploratory factor analysis, confirmatory factor analysis, structural .equation modeling, measurement invariance, total effects

ACKNOWLEDGEMENTS

First, I would like to thank Allah, the almighty, for giving me the strength to carry on this project and for blessing me with many great people who have been my greatest support in both my personal and professional life. As Prophet Mohammad (peace be upon him) said: “All praise and thanks are only for Allah, the One who, by His blessing and favor, perfected goodness/good works are accomplished.”

“الْحَمْدُ لِلَّهِ الَّذِي بِنِعْمَتِهِ تَتِمُّ الصَّالِحَاتُ”

I would like to gratefully and sincerely thank Dr. Richard Sudweeks for his guidance, understanding, patience, and most importantly, his friendship during my graduate studies at BYU. His mentorship was paramount in providing a well-rounded experience consistent to my long-term career goals. He encouraged me to not only grow as an evaluator and methodologist but also as an independent thinker. I was given the opportunity to develop my own individuality and self-sufficiency by being allowed to work with great professor and evaluators. For everything you’ve done for me, Dr. Sudweeks, I thank you.

I would also like to thank members of EMIE and IP&T for their assistance and guidance in getting my graduate career started on the right foot and providing me with the foundation for becoming an ambidextrous evaluator, knowledgeable in both qualitative and quantitative methods. I believe that both departments provided me with the unique opportunity to gain a wider breadth of experience while still a graduate student. Additionally, I would like to thank the members of my doctoral committee for their input, valuable discussions and accessibility. In particular, I would like to thank Dr. Lane Fischer for his kindness and heartfelt concern, as well as a being a great teacher and kind friend, Dr. Joseph Olsen for his insights regarding measurement invariance, Dr. Ross Larsen for hard work, expertise and patience. In addition, I would like to thank Dr. Kristie Seawright for giving me the opportunity to work with her and develop this work in attempt to answer the perplexing questions of innovativeness and guilt and shame. I thank Dr. Randall Davies for his unique guidance and advice, and made my evaluative experience worthy over the past three years. I would like specifically to thank Dr. Pete Peterson, for his support and unending encouragement through the time I have known him.

Most importantly, I would like to thank my husband Ala'a. His support, encouragement, quiet patience, and unwavering love were undeniably the bedrock upon which the past four years of my life have been built. His tolerance of my occasional evaluative moods is a testament in itself of his unyielding devotion and love, even at times when he said 'check your assumptions.'

I thank my mother for her faith in me and allowing me to be as ambitious as I wanted; it was under her watchful eye that I gained so much drive and an ability to tackle challenges head on. I thank my sisters, Shatha and Reem, who offered invaluable support and humor over the years. I thank my brothers, Mohammad and Ahmad, who constantly reminded me and demonstrated that all I had to do was say the word and they would be here. Ahmad, it was your infinite number of supportive phone calls from the first day I came that allowed me to stay focused and believe in myself. In addition, I thank Ala'a's family, for their endurance of the graduate school experience, for they provided me with unending encouragement and support. A good support system is always important and a key to surviving any form of graduate studie. That is why I would also like to thank my dear friends and sisters, Hannah Abuain and Rania Ta'ani, who provided emotional and strategic support. Hannah, I thank you, as it was your positive outlook that kept me going during those late hours into the night.

For everyone above and everything each one of you provided me throughout each stage of this dissertation I thank you; without it, this journey could not have been completed.

Finally, I dedicate this to my beloved father, who I know is proud and watching over me, to my mother for her constant support and unconditional love, to my interminable inspiration, Taj and Masa.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter 1

Introduction

When we think of a typical leader, most of us conceptualize a person who is sociable, enthusiastic and an initiator. Nevertheless, new research puts a dent in that stereotype, revealing an unexpected sign of leadership potential: the tendency to feel guilty (Markman, 2012; Schaumberg & Flynn, 2012). It is because individuals who sense this emotion feel a sense of responsibility that sets them apart from others (Tangney, 1991). Although every organization will have its own priorities and sector-specific issues to balance, businesses that fail to innovate run the risk of losing ground to competitors, losing key staff members, or simply operating inefficiently. Innovation can be a key differentiator between market leaders and their rivals. However, when we mention guilt, shame is also associated with it. In recent years the process of distinguishing between shame and guilt has become more difficult due to the different interpretations between different cultures and between individuals. Shame and guilt if looked at traditionally are related to emotions rather than experiences (Keltner & Buswell, 1997). By focusing on the meaning and defining the emotions correctly it allows for a better understanding of why shame is seen more as the negative emotion rather than guilt. The basis of these meanings allows for further analyses into the relationship of business students innovation with regards to gender differences. In society, females are seen as the more emotional gender in comparison to males. This was presented in the study conducted by (Brody & Hall, 2000).

The importance of innovation in the labor market has become a highly publicized issue when looking for leaders to take over the business world. The focus has been on pinpointing specific traits that highly innovative leaders portray. Studies were conducted to determine whether guilt prone or shame prone behaviors result in higher leadership characteristics.

The measurement of guilt and shame is crucial as it distinguishes each emotion among different individuals. The characteristics of these emotions are a result of each individual's reaction to the environment and society that surround them. There are different tools of measurement that can be used to analyze these emotions in different studies. The main instruments that are used to measure shame and guilt proneness are the Test of Self Conscious Affect-3 (TOSCA-3) (Tangney, Dearing, Wagner, & Gramzow, 2000), the Dimensions of Conscience Questionnaire (DCQ) (Johnson, et al., 1987), and the Guilt and Shame Proneness Scale (GASP) (Cohen, Wolf, Panter, & Insko, 2011). There is no one form of measurement that is a hundred percent complete that satisfies all variables in the study. Each measurement has its advantages and disadvantages; with this said a combination of all the measurement tools contribute to the findings that is needed for the research. The purpose of this research is to determine whether BYU business students follow the TOSCA-3 scales of guilt and shame, and whether these variables affect the constructs of their innovation in the business society.

Problem Statement

The last decade has witnessed a dramatic increase in theoretical and empirical studies of shame and guilt (Baumeister, Well, & Heatherton, 1995; Bybee & Quiles, 1998; Tangney, 1998; Tangney & Fischer, 1995). These two constructs have been conceptualized from different theoretical perspectives (Tangney, 1995; 1998; Tangney & Fischer, 1995; Wallbott & Scherer, 1995) and different measurement instruments of shame and guilt have been constructed (see Tangney, 1996 for an overview). In this limited literature piece, the discussion will be held about the relationship that guilt and shame hold on business students' innovation considering gender as a covariate.

In the present research, we investigated whether BYU business students follow the same structure of TOSCA-3 scales of guilt and shame, and the effect of these constructs on their innovativeness. Furthermore, we investigated whether this relationship is different across gender groups. This investigation was accomplished by first, testing the measurement models for the constructs of guilt, shame, and innovation, and investigating whether TOSCA-3 guilt and shame items could be used as described in the literature. Second, we assessed the direct and indirect effect of guilt and shame on innovation using structural equation model, and investigate the model invariance in terms of gender.

Statement of Purpose

The purpose of this research was to examine the moderating role of effect—in the form of shame and guilt as latent variables—in explaining the relationship of guilt and shame to business students' innovation.

Research Questions

1. To what extent do the results of exploratory and confirmatory factor analysis provide evidence that the TOSCA-3 scales, that are purported to measure shame and guilt constructs, are congeneric measures of two distinct factors?
    a. To what extent is there evidence of correlated errors within or across the two latent factors of guilt and shame?
    b. To what extent is there evidence of convergent validity among the items assigned to each scale?
    c. To what extent is there evidence of discriminant evidence of validity between the two scales?

   d. Which items either do not clearly load on the factor, and which items cross-load both factors, and which of these offending items should be deleted?

2. To what extent do the results of exploratory and confirmatory factor analysis provide evidence that the Dyer Innovation Measurement (DNA) scale is a measure of four distinct factors?
   a. To what extent is there evidence of correlated errors within or across the four factors of DNA?
   b. To what extent is there evidence of convergent validity among the items assigned to each scale?
   c. To what extent is there discriminant evidence of validity between the four scales?

Which items clearly load on the intended factor, and which items cross-load on more than one factor? Which of these items offending items should be deleted?

3. What evidence is provided by exploratory and confirmatory factor analyses that the models of Guilt and Shame, and four-factor model for innovation adequately fits the data?
4. What evidence, if any, is there that the factor structure is invariant across gender groups?
5. What direct effects do shame and guilt have upon innovation in this population?
   a. How are the effects of shame and guilt of innovation influenced by gender?
   b. What evidence, if any, is there that the structural model is also invariant across gender groups?
   c. What are the direct and indirect effects of gender via guilt and shame on innovativeness?

Chapter 2

Literature Review

Shame and guilt are important factors in the relationship among human behavior itself. They both play a role in social factor and social situations. The attempt to differentiate between shame and guilt has become more difficult and unclear between different cultures and between individuals. If looked traditionally at shame and guilt are related to emotions rather than experiences (Keltner & Buswell, 1997). Shame can be defined as “a painful feeling of having lost the respect of others because of the improper behavior, incompetence, of oneself or another” (Webster’s New World Dictionary, 1982, p. 1308). When referring to guilt, it can be defined as a “painful feeling of self-reproach resulting from a belief that one has done something wrong or immoral” (p. 622). When solely looking at the definitions the distinction is quite clear, shame resides solely on negative outcomes and responses by outside forces and personal feelings, “shame is an unpleasant emotional reaction by an individual to an actual or presumed negative judgment of himself by others” (Ausubel, 1955, p. 382). Whereas, guilt is experienced from a negative event that was done, rather than the focus being on the individual who committed the wrongful act. Another clear distinction between the two is that shame is dependent on public exposure of ones failing, whereas guilt is more a private act and may remain hidden without anyone else breaching social norms of an immoral act (Smith, Webster, Parrott, & Eyre, 2002). Shame involves feelings associated with being negatively evaluated by others while guilt involves being negatively evaluated by one self. This is the reason why shame has more of an effect on self-esteem than guilt (Wong & Tsai, 2007). In recent studies participants associated the term shame with embarrassment while guilt stemmed from the thought of condemnation (Lewis, 1971). Understanding the distinction between the two allows for a better explanation of why shame holds a greater weight of negativity in comparison to guilt (Smith, et.al, 2002). By defining the two and becoming familiar with the terms, it paves the way for analyses of variation, if any, between the emotions in regards to gender groups.

Gender Differences in Guilt and Shame

When it comes to the topic of gender, this proves to be of much interest to humanity. There has always been a stereotype among the public that women are more emotional than men are. This theory can be related to the idea that males are more masculine and females are more feminine. Femininity and the female role are most often associated with experience, feelings, emotions, and form of communication. Women have a greater tendency to express what is inside of them and relate to what others are feeling. When discussing men, the term emotional is not commonly used. Males are associated with control and suppression of emotion (Fischer & Manstead, 2000). The idea that women are more emotional than men is found in 30 different cultures (Brody & Hall, 2000). Stereotypes are also emotion specific: Happiness, embarrassment, surprise, sadness, fear, shame, and guilt are believed to occur more in women, and anger, contempt, and pride more in men (Hess, Adams, & Kleck, 2004; Plant, Hyde, Keltner, & Devine, 2000).

Several researchers have explored gender differences in the experience of guilt and shame using a range of measures. Researchers who study adult samples often find that women report greater feelings of both shame and guilt than men do, when scenario based measures are used (Ferguson & Crowley, 1997). Gender role may influence the emergence of a shame-prone or guilt-prone pattern of response (Ferguson & Stegge, 1995), which may develop, over time, into a readiness to respond in habitual ways to certain stimuli and interpersonal situations. Guilt and shame are distressing emotional reactions to self-determined or culturally determined undesirable behaviors. It follows that guilt and shame may result from behaviors or situations that are incongruent with one's gender role. The experience of shame for men and women may reflect a perceived violation of stereotypical gender role norms. In regards to guilt proneness and shame proneness women were reported to have greater levels in both emotion categories (Benetti-McQuoid & Bursik, 2005).

Findings have proved that there are consistent differences between genders when it comes to emotions and the way it is expressed by each gender. The stereotypes that exist among the genders have proved to be true in recent studies. Females are more emotional than males and tend to express their emotions more openly than males (Brody & Hall, 2000).

Effect of Guilt and Shame on Leadership

Innovativeness is an important trait that is sought for when looking for individuals to help generate innovated ideas in the business world. Scholars have long been interested in seeking the underlying traits that distinguish successful innovators from normal individuals. This specific topic is crucial given the demand in the outside world. It is those significant individuals, with the innovation and entrepreneurship traits, that the world seeks when it is due to revitalize the economy when a crisis or economic downfall occurs (Schaumberg & Flynn, 2012). A study was conducted by Schaumburg and Flynn focused on guilt proneness in effect to leadership; the results indicated that participants with high guilt prone behaviors resulted with higher leadership standards and behaviors in contrast to less guilt prone behaviors. With this being the result, the participants that showed more guilt proneness were more determined in fixing mistakes in any way they sought fit, which led to new innovative ideas. When people feel guilt, they tend to try to eliminate past mistakes to avoid future situations that allows them to feel this emotion, guilt. According to Schaumberg and Flynn (2012), guilt proneness is positively related to leadership effectiveness as it engages individuals to tend to their needs and prioritize what is needed to be done. These traits are looked for when searching for an innovator leader. Unlike similar emotions to guilt such as shame and embarrassment, these tend to have the counter effect when analyzing these in relation to leadership. The feeling of shame pulls people away from the environment around them and shields them from prospective situations and conflict. Individuals that experience these emotions do not strive to better themselves but to hide and pull away from social groups.

Guilt proneness is a seen as a positive indicator that allows reaching the level of leaders that take charge and demand better achievement. Individuals with this emotional behavior feel a sense of responsibility that sets them apart from others (Tangney, 1991). Individuals who feel guilty also feel responsible for people around them and compel themselves to take the initiative to take care of the people around them, which allow them to possess the leadership trait. In one of the studies conducted by Schaumberg and Flynn (2012) it focused on the leadership ability of participants as a function of one's level of guilt proneness and shame proneness. The results produced the effect that the higher the shame proneness the less the leadership ability which in turn leads to less determination and less innovative ideas, in contrast to the higher the guilt proneness the higher the leadership and innovative ability. To this end, there was no literature about the effect of guilt and shame on students' innovation.

Measuring Guilt, Shame, and Innovation

Measuring guilt and shame is important as they distinguish different characteristics among individuals (Schaumberg & Flynn, 2012). These characteristics help identify human emotion and how their emotions respond given the environment around them. Shame and guilt develop naturally in the process of internalization as the gradual transformation of one's external social control mechanisms into one's own internal rules of behavior (Makogon, & Enikolopov, 2013).

The main instruments used to measure shame and guilt proneness are (a) the Test of Self Conscious Affect-3 (TOSCA-3) (Tangney, Dearing, Wagner, & Gramzow, 2000), (b) the Dimensions of Conscience Questionnaire (DCQ) (Johnson, et al., 1987), and (c) the Guilt and Shame Proneness Scale (GASP) (Cohen, Wolf, Panter, & Insko, 2011). The GASP scale was created to overcome areas that these first two instruments lack. The GASP according to its authors was established as a progressive tool in assessing moral emotions (Makogon & Enikolopov, 2013). The DCQ, which is, also a popular questionnaire differentiates these emotions based on whether the event causing them is public or personal. With the DCQ the guilt questions ask participants to indicate how badly they would feel after committing a private transgression while the shame questions ask the participant to indicate how they badly they would feel after committing a public transgression (Makogon & Enikolopov, 2013). Each instrument of measurement has its advantages and disadvantages. There is no scale or tool that measures guilt proneness and shame proneness using both self-behavior and public-private distinctions, nor is there a method to differentiate emotional and behavioral responses.

TOSCA-3 guilt and shame constructs. Guilt and shame are the two most frequently studied emotions in the self-conscious group (Tangney, 1996; Tracy & Robins, 2004). When measuring shame and guilt, it is important to have a knowledgeable understanding of what each emotion consists of. It is important to keep in mind that shame involves stable and global negative evaluation of the self, while guilt involves negative evaluation of the specific behavior or action. The commonly used instrument for measurements of shame-proneness and guilt-proneness is the Test of Self-Conscious Affect also known as the TOSCA (Robins, Noftle, &

Tracy, 2007). The TOSCA has been used to help find the relationship and connection between both emotions and different forms of psychopathologies. According to researchers when using the TOSCA-3, shame-proneness is a more maladaptive emotion as compared to guilt-proneness. It has been found to be in relation to poor psychological adjustment and to various psychopathologies, including low self-esteem, destructive anger, depression, and Post-Traumatic Stress Disorder. In contrast, guilt-proneness has been found to be not correlated or negatively correlated with these psychopathologies (Tangney, et.al., 1992).

