TESTING THE MEDIATING EFFECTS OF RESILIENCE AND MENTAL HEALTH ON THE RELATIONSHIP BETWEEN ACCULTURATIVE STRESS AND BINGE DRINKING AMONG INTERNATIONAL STUDENTS

by

YOUN KYOUNG/LILY KIM

Presented to the Faculty of the Graduate School of

The University of Texas at Arlington in Partial Fulfillment

of the Requirements

for the Degree of

DOCTOR OF PHILOSOPHY

THE UNIVERSITY OF TEXAS AT ARLINGTON

Spring 2016

Acknowledgement

It is my great pleasure to express my appreciation to the many people who have supported and helped me through this long and arduous journey.

First of all, I owe my deepest gratitude to my advisor, Dr. Courtney Cronley. Without her persistent and caring support, insightful guidance, and constant encouragement, I could not have completed my dissertation. I have always felt so honored and privileged to have Dr. Courtney Cronley as my advisor. She was undoubtedly the most supportive and brilliant advisor anyone could ask for. I am sincerely thankful for her generosity, her time, energy, and patience throughout my doctoral study at the University of Texas at Arlington. I was deeply touched by her genuine tears of happiness after I successfully defended my dissertation, Needless to say, I was also strongly encouraged by her blissful silence that still resonate with me. She is the BEST chair ever and I deeply appreciate her guidance both personally and professionally

I would like to thank all my committee members for their encouragement throughout my dissertation and for allowing me to grow as a scholar. My deep appreciation goes to Dr. Diane Mitschke. I thank her for her guidance and suggestions. Her guidance on conducting a systematic review before I embarked on my dissertation journey was extremely helpful to get further insights on my dissertation. I am thankful to Dr. Vijayan Pillai. His constructive advice and expertise on methodology and analysis helped me find efficient solutions. I am thankful to Dr. Small for his suggestions and comments, which challenged me to think more deeply and understand the implications of this study in a

comprehensive manner. His mentorship throughout my Ph.D. study has significantly boosted my motivation and confidence. Last, but not the least, I would like to extend my special thanks to Dr. Wendy Casper. I feel lucky to have taken her statistics course at the Business School. I really enjoyed her class, which deepened my knowledge and expertise on methodology and data analysis. I will truly miss her amazing class!

My sincere gratitude goes to Caroline DeCoux and Larry DeCoux, whose love and support have always brightened my life and empowered my spirit to overcome the challenges and difficulties I encountered as trying to learn the whereabouts of the foreign land. The wonderful conversations, discussions, experiences, prayers, and Bible verses with them have been the true buffers throughout my life here in the US. Especially Caroline, added to my resilience to achieve positive outcomes in the face of stressful situations during my personal acculturation process. I thank you both for always being there for me through thick and thin. My Ph.D. experience would not have been meaningful without the support of my wonderful friends, Drs. Arati Maleku, Yi Jin Kim, Cecilia Mengo, Silviya Nikolova, Jeyle Ortiz and soon-to-be Dr. Bonita Sharma and Min Joo Kim. Especially Arati, you have relentlessly encouraged and inspired me throughout my Ph.D. endeavor. Thank you for your amazing support.

This Ph.D. journey would never have been possible without my two wonderful children, Mizzu Cho and Albert Cho. I am blessed to have both of them as my children. You were such amazing supporters, friends, and company for me. I am extremely happy to have shared my precious Ph.D. journey with the both of you. When I had difficult moments and was at the verge of giving up, both

of you encouraged me to overcome every single challenge. You are my life treasures and has been an absolute joy to share every small milestones and accomplishments with the both of you. I am truly blessed to be your mom. I would like to thank all my family members including my brothers, sister, and cousins in Korea. Also, my aunt and uncle, thank you for your kind and caring support. My special thanks goes to my mother. No matter how hard the situations were, you encouraged me to bounce back stronger. Thank you for your strength, courage, and perseverance that you have bestowed on me. Lastly, as I remember all the supportive hearts, my deep appreciation goes to my father. He passed away when I was pursuing my master's degree in the US. Dad, my sincere apologies for not being able to bid you farewell. You are always alive in my mind. I feel your presence through the important life lessons of leadership and perseverance that you taught me. I am so proud to be your daughter. I admire you so much! As I vividly remember you and your words, I am reminded of the strength and positivity you have relayed to me. You often said, "do not worry about me, finish your school successfully and get your Ph.D. I know how strong you are. You can do it." As I complete this Ph.D. journey, I dedicate my dissertation to my father.

April 20, 2016

Abstract

TESTING THE MEDIATING EFFECTS OF RESILIENCE AND MENTAL HEALTH ON THE RELATIONSHIP BETWEEN ACCULTURATIVE STRESS AND BINGE DRINKING AMONG INTERNATIONAL STUDENTS

Youn Kyoung/Lily Kim, MSW
The University of Texas at Arlington, 2016

Supervising Professor: Courtney Cronley

The purpose of this study was to test the mediating effects of resilience and mental health (depression and anxiety) on the relationship between acculturative stress and binge drinking among international students in the United States. International students constitute approximately 4% of the total U.S. higher education population. Between 2014 and 2015, nearly 974,926 international students studied at U.S. colleges and universities. This rapidly increasing population faces multiple stressors such as cultural adjustment, academic pressure, financial concerns, language difficulties, and perceived discrimination. According to Hahn (2010), 22.6% of international students were clinically depressed, which is two times higher than domestic undergraduate students. Also, 36% of international students between the ages of 18 and 24 reported one or more incidents of binge drinking in a 2-week period (Koyama & Belli, 2011).

The cross-sectional design of this study tested the hypothetical model of binge drinking among a sample of international students. The multi-method approach for data

collection used both: 1) a web-based online survey and 2) a paper-based face-to-face survey. The online survey used social networking sites such as Facebook and Twitter. The paper survey was conducted at four universities near the University of Texas at Arlington. A total sample of 322 was collected (131-online and 191-paper survey). The modified Index of Life Stress (Yang & Clum, 1995; 15 items, α=0.86), the Resilience Scale for Adults (Friborg, Hjemdal, Rosenvinge, & Martinussen, 2003; 20 items, α=0.94), and the Patient Health Questionnaire-SAD: PHQ-9 and GAD- 7 (Spitzer et al., 1994: α=0.91 and α=0.92 respectively) were used to measure the four latent variables: 1) acculturative stress, 2) resilience, 3) depression, and 4) anxiety. Binge drinking was measured with a single item question on a 6 point Likert scale, "Think back over the last two weeks, how many times have you had five or more drinks in a row?" To handle missing values, the study used multiple imputation. The main analysis conducted a Structural Equation Modeling (SEM), using Mplus version 7 to test the measurement and structural models.

The results from the measurement model showed good model fit (χ^2=145.83, *df*=57, χ^2/df=2.56, CFI=0.95, TLI=0.93, SRMR=0.048, RMSEA=0.07). Also, the results from the structural model showed that the direct effect of acculturative stress on resilience, the direct effect of resilience on binge drinking, and the direct effect of acculturative stress on mental health were significant. The indirect effect of acculturative stress on binge drinking through resilience was significant. Resilience mediated the relationship between acculturative stress and binge drinking in the conceptual model.

However, the results did not support the main hypothesis (the mediating indirect effects of resilience and mental health on the relationship between acculturative stress and binge drinking).

The findings have larger implications for the overall academic environment by providing insight into international student needs. The awareness of resilience may help schools and health care providers adopt more effective strategies to overcome behavioral health problems (i.e., depression, anxiety, and binge drinking) caused by acculturative stress among international students. More importantly, the results of this study may also be useful in informing U.S. colleges and universities as they make decisions about programs and services for international students and may thus benefit other international students. Furthermore, the hypothesized conceptual model of binge drinking can assist in the creation of replicable models of resilience that can be applied to other vulnerable populations adding to the translational science literature.

Table of Contents

Abstract ii

List of Illustrations x

List of Tables xi

Chapter 1 Introduction 1

Statement of Problem 1

Purpose of the Study 5

Significance of the Study 6

Definitions and Terms 7

Acculturative Stress 7

Resilience 7

Vulnerability 8

Health Risk Behavior-Binge Drinking 8

International Students in the United States 8

Demographics 10

Chapter 2 Theoretical/Conceptual Framework 11

Theory of Acculturation and Acculturative Stress 11

Acculturative Stress and Mental Health 13

Vulnerability Perspective 15

Mental Health (Depression & Anxiety) 17

Health Risk Behaviors 18

Mental Health and Health Risk Behaviors…….…. 19

Acculturative Stress and Health Risk Behaviors……..….20

ResilienceTheory……...21

Models of Resilience: Mediating and Moderating the Relationship

between Acculturative Stress, Resilience, & Mental Health…….23

Resilience and Health Risk Behaviors…….....26

Proposed Conceptual Model of the Study 27

Chapter 3 Review of the Literature 29

Review Methods and Search Criteria 29

Methodological Developments: A Critical Review of the Literature 31

Participant Characteristics 32

Study Characteristics 32

Scales 33

The Roles of Each Variable in the Studies 36

Study Limitations 37

Quality of Assessment 38

Summary of Results of Methodological Development 43

Analysis of the Literature Review 40

Summary of the Literature Review……43

Research Questions and Hypotheses 44

Chapter 4 Methodology 47

Research Design 47

Sampling Methodology 47

Sampling Strategy……..……...48

Sampling Methods for Online Survey……..…..…..... 48

*Universities with a Large Number of International Students for Conducting Online Surve*ys…….....49

*Universities with a Smaller Number of International Students for Conducting Online Surve*ys…….....50

Final University International Student Clubs for Conducting Online Surveys…….……..51

Sampling Methods for Paper-Based Surveys……..…..... 52

Sample Size……...….52

Sample…...……...….53

Sample Representativeness…….....57

Comparisons of Online and Paper Surveys.……..... 58

Demographic Differences…….59

Acculturative Stress, Resilience, Anxiety, Depression, & Binge Drinking……62

Data Collection…….....63

Measures..... 66

Modified Index of Life Stress 66

Modified Resilience Scale for Adults……69

The Patient Health Questionnaire 9 72

The Generalized Anxiety Disorder 7…… 73

Monitoring The Future Survey-Alcohol Related Survey Questions..... 74

Pilot Test for Online Questionnaire Literacy 7

Data Analysis 79

Chapter 5 Results ……..82

Preliminary Analysis 82

Data Screening & Preparation 82

Missing Data……..84

Description of Variables (Mean, Standard Error, Skewness, & Kurtosis)….87

Mean Differences across Demographic Variables…….89

Acculturative Stress……...89

Resilience……...91

Mental Health (Anxiety & Depression)…….92

Binge Drinking……..93

Acculturative Stress, Resilience, Anxiety, & Depression by Binge Drinking……..96

Correlations……....97

Structural Equation Model Results……99

Measurement Model……...……...99

Structural Model……..104

Results of the Path Proposed in the Hypothesized Structural Model……...104

Direct & Indirect Parameter Estimates for the Hypothesized Structural Model……...104

Chapter 6 Discussion……...…109

Discussion of Major Findings…….……..…109

The Role of Resilience…….109

Demographic Variables and Acculturative Stress……...……114

Demographic Variables and Resilience…….…….....115

Demographic Variables and Depression and Anxiety…….116

Demographic Variables and Binge Drinking……...118

Strengths and Limitations of the Study……118

Strengths……..……118

Limitations……...……119

Implications of the Study…….122

Implication for Theory…….123

Implication for Social Work Practice..……124

Implication for Policy……..126

Implications for Research…...…….127

Implications for Academic Institutions……..…….130

Implications for Home Countries & Families..……..…….131

Summary and Conclusion……131

References..... 133

APPENDIX A-N List of Empirical Studies Reviewed..... 194

List of Illustrations

Figure 2-1 Berry's Theoretical Conception of Acculturation and Stress (1987)...13

Figure 2-2 Conceptual Model of Vulnerability 17

Figure 2-3 Conceptual Model of Resilience 25

Figure 2-4 Conceptual Model of Binge Drinking…….....27

Figure 4-1 Sampling Frame and Process……...…62

Figure 5-1 Missing Value Patterns……96

Figure 5-2 CFA Model…….……....112

Figure 5-3 Path Analysis……..115

Figure 6-1 Final Conceptual Model of Resilience as a Collective Protective Factor against Binge Drinking……..157

List of Tables

Table 3-1 Search Terms, Database, Results, Ideas for Another Search, & Final Review for Literature Review 40

Table 3-2 Assessment of Quality of Reviewed Studies Using a 3-Point Likert Scale 49

Table 3-3 Descriptive Analysis of Qualitative Reviewed Studies 50

Table 4-1 Demographic Characteristics of the Sample……60

Table 4-2 Sample Comparison with National Demographics……121

Table 4-3 29 Colleges and Universities with More than 5,000 Interntional Students 64

Table 4-4 University International Clubs for Conducting Online Surveys 65

Table 4-5 103 Colleges and Universities with Less Than 1000 International Students 66

Table 4-6 University International Clubs for Conducting Online Surveys 70

Table 4-7 Results of Focus Group Meeting……...87

Table 5-1 Description of Demographic, Endogenous, and Exogenous Variables.92

Table 5-2 Missing Value Analysis……..…95

Table 5-3 Description of Variables……97

Table 5-4 Mean Differences across Demographic Variables……..…103

Table 5-5 Acculturative Stress, Resilience, Anxiety, and Depression by Binge Drinking……..106

Table 5-6 Correlation Matrix……...107

Table 5-7 Measurement Model Fit Results…….109

Table 5-8 CFA Results……110

Table 5-9 Discriminant Validity……..111

Table 5-10 Structural Model Fit Results…….113

Table 5-11 Path Analysis Results……114

Table 5-12 Summary Evaluation of the Hypotheses……...117

Chapter 1

Introduction

Globally, the number of students moving across nations and continents in pursuit of higher education is increasing as a result of economic globalization and higher internationalization, contributing to the increasing mobility of international students. In 2011, there were more than 4.5 million international students worldwide who emigrated abroad for tertiary education (Organization for Economic Cooperation and Development [OECD], 2013). The United States (U.S.) has by far the largest number of international students. In 2013, approximately one in five (17%) international students chose to study in the U.S., followed by the United Kingdom (13%), Australia (6%), Germany (6%), and France (6%) (OECD, 2013). A total of 974,926 international students were enrolled in U.S. colleges and universities in the 2014-2015 academic year (Institute of International Education [IIE], 2015). The international student population constitutes about 4.8% of the total students in U.S. higher education (IIE, 2015).

High-status qualifications, cultural enrichment, improved language skills, and a competitive edge to access better jobs are the main factors that attract international students to the U.S. as a host country. The convenience and declining cost of international travel and communication also make the U.S. appealing to international students (OECD, 2013). Host countries like the U.S., on the other hand, also reap benefits from the international students who come for higher education. International students add to the financial as well as the intellectual capital of the U.S. and their host countries (Smith & Khawaja, 2011). Data reveal the economic contribution of international students to host countries. In the U.S alone, international students contributed approximately $30.8 billion to the U. S. economy in 2015 with almost 64% primarily

relying on personal and family funds in order to pay for their education (IIE, 2015). Even though pursuing an academic degree as an international student in the U.S. can provide many positive outcomes, it can also be very challenging in terms of mental health and health behaviors. Unfortunately international students do not consider these risks before migrating to the U.S.

As they transition to the U.S., international students encounter many barriers contrary to their feelings of excitement and optimism (Gómez**,** Urzúa**,** & Glass**,** 2014). In tandem with unfamiliar environment fraught with linguistic and cultural barriers, international students are also expected to meet the arduous demands of academic life at the same level as their domestic counterparts. This shift to international student status produces serious consequences as they undergo general feelings of inadequacy, insecurity, in addition to feelings of insufficiency regarding their English language skills (de Araujo, 2011; Gallagher, 2013; Gómez, Urzúa, & Glass, 2014; Poyrazli & Kavanaugh, 2006). These problems are also accompanied by confusion, frustration, stress, and self-esteem related issues affecting their overall well-being (Gómez, Urzúa, & Glass, 2014).

In general, acculturation, a dynamic, complex, and multidimensional process of adaptation that international students go through, has adverse effects on their behavioral health. The literature reveals serious behavioral health problems including, but not limited to, depression, anxiety, and alcohol, tobacco, and illegal substance use among international students (Constantine, Okazaki, & Utsey, 2004; Holguin, 2011; Sa, Seo, Nelson, & Lohrmann, 2014). A study conducted by Hahn (2011) among international students from 74 countries studying in the U.S. showed that 22.6% of these international students were clinically depressed. This rate of clinical depression among international students has been shown to be two times higher than the

recorded rate of depression among domestic undergraduate students and greater than two times higher compared to the general U.S. population (Hahn, 2011).

On average, international students that come to the U.S. for higher education vary in age from 17 to 45 years of age (Eustace, 2007). Developmentally, international students are in the period of transition between late adolescence and adulthood. These ongoing developmental changes contribute to their vulnerability to health risk behaviors (Maggs, Frome, Eccles, & Barber, 1997). More specifically, alcohol use has been found to be a common health risk behavior among international students (Kanaparthi, 2009; Sa, 2010). According to Koyama and Belli (2011), 36% of international students between the ages of 18 and 24 reported one or more incidents of binge drinking (heavy episodic alcohol use) in a 2-week period. 52% of the international students surveyed reported that they had, at least, one drink of alcohol, and 52% had binge drinking in the past 30 days (Sa, 2010). Likewise, Yeramaneni and Sharma (2009) found that the prevalence of binge drinking among Asian Indian students was 51.3% in their study sample (N=245). According to Jones and colleagues (2001), the more often students binge drank, the more likely they were to have ever used cigarettes, cocaine, marijuana, and other drugs. Often times, alcohol use leads to psychological, physical, and educational problems (Everett, Lowry, Cohen, & Dellinger, 1999; Presley, Meilman, & Cashin, 1992; Sa, 2010; Wechsler, Dowdall, Davenport, & Catillo, 1995; Yeramaneni & Sharma, 2009).

It is, therefore, crucial for international students to cultivate new ways of living, understanding, and communicating to overcome these problems (Gómez, Urzúa, & Glass, 2014), meet the everyday demands of U.S. universities, and make the most out of their life opportunities. A longitudinal study by Ying & Han (2006) found that acculturative stress had ongoing long-term effects on international students regarding psychological well-being.

Given the increasing number of international students that come to the U.S., the adverse compounding effects on the overall health and well-being, fueled by multiple stressors in the process of acculturation, cannot be underestimated. Consequently, it also becomes necessary to establish intervention programs that can mitigate these compounding health issues among international students. However, due to the lack of prevention and self-management programs where individuals can participate in addressing their behaviors and health problems, recent studies have shown the need for comprehensive explanatory methodologies (Kanaparthi, 2009; Sa, 2010; Wei, Liao, Heppner, Chao, & Ku, 2012) in social work and health research to analyze pathways to effective health behavior outcomes for international students.

International students have numerous risk factors such as financial concerns, language difficulties, perceived discrimination, cultural adjustments, and academic pressures (Eustace, 2007; Koyama & Belli, 2011; Sullivan, 2010), which in turn, generate higher levels of stress, depression, anxiety, and risky health behaviors. International students need protective factors and processes that promote positive outcomes and reduce vulnerability to behavioral health problems in the face of stressful situations. Maximizing protective factors and minimizing risk factors by reinforcing internal resources and providing external resources could help international students continue adjusting, withstand chronic stress, and achieve successful adaptation. To date, few studies have focused on looking at how to maximize protective factors to deal with the vulnerable situations of the international students that stem from multiple stressors. Therefore, the consideration of the role of resilience is beneficial in terms of 1) covering the transition to a new academic and cultural environment, 2) the stability of adjustment patterns over time, 3) maintaining psychological well-being, and 4) overall behavioral adjustment. The collective positive factors that construct individuals' resilience enable them to overcome stressful situations

and move on to rewarding lives with better health outcomes. Therefore, it is essential to identify the role of resilience within a comprehensive model to understand mechanisms with variables related to behavioral health problems in the process of acculturation.

Given the complex nature of confluent stressors impacting international students in the U.S., this study examines whether the impact of the accumulated demands related to acculturative stress on behavioral health problems is mediated by resilience, and whether or not resilience functions as a collective protective factor leading to positive behavioral health outcomes, specifically alcohol use, in the process of acculturation.

This study will attempt to fill gaps in the knowledge base about the most common health risk behavior, binge drinking, among international students and contribute to prevention literature. Further, this conceptual model will assist in the creation of replicable models of resilience that can be applied to other vulnerable populations adding to the transitional science literature. As the international student body grows, it is imperative for colleges and universities to address acculturative stress, resilience, and mental health simultaneously to improve health behaviors of international students in the U.S, which has larger implications to the overall academic environment.

Purpose of the Study

The proposed study addresses three critical needs in behavioral health among international students: 1) the high prevalence and disproportionate impact of acculturative stress, mental health, and health risk behavior (binge drinking); 2) the need for a comprehensive theoretical framework, which explains pathways to behavioral health outcomes during the process of acculturation; and 3) the lack of culturally appropriate self-management and prevention programs geared towards improved behavioral health. Thus, the purpose of the study

is to examine the direct effect of the latent variables (acculturative stress, resilience, and mental health) on health risk behaviors, specifically binge drinking, as well as to test the mediating role of resilience in the relationship between acculturative stress, mental health (depression and anxiety), and binge drinking among international students to determine if resilience functions as a collective protective factor against binge drinking.

Significance of the Study

International students are a hidden segment of the population, in that although their problems and needs are prevalent in social work practice, access and utilization of resources related to behavioral health concerns are still stigmatized. In other words, they are hidden because they rarely seek help. With the rapidly increasing international student population, behavioral health problems such as depression, anxiety, and binge drinking resulting from multiple stressors manifested by the acculturation process cannot be underestimated. Resilience is the process of overcoming stressful situations through the use of internal assets and external resources and can have significant implications for behavioral health interventions. However, few studies have examined how resilience is associated with behavioral health problems, such as depression, anxiety, and binge drinking, among international students. This study seeks to establish a comprehensive conceptual model that focuses on the mediating role of resilience in the relationship between acculturative stress, mental health, and the health risk behavior of binge drinking, among international students. The risk exposure during acculturation can make international students extremely vulnerable in terms of mental health such as depression and anxiety, which in turn, can generate other risks in health behaviors. The concept of resilience and its roles in the comprehensive model suggest practical implications for the prevention of negative mental health and alcohol use. Understanding the mediating role of resilience in the relationship

between acculturative stress and health behaviors may have a positive influence not only on individuals but also in the larger academic environment where preventing conditions leading to health risk behaviors can be changed and adjusted. In addition, a deeper understanding of the role of resilience in the relationship between acculturative stress, mental health, and binge drinking will help in the application of culturally appropriate strategies to develop assets and resources conducive to international students exposed to multiple stressors, instead of only focusing on stress amelioration in isolation.

Definitions and Terms

International Students

For this study, international students are defined as nonimmigrants on a temporary F-1 or J-1 visa at the post-secondary level. They are not residents and have come to the U.S. for the sole purpose of pursuing higher education.

Acculturative stress

Acculturative stress is defined as the result of collective stressors that arise during the process of acculturation, which can lead to a lower mental health status (Berry, Kim, Minde, & Mok, 1987).

Resilience

Resilience is defined as the dynamic process of overcoming risks and avoiding negative outcomes using internal assets and external resources in the face of stressful situations (Fergus & Zimmerman, 2005; Hjemdal, Friborg, Martinussen, & Rosenvinge, 2001). In simpler terms, resilience refers to the process of overcoming risks and avoiding their negative outcomes, and often functions in protecting individuals from risk factors or potential negative outcomes. In this sense, resilience consists of three key components: risk factors, protective factors, and

vulnerability factors. Resilience focuses on individual protective factors. The protective factors comprise both assets and resources.

Vulnerability

Vulnerability refers to the state of susceptibility to harm and the exposure to multiple individual, environmental, and social risk factors that result from the absence of protective factors to adapt (Aday, 2001; Fergus & Zimmerman, 2005; Neil, 2006). The risk factors included in this study reflect stressors that arise during acculturation that can be attributed to negative health outcomes. For this study, negative mental health is operationalized as vulnerability.

Health Risk Behavior-Binge Drinking

Health risk behaviors refer to "any activity undertaken by an individual that potentially increases negative effects on health" (Nguyen, 2012, p. 10). Health risk behaviors increase with vulnerability associated factors. For this study, binge drinking is operationalized as a health risk behavior. Binge drinking is defined as the number of times one had five or more drinks in a row over the last two weeks.

International Students in the United States

International students refer to those who have crossed national borders for the purpose of higher education (OECD, 2013). The OECD and European Statistics Office [EUROSTAT] define international students "as those who are not residents of their country of study or those who received their prior education in another country" (OECD, 2013, p.4). In the U.S., international students are defined as nonimmigrants on temporary visas at the post-secondary level (Institute of International Education [IIE], 2013).

According to U.S. Immigration and Customs Enforcement [ICE], (2014), international students are categorized as F-1, M-1 and J-1 nonimmigrants that enter the U. S. to study

temporarily and not stay permanently in the United States. F-1 nonimmigrant students refer to students who pursue a full program of study in college, university, seminary, conservatory, academic high school, private elementary school, other academic school or language training program in the U.S. M-1 nonimmigrant students are foreign nationals who pursue a full program of study at vocational schools or other recognized non-academic schools (ICE, 2014). J-1 exchange visitors are foreign nationals selected by a Department of State-designated program to participate in an exchange visitor program (ICE, 2014).

In addition, international students can be classified as voluntary migrants. All foreign-born populations in the U.S. can be categorized into two groups: involuntary and voluntary international migrants. While involuntary international migrants refer to any foreign-born people who were forced to migrate to the U.S. because they had no other choice (e.g. displacement from their home country, persecution, and deception or coercion), voluntary migrants include all other international migrants who have moved as a result of their own desires and motivations (e.g. students, tourists, professionals on assignment, guest workers, and seasonal workers) (Tripodi & Potocky- Tripodi, 2007). Since international students stay for a limited period of time and return to their home country, they are categorized as temporary voluntary migrants. Berry and his colleagues (1987) found that voluntary migrants experienced less acculturative stress and psychological distress than involuntary migrants. However, temporary voluntary migrants, such as international students, without permanent social support in the host country, were more likely to experience acculturative and psychological distress than even involuntary migrants. Moreover, individuals who migrated after the age of 12 experienced much more acculturative stress than those before the age of 12 (Padilla, Alvarez, & Lindholm, 1986). It is important to note that

immigrant college students, who moved to the U.S. after their tenth birthday, experienced significantly more acculturative stress (Mena, Padilla, & Maldonado, 1987).

Demographics

The number of international students in the U.S. multiplied more than 38 times during the period 1948–1949 to 2011–2015 (from 25,464 to 974,926). In the 2014-2015 academic year, a total number of 974,926 international students were enrolled in U. S. colleges and universities (IIE, 2015). This figure represents a 10% growth from previous years (IIE, 2015). Between 2014 and 2015 undergraduate international students increased by 7.6%, while graduate international students showed a greater increase (9.8%). As far as gender, over half of international students in the U.S. (56.3%) are males, and the proportion of male international students is steadily growing (Student and Exchange Visitor Program [SEVP], 2015). Among international students, approximately 60% are from Asia, with the largest representation from China (31%), then India (14%) and South Korea (7%) respectively (IIE, 2015). Among these student populations, Chinese international students have dramatically increased since the late 1980s because of the newly established open-door policy to keep China's door open for all countries they trade with. The Asian group is followed by Europeans (23%), Africans (12%), and others (5%) (OECD, 2013). In the U.S., California (160,722), New York (112,040), and Texas (68,543) are the largest states hosting 35% of all international students (SEVP, 2014). One out of three international students studies in California, New York, or Texas. As far as disciplines are concerned, Business, Management, Marketing and Related Support Services are the most popular majors among international students, followed by Engineering and Computer and Information Science (SEVP, 2014).

Chapter 2

Theoretical/Conceptual Framework

The theoretical framework for this study is based on the concepts drawn from three distinct theoretical perspectives: 1) acculturative stress (Berry, 1998), 2) vulnerability (Aday, 2001; Fergus & Zimmerman, 2005; Neil, 2006), and 3) resilience (Fergus & Zimmerman, 2005). These theoretical perspectives provide emphasis on minimizing risk factors and maximizing protective factors to obtain positive adaptation in the face of a stressful situation. Consideration of these theoretical perspectives leads to a comprehensive model that identifies the theoretical mechanisms of these four elements: acculturative stress, resilience, mental health, and binge drinking. These elements are incorporated into the theoretical model in Figure 4-1. The proposed model for this study is an integrated model from (1) the Mediation Model of Resilience (MMR; Yoo et al., 2014) and (2) the Prediction Model of Alcohol Use (PMA; Kim & Kim, 2014).

Theory of Acculturation and Acculturative Stress

For international students, acculturation can be a source of stress with negative repercussions to their behavioral health (Yeramaneni & Sharma, 2009). Acculturation refers to the diverse process of cultural modification resulting from contact between individuals or groups with distinctive cultures (Berry, 2002; Kiefer, 1974). Under different cultural norms and social conditions, people face challenges such as structural confusion, cultural conflict, and feelings of alienation (Berry, 2002; Kiefer, 1974; Wolfer & Robinson, 2001). Limitations and interferences induced by language barriers and a lack of knowledge about a new culture may not only interfere with everyday experiences but also erode self-confidence (Noel, Pon, & Clement, 1996) and psychological well-being (Lau, 2000). This issue is particularly significant for international students because empirical studies have consistently shown that low levels of acculturation

attained in a host society are associated with poor mental health and higher levels of depression (Constantine et al., 2004; Dao et al, 2007; Han et al., 2013; Wei, 2007). A significant aspect of the international student experience is dealing with acculturative stress during the adaptation process as they adjust to the social, cultural, and educational systems in addition to the realities of the new society.

Acculturative stress occurs when individuals experience problems arising from the acculturation process (Crockett et al., 2007; Williams & Berry, 1991). Berry (1987) developed the acculturative stress model, which posits that five individual and group characteristics moderate the effect of acculturation for individuals and groups on mental health as illustrated in Figure 2-1. These characteristics include: nature of the larger society, type of acculturating group, models of acculturation, demographic and social characteristics of the group, and psychological characteristics of the individual. This acculturative stress model has been utilized in many studies to theorize acculturation and its psychological impact. According to Williams and Berry (1991), psychological impact includes negative emotional states such as depression and anxiety that have stemmed from acculturative stress. While a number of empirical studies have assessed and validated the assumption that acculturative stress may be a critical antecedent for international students' negative mental health outcomes (Lau, 2006; Lee & Park, 2013; Wei, 2007; Wei et al., 2012; Yakunina et al., 2013) and risky health behaviors (Koyama, 2005; Koyama & Belli, 2011; Sa et al., 2014), other studies have also found a positive relationship between acculturative stress and negative mental health status among international students (Constantine et al., 2004; Dao et al, 2007; Wei, 2007). These previous works provide a valuable platform on which to build this study.