TOSCA-3 is based on a theory that differentiates shame and guilt according to where the negative evaluation of the misbehavior is directed, at either one's self or one's actions. The TOSCA-3, which is the most widely used tool of assessment, deals with shame and guilt through 16 scenarios (11 negative and 5 positive) that people are likely to encounter on daily basis. Each situation is followed by a description of emotions. The task is to see how they would react in each of these ways on a 5-point scale given the 6 self-conscious affects; shame, guilt, externalization, detachment, alpha pride and beta pride. The guilt responses to the TOSCA-3 are based on regret and negative baggier evaluations as well as repair action tendencies. Shame responses are characterized by negative self-evaluations and withdrawal action tendencies.

Innovativeness: Dyer Innovation Measure (DNA). Innovative entrepreneurs have something called creative intelligence, which enables discovery, yet differs from other types of intelligence - as suggested by the theory of multiple intelligences (Gardner, 1983). It is more than the cognitive skill of being right-brained. Innovators engage both sides of the brain as they leverage the five discovery skills to create new ideas.

Innovation is the key ingredient of success in companies today. Innovation is introducing something new to the world that can lead us into a successful future. The secret behind the success of such ideas is its creators. The individuals that develop and brainstorm these innovative ideas plant the stepping-stones to success. One of the main questions that arise in the field of entrepreneurship is why some individuals discover opportunities for new businesses and products while others fail to recognize these opportunities (Dyer, Gregersen, & Christensen, 2008). The answer to this lays within the personality traits of entrepreneurship. The difference in personality traits between successful businesses and successful entrepreneurs are quite slim and not significant (Burmeister & Schade, 2007; Busenitz & Barney, 1997). Many researchers and studies focusing on this subject have shifted their focus on a more behavioral approach on what the entrepreneur does, rather than who they are. Jeff Dyer, Hal Gregersen and Clayton Christensen (2008) used grounded theory to study and identify the behaviors of innovators that were relevant to the creative idea generation. Their theory focused on four behaviors: questioning, observing, networking and experimenting this allowed them to develop "The Innovator's DNA Survey Assessment." This guide allows the comparison of innovative entrepreneur's behavior to a sample of managers. Questioning requires an individual to have traits such as curiosity and courage. This trait is a signal that an individual has the tendency and ability to ask proactive and challenging questions. This trait serves as the foundation, which leads to discovery skills (Dyer, et.al., 2008). Observing allows people to be aware of the environment around them while being able to view the world through different perspectives. Networking is also an important factor as it is socially focused. Being able to communicate and relate one's ideas is quite important (Dyer, et.al., 2008). The last behavioral trait is the ability to test new things by the way of experimenting. Experimenting focuses on how and what makes things work that allows researchers to analyze individuals work ethics and understanding of what goes on around them. Dyer, Gregersen and Christensen (2008) found that the four behaviors they sought were found mostly in innovative entrepreneurs rather than upper level management. The iDNA allows organizations and individuals to gain insight into which traits are present in certain individuals, which ultimately may lead to a more successful industry. When making an executive decision it is important to look at all factors that may be beneficial to the overall decision making for the future. According to Dyer, Gregersen and Christensen the iDNA feedback can help in three ways by identifying an individual's ability to discover, analyze, plan, implement new ideas, assess performance skills pertaining discovery and execution, and to facilitate individual efforts to strengthen discovery skills in order to foster innovation. Innovation is important in the entrepreneurship world yet there are controls to look at that have significant influence when considering things, Such as Age, education level and conscientiousness. No test, survey, or assessment is perfect but the trustworthiness of such instruments used is important. Trustworthiness falls upon two basis reliability and validity. The Innovator's DNA Assessment is a key tool used to measure the Discovery skills, which leads to innovation and allows an advantage in identifying individuals that exhibit behavioral traits of successful innovators.

Chapter 3

Method

Subjects

Subjects included 543 students who were registered in the Marriott School of Management School at Brigham Young University during the academic year 2014 - 2015. Participants ranged from ages 18 to 48 years old (M = 24, SD = 3.64), more than half of them (55.8%) were male. All participants were English speaking, and no translation was needed. At the time when data were being collected from students at the business school of BYU, students were asked to report their level of education. About 89% of the students reported that their education level is at the university level with or without a degree, whereas 2.8% reported that they are not at the graduate level with or without a degree. About seven percent of the sample of students reported that they have some secondary school or completed high school, despite their undergraduate status at that time. Responses included in this research were collected from all participants who signed a consent form for the use of their information.

Instruments

The instruments described below were selected based on reported validity and reliability evidence and whether or not they are widely accepted. Our goal in this study is not to measure the incidence of guilt and shame, but rather the effect of these traits on students' innovation. It is expected that the two traits to be positively correlated. Students' innovation was measured using the Dyer Innovation Measure (DNA), since it has been used in many studies and studies provided evidence for its validation and reliability.

TOSCA 3. The Test of Self-Conscious Affect (TOSCA 3), developed by Tangney, Dearing, Wagner & Gramzow (2000), has been used as an instrument for empirically distinguishing between trait emotions of guilt and shame. It was administered to students in this study to measure the constructs of guilt and shame. In this instrument, students are provided with situations that people are likely to encounter on a day-to-day basis, followed by several common reactions to those situations. As students read each scenario, they are directed to try imagining themselves in that situation, and then indicating how likely they would react in each of the ways described. They are asked to rate all responses because people may feel or react more than one way to the same situation, or may react in different ways in different times.

For example:

You wake up early one Saturday morning; it is cold and rainy outside.

a- You would telephone a friend to catch up on news.	1- - - 2 - - - 3 - - - 4 - - - 5 not likely very likely
b- You would take the extra time to read the paper.	1- - - 2 - - - 3 - - - 4 - - - 5 not likely very likely
c- You would feel disappointed that it's raining.	1- - - 2 - - - 3 - - - 4 - - - 5 not likely very likely
d-You would wonder why you woke up so early.	1- - - 2 - - - 3 - - - 4 - - - 5 not likely very likely

The scale contains 11 negative and 5 positive scenarios yielding indices of Guilt, Shame, Externalization, Detached, Alpha Pride and Beta Pride. The authors' reported TOSCA 3 test-retest reliabilities of .74 (Guilt) and .84 (Shame), and Cronbach's alpha values of .78 (Guilt), and .77 (Shame), (Dyer, et.al., 2008). The interest of this study is the guilt construct, which included 16 items, and shame construct, which also included 16 items. These constructs are considered as the independent variables.

The Dyer Innovation measures. The Dyer Innovation measure (DNA) was also administered at the same time as TOSCA-3 for the Business students of BYU during the 2014-2015 school year. The DNA instrument contains 19 items pertaining to four behaviors known as Discovery skills (Dyer, et.al., 2008). These skills are (a) questioning, (b) observation, (c) experimentation or exploring, and (d) networking, covering the innovation construct. Participants were instructed to read the items and indicate their level of agreement or disagreement on a five-point Likert scale (Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, Strongly Agree). The author reported Cronbach alpha coefficient of .74 (Questioning), .78 (Observing), .78 (Idea Networking), and .78 (Experimenting). The items for the scales held together strongly as separate factors. Nonetheless, one item that cross-loaded on Experimenting and Questioning (.42 and .52 respectively); the authors considered this item load better on Questioning. In addition, the eigenvalue was highest for the first order (6.05) followed by lower eigenvalues for the other three factors (i.e., 2.13 for Questioning, 1.21 for Observing, and 1.16 for Idea Networking). The resulted latent variables are continuous. Furthermore, the subscales were reported to be correlated fairly well, as summarized in the table 1.

Table 1

Discovery Skills Correlation as Reported by Authors

Construct	Questioning	Observing	Experimenting	Idea Networking
Questioning	1.000			
Observing	.430**	1.000		
Experimenting	.390**	.530**	1.000	
Idea Networking	.300**	.540**	.510**	1.000

All correlations were statistically significant at the ** = .05.

Procedure

The TOSCA-3 and DNA instruments were administered via Qualtrics during the 2014-2015 school year. Informed consent forms outlining the general purpose of the study and describing the confidentiality policy were distributed to all participants at the beginning of the study. Full confidentiality and anonymity were guaranteed. All participants completed the questionnaires in the following order: (a) participant consent, (b) Dyer innovation measure (DNA), (c) cultural dimension measure, (d) digit symbol substitution, (e) TOSCA-3, (f) demographic information, and (g) risk assessment and propensity. The questions of each instrument were arranged randomly. Participants were given the option to withdraw from the study at any time and would not be penalized. Upon completion of the questions, participants received compensation in the form of extra credit. For the purpose of this study, TOSCA-3 subscales of guilt and shame, DNA, and demographic information are the only variables used.

Analysis

The dataset was divided into two random halves by using systematic sampling; the first sample (Sample A) will include the odd numbered cases (n = 272), and the second sample (Sample B) will include even numbered cases (n = 271). The purpose for splitting the sample was to cross-validate the model generated from the factor analysis.

Covariate. The effect of Guilt and Shame on student's innovation model will be compared in terms of gender. Gender as a nominal variable with values of (1 males, 2 female), will be used as the covariate. Gender was recoded to 0 = male, and 1 = female.

Structural equation model (SEM). Developing the SEM began with developing the measurement model for the construct guilt, shame, and innovativeness (known as DNA).

In order to develop the measurement models, factor analysis using Mplus (Muthén & Muthén, 2010) was used to uncover the underlying structure of the latent variables guilt, shame, and innovation.

The Exploratory Factor Analysis (EFA) was used to generate hypotheses about the underlying factor structure including the number of factors to retain, which items appear to load on which factor, and the correlation between the factors. In this study, we aim at minimizing the variable complexity and maximizing the factor complexity, hence we used Geomin rotation because it is developed to variable complexity and work well with distinct clusters (Browne, 2001; Sass & Schmitt, 2010). Based on theory, scree plots, eigenvalues, factor loadings, and model fit the results from the EFA; several candidate psychometric models were identified and compared against specific criterion to identify the number of factors for each model.

Exploratory factor analysis (EFA). In this study, the EFA replication (Osborne & Fitzpatrick, 2012) procedure was used to cross-validate the hypothesis that the data fits the constructs as described in the literature. Using the criteria of the EFA replication, factor correlations, and model fit indices provide rich information about which items to keep and/or delete, and which model the data fits better. This procedure was performed for three measurement models: guilt, shame, and DNA. The EFA replication procedure included the following steps:

1. The two split samples were subject to the same EFA procedure, ideally specifying the same number of factors to be extracted, the same extraction (Geomin) and rotation procedures, etc.
2. A table was created listing each item's Standardized factor loadings within each sample, and another table listing the model fit statistics for each analysis.

3. Factor loadings: Identify the strongest loading for each item (i.e., which factor does that item "load" on) considering that the minimum loading should be .318, and confirm that these are congruent across the two analyses. Loadings with less than this criterion should be disregarded.
4. Squared difference: If a scale passes the basic test of having items structurally assigned to the same factors, the other important criterion for strong replication is confirming that the factor loadings are roughly equivalent in magnitude. At this point, simple metrics serve the purpose. Osborne and Fitzpatrick (2012) advocate for simply subtracting the two standardized (rotated) factor loadings for congruent items, and squaring the difference, to eliminate non-important negative and positive values and highlighting larger differences. They suggested setting the minimum squared difference to be .04.

EFA replication procedure provided us with the number of volatile items in the two samples. This information is very important- that these items need to be revised or deleted from the instrument. Accordingly, replication served as an exploratory purpose, of which it indicates the failing model, which includes high numbers of volatile items. This is an opportunity to revise substantially the models before proceeding to conducting CFA (Osborne & Fitzpatrick, 2012).

Confirmatory factor analysis. After an appropriate model has been hypothesized based on the results of the EFA, CFA was conducted using the total sample (i.e., 543 cases), to the proposed measurement model, and to decide whether a second-order model was needed to account for the correlations among the first-order factors, and decide if any correlated errors should be specified in the model.

Model fit and model comparisons. The most commonly used test to check global model fit is the chi-square test, but it is dependent on the sample size. It rejects reasonable models if the sample is large and it fails to reject poor models if the sample is rather small (Bentler & Bonette, 1980; Browne & Cudeck, 1989). Furthermore, it cannot be used for non-nested models, instead, three other types of fit indices that can be used to assess the fit of a model.

As recommended by (Hu & Bentler, 1999), we compared different parameters in order to evaluate the EFA, CFA, and SEM model fit, Comparative Fit Index (CFI) and Tucker Lewis Index (TLI) as relative fit indices, Root Mean Square Error of Approximation (RMSEA) as a parsimony corrected fit indices, Standardized Root Square Mean Residual (SRMR) as an absolute fit indices. We chose to rely on the indices that are less sensitive to sample size (TLI, RMSEA; Sharma, Mukherjee, Kumar, & Dillon, 2005). Further, because SRMR is not available for SEM categorical outcome testing in Mplus, this model specification index will be used only to evaluate the measurement model only. Although values of.06 or less are considered an adequate fit for SRMR and RMSEA (MacCallum, Browne, & Sugawara, 1996), values of.05 or less represent a more conservative choice. A value of.95 and above is considered an excellent fit for CFI and TLI. In addition, a 3.0 value or less represents the best ratio for χ^2/df (Bentler & Bonett, 1980). To compare non-nested CFA models, Akaike Information Criterion (AIC; Akaike, 1987), Bayesian Information Criterion (BIC; Schwartz, 1987), and Sample-Size Adjusted Bayesian Information Criterion (ABIC; Sclove, 1987) are usually used, but they are not applicable for categorical data.

Table 2

Recommended Guidelines for Assessing Model Fit

Absolute and parsimony corrected fit indices	Degree of fit	Relative fit indices
.00	Exact	1.00
.01 -.05	Close	.95 -.99
.05 -.08	Acceptable	.90 -.95
.08 -.10	Mediocre	.85 -.90
>.10	Poor	<.85

Adequacy of factor loadings was examined for all models. Although factor loadings exceeding .40 are considered acceptable (Hair, Anderson, Tathman, & Black, 1998). Based on personal communication with Dr. Sudweeks on October 2015, we decided to adopt a less conservative standard of .318, because we are looking for an item that has at least 10% of the variance explained by the factor.

Finally, Cronbach's alpha coefficient was examined for each scale. Researchers reported that all reliabilities that exceeded .70 criterion suggested by Nunnally (1978) were considered acceptable (McAllister & Bigley, 2002; Schilling, 2002; Spector, et al., 2002) assuming that scales with .70 and above reliability maintained adequate internal consistency reliabilities. However, Nunnally suggested that the intended use of the scale determines the satisfactory level of reliability. Henceforth, appropriateness of the acceptable reliability is determined by researchers according to the measurement context (John & Benet-Martinez, 2000; Schmitt, 1996). However, Cronbach's alpha tends to underestimate the reliability of the scale due to its assumptions, especially when the factor loadings are not equal, which leads to the violation of the assumption of Tau equivalence (Yang & Green, 2011). Hence, it will be compared to the composite reliability, which takes account each of the latent factor's contribution to each item and item's error, Raykov's rho (Raykov, 1997).

Model invariances. Multiple group invariance of the final models was tested for males and females. Measurement invariance will be investigated by testing the invariance of measurement parameters across groups (i.e., males and females). Measurement parameters include intercepts, factor loadings, and residual variances of the factor indicators (Muthén & Muthén, 2010).

We tested the CFA models for each group separately (i.e., male and female) to test for configural invariance, whether the factor structure is valid in each group, to test the difference between group means, and to analyze the relationship of the scale to other variables in each group. The subcommand in Mplus, USEOBS, allows us to select subsets of cases to be used in a particular analysis. For example, when using USEOBS Gender = 1. This subcommand will limit the analysis to males' participants only, instead of creating separate sample by gender. The purpose of this step is to investigate whether there is significant difference in the model structure between genders. The results are important to identify the next steps in the analysis; if the loadings for the items on the underlying factor/s are the same across groups, then the measurement invariance is supported (Cheung & Rensvold, 2002; Horn & McArdle, 1992; Meredith & Millsap, 1992; Millsap, 1998; Schoot, Lugtig, & Hox, 2012; Vandenberg & Lance, 2000) and represents one approach to the measurement invariance.

Using hierarchically nested steps, we determined the measurement invariance (MI) to test whether the same construct is being measured across groups (i.e., gender). The MI steps are: (a) a baseline model for each group, (b) configural invariance, to test the same pattern of factors and loadings across groups, established before conducting measurement invariance tests, (c) and weak (Metric) invariance, to test the invariant factor loadings. The measurement invariance was tested for three measurement models: guilt, shame, and innovativeness.

The structural model. Finally, we used the final developed measurement models to create a structural model using the total sample, to verify the prospective link between latent variables of guilt, shame, and innovation for the students of BYU. Configural invariance was tested between male and female as a first step by developing two SEM models for males and females. The next step was examining the significance of the interaction between gender and guilt, and gender and shame. The final step, was examining the direct effect of guilt, shame, and gender, and the indirect effects of gender via guilt and guilt via shame on innovativeness

Missing values. Missing value analysis helps address several concerns about incomplete dataset. If cases with missing values are systematically different from cases without missing values, the results can be misleading. In addition, missing data may reduce the precision of calculated statistics because there is less information than originally planned.

The researcher conducted the missing values analysis for the original dataset, and found that there are 12 cases answered one or two variables and dropped the rest of the questionnaire. These cases were deleted from the data set, hence the final dataset consisted of 543 cases with only .29% of the values missing, which comprise of 10.60% of the cases did not fill all the questions. However, the researcher conducted missing values analysis to uncover differences, if any, between the cases with missing values and cases without missing values. The results concluded that there is no significant difference between the cases with missing values and cases without missing values. Accordingly, there is no need for missing data imputation.

Chapter 4

Results

In this chapter, results from the factor analysis were used to develop and evaluate measurement models of guilt, shame, and innovativeness based on the questionnaires are presented. The results of the EFA replication are presented first, followed by the results of the CFA of each measurement model. Measurement invariance is then discussed followed by the general SEM and SEM with gender as a covariate. Finally, the structural invariance between males and females is presented.

Exploratory Factor Analysis (EFA)

EFA of the guilt scale. The two sub-sample, which were systematically split, were analyzed separately. Three factors were extracted and rotated using Geomin rotation. The model fit indices, factor loadings, and factors correlation were examined, and compared to the results from the EFA conducted on the two sub-samples. The Eigenvalues for both analyses (sample A, and sample B) show that the first factor accounted for the most variance, 4.903 for Sample A and 5.071 for sample B.

Three-factor model. The first criterion to assess is the factor structure. Seven of the sixteen items failed to replicate basic structure; in other words, they loaded on non-congruent factors. Further, the squared difference for the loadings of items 2, 5, 8, and 9 were larger than .04, reflecting a large change in factor loading. Eleven items out of the16 items failed the replicability test (Table 3), despite model fit statistics showed better fit compared to the two-factor and one-factor model (Tables 4 and 5). In addition, the factor correlations between the three factors were not statistically significant.

Two-factor model. Replication of guilt scale failed to meet the initial criterion of structural replication. Specifically, looking at the factor loadings in Appendix A, items 8, 13, 14, and 15 have the highest loadings on Factor 1 in the first EFA and on Factor 2 on the second EFA. All other items have their strongest loadings on congruent factors, so if we decide to delete these items, we would say that the factor structure of the scale meets the basic level of replication. The next step was to examine the squared difference in the factor loadings. These ranged from .000 to .060, indicating that item 9 is considered as volatile item, and we may consider deleting it. In total, if to consider this model, we will have to delete five items. The third criteria examined the model fit statistics, which showed good fit for the two-factor, however, there are five items that failed the EFA replication test, and the two factor correlated fairly well (Table 3).

One-factor model. The relative fit indices (Table 4) show a close to acceptable fit, SRMR indicates a close fit, and RMSEA indicates an acceptable fit for both EFAs. The factor loadings are compared by estimating the squared difference between factor loadings from EFA_A and EFA_B. Both EFAs showed that two items (G6 and G11) have low loadings (Annex I), deleting these two items may enhance the model fit statistics. Based on the previous criteria, the one-factor model, with deleting the two low loading items was selected as the model that may fit the data, and was followed by CFA to confirm the hypothesis.

EFA of the shame scale. The same procedure and criteria used to develop and test guilt scale was used to test shame scale.

The four-factor model. Only 2 items of the 16 items passed the first criteria of the factor structure, and the rest failed. One item failed the squared-difference test. This reason is strong enough to reject the four-factor model regardless the model fit statistics. In addition, the factors were poorly, and non-significant, correlated with a range of -.17 to .481.

Three-factor model. Fifteen items failed the factor structure replicability test, which is a substantial reason to also reject the three-factor model for the construct shame. Factor 2 and Factor 3 had non-significant poor correlation (.092), while factor one and factor two are statistically significant and reasonable correlated (.628).

Two-factor model. Three items (2, 5, and 7) load on Factor 1 for each of the analyses, however, item 7 cross-loads on both factors in the $EFA_{(Sample\ A)}$ and dual loading in the $EFA_{(Sample\ B)}$, hence, this is a failed item. Item 8 loads on Factor 2 in the $EFA_{(Sample\ A)}$, but it did not pass the minimum loading criteria (.318) and it cross loads on both factor, hence it is a failed item. Item 2 has a high squared difference that is larger than .04. In summary, there are two pass items on factor 1 and the rest of the items on Factor 2, with a non-significant factor correlation of .181. It is not recommended to have a factor with only two items.

The relative fit indices CFI and TLI show acceptable and mediocre degree of fit with values of .925 and .899 respectively, whereas the parsimony corrected indices, RMSEA, and SRMR show acceptable degree of fit for both analyses. We may conclude that the two-factor model is not recommended.

One-factor model. The factor structure criteria is pass for this model by default because there is only one factor. All items passed the square different test with minimum value of .001 and maximum value of .025. However, the $EFA_{(Sample\ A)}$ showed that item 5 did not pass the minimum factor loading criteria with a value of .171, and the $EFA_{(Sample\ B)}$ showed that items 1, 2, 3, and 5 did not meet this criteria. The relative fit indices CFI and TLI and parsimony corrected indices show mediocre degree of fit with values of .861 and .839 and .077 respectively, while the absolute fit indices indicate a poor fit.

Despite the model's fit statistics showed mediocre degree of fit for the one-factor model, the other models did not have a consistent and good factor structure. Hence, one-factor model with deletion items 1, 2, 3, and 5 is selected to be the model that may fit the data.

EFA of the Innovativeness scale. The same procedure and criteria were used when conducting EFA replication for the innovativeness scale. The two analyses showed that there are four possible factors, where the eigenvalues were explained by four factors. The most variance, as always is explained by the first factor, and progressively less variance is explained by the following three factors.

One-factor model. By default, all items passed the factor structure criteria. Examining the squared difference test, all the items have a difference of less than .04. However, item Q3 loads poorly on the one factor in both analyses. The model fit statistics show mediocre to weak degree of fit.

Two-factor model. More than half of the 19 items failed the first criterion; the factor structure, which means that they loaded on non-congruent factors, which they had non-significant correlation. Further, and one item failed the squared difference test. In summary, of the 19 items, only three items passed the first two criteria. The model fit statistics show close to mediocre degree of fit.

Three-factor model. $EFA_{(Sample\ A)}$ showed that experimental and questioning items load on Factor 1 and observation items and two idea networking items load on Factor 2, and only two items of idea networking load on Factor 3. As mentioned in the shame two-factor model case, it is not recommended to have a factor with only two variables. However, $EFA_{(Sample\ B)}$ showed different results; experimental items loaded on Factor 1, idea networking, and observation loaded on Factor 2, and questioning items loaded on Factor 3. This means that the two analyses are not consistent in the factor structure. Both analyses have acceptable to mediocre degree of fit.

Four-factor model. The two analyses have the same items load on the same factors except for items IN2 that loaded on Factor 1 in $EFA_{(Sample\ A)}$ and on Factor 2 in $EFA_{(Sample\ B)}$. Furthermore, item E3 loaded poorly on all factors in both analyses, which mean there is consistency with the factor structure. The correlation between the four factors range is .291 to .616 in $EFA_{(Sample\ A)}$ and .297 to .472 in $EFA_{(Sample\ B)}$. Furthermore, the model indices indicate acceptable to close degree of fit for both models. Based on EFA replication results, the data fits better the four-factor model, after deleting items E3 and IN2.

Table 3

Number of Items Violating the Factor Structure, Squared Difference and Factor Loading Criteria

		Criteria			
Construct	Model	Factor structure	Squared difference	Factor loading	Number of volatile items
Guilt (16 Items)	3-F	7	4	1	12
	2-F	4	1	2	7
	1-F	NA*	NA	2	2
Shame (16 Items)					
	4-F	11	1	3	15
	3-F	15			15
	2-F	2	1	2	5
	1-F	NA	NA	4	4
Innovativeness (19 Items)	4-F	1	--	1	2
	3-F	8	--	1	9
	2-F	14	1	2	17
	1-F	NA	NA	1	1

*NA = Not Applicable.

Table 4

Model Fit Statistics Results for the EFA, Guilt, Shame, and Innovativeness Constructs for Sample A

Construct	Model	Chi squared	p	CFI	TLI	RMSEA	SRMR	Factor correlations
Guilt (16 Items)	3-F	91.721	< .000	.991	.985	.029	.037	.702, .278, .28
	2-F	123.506	.0091	.981	.974	.038	.044	.602*
	1-F	195.452	.0920	.950	.942	.057	.060	
Shame (16 Items)	4-F	88.734	< .000	.980	.961	.040	.033	.154, .103, .370, .115, .375, .163
	3-F	139.452	< .000	.952	.922	.057	.044	.052, .026, .421
	2-F	188.766	< .000	.925	.899	.065	.054	.306*
	1-F	188.766	.0146	.925	.899	.065	.054	
Innovativeness (19 Items)	4-F	225.759	< .000	.960	.932	.068	.042	.538*, .291*, .616*, .443*, .352*, .414*
	3-F	308.912	< .000	.938	.910	.078	.052	.493, .436, .381
	2-F	431.619	< .000	.904	.878	.091	.065	.664
	1-F	580.835	< .000	.862	.845	.102	.078	

* Correlation is statistically significant at the .05.

Table 5

Model Fit Statistics Results for the EFA, Guilt, Shame, and Innovativeness Constructs for Sample B

Scale	Model	Chi squared	p	CFI	TLI	RMSEA	SRMR	Factor Correlations
Guilt (16 Items)	3-F	118.517	< .000	.974	.958	.047	.047	.344, .435, .626
	2-F	149.308	.0001	.964	.951	.051	.054	.440*
	1-F	226.048	.0010	.926	.915	.067		
Shame (16 Items)	4-F	82.716	< .000	.980	.962	.036	.037	.048, -.023, .481, -.174, .350
	3-F	110.432	< .000	.966	.946	.042	.042	.124, .628, .092
	2-F	156.848	.0049	.935	.913	.054	.053	.181
	1-F	230.793	.0405	.879	.860	.068	.070	
Innovativeness (19 Items)	4-F	191.080	< .000	.964	.938	.058	.044	.469*, .459*, .387*, .472*, .437*, .297*
	3-F	286.282	< .000	.931	.900	.074	.055	.667*, .222, -.035
	2-F	427.473	< .000	.881	.848	.091	.069	.423
	1-F	582.376	< .000	.826	.804	.104	.091	

* Correlation is statistically significant at the .05.

Confirmatory Factor Analysis

The extent to which confirmatory factor models measuring guilt (with 14 items each on a 5-point response scale), shame (with 12 items each on a 5-point response scale), and innovativeness (second-order model, with 12 items each on a 5-point response scale) fit the data was examined using Mplus v. 7.11. WLSMV estimation with THETA parameterization was used to estimate all models. Model fit statistics that describe the degree of fit of the model, item loadings, existence of correlated errors, and factors correlations, when exist, were examined.

CFA of the guilt scale. Based on the hypothesis developed from the EFA replication procedure, the data were tested for a one-factor model (Figure 1). The factor loadings of the items ranged from .398 to .690, which fits the minimum requirement for factor loading criterion in this study. The Chi-square fit statistic was 182.491 and statistically significant, ($p < .000$, df = 77). The model fit statistics of the one-factor model, with two items deleted, indicated close degree of fit to the observed model, (CFI = .966, TLI =.960, RMSEA =.051, SRMR = .048). The test for minimum modification indices of 20 showed there are no correlated errors between items that should be included in the model.

CFA of the shame scale. The one factor-model, after items 1, 2, 3, and 5 were deleted, was tested (Figure 2), and the model fit statistics indicated close to acceptable degree of fit. The Chi-square fit statistic was 183.118 and statistically significant, ($p < .000$, df = 54). The CFI and TLI were .941 and .927 respectively, RMSEA was reported to be .067, and SRMR was .049 which is considered as close fit. The modification indices showed there are no correlated errors that should be included in the model.

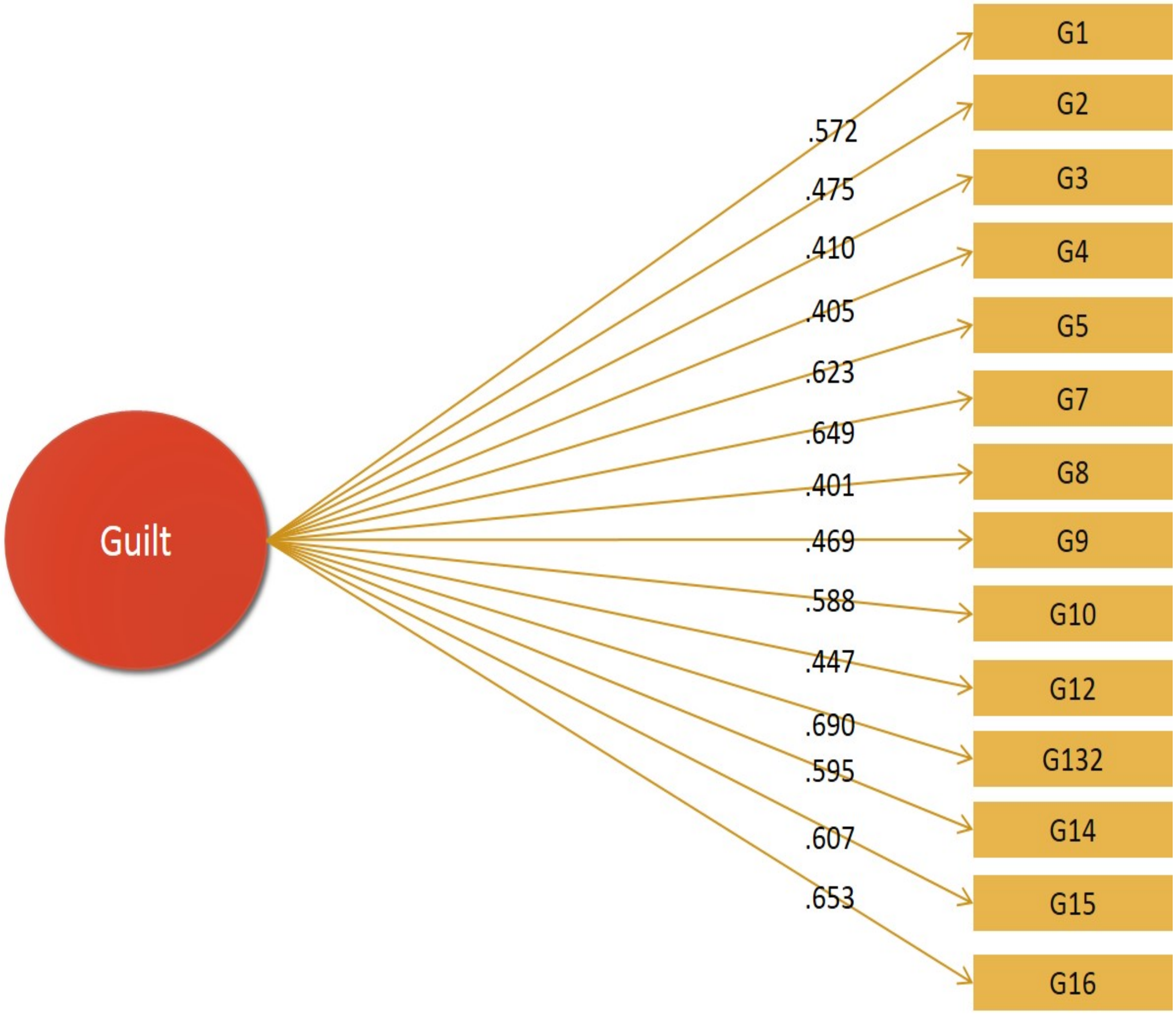

Figure 1. One-factor model of guilt construct.