As stated above, acculturative stress has been defined as the result of collective stressors that arise during the process of acculturation, which can lead to lower mental health outcomes (Berry, Kim, Minde, & Mok, 1987). In the context of international students, financial concerns, language difficulties, perceived discrimination, cultural adjustments, and academic pressure were the major stressors causing acculturative stress (Yang and Clum, 1995). These stressors are risk factors that have the potential to generate negative outcomes in mental health among international students.

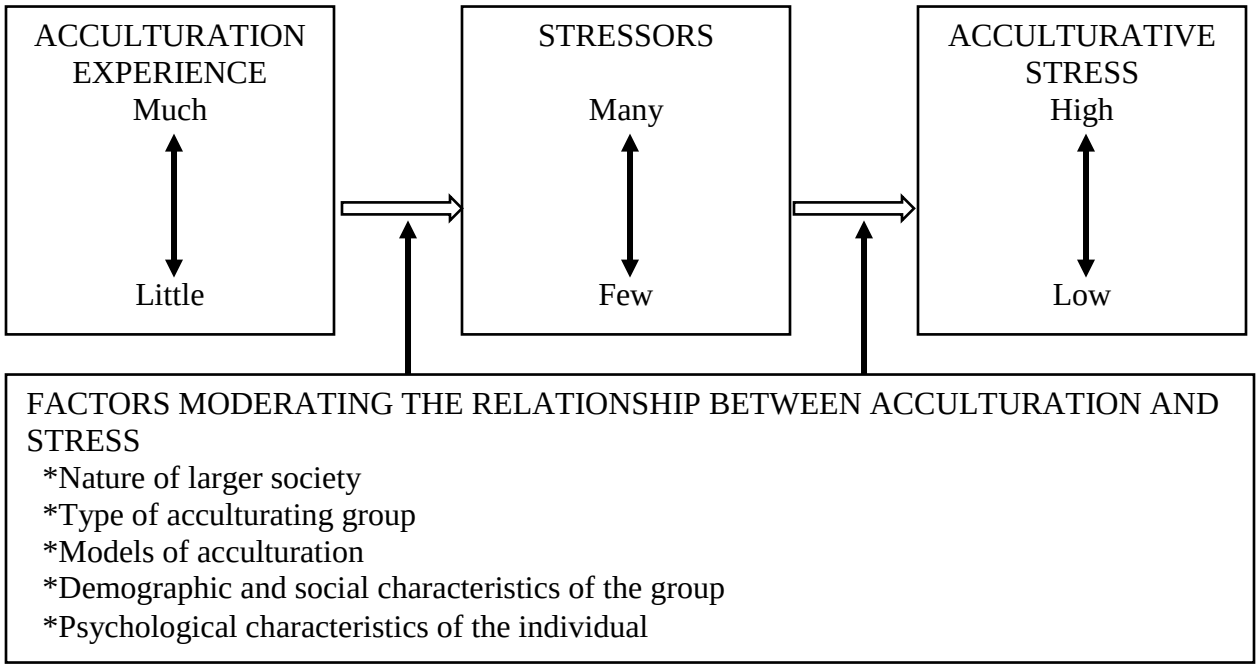

Figure 2-1: Berry's Theoretical Conception of Acculturation and Stress (1987)

Acculturative Stress and Mental Health

Studies have established that the experience of acculturative stress among international students can lead to serious mental health problems especially depression and anxiety (Constantine, Ogazaki, & Utsey, 2004; Duru & Poyrazil, 2007; Lau, 2006; Wei et al., 2007; Wei et al., 2008; Wei et al., 2012). A number of studies also revealed significant relationships between acculturative stress and mental health symptoms affecting the success of international

students in the U.S. (Constantine et al., 2004; Duru & Poyrazil, 2007; Lau, 2006; Lee, Koeske, & Sales, 2004; Wei et al., 2012; Wei et al., 2007). Lau (2006) investigated the relationship between acculturative stress and psychological well-being and found that acculturative stress had a negative association with positive psychological outcomes and a positive association with negative psychological outcomes. Consistently, acculturative stress had a positive correlation with adjustment difficulties (Duru & Poyrazli, 2007). Wei and colleagues (2012) also indicated that acculturative stress had a significant association with psychological distress specifically when students perceived themselves to have lower English proficiency. It is understandable that acculturative stress is closely related to mental health problems, since international students as temporary migrants have multiple collective stressors as they adapt to a new academic and cultural environment over a short period of time. This stressful dynamic requires a certain level of individual competence among international students, in order for them to seek resources that can help them overcome the stressful situations and ultimately maintain their well-being. Despite all the discussions about acculturation, little attention has been paid to acculturative stress among international students.

Acculturative stress, in essence, functions as a chronic stressor among international students that revolves around meeting ongoing demands and threatens to exceed their resources during the acculturation process. As noted earlier, they suffer from stress derived from the discrepancy between the new academic and environmental demands as well as their adaptive capacity which disrupt their normal functioning. Ying and Han (2006) indicated that acculturative stress has on-going, long-term negative effects for international students when considering language barriers and discrimination as acculturative stressors. These stressors are risk factors that have the potential to generate negative outcomes in mental health among

international students. These collective risk factors that they encounter while adapting to new cultural and academic environments often make them vulnerable (Sherry, Thomas, & Chui, 2010).

Vulnerability Perspective

Vulnerability refers to the state of susceptibility to harm and the exposure to multiple individual, environmental, and social risk factors that result from the absence of protective factors (Aday, 2001; Fergus & Zimmerman, 2005; Neil, 2006). Vulnerability is defined as experiences that can cause stress or anxiety with negative impact on one's physical, psychological, and social functions (Sihyun & Schepp, 2014). While any one can be vulnerable at any given point in time, the concept of vulnerability has been used to identify certain individuals and populations at risk when compared to others (Aday, 2001). Therefore, vulnerable populations are social groups who experience limited resources and consequently fall under high relative health risks (Aday, 2001; Flaskerud & Windslow, 1998). According to Flaskerud & Windslow (1998), the lack of environmental resources is often the main cause of increased susceptibility to negative health outcomes. Typically, increased relative risk or susceptibility to adverse health outcomes results from this state of vulnerability (Flaskerud & Windslow, 1998). Stressful or negative events bring about increased susceptibility to physical, psychological, or social health (Aday, 2001). For international students then, the acculturative stress as a result of their contact with a different social, educational, and everyday culture can put them more at risk for negative psychological and social functions when compared to their domestic counterparts.

While vulnerable groups often include ethnic people of color and migrants (Flaskerud & Windslow, 1997), international students, as both temporary and voluntary migrants, also fall into the category of vulnerable groups. According to Sherry, Thomas, and Chui (2009), the

experience of international students can be even more traumatic for students who experience linguistic and cultural barriers, social exclusion, racism, and financial difficulties. Specifically, the lack of effective social, cultural, and economic support often makes these students more vulnerable to exploitation and social exclusion (Sherry et al., 2009). Sherry and colleagues (2009) stated that "such exploitation may occur when there is insufficient commitment on the part of an educational institution to equal opportunity, when foreign students receive low quality education or are financially exploited'' (p. 34).

As stated before, multiple acculturative stressors, such as financial concerns, language difficulties, academic pressure, cultural adjustment, and perceived discrimination, have been significant predictors of negative mental health outcomes, including depression and anxiety (Sümer, Poyrzli, & Grahame, 2008). Also international students are often vulnerable to disciplinary action in new academic systems due to academic dishonesty issues such as plagiarism, multiple submissions, and facilitation of academic misconduct (International Center at UCLA, 2015). These risk factors are more likely to increase levels of vulnerability. When individuals face stressful situations, they become vulnerable to mental health. When vulnerability increases, so does the likelihood of negative health outcomes as illustrated in appendix A. In the light of this cycle of stress and vulnerability, if individuals do not have the necessary protective factors to minimize vulnerability factors and increase protective factors, such as assets and social resources, they are more likely to have negative mental health outcomes (Fergus & Zimmerman, 2005). These negative mental health outcomes can generate risky health behaviors, which in turn can lead to other negative outcomes (Sa, Seo, Nelson, & Lohrmann, 2013). In the context of international student population, Sa and his colleagues (2013) found that anxiety and depression significantly predicted alcohol use. Negative mental health was also

significantly associated with an increase in binge drinking and drinking and driving behavior among this population. Therefore, vulnerability, particularly, is an important concept referring to a process that often leads individuals to develop high risks and negative outcomes (Fergus & Zimmerman, 2005).

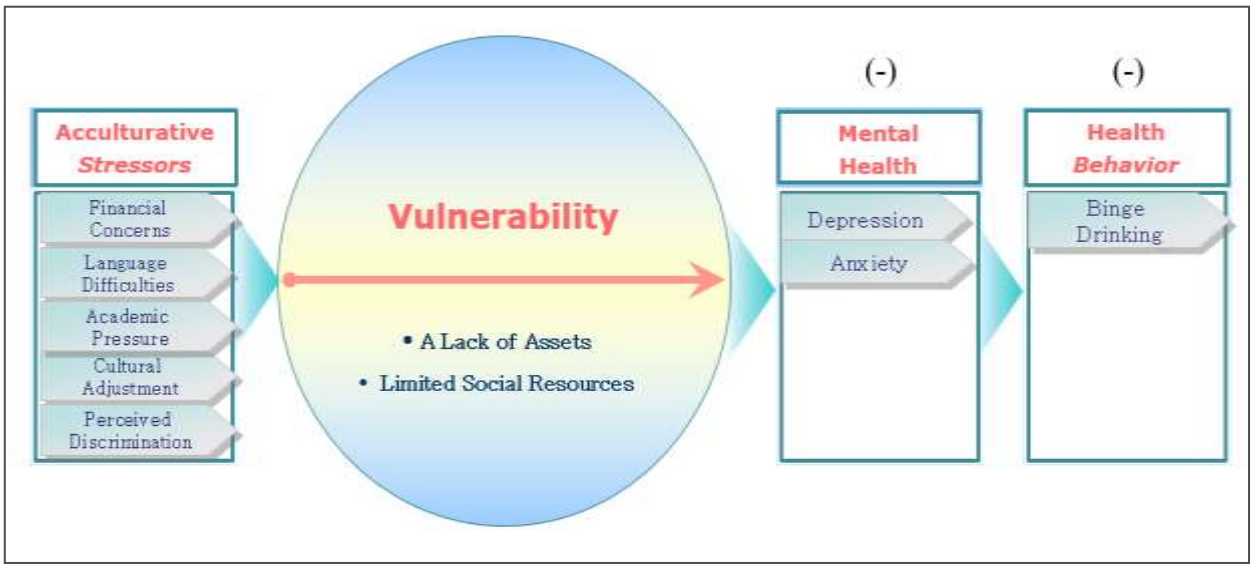

Figure 2-2: Conceptual Model of Vulnerability

Mental Health

Depression and anxiety are the most frequent issues among international students (Wei et al., 2007). Depression refers to "a state in which persistent depressed mood or loss of interest occurs together with other reliable physical and mental signs, such as difficulties sleeping, poor appetite, impaired concentration, and feelings of hopeless and worthlessness" (Lee, Nam, Kim, Kim, Lee, & Lee, 2013, p.272).

Although experiencing some anxiety is a part of most people's lives, it becomes problematic when the symptoms become chronic and can ruin a person's daily functioning. Anxiety is "a transient emotional state, characterized by subjectively experienced tension and an increased activity state of the autonomous nervous system" (Van den Bergh, Van Calster, Pinna

Puissant, & Van Huffel, 2008, p.254). The Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychiatric Association) defined this mental health disorder as a:

> Clinically significant behavioral or psychological syndrome or pattern that occurs in an individual and that is associated with present distress (e.g., a painful symptom) or disability (i.e., impairment in one or more important areas of functioning) or with a significantly increased risk of suffering death, pain, disability, or an important loss of freedom (American Psychiatric Association, 2000, p. xxxi).

Mental health problems such as depression and anxiety result in health risk behaviors.

Health Risk Behaviors

Health risk behaviors refer to "any activity undertaken by an individual that potentially increases negative effects on health" (Nguyen, 2012, p. 10). Health risk behaviors increase a person's vulnerability to negative health outcomes (Wang, Ou, Chen, & Duan, 2009). According to Schwartz and colleagues (2011), acculturation among immigrant youth and adults was linked to many health risk behaviors such as, alcohol and drug use and unsafe sexual behaviors. Some studies have identified an emerging pattern, known as the immigrant paradox, where increased acculturation specifically in terms of language use and ethnic identification has shown to be more likely to be associated with increased risky health behaviors (Allen et al., 2008; Zamboanga, Raffaelli, & Horton, 2006). For temporary migrants, such as international students, increased acculturative stress during the process of adaptation to a new culture and a new academic environment also leads to improved health risk behaviors (Kanaparthi, 2009; Koyama & Belli, 2011; Sa, Seo, Nelson, & Lohrmann, 2013). The Center for Disease Control and

Prevention (CDC) has operationalized health risk behaviors into six areas that contribute to youth morbidity and mortality. These six behaviors include: 1) alcohol and other drug use, 2) tobacco use, 3) unhealthy dietary behaviors, 4) inadequate physical activity, 5) sexual behaviors that contribute to unintended pregnancy and sexually transmitted diseases, and 6) behaviors that contribute to unintentional injuries and violence (CDC, 2014). The above six areas have often been used for the operationalization of health risk behaviors. However, studies on international students often use a one-dimensional health risk behavior scale (alcohol use or tobacco use) instead of multidimensional ones to avoid the complexity created by many different risk behaviors.

Mental Health and Health Risk Behaviors

Health risk behaviors such as tobacco use, alcohol use, and other drug use often result from mental health problems such as depression and anxiety, which often leads to participation in other risky health behaviors, a progression that can be detrimental to positive health outcomes. Kim and Kim (2014) found that depression was significantly associated with drinking problems (hazardous alcohol use, dependence symptoms, and harmful alcohol use). In their model, mental health directly influenced drinking problems. In another study, Sa and colleagues (2013) investigated predictors of increased cigarette smoking over time in the U.S. The study was conducted using a sample of 1,201 Korean international students from 52 U.S. universities. The results showed that cigarette smoking among these international students had a significant association with stress. The study also found that those with increased levels of depression and anxiety were more likely to experience an increase in cigarette smoking. This result is consistent with an earlier study conducted by Sa (2010), which demonstrated that levels of anxiety and depression were significantly associated with an increase in binge drinking, drinking and driving,

and cigarette smoking. Kim and Kim (2014) also found that depression was a significant predictor of drinking problems among Chinese foreign students in Korea. Chinese international students with higher levels of depression had an increased incidence of higher levels of drinking problems. Overall, these empirical studies reveal a close relationship between mental health and alcohol use among international students.

Acculturative Stress and Health Risk Behaviors

Numerous studies have been focused on alcohol use, substance use, and cigarette smoking as health risk behaviors among international students (Holguin, 2011; Kanaparthi, 2009; Koyama, 2005, Koyama & Belli, 2011; Sa, 2010, Sa et al., 2014). These studies indicated that acculturative stress was significantly associated with different health risk behaviors and also a significant predictor of health risk behaviors. As far as alcohol use among international students is concerned, Koyama and Belli (2011) demonstrated that acculturative stress had a significant association with the drinking motivation of international students and that both acculturative stress and drinking motivation were significant predictors of levels of alcohol use. Likewise, acculturative stress had a significant association with an increase in cigarette smoking (Sa et al., 2013). Consistently, Kanaparthi (2009) reported that fear and culture shock in international students had a significant correlation with their alcohol use in terms of quantity, frequency, binge, and audit. However, the study failed to show that acculturative stress had a significant predictive effect on alcohol use. Koyama (2005) had also found similar results where acculturative stress was not a significant predictor of drinking motivations and alcohol use. According to Holguin (2011) however, after living in the U.S., international students have shown an increased consumption of legal and illegal substances. Studies also showed that physical inactivity among international students resulted from communication difficulties, adjusting to a

rigorous academic system, dealing with cultural identity, struggling with financial concerns, having an unfamiliar social support system, and feeling lonely, which were all stressors causing acculturative stress among international students (Taeho, Heewon, & Gordon, 2008). Based on the results of the previous studies, during the process of acculturation, the effects of stress on negative health risk behavior outcomes cannot be underestimated. The goal then, is to build a protective factor that can minimize these negative risky behaviors and lead to improved health behaviors. This study proposes resilience to be that protective factor.

Resilience Theory

Resilience is "the process of overcoming the negative effects of risk exposure, coping successfully with traumatic experiences, and avoiding the negative trajectories associated with risks" (Fergus & Zimmerman, 2005, p. 399). Simply put, resilience refers to the process of overcoming risks and avoiding their negative outcomes. Resilience consists of three key components: risk factors, protective factors, and vulnerability. Resilience focuses on individual protective factors, which comprise assets and resources (Fergus & Zimmerman, 2005). Hjemdal and his colleagues (2006) found that individuals with internal resources (personal competency, social competency, and structural style) and external resources (family cohesion and social resources) as protective factors were basically unchanged in terms of their mental health status in spite of stressful life events. The stressful events did not even negatively impact the mental health of the individuals with protective resources available (Hjemdal et al., 2006).

Individuals, who sustain normal growth in the face of stressful situations, are frequently labeled as "resilient" (Friborg, Hjemdal, Rosenvinge, & Martinussen, 2003). There were some groundbreaking longitudinal studies conducted by pioneering researchers in the field of resilience in the early 1990s (Garmezy, 1991; Rutter, 1993; Werner and Smith, 1992) to

determine the primary resilience features associated with positive adaptation in the face of multiple, serious risk factors. In spite of being exposed to multiple risk factors such as poverty, disrupted family environments, parental psychopathology, and perinatal stress, some high-risk children showed positive adjustments in their adult life (Werner & Brendtro, 2012). These results showed that individuals who are resilient, despite long-term stress, are more flexible than vulnerable people in using several protective resources not only in themselves, but also in their environment (Friborg et al., 2003). Contexts or conditions in which people live and age usually shape their capacity to respond to external adversity without experiencing significant harm (UCLA Institute of Health Equity, 2014). Therefore, resilience is not just an individual's innate personality trait, rather resilience refers to "the combination of individual resources, the support provided by the family and significant others as well as experiences and opportunities within the wider environment that facilitate successful adaptation to challenging situations" (Schoon, 2006, p.16). From these studies, it is apparent that adaptive functioning in the face of stressful situations not only relies on individual characteristics, but also is greatly affected by interactions with the environment (Schoon, 2006).

Resilience requires the presence of both risk factors and protective factors that either help raise a positive outcome or avoid an adverse outcome. According to Fergus & Zimmerman (2005), while risk factors increase vulnerability leading to negative outcomes, protective factors increase resilience, which leads to positive outcomes, such as good mental health and well-being. Overall, minimizing risk factors and maximizing protective factors are essential to developing and maintaining positive outcomes in the face of stressful situations (UCLA Institute of Health Equity, 2014). Despite chronic stress, resilient individuals may show better outcomes, including (1) higher mental well-being and flourishing and (2) lower incidence of unhealthy or risky

behaviors (UCLA Institute of Health Equity, 2014) than those who are less resilient. Thus, resilience refers not just to the outcome, but to the process of overcoming the negative effects of risk exposure and avoiding negative trajectories related to risks (Fergus & Zimmerman, 2005). In addition, the process of resilience includes an immediate mechanism of successful coping with traumatic stressful situations (Fergus & Zimmerman, 2005).

The protective factors that help individuals avoid the negative effects of risks can be either assets or external resources. Friborg et al. (2003) stated that assets are internal resources that reside in the individual such as positive perception of self, positive perception of the future, social competence, and structured style. Resources are factors external to the individual that can help the individual overcome risk. They include family cohesion and social resources (Friborg et al., 2003). Friborg et al. (2003) explained, "the term resources 1) emphasizes social environmental influences on health and development, 2) helps place resilience theory in a more ecological context, and 3) moves away from conceptualizations of resilience as a static, individual trait" (p. 399). Individual internal assets and external resources such as protective factors help to strengthen resilience by playing a role in changing the negative effects of stressful circumstances (Schoon, 2006). Schoon (2006) concluded that "the ecological perspective of human development provides a heuristic for understanding how multiple factors influence individual development and adjustment" (p.19).

Models of Resilience: Mediating and Moderating the Relationship between Acculturative Stress, Resilience, & Mental Health

In the context of international students, resilience can be established as an essential component of positive adaptation that helps them deal positively with psychological and behavioral changes (Sa et al., 2013; Yoo et al., 2014). At the same time, resilience can act as a

catalyst to increase the abilities of international students and to avoid negative outcomes such as mental health problems and health risk behaviors that are detrimental to their health (Friborg, et al., 2005; Lee & Park, 2014). A study conducted by Yoo and colleagues (2014) demonstrated that resilience partially mediated the effect of acculturative stress on negative mental health. Acculturative stress, as the result of collective stressors, led to the increase in negative mental health outcomes. However, the negative effect of acculturative stress on mental health was decreased through the mediator, resilience. In short, resilience had a positive role in decreasing the negative effect of acculturative stress on mental health among international students. In the face of stressful situations, during the process of acculturation, an increase in resilience is more likely to be associated with a decrease in negative mental health status. This study clearly demonstrated that resilience acted as a mediator and protective factor in the relationship between acculturative stress and mental health, implying that depression among international students, resulting from acculturative stress, can be decreased by reinforcing their resilience levels (Yoo et al., 2014). In addition, according to Kim and Kim (2014), negative mental health outcomes affected by multiple stressors created another risky health behavior, alcohol use. Negative mental health was a significant predictor of this health risk behavior in addition to acculturative stress.

In terms of examining resilience as a moderating variable, Lee and Park (2014) introduced a moderation model of resilience where they found that resilience had a significant moderating effect on the relationship between acculturative stress and depression among international students. The moderating effect of resilience, defined as a composite variable of hardiness, control, self-esteem, clear goals, self-confidence, problem solving skills, adaptability to change, affection, and a sense of humor in times of stress, demonstrated that resilience protected individuals experiencing high levels of acculturative stress and buffered the

relationship between acculturative stress and negative mental health status. The results from the Lee and Park (2014) study showed that the negative effect of acculturative stress on depression was lower when the level of resilience was high.

As illustrated in Figure 2-1, multiple acculturative stressors cause international students to become vulnerable to their mental health, and in turn, negative mental health outcomes create a risk in their health behavior. However, in the vulnerability model into which resilience is added as illustrated in Figure 2-3, the negative outcome from risk exposure in mental health and a health behavior could turn into a positive outcome. Diverse psychosocial factors maintain and contribute to health risk behaviors (McLeroy, Steckler, Simons-Morton, Goodman, Gottlieb, & Burdine, 1993).

From the empirical models above, what can be interpreted is that resilience as a protective factor can provide important implications for intervention in situations of acculturative stress negatively affecting mental health status, especially among international students.

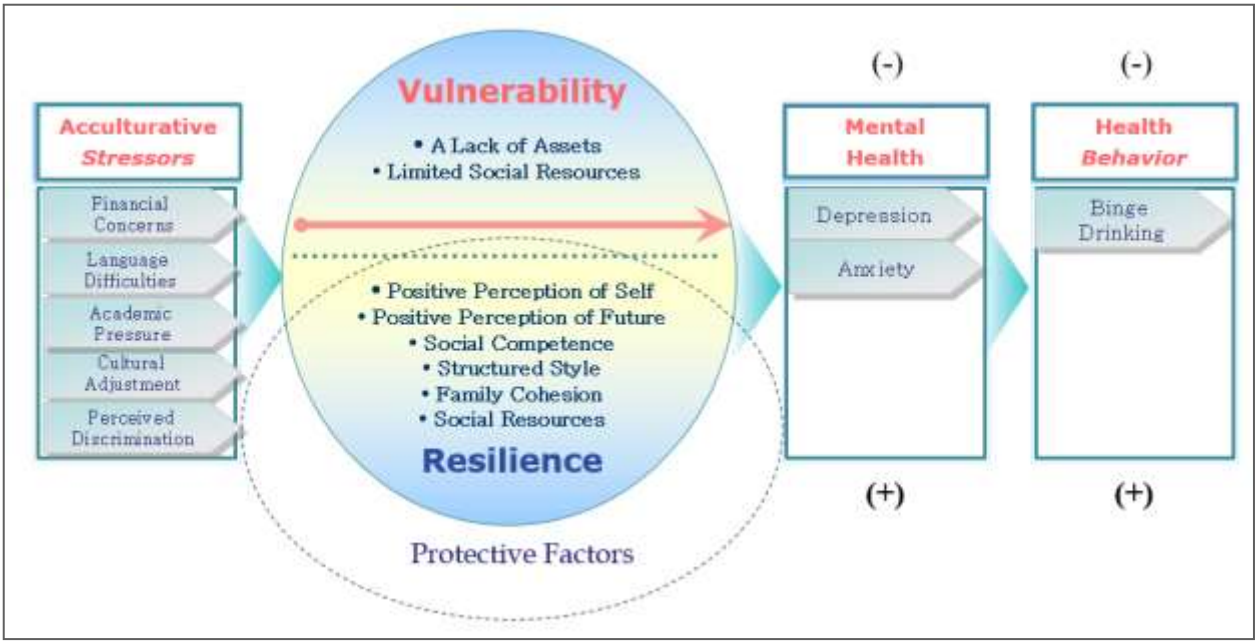

Figure 2-3: Conceptual Model of Resilience

Resilience and Health Risk Behaviors

Studies have shown evidence that supports the negative relationship of resilience with any health risk behaviors and resilience as a significant predictor of health risk behaviors. Johnson, Dinsmore, and Hof (2011) examined the relationship between the psychological trait of resilience and five different levels of alcohol use (binge drinking, heavy drinking, moderate drinking, light drinking, and abstinence from drinking) among college students and found that there was a significant negative correlation between resilience and alcohol consumption level. Moreover, Hodder and colleagues (2011) conducted a school-based resilience intervention to reduce health risk behaviors, such as tobacco, alcohol, and illicit drug use among secondary school students from 32 schools in impoverished areas. Baseline surveys were conducted with 7th graders in both intervention and control groups and then post-test surveys were conducted when both groups became 10th graders. This longitudinal intervention study showed that a comprehensive school-based resilience intervention was effective in decreasing the self-reported health risk behaviors among adolescents. This school-based longitudinal intervention study of resilience suggested a causal relationship between resilience and health risk behaviors (e.g. alcohol, tobacco, and illicit drug use) among adolescents. Although these studies were not conducted with international students, they shed light on the potential significant relationship between resilience and health risk behaviors during the process of acculturation among international students.

Kim and Kim (2014) studied the relationship between resilience and health risk behaviors using a sample of international students. The study demonstrated that resilience negatively correlated with drinking problems and resilience significantly predicted drinking problems

among Chinese international students in Korea. Results indicated that higher levels of resilience were less likely to have higher levels of drinking problems.

Proposed Conceptual Model of the Study

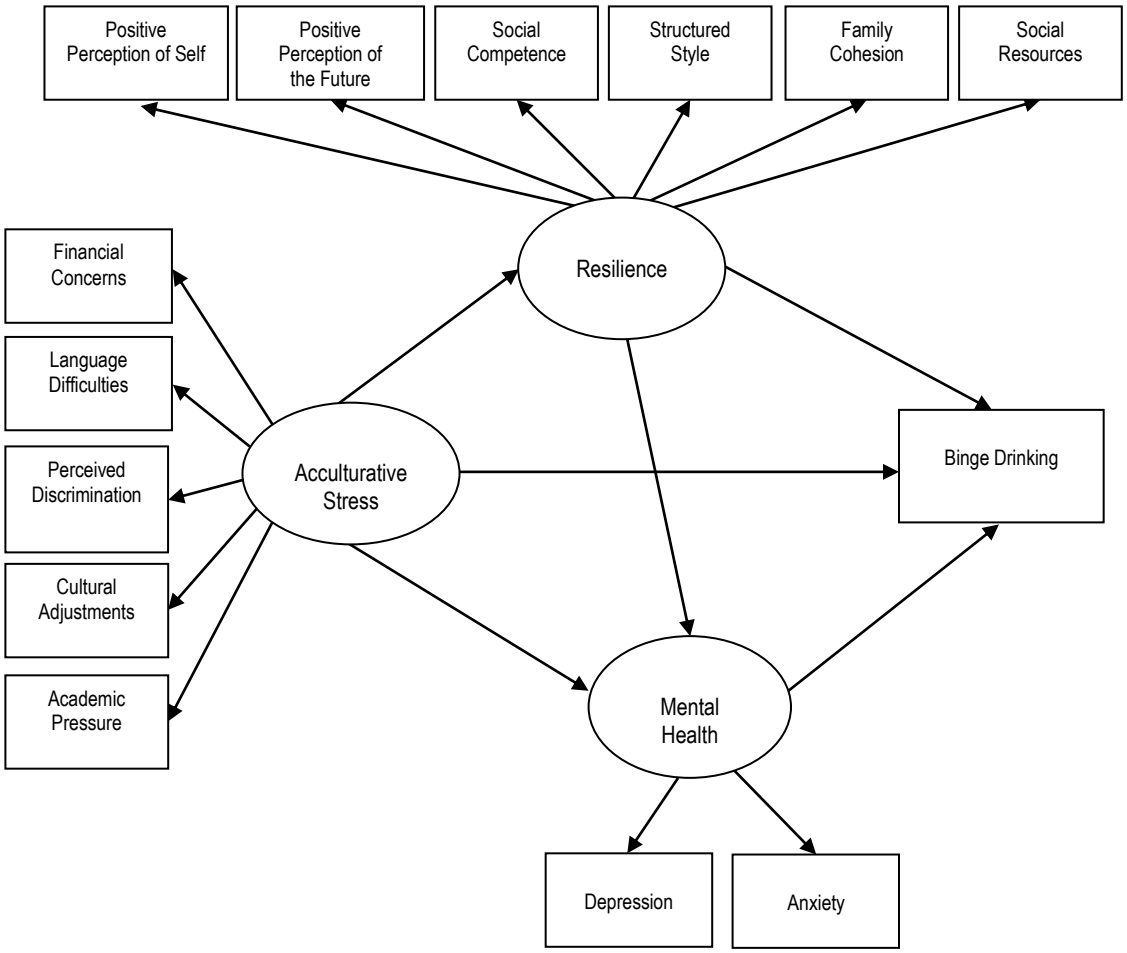

Figure 2-4: Conceptual Model of Resilience as a Protective Factor against Binge Drinking

Figure 2-4 presents a conceptual model that is based on a theoretical framework using three different theories: (1) acculturative stress, (2) vulnerability, and (3) resilience. The three theories provide a strong foundation for identifying health behavior determinants. The hypothesized conceptual model includes all possible causal relationships between acculturative stress, resilience, mental health, and alcohol use. The concept of health risk behaviors was

derived from a negative approach toward mental health, which is affected by acculturative stress and constructed based on vulnerability theory. However, resilience is a positive approach, and when resilience is entered into the model, it creates the potential for positive outcomes in mental health, which in turn, leads to positive health behavior in binge drinking among international students.