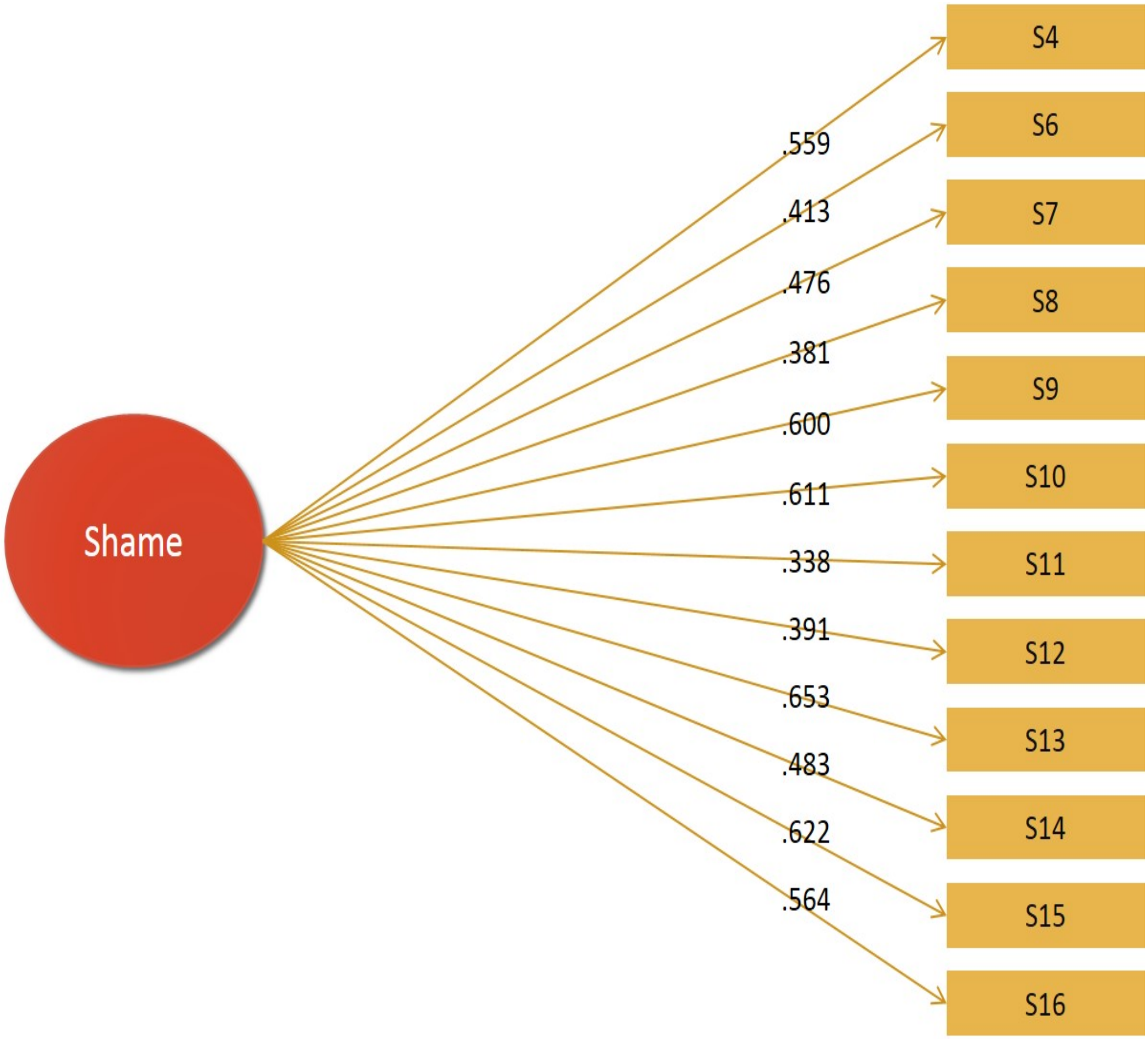

Figure 2. One-factor model of shame construct.

CFA of the innovativeness scale. Four-factor innovativeness model (items E3 and IN2 not included) was examined. The minimum factor loading was .323 for item Q3 and the highest was .795 for O2. The four factors were reasonably correlated as reported in Table 5. All of the correlation coefficients where below .85, which indicates that these factors measure different things, which supports discriminant validity (Campbell & Fiske, 1959).

Table 6

Discovery Skills Correlation as Reported by CFA- Mplus

Factor	Experimental	Idea Networking	Observation	Questioning
Experimental	1.000			
Idea Networking	.619	1.000		
Observation	.644	.657	1.000	
Questioning	.668	.629	.595	1.000

Since the four factors were hypothesized to measure innovativeness, a second-order model and a one-factor model were tested against the first-order-four-factor model. The first order, four-factors model had a model fit compared to the first order, one-factor model, which indicated a mediocre fit. Furthermore, the second-order model indicated an acceptable fit (table 6). The Chi squared difference test indicated that the second-order factor is a better fit than the two other models with a $\Delta \chi^2$ value of 4.937, *df* = 2, and p = .0847, where the chi-square difference test of the one factor model against the four factor model results a value of 301.193, *df* = 6, and $p < .000$.

Table 7

Model Fit Indices Innovativeness Models; One-Factor, Four-Factor, Higher-Order

Model	Chi squared	*df*	p	RMSEA	CFI	TLI
First order, four-factors	379.577	113	< .000	.066	.946	.935
First order, one-factor	917.689	119	< .000	.112	.835	.812
Second order model	373.171	115	< .000	.065	.947	.937

Measurement Model

Once the constructs were validated, the full measurement model with the three constructs was tested to examine the degree of fit, and assess the existence of correlated errors between guilt and shame as a first step, then the guilt, shame and innovativeness all together.

Fifteen correlated errors between guilt items and shame items were found. This was expected due to the nature of the instruments; it is based on scenarios, where for each scenario, there are two items that represent guilt and shame, and the student must answer each one. The correlation between items may be due to a method effect, such that the instruments used in this study are self-report. In addition, the correlated items are negatively worded items, which may cause the correlation errors in the model (Tomás & Oliver, 1999). Three types of correlated errors:

1. Covariance between parallel items within the same scenario across the two constructs. (For example S9 and G9, and S15 with G15.)
2. Covariance between items containing different scenarios across constructs.
3. Potential covariance between items corresponding two different scenarios within the same construct. (For example, there is no correlated error between S16 and S15, or S16 with any other items in the shame scale.) These covariances were not statistically significant, and were not included in the model.

The correlated errors within scenarios are theoretically justified, because the wordings are close and similar. For example, item 9 in the Guilt scale states: “You are driving down the road, and you hit a small animal. You'd feel bad you hadn't been more alert driving down the road,” and item 9 in the Shame scale states: “You are driving down the road, and you hit a small animal. You would think: I'm terrible.” These two items are correlated with an expected value of

.626, with modification index of 123.23. The across scenario correlated errors are due to the similarity in the scenarios, for example, scenario 8 states: “You are taking care of your friend’s dog while they are on vacation and the dog runs away. You think: I am irresponsible and incompetent.” While scenario 16 states: “You walk out of an exam thinking you did extremely well. Then you find out you did poorly. You would think: I should have studied harder.” Both scenarios are about responsibility and competence to do better job at what the person is doing. Scenarios 5, 8, 9, and 7 describe situations related to friends and co-workers, while scenarios 3, 4, 11, and 16 describe situations regarding actions and responsibilities.

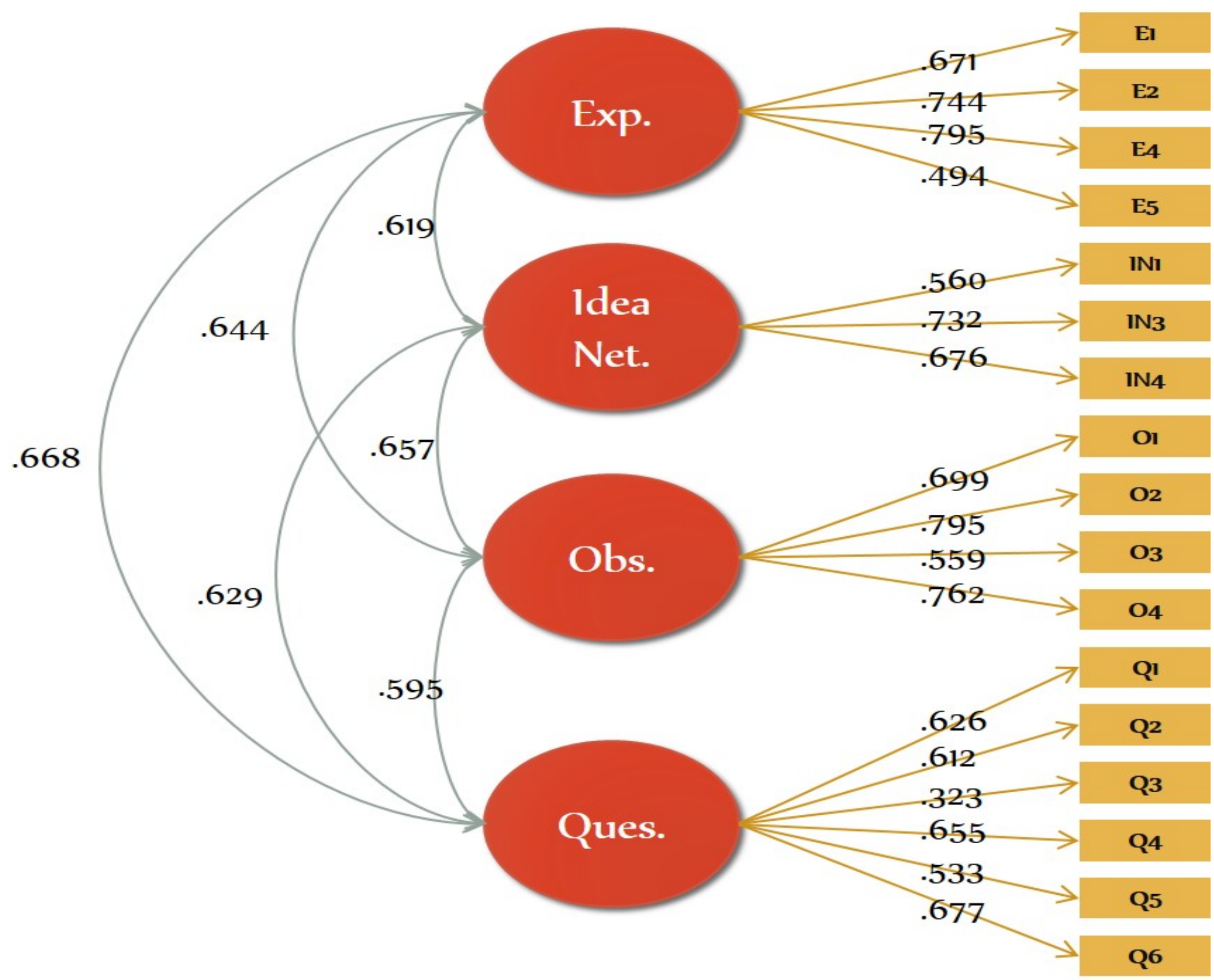

Figure 3. First-order, four-factor model of innovativeness construct.

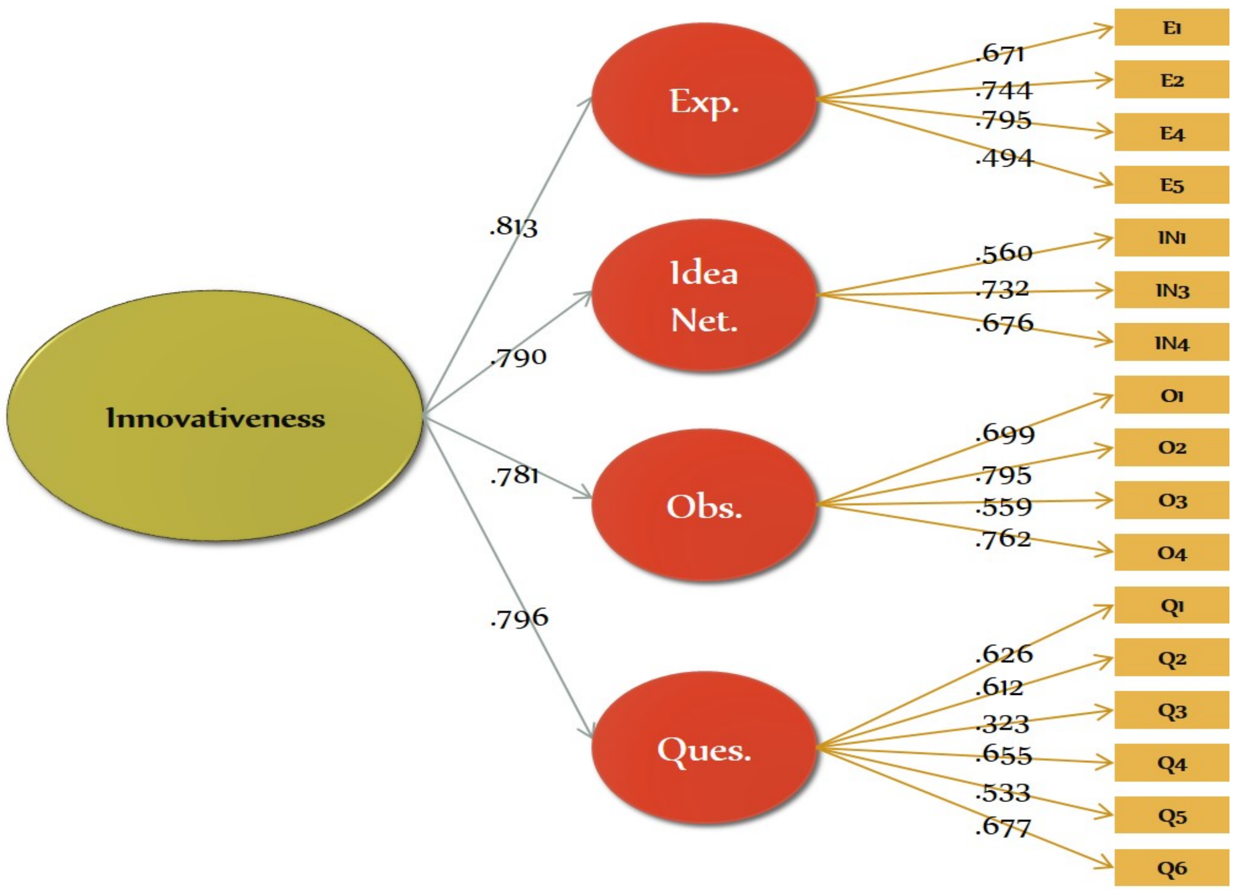

Figure 4. Second-order model of the Innovativeness construct.

Adding the correlated errors in the measurement model improved the model degree of fit substantially, where the chi-square difference between the two models was 392.601, and the model without the correlated errors indicated mediocre fit, whereas when accounting for the correlated errors, it indicated an acceptable fit. However, in the second model, the modification indices suggested more correlated errors, but accounting for them did not change the model fit, and the scenarios were not logically correlated, so they were not accounted for in the final guilt-shame model. The correlation between guilt and shame is .535. Although there is no standard value for discriminant validity, Campbell and Fiske suggested that a result less than .85 indicates discriminant validity likely exists between the two scales, and since .535 is less than .85 we can conclude that discriminant validity exists between the scale measuring guilt and shame. Consequently, the two scales measure theoretically different constructs.

Table 8

Comparison of the Measurement Model of Guilt and Shame Comparison

Model	Chi-Squared	*df*	p	RMSEA	CFI	TLI
No correlated errors	1093.053	298	< .000	.071	.853	.840
Correlated errors included	700.452	283	< .000	.053	.923	.911

The full measurement model including innovativeness was developed to examine existence of correlated errors between guilt, shame, and innovativeness, and examine the model fit for the measurement model. The results indicated a close to acceptable degree of fit, (χ^2 = 1407.776, p <.000, *df*= 838, CFI = .932, TLI = .927, RMSEA = .036), and no additional correlated errors found between the innovativeness items and guilt and shame. The correlation between shame and innovativeness is negative and low (-.207), whereas the correlation between guilt and shame is positive and low (.154).

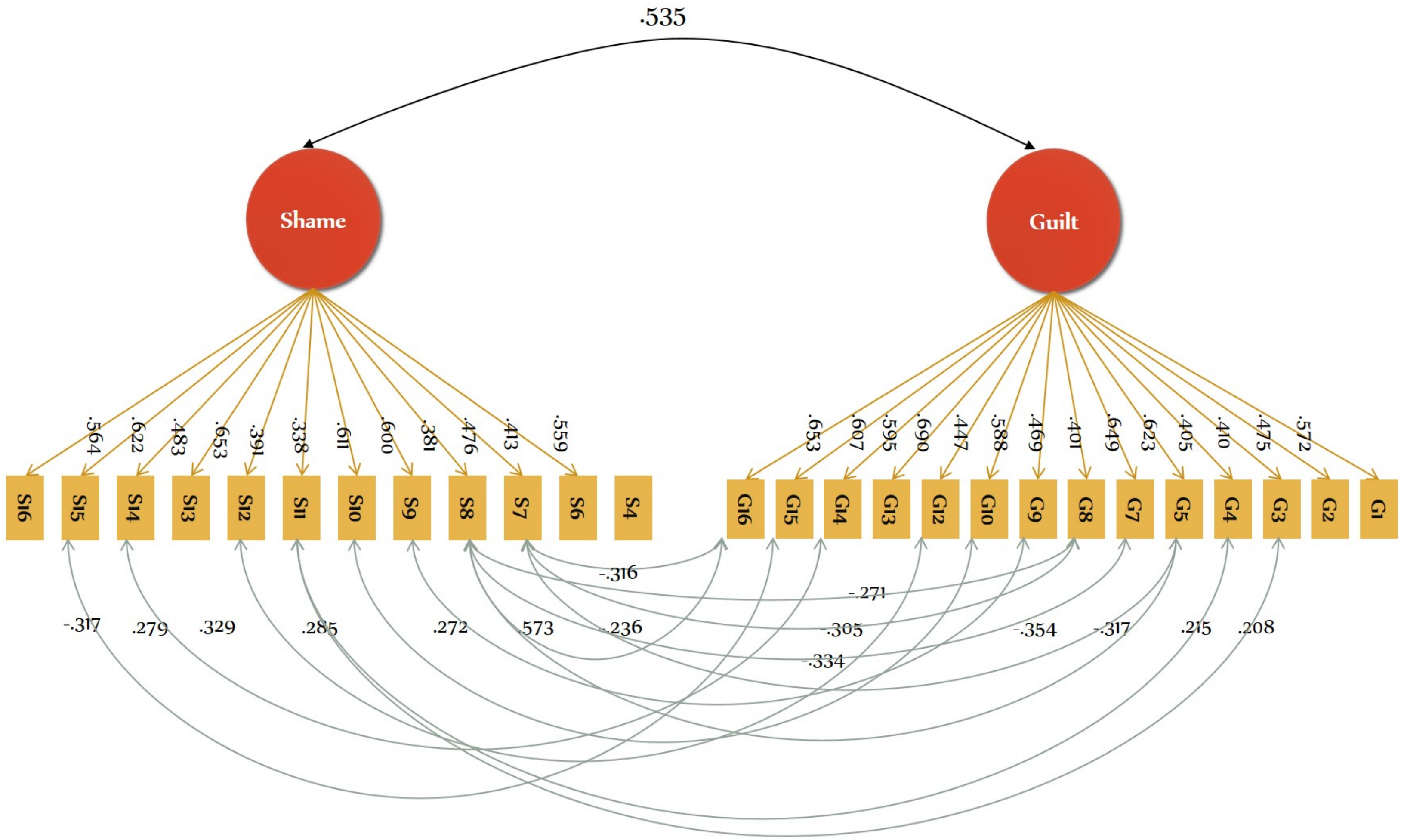

Figure 5. Measurement model of Guilt and Shame, including the correlation errors between the two constructs.

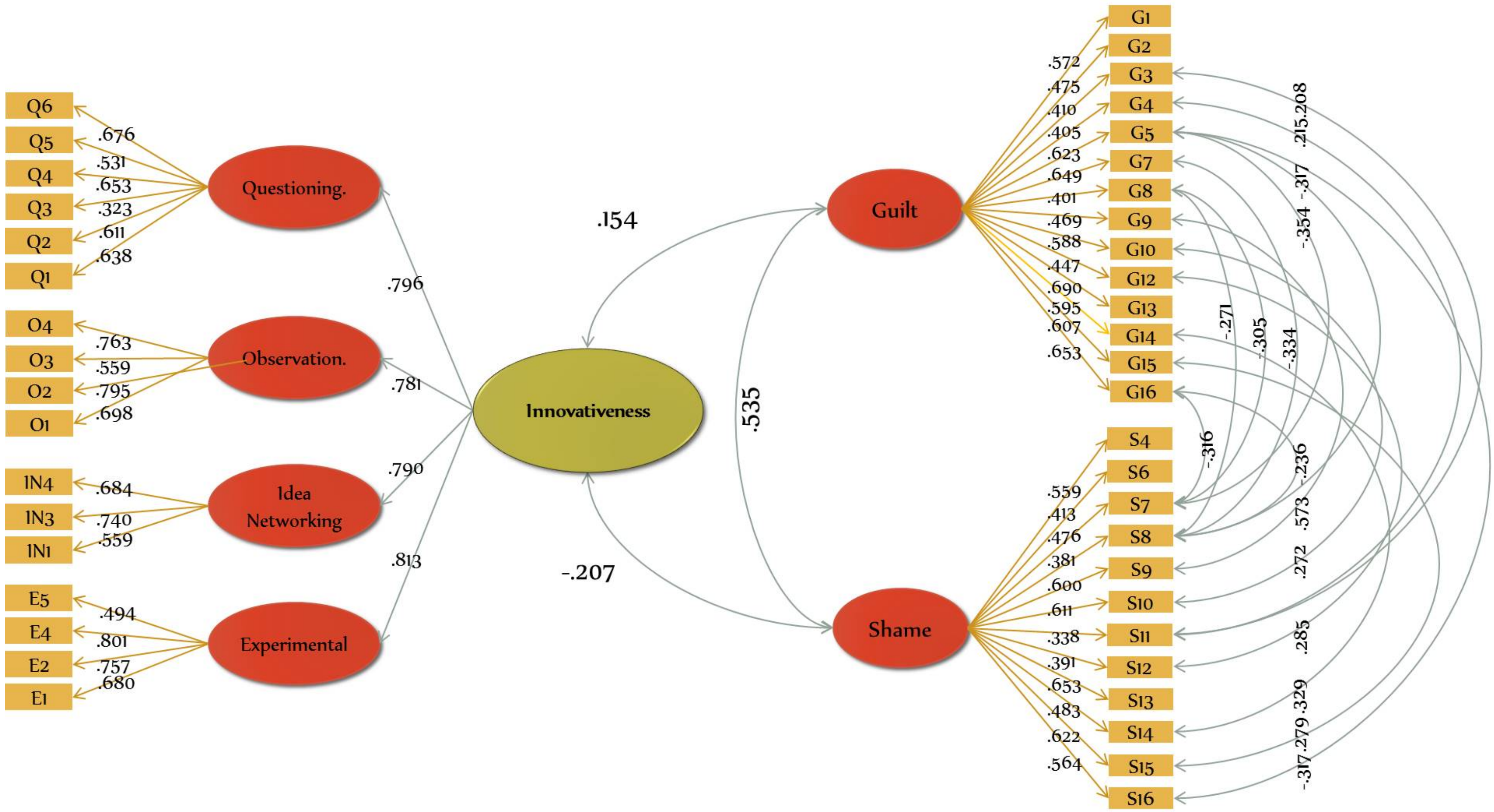

Figure 6. Full measurement model.

Reliability. Using R version 3.2.2, reliability values were estimated by coefficient omega. Cronbach Alpha was tested for the four factors separately based on their observed variances and covariances (R Development Core Team, 2013). Raykov's Rho uses the factor loadings of items, factor variance, the variance of measurement errors and the covariance of measurement errors (R Development Core Team, 2013; Raykov, 2001). Bentler's (1972, 2009) coefficient omega uses the measurement error covariance matrix, the model-implied covariance matrix, and the *k*-dimensional vector, and if Bentler's coefficient omega and Raykov's rho are different, this means that there are dual factor loadings within the model (R Development Core Team, 2013). Finally, McDonald (1999), omega hierarchical coefficient, was calculated for each construct. If the model fits the data well, this third coefficient omega will be similar to the Raykov's rho and Bentler's omega (R Development Core Team, 2013).

Cronbach's alpha is not applicable for estimating scores from a higher-order factor model (Brunner, Nagy, & Wilhelm, 2011). Accordingly, instead of using Cronbach's alpha, we used McDonald's coefficient omega (McDonald, 1985) to estimate the reliability for the second-order model. The reliability for the second-order factor of innovativeness scale was calculated using the first coefficient omega. The model-implied covariance matrix of a second-order factor model can be separated into three sources: the second-order factor, the uniqueness of the first-order factor, and the measurement error of indicators (McDonald, 1999). The first-order factors reliability was estimated as .760, and the second level is .871, and the partial coefficient omega at Level 1, or the proportion of observed variance explained by the second-order factor after partialling the uniqueness from the first-order factor is .858. All of the reliabilities of the model are considered high and acceptable (Nunnally, 1978; Schilling, 2002; Spector, et al., 2002).

Table 9

Reliability Coefficients Comparison as Reported in R, 2013

Reliability Coefficient	Experimental	Idea Networking	Observation	Questioning	Guilt	Shame
Cronbach's alpha	.721	.643	.748	.706	.774	.782
Raykov's rho	.723	.646	.756	.699	.774	.782
Bentler's omega	.723	.646	.756	.699	.774	.782
McDonald's omega	.721	.641	.759	.680	.765	.770

Measurement Invariance (MI)

The extent to which confirmatory factor models measuring guilt, shame, and innovativeness exhibited measurement invariance between women and men was examined. Nested model comparisons were conducted using the DIFFTEST procedure available in Mplus version 7.11. The analysis proceeded by applying parameter constraints in successive models to examine potential decreases in fit resulting from measurement or structural non-invariance between men and women, with men classified as the reference group.

Configural invariance. For each construct, the configural invariance model was initially specified in which the model was estimated simultaneously in each group. To run separate analyses based on groups represented by values on a variable in the data set, we used the VARIABLE section of the code, substituting the variable's name and value as appropriate. The analysis was specified to use only cases that have a value of 0 on the gender variable in the dataset. After running the model with this group, the second run included the value was changed to 1 to run the model with female group. The patterns of factors and loadings are the same across groups, equivalent magnitude and direction effect of shame and guilt on innovativeness, and equivalent correlated errors, which means that the configural structural invariance is achieved at this point.

Model fit statistics and patterns of factor loadings across groups were examined. We looked in this model for similar, but not identical constructs. The factor variance was fixed to 1.0 in the reference group and free in the other, because loadings for marker items (fixed 1.0 for identification) would be assumed invariant, and thus they could not be tested. The factor mean was fixed to 0.0 in each group for identification, such that all item factor loadings (one per item) and thresholds (four per item given five response options) were then estimated. As shown in Table 10, the configural invariance model had good fit for all constructs in this study, and we may conclude the two groups have configural invariances in guilt, shame, and innovativeness. Guilt configural model indicated good degree of fit (χ^2 = 326.503, p <.000, *df* = 208, CFI =.963, TLI = .958, RMSEA = .047), which means that both groups have the same factor patterns. Two CFAs were conducted for males (χ^2 = 326.503, *df* = 77, p <.000, CFI = .958, TLI = .963, RMSEA = .047), and females (χ^2 = 133.862, *df* = 77, p <.000, CFI = .962, TLI = .955, RMSEA = .057). The two groups showed a good degree of fit for one factor model of guilt, with no correlated errors.

Shame configural model showed good model fit (χ^2 = 338.171, p <.000, *df* = 208, CFI = .918, TLI = .904, RMSEA = .068), and the CFA's for the two groups were conducted separately. Males group showed a mediocre degree of fit (χ^2 = 127.080, *df* = 54, p < .000; CFI = .892, TLI = .868, RMSEA = .068), as well as the females group (χ^2 = 143.036, *df* = 54, p < .000, CFI = .927, TLI = .911, RMSEA = .084).

The innovativeness configural model also showed a good fit (χ^2 = 547.204, p <.000, *df*= 286, CFI = .947, TLI = .944, RMSEA = .059). In addition, the two groups showed an equivalent factor structure and patterns, where the males showed a (χ^2 = 223.551, *df* = 115, p < .000, CFI = .961; TLI = .954, RMSEA = .057), and the females showed a degree of fit (χ^2 = 291.750, *df* = 115, p < .000, CFI = .904; TLI = .887, RMSEA = .082).

Table 10

Model Fit Indices Comparison for Configural Invariance Tests for Guilt, Shame, and Innovativeness

Construct	Model	Chi squared	p	*df*	RMSEA	TLI	CFI
Guilt	Configural	341.551	< .000	195	.054	.951	.948
	Male	146.723	< .000	77	.056	.937	.947
	Female	121.932	< .000	77	.050	.964	.970
Shame	Configural	338.171	< .000	154	.068	.904	.918
	Male	127.080	< .000	54	.068	.892	.868
	Female	144.513	< .000	54	.085	.928	.912
Innovativeness	Configural	547.204	< .000	286	.059	.944	.947
	Male	223.551	< .000	115	.057	.954	.961
	Female	291.750	< .000	115	.082	.904	.887

Metric invariance. This model implies that the same constructs are being measured across groups. The factor variance was fixed to 1.0 for the male group model for identification purposes, but was freely estimated in the female group; the factor mean was fixed to 0.0 in both groups for identification. All factor loadings were constrained equal across groups. The metric invariance model did not fit significantly worse than the configural invariance models for all constructs (Table 5). The modification indices did not suggest any points of localized misfit for the constrained loadings. The fact that metric invariance (i.e., “weak invariance”) held indicates that the items were related to the latent factor equivalently across groups, or more simply, that the same latent factor was being measured in each group.

After confirming the configural measurement for guilt construct, a more constrained model was developed to compare it with the configural mode. The Metric model fit showed good fit (χ^2 = 262.315, p <.000, *df* = 168; CFI = .951, TLI = .954, RMSEA = .054), with $\Delta\chi^2$ 13.808, *df* = 168, p = .3875, which means that the two groups are invariant in the construct guilt. The same procedure was performed for shame, of which the configural model showed a good fit (χ^2 = 338.171, p <.000, *df* = 208, CFI = .918, TLI = .904, RMSEA = .068), and the metric model has a $\Delta\chi^2$ 17.930, *df* = 119, p .0832. Innovativeness metric model, also, showed a good fit (χ^2 = 501.816, p <.000, *df* = 241, CFI = .943, TLI = .937, RMSEA = .067), with $\Delta\chi^2$ = 24.352, *df* = 248, p = .0821.

Table 11

Model Fit Indices Comparison for Weak Measurement Invariance Tests for Guilt, Shame, and Innovativeness

Construct	Chi squared	p	*df*	$\Delta\chi^2$	p	RMSEA	TLI	CFI
Guilt	262.315	< .000	168	13.808	.3875	.054	.954	.951
Shame	267.094	< .000	119	17.930	.083	.069	.923	.915
Innovativeness	515.217	< .000	248	24.352	.0821	.064	.937	.943

Structural Equation Model

Full SEM model. The direct effect of guilt and shame on innovativeness was tested using the SEM procedure. The model indicated an acceptable degree of fit (χ^2= 1407.776; *df* = 838; p < .000; CFI = .932, TLI = .927; RMSEA = .036), and the modification indices indicated there are no correlated errors, other than the ones already existed in the model (Figure 7). The SEM model was examined for male and female separately to examine the structure and modification indices for each group.

Table 12

Model Fit Indices Comparison for Structural Models

Model	Chi-Squared	p	RMSEA	CFI	TLI
Full SEM	1407.776	< .000	.036	.932	.927
SEM Male	1210.641	< .000	.039	.903	.901
SEM Female	1100.423	< .000	.037	.922	.916

Shame affects the innovativeness in negative manner (-.403), which means the more shame the individual, has, the less innovative they tend to be, in contrast to guilt (.369), the more guilt the individual is, the more innovative he/she is. Furthermore, there is positive correlation between guilt and shame (.549), which indicates a good discriminant validity, such that if the correlation is .80 and above, which leads to violation of discriminant validity (Campbell & Fiske, 1959). Hence, we may conclude that the discriminant validity between guilt and shame is supported.

Since the construct have non-equal factor-loadings, it is important to consider more than one reliability coefficient to address the limitations of Cronbach's alpha because the data violates the asumption of essential tau-equivalence (Raykov, 1997). However, if the items loadings on each factor were essentially uniform, and if there were no error covariances, then alpha would estimate the true reliability, and then alpha is appropriate in such case (Statmodel, 2015). Otherwise, Cronbach's alpha coefficient would not be appropriate.