The conceptual framework integrates the Mediation Model of Resilience (MMR; Yoo et al., 2014) and Prediction Model of Alcohol Use (PMA; Kim & Kim, 2014). When integrated, the MMR and PMA models provide a broader theoretical framework and a comprehensive testable intervention model. The new integrated model, illustrated in Figure 2-4, shows that health behaviors would be influenced by acculturative stress, resilience, and mental health. Vulnerability theory explains that when international students are exposed to risk, the acculturative stressors lead to negative outcomes in mental health that, in turn, bring about other risk factors in terms of health behavior outcomes. On the other hand, the MMR as a positive factor shows positive outcomes in mental health, which in turn, reduces and/or avoids negative outcomes in health behaviors. Both acculturative stress and mental health would work as sources of negative contingencies associated with the health behavior, binge drinking. However, resilience would work as a source of positive contingency associated with binge drinking. Specifically, in the integration model, resilience would be explained as a mediator in the relationship between acculturative stress, mental health, and binge drinking. Therefore, the negative effects of stress are not uniform, but vary according to the level of resilience that each individual has available in order to adapt to stressful situations.

CHAPTER 3

Review of the Literature

This chapter presents a review of the literature concerning acculturative stress, resilience, mental health, and health risk behaviors among international students. This literature review examines the methodological developments surrounding the relationships between acculturation, acculturative stress, mental health, and health risk behaviors. Careful consideration was given to examine the current state of the literature about international students in the U.S. In particular, the study utilizes four systematic reviews included in Table 3-1.

Table 3-1: Search Term, Database, Results, Ideas for Another Search, & Final Review for Empirical Literature Review

Search Terms	Database	Results	Ideas for Another Search	Final review
Acculturative stress	Academic Search Complete & ProQuest Dissertations & Theses	1,146 hits	Narrow search by looking for international students	8
Resilience	Academic Search Complete & Google	2,431 hits	Narrow search by looking for international students	4
Mental health, psychological distress	Academic Search Complete & ProQuest Dissertations & Theses	232 hits	Narrow search by looking for depression and anxiety as well as international students	8
Health risk behavior,	Academic Search Complete & ProQuest Dissertations & Theses	440 hits	Narrow search by looking for specific health risk behaviors (tobacco use, alcohol and other drug use, sexual behaviors, dietary behaviors, and physical inactivity) as well as international students	8

Review Methods and Search Criteria

This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to analyze relevant studies and assess limitations in the process of methodological developments surrounding the state of resilience and health risk behaviors

among international students. In particular, this review examined: 1) the relationships between acculturative stress, resilience, mental health, and health risk behaviors by examining quantitative studies that focus on international students; 2) the role of each variable in the relationship between acculturative stress, resilience, mental health, and health risk behaviors; 3) the conceptual and methodological constructs of the variables; 4) participant and study characteristics; and 5) the overall quality of studies based on five criteria: relevance to the present topic, a clearly outlined study design, measurement error, appropriateness of the analysis, and generalizability. The criteria for quality assessment on systematic reviews were adapted from quality indicators based on the Center for Reviews and Dissemination's (CRD) guidelines (2009.)

Electronic databases (Academic Search Complete and ProQuest Dissertations & Theses) were systematically searched to identify all relevant articles for this review. Preliminary searches before conducting the systematic review showed that Academic Search Complete and ProQuest Dissertation and Theses had the majority of relative peer reviewed articles specifically using a sample of international students. For instance, PsycINFO and PubMed showed 14,185 and 7,207 hits respectively when the study used resilience as a keyword for search, but when the study narrowed the search by the target population of international students, the results garnered only 23 and 11 hits respectively, after excluding studies that were either duplicates or irrelevant. For this review, inclusion criteria were limited to studies 1) published in peer-reviewed journals; 2) published in full text in the ten year period (2004-2014); 3) conducted using quantitative research; 4) used acculturative stress, resilience, mental health, and health risk behaviors as the primary variable or concept of interest (i.e., measurement of each variable must be clearly delineated) and then 5) narrowed the search by looking for international student samples. The

chosen studies were analyzed according to the quality of the research, with particular attention to their conceptual constructs, methods, and presentation of results.

An initial literature search obtained a total of 4,249 citations (acculturative stress [AS]-1,146, resilience 2,431, mental health [MH] 232, & health risk behaviors [HRB] 440). As the first step, the titles of the studies were screened. From the title screen, the study eliminated 4,113 records that were either duplicates or irrelevant, yielding 136 citations (AS [66], resilience [34], MH [22], HRB [14]). All citations from Academic Search Complete and ProQuest Dissertations & Theses were subjected to full-text article screening, and 28 articles were deemed eligible per the inclusion criteria (AS [8], resilience [4], MH [8], HRB [8]) (see Table 3-1). Based on the inclusion criteria for each variable, four separate systematic reviews were conducted.

A data coding sheet was created to capture information based on 1) participant characteristics (each study's sample size and its participants were characterized by gender, age, countries of origin, education level, length of stay in the U.S.); 2) study characteristics (study design, major analysis, and findings); 3) measures of key variables and their characteristics; 4) the role of each variable in the studies; and 5) study limitations (see Appendices B-E).

Methodological Developments: A Critical Review of the Literature

This review utilized four systematic reviews using key variables (acculturative stress, resilience, mental health, and health risk behaviors) to analyze strengths and limitations in the process of the methodological developments. These four systematic literature reviews examined 1) participant characteristics, 2) study characteristics, 3) the role of each variable in the studies, 4) study limitations, 5) summary of quality assessment, and 6) a summary of four literature reviews. A total of 28 articles from four systematic reviews were analyzed in terms of participant

characteristics, study characteristics, and study limitations. In addition, the reviewed articles (8 AS, 4 resilience, 8 MH, and 8 HRB) from each systematic review were analyzed separately in terms of scales and the role of each variable in the study.

Participant Characteristics

A total of 28 studies collected data from both male and female international students. The age range of participants varied from 17 to 52 years (mean age =28.97 years). A majority of studies included nontraditional graduate level students. Sixteen out of 28 studies (57.1%) sampled both undergraduate and graduate level international students including doctoral students at the same time. The remaining studies (42.9%) excluded graduate level students and focused on undergraduate students at community colleges and 4-year institutions. Regarding race/ethnicity and countries of origin, over half of the studies (16 out of 28 studies) focused on Asian international students. Specifically, eight out of 16 studies (50%) focused only on Chinese students. It is important to note that Chinese students account for more than 29% of the international student population (IIE, 2013). Therefore, it was not incongruous to have a significant number of Chinese students in the sample of international students. Also. over 40% of the reviewed studies (42.9%) collected data on a variety of racial backgrounds or countries of origin of international students, based on the country of origin of the participants. Ten out of the 28 reviewed studies provided data that determined the average length of stay in the U.S. among international students to be 2.54 years. Some of the study participants had stayed in the U.S. for as many as 5-6 years.

Study Characteristics

As far as research design, all the 28 studies predominantly used a non-experimental and cross-sectional survey design. Interestingly, 67.86 % of the studies (19 out of 28 studies) used an

online survey and two of them had convenience and snowball sampling with online recruitment due to low response rates. An online survey was very common for data collection from international students as it was easy to get the list of international students and their email addresses. Furthermore, none of the studies used probability sampling or a nationwide sample, which limited the generalizability and representativeness of the samples. The sample size of these 28 studies ranged from 52 to 1,201. Overall the sample size was small. Thirteen out of 28 studies used a sample of fewer than 300 cases. Twenty-four out of 28 studies were exploratory research. About 10 % (3 out of 28) of the studies were explanatory studies examining casual relationships. The majority of the studies utilized data driven models rather than theory driven models; they mainly analyzed the data in order to determine direction, examine direct effects, and relationships among variables. Also in the area of data analysis, 42.9 % of the reviewed studies (12 out of 28) utilized hierarchical regression analysis, followed by multiple regression analysis (32.1 %), other (10.7 %), and multivariate logistic regression (7.2 %). On the other hand, only two studies (7.2 %) used Structural Equation Modeling (SEM), causal modeling, which combines elements of regression analysis, factor analysis, and simultaneous equation modeling.

Scales

Five out of eight reviewed studies (62.5%) regarding acculturative stress used the Acculturative Stress Scale for International Students (ASSIS) developed by Sandhu & Asrabadi (1994). The ASSIS is a 36-item scale, measured on a 5-point Likert scale. It consists of seven subdomains: 1) perceived discrimination, 2) homesickness, 3) perceived hate, 4) fear, 5) stress due to change/ culture shock, 6) guilt, & 7) nonspecific concerns. Overall, the ASSIS scale in the five studies showed high internal validity (above 0.90). According to Constantine and his

colleagues (2004), the ASSIS showed a high convergent validity and had a significant negative correlation with international college students' English fluency and social self-efficacy and positive correlations with self-concealment and depressive symptoms (see Table 2-1 in Appendix A).

Secondly, 33.3% of the reviewed studies focusing on resilience employed the Connor-Davidson Resilience Scale (CD-RISC). The CD-RISC is a 25-item scale, measured on a 5-point Likert scale from 0 (not at all true) to 4 (true nearly all of the time). The CD-RISC consists of five subdomains: 1) personal competence, high standards, and tenacity, 2) trust in one's instinct, tolerance of negative effects, and strengthening effects, 3) positive acceptance of change and secure relationships, 4) control, and 5) spiritual influence. These factors of resilience are more related to personal traits. The studies reported good internal consistency and test-retest reliability. The CD-RISC has been validated with different cultural groups and languages. It has measured the same construct, in the same way, across the various groups or over time (www.connordavidson-resiliencescale.com, 2014). Total scores range from 0 to 125 (high resilience). The CD-RISC has reported good content, criterion, and construct validity and internal consistency and test-retest reliability (see Table 2-1 in Appendix A).

Thirdly, 37.5% of the reviewed studies regarding mental health (3 out of 8) measured depression with the Center for Epidemiologic Studies Depression Scale (CES-D) to assess symptoms of depression. Twenty items were measured on a 4-point scale [0 (rarely or none of the time, less than 1 day) to 3 (most or all of the time, 5-7 days)]. Total scores can range from 0 to 60. High scores indicate high levels of depressive symptoms. Scores equal to or greater than 16 represent a significant risk for depression (critical cutoff point=16). The CES-D is reported to have high internal consistency reliability (0.85–0.91) and good construct validity in college,

clinical, and community samples. Also, the 3 out of 8 studies used the Patient Health Questionnaire PHQ-9 and the Generalized Anxiety Disorder 7 (GAD-7) to assess depression and anxiety. They are subscales of the Patient Health Questionnaire-Somatic, Anxiety, and Depression (PHQ–SADS). The PHQ-9 is a 9-item scale, measured on a 4-point Likert scale ranging from 0 (not at all) to 3 (nearly every day). PHQ-9 items were derived from the DSM-IV classification system pertaining to: 1) anhedonia, 2) depressed mood, 3) trouble sleeping, 4) feeling tired, 5) change in appetite, 6) guilt or worthlessness, 7) trouble concentrating, 8) feeling slowed down or restless, 9) suicidal thoughts. The studies showed high internal validity (above 0.84) as well as good test-retest reliability (interclass correlation = 0.84). The GAD-7 items, also measured on a 4-point Likert scale ranging from 0 (not at all) to 3 (nearly every day), covers: 1) nervous, anxious, or on edge, 2) easily annoyed or irritable, 3) afraid as if something awful might happen, 4) worried about different things, 5) restless and unable to sit still, 6) unable to stop or control worrying, 7) have trouble relaxing. The PHQ-9 and the GAD-7 provide diagnostic guides with cutoff scores to assess depression and anxiety respectively. High internal validity of above 0.90 and test-retest reliability (interclass correlation = 0.83) have been consistently reported. Both scales have cutoff scores of 5, 10, and 15, indicating mild, moderate, and severe levels. The GAD-7 has high convergent validity, which had significant correlations with two other anxiety scales: the Beck Anxiety Inventory ($r = 0.72$) and the anxiety subscale of the Symptom Checklist-90 ($r = 0.74$) (see Table 2-1 in Appendix A).

Lastly, the Health Risk Behavior Survey (HRBS) developed by Douglas et al. (1997) was used to assess health risk behaviors among college students. The HRBS scale consists of 6 subdomains: 1) behaviors leading to intentional or unintentional injury, 2) tobacco use, 3) alcohol and other drug use, 4) sexual behaviors, 5) dietary behaviors, & 6) physical inactivity.

The HRBS has 33 items, but it has not been validated (see Table 2-1in appendix A). Most of the reviewed studies on health risk behaviors only focused on alcohol use and tobacco use, so there was a paucity of research measuring the concept of health risk behaviors using multidimensional subdomains for international students.

The role of each variable in the studies

Acculturative Stress [8 Studies] - English proficiency, discrimination, and length of stay in the U.S. were the most frequently used variables for the acculturative studies. These three variables (predictors) played interactive and important roles in the experience of acculturative stress (outcome variable) among international students. Furthermore, in the majority of the studies (5 out of 8), acculturative stress was associated with behavioral health problems, such as depression, anxiety, and alcohol use. Acculturative stress was a predictor of mental health and health risk behaviors. Also, acculturative stress was a moderator between some predictors of acculturative stress and psychological outcomes.

Resilience [4 Studies] - The outcome variable of the four reviewed studies was depression. Resilience was 1) a predictor of depression (in the predictive model); 2) a moderator in the relationship between acculturative stress and depression (in the protective model); 3) a mediator in the relationship between acculturative stress and depression (in the mediation model). However, none of the reviewed studies used resilience as their outcome variable.

Mental Health [8 Studies] - English proficiency, perceived social support, coping, and perceived discrimination were the most frequently employed variables considered for mental health. All of the reviewed articles (8 out of 8 studies) related to mental health used depression and/or anxiety as their outcome variable.

Health Risk Behaviors [8 Studies] - Among the eight studies, four studies used alcohol use as an outcome variable, followed by alcohol use and cigarette smoking (1 study), cigarette smoking (1 study), substance abuse (1 study), and change in eating habits (1 study). To be specific, three studies focused on binge drinking among international students. The studies reported high prevalence of binge drinking (i.e., 36% [Koyama & Belli, 2011]; 52% [Sa, 2010]; 51.3% [Yeramaneni & Sharma, 2009] respectively). There were no studies that measured health risk behaviors with multidimensional concepts. None of the health risk behaviors were a predictor. Acculturative stress, depression, and resilience were significant predictors of health risk behaviors among international students.

Study Limitations

Most of the relevant articles had similarities in their study limitations. Many studies used a small sample size, a nonprobability sampling method, a cross-sectional design (no causal conclusion can be drawn), and had limited generalizability of the results and representativeness of the sample. None of the studies supported external validity for generalizability. Second, a majority of the studies were limited to Asian international students, especially Chinese students, a major limitation of the reviewed studies. Also, many studies utilized an online survey with a low response rate. Moreover, some studies had responding error problems due to the language barriers of international students. Since most of the surveys were self-reported, it is fair to assert that the participants could have interpreted questions differently. The studies that were reviewed included international students with different countries of origins and ethnicity, but they did not consider cultural or racial differences in their studies. With regards to studies exploring mental health using a sample of international students, what cannot be ignored is the fact that those who

experienced or are experiencing depression and/or anxiety are more likely to participate in the studies, due to their interest in the subject.

Quality Assessment

The quality assessment of the studies reviewed was based on five criteria: 1) relevance to the present topic, 2) clearly outlined study design, 3) measurement error (reliability and validity), 4) appropriateness of analysis, and 5) generalizability. Overall, the average quality of studies was below moderate (m=1.92). They were measured on a 3-point Likert scale ranging from 1 (weak) to 3(strong) (as illustrated in Tables 3-2 and 3-3). The mean of appropriateness of analysis was 2.43, followed by clearly outlined study design (m=2.29) and relevance to my topic (m=2.11). The above three criteria were above moderate, but measurement error (m=1.71) and generalizability (m=1.07) were very weak. The assessment of generalizability in all the reviewed studies was consistently weak.

Table 3-2: Assessment of Quality of Reviewed Studies Using a 3-point Likert Scale

Authors (year)	Relevance to the Present Topic	Clearly outlined study design	Measurement error (Validity and Reliability)	Appropriateness of analysis	Generalizability
Yakunina et al. (2013)	moderate	strong	Weak	strong	weak
Wei et al. (2012).	moderate	moderate	Moderate	strong	weak
Koyama & Belli (2011)	moderate	moderate	Weak	strong	weak
Wei et al. (2007)	moderate	strong	Moderate	strong	weak
Duru & Poyrazli (2007).	strong	moderate	Moderate	moderate	weak
Lau (2006)	moderate	moderate	Moderate	strong	weak
Eustace (2007)	moderate	strong	Weak	moderate	weak
Sullivan (2010)	weak	moderate	Weak	moderate	weak
Yoo et al. (2014)	strong	strong	Weak	strong	weak
Kim & Kim(2014)	strong	moderate	Moderate	strong	weak
Lee & Park (2013)	strong	moderate	Moderate	strong	weak
Cheung & Yue (2012)	strong	moderate	Weak	moderate	weak
Han et al. (2013)	moderate	strong	Strong	strong	weak
Sümer et al. (2008)	moderate	strong	Weak	moderate	weak
Dao et al. (2007)	moderate	moderate	Moderate	moderate	weak
Wei et al. (2007)	moderate	strong	Moderate	strong	weak
Wei et al. (2008)	weak	moderate	Moderate	strong	weak
Constantine et al. (2004)	weak	moderate	Moderate	moderate	weak

Wei et al. (2012)	weak	moderate	Moderate	strong	moderate
Iwamoto & Liu (2010)	weak	strong	Moderate	strong	weak
Koyama & Belli (2011)	moderate	moderate	Moderate	moderate	moderate
Kanaparthi (2009)	moderate	moderate	Moderate	moderate	weak
Koyama (2005)	strong	moderate	Moderate	moderate	weak
Sa (2010)	moderate	moderate	Moderate	moderate	weak
Holguin (2011)	strong	weak	Moderate	weak	weak
Noyongoyo (2011)	weak	weak	Weak	moderate	weak
Sa et al. (2014)	strong	strong	Weak	moderate	weak
Yeramaneni & Sharma (2009)	strong	strong	Moderate	moderate	weak

Table 3-3: Descriptive Analysis of Quality of Reviewed Studies (*N*=28)

	N (%)/ *M* (*SD*)
Number of Reviewed Articles	*N* (%)
Acculturative stress	8 (28.6 %)
Resilience	4 (14.2 %)
Mental Health	8 (28.6 %)
Health Risk Behaviors	8 (28.6 %)
Descriptive Analysis of Quality	*M* (*SD*)
Relevance to the present topic	2.11 (0.73)
Clearly outlined study design	2.29 (0.59)
Measurement error	1.71 (0.54)
Appropriateness of analysis	2.43 (0.58)
Generalizability	1.07 (0.27)

Summary of Results of Methodological Development

The methodological development based on the four systematic reviews provided a good framework for methodological applications for future studies with international students. Due to the small sample size and limited diversity of the sample, in terms of countries of origin and race/ethnicity of research subjects, there is the need to conduct more rigorous studies with large non-experimental sample sizes. With regards to study design and sampling design, most studies used either: 1) a non-experimental and cross-sectional survey design, 2) a small sample size, 3) non-probability sampling methods, and 4) online survey. Specifically, online sampling methods showed a huge limitation in terms of response rate. Except for ASSIS and ILS, the most

frequently used scales (CD-RISC, RSA, PHQ-9, CAD-7, and NCHRBS) were not initially developed and validated for an international student population. The operationalization of each variable was not constructed based on the understanding of the culture of international students. The results showed great weaknesses in measurement errors. Furthermore, when it came to the role of each variable in the reviewed articles, the results illustrated that comprehensive practical relevance using all four variables is necessary.

So, although both the theoretical and methodological developments are evolving, there is a huge need to conduct more studies in this area that can also potentially be replicable to other immigrant populations.

Analysis of the Literature Review

Overall, this literature review regarding acculturative stress, resilience, mental health, and health risk behaviors suggests three main limitations in the extant literature: 1) a lack of a comprehensive theoretical framework that explains pathways to behavioral health outcomes during the process of acculturation among international students, 2) a lack of cross-cultural valid scales for an international student population avoiding response biases, and 3) a lack of ensuring the internal and external validity of empirical studies conducted with international students.

This review indicated that there were no studies that used theoretically informed explanatory methodologies with all four variables (acculturative stress, resilience, mental health, and a health risk behavior). Although this is a significant limitation in terms of social work and health research where findings cannot be conclusive for tailored interventions, it also opens a fertile field for social work intervention research. As discussed previously, the literature provided two different health behavior models: (1) the mediation model of resilience in the relationship between acculturative stress and mental health and (2) the moderation model of resilience in the

relationship between acculturative stress and a health risk behavior. It is important to note that both of these health behavior models do not include all possible causal relationships between acculturative stress, resilience, mental health, and a health risk behavior, which suggests the need for a new comprehensive theoretical framework. When all relative variables are taken into account, the model can explain causal pathways to health outcomes in a more parsimonious way (Figure 4-1). From both the theoretical and pragmatic lens, the mediation model seems more feasible than the moderation model for the consideration of an effective intervention program to prevent a negative health outcome, especially since the moderation model only controls the strength of the relationship between acculturative stress and health risk behaviors. The mediation model of resilience, however, proposes the role of resilience in the relationship between acculturative stress and mental health, providing stronger explanatory power

As discussed this review established empirical evidence between acculturative stress, resilience, and mental health as significant predictors of the health risk behavior, binge drinking. When integrated, the mediation model of resilience and the prediction model of alcohol use provide a broader theoretical framework and a comprehensive testable intervention model. The new integrated model, illustrated in Figure 2-4, shows that binge drinking as a health risk behavior would be influenced by acculturative stress, resilience, and mental health. Both acculturative stress and mental health would work as a source of negative contingencies associated with binge drinking. Resilience would work as a source of positive contingencies associated with binge drinking. Specifically, in the integration model, resilience would be explained as a mediator in the relationship between acculturative stress, mental health, and binge drinking.

There is a paucity of research focusing on the use of valid cross-cultural scales for an international student population that can help avoid response biases. Since the study population is international students, the majority of whom are not native English speakers and have diverse cultural backgrounds, special attention should be given to response biases and measurement invariance. In addition, the scales, used for measuring each conceptual definition of resilience, mental health, and health risk behavior, were not validated with international students. This shows a lack of culturally sensitive and valid scales that can capture the appropriate constructs and functions of each variable (acculturative stress, resilience, depression and anxiety, and health risk behaviors) for the international student population. Therefore, studies conducted among international students should assess cultural invariance to measure the same construct in the same way across different groups over time.

However, minimizing response bias from international students can be challenging because each scale can be misinterpreted due to a lack of understanding and motivation, so strategies to reduce response bias are pertinent and also necessary. According to Furr and Bacharach (2008), some response bias can be reduced and nullified by choosing specific kinds of items or specific formats. Therefore, scales can minimize the existence of response bias by using appropriate wording and different scoring. A simplified version of the scales can be used to help respondents understand the questions properly. Acquiescence bias also cannot be underestimated. “Acquiescence bias occurs when a person agrees to a statement without regard for the meaning of the statement” (Furr & Bacharach, 2008, p.291). Some items in all scales should be negatively keyed and some should be positively keyed, which will be useful to minimize the threat to acquiescence response bias from international students.

Lastly, the literature indicates limitations of internal and external validity of the empirical studies with international students. Most studies were data driven models not theory driven models meaning they mainly analyzed the data in order to determine direction, examine direct effects and relationships among variables. This does not meet the criteria of causal inferences. A comprehensive explanatory methodology based on relative theories has more practical implications to explain pathways to negative health behaviors, which increases the internal validity of any study. The majority of the studies used a cross-sectional survey design with a small sample size and a nonprobability sampling method, which limited the generalizability of the results and representativeness of the samples. In order to increase internal and external validity of the study using a sample of international students, these limitations should be taken into consideration.

Summary of the Literature Review

The literature review covered the current state of the literature regarding acculturative stress, resilience, mental health, and health risk behaviors, particularly among international students. Based on the literature review, it can be established that there are a high prevalence and disproportionate impact of acculturative stress on a health risk behavior, specifically binge drinking, among international students. Although research in this area is evolving, more attention should be given to the need for comprehensive explanatory methodologies to analyze pathways that can prove to be effective on positive health behavior and better health outcomes for international students. The comprehensive explanatory model as shown in Figure 2-4 is a good start in this area. It should also be noted that this model is also replicable to other similar vulnerable populations such as refugees and immigrants that go through the process of acculturation and adaptation.

Since the literature presented empirical evidence to support the potential role of resilience as a mediator in the relationship between acculturative stress and a health risk behavior for better health outcomes was limited, more research is needed in this area. This could offer a positive impact on self-management and prevention programs that address the influences of the complex systems in which individual international students function, opening a fertile field of inquiry to social work research and intervention. The application of a model that provides more explanatory power to describe the critical role of the four variables namely, acculturative stress, resilience, mental health (depression and anxiety), and a health risk behavior (binge drinking). This will have significant implications for the social work practice aimed at developing social service programs to prevent behavioral health problems and risks among temporary and permanent immigrants in the U.S. due to the rising demographic changes, this is something that is not only important but timely and urgent.

Research Questions and Hypotheses

The purpose of the study is to examine the direct associations between the latent variables (acculturative stress, resilience, mental health [as a composite variable of depression and anxiety], and binge drinking) as well as to test the indirect effects of acculturative stress on binge drinking through resilience and mental health. Based on the theoretical framework using resilience and vulnerability theories and previous studies, it is hypothesized that respondents with higher acculturative stress will exhibit negative health behavior outcomes. It is also hypothesized that resilience and mental health, as a composite variable of depression and anxiety, mediate the relationship between acculturative stress and alcohol use among international students. Below are the specific research questions and relative hypotheses.

1. Are there significant and *direct association*s between the latent variables [acculturative stress, resilience, mental health (depression & anxiety), and binge drinking] in the conceptual model?

   Hypothesis 1: Higher levels of acculturative stress will be significantly associated with higher levels of binge drinking.

   Hypothesis 2: Higher levels of acculturative stress will be significantly associated with higher levels of depression and anxiety.

   Hypothesis 3: Higher levels of resilience will be significantly associated with lower levels of depression and anxiety.

   Hypothesis 4: Higher levels of acculturative stress will be significantly associated with higher levels of binge drinking.

   Hypothesis 5: Higher levels of resilience will be significantly associated with lower levels of binge drinking.

   Hypothesis 6: Higher levels of depression and anxiety will be significantly associated with higher levels of binge drinking.

2. Are there significant and *indirect associations* between the latent variables [acculturative stress, resilience, mental health (depression & anxiety), and binge drinking] in the conceptual model?

   Hypothesis 7: Resilience will significantly mediate the relationship between acculturative stress and binge drinking

   Hypothesis 8: Depression and anxiety will significantly mediate the relationship between acculturative stress and binge drinking

Hypothesis 8: Resilience will significantly mediate the relationship between acculturative stress and mental health (depression and anxiety)

Hypothesis 9: Resilience and mental health (depression and anxiety) will significantly mediate the relationship between acculturative stress and binge drinking.

Chapter 4

Methodology

This chapter describes the research methods employed to explore the roles of resilience as a collective protective factor that leads to positive behavioral health outcomes, including mental health and alcohol use, during the process of acculturation among international students. This chapter consists of six sections: 1) research design, 2) sample and sampling methodology, 3) data collection, 4) measures, 5) pilot test for online questionnaire reliability and validity, and 6) data analysis.

Research Design

The study employs an explanatory survey design to test the hypothetical model of binge drinking among a sample of international students. It is a cross-sectional study with individual students as the unit of analysis. Utilizing a cross-sectional design provides accurate quantitative data that are generalizable to a designated target population, given limited time and resources.

Sampling Methodology

International students attending colleges and universities in the US were the target population for this study. This study used a multi-method approach for sample recruitment including both online and in-person surveys. As illustrated in Figure 4-1, the sampling frame and the process of participant recruitment for both the online and paper-based samples were used in tandem.

Sampling Strategy

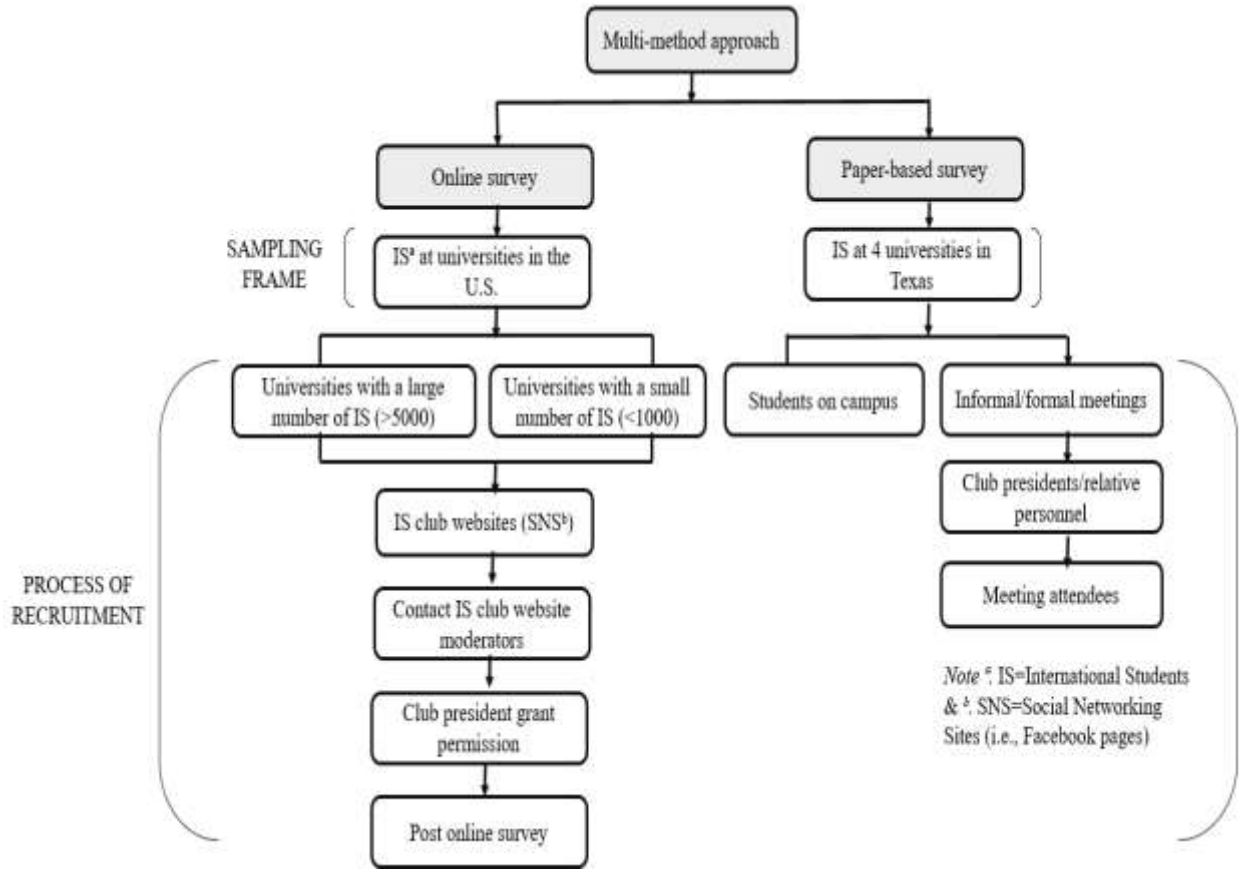

Figure 4-1: Sampling Frame and Process

Sampling Methodology for Online Survey

The online survey was conducted through social networking sites (SNSs) connected to university international student clubs across the U.S. Conducting an online survey using SNS has previously reported large and good data collection results from target populations (Tan, Forgasz, Leder, McLeod, 2012). Facebook and Twitter are widely used social networking sites (SNSs) that have received research attention for data collection (Tan et al., 2012).