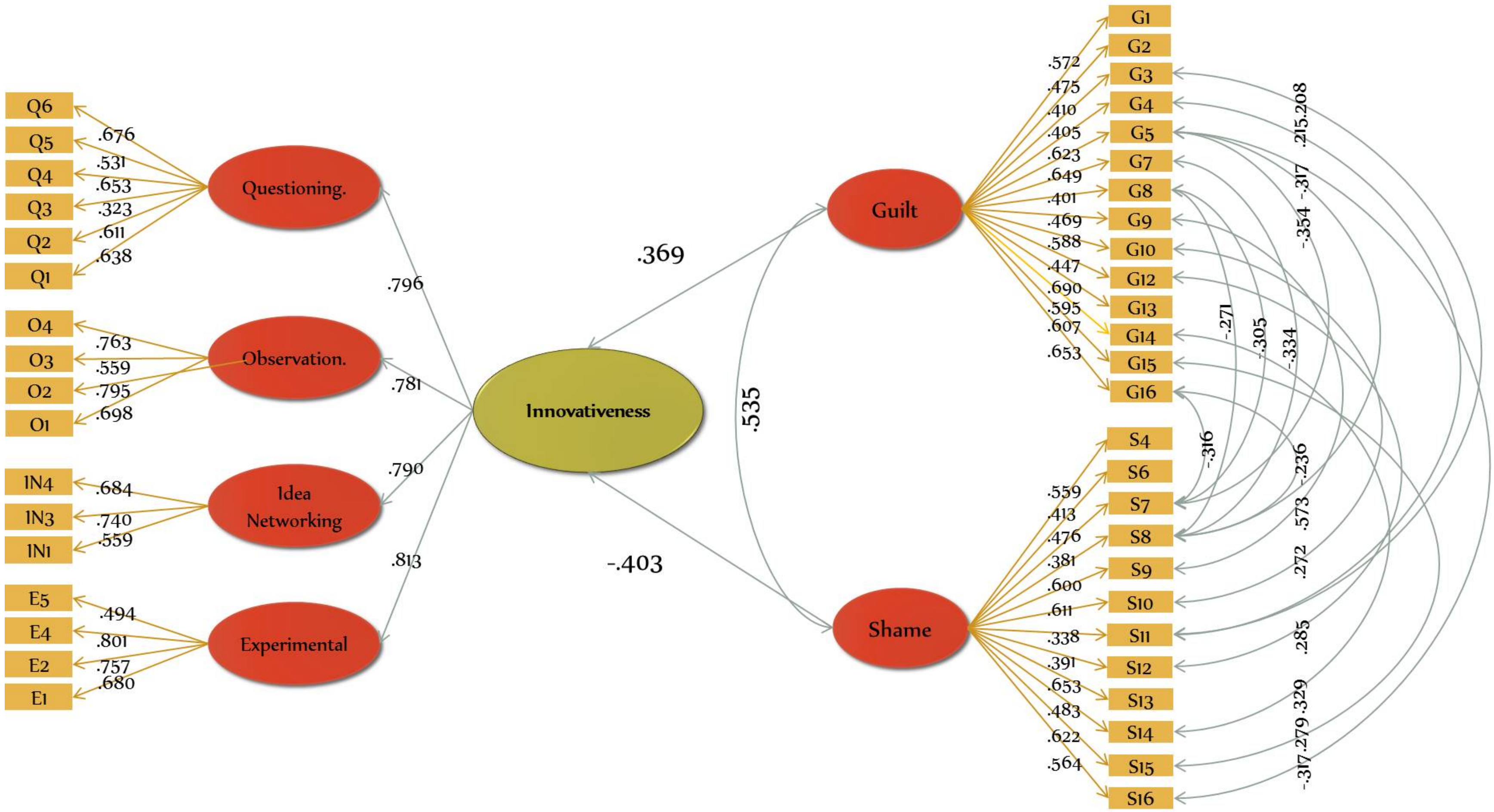

Figure 7. Structural equation model.

Structural Invariance

After having established good measurement models, and demonstrating that configural and metric invariance were supported, the next step was to examine the structural invariance to determine whether the hypothesized structural relationships between guilt, shame, and innovativeness (Figure 5) are the same across groups.

Structural invariance was supported for the configural invariance with good-fit, where (χ^2 = 2308.169, *df* = 1676; p < .000; CFI = .912, TLI = .906, RMSEA = .038). At this point, we were seeking a good-fitting model for each group, but it may be acceptable to have marginal fit at this stage (Raykov, Marcoulides, & Li, 2012). The model fit the data to an acceptable degree.

This unconstrained model served as the basis for comparison with the full structural invariance model. The chi-squared difference test revealed significant difference of 75.729, *df* = 47, p < .000, (CFI = .912, TLI = .908, RMSEA = .037), suggesting some of the factor loadings are variant across groups. However, the modification indices did not show any items need freeing to test the partial invariance. In this case, chi-squared difference testing might not be accurate due to the small sample size of each group (Meade, 2005; Sass, Schmitt, & Marsh, 2014), and other criteria should be considered when examining the measurement invariance. The absolute difference between RMSEA of the configural and the metric is .001, the absolute difference between the CFI of configural and metric is .000 and the absolute difference between TLI configural and metric is .001. Accordingly, we can conclude that there is measurement invariance between males and females in the full measurement model.

We attempted to examine the invariance of the structural paths between the groups, but due to the complexity of the model, and the small sample size for each group; of which the structural invariance method is affected by (Meade, 2005), to the fact that the results tend to show structural invariance for groups with sample size of around 200. Accordingly, we did not have the statistical power to test the structural paths invariance. However, the researcher followed an ad hoc approach to test the structural invariance, by testing the significance of the guilt and gender interaction, and shame and gender interaction. Testing the interaction in Mplus was not possible because the SEM model includes 15 correlated errors, and each correlated error needs a dimension of integration, which makes the model impossible to run (Statmodel, 2015). Alternatively, the researcher used SPSS to test the interactions using multiple regression. Using stepwise method, the results indicated that the correlation between the observed and predicted values of dependent variable (R) is .270, where the gender and guilt, and gender and shame interactions were insignificant.

$$Innovativeness_{Predicted} = 36.551 + (.263)\ Guilt + (-.239)\ Shame + (-1.901)\ Gender + (-.103) GednerxGuilt + (.018) GenderxShame \quad (1)$$

Hence, for every unit increase in guilt, a .262 increase in innovativeness is predicted, holding all other variables constant, for every unit increase in shame, a .238 decrease in innovativeness, holding all other variables constant, and because gender is coded 0/1, the predicted innovativeness would be 1.901 lower than males. The limitation of this procedure to examine structural invariance, is that it assumes zero correlated errors in the regression model, which violates the current status of the SEM model, of which includes fifteen correlated errors between items of guilt and items of shame.

Direct and Indirect Effects of Gender on Innovativeness

To address the final question in this study, a mediation model, which included the total sample, was tested in which the effect of gender on innovativeness was estimated. The respondent's gender, as exogenous variable, was hypothesized to influence the endogenous latent variable innovativeness. We tested the direct effect, the indirect effect, and the total effect of gender in Mplus.

The model fit was estimated to be acceptable fit, (χ^2 = 1501.740, *df* = 878, p < .000; CFI = .923, TLI = .917, RMSEA = .037). Gender predicted less innovativeness (β = -.131, p .009), also less shame (β = -.171, p < .000), and higher guilt (β = .295, p < .000). Gender's total indirect effect is negative and statistically significant (-.044, p .035), which consists of two specific indirect effects; via shame (-.107, p <.000), and via guilt (.063, p = .001). The total effect of gender on innovativeness, which is the sum of all its direct and indirect effects, is statistically significant (-.175, p <.000). The standardized direct, indirect, and total effects are shown in Table 13. All parameters estimates were significant, which represent strong effect of gender on innovativeness.

Table 13

Direct and Indirect Effects of Gender

Effects	Estimate	S.E.	Est./S.E.	p
Total	-.175	.048	-3.682	< .000
Total indirect	-.044	.021	-2.107	.035
Specific indirect				
Gender via Shame	-.107	.025	-4.282	.000
Gender via Guilt	.063	.019	3.230	.001
Gender on Innovativeness	-.131	.050	-2.601	.009

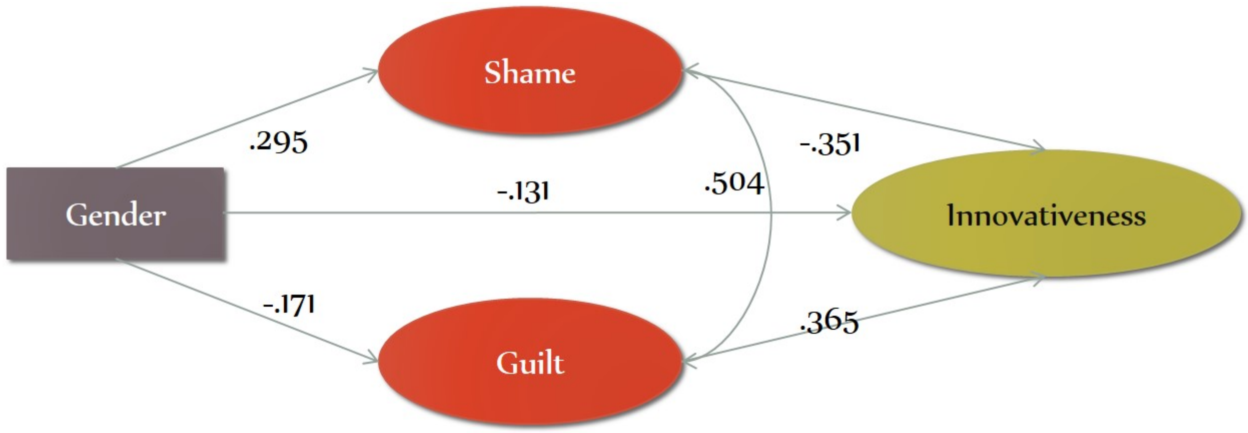

Figure 8. Structural equation model.

Chapter 5

Discussion

Examination of both direct and indirect effects through different constructs can yield greater insight about factors that influence innovativeness than analysis of direct effects alone. The study investigated the factor structure used to measure guilt and shame and their influence on innovativeness. Using structural modeling, evidence was found to support the importance of guilt, shame, and gender in the study of innovativeness. By testing various models and measurement invariance across groups, results of this study indicated that the measures of guilt, shame, and innovativeness, are invariant across gender groups.

Measurement and Structural Models

The results of the EFA were used to examine factor structure for each instrument used. CFA results indicated that the 14 guilt items loaded well on the one-factor model with no correlated errors within this scale. The model fit statistics indicated that the variance and covariances predicted by the one-factor model are closely consistent with the actual variance and covariances in the observed data. In other words, the data is a close fit to the predicted model. Furthermore, CFA results of shame construct indicated that the 12 shame items load well on one-factor model with an acceptable degree of fit. The results also indicated that there are no correlated errors between the items within this scale. However, results indicated that anticipated correlated errors across the two scales of guilt and shame (i.e., within scenarios and across scenarios) were justified empirically and theoretically.

The four-factor model that included the experimental (4 items), idea networking (3 items), observation (5 items), and questioning (6 items) factors was hypothesized to fit the data and examined using CFA. The results indicated an acceptable degree of fit, and suggested that a second-order factor was a good possibility. The latter also indicated an acceptable fit with no correlated errors. One item from the experiment factor and one item from the idea networking factor did not load adequately on any factor. This may be due to the limited opportunities students have to network and experience the real world compared to the opportunities that professionals and managers have. The reliability estimates of all the constructs indicated a value exceeded .75.

Table 14

Fit Statistics for the Final Models of Guilt, Shame, Second-order Innovativeness, and the Structural Model

Indices	Guilt	Shame	1st Order DNA	2nd Order DNA	SEM
Chi-squared	182.491	187.94	380.848	377.327	1407.776
CFI	.966	.938	.945	.946	.932
TLI	.960	.924	.934	.937	.927
SRMR	.048	.049	.051	.052	--
RMSEA	.051	.068	.067	.065	.036

The reliability of the constructs in this study ranged from .760 for the first order model innovativeness, to .871 for the second-order model of innovativeness. The Guilt scale's reliability was estimated at .765, and the Shame scale's reliability was .770.

Measurement Invariance

Weak measurement invariance was supported for the three constructs (guilt, shame, and innovativeness). This means that factor structure was similar for gender groups, and that the data fit the models for both groups.

Furthermore, the invariance of the full measurement model was supported, indicating that the combined factor structure of the guilt, shame, and innovativeness scales is invariant across the two gender groups. However, different criteria were used to examine the structural invariance due to the limitation of the chi-square difference test and its sensitivity to sample size. Both configural and weak models were similar in model fit indices, which supported the conclusion that the two groups are invariant. The gender–by–guilt interaction and gender–by–shame interactions were insignificant, which supports the conclusion that the two groups are invariant in term of structural paths.

Total Effect of Gender on Innovativeness

The model indicated that women tend to experience more guilt and shame than men do. This finding supports what is reported in the literature regarding the gender difference in guilt and shame, where women tend to be more emotional and have greater shame and guilt proneness (Benetti-McQuoid & Bursik, 2005; Ferguson & Crowley, 1997; Ferguson & Stegge, 1995; Hess, Adams, & Kleck, 2004; Plant, Hyde, Keltner, & Devine, 2000). Furthermore, the SEM indicated that there is a positive association between guilt and innovativeness, and a negative association between shame and innovativeness. These findings are also supported by previous studies (Schaumberg & Flynn, 2012). One possible explanation for these findings is that experiencing feeling guilt feelings tends to increase feelings of responsibility and the desire to make positive changes, while shame tends to make the person more conservative and less open. In addition, the results indicate that innovativeness is associated with being female. Accounting for gender, females are associated with lower innovativeness than males, but the difference is minimal even though it is statistically significant. However, although what is reported here is a path analysis based on relationships between among latent variables, path analysis traditionally uses the term *effects*, but the results reported here should not be interpreted as evidence of causal effects.

Only a small part of the variance in the innovativeness measures was explained by guilt and shame. Even though this results is statistically significant, from a practical point of view it is negligible. In addition, if we look at the start mean value, which was high for both genders, the difference between genders is very small that it may not need intervention, without excluding other factors and variables, which were not included in this study.

Conclusions

While, the EFA replication method provided useful information about the items and factor structure, CFA provided evidence that the selected models are good-fit models and needed no additional improvements.

Feeling guilt is positively associated with feelings of responsibility and the desire to improve and enhance productivity; individuals who have high levels of guilt tend to feel responsible for people around them. Hence, they compel themselves to take the initiative to take care of people. By doing so, they demonstrate, leadership (Schaumberg & Flynn, 2012). However, feeling shame inhibits the ability to take initiative and be innovative. This conclusion is supported by the result that shame has a negative effect on innovativeness, maybe because individuals who feel shame tend to be more conservative and less open (Schaumberg & Flynn, 2012).

Despite the opposite effect that guilt and shame on innovativeness, they correlated positively and fairly well (.537) which means that there is a linear relationship between the two constructs. Women tend to have more guilt and shame than men do, yet men tend to have more innovativeness. Innovativeness is affected directly and positively with guilt, and the effect is greater when the individual is female.

Evidence of Reliability and Validity

The data analyzed based on the selected models are estimated to have high reliability. The four different reliability coefficients produced very similar estimates. This may mean that the data fits the models, especially that because Raykov's rho and Bentlers' coefficient omega are very similar, meaning that there are no dual loadings within the models (R Development Core Team, 2013). Furthermore, CFA provided some evidence of construct validity. While further research is needed to provide even more evidence of validity, the instruments in their current form is recommended for use by developers and users.

Contribution of this Study to Literature of Scale Development and Evaluation

The findings from this study are consistent with the literature on the direct effect of guilt and shame on innovativeness, and direct and indirect effects of gender on innovativeness. This study has expanded the research beyond the direct and indirect effect, to examine whether the factor structure is the same for women and men in terms of guilt, shame, and innovativeness. Furthermore, this study provided empirical evidence of how to deal with partial measurement invariance and how to identify nonequivalent items of an instrument in multi-group analysis research. Furthermore, this study provided an evidence that males and females have similar meanings in the traits of guilt and shame in the context of structural model.

Limitations

Sampling inadequacies. Because this study was performed for students enrolled in specific classes in the Marriot School of Business at BYU, there was no random sampling from a larger and more diverse population. The perspective of students from other universities and other parts of the country were not included, further limiting the representativeness of the sample. Consequently, the extent to which the results are generalizable is unknown. However, it is not clear why models would be expected (or not) to vary across type of student or geographic location. Further research is needed to shed light on this issue.

In addition, the students' motivation to respond to the questionnaire may have been simply to earn extra credit. We do not know how thoughtful they were when they responded. Moreover, Delva, Kirby, Knapper, & Birtwhistle, (2002), noted surveys that are distributed with time constraints, as a problem in people who struggle with real or perceived time constraints; it was explained that they are less likely to respond to surveys because they feel overworked. In this study, students were limited to specific amount of time to respond to the survey.