A non-probability sampling procedure for online surveys was used for this study to collect data through the SNS Facebook. This study targeted international student clubs at

schools with large and small populations of international students. However, the study ended up with some schools considered by the researcher as medium-sized since the study could not block access to the survey for international students from medium sized schools (1000<n<5000). The Facebook pages for the most part were accessible to the public.

It is important to note that schools with a large international population included in the study can be biased in terms of studying behavioral health problems, such as mental health, resilience, and binge drinking. In general, bigger universities with a significant number of international students and universities with a smaller number of internationals student may have different types of resources and support for international students. So, in order to ensure a more representative sample and a larger sample size, a maximum variation sampling frame was created considering two different sized populations: universities with large (population >5,000) and small numbers (population < 1,000) of international students. The information on the size of international student populations at U.S. universities was retrieved from the Institute of International Education (IIE) website (http://www.iie.org). The IIE is an independent, non-profit international education and training organization. The website provided a list of colleges and universities by U.S. state with information on international students coming to the U.S.

Universities with a Large Number of International Students for Conducting Online Surveys

First, the researcher read through the list state by state and chose schools with more than 5,000 international students. The website provided 29 universities that had more than 5,000 international students. The total number of international students in the 29 schools was 211,771 as illustrated in Appendix F. Based on the list of the 29 schools, the researcher visited each school's international club website to verify the information to know the feasibility of conducting an online survey.

The researcher found that eight out of 29 universities (Academy of Art University, Arizona State University, Cornell University, Georgia Institute of Technology, Northeastern University, Michigan State University, SUNY at Buffalo, and University of Illinois at Urbana-Champaign) had international student clubs with websites, Facebook pages, or Twitter, in addition to listing a contact person and an email address. Six other universities almost met the criteria, but they were excluded from the final list due to several reasons: 1) websites not designed in English, 2) no contact person or email, or 3) no connected SNS links. Through the search of the eight universities meeting all the criteria, the researcher ended up with 123 international student SNS links as a source for surveys. The majority of the SNSs were Facebook pages. As shown in Appendix G, the researcher contacted the moderators or presidents of the 105 clubs from the eight selected universities to obtain approval to post the online survey in August.

Universities with a Smaller Number of International Students for Conducting Online Surveys

The information on the universities with smaller international student population was also retrieved from the IIE website. The researcher read through the list, state by state and chose schools with less than1000 international students. Eventually, 103 schools in 32 out of 51 states with less than 1000 international students were considered as shown in Appendix H. To examine the feasibility of conducting an online survey, the researcher also visited international club websites of respective schools to verify the information.

The same inclusion criteria were applied for the universities with larger international student populations and those with smaller international student populations. The five criteria were: 1) university international student clubs, 2) the number of clubs, 3) a contact person, 4) a contact email, and 5) relative SNS links. The majority of the SNSs were Facebook pages. In

general, most of the community colleges and universities with a smaller international population did not meet the criteria to post the online survey. Compared to larger schools with a large number of international students, international student club websites at smaller schools showed gaps in information. Their club websites and Facebook pages were also not actively utilized. Only 14 out of 103 community colleges and universities with smaller international student populations had international student clubs with websites and Facebook pages.

The researcher contacted the moderators and/or presidents of the clubs from the selected universities to obtain approval to post the online survey, but ended up with few (around 10% out of the 103) international student clubs at the smaller schools agreeing to participate in the survey. During the pilot test focus group meeting in April 2015, participants provided information regarding the international student organization at the University of Texas at Arlington (UTA) website (see p. 58 for more information on the pilot group). The website was also included as a source for posting online surveys. (It had originally been excluded because it did not meet the criteria for large or small international student population.)

Final University International Student Clubs for Conducting Online Surveys

Finally, a total of 38 Facebook pages were utilized to post the online survey to collect data from international students (see Appendix I): 1) fourteen Facebook pages from seven universities with a larger number of international students (Arizona State University, Georgia Tech, Indiana University at Bloomington, The Ohio State University, University of Illinois Urbana-Champaign, University of Michigan- Ann Arbor, and The University of Texas at Austin), 2) eighteen Facebook pages from seven universities a medium number of international students (Case Western Reserve University, Indiana State University, Pittsburg State University, Purdue University, University of Houston, University of North Texas, and University of Texas

Arlington), 3) two Facebook pages from two universities with a smaller number of international students (Dallas Baptist University and Texas A&M International University), and 4) four Facebook pages which were not university international clubs (French American Student Organization, Meehan Adjournment of a Meeting Organization, International Student Association, and Madison Bridges International).

In addition to international students attending the universities as club members, students from other universities across the U.S. who visited the selected SNSs were also identified as potential participants for this study.

Sampling Methodology for Paper-Based Surveys

A non-probability sampling procedure for paper-based surveys, specifically, a convenience sampling method, was also used for this study to collect data. To assess the feasibility of the study and ensure data collection from a large number of participants, the paper-based survey was conducted at UT Arlington, UT Austin, UT Dallas, and UNT in Fort Worth due to convenience access to the study population. The researcher contacted the president of the international student organizations and attended some of these organizations formal and informal events, as well as classes international students attended during the 2015 fall semester. Moreover, the researcher went to the campuses and conveniently asked international students to participate in the paper-based survey.

Sample Size

Structural Equation Modeling (SEM) was used for the data analysis to test the hypothesized conceptual model with the four latent variables and 14 indicators (see *Measures* and *Data Analysis* for information on the variables and analytic model). Westland (2010) recommends that the traditional minimum sample size to use SEM is, at least, five respondents

per indicator (parameters), 10 per indicator is preferred, and 15 is required when multivariate normality is violated. Kline (1998) also recommends that there must be at least five participants per each indicator in a path model to attain statistical stability. For this study, 15 cases per each indicator (at least more than 210) were considered when calculating the sample size. For data analyses using SEM, a total sample of 341 were collected: 1) 150 cases were collected from the online survey and 2) 191 from the paper-based survey from August 27, 2015 to Jan 17, 2016. However, 19 cases out of the 150 cases from the online survey were removed due to significant missing data (more than 80% missing). Ultimately, a sample of 322 participants (131 cases from the online survey and 191 cases from the paper-based survey), were included for the final analysis.

Sample

A sample of international undergraduate and graduate students from colleges and universities in the United States was recruited for this study. To participate in this study, students were eligible if they met all of the following inclusion criteria: 1) students who were born in a foreign country; 2) students who hold a foreign citizenship; and 3) current students who are enrolled in a degree program with an F-1 visa or exchange students with a J-1 visa.

As described in Table 4-1, the majority of participants sampled were from universities in the Southwest U.S. Specifically, more than half of the participants (52.8%) were recruited from the University of Texas at Arlington, followed by 14.3% from the University of Texas at Dallas, 11.8% the University of Texas at Austin, and 21.1% other schools. Overall, the participants represented diverse backgrounds. Altogether students originated from 24 countries. The largest group of international students came from India (37.6%), followed by China (23.6%), South Korea (15.5%), and other (23.3%). Other countries included Afghanistan, Bangladesh, Brazil,

Egypt, France, Jordan, Kazakhstan, Kenya, Laos, Mexico, Nepal, Nigeria, Palestine, Russia, Saudi Arabia, Singapore, Thailand, Vietnam, Uganda, and UK. The educational level reported by the students were undergraduate (28.6%), master's (55.6%), and doctoral (15.9%). The participants studied in a variety of fields, including Engineering (32.6%), Business (28%), Social Science (10.5%), Health Science (6.2%), Computer Science (9.6%), Information & Management (5.3%), and other (7.8%). Social Science, as one of the categories, included Political Science, Social Work, Linguistics, Communication, Philosophy, and Theology.

The students consisted of 179 males (55.6%) and 143 females (44.4%) with a mean age of 24.64 years (*s.d.*=3.84). Regarding religious affiliation, 62.7% had a religious affiliation (28.6% Hinduism, 15.8% Christian, 7.5% Muslim, 5.6% Buddhism, 4.3 Catholicism, and 0.9% other). The participants reported predominantly being never married (85.4%, *n*=275). In terms of family status, the majority of the participants (81.7%) were living without their family. Approximately 70% (*n*=222) reported they had no prior experience studying at another institution in the US before the university attending now. About half of the participants (45%) depended on family funds as their primary source of funding. In terms of length of stay, 35.7% of international students reported having been in the U.S. for less than six months, 18.6% six months to 1 year, 16.5% up to 2 years, and 29.2% more than two years. More than half of students' GPA ranged between 3.0 and 3.49 (52.8%) (see Table 4-1 for a full description of the sample).

Table 4-1: Demographic Characteristics of the Sample (*N*=322)

Category	% (*n*)
Age	
18-25	69.3 (223)
26-30	22.7 (73)
31-35	5.6 (18)
36-40	2.5 (8)
Gender	
Female	44.4 (143)
Male	55.6 (179)
Religious Affiliation	
None	37.3 (120)
Catholicism	4.3 (14)
Muslim	7.5 (24)
Hinduism	28.6 (92)
Buddhism	5.6 (18)
Christian	15.8 (51)
Other	0.9 (3)
Marital Status	
Never married	85.4 (275)
Married	1.2 (4)
Divorced	5.3 (17)
Separated	6.8 (22)
Other	1.2 (4)
Family Status	
I don't live with my family	81.7 (263)
Mother only	1.2 (4)
Father only	1.2 (4)
Sibling(s) only	2.5 (8)
Mother & Father only	1.2 (4)
Spouse & Children only	8.4 (27)
Other	3.7 (12)
Country of Origin	
India	37.6 (121)
China	23.6 (76)
South Korea	15.5 (50)
Taiwan	6.2 (20)
Vietnam	3.1 (10)
Bangladesh	3.7 (12)
Other	10.3 (33)
Educational Level	
Bachelor’s	28.6 (92)
Master’s	55.6 (179)
Doctoral	15.8 (51)

Table 4-1-continued

Major	
Engineering	32.6 (105)
Business	28.0 (90)
Social Sciences	10.5 (33)
Health Science	6.2 (20)
Computer Science	9.6 (31)
Information & Management	5.3 (17)
Other	7.8 (25)
School	
UT Arlington	52.8 (170)
UT Dallas	14.3 (46)
UT Austin	11.8 (38)
SUNY Buffalo	2.5 (8)
Pittsburg State University	1.9 (6)
University of Houston	1.2 (4)
UNT	1.2 (4)
University of Illinois at Urbana Champaign	1.2 (4)
Other	21 (42)
Length of Stay	
Less than 6 months	35.7 (115)
6 months to 1 year	18.6 (60)
Up to 2 years	16.5 (53)
Up to 3 years	5.3 (17)
Up to 4 years	6.5 (21)
Up to 5 years	5.9 (19)
More than 5 years	11.5 (37)
GPA	
Below 1.5	0.6 (2)
1.5-1.9	2.2 (7)
2-2.49	7.5 (24)
2.5-2.9	34.2 (110)
3-3.49	52.8 (170)
3.5-4.0	2.8 (9)
Prior Experience Studying at Another Institution in the US	
No	68.9 (222)
Yes	31.1 (100)
Current Source of Funding	
Graduate teaching/research assistantship	18.9 (61)
Department/school scholarship	5.0 (16)
Family funds	45.0 (145)
Fellowship	3.7 (12)
On-campus job	3.1 (10)
Loans	14.9 (48)
Previous personal savings	4.0 (13)
Other	5.0 (16)

Sample Representativeness

As described earlier, the sample for this study was comprised of international students attending U.S. universities (*N*=322). To strengthen inferences about the representativeness of data from national samples, national demographics of international students were compared. The representativeness of survey participants was assessed by systematically comparing the most recent demographics from the Institute of International Education in 2015 by a broad range of demographic characteristics.

The demographic characteristics provided on Table 4-2 shows a comparison of participants in this sample with the most recent national demographics from 2015 (Institute of International Education, 2015). Proportions of female and male students in this sample are similar to national demographics as both are about 56% male (56.3% national demographics and 55.6% in this study). However, regarding educational level, while this sample had larger graduate students (71.4%) than the national data (47.6%), the national data had larger number of undergraduate students. On the other hand, this sample had much smaller number of undergraduate students compared to the national data. Given the country of origin, this sample had more than double the number of international students from Indian compared to national demographics (37.6% versus 14%). Also, this sample had only 23.6% Chinese students compared to 31% within national demographics. Furthermore, the sample had a much larger Korean international student population (15.5%) compared to national demographics (7%). In terms of majors, while this study sampled more international students studying Engineering (32.6% in this study vs. 20% national demographics), Business & Management (33.3% vs. 20%), Social Science (10.5% vs. 8%), and Health Science (6.2% vs. 3.0%). Compared to national demographics, this sample had less international students studying Computer Science (9.6% vs.

12%). Current source of finding in this sample however, is very similar to national demographics, both are 64% personal and family funding (63.9% in this study vs. 64% national demographics). These differences in sample population are likely due to having a non-randomized sample; specifically the study used a convenience sample.

Table 4-2: Sample Comparison (*N*=322) with National Demographics (*N*=974,926)

Category	Sample (%)	Institute of International Education (IIE) national data (%)
Gender		
Female	44.4	43.7
Male	55.6	56.3
Education level		
Undergraduate	28.6	52.4
Graduate	71.4	47.6
Country of Origin		
India	37.6	14
China	23.6	31
South Korea	15.5	7
Other	16.4	48
Major		
Engineering	32.6	20.0
Business & Management	33.3	20.0
Social Sciences	10.5	8.0
Health Science	6.2	3.0
Computer Science	9.6	12.0
Other	7.8	37.0
Current Source of Funding		
Personal & family	63.9	64
Other	36.1	36

Sampling Bias (Online Survey vs. Paper-Based Survey)

This study used a multi-method approach to collect data including both online and paper-based surveys. Different ways of respondent selection may create sampling bias. In order to estimate influences of sampling bias from different data collection methods, this study conducted univariate and bivariate analyses to compare the samples from online and paper-based surveys

based on 1) demographic variables and 2) five latent variables including acculturative stress, resilience, depression, anxiety, and binge drinking.

Demographic Differences

The samples from the different data collection methods showed different demographic characteristics in terms of religious affiliation, family status, country of origin, educational level, major, school, length of stay, and current source of funding. However, demographic characteristics in the two samples are similar in terms of age, gender, marital status, and GPA. The demographic characteristics provided in Table 4-3 shows a comparison of samples from online and paper-based surveys. The proportion of participants between the age of 18 and 25 in the sample from the online survey is similar to the sample from the paper-based survey (69.4% online and 72.3% paper-based). Also, online and paper-based proportions were similar with regard to female (59.5% and 52.9%). Likewise, the proportion of non-marital status in the sample from the online survey is similar to the sample from the paper-based survey (82.4% online and 87.4% paper-based). However, regarding religious affiliation, the online sample has more international students with a religious affiliation (76.3%) compared to the sample from the paper-based survey (53.4%).

In terms of family status, the sample from the online survey has a higher number of students living without their family compared to the sample from the paper-based survey (75.6% online vs. 85.9% paper-based). Furthermore, proportions of Indian, Chinese, and Korean students (43.5%, 6.1%, and 26.7% respectively) in the sample from online survey are different from the sample from the paper-based survey (33.5%, 35.6%, and 7.9% respectively). Also, the sample from the paper-based survey had a much larger proportion of master's students (66.5%) compared to the sample from the online survey (39.7%).

In terms of majors, the online survey sampled more international students studying Engineering (35.9% online and 30.4% paper-based) and Computer Science (12.2% online vs. 7.9% paper-based). On the other hand, the sample from the paper-based survey had more international students studying Business (11.5% online vs. 39.3% paper-based). Regarding schools, the online survey sampled more international students from schools from other states (43.5% online vs. 3.7% paper-based), but the paper-based survey sampled more international students from UTA (48.9% online vs. 55.5% paper-based), UTD (0% online vs. 24.1% paper-based), and UT (5.3% online vs. 16.2% paper-based). Moreover, the paper-based survey sample had more international students who stayed less than 6 months (21.4% online vs. 45.5% paper-based), while the online survey sampled more international students who stayed in the US more than 2 years (41.2% online vs. 20.9% paper-based). However, in terms of GPA and other US educational experience, the online survey sampled similar proportions of international students with a GPA between 2.5 and 4.0 (99.2% online vs. 99.5% paper-based) as well as those with no other US educational experience (66.4% online vs. 70.7% paper-based). Lastly, the sample from the online survey had more international students using funding from their GRA/GTA work at school (22.1% online vs. 16.8% paper-based), but the sample from the paper-based survey had more international students using their family funds (38.2% online vs. 49.7% paper-based).

Table 4-3: Demographic characteristics by Different Surveys

Category	Online Survey *n*=131 (%)	Paper-Based Survey *n*=191 (%)
Age		
18-25	69.4	72.3
26-30	22.1	23.0
31-35	8.4	3.7
36-40	4.6	1.0
Gender		
Female	59.5	52.9
Male	40.5	47.1
Religious Affiliation		
None	23.7	46.6
Catholicism	5.3	3.7
Muslim	7.6	7.3
Hinduism	31.3	26.7
Buddhism	5.3	5.8
Christian	26.0	8.9
Other	0.8	1.0
Marital Status		
Never married	82.4	87.4
Married	0.8	8.4
Divorced	0.0	2.1
Separated	13.7	2.1
Other	3.1	0.0
Family Status		
I don't live with my family	75.6	85.9
Mother only	0.8	1.6
Father only	0.0	2.1
Sibling(s) only	3.8	1.6
Mother & Father only	2.3	0.5
Spouse & Children only	9.2	7.9
Other	8.4	0.5
Country of Origin		
India	43.5	33.5
China	6.1	35.6
South Korea	26.7	7.9
Taiwan	1.5	9.4
Vietnam	1.5	4.2
Bangladesh	1.5	5.2
Other	19.2	4.2
Educational Level		
Bachelor’s	38.2	22.0
Master’s	39.7	66.5
Doctoral	22.1	11.5

Table 4-3-continued

Major		
Engineering	35.9	30.4
Business	11.5	39.3
Social Sciences	13.0	2.1
Health Science	9.2	4.7
Computer Science	12.2	7.9
Information & Management	3.8	6.3
Other	14.4	9.3
School		
UT Arlington	48.9	55.5
UT Dallas	0.0	24.1
UT Austin	5.3	16.2
UNT	2.3	0.5
Other	43.5	3.7
Length of Stay		
Less than 6 months	21.4	45.5
6 months to 1 year	18.3	18.8
Up to 2 years	19.1	14.7
More than 2 years	41.2	20.9
GPA		
Below 2.5	0.8	0.5
2.5-4.0	99.2	99.5
Prior Experience Studying at Another Institution in the US		
No	66.4	70.7
Yes	33.6	41.9
Current Source of Funding		
GRA/GTA	22.1	16.8
Family funds	38.2	49.7
Loans	19.8	11.5
Other	19.8	22.0

Acculturative Stress, Resilience, Anxiety, Depression, and Binge Drinking

The samples from the online and paper surveys showed some difference in terms of acculturative stress, but overall the sample from the online survey was similar to the paper- based survey in terms of resilience, anxiety, depression, and binge drinking. Specifically, independent sample *t*-test showed that the respondents from the online survey (M=15.76, $s.d.$=8.08) had higher levels of acculturative stress than those from the paper-based survey (M=12.18,

s.d.=7.79). The insignificant difference in resilience, anxiety, depression and binge drinking show the samples are less biased.

Table 4-4: Acculturative Stress, Resilience, Anxiety, Depression, & Binge Drinking by Different Surveys

	Online Survey (*n*=131)	Paper-Based Survey (*n*=191)	*t*
	M(*SD*)	*M*(*SD*)	
Acculturative Stress	15.76 (8.08)	12.18 (7.79)	3.98***
Resilience	103.04 (19.65)	104.60 (20.69)	-0.68
Anxiety	7.09 (5.38)	6.58 (5.01)	0.88
Depression	7.89 (6.69)	7.37 (5.97)	0.74
Binge Drinking	1.30 (0.71)	1.42 (0.91)	-1.28

Data Collection

Prior to conducting this survey, human subjects' approval from the UTA Office of Research's Institutional Review Board was obtained on April 4, 2015 (see the Appendix P). The study posed minimal risk to the participants. Participation in this research study was voluntary. For the online survey, a participant was able to exit the survey at any time or withdraw from the study completely. In addition, for the paper survey, a participant had the right to decline participation in any or all study procedures or quit at any time at no consequence. All the participants were provided with resources such as counseling and psychological services that they could contact. No identifiable information was included in the online and paper surveys to ensure the anonymity of all participants. Students could provide their email address if they chose to participate in a raffle that the researcher used as an incentive. Collected data were confidential and anonymous.

For the online survey, the researcher contacted the moderators of university international student club websites at the universities with larger and smaller international student populations to ask permission to advertise on their websites (see the Appendix M). If granted permission, an

invitation to participate in the online survey was posted on the organization websites, Facebook pages, or Twitter (see the Appendix N). Ultimately, a total of 38 moderators responded to the request and granted permission for the survey to be advertised on their club website. The online survey opened with an informed consent statement illustrated in the Appendix J. The participants were asked to complete an online survey entitled "International students' resilience and health risk behavior survey."

The online survey for this proposed study was built via Qualtrics, www.qualtrics.com, a user-friendly, web-based software used for creating and hosting online surveys. The participants read through an informed consent form on the survey website. If they did not want to participate, they could click on "I don't agree to participate", which took them to the end of the survey. If they were not an international student with F-1 or J-1 status in the U.S, they were automatically exited from the online survey. If the participants consented and responded to the screening question positively (are you an international student with an F-1 or J-1 visa in the U.S?) the participants were directed to the online survey. The online survey data were stored on UTA's server. Participants answered questions concerning demographic information, acculturative stress, resilience, mental health, and alcohol use. Since the questionnaire had more than 70 questions, the order of the questions in the survey was organized to avoid survey fatigue. Questions about acculturative stress, resilience, depression and anxiety, and alcohol use were arranged and placed before the simple demographic questions. To complete the online survey required approximately 15 to 20 minutes.

The survey website was available after the first online survey was posted and until obtaining, at least, more than the required sample size (see the detailed information on page 72). A follow-up reminder with the survey information was posted on each website. If the

participants chose to provide their email address at the end of the survey, they were entered into a raffle and could receive compensation. All email addresses were entered into a raffle for one of three $50 Walmart gift certificates. They were distributed at the end of the data collection on Jan. 25, 2016.

At the same time, for the paper-based survey, the researcher contacted the presidents of the international student organizations and then attended formal and informal events of these organizations in the 2015 fall semester. Also, the research conveniently recruited international students on campus when the researcher visited the universities. The face-to-face survey used a hard copy of the online survey. Data were collected by the researcher, both one-on-one or in a group setting, as feasible. For instance, the researcher went to an informal lunch meeting at the Christian Campus Center run by the First Baptist Church on UTA campus. Every day during the week, the Christian Center serves lunch for international students at UTA regardless of their religious backgrounds. The researcher received permission from the director of the Center and conducted data collection right before lunch started. Another group was the Chinese MBA students at UTA and UTD. The researcher also received approval from the secretary of the program to conduct data collection of the students and was given information regarding classes with Chinese students. I approached the classroom where most Chinese international students were attending. Before or after the classes started, I collected data of them.

Informed consent forms for the paper-based survey were collected in-person. The only difference from the online survey was that the informed consent and the data were collected face to face. In order to better protect the identities of the subjects, the paper-based version of the informed consent did not include any signatures or any associated identification information. For the paper-based survey, in order to avoid collecting data from the same person two times (online

and face-to-face survey), the researcher made sure that a respondent had not already completed the survey online by showing them the consent form and then asking, “Have you completed this survey before?”

The participants answered the same questions concerning demographic information, alcohol use, acculturative stress, resilience, depression and anxiety as the online survey. At the end of the survey, if the participant wanted to participate in a raffle for a $50 Wal-Mart gift card, they provided their email address using an entire separate survey. Their email address was not linked to their responses. After they turned in the paper survey, the participants were provided with a copy of the informed consent along with a separate handout that included the link for the raffle entry and information on a mental health resource that they could contact.

Measures

To test the hypothetical conceptual model of health behaviors among international students, the questionnaire contained items from the following scales: Index of Life Stress [modified] (ILS; Yang & Clum, 1995), Resilience Scale for Adults [modified] (RSA; Friborg, Hjemdal, Rosenvinge, & Martinussen, 2003), Patient Health Questionnaire- 9 and Generalized Anxiety Disorder Assessment-7 (PHQ-9 & GAD-7, Kroenke, Spitzer, & Williams, 1999), and Monitoring the Future Survey--Alcohol Related Survey Questions. Demographic variables at the end of the survey included: age, gender, length of stay in the U.S., religious affiliation, marital status, country of origin, major, and university.

Modified Index of Life Stress (ILS; Yang & Clum, 1995)

The ILS developed by Yang and Clum (1995) is a 31-item self-report scale for measuring particular aspects of stress for Asian international students who are F-1 student visa holders and were born in an Asian country. However, the ILS has often been used for non-Asian

international students (Eustace, 2007; Koyama & Belli, 2011; Sullivan, 2010). The ILS is measured on a 4-point Likert scale ranging from 0 (never) to 3 (often), which indicates the frequency that a particular stressful event is experienced. Higher scores indicate higher levels of acculturative stress. The ILS consists of five subdomains, which indicate stressful events: 1) financial concerns, 2) language difficulties, 3) perceived discrimination, 4) cultural adjustment, & 5) academic pressure.

The first subdomain, financial matters, includes four items such as "my financial situations influences my academic study" and "I worry about my future." The second subdomain, language difficulties, includes four items such as "my English embarrasses me when I talk to people" and "my English makes it hard for me to read articles, books, etc." The third subdomain, interpersonal stress, consists of 5 items such as "I can feel racial discrimination toward me from other students" and "people treat me badly just because I am a foreigner." The fourth subdomain, cultural adjustment, consists of 8 items such as "I don't like the religions in the U.S." and "I don't like the things people do for their entertainment here."

According to Yang and Clum (1995), test-retest reliability on the ILS was 0.87 with a one-month interval, which indicates high test-retest reliability. The ILS also showed high concurrent validity with the Life Experiences Survey (LES; Johnson & Siegel, 1978), a 57 item scale of stressful life experiences measured on a 7 point Likert scale ranging from -3 to +3. Negative life experiences negatively associated with higher levels of stress (r = -0.46, p<.001). In addition, the ILS scale significantly correlated with the UCLA Loneliness Scale (Russell, Peplau, & Ferguson, 1978) (r = 0.51, p<.001), Zung's Self-Rating Depression Scale (Zung, 1965) (r = 0.41, p<.001), Beck Hopelessness scale (Weissman, Lester, & Trexler, 1974) (r =

0.37, $p<.001$), and Modified Scale for Suicide Ideation (Miller, Norman, Bishop, & Dow, 1986) ($r = 0.21$, $p<.05$).

The ILS scale also showed strong construct validity via principal axis factoring with a varimax rotation. The cases with missing values were eliminated from the construct validity analysis. The factor analysis provided a listing of five factors with Eigen values greater than 1.0. The five factors explained 55.2 % of the variance. A factor pattern and structure coefficient of 0.40 was determined to be the lowest acceptable loading. The Cronbach's alpha of the 31 item scale was 0.94.

Even though the ILS was developed for Asian international students, it also shows robust psychometric properties for non-Asian international students. Misra and colleagues (2003) conducted a study with 143 international students from all over the world to examine the relationships among life stress, social support, and academic stress, and reactions to stressors. They reported satisfactory coefficient alphas for the subscales ranging from 0.71 to 0.88. Another study (Eustace, 2007) conducted with 606 international students from different countries throughout the world showed high internal reliability. Eustace (2007) modified the ILS by adding six more items. The Chronbach's alpha was 0.81.

Even though the original ILS has shown strong internal consistency and construct validity, the ILS scale for the proposed study was shortened to increase response rates from the online survey. Due to the nature of online surveys, it has been shown that the longer survey, the less likely that respondents complete the survey (Galesic & Bosnjak, 2009). Based on the factor analysis conducted by Yang and Clum (1995), if the factor loading of an item was below 0.5/0.6, it was excluded from the ILS scale in this study. In addition, since all the items for the third factor, interpersonal stress, did not actually explain perceived the discrimination that the author

intended to measure, the items were replaced with items for perceived discrimination from the Acculturative Stress Scale for International Students (ASSIS; Sandhu & Asrabadi, 1994). Now, the first factor, financial concerns, has 3 items whose loadings were above 0.6 such as "I worry about my financial situation" and "my financial situation influences my academic study." The second factor, language difficulties, dropped only one item from the original set of items ("it is hard for me to develop an opposite sex relationship here) because the loading for the excluded item was 0.49. The third factor, perceived discrimination, consisted of 4 items that are one of the sub-constructs of the ASSIS (Sandhu & Asrabadi) such as "many opportunities are denied to me" and "others are biased toward me." The fourth factor, cultural adjustment, has two items whose factor loadings are 0.62 and 0.63 respectively ("I don't like the religion in the U.S." and "I don't like the things people do for their entertainment here"). The fifth factor, academic pressure, also has two items with a factor loading above 0.6 ("I worry about my academic performance" and "I am not doing as well as I want to in school").

This modified shorter version of the ILS has some advantages in terms of 1) including items with high factor loadings (above 0.60), which may increase the construct validity of the scale and 2) reducing the number of questions for the questionnaire, which motivate international students to participate in an online survey.

Modified Resilience Scale for Adults (RSA; Friborg, Hjemdal, Rosenvinge, & Martinussen, 2003; Hjemdal, Friborg, Martinussen, & Rosenvinge, 2001)

The RSA, a 31-item scale designed to measure a set of protective resilience factors, has been cross-culturally validated with various samples in different languages such as Norwegian (Friborg et al., 2003; Friborg et al., 2009; Hjemdal, Friborg, Stiles, Rosenvinge, & Martinussen, 2006), Persian (Jowkar, Friborg, & Hjemdal, 2010), and French (Hjemdal, 2011). The RSA is

measured on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The RSA scores range from 31to 165. “Higher scores indicate higher levels of protective resilience factors” (Hjemdal et al., 2011, p.58). The RSA consists of six subdomains: 1) positive perception of self, 2) positive perception of future, 3) social competence, 4) structured style, 5) family cohesion, and 6) social resources.

The first subdomain, positive perception of self, includes six items such as “I strongly believe in my abilities” and “I trust my judgement and decisions.” The second subdomain, positive perception of future, includes 4 items such as “I know how to reach my future goals” and “I have clear goals for the future.” The third subdomain, social competency, consists of 6 items such as “I am good at meeting new people” and “I easily laugh with others.” The fourth subdomain, structured style, consists of 4 items such as “I prefer a plan before starting with new things” and “I am good at organizing my time.” The fifth subdomain, family cohesion, consists of 6 items such as “I am very happy with my family” and “my family and I understand things similarly.” The sixth subdomain, social resources, consists of 7 items such as “when needed, I always have someone who can help me” and “the bonds among my friends are strong” (Hjemdal, 2010).

According to Friborg et al., 2005, test-retest reliability *r* ranged from 0.76 to 0.86 and Hjemdal et al., (2006) ranged from 0.73 to 0.84, each with a four-month interval, indicating high test-retest reliability. The test-retest reliability tests were conducted using a sample of applicants for the military college and students at the Norwegian University of Science and Technology respectively. A confirmatory factor analysis also showed satisfactory construct validity (Friborg, et al., 2003; Friborg, et al., 2005; Hjemdal et al., 2006).

The RSA has not been validated using a sample with international students, but Hjemdal and his colleagues (2006) examined if resilience, measured by the RSA, predicted positive mental health when exposed to stressful life events, using a sample of 159 college students at the Norwegian University of Science and Technology. The study showed that individuals with higher levels of resilience (measured by the RSA) were basically unchanged in terms of their mental health status (measured by the Hopkins Symptom Checklist-25) in spite of stressful life events. The stressful events did not negatively impact the mental health of individuals with protective resources available, which means that the RSA has strong predictive validity. The six factors showed high satisfactory internal consistency reliability ranging from 0.73 to 0.83 and the test retest reliability of the RSA was 0.84.

Although the original RSA has shown satisfactory reliability and validity, the RSA scale for this study was shortened and modified to increase response rates and to avoid response errors. As stated before, it has been shown that the longer survey, the less likely that respondents complete the survey (Galesic & Bosnjak, 2009). Based on the factor analyses conducted by several studies (Friborg, et al., 2003; Friborg, et al., 2005; Hjemdal et al., 2006; Hjemdal & Friborg, 2011; Jowkar, 2010), when the factor loading of each item in a subdomain was below 0.5 or 0.6, it was excluded from the RSA scale in this study.

Now, the first factor, positive perception of self, has 4 items whose loadings were above 0.6 such as “no matter what happens, I always find a solution” and “I believe in my abilities.” The second factor, positive perception of future, now includes 3 items after removing one item with a comparatively lower factor loading: “I feel that my future looks very promising.” The third factor, social competence, consists of 3 items such as “I make new friendships easily” and “I enjoy being with other people.” The fourth factor, structured style, has 3 items whose factor

loading were above 0.6 such as “I prefer a plan before starting with new things” and “rules and regular routines simplify my everyday life.” In addition, items for the fifth factor, family cohesion (3 items), do not actually portray the construct since the majority of international students are not living with their family in the U.S. Therefore, some items for family cohesion were revised for international students. For instance, the second item (in my family, we do things together) has been replaced with “my family and I communicate well.” The sixth factor, social resources, includes 4 items such as “when needed, I always have someone who can help me” and I have friends/family members that encourage me.” Like the modified ILS (Yang and Clum, 1995), this modified shorter version of the RSA has some advantages in terms of 1) including items with higher factor loadings (above 0.60), which may 1) increase response rates with decreased numbers of questions for a questionnaire and 2) motivate international students to participate in an online survey.

The Patient Health Questionnaire 9 (PHQ-9; Kroenke, Spitzer, & William, 2001)

The PHQ-9 developed by Kroenke, Spitzer, and William (2001) is a self-administered questionnaire with 9 items that assess depressive symptom severity from patients in clinical settings. The PHQ-9 items are based on specific DSM-IV depressive symptom diagnostic criteria. The PHQ-9 scale rates the frequency and occurrence of depressive symptoms including poor concentration, anhedonia, psychomotor problems, low mood, lack of appetite, fatigue, sleeping problems, suicidal ideations, and low self-esteem during the last two weeks. The PHQ-9 is measured on a 4-point Likert scale ranging from 0 (not at all) to 3 (nearly every day). Its total scores can range from 0 to 27. The PHQ-9 scores of 5, 10, 15, and 20 indicate mild, moderate, moderately severe, and severe depression respectively (Kroenke, Spitzer, & Williams, 2001).

The PHQ-9 score of 10 or higher is considered as a cut off point for depressive symptoms because it had a sensitivity of 88% for major depression.

The PHQ-9 showed strong reliability and validity with a wide range of people such as those in medical settings (Diez-Quevedo, Rangil, Sanchez-Planell, Kroenke, & Spitzer, 2001), the general population in non-medical settings (Martin, Rief, Klaiberg, & Braehler, 2006), and international students (Hahn, 2010).

The PHQ-9 showed a satisfactory internal consistency reliability and construct validity established by a study involving 648 international students from 74 countries (Hahn, 2010). The Cronbach's alpha for the nine items was 0.874, which suggests that the 9 items have overall high internal consistency. The reliability coefficient of 0.874 confirmed the PHQ-9 as a highly reliable scale for international students from different cultural backgrounds. This study also showed strong construct validity. A principal component analysis with a varimax rotation procedure demonstrated a one simple factor structure. The criterion of eigenvalue was 1.0. All factor loadings were above 0.4 and the 9 items accounted for accumulatively, 100% of the total variance.

The Generalized Anxiety Disorder (GAD-7; Kroenke, Spitzer, William, & Löwe, 2006)

The GAD-7 also developed by Kroenke and colleagues (2006) is a self-administered questionnaire with 7 items to assess the frequency of anxiety symptoms in clinical settings and research. The GAD-7 scale asks subjects to validate how often during the past two weeks they have experienced various symptoms such as "trouble relaxing" and "feeling afraid as if something awful might happen'" related to a diagnosis of generalized anxiety symptoms. The GAD-7 is measured on a 4-point Likert scale ranging from 0 (not at all) to 3 (nearly every day). Its total scores can range from 0 to 21. The GAD-7 scores of 5, 10, and 15 indicate mild,

moderate, and severe anxiety respectively (Kroenke et al., 2006). A GAD-7 score of 10 or higher is considered as a cut off point for anxiety symptoms. Spitzer and colleagues (2006) reported good internal consistency (Cronbach's alpha) at 0.92 and a high test-retest reliability of 0.83.

The GAD-7 scale also showed excellent construct validity (Spitzer et al., 2006). A principal components analysis used 8 items from a well-developed depression screener, the Patient Health Questionnaire (PHQ-8, Kroenke & Spitzer, 2002) in addition to the seven items established for the GAD-7 to confirm the primary factor structure. All 8 items from the PHQ-8 loaded on to a first factor. On the other hand, all the same 7 items from the GAD-7 loaded on to a second factor. The factor loadings ranged from 0.69 to 0.81. Furthermore, the GAD-7 has high convergent validity and had significant correlations with 2 anxiety scales: the Beck Anxiety Inventory ($r = 0.72$) and the anxiety subscale of the Symptom Checklist-90 ($r = 0.74$) (Spitzer et al., 2006).

Monitoring The Future Survey--Alcohol Related Survey Questions (Miech, Johnston, O'Malley, & Bachman, 2014).

The MTF is conducted by the Institute for Social Research at the University of Michigan and monitors licit and illicit drug use and other behaviors among 8^{th}, 10^{th}, and 12^{th} grade students with annual follow-up surveys with the same students of the behaviors, attitudes, and values of American secondary school students, college students, and young adults. Since 1975, high school seniors from public and private high schools across the U.S. have been surveyed during the spring semester of each year. The MTF contains measures of alcohol consumption such as the frequency of alcohol drinking during the past month, during the past year, and measures of heavy drinking incidents during the past two weeks.

This study uses the alcohol-related survey questions of the MTF with 2 subdomains: 1) alcohol use (any) and 2) episodic heavy or binge drinking. The MTF defined a drink as a 12-ounce can (or bottle) of beer, a 4-ounce glass of wine, a 12-ounce bottle (or can) of a wine cooler, a mixed drink, shot glass of liquor, or the equivalent. Also, the MTF defines binge drinking as five or more drinks in a row at least once during the prior two-week interval. The first subdomain of the alcohol-related survey questions, alcohol use (any), has 7 items such as "on how many occasions (if any) have you been drunk or very high from drinking alcoholic beverages: a) in your lifetime, b) during the last 12 months, and c) during the last 30 days." The second subdomain of the alcohol-related survey questions of the MTF (episodic heavy or binge drinking) has 4 items such as "during the last two weeks, how many times have you had five or more drinks in a row."

For the final analysis, the study used one item that measured binge drinking: "think back over the last two weeks. How many times have you had five or more drinks in a row?" The question was assessed on a 6-point Likert scale ranging from 1 (none) to 6 (ten or more times). For the final SEM analysis, the 6-point Likert scale was recorded as a dichotomous variable (yes or no) since the majority of the participants with experience related to binge drinking reported only 1 or 2 times making the variance of the 6-point Likert scale too large.

Pilot Test for Online Questionnaire Literacy

Minimizing response bias from international students can be challenging because each item of the scale can be misinterpreted due to lack of understanding, motivation, and literacy issues. One strategy for reducing response errors when necessary is to specifically manage text content (Furr & Bacharach, 2008). According to Furr and Bacharach (2008), some response biases can be reduced and nullified by choosing clarified and specific kinds of items or specific

formats. Using appropriate wording and improving the levels of literacy for those who use English as a second language, can minimize the existence of response bias.

This study used a pilot test to gauge the literacy of international students and minimize potential response bias. The pilot test employed a focus group meeting to assess the clarity of all the questions on the questionnaire. The participants in the focus group meeting were recruited from personal connections, through communication with international students in different departments, and campus-wide (bulletin boards, school post office and dining café) advertising with flyers (see Appendix G). All focus group participants received a $10 Starbucks gift cards in an effort to encourage higher participation. Before beginning the focus group, the researcher explained that the results of the pilot test would not be used for any publication and were only for ensuring the literacy and understanding of the questionnaire for this study.

The researcher recruited eight participants for the focus group. The participants provided feedback on the questionnaire regarding acculturative stress, resilience, and health risk behaviors. The focus group was very diverse with different demographic backgrounds represented. Three were male, and five were doctoral students, followed by two masters students, and one undergraduate student. The participants came from eight different countries (Russia, Iran, Mexico, Nepal, China, Kenya, Ivory Coast, and Brazil). Four participants were from the social work program, and the others were from information science, business, biotechnology, and education.

All participants voluntarily consented and participated in the pilot test. The focus group meeting took place in a comfortable and private room in the UTA School of Social Work. This study used the same online survey created with Qualtrics software that would be used in the study. The participants brought their laptop computers to complete the survey. Immediately

following the researcher's explanation of the purpose of the focus group meeting the participants read the informed consent on the first page of the online survey and after consenting, they began completing the questionnaire. The participants felt free to ask questions during completion of the survey.

The focus group highlighted several different issues. The researcher estimated 15-20 minutes as the time needed to complete the questionnaire. Within 20 minutes, all the participants had finished their survey. Second, the participants were asked to provide feedback on the format and the questions. One of the participants suggested that the big tables for each scale should be broken into two sections. This suggestion was applied after the meeting. Other than that, the majority of the participants were satisfied with the format of the questionnaire. Third, the participants discussed portions of the questionnaire with which they had difficulty and suggested improvements (Waltz et al., 2010) (see Table 4-7). Several participants pointed out that the demographic questions were not mutually exclusive and collectively exhaustive. For instance, educational level or current source of funding could be more collectively exhaustive, and did not include all possible categories. They suggested that just an F-1 visa should be eliminated from the screening questions and more people with different visa statuses should be included for the study.

In addition, there were a few interpretation issues with the questions. Two participants stated that question 2 in the modified Index of Life Stress section was confusing "I don't like the religions in the U.S." Question 6 in the Resilience scale section was considered as an unclear question too. They said that questions 18 and 20 would be clear if each question did not include three options as a social resource. They thought each question should be made into three separate

questions. Also the participants said that question 8 in the Depression scale section was too long to understand. Other than the above, the participants were very satisfied with the study questions.

Table 4-7: Results of Focus Group Meeting

Section	Original	Participants' Opinion	Revision/Notes
Screening question	Are you an international student with an F-1 visa in the United States?	International students with J-1 exchange student visa should be included in the screening question	Are you an international student with an F-1 or J-1 visa in the United States?
Modified Index of Life Stress-question 2	I don't like the religions in the U.S.	We keep the original question since the item was highly loaded on the sub-construct in the validation study.	The question is confusing. The U.S. is a very diverse country and the statement sounds like a respondent either hates diversity of religions or doesn't like all religions at all.
Modified Resilience Scale for Adults-question 6	My goals for the future are well thought through	The question 6 should be reworded since it sounds a little awkward.	I have clear goals for the future
PHQ-9 - question 6	Moving or speaking so slowly that other people could have noticed? Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual	The question is too long so it should be broken into 2 questions	The scale is a criterion-referenced scale so it was kept as is.
Demographic question 8		J-1 exchange visitors don't have any category for question 8	Added one more category, which is J-1 exchange visitors
Format		Overall the questionnaire looks good, but one page has many questions. It should be divided into 2 parts.	Applied

For additional SNS resources, the participants could only provide one additional specific website (the International Student Organization at UTA) for conducting an online survey with

international students. This website was included as a source for posting online surveys. The results of this pilot test were applied to the questionnaire to reduce potential response bias due to a potential literacy and cultural challenges. .

Data Analysis

The preliminary analyses for this study consisted of data screening, missing value analyses, normality tests (skewness and kurtosis), descriptive analyses, and bivariate analyses (ANOVAs, *t*-tests, and Person's correlations) in order to 1) understand the characteristics of the participants, 2) understand the differences of the four main latent variables (acculturative stress, resilience, mental health, and alcohol use) according to demographic variables, and 3) make sure the readiness of the data for conducting Structural Equation Modeling (SEM) analyses to test the hypothetical model. Data screening, missing value analyses, and bivariate relationships were assessed in SPSS 20.

In particular, since the primary analysis for this study was based on SEM, missing values had to be handled. Multiple imputation was used to handle missing values for this study (see the detailed information regarding the process of handing missing values for this study on pages 93-96 in the results section).

Second, a normality test was conducted to check if the data met the assumption of the main analysis, SEM. Normality was assessed using the Fisher's skewness and kurtosis coefficients (see the detailed information regarding the process of handling normality for this study on pages 97-98 in the results section).

Also, the study conducted ANOVAs and *t*-tests to test the mean differences of the four latent variables (acculturative stress, resilience, mental health and alcohol use) according to demographic variables such as age, gender, religious affiliation, race/ethnicity, and length of

study in the U.S. The Tukey honest significant difference (HSD; Tukey, 1949) test was used as a post-hoc test.

As a main analysis, SEM, consisting of a measurement model and a structural model was conducted. A measurement model describes the relationship between observed indicators and unobserved latent variables and specifies the extent to which the observed indicators are related to the latent variables. The measurement model of SEM is the Confirmative Factor Analysis (CFA) and depicts the pattern of observed variables for those latent constructs in the hypothesized conceptual model (Schreiber, Stage, King, Nora, & Barlow, 2006). The overall fit of the model was estimated using goodness-of-fit indices: 1) chi-square (χ^2) statistic, 2) normed chi-square statistic (χ^2/df), 3) comparative fit index (CFI; Bentler, 1990), 4) Tucker Lewis Index (TLI; Tucker & Lewis, 1973), 5) root mean square error of approximation (RMSEA; Steiger, 1990), and 6) Akaike Information Criterion (AIC; Akaike, 1987; see the detailed information regarding the goodness-of-fit indices for this study on page 108).

Reliabilities and Average Variance Extracted (AVE) were also estimated. Specifically, AVE assesses convergent validity to test construct validity (Fornell & Larcker, 1981). Usually, the value of AVE for each construct is between zero and one. The value should be at least 0.5 (Ghadi et al., 2012). Discriminant validity also was estimated in addition to convergent validity using correlations coefficients and AVE values for each latent variable (see the results section on pages 110 and 111).

On the other hand, the SEM structural model describes interrelations among latent constructs and observable variables in the proposed model (Schreiber et al., 2006). A structural model also displays direct and indirect effects of particular variables on certain other latent variables in the model. To assess this hypothesized conceptual model, a series of structural

model fit indices were compared. The study allowed several items to co-vary based on the information from modified model fit indices, which allowed for simultaneous consideration of relationships between multiple predictors and dependent variables, in addition to the direct and indirect tests of hypothesized differences between a basic model and a modified model.

Chapter 5

Results

This chapter presents the results of the study. The chapter begins with the data screening results in terms of missing data and necessary assumptions for further analyses. Next, bivariate analyses are presented to describe mean differences in the four main latent variables (acculturative stress, resilience, mental health, and alcohol use) based on the demographic variables, as well as correlations among the four latent variables. Finally, the results of the SEM analysis are presented in order to answer the research questions of the study. The process of examining the measurement model is discussed to examine the goodness-of-fit of the hypothesized model. In addition, the structural path model presents the direct and indirect effects in the hypothesized model discussed in the previous chapter. This chapter ends with the summary of results.

Preliminary Analysis

Data Screening and Preparation

Before conducting preliminary analyses and SEM, the data were carefully screened. In the current study, data were examined in terms of missing values and normality (Kline, 2005). SPSS 20 was used in order to test these assumptions. As a first step, after the data had been completely entered into an SPSS file, they were assessed for possible data entry errors such as whether: 1) data were correctly entered, and 2) variables were properly coded (see Table 5-1). This step was achieved by running and inspecting frequency tables for all variables in the data set. These frequency tables display the actual scores, from low to high, for continuous data or actual categorical data. All values that appeared outside the possible range for each variable were

re-evaluated and recoded again. Several open-ended questions such as country of origin, major, and school were reentered as categorical variables, as described in Table 5-1.

Table 5-1: Description of Demographic, Endogenous, and Exogenous Variables

Demographic Variable		Response Categories	Variable Transformation
Age	How old are you?		1=18-25, 2=26-30, 3=31-35, 4=36-40
Gender	What is your gender?	1=female, 2=male	
Religious affiliation	Do you have any religious affiliation	1=None, 2=Catholic, 3=Jewish, 4=Muslim, 5=Hinduism, 6=Buddhism, 7=Christian, 8=Other	0=No, 1=Yes
Marital status	What is your marital status?	1=Never married, 2=Married, 3=Divorced, 4=Separated, 5=Widowed, 6=Other	0=Never married, 1=Other
Family status	Do you live with your family in the U.S.?	1=I don't live with my family, 2=Mother only, 3=Father only, 4=Sibling(s) only, 5=Mother and Father only, 6=Other	0=Don't live with my family, 1=Live with my family
Length of stay	How many years have you lived in the U.S.?	1=Less than 6 months, 2=6 months to 1 year, 3=Up to 2 years, 4=Up to 3 years, 5=Up to 4 years, 6=Up to 5 years, 7=more than 5	1=Less than 6 months, 2=6 months to 1 year, 3=Up to 2 years, 4=more than 2 years
Other educational experiences in the U.S.	Have you had other educational experiences in the U.S. before the university you are attending now (for example, studying abroad at a prior point in time)?	1=No, 2=Yes	
Country of origin	What is your country of origin?	1. India, 2. China, 3. South Korea, 4. Taiwan, 5. Vietnam, 6. Bangladesh, 7. Nigeria, 8. Nepal, 9. Mexico, 10. Kenya, 11. Thailand, 12. Saudi Arabia, 13. Brazil, 14. Russia, 15. Uganda, 16. Palestine, 17. UK, 18. France, 19. Afghanistan, 20. Egypt, 21. Kazakhstan, 22. Singapore, 23. Laos, 24. Jordan	1. India, 2. China, 3. South Korea, 4. Other
Major	What is your major of study?	1. Engineering (Bioengineering, civil engineering, computer science and engineering, electrical engineering, industrial, manufacturing, and systems engineering, material science and engineering, mechanical and Aerospace engineering), 2. Business (Accounting, Economics, Finance and Real Estate, Information Systems and Operations Management, Management, and Marketing), 3. Social science (social work, linguistics, communication, political science, philosophy, theology…), 4. Health science (dentistry, biology, pharmacy, medicine, biomedical, nursing…), 5. Computer Science, 6. Information and Management, 7. Natural Science, 8. Material Science, 11. Other	1. Engineering, 2. Business, 3. Social science, 4. Computer Science, 5. Other
School	What university/school do you attend?	1. UTA, 2. UTD, 3. UT Austin, 4. SUNY Buffalo, 5. Academy of Art University, 6. Pittsburg state University, 7. University of Houston, 8. Mountain View Community College, 9. UNT, 10. University of Illinois at Urbana-Champaign, 11. Texas State University, 12. University of Wisconsin-Madison, 13. Other (University of Michigan, Michigan Tech, OSU, Purdue University, Georgia Institute of Technology, etc..)	1. UTA, 2. UTD, 3. UT Austin, 4. Other
Educational level	What is your educational level now?	1=College freshman, 2=College sophomore, 3=College junior, 4=College senior, 5=Master-1st year, 6=Master-2nd year, 7=Master-3rd year, 8=Master-4th year, 9=PhD-1st year, 10=PhD-2nd year, 11=PhD-3rd year, 12=PhD-4th year, 13=PhD-5th year.	1=Bachelor's, 2=Master's, 3=Doctoral,
GPA	What is your current GPA?	1=Below 1.0, 2=1.0-1.49, 3=1.5-1.9, 4=2-2.49, 5=2.5-2.9, 6=3-3.49, 7=3.5-4.0	1=0-2.9, 2=3.0-4.0
Current source of funding	What is your current source of funding for your studies?	1=Graduate teaching/research assistantship, 2=Department/school scholarship, 3=Family funds, 4=Fellowship, 5=On-campus job, 6=Loans, 7=Previous personal savings, 8=Other	1=Family funds, 2=Other

Table 5-1- Continued

Exogenous & Endogenous Variables			Response Categories
Acculturative stress (exogenous)	Financial concerns	3 items (Q 8, 9, 11)	0=Never, 1=A little, 2= Sometimes, 3=Often
	Language difficulties	4 items (Q 1, 5, 7, 10)	
	Perceived discrimination	4 items (Q 12, 13, 14, 15)	
	Cultural adjustments	2 items (Q 2, 6)	
	Academic pressure	2 items (Q 3, 4)	
Resilience (exogenous & endogenous)	Positive perception of self	4 items (Q 1, 2, 3, 4)	1=Not at all well, 2=Not very well, 3=Slightly well, 4=Sometimes well, 5=Well, 6=Very well, 7=Excellently well
	Positive perception of future	3 items (Q 5, 6, 7)	
	Social competence	3 items (Q 8, 9, 10)	
	Structured style	3 items (Q 11, 12, 13)	
	Family cohesion	3 items (Q 14, 15, 16)	
	Social resources	4 items (Q 17, 18, 19, 20)	
Mental health (exogenous & endogenous)	GAD-7 (anxiety)	7 items	1=Not at all, 2=Several days, 3=More than half the days, 4=Nearly every day
	PHQ-9 (depression)	9 items	
Binge drinking (endogenous)		Think back over the last two weeks. How many times have you had five or more drinks in a row?	1=None, 2=Once, 3=Twice, 4=Three or five times, 5=Six to nine times, 6=Ten or more times → 0=No, 1=Yes (Transformed)

Missing Data

In order to handle missing values this study used multiple imputation. The decision on how to deal with missing data depends on the patterns of missing values and the number of cases with missing values (Abu-Bader, 2010). According to Little and Rubin (1987), missing data patterns are commonly described as three categories: 1) Missing Completely at Random (MCAR), 2) Missing at Random (MAR), and 3) Missing Not at Random (MNAR). First, when data are MCAR, "missing cases are no different than non-missing cases, in terms of the analysis being performed" (Wayman, 2003, p.3); therefore these cases can be considered randomly missing from the data. Second, if data are MAR, "missing data depends on known values and thus is described fully by variables observed in the dataset" (Wayman, 2003, p.3). Usually, MAR

data produce unbiased results in an analysis. Third, when data are MNAR, the missing data mechanism cannot be measured.

In this study, all the variables had less than 2.2 % missing cases, except 1) previous educational experience in the U.S (with 8.1% missing cases), 2) GPA (13.4%), 3) funding source (8.7%) (Table 5-2). The ratio of missing data was less than 5%. As a general guideline, if the variables overall have only 5% or less missing values at random, then almost any procedure for handling missing values generates similar results (e.g., Acuna & Rodrigues, 2004). First of all, to understand the pattern of missing data, missing value analysis was conducted to examine whether missingness was completely at random (MCAR). Little's Missingness Completely at Random (MCAR) test showed that the missing data pattern was considered to be completely missing at random. When data are MCAR, missing cases are not different than non-missing cases (Wayman, 2003). Since the missing value analysis resulted in statistically significant [$\chi^2(2776.9)=2244$, $p=0.001$], the missingness was not MCAR. As a second missing analysis, missing value analysis for multiple imputation was conducted to examine whether missingness was at random (MAR) since it shows visual patterns of missing values. The results showed that missingness was at random as illustrated in Figure 5-1.

As the data were missing at random, for an SEM analysis, different methods of managing randomized missing values such as listwise deletion, mean substitution, and imputation were possible. However, handling missing data by eliminating cases with missing data such as listwise deletion will bias results if the remaining cases are not representative of the entire sample (Wayman, 2003). In addition, mean substitution as another common method replaces missing data with the average of valid data, but since the same value is being replaced for each missing case, this approach artificially reduces the variance of the variable and diminish

relationship with other variables (Wayman, 2003). Multiple imputation is an attractive choice as a solution to missing data problems because it represents a good balance between quality of results and ease of use. Multiple imputation has been shown to produce unbiased parameter estimates (Enders & Bandalos 2001; Jelicic, Phelps & Lerner 2009; Schafer & Graham, 2002) and "to be robust departures from normality assumptions and provides adequate results in the presence of low sample size or high rate of missing data" (Wayman, 2003, p.4). Therefore, in this study, an imputation method was used to replace the missing values. The multiple imputation created five imputed datasets and this study chose the 5th imputed dataset for data analyses. Commonly, researchers select between 3 and 10 data sets and the multiple imputed dataset generates the same results (Wayman, 2003).

Table 5-2: Missing Value Analysis

Variable	*N*	*M*	*S.D.*	Missing		No. of Extremes[a]		Variable	*N*	*M*	*S.D.*	Missing		No. of Extremes[a]	
				Count	Percent	Low	High					Count	Percent	Low	High
Binge	322	1.37	0.83	0	0.0			R_18	322	5.76	1.40	0	0.0	14	0
AS_1	321	1.01	0.93	1	.3	0	0	R_19	322	5.46	1.46	0	0.0	14	0
AS_2	321	0.37	0.76	1	.3			R_20	321	5.48	1.57	1	.3	22	0
AS_3	321	1.71	1.06	1	.3	0	0	A_1	322	1.01	0.86	0	0.0	0	25
AS_4	320	1.31	1.00	2	.6	0	0	A_2	322	1.06	0.90	0	0.0	0	0
AS_5	320	0.78	0.95	2	.6	0	22	A_3	322	1.17	0.92	0	0.0	0	0
AS_6	321	0.77	0.93	1	.3	0	19	A_4	322	0.94	0.93	0	0.0	0	27
AS_7	321	0.86	0.91	1	.3	0	21	A_5	322	0.77	0.90	0	0.0	0	22
AS_8	321	1.56	1.08	1	.3	0	0	A_6	322	0.89	0.90	0	0.0	0	22
AS_9	319	1.02	1.05	3	.9	0	0	A_7	321	0.94	0.91	1	.3	0	25
AS_10	320	0.57	0.83	2	.6	0	14	D_8	322	0.90	0.89	0	0.0	0	21
AS_11	321	0.86	1.00	1	.3	0	32	D_9	322	0.84	0.90	0	0.0	0	20
AS_12	319	0.95	0.95	3	.9	0	29	D_10	321	1.00	1.02	1	.3	0	0
AS_13	320	0.61	0.82	2	.6	0	11	D_11	321	1.09	0.93	1	.3	0	0
AS_14	321	0.59	0.81	1	.3	0	13	D_12	321	0.92	0.96	1	.3	0	0
AS_15	321	0.64	0.84	1	.3	0	15	D_13	320	0.87	0.93	2	.6	0	23
R_1	322	5.30	1.29	0	0.0	30	0	D_14	322	0.80	0.93	0	0.0	0	24
R_2	321	5.11	1.26	1	.3	6	0	D_15	322	0.69	0.87	0	0.0	0	14
R_3	319	5.39	1.32	3	.9	28	0	D_16	322	0.53	1.59	0	0.0	0	14
R_4	321	5.02	1.43	1	.3	5	0	Age	318	24.63	3.84	4	1.2	0	19
R_5	321	5.03	1.43	1	.3	4	0	Gender	320	1.45	0.50	2	.6	0	0
R_6	322	5.00	1.54	0	0.0	5	0	Religion	322	3.70	2.35	0	0.0	0	0
R_7	320	4.93	1.53	2	.6	4	0	Marital	322	1.37	1.03	0	0.0		
R_8	322	4.75	1.67	0	0.0	11	0	Family	322	1.80	1.81	0	0.0		
R_9	321	4.63	1.65	1	.3	10	0	Length	319	2.91	2.07	3	.9	0	0
R_10	322	4.96	1.53	0	0.0	7	0	EduExp	318	1.31	0.46	4	1.2	0	0
R_11	322	5.17	1.46	0	0.0	3	0	Country	315	3.24	3.88	7	2.2	0	42
R_12	321	4.93	1.49	1	.3	7	0	School	315	3.24	3.87	7	2.2	0	55
R_13	321	4.71	1.58	1	.3	9	0	EduLevel	296	5.58	2.78	26	8.1	17	49
R_14	322	5.62	1.56	0	0.0	19	0	GPA	279	6.43	0.79	43	13.4	8	0
R_15	322	5.69	1.48	0	0.0	14	0	Funding	294	3.53	2.03	28	8.7	0	16
R_16	322	5.72	1.42	0	0.0	12	0	Major	311	3.11	2.43	11	3.4	0	0
R_17	321	5.34	1.52	1	.3	0	0								

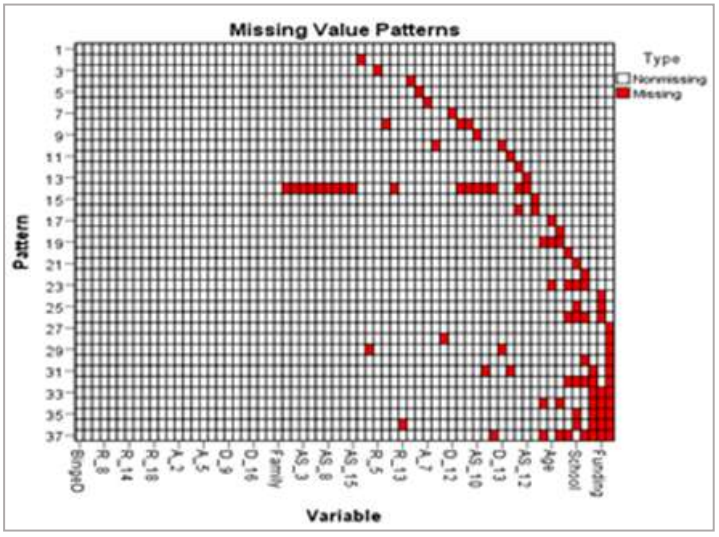

Figure 5-1: Missing Value Patterns.