Measurement invariance cross-validation. Finally, the most important sampling inadequacy was the small sample size. While the sample size was quite adequate to perform EFA, CFA, and SEM, it was not adequate to examine the full measurement model using Chi-square difference testing due to its sensitivity to sample size. Moreover, previous research (Meade, 2005) provided evidence that measurement invariance also sensitive to sample size. The small sample size in this study prohibited a cross-validation for the measurement invariance.

Recommendations For Further Research

The following recommendations for further research are made based on the findings of this study:

1. I recommend a sample size of at least 1000 to conduct further research on the EFA replication methodology, and cross-validate the results of EFA, because conducting EFA on two different samples may results two different results. However, EFA replication creates more criteria to select the more appropriate model for the data. Furthermore, such

study will extend the generalizability of the method in the factor analysis field. Furthermore, the large sample size will allow for measurement invariance cross validation, and performing structural invariance to make accurate inferences.

2. Further research should explore the stability of the proposed models across other subgroups and across time. Cross-group studies would determine whether, or not, the structural model is the same across ethnic, and student groupings (courses, university, community college, etc.). Such studies could also establish that the model is, or not, stable across time or administration of the instruments.
3. Future research should be conducted to improve the measurement instrument. Specifically, future studies should explore student sincerity in responding to items (Browne, 2011). In addition, future studies should estimate the reliability of the measurement instrument using a hierarchal linear modeling approach (Yeo, Kim, Branum-Martin, Wayman, & Espin, 2011). Such an approach would provide a more appropriate reliability estimate than a single reliability coefficient because the subjects being evaluated are nested within courses, and time.

References

Akaike, H. (1987). Factor structure and AIC. *Psychometrika, 52*, 317-332.

Archmabault, I., Janoz, M., Fallu, J.-S., & Pagani, L. S. (2009). Student engagement and its relationship with early high school dropout. *Journal of Adolescence, 32*, 651-670.

Baumeister, R. F., Well, A. M., & Heatherton, T. F. (1995). Personal narratives about guilt: Role in action control and interpersonal relationships. *Basic and applied social psychology, 17*, 173-198.

Benetti-McQuoid, J., & Bursik, K. (2005). Individual differences in experiences of and responses to guilt and shame: Examining the lenses of gender and gender role. *Sex Roles, 53*, 133-142.

Bentler, P. M. (1972). A lower-bound method for the dimension-free measurement of internal consistency. *Social Science Research, 1*, 343-357.

Bentler, P. M. (2009). Alpha, dimension-free, and model-based internal consistency reliability. *Psychometrika, 74*, 137-143.

Bentler, P., & Bonette, D. G. (1980). Significance tests and goodness of fit in the analysis of covaraince structures. *Psychological Bulletin, 88*, 588-606.

Brody, L., & Hall, J. (2000). Gender, emotion, and expression. In M. Lewis, & J. Haviland-Jones (Eds.), *Handbook of emotions* (pp. 339-348). New York, NY: Guilford Press.

Browne, M. W. (2001). An overview of analytic rotation in exploratory factor analysis. *Multivariate Behavioral Research, 36*, 111-150.

Browne, M. W., & Cudeck, R. (1989). Simgle sample cross-validation indices for covariance structures. *Multivariate Behavioral Research, 24*, 445-455.

Brunner, M., Nagy, G., & Wilhelm, O. (2011). A tutorial on hierarchically structured constructs. *Journal of Personality, 80*, 796-846.

Burmeister, K., & Schade, C. (2007). Are entrepreneurs' decisions more biased? An experimental investigation of the susceptibility to status quo bias. *Journal of Business Venturing, 22*, 340–362.

Busenitz, L., & Barney, J. (1997). Differences between entrepreneurs and managers in large organizations: biases and heuristics in strategic decision-making. *Journal of Business Venturing, 12*, 9–30.

Bybee, J., & Quiles, Z. N. (1998). Guilt and mental health. In J. Bybee (Ed.), Guilt and *children* (pp. 269-291). London, UK: Academic Press.

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin, 56*, 81-105.

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing MI. *Structural Equation Modeling, 9*, 235-55.

Cohen, T. R., Wolf, S. T., Panter, A. T., & Insko, C. A. (2011). Introducing the GASP Scale: A new measure of guilt and shame proneness. *Journal of Personality and Social Psychology, 100*, 947-966.

Cronbach, L. J. (1951). Coefficient alha and the internal structure of tests. *Psychometrika, 16*, 297-334.

Delva, M., Kirby, J. R., Knapper, C. K., & Birtwhistle, R. V. (2002). Postal survey of approaches to learning among Ontario physicians: Implications for continuing medical education. *Britich Midecal Journal, 325*, 1218-1222.

Dyer, J. H., Gregersen, H. B., & Christensen, C. (2008). Entrepreneur behaviors, opportunity recognition, and the origins of innovative ventures. *Strategic Entrepreneurship Journal, 2*, 317-338.

Ferguson, T. J., & Crowley, S. L. (1997). Measure for measure: Guilt is not a unitary construct. *Journal of Personality Assessment, 69*, 425-441.

Ferguson, T. J., & Stegge, H. (1995). Emotional states and traits in children: The case of guilt and shame. In J. P. Tangney, & K. W. Fischer (Eds.), *Self-conscious emotions: The psychology of shame, guilt, embarrassment, and pride* (pp. 174–197). New York, NY: Guilford Press.

Fischer, A. H. (2000). *Gender and Emotion: Social Psychological Perspectives.* New York, NY: Cambridge University Press.

Fischer, A., & Manstead, A. (2000). The relation between gender and emotions in different cultures. In Agneta H. Fischer (Ed.), *Gender and Emotion: Social psychological perspectives* (pp. 72-91). Cambridge, UK: University Press.

Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences.* The University of Michigan: Basic Book.

Hair, J., Anderson, R., Tathman, R., & Black, W. (1998). *Multivariate data analysis.* Upper Saddle River, NJ: Prentice Hall.

Hess, U., Adams, R., & Kleck, R. (2004). Facial appearance, gender, and emotion expression. *Emotion, 4*, 378-388.

Horn, J. L., & McArdle, J. J. (1992). A practical and theoretical guide to MI in aging research. *Experimental Aging Research, 18*, 117-144.

Hu, L., & Bentler, P. (1999). Cut-off criteria for fit indices in covariance structure analysis: conventional criteria versus new laternatives. *Structural Equation Modeling, 6*, 1-55.

John, O. P., & Benet-Martinez, V. (2000). Measurement: Reliability, construct validation, and scale construction. In Harry. T. Reis, & Charles. M. Judd (Eds.), *Handbook of Reseach Methods in Socail and Personality Psychology* (pp. 339-369). Cambridge, UK: Cambridge University Press.

Johnson, R. C., Danko, G. P., Huang, Y. H., Park, J. Y., Johnson, S. B., & Nagoshi, C. T. (1987). Guilt, shame and adjustment in three cultures. *Personality and Individual Differences, 8*, 357–364.

Keltner, D., & Buswell, B. N. (1997). Embarrassment: Its distinct form and appeasement functions. *Psychological Bulletin*, 250–270.

Lewis, H. B. (1971). *Shame and guilt in neurosis.* New York, NY: International Universities Press.

MacCallum, R., Browne, M. W., & Sugawara, H. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods, 1*, 130-149.

Makogon, I., & Enikolopov, S. (2013). Problems with the assessment of shame and guilt. *Psychology in Russia: State of the Art, 6*, 168-175.

Markman, A. (2012, July). *Psychology Today*. Retrieved from Guilt and Leadership: People who feel guilt, but not shame, make good leaders. Retrieved fromww.psychologytoday.com

McAllister, D. J., & Bigley, G. A. (2002). Work context and the definition of self: How organizational care influences organization-based self-esteem. *Academy of Management Journal, 45*, 894-904.

McDonald, Roderick. P. (1985). *Factor analysis and related methods.* New York, NJ: Erlbaum: Hillsdale.

McDonald, Roderick. P. (1999). *Test theory: A unified treatment.* Mahwah, NJ: Erlbaum: Mahwah.

Meade, A. W. (2005). Sample size and tests of measurement invariance. *20th Annual Conference of the Society for Industrial and Organizational Psychology.* Los Angeles, CA.

Meredith, W., & Millsap, R. E. (1992). On the misuse of manifest variables in the detection of measurement invariance. *Psychometrika, 57*, 289-311.

Millsap, R. E. (1998). Group differences in regression intercept: Implication for factorial invariance. *Multivariate Behavioral Research, 33*, 403-424.

Muthén, L. K., & Muthén, B. O. (2010). *Mplus User's Guide (6th Edition).* Los Angeles, CA: Muthén & Muthén.

Nunnally, J. C. (1978). *Psychometric theory (2nd ed.).* New York, NY: McGraw-Hilll.

Osborne, J. W., & Fitzpatrick, D. C. (2012). Replication analysis in exploratory factor analysis: What it is and why it makes your analysis better. *Practical Assessment, Research & Evaluation, 17*?????.

Plant, E., Hyde, J., Keltner, D., & Devine, P. (2000). The gender stereotyping of emotions. *Psychology of Women Quarterly, 24*, 81-92.

R Development Core Team. (2013). R: A language and environment for statistical computing. Vienna, Austria: R Foundation for Statistical Computing. Retrieved from http://www.R-project.org/

Raykov, T. (1997). Scale reliability, Cronbach's Coefficient Alpha, and violations of essential tau-equivalence with fixed congeneric components. *Multivariate Behavioral Research, 32*, 329-353.

Raykov, T., Marcoulides, G. A., & Li, C.H. (2012). Measurement invariance for latent constructs in multiple populations: A critical view and refocus. *Educational and Psychological Measurement, 72*, 954-974.

Raykov, T. (2001). Estimation of congeneric scale reliability using covaraince structure analysis with nonlinear constraints. *British Journal of Mathematical and Statistical Psychology, 54*, 315-323.

Robins, R. W., Noftle, E. E., & Tracy, J. L. (2007). Assessing self-conscious: A review of self-report and nonverbal measures. In J. L. Tracy, R. W. Robins, & J. P. Tangney (Eds.), *The self-conscious emotions: Theory and research* (pp. 443–467). New York, NY: Guilford Press.

Sass, D. A., & Schmitt, T. A. (2010). A comparative investigation of rotation criteria within exploratory factor analysis. *Multivariate Behavioral Research, 45*, 73-103.

Sass, D. A., Schmitt, T. A., & Marsh, H. W. (2014). Evaluating model fit with ordered categorical data within a measurement invariance framework: A comparison of estimators. *Structural Equation Modeling: A Multidisciplinary Journal, 21*, 167-180.

Schaumberg, R. L., & Flynn, F. J. (2012). Uneasy lies the head that wears the crown: The link between guilt proneness and leadership. *Journal of Personality and Social Psychology, 103*, 327-342.

Schilling, M. A. (2002). Technology success and failure in winner-take-all markets: The impact of learning orientation, timing, and network externalities. *Academy of Management Journal, 45*, 387-398.

Schmitt, N. (1996). Uses and abuses of coefficient alpha. *Psychological Assessment, 8*, 350-353.

Schoot, R. V., Lugtig, P., & Hox, J. (2012). A checklist for testing measurement invariance. *European Journal of Developmental Psychology*, 1-7.

Schwartz, G. (1987). Estimating the dimension of model. *Annals of statistics, 6*, 461-464.

Sclove, L. (1987). Application of model-selection criteria to some problems in multivariate analysis. *Psychometrika, 52*, 333-343.

Sharma, S., Mukherjee, S., Kumar, A., & Dillon, W. (2005). A Simulation study to investigate the use of cutoff values for assessing model fit in covariance structure models. *Journal of Business Research, 58*, 935-943.

Smith, R., Webster, J., Parrott, W., & Eyre, H. (2002). The role of public exposure in moral and nonmoral shame and guilt. *Journal of Personality and Social Psychology, 83*, 138-159.

Spector, P., Cooper, C. L., Sanchez, J. I., O'Driscoll, M., Sparks, K., & Bernin, P. e. (2002). Locus of control and well-being at work: How generlizable are western findings? *Academy of Management Journal, 45*, 453-470.

Statmodel. (2015, October). *Reliability Eestimates*. Retrieved from Mplus discussion: http://www.statmodel.com/

Tangney, J. P. (1991). Moral affect: The good, the bad, and the ugly. *Journal of Personality and Social Psychology, 61*, 598-607.

Tangney, J. P. (1995). Shame and guilt in interpersonal relationships. In J. P. Fischer, & T. &. K.W. (Eds.), *Self-conscious emotions: Shame, guilt, embarrassment, and pride* (pp. 114-139). New York, NY: Guilford Press.

Tangney, J. P. (1996). Conceptual and methodological issues in the assessment of shame and. *Behaviour Research and Therapy, 34*, 741-754.

Tangney, J. P. (1998). How does guilt differ from shame? In Jane Bybee (Ed.), *Guilt and children* (pp. 1-17). New York, NY: Academic Press.

Tangney, J. P., & Fischer, K. W. (1995). *Self-conscious emotions: Shame, guilt, embarrassment, and pride.* New York, NY: Guilford Press.

Tangney, J. P., Dearing, R. L., Wagner, P. E., & Gramzow, R. H. (2000). *The Test of Self-Conscious Affect-3 (TOSCA-3).* Fairfax, VA: George Mason University.

Tangney, J., Wagner, P., Fletcher, C., & Gramzow, R. (1992). Shamed into anger? The relation of shame and guilt to anger and self-reported aggression. *Journal of Personality and Social Psychology, 62*, 669 – 675.

Tomás, J. M., & Oliver, A. (1999). Rosenberg's self-esteem scale: Two factors or method effects. *Structural Equation Modeling, 6*, 84–98.

Tracy, J. L., & Robins, R. W. (2004). Putting the self into self-conscious emotions: A theoretical model. *Psychological Inquiry, 15*, 103–125.

Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the MI literature: Suggestions, practices and recommendations for organizational research. *Organizational Research Methods, 4*, 4-69.

Wallbott, H. G., & Scherer, K. (1995). Cultural determinants in experiencing shame and guilt. In June. P. Tangney, & Kurt.W. Fischer (Eds.), *Self-conscious emotions: The psychology of shame, guilt, embarrassment, and pride* (pp. 465-487). New York, NY: Guilford Press.

Webster's New World Dictionary (2nd ed.). (1982). New York: Simon & Schuster.

Wong, Y., & Tsai, J. (2007). Cultural models of shame and guilt. In R. R. J. Tracy, & J. Tangney (Eds.), *Handbook of Self-Conscious Emotions* (pp. 210-223). New York, NY: Guilford Press.

Yang, Y., & Green, S. B. (2011). Coefficient alpha: A reliability coefficient for the 21st century? *Journal of Psychoeducational Assessment, 29*, 377 - 392.