Description of Variables (Mean, Standard Error, Skewness, & Kurtosis)

In this study, instead of utilizing individual items, the subdomains (i.e., positive perception of self, positive perception of the future, social competence, structured style, family cohesion, and social resources) of the latent variable scales (i.e., resilience) were used. Using subdomains of the scale can be helpful to obtain more continuous and normally distributed data (Bandals, 2008; Tempelaar et al., 2007). Also, the subdomains of the latent variable scales are used to reduce the number of parameters to obtain more stable parameter estimates (Bandals, 2008; Tempelaar et al., 2007). This approach works because the number of indicators are reduced when the subdomains of the scales are used instead of individual items. Subdomains refer to averaging items scores from two or more items from the same scale (Bandalos, 2008). The subdomains of the latent variable scales are described in Tables 5-1.

In order to provide information regarding the distribution of subdomains of the scales, skewness and kurtosis values were analyzed. Skewness is defined as a measure of symmetry of a distribution, whereas kurtosis is defined as a measure of the flatness or peakedness of a

distribution (Abu-Bader, 2010). The distribution is perfectly normal when skewness and kurtosis values are zero. Variables with values of the skewness and kurtosis between - 1.96 and +1.96 are close to normal (Abu-Bader, 2010). According to Kline (2005), if the absolute values of the kurtosis index is greater than 10, this can be problematic. In this study, the skewness of the subdomains for acculturative stress (financial difficulties, language difficulties, perceived discrimination, cultural adjustments, and academic pressure) ranged from 0.054 to 1.219 while the kurtosis varied from 0.533 to 1.233. The skewness of the subdomains for resilience varied from -0.256 to -1.074 and the kurtosis varied from -0.345 to 1.057. In addition, the skewness of depression and anxiety was 0.934 and 0.787 respectively and the kurtosis of depression and anxiety was 0.297 and 0.166. Skewness and kurtosis values for the corresponding latent variables and their subdomains were presented in Table 5-3. All in all, subdomains of the latent variable scales were close to normal since they did not deviate much from the skewness and kurtosis values of zero.

Table 5-3: Description of Variables (*N*=322)

Variables	Min	Max	Mean	SD	Skewness	Kurtosis
Acculturative Stress	0	45	13.63	0.45	0.844	1.085
Financial Concerns	0	9	3.45	0.15	0.517	-0.856
Language Difficulties	0	12	3.24	2.94	0.989	0.533
Perceived Discrimination	0	12	2.78	2.76	1.219	1.233
Cultural Adjustments	0	6	1.14	1.29	1.104	0.77
Academic Pressure	0	6	3.02	1.79	0.054	-0.931
Resilience	29.00	140	103.97	1.13	0.684	0.45
Positive Perception of Self	4.00	28	20.81	4.52	0.826	1.057
Positive Perception of the Future	4.00	21	14.96	4.02	-0.446	-0.523
Social Competence	3.00	21	14.34	4.4	-0.256	-0.636
Structured Style	3.00	21	14.8	3.84	-0.366	-0.345
Family Cohesion	3.00	21	17.02	4.02	-1.074	0.587
Social Resources	4.00	28	22.03	5.05	-1.029	0.781
Depression	0	27.00	7.58	0.35	0.934	0.297
Anxiety	0	21.00	6.79	0.29	0.787	0.166

In addition, as shown in Table 5-3, the sample's mean score on the acculturative stress scale was 13.63 with a standard deviation of 0.45 and scores falling between 0 and 45. Also, the sample's mean score on the resilience scale was 103.97 with a standard deviation of 1.13 and scores falling between 29 and 140. While the mean of the acculturative stress was not high, the mean of resilience was high. The depression and anxiety scores of 5, 10, 15, and 20 indicate mild, moderate, moderately severe, and severe symptoms respectively (Korenke et al., 2001). The averages of depression (M=7.58, $s.d.$=0.35) and anxiety mean (M=6.79, $s.d.$=0.29) that overall international students had very mild depression and anxiety.

Mean Differences across Demographic Variables

The bivariate analyses were conducted to compare mean differences in acculturative stress, resilience, anxiety, depression, and binge drinking by demographic variables. Since acculturative stress, resilience, anxiety, and depression were continuous variables and the demographic variables were categorical or dichotomous variables, the study used independent-samples *t*-test or ANOVA to compare the mean differences of the main latent variables based on demographic variables: 1) age, 2) gender, 3) religious affiliation, 4) marital status, 5) family status, 6) length of stay in the U.S., 7) other educational experience in the U.S., 8) country of origin, 9) major, 10) school, 11) educational level, 12) GPA, and 13) current source of funding. In addition, chi-square tests were conducted to test for independence between binge drinking, which was a dichotomous variable, and the demographic variables as shown in Table 5-4.

Acculturative Stress

ANOVA was implemented for determining the differences of the degree of acculturative stress by age, length of stay, country of origin, major, school, and educational level. First, acculturative stress was significantly different according to age (F=3.48, p<.05). A post-hoc

comparison using Tukey's honest significant difference (HSD; Tukey, 1949) test, which is commonly used procedure, for age (p<.05) indicated that international students between the age of 36 and 40 (M=21.1, $s.d.$=10.78) and 31 and 35 (M=15.50, $s.d.$=9.12) had higher levels of acculturative stress compared to those between the age of 26 and 30 (M=14.47, $s.d.$=8.21) and 18 and 25 (M=12.95, $s.d.$=7.73). The older international students had much higher levels of acculturative stress than younger international students.

Secondly, differences in acculturative stress were found for length of stay (F=8.85, p<.001). A post-hoc test showed that international students who stayed more than 2 years (M=16.86, $s.d.$=9.49) had higher levels of acculturative stress than those who stayed less than 6 months (M=11.4, $s.d.$=6.86), 6 months -1 year (M=12.63, $s.d.$=7.05), and up to 2 years (M=13.91, $s.d.$=7.20).

In addition, acculturative stress was significantly different based on country of origin (F=8.33, p<.001). Tukey's HSD test (p<.05) showed that international students from India (M=11.18, $s.d.$=6.51) had much lower levels of acculturative stress than those from China (M=13.11, $s.d.$=7.75), South Korea (M=15.90, $s.d.$=8.17), Taiwan (M=13.20, $s.d.$=8.74), and other (M=17.87, $s.d.$=9.32). Interestingly, international students who came from other countries (M=17.87, $s.d.$=9.32) had the highest levels of acculturative stress compared to those from the four major Asian countries.

Also, acculturative stress was significantly different by major (F=5.43, p<.001). A post-hoc test (p<.05) indicated that international students studying Social Science (M=17.88, $s.d.$=8.61) had much higher levels of acculturative stress than those studying other majors such as Computer Science (M=11.48, $s.d.$=8.14), Engineering (M=12.36, $s.d.$=7.02), Business (M=13.59, $s.d.$=7.67), and other (M=12.83, $s.d.$=9.11).

Lastly, acculturative stress was significantly different according to educational level (F=8.32, p<.001). The post-hoc test (p<.05) described that bachelor's level students (M=16.21, *s.d.*=8.17) had much higher levels of acculturative stress than master's level students (M=12.12, *s.d.*=7.07) and doctoral level students (M=14.31, *s.d.*=10.00). Undergraduate students had more acculturative stress than graduate students.

The study conducted independent-samples *t*-test to compare acculturative stress levels based on gender, religious affiliation, marital status, family status, other educational experience in the U.S. and GPA. Acculturative stress was significantly different only according to gender (t=-3.47, p<.001) and marital status (t=-2.65, p<.05). Female international students (M=15.41, *s.d.*=9.14) had higher levels of acculturative stress than male international students (M=12.22, *s.d.*=6.84). Also, international students who were never married (M=13.04, *s.d.*=7.55) had less acculturative stress than those who were either married, divorced, separated, and widowed) (M=17.14, *s.d.*=10.12).

Resilience

ANOVA tests were conducted to examine the differences of resilience levels based on age, length of stay, country of origin, major, school, and educational level (see Table 5-4). First, resilience levels were significantly different according to country of origin (F=2.78, p<.05). A post-hoc comparison for country of origin (p<.05) indicated that resilience levels among international students from India (M=106.83, *s.d.*=20.78), other countries (M=107.64, *s.d.*=17.76) were much higher than those from South Korea (M=103.06, *s.d.*=16.42), China (M=99.04, *s.d.*=21.64), and Taiwan (M=97.05, *s.d.*=23.08). Furthermore, graduate-level international students scored higher on resilience than undergraduate level international students

(F=5.26, p<.01). Doctoral students (M=107.88, $s.d.$=16.24) and master's students (M=105.72, $s.d.$=20.25) scored higher than bachelor's students (M=98.38, $s.d.$=21.31).

Independent-samples t-tests were implemented to compare resilience levels according to gender, religious affiliation, marital status, family status, other educational experience in the U.S. and GPA. Resilience was significantly different according to religious affiliation (t=-3.13, p<.01). International students who had any religious affiliation (M=106.65, $s.d.$=19.48) had higher levels of resilience than those who did not have a religious affiliation (M=99.44, $s.d.$=20.80).

Anxiety & Depression

In order to compare levels of anxiety and depression according to demographic variables, ANOVA and independent-samples t-tests were conducted again. First, anxiety levels were significantly different based on school (F=2.78, p<.05) and educational level among international students (F=5.21, p<.01). Tukey's HSD test showed that international students attending UTA (M=7.03, $s.d.$=5.05) and other schools (M=7.87, $s.d.$=5.94) had much higher levels of anxiety than those at UT Dallas (M=5.11, $s.d.$=4.81) and UT Austin (M=5.79, $s.d.$=3.96). Furthermore, doctoral students (M=5.27, $s.d.$=4.03) had much less anxiety than bachelor's (M=8.04, $s.d.$=4.97) and master's students (M=6.57, $s.d.$=5.42). Bachelor's students showed higher levels of anxiety than graduate-level students.

Also, from the independent-samples t-tests, significant differences were found for gender (t=-2.47, p<.05), religious affiliation (t=-2.69, p<.01), and GPA (t=2.13, p<.05). Female international students (M=6.16, $s.d.$=4.98) had higher levels of anxiety than male international students (M=7.57, $s.d.$=5.29). Also, international students who had any religious affiliation (M=5.79, $s.d.$=4.63) had lower anxiety levels than those who did not have a religious affiliation

(*M*=7.38, *s.d.*=5.38). International students with lower GPAs (below 3.0) (*M*=14.5, *s.d.*=6.36) were more anxious than those with higher GPAs (3.0 or above) (*M*=7.54, *s.d.*=6.26).

Regarding depression, only educational level (*F*=6.94, *p*<.001) and gender were significant (*t*=-2.18, *p*<.01). A post-hoc test showed that undergraduate students (*M*=9.32, *s.d.*=6.78) were more depressed than master's students (*M*=7.30, *s.d.*=6.22) and doctoral students (*M*=5.43, *s.d.*=4.52). Like anxiety, a *t*-test revealed that gender was significant for depression. Female international students (*M*=8.43, *s.d.*=6.46) were more depressed than male international students (*M*=6.91, *s.d.*=6.04).; none were not clinically depressed. The cut-off score for clinical depression is 10. A score of 10 is considered a clinically significant indicator of the condition warranting further assessment.

Binge Drinking

The differences in alcohol use by demographic variables were conducted as reported in Table 5-4. Two of these variables: (1) religious affiliation (χ^2=4.889, *p*<.05) and (2) other educational experience in the U.S. (χ^2=5.818, *p*<.05) were significant. When asked about binge drinking, 28.3% (n=34) of the international students without any religious affiliation (n=120) reported they were more likely to have experience related to binge drinking, compared to 17.8% (*n*=36) of those with any religious affiliation (n=202). Moreover, international students who did not have another educational experience in the U.S. (18%, *n*=40) were less likely to have experience regarding binge drinking, compared to those who had (30%, *n*=30). A chi-square test indicated that international students without any religious affiliation and with other educational experience in the U.S. were more likely to be involved in binge drinking.

Table 5-4: Mean Differences Across Demographic Variables (*N*=322)

	Acculturative Stress		Resilience		Anxiety		Depression		Binge Drinking		
									No	Yes	
	M (*SD*)[1]	*F*/*t*	*M* (*SD*)	*F*/*t*	*M* (*SD*)	*F*/*t*	*M* (*SD*)	*F*/*t*	n (%)	n (%)	χ^2
Age											
18-25	12.95 (7.73)[b]		102.97 (20.78)		6.98 (5.22)		7.91 (6.44)		176 (78.9)	47 (21.1)	
26-30	14.47 (8.21)[b]	**3.48***	104.48 (19.99)	1.365	7.07 (5.14)	2.463	7.26 (5.94)	1.167	56 (76.7)	17 (23.3)	0.948
31-35	15.50 (9.12)[ab]		112.56 (16.46)		3.72 (4.34)		5.33 (6.18)		13 (72.2)	5 (27.8)	
36-40	21.1 (10.78)[a]		107.63 (10.82)		5.63 (3.58)		6.25 (3.62)		7 (87.5)	1 (12.5)	
Gender											
Male	12.22 (6.84)	**- 3.47*** **	105.04 (19.83)	1.604	6.16 (4.98)	**- 2.47***	6.91 (6.04)	**- 2.18***	139 (77.7)	40 (22.3)	0.787
Female	15.41 (9.14)		102.62 (20.77)		7.57 (5.29)		8.43 (6.46)		113 (79.0)	30 (21.0)	
Religious Affiliation											
No	12.91 (7.42)	- 1.25	99.44 (20.80)	**- 3.13****	5.79 (4.63)	**- 2.69****	7.05 (5.84)	- 1.15	86 (71.7)	34 (28.3)	**4.889***
Yes	14.07 (8.45)		106.65 (19.48)		7.38 (5.38)		7.89 (6.50)		166 (82.2)	36 (17.8)	
Marital Status											
Never married	13.04 (7.55)	**- 2.65***	104.03 (20.25)	0.14	6.85 (5.22)	0.58	7.51 (6.17)	- 0.50	215 (78.2)	60 (21.8)	0.007
Other	17.13(10.12)		103.59 (20.48)		6.38 (4.85)		8.00 (6.88)		37 (78.7)	10 (21.3)	
Family Status											
Live without my family	12.83 (7.52)	**- 3.34*****	104.92 (19.19)	1.55	6.68 (5.01)	- 0.80	7.33 (6.01)	- 1.34	204 (77.6)	59 (22.4)	0.407
Live with my family	17.24 (9.49)		99.71 (24.19)		7.27 (5.83)		8.69 (7.25)		48 (81.4)	11 (18.6)	
Length of Stay											
Less than 6 months	11.4 (6.86)[a]		106.10 (19.67)		6.71 (5.52)		7.71 (6.89)		91 (79.1)	24 (20.9)	
6 months - 1 year	12.63 (7.05)[a]	**8.85*****	103.78 (17.59)	0.89	7.60 (5.14)	0.76	8.31 (5.90)	0.73	48 (80.0)	12 (20.0)	0.336
Up to 2 years	13.91 (7.20)[a]		100.81 (25.27)		6.17 (5.12)		6.60 (0.06)		41 (77.4)	12 (22.6)	
More than 2 years	16.86 (9.49)[b]		103.26 (19.42)		6.70 (4.74)		7.50 (5.83)		72 (76.6)	22 (23.4)	
Other Educational Experience											
No	13.44 (7.97)	- 0.66	104.65 (19.37)	0.91	7.03 (5.33)	1.25	7.94 (6.38)	1.52	182 (82.0)	40 (18.0)	**5.818***
Yes	14.08 (8.36)		102.44 (22.12)		6.25 (4.74)		6.79 (5.96)		70 (70.0)	30 (30.0)	
GPA											
0-2.9	15.0 (7.07)	0.239	109.5 (14.85)	0.387	14.5 (6.36)	**2.13***	14.5 (6.36)	1.57	2 (100)	0 (0.0)	0.559
3.0-4.0	13.63 (8.10)		103.93 (20.30)		7.54 (6.26)		7.54 (6.26)		250 (78.1)	70 (21.9)	

* $p < .05$, ** $p < .01$, *** $p < .001$. *Note*[1]. Post hoc Tukey's HSD test.

Table 5-4-continued

	Acculturative Stress		Resilience		Anxiety		Depression		Binge Drinking No	Binge Drinking Yes	
	M (*SD*)[1]	*F*/*t*	*M* (*SD*)	*F*/*t*	*M* (*SD*)	*F*/*t*	*M* (*SD*)	*F*/*t*	n (%)	n (%)	χ^2
Country of Origin											
India	11.18 (6.51)[a]		106.83 (20.78)b		6.64 (5.39)		7.25 (6.25)		98 (81.0)	23 (19.0)	
China	13.11 (7.75)[ab]		99.04 (21.64)ab		6.14 (4.56)		6.97 (5.83)		57 (75.0)	19 (25.0)	
South Korea	15.90 (8.17)[ab]	**8.33*** **	103.06 (16.42)ab	**2.78***	6.06 (4.46)	2.09	6.76 (5.52)	2.09	38 (76.0)	12 (24.0)	6.749
Taiwan	13.20 (8.74)[bc]		97.50 (23.08)a		7.35 (5.15)		8.20 (6.26)		12 (60.0)	8 (40.0)	
Other	17.87 (9.32)[c]		107.64 (17.76)b		8.45 (5.79)		9.67 (7.22)		47 (85.5)	8 (14.5)	
Major											
Engineering	12.36 (7.02)[a]		106.92 (18.59)		6.81 (5.20)		7.56 (6.68)		88 (83.8)	17 (16.2)	
Business	13.59 (7.67)[a]		102.72 (20.11)		6.66 (4.85)		7.76 (5.74)		67 (74.4)	23 (25.6)	
Social science	17.88 (8.61)[b]	**5.43*** **	99.25 (21.60)	1.47	7.07 (4.84)	0.228	7.67 (5.91)	0.102	42 (75.0)	14 (25.0)	3.047
Computer science	11.48 (8.14)[a]		104.06 (19.95)		7.26 (5.92)		7.64 (6.60)		24 (77.4)	7 (22.6)	
Other	12.83 (9.11)[a]		105.52 (20.26)		6.25 (5.74)		7.03 (6.78)		31 (77.5)	9 (22.5)	
School											
UT Arlington	13.811 (7.45)		104.12 (19.10)		7.03 (5.05)ab		7.68 (5.74)		136 (80.0)	34 (20.0)	
UT Dallas	11.22 (7.83)	2.17	107.33 (22.70)	1.17	5.11 (4.81)a	**3.28***	6.74 (6.83)	2.6	34 (73.9)	12 (26.1)	0.952
UT Austin	13.21 (10.08)		99.08 (18.73)		5.79 (3.96)a		5.68 (5.34)		30 (78.9)	8 (21.1)	
Other	15.07 (8.36)		104.03 (22.02)		7.87 (5.94)b		8.97 (7.31)		52 (76.5)	16 (23.5)	
Educational Level											
Bachelor's	16.21 (8.17)[b]		98.38 (21.31)[a]		8.04 (4.97)[b]		9.32 (6.78)b		69 (75.0)	23 (25.0)	
Master's	12.12 (7.07)[a]	**8.32*** **	105.72 (20.25)b	**5.26** **	6.57 (5.42)[ab]	**5.21** **	7.30 (6.22)a	**6.94*** **	144 (80.4)	35 (19.6)	1.174
Doctoral	14.31 (10.00)[a]		107.88 (16.24)b		5.27 (4.03)[a]		5.43 (4.52)a		39 (76.5)	12 (23.5)	
Current Source of Funding											
GRA/GTA	13.85 (9.16)		106.61 (21.31)		6.13 (4.67)		6.13 (5.45)		47 (77.0)	14 (23.0)	
Family funds	12.57 (7.16)	2.38	103.19 (20.63)	1.75	6.59 (5.09)	0.91	7.64 (6.13)	1.715	108 (74.5)	37 (25.5)	3.232
Loans	13.67 (8.80)		107.98 (20.15)		7.42 (6.34)		8.73 (7.61)		40 (83.3)	8 (16.7)	
Other	15.71 (8.18)		100 (18.10)		7.35 (4.81)		7.94 (6.11)		57 (83.8)	70 (21.7)	

* $p < .05$, ** $p < .01$, *** $p < .001$. *Note*[1]. Post hoc Tukey's HSD test.

Acculturative Stress, Resilience, Anxiety, and Depression by Binge Drinking

As illustrated in Table 5-5, independent-samples *t*-tests were conducted to compare the difference in acculturative stress, resilience, anxiety, and depression according to binge drinking. The analyses compared the levels of acculturative stress, resilience, anxiety, and depression between international students with and without experience related to binge drinking. Only resilience levels were significantly different between the two groups (t=-2.66, p<.01). International students with experience related to binge drinking (M=105.54, $s.d.$=18.82) had lower levels of resilience compared to those without experience related to binge drinking over the past two weeks (M=98.31, $s.d.$=24.08).

Table 5-5: Acculturative Stress, Resilience, Anxiety, and Depression by Binge Drinking

	Acculturative Stress		Resilience		Anxiety		Depression	
	M (*SD*)	*t*	*M* (*SD*)	*t*	*M* (*SD*)	*t*	*M* (*SD*)	*t*
Binge Drinking								
No	13.5 (7.99)	-0.56	105.54 (18.82)	**2.66****	6.89 (5.18)	0.68	7.58 (6.30)	-0.01
Yes	14.13 (8.45)		98.31 (24.08)		6.41 (5.11)		7.59 (6.21)	

** $p < .01$

Correlations

Pearson's correlations were conducted for examining the relationships among latent variables and indicators as shown in Table 5-6. There were significant correlations among latent variables. Specifically, acculturative stress had a negative correlation with resilience (r=-0.234, p<.001). Also, acculturative stress was positively associated with anxiety (r=0.468, p<.001) and depression (r=0.507, p<.001). There were negative correlations between resilience and anxiety (r=0.17, p<.01), as well as between resilience and depression (r=-0.253, p<.001). In addition, resilience had a significant negative correlation with binge drinking (r=-0.253, p<.001).

Table 5-6: Correlation Matrix (*N*=322)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1															
2	.729***	1														
3	.685***	.258***	1													
4	.787***	.490***	.333***	1												
5	.554***	.236***	.303***	.423***	1											
6	.666***	.418***	.328***	.414***	.267***	1										
7	-.234***	-.155**	-.229***	-.155**	-0.109*	-.128*	1									
8	-.221***	-.156**	-.272***	-0.101	-.058	-.113*	.821***	1								
9	-.275***	-.211***	-.218***	-.203***	-.091	-.185***	.839***	.717***	1							
10	-.203***	-.132**	-.184***	-.133*	-.122*	-.119*	.726***	.488***	.556***	1						
11	-.078	-.028	-.131*	.002	-.021	-.080	.705***	.507***	.602***	.426***	1					
12	-.088	-.032	-.076	-.108	-.093	.007	.771***	.534***[*]	.536***	.400***	.445***	1				
13	-.217***	-.151**	-.180***	-.171**	-.118*	-.105	.824***	.593***	.558***	.520***	.411***	.707***	1			
14	.468***	.350***	.273***	.344***	.278***	.402***	-.170**	-.235***	-.139*	-.052	.024	-.118*	-.241***	1		
15	.507***	.388***	.323***	.342***	.340***	.395***	-.253***	-.315***	-.235***	-.108	-.055	-.133*	-.305***	.797***	1	
16	.032	-.010	.058	0.072	.001	-.045	-0.147**	-0.163**	-.170*	-0.017	-.095	-0.163**	-.093	-.038	.001	1

* $p < .05$, ** $p < .01$, *** $p < .001$. *Note.* 1=acculturative stress, 2=financial concerns, 3=language difficulties, 4=perceived discrimination,5=cultural adjustment, 6=academic pressure, 7=resilience, 8=positive perception of self, 9=positive perception of future, 10=social competence, 11=structural style, 12=family cohesion, 13=social resources, 14=anxiety, 15=depression, 16=binge drinking

Structural Equation Model Results

Measurement Model

A measurement model was tested to ensure that the observed items used to measure the four latent variables (acculturative stress, resilience, depression, and anxiety) were valid indicators of the constructs. The overall fit of the model was estimated using the following goodness-of-fit indices: 1) chi-square (χ^2) statistic, 2) comparative fit index (CFI; Bentler, 1990), 3) Tucker Lewis Index (TLI; Tucker & Lewis, 1973), 4) root mean square error of approximation (RMSEA; Steiger, 1990), and 5) Akaike Information Criterion (AIC; Akaike, 1987).

The chi-square statistic is sensitive to sample size. For instance, the chi-square values can be inflated with large sample size, so it could incorrectly imply a bad model fit (Schumacker & Lomax, 2004). Thus, to handle the limitations of the chi-square statistic, a number of other goodness-of fit indices were utilized to supplement it. In general, if the normed chi-square statistic (normed chi-square = $\chi 2/df$) is less than 2 or 3, the model is considered a good fit to the data (Bollen, 1989).

As to the other goodness-of fit indices, "The CFI represents the improvement of fit of the model as compared to a baseline model in which all of the variables are constrained to be uncorrelated" (Budlanto, 2005, p.50). The value of CFI ranges from 0 to 1. To be considered a good fitting model, the value of CFI should be greater than 0.90 (Kline, 2005). In addition, the TLI is a measure of incremental fit that attempts to 1) capture the percentage improvement of a hypothesized model over the null model and (2) adjust this improvement for the number of parameters in the hypothesized model" (Kelloway, 2015). The TLI generates values ranging from 0 to 1. The value of TLI is close to 0.95 is considered a good fit between the model and the

data (Byrne, 2010). RMSEA reflects the degree to which a lack of fit is due to misspecification of the model tested versus sampling error (Kline, 2005). A model with a RMSEA value of less than 0.05 is considered a good model (Kline, 2005). Also a RMSEA value equal to or less than 0.08 is considered an adequate fit (McDonald & Ho, 2002). The AIC is best used to compare the fit of different competing models and the lower values indicate better fit (Kelloway, 2015).

Examination of these indices of model fit showed that the sample data fit the hypothesized model well. The initial basic model showed less than acceptable fit [$\chi^2(62)=230.24$, $p < .001$, $x^2/df = 3.7$, CFI = 0.902, TLI= 0.877, SRMR=0.053, RMSEA= 0.09] (see Table 5-7) Modification indices were used to improve model fit by allowing specific items to co-vary. The incorporation of the error covariance made a large improvement in model fit. This post-hoc model showed better model fit (AIC=10156.33 vs. 10081.92, difference=74.41) compared to the basic model. The post-hoc model showed improved model fit for the observed data [$\chi^2(57)=145.832$, $p < .001$, $\chi^2/df = 2.6$, CFI = 0.948, TLI= 0.929, SRMR=0.048, RMSEA= 0.07]. Specifically, the overall chi-square value decreased from 230.24 to 145.83. The normed chi-square statistic of the modified model ($\chi^2 = 145.832/57=2.558$) was within the recommended value of 2 or 3. The GFI and the CFI value were both above 0.90, suggesting a good fit of the model to the data. The RMSEA value also decreased from 0.09 to 0.07, which just met the criteria for an adequate model.

Table 5-7: Measurement Model Fit Results (*N*=322)

	AIC	χ^2	*df*	χ^2/df	CFI	TLI	SRMR	RMSEA
Measurement Models								
Basic model	10156.33	230.24	62	3.7	0.902	0.877	0.053	0.09
Post-hoc model	**10081.92**	**145.83**	**57**	**2.6**	**0.948**	**0.929**	**0.048**	**0.07**

The factor loadings of each latent variable were examined. All the indicators had a factor loading greater than .50, which identified strong construct validity. In general, the traditional cutoff point of factor loadings is 0.7 (Wang & Wang, 2012). Overall, the reliabilities of each latent construct was greater than 0.7 (acculturative stress α=0.824, resilience α=0.796, and mental health α=0.926).

As illustrated in Table 5-8, the values of Average Variance Extracted (AVE) for acculturative stress and resilience (0.488 and 0.398 respectively) were less than 0.5, which means the variance due to measurement error was greater than the variance due to the construct (Ghadi, Alwi, Bakar, & Talib, 2012). AVE assesses convergent validity to test construct validity (Fornell & Larcker, 1981) and it measures the amount of variance that is captured by the construct related to the amount of variance due to measurement error (Ghadi et al., 2012). In other words, AVE states how much variance captured by the latent variable is shared among other variables. Generally, the value of AVE for each construct should be at least 0.5 (Ghadi et al., 2012). AVE was calculated using the formula as below.

$$\text{AVE} = \frac{\text{Sum (beta}^2\text{)}}{\text{Sum (beta}^2\text{)} + \text{Sum (Error)}}$$

Table 5-8: CFA Results

Latent variable	Observed variable	Estimate	S.E.	Reliability	AVE
Acculturative Stress	Financial concerns	0.642***	0.042	0.824	0.488
	Language difficulties	0.508***	0.05		
	Perceived discrimination	0.721***	0.038		
	Cultural adjustments	0.536***	0.048		
	Academic pressure	0.624***	0.044		
Resilience	Positive perception of self	0.796***	0.032	0.796	0.398
	Positive perception of the future	0.886***	0.046		
	Social competence	0.642***	0.04		
	Structured style	0.615***	0.042		
	Family cohesion	0.666***	0.041		

Mental Health	Social resources	0.752***	0.035	0.926	0.863
	Anxiety	0.839***	0.033		
	Depression	0.911***	0.033		

As commented above, the AVE values calculated according to the formula presented must be compared with correlation coefficients of each construct with the other constructs. So, it is necessary to obtain a matrix where we can see the correlation of each variable with the other variables. Afterwards on the diagonal the AVE value was inserted in order to compare it with the other correlation coefficient. Table 6-2 shows results of the AVE analysis. Diagonal elements are the square root of the variance shared between the constructs and their measures (Zait & Bertea, 2011). As described in Table 5-8, off-diagonal elements are the correlations among constructs. For discriminant validity, diagonal elements should be larger than off-diagonal (Zait & Bertea, 2011). In this study, the diagonal elements were greater than off-diagonal, which means strong discriminant validity.

Table 5-9: Discriminant Validity

	Acculturative Stress	Resilience	Mental Health
Acculturative Stress	0.488		
Resilience	0.104	0.398	
Mental Health	0.394	0.088	0.863

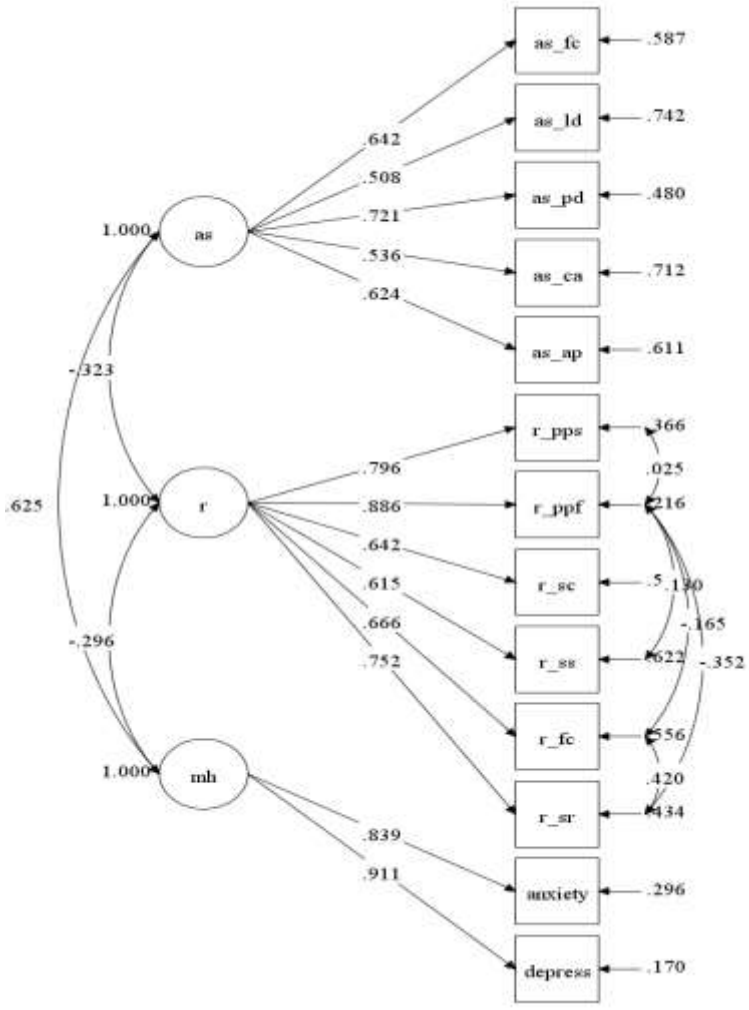

Figure 5-2: CFA Model
Note. as=acculturative stress, r=resilience, mh=mental health, as_fc=financial concerns, as_ld=language difficulties, as_pd=perceived discrimination, as_ca=cultural adjustment, as_ap=academic pressure, r_pps=positive perception of self, r_ppf=positive perception of the future, r_sc=social competence, r_ss=structural style, r_fc=family cohesion, r_sr=social resources

Structural Model

The structural model was also evaluated for its goodness-of fit. Compared to the basic structural model, the modified structural model had improved model fit by allowing specific items to co-vary [$\chi^2(67)=160.53$, $p < .001$, $\chi^2/df=2.4$, CFI = 0.95, TLI= 0.927, SRMR=0.047,

RMSEA= 0.066] as described in Table 5-10. The normed chi-square was well below the recommended value of 2 or 3. The CFI, the TLI, and the RMSEA values indicated a good fit model to the data. The AIC for the modified model with covariates (10427.51), dropped by 74.17 points compared to the basic model without covariates (10501.68). The model fit indices across models are presented in Table 5-10. The structural model, along with the standardized regression weights and loadings, is shown in Figure 5-3.

Table 5-10: Structural Model Fit Results (*N*=322)

	AIC	χ^2	*df*	χ^2/df	CFI	TLI	SRMR	RMSEA
Structural Models								
Basic model	10501.68	244.7	72	3.4	0.9	0.874	0.052	0.86
Post-hoc model	**10427.51**	**160.53**	**67**	**2.4**	**0.95**	**0.927**	**0.047**	**0.066**

Results of the Path Proposed in the Hypothesized Structural Model

In this section, the current study's hypotheses are reviewed by examining the causal relationships indicated in the structural model. Figure 5-3 depicts the model with estimates for the regression weights and loadings, using Mplus 7.0.

Direct and Indirect Parameter Estimates for the Hypothesized Structural Model

The hypothesized structural model explains the direct effects on binge drinking. Standardized regression weights were reported in Table 5-11. A total of 6 direct paths were estimated and the results showed that only 3 paths to be statistically significant: 1) acculturative stress to resilience (b= - 0.321, p < .001), 2) acculturative stress to mental health (b= 0.594, p < .001), and 3) resilience to binge drinking (b= - 0.183, p < .003).

The indirect effect of acculturative stress on binge drinking through resilience was significant (b= 0.024, p<.01). Resilience mediated the relationship between acculturative stress and binge drinking among international students. However, the results did not support the main hypothesis of the mediating indirect effects of resilience and mental health on the relationship between acculturative stress and binge drinking.

Table 5-11: Path Analysis Results

Path	Standard Estimate	S.E	t	p
Direct effect				
AS → R	-0.321	0.061	-5.227	**0.000**
AS → MH	0.594	0.056	10.54	**0.000**
R → MH	-0.102	0.061	-1.687	0.092
AS → Binge	0.064	0.092	0.692	0.489
R → Binge	-0.183	0.061	-2.992	**0.003**
MH → Binge	-0.077	0.086	-0.901	0.367
Indirect effect				
AS→R→Binge	0.024	0.01	2.553	**0.01**
AS→MH→Binge	-0.024	0.021	-1.139	0.255
AS→R→MH	0.033	0.019	1.692	0.091
AS→R→MH→Binge	-0.003	0.003	-0.963	0.337

* p < .05, ** p < .01, *** p < .001. *Note.* AS=acculturative stress, R=resilience, MH=mental health, Binge=binge drinking

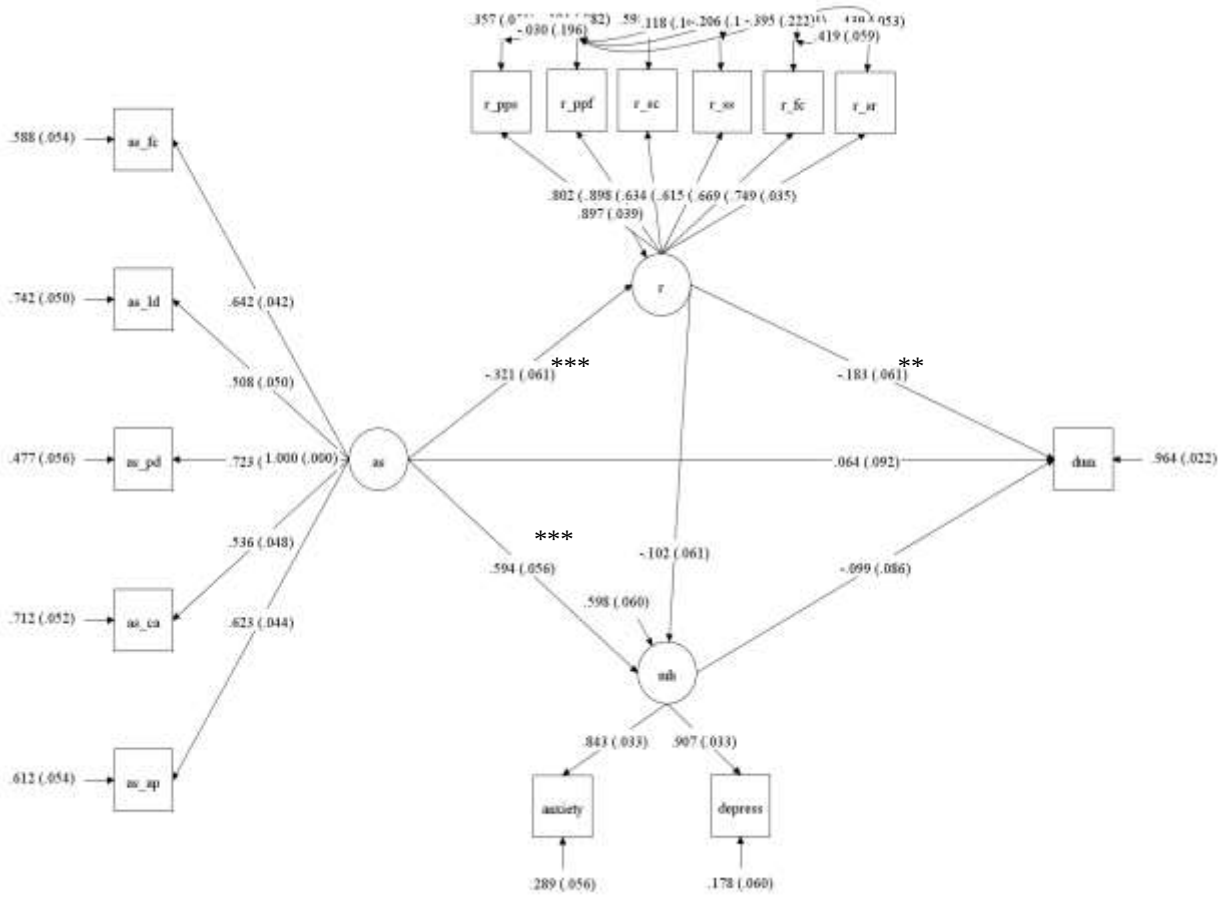

Figure 5-3. Path Analysis. *Note.* as=acculturative stress, r=resilience, mh=mental health, as_fc=financial concerns, as_ld=language difficulties, as_pd=perceived discrimination, as_ca=cultural adjustment, as_ap=academic pressure, r_pps=positive perception of self, r_ppf=positive perception of the future, r_sc=social competence, r_ss=structural style, r_fc=family cohesion, r_sr=social resources

Summary Evaluation of the Hypotheses

Moving forward, the hypotheses were evaluated based on the results of the study. The hypotheses and the respective results are summarized below (see Table 5-12).

First, hypothesis 1 (higher levels of acculturative stress will be associated with lower levels of resilience) was supported by the results. The relationship between acculturative stress and resilience was negatively associated. The second hypothesis (higher levels of acculturative stress will be associated with higher levels of depression and anxiety) was supported by the results.

Acculturative stress was significantly and positively associated with mental health (depression and anxiety). Third, hypothesis 3 (higher levels of resilience will be associated with lower levels of binge drinking) was supported. The relationship between resilience and binge drinking was significantly and negatively associated. Fourth, hypothesis 4 (higher levels of acculturative stress will be associated with higher levels of binge drinking) was not supported. There was no significant relationship between acculturative stress and binge drinking. Fifth, hypothesis 5 (higher levels of depression and anxiety will be associated with higher levels of binge drinking) was also not supported by the results. Sixth, hypothesis 6 (resilience will mediate the relationship between acculturative stress and binge drinking) was supported.

The indirect effect of acculturative stress on binge drinking was significant through resilience. However, hypotheses 7-9 were not supported by the results. The indirect effect of acculturative stress on binge drinking was not mediated by depression and anxiety. The indirect effect of acculturative stress on depression and anxiety was not significant as well. The main hypothesis for this study (resilience and mental health will mediate the indirect effect of acculturative stress on binge drinking) was not supported. The indirect effects in the relationship between acculturative stress and binge drinking were not significantly mediated by resilience and mental health.

Table 5-12: Summary Evaluation of the Hypotheses

	Hypothesis	Results	
1	Acculturative stress → resilience	Higher levels of acculturative stress was significantly associated with lower levels of resilience	Supported
2	Acculturative stress → mental health	Higher levels of acculturative stress was significantly associated with higher levels of depression and anxiety	Supported
3	Resilience → mental health	No significant relationship	Not supported
4	Acculturative stress → binge drinking	No significant relationship	Not supported
5	Resilience → binge drinking	Higher levels of resilience was significantly associated with lower levels of binge drinking	Supported
6	Mental health → binge drinking	No significant relationship	Not supported
7	Acculturative stress→resilience→binge drinking	Resilience mediated the relationship between acculturative stress and binge drinking	Supported
8	Acculturative stress→mental health→binge drinking	Mental health (depression and anxiety) did not mediated the relationship between acculturative stress and binge drinking	Not supported
9	Acculturatuve stress →resilience→mental health	Resilience mediated the relationship between acculturative stress and mental health (depression and anxiety)	Partially supported
10	Acculturative stress→resilience→ metnal health→binge drinking	Resilience and mental health (depression and anxiety) mediated the relationship between acculturative stress and binge drinking.	Partially supported

Chapter 6

Discussion

The results presented in Chapter 5 serve as the foundation for further discussion in several areas: 1) the major findings related to resilience, 2) underlying theoretical framework and empirical findings, 3) strengths and limitations of the study, and 4) the implications of the study. The primary focus of this study was to test a conceptual model of binge drinking in the context of resilience as a protective factor among international students living in the US. Specifically, the study explored whether or not resilience functions as a collective protective factor leading to positive behavioral health outcomes in the process of acculturation among international students. The international student population is growing exponentially in the US and the literature reveals that international students experience high levels of acculturative stress (Duru & Poyrazli, 2007; Eustace, 2007; Sullivan, 2010), which often leads to increased rates of negative mental health (Constantine et al., 2004; Wei et al., 2007) and health risk behaviors (Kanaparthi, 2009; Sa, 2010). International students face numerous risk factors such as financial constraints, language barriers, academic pressures, cultural adjustments, and perceived discrimination (Duru & Poyrazli, 2007; Eustace, 2007; Sullivan, 2010). Based on resilience and vulnerability theories, these multiple risk factors generate vulnerability to mental health problems, which in turn creates other risk factors manifested through negative health behaviors, such as binge drinking. Maximizing protective factors and minimizing risk factors by reinforcing internal assets and providing external resources could help international students withstand cultural and academic stress as well as achieve successful adaptation. The study examined whether the impact of the accumulated demands caused by acculturative stress affected behavioral health problems (depression, anxiety, and binge drinking) and was mediated by resilience.

The hypothesized conceptual model of resilience as a protective factor against binge drinking was tested using SEM to determine the direct and indirect effects of acculturative stress on binge drinking through resilience and mental health. The conceptual model included four latent variables related to international students: 1) acculturative stress, defined as the results of collective risk factors including financial concerns, language difficulties, perceived discrimination, cultural adjustment, and academic pressure; 2) resilience as a collective protective factor including positive perception of self, positive perception of the future, social competence, structured style, family cohesion, and social resources; 3) depression and anxiety as vulnerability factors to mental health, and 4) binge drinking as a health risk behavior.

Discussion of Major Findings

The Role of Resilience

The results from the SEM analyses indicate that the hypothesized conceptual model of resilience as a protective factor against binge drinking provides an additional lens to understand health risk behaviors among international student populations. The central hypotheses were partially supported through tests of statistical significance: 1) the direct effects of acculturative stress on resilience and mental health; 2) the direct effect of resilience on binge drinking, and 3) the indirect effect of acculturative stress on binge drinking through resilience. In particular, the significant mediating effect of resilience on the relationship between acculturative stress and binge drinking can be an invaluable finding since resilience can function as an intervention tool to reduce and prevent health risk behaviors, specifically binge drinking. The resilience intervention can be cost-efficient as well, since treatment for behavioral health problems (i.e., depression, anxiety, and binge drinking) just requires more resources (Luther & Cicchetti, 2000). For this study, mental health (depression and anxiety) did not mediate the effect of acculturative

stress on binge drinking among international students. However, resilience as a collective protective factor mediated the effect of acculturative stress on binge drinking. The study findings provide a comprehensive understanding of the path to binge drinking that integrates vulnerability and resilience approaches.

The hypothesized structural model explained the direct effects between the variables. A total of six direct paths were estimated and although the results showed only three paths to be statistically significant, these results are consistent with findings from previous studies (Constantine, et al., 2004; Lau, 2006; Wei et al., 2007; Yoo et al., 2014). First, acculturative stress was negatively associated with resilience. This was consistent with Yoo and colleagues (2014) who sampled 276 Chinese international students and tested the mediating effect of resilience on the relationship between acculturative stress and binge drinking. The previous results showed that higher levels of acculturative stress were associated with lower levels of resilience in the causal mediation model. Also, the direct relationship between acculturative stress and mental health including depression and anxiety was significant. International students with higher levels of acculturative stress had higher levels of depression and anxiety. A number of previous studies have consistent empirical findings supporting this significant direct effect of acculturative stress on mental health (Constantine, et al., 2004; Lau, 2006; Wei et al., 2007; Yoo et al., 2014). It seems natural that acculturative stress that is defined as a results of multiple risk factors creates vulnerability to mental health.

Lastly, resilience was negatively associated with binge drinking leading to positive behavioral health outcomes. International students who were well adapted and resilient were less likely to engage in binge drinking behavior than those who were not. This finding is also consistent with other empirical research findings. Kim and Kim (2014) conducted a study that

investigated the effect of resilience on drinking problems and social maladaptation among Chinese students and found that resilience had a negative correlation with drinking and was a significant predictor of drinking problems. The consistent findings from the current and previous studies show that resilience plays a significant role to address alcohol use among international students.

The hypothesized structural model also explains the indirect effects of acculturative stress on binge drinking. A total of four indirect paths were estimated, but only one indirect effect was significant. This is a new finding since few studies have tested the mediating effect of resilience on the relationship between acculturative stress and binge drinking. Higher levels of acculturative stress were associated with lower levels of resilience, and in turn lower levels of resilience led to higher levels of binge drinking experience. As illustrated in Figure 6-1, resilience as a collective protective factor explained the path to binge drinking among international students. However, mental health, including depression and anxiety, didn't play a key role as a mediator to explain the relationship between acculturative stress and binge drinking. The findings regarding mental health and binge drinking were discrepant from the previous empirical research results since alcohol use has been known as a coping mechanism to handle negative mental health. Numerous studies reported that higher levels of depression and anxiety were significantly associated with higher levels of alcohol use and relative problems. For this study, negative mental health was not an important predictor of binge drinking. The majority of studies conducted on international students regarding mental health variables used a problem-oriented approach. In this conceptual model, when resilience is considered with mental health, resilience shows stronger influences on binge drinking compared to mental health. Thus, the final model considered only resilience as a protective factor against binge drinking as illustrated

in Figure 6-1. The impact of acculturative stress on binge drinking experience among international students was explained by the students' levels of resilience.

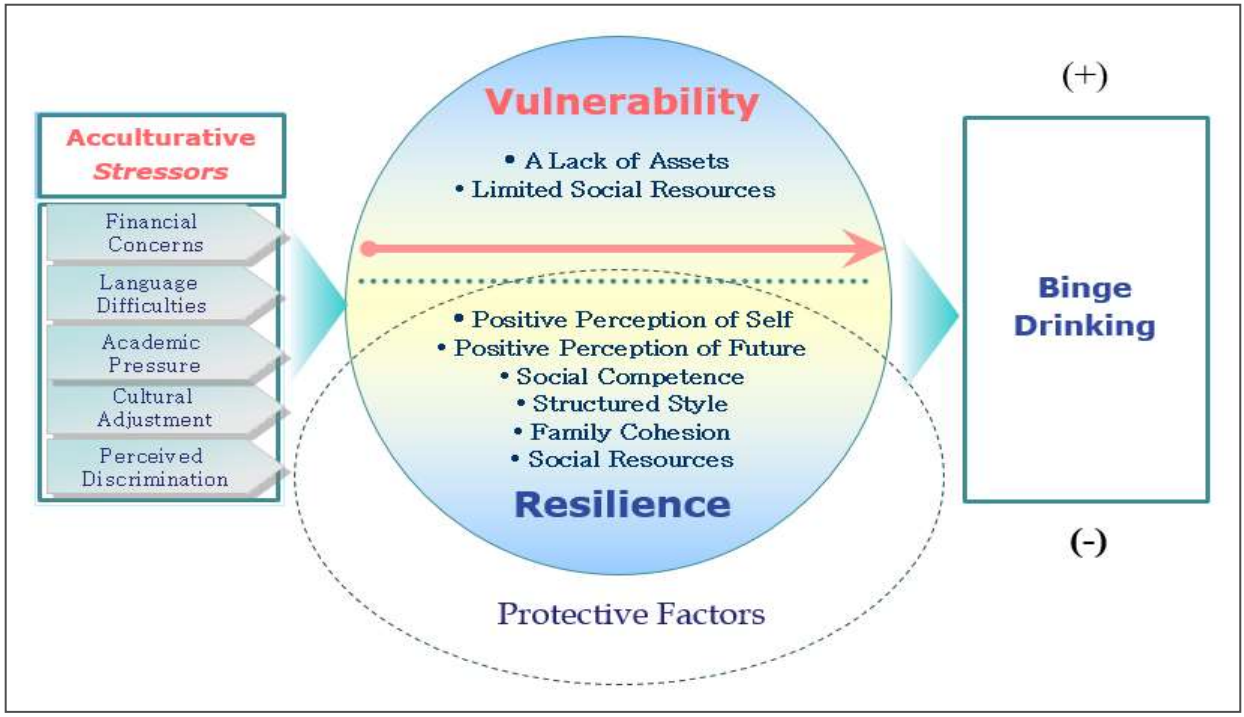

Figure 6-1: Final Conceptual Model of Resilience as a Collective Protective Factor against Binge Drinking

These findings suggest that a resilience approach can be an innovative strategy for examining changes in health risk behaviors among international students. Understanding the role of resilience on behavioral health problems leads to important prevention strategies to intervene on health risk behaviors such as binge drinking. Prevention strategies with a resilience focus are not only directed toward the reduction of negative outcomes, but the promotion of positive dimensions that capitalize specific resources within specific populations. Building these strengths of individuals in a community can not only promote self-efficacy and competence in individuals, but these protective factors also foster their investment in ensuring positive changes in their environment. Therefore, intervention and prevention strategies with a resilience focus in the case of risky drinking behavior can not only reduce risky drinking behavior among youth, but

have ripple effects in healthy behavior change within college campuses, where peer influence can be a major factor to initiate risky behavior. The creativity in harnessing existing resources among individuals and communities also make intervention efforts with a resilience focus self-sustaining.

In terms of international students, many universities are concerned about international students who suffer from acculturative stress, negative mental health, and binge drinking so they provide counseling to deal with their behavioral health problems (Sümer et al.). However, as long as universities are able to create supportive network and resources to build up resilience, binge drinking and even other health risk behaviors can be manageable. Working closely with international students rather than immediately responding with an expensive, short-term treatment solution cannot be underestimated to prevent and reduce health risk behaviors among international students. It is also important to highlight the need for prevention and intervention strategies that might build resilience and mitigate the negative effects of acculturative stress among international students.

In fact, the role of resilience from this study in determining positive health outcomes can go beyond the international student populations. The resilience framework presented in this study addressed individual and sociocultural risk factors and protective resources that can influence health outcomes among international students. The framework also incorporated an acculturation perspective to address precursors and health-risk behaviors that may be responsive to early health-promoting interventions among international students as they adapt to the foreign academic environment. Results from the study discuss the role of resilience that can be applicable to other immigrant and refugee youth population. Interventions that enhance protective factors are much needed to counter balance vulnerabilities that lead to health risk

behaviors such as binge drinking and thus, promote positive health outcomes among other migrant youth populations. This conceptual model of resilience as a protective factor against binge drinking was a robust integrated theory-informed model. Replication of this conceptual model of binge drinking using resilience and vulnerability approaches among other vulnerable populations beyond international students might show promising results in intervention programming. Given the focus on developmental factors such as social, emotional, and cognitive capacities, prevention and intervention strategies with a resilience focus not only negate risky behaviors as binge drinking, but increase protective factors such as self-efficacy, competence, social support, and harness the resources available in individuals and communities, making these positive changes self-sustaining.

Demographic Variables and Acculturative Stress

Previous and current research had provided consistent results regarding the effect of age on acculturative stress (Eustace, 2007; Lau, 2006; Sullivan, 2010). In particular, previous research indicated that older international students had higher levels of acculturative stress (Lau, 2006). In terms of age, the findings of the current results are consistent with the previous studies. Older international students, specifically between the ages of 36 and 40, have higher levels of acculturative stress than younger students. Older international students experience more stress during the process of acculturation. Adaptation to a new academic and cultural environment for older students from other cultural background may be more challenging than for younger students.

The findings also show that international students in Social Sciences, i.e. studying Politics, Social Work, Sociology, and Linguistics, had much higher levels of acculturative stress than those studying other subjects including Engineering, Computer Science, and other. There

are relatively few studies focused on examining the association between academic majors and acculturative stress among students. This could also be because Social Science requires more social and cultural understanding and communications rather than STEM programs (Science, Technology, Engineering, and Math). This leads to an interesting new research question on whether acculturative stress levels differ based on majors, further opening other areas of inquiry.

Previous research showed that acculturative stress did not differ according to 1) gender (Eustace, 2007; Lan, 2006; Sullivan, 2010), 2) marital status (Lan, 2006), and 3) length of stay (Eustace, 2007; Lan, 2006; Sullivan, 2010) among international students, and this study is consistent with the previous findings.

As described in Chapter 3, previous studies focused mainly on Asian international students, especially Chinese international students, in different geographical areas in the US. This may be the source of the discrepancy in this study's findings associated with acculturative stress among international students based on their demographic characteristics. Acculturative stress may have been underestimated in the past since the current study found that international students had different levels of acculturative stress depending on their country of origin and educational levels. The sample in this study included a diverse array of international students from other countries: Afghanistan, Bangladesh, Brazil, Egypt, France, Jordan, Kazakhstan, Kenya, Laos, Mexico, Nepal, Nigeria, Palestine, Russia, Saudi Arabia, Singapore, Thailand, Vietnam, Uganda, and UK. The acculturative process of international students from diverse backgrounds and countries cannot be undervalued.

Demographic Variables & Resilience

Research on resilience among international students has been sparse. Compared to acculturative stress, few results have reported the effects of demographic characteristics on

resilience. This study showed some significant differences in resilience levels according to demographic variables. The results showed that there were significant differences in resilience levels based on religious affiliation, country of origin, and educational level. International students who had religious affiliation scored higher on resilience. There are numerous studies from different countries showing that religious affiliation has a substantial effect on people's (not only international students') ability to cope with difficulties and do well despite chronic adversities with multiple risk factors (Javanmard, 2013; Lester, Mastern, & McEwen, 2006; Masten, 2010, Pargament, 2010; Wright & Masten, 2005). Therefore, the significant results between resilience and religious affiliation may be natural. Resilience levels for international students from India were much higher than those from other countries. Furthermore, graduate students scored higher on resilience than undergraduate students. It should be noted that the sample of this study could have had more resilient international students since the majority of the participants were Indian and graduate international students based on the results of this study.

However, two previous studies (Cheung & Yue, 2012; Yoo et al., 2014) conducted in Korea among international students showed no difference in resilience levels based on demographic characteristics. The results indicated that demographic variables including age (Cheung & Yue, 2012), gender (Cheung & Yue, 2012; Yoo et al., 2014), educational level (Cheung & Yue, 2012; Yoo et al., 2014), major (Yoo et al., 2014), and length of stay (Cheung & Yue, 2012) were not significantly associated with resilience among international students. The results related to resilience levels based on demographic variables however, might be different since previous research used international student groups in other countries.

Demographic Variables, Depression and Anxiety

Demographic characteristics may be the source of mental health differences reported in the previous research (Sűmer, Poyrazli, & Grahame, 2008). It is important to see if any demographic characteristics are related to the experiences of anxiety and depression. The results of the current study were consistent with the previous research regarding the relationship between gender and depression. Also, female international students had higher levels of anxiety than male international students. However, the results indicated that there were differences in depression and anxiety levels based on demographic characteristics among international students. Interestingly, international students who had any religious affiliation had higher, although not clinically high, anxiety levels than those who didn't have. At the same time, students who had lower GPA (below 3.0 had higher, although not clinical, levels of anxiety compared to those with higher GPA (3.0 or above4.0). Undergraduate students were more depressed than master's students and doctoral students. As with anxiety, female international students were more depressed than male international students although again not clinically depressed. International students attending at UT Arlington and 'other' schools had much higher levels of anxiety than those at UT Dallas and UT Austin. Furthermore, doctoral students had much less anxiety than bachelor's and master's students. Bachelor's students showed higher levels of anxiety than graduate level students.

Literature about mental health among international students reported depression and anxiety levels were different based on gender, marital status, age, length of stay in the US (Lau, 2006). To be specific, single, female international students, the age of 30 or over, and those who stayed less than 36 months reported higher levels of depression and anxiety. On the other hand, other previous studies reported that depression among international students was not different according to gender (Han et al., 2013; Wei et al., 2007), age (Han et al., 2013; Wei et al., 2007),

length of stay (Wei et al., 2007), educational level (Wei et al., 2007), religious affiliation (Han et al., 2013), and source of funding (Han et al., 2013).

Demographic Variables and Binge Drinking

The results of the current study regarding binge drinking show that international students without any religious affiliation reported that they were more likely to experience binge drinking, compared to those with religious affiliation. Moreover, international students who did not have prior experience studying at another institution in the US were less likely to have experience regarding binge drinking, compared to those who had. These findings are consistent with many previous studies showing an emerging pattern for immigrants known as "immigrant paradox." This means assimilated children or immigrants experience diminishing developmental health outcomes. The findings of this study are consistent with the results from previous studies (Kim & Kim, 2014; Seo, 2006). Acculturation may promote health risk behaviors. For example, drinking is more normalized among US students, so those international students who have stayed longer with more US friends, may be more likely to engage in risky drinking behavior like binge drinking. This study found that 28% of the participants had binge drinking experience at least once. In other words, more than one out of four participants were involved in an incidence of binge drinking. Since binge drinking can lead to other health risk behaviors such as risky sexual behaviors, other substance abuse, increased violence, and poor academic achievement (Jones, Oeltmann, Wilson, Brener, & Hill, 2001; El Ansari, Stock, & Mills, 2013), the prevalence of binge drinking cannot be undervalued.

Strengths and Limitations of the Study

Strengths

This study has several strengths that set it apart from other research. First, this study includes the SEM procedure used for the analyses. SEM is one of the most efficient and least problematic methods to test a mediation model (Hoyle & Smith, 1994). Since resilience was conceptualized as a mediator, this explains why acculturative stress as a collective risk factor leads to binge drinking among international students. SEM also enables estimation and correlation for both random and non-random measurement errors that are inevitable in real-world data. Also, SEM procedures fit the purpose of the current study to test direct and indirect effects of predictor variables (acculturative stress, resilience, and mental health) on an outcome variable (binge drinking).

Second, the conceptual model of resilience as a protective factor against binge drinking was a robust integrated theory-informed model. Replication of this conceptual model using resilience and vulnerability approaches among other vulnerable populations beyond international students might show promising results in intervention programming. The current study is the first attempt to integrate multiple theories, including acculturative stress, resilience, and vulnerability theory, into a conceptual model and apply it to international students. The study tested the direct and indirect effects of acculturative stress on binge drinking by adding resilience to the vulnerability model. For this study, mental health such as depression and anxiety were operationalized as vulnerability factors to health behaviors. Also to support this theory-informed model, tested empirical models (mediation model and prediction model of alcohol use) were applied.

Third, the Index of Life Stress for acculturative stress (ILS; Yang & Clum, 1995) and the Patient Health Questionnaire (PHQ-9; Spitzer et al., 1994) had been validated with international students before they were used for this study. The other two scales, the Resilience Scale for Adults (RSA; Friborg, Hjemdal, Rosenvinge, & Martinussen, 2003) and GAD-7 for anxiety that had not been validated were tested using a focus group meeting for the literacy of the questions and any concerns about response or measurement biases. The focus group meeting minimized response errors, which was helpful to increase reliability and validity. Although not a strict validation, using a focus group adds to the literature and if replicated by other studies could lead to stronger confirmation for RSA and GAD-7 validity. Overall, the four scales showed strong reliability and robust construct validity.