Appendix A
Comparison of Exploratory Factor Analysis Results

Table A1

Guilt model fit indices for three models as a result of EFA

	One-factor		Two-Factor		Three Factor	
Fit statistics	Sample A	Sample B	Sample A	Sample B	Sample A	Sample B
χ^2	195.452	226.048	123.506	149.308	91.721	118.517
df	104	104	89	89	75	75
P	.000	.000	.009	.000	.092	0.001
RMSEA	.057	.067	.038	.051	.029	.047
CFI	.950	.926	.981	.964	.991	.974
TLI	.942	.915	.974	.951	.985	.963
SRMR	.060	.061	.044	.054	.037	.047

Table A2

Three- Factor Guilt Replicability Analysis, WLSMV Extraction, and Geomin Rotation with max iteration 1000

Items	Sample A Factor Load			Sample B Factor Load			Squared Diff
	1	2	3	1	2	3	
G1	.630	-.009	-.132	.732	-.116	-.019	.010
G2	.567	-.071	.129	.348	.106	.032	.048
G3	.280	.078	.132	.325	.306	-.065	.002
G4	.193	.216	.169	.009	.273	.263	.034
G5	.849	-.245	.006	.601	.064	.082	0.062
G6	.006	.125	.626	-.012	.580	-.188	*Failed*
G7	.625	.086	-.147	.742	.019	-.033	.014
G8	.264	.160	.162	.691	-.003	-.356	.182
G9	-.026	.413	.166	.192	.646	.005	.054
G10	.051	.596	.026	.373	.274	.088	*Failed*
G11	.050	.005	.385	.047	.369	.018	*Failed*
G12	.260	.214	.065	.224	.178	.164	*Failed*
G13	.109	.727	-.060	.144	-.001	.659	*Failed*
G14	.311	.372	.020	.000	.100	.618	*Failed*
G15	-.002	.597	.256	.378	.193	.157	*Failed*
G16	.645	.124	-.107	.607	-.170	.179	.001

Table A3

Two-Factor Guilt Replicability Analysis, WLSMV Extraction, and Geomin Rotation with max iteration 1000

items	Sample A Factor Load 1	Sample A Factor Load 2	Sample B Factor Load 1	Sample B Factor Load 2	Squared Diff
G1	.632	-.044	.705	-.038	.005
G2	.409	.172	.307	.177	.010
G3	.195	.239	.184	.345	.011
G4	.136	.361	.056	.420	.003
G5	.653	-.016	.579	.187	.005
G6	-.204	.614	-.243	.513	.010
G7	.638	.034	.662	.108	.001
G8	.182	.327	.435	-.049	*Failed*
G9	-.011	.475	-.001	.720	.060
G10	.182	.487	.308	.388	.010
G11	-.160	.402	-.051	.415	.000
G12	.241	.274	.233	.303	.001
G13	.292	.515	.414	.343	*Failed*
G14	.362	.345	.288	.371	*Failed*
G15	.006	.713	.367	.339	*Failed*
G16	.671	.078	.684	-.006	.000

Table A4

Once- Factor Guilt Replicability Analysis, WLSMV Extraction, and Geomin Rotation with max iteration 1000

Items	Sample A Factor Load	Sample B Factor Load	Squared Diff
G1	.526	.599	.005
G2	.523	.415	.012
G3	.388	.439	.003
G4	.447	.385	.004
G5	.567	.677	.012
G6	.367	.206	.026
G7	.615	.683	.005
G8	.455	.343	.013
G9	.424	.560	.018
G10	.603	.582	.000
G11	.217	.290	.005
G12	.462	.451	.000
G13	.721	.643	.006
G14	.632	.556	.006
G15	.638	.600	.001
G16	.665	.596	.005

Table A5

Shame model fit indices for four models as a result of EFA

	One-Factor Model		Two-Factor Model		Three-Factor Model		Four-Factor Model	
Fit Statistic	Sample A	Sample B	Sample A	Sample B	Sample A	Sample B	Sample A	Sample B
χ^2	289.134	230.793	188.766	156.848	139.452	110.432	88.734	82.716
df	104	104	89	89	75	75	62	62
P	.000	.000	.000	.000	.000	.000	.015	.041
RMSEA	.081	.068	.065	.054	.057	.052	.040	.036
CFI	.861	.879	.925	.935	.952	.932	.980	.980
TLI	.839	.860	.899	.913	.922	.946	.961	.962
SRMR	.077	.070	.054	.053	.044	.042	.033	.037

Table A6

Four- Factor shame Replicability Analysis, WLSMV Extraction, and Geomin Rotation with max iteration 1000

	Sample A Factor Load				Sample B Factor Load				
Items	1	2	3	4	1	2	3	4	Squared Diff
S1	-.244	.444	.005	.062	-.315	.001	.283	.049	*Failed*
S2	.715	-.010	.242	.018	.483	.057	-.016	.373	0.054
S3	-.007	.071	.266	.302	-.050	.333	.005	-.019	*Failed*
S4	-.166	.617	.109	.027	.026	.284	.179	.266	*Failed*
S5	.474	.007	-.155	.139	.552	-.020	-.012	.290	.006
S6	.135	-.055	.359	.373	-.029	.640	-.041	-.029	*Failed*
S7	.403	.306	.203	-.017	.220	.550	.090	-.046	*Failed*
S8	.258	.312	.022	.123	.196	.294	.029	.180	.000
S9	-.026	.431	.266	.058	.037	.237	.469	.040	*Failed*
S10	-.018	.499	-.007	.202	-.090	.117	.417	.244	*Failed*
S11	.104	.068	.216	.159	-.361	.391	-.028	.158	*Failed*
S12	-.034	.090	.691	-.021	-.193	.260	.127	.056	*Failed*
S13	.068	.741	.079	-.193	-.024	.002	.432	.445	*Failed*
S14	-.007	.200	.023	.639	.080	.028	.553	-.092	*Failed*
S15	-.001	.585	-.142	.234	.007	-.013	.787	-.037	*Failed*
S16	.362	.612	-.080	-.036	-.014	-.054	.365	.379	*Failed*

Table A7

Three- Factor shame Replicability Analysis, WLSMV Extraction, and Geomin Rotation with max iteration 1000

	Sample A Factor Load			Sample B Factor Load			
Items	1	2	3	1	2	3	Squared Diff
S1	-.225	.463	-.006	.003	-.316	.359	*Failed*
S2	.703	-.010	.318	.111	.481	.080	*Failed*
S3	-.013	.127	.404	.374	-.036	-.068	*Failed*
S4	-.142	.610	.096	.349	.049	.247	*Failed*
S5	.438	.050	.000	-.004	.576	.060	*Failed*
S6	.113	.002	.566	.714	-.002	-.181	*Failed*
S7	.408	.295	.215	.527	.214	-.019	.014
S8	.269	.352	.100	.340	.212	.036	*Failed*
S9	-.014	.422	.280	.208	.043	.471	*Failed*
S10	-.006	.542	.100	.165	-.075	.514	*Failed*
S11	.102	.094	.294	.471	-.306	.023	*Failed*
S12	-.002	.121	.471	.311	-.176	.122	*Failed*
S13	.101	.653	.002	.096	-.016	.606	*Failed*
S14	.003	.358	.302	-.015	.061	.478	*Failed*
S15	.009	.618	.030	-.046	.003	.730	*Failed*
S16	.404	.640	-.092	.013	-.006	.532	*Failed*

Table A8

Two- Factor shame Replicability Analysis, WLSMV Extraction, and Geomin Rotation with max iteration 1000

	Sample A Factor Load		Sample B Factor Load		
Items	1	2	1	2	Squared Diff
S1	-.273	.510	-.311	.395	.013
S2	.798	.002	.523	.078	.076
S3	.063	.359	.069	.233	.016
S4	-.178	.694	.144	.497	.039
S5	.419	-.048	.540	-.041	.015
S6	.213	.303	.161	.383	.006
S7	.430	.325	.336	.360	*Failed*
S8	.250	.349	.307	.265	*Failed*
S9	.009	.583	.087	.609	.001
S10	-.044	.605	-.038	.634	.001
S11	.157	.241	-.133	.414	.030
S12	.096	.386	-.080	.382	.000
S13	.046	.625	.009	.656	.001
S14	.032	.527	.033	.437	.008
S15	-.042	.628	-.025	.656	.001
S16	.287	.494	-.004	.518	.001

Table A9

Once- Factor shame Replicability Analysis, WLSMV Extraction, and Geomin Rotation with max iteration 1000

Items	Sample A Factor Load	Sample B Factor Load	Squared Diff
S1	.358	.284	.005
S2	.391	.233	.025
S3	.384	.252	.017
S4	.584	.537	.002
S5	.171	.139	.001
S6	.405	.430	.001
S7	.529	.457	.005
S8	.467	.358	.012
S9	.574	.631	.003
S10	.567	.616	.002
S11	.316	.365	.002
S12	.426	.353	.005
S13	.635	.655	.000
S14	.532	.444	.008
S15	.589	.643	.003
S16	.625	.513	.013

Table A10

Four- Factor innovativeness Replicability Analysis, WLSMV Extraction, and Geomin Rotation with max iteration 1000

Items	Sample A Factor Load				Sample B Factor Load				Squared Diff
	1	2	3	4	1	2	3	4	
E1	.835	-.035	.009	-.066	.840	-.081	-.012	-.070	.000
E2	.803	-.037	-.029	.055	.662	.038	.053	.043	.020
E3	.173	.195	.166	.207	.281	.185	.148	-.089	*Failed*
E4	.477	.214	.148	.086	.546	.050	.227	.082	.005
E5	.436	-.141	.060	.098	.506	.017	-.149	.232	.005
IN2	.440	.164	-.171	.109	.049	.655	.048	-.020	*Failed*
IN3	.265	.425	.191	.082	.040	.623	.066	.064	.039
IN4	.346	.591	.047	-.076	.020	.600	-.074	.078	.000
IN1	-.059	.803	-.018	.128	-.041	.621	.009	.087	.033
O1	-.049	-.142	.796	.175	-.014	.092	.634	.060	.026
O2	.168	.043	.681	-.007	.059	.111	.598	.069	.007
O3	.014	.044	.401	.204	-.004	.237	.401	-.148	.000
O4	.103	.074	.735	-.073	.002	-.048	.900	.001	.027
Q1	-.033	.094	.065	.571	.030	-.183	.208	.705	.018
Q2	.016	-.040	.024	.659	-.038	.062	-.016	.677	.000
Q3	.046	-.164	.074	.423	-.089	.000	-.043	.532	.012
Q4	.134	.011	.048	.506	.083	.131	.082	.473	.001
Q5	.058	.019	-.160	.721	.022	.064	-.040	.522	.040
Q6	.133	.098	.296	.302	.026	.128	.170	.373	.005

Table A11

Three- Factor innovativeness Replicability Analysis, WLSMV Extraction, and Geomin Rotation with max iteration 1000

Items	Sample A Factor Load			Sample B Factor Load			Squared Diff
	1	2	3	1	2	3	
E1	.689	.057	-.317	.831	.007	-.152	.020
E2	.778	.007	-.317	.644	.144	-.003	.018
E3	.318	.279	.094	.261	.298	-.067	*Failed*
E4	.480	.307	-.006	.536	.297	.031	.003
E5	.495	-.010	-.267	.493	-.077	.209	.000
IN2	.502	-.054	.010	.006	.517	.156	*Failed*
IN3	.251	.419	.181	-.004	.527	.217	.012
IN4	.165	.463	.371	-.012	.360	.237	.011
IN1	-.002	.466	.722	-.067	.331	.217	.018
O1	.004	.740	-.121	-.025	.594	.015	.021
O2	.003	.796	-.056	.039	.692	.013	.011
O3	.143	.434	.007	-.024	.615	-.086	.033
O4	-.136	.882	-.016	.022	.787	-.101	.009
Q1	.547	.008	.083	.073	.041	.595	*Failed*
Q2	.675	-.105	-.037	-.029	.008	.705	*Failed*
Q3	.382	-.084	-.157	-.074	-.065	.544	*Failed*
Q4	.631	-.024	-.023	.083	.167	.496	*Failed*
Q5	.788	-.259	.010	.026	.001	.540	*Failed*
Q6	.361	.342	.029	.026	.245	.390	*Failed*

Table A112

Two- Factor innovativeness Replicability Analysis, WLSMV Extraction, and Geomin Rotation with max iteration 1000

Items	Sample A Factor Load		Sample B Factor Load		Squared Diff
	1	2	1	2	
E1	.672	.044	.563	.018	.012
E2	.749	.006	.610	.088	.019
E3	.292	.316	.452	-.018	*Failed*
E4	.455	.331	.658	.117	*0.041*
E5	.493	-.038	.276	.276	*Failed*
IN2	.445	.012	.481	.160	.001
IN3	.217	.473	.490	.212	*Failed*
IN4	.053	.646	.318	.237	*Failed*
IN1	-.055	.626	.263	.206	*Failed*
O1	.006	.716	.557	-.007	*Failed*
O2	.007	.773	.698	-.004	*Failed*
O3	.148	.424	.563	-.086	*Failed*
O4	-.098	.826	.769	-.110	*Failed*
Q1	.498	.078	.076	.612	*Failed*
Q2	.631	-.052	-.026	.703	*Failed*
Q3	.363	-.083	-.123	.537	*Failed*
Q4	.590	.024	.198	.519	*Failed*
Q5	.713	-.166	.005	.551	*Failed*
Q6	.353	.351	.242	.393	*Failed*

Table A13

One- Factor shame Replicability Analysis, WLSMV Extraction, and Geomin Rotation with max iteration 1000

Items	Sample A Factor Load	Sample B Factor Load	Squared Diff
E1	.655	.542	.013
E2	.690	.630	.004
E3	.552	.412	.020
E4	.717	.702	.000
E5	.419	.455	.001
IN2	.410	.559	.022
IN3	.631	.605	.001
IN4	.637	.461	.031
IN1	.523	.391	.017
O1	.671	.523	.022
O2	.713	.661	.003
O3	.524	.465	.003
O4	.668	.656	.000
Q1	.530	.521	.000
Q2	.526	.497	.001
Q3	.258	.282	.001
Q4	.568	.563	.000
Q5	.496	.407	.008
Q6	.640	.504	.018

Appendix B

TOSCA- 3

Guilt and Shame Scenarios

Table B1

Guilt and Shame Scenarios

Number	Scenario	Shame	Guilt
1	At work, you wait until the last minute to plan a project, and it turns out badly.	You would feel incompetent.	You would think: "I deserve to be reprimanded for mismanaging the project."
2	For several days, you put off making a difficult phone call. At the last minute, you make the call and are able to manipulate the conversation so that all goes well.	You would feel like a coward.	You would regret that you put it off.
3	While out with a group of friends, you make fun of a friend who is not there.	You would apologize and talk about that person's good points.	You would feel small... like a rat.
4	While playing around, you throw a ball and it hits your friend in the face.	You would apologize and make sure your friend feels better.	You would feel inadequate that you can't even throw a ball.
5	You and a group of co-workers worked very hard on a project. Your boss singles you out for a bonus because the project was such a success.	You would feel alone and apart from your colleagues.	You would feel you should not accept it.
6	You are driving down the road, and you hit a small animal.	You would think: "I'm terrible."	You'd feel bad you hadn't been more alert driving down the road.
7	You are out with friends one evening, and you are feeling especially witty and attractive. Your best friend's spouse seems to particularly enjoy your company.	You would probably avoid eye contact for a long time.	You would think: "I should have been aware of what my best friend is feeling."
8	You are taking care of your friend's dog while they are on vacation and the dog runs away.	You would think, "I am irresponsible and incompetent."	You would vow to be more careful next time.

Number	Scenario	Shame	Guilt
9	You attend your co-worker's housewarming party and you spill dark red juice on their new white carpet, but you think no one notices.	You would stay late to help clean up the stain after the party.	You would wish you were anywhere but at the party.
10	You break something at work and then hide it.	You would think about quitting.	You would think: "This is making me anxious. I need to either fix it or get someone else to."
11	You have recently moved away from your family, and everyone has been very helpful. A few times you needed to borrow money, but you paid it back as soon as you could.	You would feel immature.	You would return the favor as quickly as you could.
12	You make a big mistake on an important project at work. People were depending on you, and your boss criticizes you.	You would feel like you wanted to hide.	You would think: "I should have recognized the problem and done a better job."
13	You make a mistake at work and find out a co-worker is blamed for the error.	You would feel unhappy and eager to correct the situation.	You would keep quiet and avoid the co-worker.
14	You make plans to meet a friend for lunch. At 5 o'clock, you realize you stood him up.	You would think: "I'm inconsiderate."	You'd think you should make it up to him as soon as possible.
15	You volunteer to help with the local Special Olympics for handicapped children. It turns out to be frustrating and time-consuming work. You think seriously about quitting, but then you see how happy they are.	You would feel selfish and you'd think you are basically lazy.	You would think: "I should be more concerned about people who are less fortunate."
16	You walk out of an exam thinking you did extremely well. Then you find out you did poorly.	You would feel stupid.	You would think: "I should have studied harder."

Innovativeness Items

Table B2

Innovativeness Items

Number	Item
E1	I love to experiment to understand how things work and to create new ways of doing things.
E2	I frequently experiment to create new ways of doing things.
E3	I am adventurous, always looking for new experiences.
E4	I actively search for new ideas through experimenting.
E5	I have a history of taking things apart.
IN1	I have a network of individuals whom I trust to bring a new perspective and refine new ideas.
IN2	I attend many diverse professional and/or academic conferences outside my industry/profession.
IN3	I initiate meetings with people outside of my industry to spark ideas for a new product, service, or customer base.
IN4	I have a large network of contacts with whom I frequently interact to get ideas for new products, services, and customers.
O1	New business ideas often come to me when directly observing how people interact with products and services.
O2	I have a continuous flow of new business ideas that comes through observing the world.
O3	I regularly observe customers' use of our company's products and services to get new ideas.
O4	By paying attention to everyday experiences, I often get new business ideas.
Q1	I am always asking questions.
Q2	I am constantly asking questions to get at the root of the problem.
Q3	Others are frustrated by the frequency of my questions.
Q4	I often ask questions that challenge the status quo (the way things are).
Q5	I regularly ask questions that challenge others' fundamental assumptions.
Q6	I am constantly asking questions to understand why products and projects underperform.