Fourth, the breadth of the sample is a strength of this study. Prior research show that studies that focused on a variety of international students from different countries, in multiple institutions, and studying a variety of disciplines are fragmented providing limited understanding of similarities and differences with this population. So, while this issue has specific generalizability concerns related to geography, the breadth of the sample is indeed a strength of the study as it includes students from multiple institutions, diverse countries, and students from various disciplines.

Lastly, the use of new technologies in the sampling strategy using social networking sites (SNS), such as Facebook and Twitter, is a strength of the study. Based on the systematic review of the previous studies with international student populations, this type of data collection method used in this study and the approaches for data collection using SNS is very innovative as far as the rapidly growing use of SNS. Say more about how this strengthened the study in terms of the breadth of the sample and diversity of the sample.

Limitations

While this study is an initial step towards understanding the larger role of resilience via a theory-informed model with variables associated with behavioral health problems in the acculturation context, it has several limitations.

First, the study uses non-probability sampling through a multi-method approach including online and paper-based survey methods. In general, this nonprobability survey (i.e., convenience sampling) can have possible limitations in terms of generalizability, homogeneity, and representativeness of the sample that will be collected (Rubin & Babbie, 2013). Specifically, using a convenience sampling method to conduct online and paper-based surveys provided biased data compared to the national data collected from the Institute of International Education (IIE see page 112). Although the research followed certain criteria for data collection, choosing SNSs hosting international students in the US for the online survey and recruiting international students in person for the paper-based survey were basically under the researcher's direction. This could have created some selection bias.

As described in the methodology section (see pages 57-58), this non-randomized sample could provide some assertions of generalizability issue when compared to national demographics in terms of educational level, country of origin, and major. The sample had a larger number of graduate students (71.4%) compared to the national data (47.6%). Also, the sample had more than double the number of Indian students as compared to national demographics (37.6% in this study versus 14% national demographics). In terms of major, this study sampled more international students studying Engineering (32.6%) in this study versus 20% national demographics) and Business & Management (33.3% versus 20%). So, while the issue has

specific generalizability, the breadth of the sample is also a strength of the study as it includes students from multiple institutions, diverse countries, and students from various disciplines.

Also, the different data collection methods using online and paper-based surveys showed some differences results regarding the two groups. As shown in the methodology section (see pages 59-63), the samples from the online survey and paper-based surveys indicated different demographic characteristics and significantly different acculturative stress levels. Therefore, using non-probability sampling through a multi-method approach appeared to generate certain levels of generalizability issue in the data. However, it is still meaningful to generalize the results of the study to international student populations. The international student population which this sample represents and the type of international students to which this study can generalize the findings, is primarily graduate students studying engineering or business and at schools in the southwestern US.

Second, this study might have some inconsistencies with participants not meeting the eligibility requirements to complete the survey. Since anyone could access an SNS, it was difficult to control the eligibility of respondents. The majority of moderators for Facebook pages rejected to post the online survey for international student using their SNS websites, which posed challenges for data collection. To combat this limitation (getting permission from Facebook moderators), the researcher had to recruit more students in person using a paper-based survey. The above reasons lead to a less representative and homogeneous sample. Moreover, the findings have to be interpreted cautiously since the study predominantly depended on data from universities in Texas.

Third, the current study examined the causal relationships in a comprehensive conceptual model, but unfortunately the nature of cross-sectional design prohibited an essential causal

inference (the cause should precede the effect in time) about the relationships among acculturative stress, resilience, mental health, and binge drinking. Since the data were not measured sequentially, findings cannot be interpreted causally; rather associations should be viewed as correlated. Indeed, further research using longitudinal measures would be helpful in determining the extent to which acculturative stress drives resilience and health behaviors among international students. However, given the evolving nature of this inquiry, a cross-sectional model is an essential first step in the right direction to begin to address significant inferences between the four latent variables. This also can add to the knowledge base and provide firm evidence to test for subsequent longitudinal models.

In addition, this current study only used one item to measure binge drinking among international students (think back over the last two weeks, how many times have you had five or more drinks in a row?), but future research is needed to use a robust scale that has been validated with international students. The validated binge drinking scale may provide more significant and accurate results.

Lastly, low response rates are a major limitation of the online survey for this study. The low response rates led to loss of power, selection bias, and time delays. Small monetary incentive and a long questionnaire may not have been effectual in encouraging international students to participate in the online survey. However, using a multi-method approach for data collection was helpful to make up for the lower response rates from the online survey.

Implications of the Study

This study explored the role of resilience as a collective protective factor and expanded its practice implications to other vulnerable youth population. The resilience approach can be an innovative strategy for behavior change in health risk behaviors among international students.

The study tested the hypothesized conceptual model that integrates a resilience approach to minimize vulnerability to mental health and behavioral health problems and maximize resilience by increasing internal assets and external resources. The findings from this study have larger implications for the overall academic environment by providing insight into international student needs. The awareness of resilience may help schools and health care providers adopt more effective strategies to overcome behavioral health problems (i.e., depression, anxiety, and alcohol use) caused by acculturative stress among international students. More importantly, the results of this study may also be useful in informing US colleges and universities as they make decisions about services or programs for international students and may thus benefit other international students. Furthermore, the hypothesized conceptual model of binge drinking can assist in the creation of replicable models of resilience that can be applied to other vulnerable populations adding to the translational science literature. Given the results of the study, the following implications are discussed.

Implication for Theory

To the best of the researcher's knowledge, this study is one of the first attempts to apply a theoretical framework integrating three different theories (i.e., acculturative stress, resilience, and vulnerability theory) to explore the mediating roles of resilience and mental health in the relationship between acculturative stress and binge drinking among international students living in the US. The three theories provide a strong foundation for identifying health behavior determinants. For this study, resilience is defined as the dynamic process of overcoming risks and avoiding negative outcomes through internal assets and external resources in the face of stressful situations. Applying the resilience framework provides attention to empirically derived knowledge regarding vulnerability and protective mechanisms that are salient within stressful

conditions (Luthar & Cicchetti, 2000). Vulnerability refers to the state of susceptibility to health as well as the exposure to multiple individual, environmental, and social risk factors that result from the absence of protective factors to adapt. The risk factors included in this study reflect stressors that arise during acculturation that attribute to negative health outcomes. According to the proposed theoretical framework, having multiple risk factors generates vulnerability to mental health, which in turn creates other risk factors manifested through negative health behaviors.

Based on the findings of the current study, this theory-informed conceptual model of resilience suggests vital implications to understand the path to binge drinking among international students. Resilience functions as a collective protective factor leading to positive behavioral health outcomes during the process of acculturation. This conceptual model of resilience as a protective factor against binge drinking, also designed as an intervention model, assists in the creation of replicable models examining binge drinking that can be applied to other vulnerable populations. Moreover, since mental health operationalized as vulnerability did not have a significant association with binge drinking, the model of resilience can be modified to make it more applicable not only to international students but also to other vulnerable populations. Both acculturative stress and mental health do not function as sources of negative contingencies associated with binge drinking. Only resilience works as a source of positive contingency associated with binge drinking. Specifically, in the conceptual model resilience was a mediator in the relationship between acculturative stress and binge drinking. Therefore, the negative effects of acculturative stress vary according to the level of resilience that each individual has available in order to adapt to stressful situations. This theory-informed intervention model that integrated resilience approaches assists in the creation of replicable

models of resilience as a protective factor against binge drinking that can be applied to other vulnerable populations to reduce and prevent binge drinking. Also, the conceptual model of resilience can consider other health risk behaviors as an outcome variable such as tobacco use, other substance abuse, and risky sexual behaviors

Implication for Social Work Practice

Social work has historically been a profession of empowerment and resilience. The emergence of resilience research further provides additional avenues for social work to increase its professional presence. Social workers, in general, provide expertise in child and adolescent well-being. They are very well positioned to provide consultation and training to university personnel, nurses, and other neighborhood organizations to emphasize the importance of strengthening protective factors. Further, social workers can work in interdisciplinary teams of public health, community, and school nurses to develop interventions to promote health that are directed not only at international students, but other vulnerable immigrant and refugee populations. Further, the role of resilience also needs to be strengthened in social work education as new practitioners and researchers are developed. Social workers can work with international student offices providing services to address international students' binge drinking. Therefore, it is helpful to understand problems that international students face and advocate for them.

Social work departments can work with university counselors to help international students from the initial processes of admission to the final stage of graduation, positively contributing to avoiding behavioral problems, such as moderate depression and anxiety, as well as occasional binge drinking, and adjusting to a university experience. One of the key constructs of resilience for this study is social support, and resilience can be improved by providing more opportunities for outreach, more resources, and support. The results from the current study

associated with resilience provide some direction on how college personnel and health care providers can take a proactive stance towards providing both preventive and intervention services related to binge drinking among international students. It suggests that the resilience factors measured by the modified Resilience Scale for Adults (Friborg et al., 2003) can be used as a framework to provide direction for both determining which factors can be developed or strengthened in international students at risk and for creating campus programming designed to build resilience factors (positive perception of self, positive perception of the future, social competence, structural style, family cohesion, and social resources) in the international student population as a whole. Not only can programs help students build resilience, the negative relationships found between acculturative stress and resilience as well as binge drinking and resilience suggest that binge drinking could be prevented by assessing resilience levels of students to determine which ones have a higher probability to binge drink in excess and intervening.

A deeper understanding of the role of resilience in the relationship between acculturative stress, mental health, and alcohol use as a whole will help in the application of culturally appropriate strategies to develop assets and resources conducive to international students exposed to multiple stressors, instead of only focusing on stress amelioration in isolation. According to the current results, resilience may be able to reduce and prevent binge drinking among international students by reinforcing internal assets (positive perception of self, positive perception of the future, social competence, structural style) and providing external resources (family cohesion and social resources).

The resilience level for international students with any religious affiliation was significantly higher than those without any religious affiliation. This may be evidence that

intervention efforts to build resilience factors could be related to spirituality. College personnel and health care providers need to consider programs or services related to spirituality to help international students avoid any health risk behaviors. The study results showed that there were significant differences in resilience levels based on religious affiliation and international students who had religious affiliation scored higher on resilience. Also, international students with any religious affiliation were less likely to have binge drinking experience.

Education and opportunities for spiritual development with faith-based student organizations could be a good intervention strategy to address binge drinking among international students. Incorporating a variety of these spiritual-based student organizations into residence hall programming, new international student orientation, or other wellness programming throughout the academic year can be helpful for international students to build better relationships across campus as well as to provide opportunities for spiritual development to those who may not be exposed to such dynamic spiritual events and groups. The opportunities can be normative programming that informs students of the spiritual interests of international students. Other possibilities include more formal wellness programs teaching students about spiritual wellness including such activities as reflection, mediation, and, personal outdoor retreats, yoga classes, and interfaith dialogues or healthy debates on issues of concern and interest.

Peer exchange programs and other collaborative approaches such as host family programs where international students are matched with a native family for cross-cultural exchanges can be some of the intervention strategies that may build social connections across a variety of settings can help mitigate the negative effects of acculturative stress leading to behavioral health problems. These prevention and intervention strategies that focus on increasing

the social connectedness can also help build resilience among international students as they develop an awareness of the complexity of culture and begin to perceive diversity both within their own peers and across the larger host community.

Implication for Policy

Policy implications in the areas of positive health behavior include the resilience lens in programs and policies. Resilience can be an intervention tool to address the effect of acculturative stress on binge drinking. Utilization of the growing knowledge based on resilience can be vital in guiding school policies to promote the wellbeing of high-risk individuals (Luthar & Cicchetti, 2000). Usually, the provision of treatment to international students with behavioral health problems such as depression, anxiety, and alcohol use entails the waste and vast erosion of human potential (Luthar & Cicchetti, 2000), so it is imperative to promote the development of resilient functioning as early as possible rather than to implement treatment strategies designed to repair behavioral health problems (Cown, 1991, 1994, 1999; Knitzer, 2000a, 200b; Luthar & Cicchetti, 2000; Rutter, 2000; Werner, 2000). Resilience policies to address behavioral health problems should not be limited to temporary immigrants including international students.

In addition, in order to prevent acculturative stress, negative mental health (depression and anxiety), and binge drinking among international students, funding needs to be allocated to develop and expand prevention or clinical programs designed to monitor international students' behavioral problems and provide necessary mental health support to international students with mental health or alcohol related problems. It is also important that more funding is allocated to assure that international students at risk can easily access the alcohol prevention programs in schools or in the community.

In general, major policies related to international students are: stringent restrictions such as “not allowed to work,” social security stamps, compliance with staying in school, and maintaining a certain grade average as well as enrolled courses. On top of this there are the pressures of expiration of documents, such as I-20 and I-94s that have to be renewed periodically, as well as outrageous tuition and the perception of exploitation in a country that promotes equality. To reduce the impact of acculturative stress on behavioral health problems, the above strict polices should be considered at the same time.

Finally, policy makers need to pay more attention to support further research on health risk behaviors specifically for international students to have a more accurate and comprehensive understanding of binge drinking.

Implications for Research

Based on the findings of this study, future research is needed to consider other health risk behaviors, such as cigarette use, dietary behaviors, and physical activity, as an outcome variables to examine the role of resilience as a collective protective factor in health risk behaviors among international students (especially since drinking did not emerge as a major problem with the study populations).

Also as discussed in the methodology section, due to the challenges faced in obtaining a representative sample, mental health might not have been found to have a relationship with the expected variables, future research should address this with a more representative sample. Length of stay is another avenue for further research since it was not found to have a relationship with many of the expected variables (as supported by prior research): 1) resilience and 2) binge drinking. Due to the lack of representativeness and homogeneity of the sample, these significant relationships in the conceptual model of resilience should be tested using a more representative

sample with more representative characteristics of the international student population living in the US. Further research is needed to replicate these findings in other settings and to explore the preliminary trends suggested by the outcomes of this study in more depth. For example, it would be beneficial to be able to determine which particular resilience factors among the six constructs (positive perception of self, positive perception of the future, social competence, structural style, family cohesion, and social resources) are most protective for students displaying specific alcohol use levels.

It appears valuable to develop this research further by engaging in larger studies and with longitudinal data in order to explain causal relationships among the latent variables (acculturative stress, resilience, mental health, and binge drinking). Since the data were collected from a cross-sectional survey, a longitudinal study will allow researchers to detect changes in outcomes over a period of time to identify a causal relationship between predictors and an outcome variable. Also, it is essential to discover the processes contributing to resilient adaptation in individuals from diverse cultural, ethnic, and racial backgrounds (Carcia Coll, Lamberty, Jenkins, McAdoo, Crnic, Wasik, & Vasues Carcia, 1996; Luthar & Cicchetti, 2000).

Findings from this study also lends into further research on the phenomenon of acculturation, peer influence, and risky drinking behavior. On one hand, risky drinking may be a result of acculturative stress. On the other, drinking may actually be a result of acculturating to the US as well. Given the increasing rate of binge drinking among US college students (White & Hingson, 2013), drinking may seem to be normalized among US students. International students who have more US friends or are trying to adjust themselves in this environment then, are more likely to engage in risky drinking behavior, which eventually can promote health risk behaviors. Due to the peer group influence on drinking behavior, future research should also control for

peer influence in models of drinking. Given this dynamic of acculturation, more research needs to be conducted on the pattern of acculturation, peer influence, and risky drinking behavior to examine pathways for contextual prevention and intervention strategies in college environments.

Implications for Academic Institutions

Academic institutions should aim to provide internationalized experiences, not only for the relatively small percentages of students who are already mobile, but also for the students and staff who are not. Creation of internationalized environments should concentrate on the 'host' context and look outwards, considering how the home campus context can become international and encourage all students and staff to view themselves as part of a global community in a global context that is interconnected. Academic institutions should continue and expand strategies such as international education week, international festival, a dedicated department for international students, and so forth to showcase the relationship building and knowledge exchange between people and communities in college environments that are crucial to solve global challenges. Given that globalization is an inevitable phenomenon that affects various facets such as trade and commerce as well as higher education especially in fields such as Business, Science, Engineering, Technology, Computing and Design, academic institutions can create conducive environments where students in general are able to adapt and grow in a global community. This environment fosters social connectedness, leadership opportunities, and social support further building and supporting resilient capacities of not only international students, but native students as it widens their outlooks and experiences, hones on the capacity to work in multi-national teams, thus avoiding stress and health risk behaviors in the process of acculturation.

Implications for home countries and families

The findings of this study also have implications for home countries and families. Since it is understood that international students encounter a unique set of challenges surrounding academic and social integration, where they experience a mismatch between their expectations before arrival and after they arrive, countries of origin can potentially exercise strategies that address these issues beforehand. Education policies surrounding study abroad programs should highlight prevention and intervention strategies geared towards student success. In home countries, policy and intervention strategies surrounding cross-cultural training and group work as part of learning experience can potentially prepare students for life in an international context. This can also open avenues for finding more social connections and resources to increase protective factors that help to avoid risky behaviors, such as binge drinking. Government policies could include providing special orientation about US culture and overall academic culture pre-arrival. These efforts can include short seminars by professionals, creating a network of students who are going abroad to provide a platform to share their own experiences in the US, and channeling students with organizations both in the home and host countries where friendship ties can be developed with local communities.

Summary and Conclusion

Individuals with many risk factors and few protective resources are vulnerable to adverse health outcomes across their life span. Literature has increasingly reported risk factors such as acculturation, increased distress, poor school performance are associated with multiple health-risk behaviors, including tobacco and alcohol use (Costa et al., 1995), weapon-carrying, suicide attempts (Vega,Alderete, Kolody, & Aguilar-Gaxiola, 2000), and early sexual activity (Coker et al., 1994) that manifest among youth populations. Casas et al. (1998) further discuss other health-risk behaviors such as diabetes, lung cancer, and hypertension that can be implicated from

adolescence and early adulthood to adulthood resulting in adverse health outcomes in adulthood. These health-risk behaviors are believed to have their origins or precursors in early and middle life stages (Rew & Horner, 2003).

Given the increasing role of resilience in positive health outcomes, we know that resilient individuals are able to access and mobilize protective resources that offset vulnerabilities. Using international students as the target population, this study further reiterated the role of resilience in buffering the impact of health risk behaviors such as binge drinking. Health risk behaviors such as binge drinking have a pervasive impact on the health of the individual, family, and the community. Early interventions that enhance protective resources, despite demographic and sociocultural risk factors, must be developed and tested to promote the health and well-being of vulnerable populations.

Various multilevel analytic techniques such as hierarchical linear modeling can be used to identify patterns of change for risk factors, protective resources, and specific health-risk behaviors. Findings from studies that are based on a resilience framework can provide the foundation for developing interventions that target prevention of specific health risk behaviors. Additionally, the resilience framework used in this study based on the acculturation perspective can assist in targeting the emerging health needs of immigrant and refugee populations, providing a further glimpse into the immigrant health paradox.

References

Abu-Bader, S. H. (2010). *Advanced and Multivariate Statistical Methods for Social Science Research with a Complete SPSS Guide*. Chicago: Lyceum Books.

Aday, L. (2001). At risk in America. San Francisco, CA: Jossey-Bass.

Allen, M. L., Elliott, M. N., Fugligni, A. J., Morales, L. S., Hambarsoomian, K., & Schuster, M. A. (2008). The relationship between Spanish language use and substance use behaviors among Latino youth: A social network approach. *Journal of Adolescent Health, 43,* 372–379.

Bandalos, D. L. (2008). Is parceling really necessary? A comparison of results from item parceling and categorical variable methodology. *Structural Equation Modeling-A multidisciplinary Journal, 15*(2), 211-240.

Belizaire, L. S., & Fuertes, J. N. (2011). Attachment, coping, acculturative stress, and quality of life among Haitian immigrants. *Journal of Counseling & Development*, *89*, 87-97.

Berry, J. W. (1980). Acculturation as Varieties of Adaptation. In A. M. Padilla (Ed.), *Acculturation: Theory, models, and some new findings* (pp. 9-25). Boulder: American Association for the Advancement of Science.

Berry, J. W. (1990). Psychology of acculturation: Understanding individuals moving between cultures. In R. Brislin (Ed.), *Applied Cross-Cultural Psychology* (pp. 232-254). Newbury Park: Sage.

Berry, J. W. (1997). Immigration, acculturation, and adaptation. *Applied Psychology: An International Review, 46*, 5-34.

Berry, J. W. (2002). Conceptual approaches to acculturation. In K. Chun, P. Organista, & G. Marin (Eds.), *Acculturation: Advances in theory, measurement, and applied research* (pp. 17-37), Washington, DC: American Psychological Association.

Berry, J. W. (2005). Acculturation: Living successfully in the two cultures. *International Journal of Intercultural Relations, 29*, 697-712.

Berry, J. W. (2008). Acculturation and adaptation of immigrant youth. *Canadian Diversity/Canadian Diversité*, *6*(2), 50-53.

Berry, J. W., Kim, U., Minde, T., & Mok, D. (1987). Comparative studies of acculturative stress. *International Migration Review, 21*(3), 491-511.

Block, J. H., & Block, J. (1980). The role of ego control and ego resilience in the organization of behavior. In W. A. Collins (Ed.), *Development of cognition, affect, and social relations: The Minnesota Symposia on Child Psychology* (pp. 39-101). Hillsdale: Lawrence Erlbaum.

Bollen, K. A. (1989). *Structural equations with latent variables*. Oxford, England: John Wiley & Sons.

Brown, R. & Hewstone, M. (2005). An integrative theory of intergroup contact. In L. Berkowitz & M.P. Zanna (Eds.), *Advances in experimental social psychology* (vol. 37), 256-331. San Deigo, CA: Academic Press.

Byrne, B. M. (2010). *Structural equation modeling with AMOS: Basic concepts, applications, and programming* (2nd ed.). Mahwah, NJ: Erlbaum.

Caplan, S. (2007). Latinos, acculturation, and acculturative stress: A dimensional concept analysis. *Policy, Politics, & Nursing Practice, 8*, 93–106.

Castillo, L. G., Conoley, C. W., Brossart, D. F., & Quiros, A. (2007). Construction and validation of the intragroup marginalization inventory. *Cultural Diversity and Ethnic Minority Psychology*, *13*, 232–240.

Center for Reviews and Dissemination (2009). Systematic reviews: CRD's guidance for undertaking reviews in health care. Retrieved from http://www.york.ac.uk/inst/crd/pdf/Systematic_Reviews.pdf

Cheung, C., & Yue, X. D. (2012). Sustaining resilience through local connectedness among sojourn students. *Social Indicators Research*. *111*, 785-800.

Constantine, M. G., Ogazaki, S., & Utsey, S. O. (2004). Self-concealment, social self-efficacy, acculturative stress, and depression in African, Asian, and Latin American international college students. *American Journal of Orthopsychiatry, 74*(3), 230-242

Dao, T. K., Lee, D., & Chang, H. L. (2007). Acculturation level, perceived English fluency, perceived social support level, and depression among Taiwanese international students. *College Student Journal*, *41*(2), 287-295.

Dumont, M, Provost, A.M. (1999). Resilience in adolescents: Protective role of social support, coping strategies, self-esteem, and social activities on experience of stress and depression. *Journal of Youth and Adolescence, 20*(3), 343

de Araujo, A. A. (2011). Adjustment issues of international students enrolled in American colleges and universities: A review of the literature. *Higher Education Studies, 1*(1), 2–8.

Duru, E., & Poyrazli, S. (2007). Personality dimensions, psychosocial- demographic variables, and English language competency in predicting level of acculturative stress among

Turkish international students. *International Journal of Stress Management, 14*(1), 99-110.

El Ansari, W., Stock, C., & Mills, C. (2013). Is Alcohol Consumption Associated with Poor Academic Achievement in University Students? *International Journal of Preventive Medicine, 4*(10), 1175–1188.

Enders, C. K., & Bandalos, D. L. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling, 8*, 430-457.

Eustace, R. W. (2007). *Factors influencing acculturative stress among international students in the United States.* (Doctoral dissertation). *ProQuest Dissertations and Theses,* 131. Retrieved from https://search.proquest.com.

Fergus, S., & Zimmerman, M. A. (2005). Adolescent resilience: A framework for understanding healthy development in the face of risk. *Public Health, 26*, 399-419.

Flaskerud, J., & Winslow, B. (1998). Conceptualizing vulnerable populations in health-related research. *Nursing Research, 47*(2), 69-78.

Fornell, C., & Larcker, D. F. (1981). Evaluting structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39-50.

Galesic, M., & Bosnjak, M. (2009). Effects of questionnaire length on participation and indicators of response quality in a web survey. *Public Opinion Quarterly, 73*(2), 349-360.

Gallagher, H. C. (2013). Willingness to communicate and cross-cultural adaptation: L2 communication and acculturative stress as transaction. *Applied Linguistics,34*(1), 53–73.

Garmezy, N. (1991). Resilience in children's adaptation to negative life events and stressed environments. *Pediatrics, 20,* 459-466

Ghadi, I., Alwi, N. H., Bakar, K. A., & Talib, O. (2012). Construct validity examination of critical thinking dispositions for undergraduate students in University Putra Malaysia. *Higher Education Studies, 2*(2), 138-145.

Gil, A. G., Wagner, E. F. & Vega, W. A. (2000). Acculturation, familism and alcohol use among Latino adolescent males: Longitudinal relations. *Journal of Community Psychology 28*(4), 443-458.

Gómez, E., Urzúa, A., & Glass, C. R. (2014). International student adjustment to college: Social networks, acculturation, and leisure. *Journal of Park & Recreation Administration, 32*(1), 7-25.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis* (5th ed.). Upper Saddle River, NJ: Prentice Hall

Han, X., Han, X., Luo, Q., Jacobs, S., & Jean-Baptiste, M. (2013). Report of a mental health survey among Chinese international students at Yale University. *Journal of American College Health, 61*(1), 1-8.

Hahn, Z. L. (2010). *Coping with acculturative stress and depression among international students: A cultural perspective.* (Order No. 3447492, University of Pennsylvania). *ProQuest Dissertations and Theses,* 269. Retrieved from https://search.proquest.com.

Hjemdal, O., Friborg, O., Stiles, T. C., Rosenvinge, J. H., & Martinussen, M. (2006). Resilience predicting psychiatric symptoms: A prospective study of protective factors and their

role in adjustment to stressful life events. *Clinical Psychology and Psychotherapy*, *13*, 194–201.

Hodder, R. K., Daly, J., Freund, M., Bowman, J., Hazell, T., & Wiggers, J. (2011). A school-based resilience intervention to decrease tobacco, alcohol and marijuana use in high school students. *BMC Public Health, 11*(722), 1-10.

Holguin, L. E. (2011). *Substance use and social networks of international students.* (Order No. 1495485, Villanova University). *ProQuest Dissertations and Theses,* 91. Retrieved from https://search.proquest.com.

Institute of International Education. (2013). International student enrollment trends, 1949/50-2012/13. *Open Doors Report on International Educational Exchange*. Retrieved from http://www.iie.org/opendoors.

Iwamoto, D., & William Ming, L. (2010). The impact of racial identity, ethnic identity, Asian values, and race-related stress on Asian Americans and Asian international college students' psychological well-being. *Journal of Counseling Psychology*, *57*(1), 79-91

Jackson, M., Ray, S., & Bybell, D. (2013). International students in the U.S.: Social and psychological adjustment. *Journal of International Students*, *3*(1), 17-28.

Javanmard, G. H. (2013). Religious beliefs and resilience in academic students. *Procedia-Social and Behavioral Sciences, 84,* 744-748.

Jelicic, H., Phelps, E., & Lerner, R. M. (2009). Use of missing data methods in longitudinal studies: The persistence of bad practices in developmental psychology. *Developmental Psychology, 45,* 1195-1199.

Johnson, N., Dinsmore, J. A., & Hof, D. D. (2011). The relationship between college students' resilience level and type of alcohol use. *International Journal of Psychology*, *8,* 67-82

Joiner, T. E., Jr., & Walker, R. L. (2002). Construct validity of a measure of acculturative stress in African Americans. *Psychological Assessment, 14,* 462–466.

Jones, S. E., Oeltmann, J., Wilson, T. W., Brener, N. D., & Hill, C. V. (2001). Binge drinking among undergraduate college students in the United States: Implications for other substance use. *J Am Coll Health*. *50*(1), 33-38.

Kanaparthi, A. (2009). *Relations between acculturation and alcohol use among international students.* (Order No. 3394817, Florida International University). *ProQuest Dissertations and Theses,* 156. Retrieved from https://search.proquest.com.

Kaplan, M. S., & Nunes, A. (2003). The psychosocial determinants of hypertension. Nutrition, Metabolism and Cardiovascular Diseases, 13, 29–52.

Kelloway, E. K. (2015). *Using Mplus for Structural Equation Modeling*. 2nd edition. Thousand Oaks, CA: Sage.

Kiefer, C. (1974). *Changing cultures, changing lives*. San Francisco, CA: Jossey-Bass.

Kim, M. & Kim, K. (2014). A study of Chinese students' acculturative stress, depression influencing on drinking problem and social maladaptation: Moderating effect of ego resilience. *Asian Journal of Child Welfare and Development, 12*(2), 23-41.

Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York: Guilford.

Kobasa, S. C., Maddi, S. R., & Kahn, S. (1982). Hardiness and health: A prospective study. *Journal of Personality and Social Psychology*, *42*, 168-77

Koyama, C., & Belli, G. (2011). Alcohol use, acculturative stress, and drinking motivation among international community college students. *Journal of Multicultural Counseling & Development, 39*(4), 229-240.

Lau, J. S. (2006). Acculturative stress, collective coping, and psychological well-being of Chinese international students. (Order No. 3245416, University of South Carolina). ProQuest Dissertations and Theses, 1-111 p. Retrieved from https://search.proquest.com.

Luthar, S. S. & Cicchetti, D. (2000). The construct of resilience: Implications for interventions and social policies. *Development and Psychopathology, 12*(4), 857-885.

Luthar, S. S., & Zelazo, L. B. (2003). Research on resilience: An integrative review. In S.S. Luthar (Ed.), Resilience and vulnerability: Adaptation in the context of childhood adversities (pp. 510-549). Cambridge, UK: Cambridge Press.

Lee, C. Y., & Park, J. H. (2014). The effects of acculturative stress and resilience on depression of university students from North Korea. *Family and Environment Research*, *52*(3), 313-324.

Lee, J.-S., Koeske, G. F., & Sales, E. (2004). Social support buffering of acculturative stress: A study of mental health symptoms among Korean international students. *International Journal of Intercultural Relations, 28,* 399–414.

Lee, J. H., Nam, S. K., Kim, A., Kim B., Lee, M. Y., & Lee, S. M. (2013). Resilience: A meta-analysis approach. *Journal of Counseling and Development*, *91*(3), 269-279.

Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development*, *71*, 543-562.

Luthar, S. S., & Zelazo, L. B. (2003). Research on resilience: An integrative view. In S. S. Luthar (Ed.), *Resilience and Vulnerability: Adaptation in the Context of Childhood Adversities* (pp. 510-549). Cambridge: Cambridge University Press.

Maggs, J. L., Frome, P. M., Eccles, J. S., & Barber, B. L. (1997). Psychosocial resources, adolescent risk behavior and young adult adjustment: Is risk taking more dangerous for some than others. *Journal of Adolescence, 20*, 103-119.

Masten, A. S. (1999). Resilience comes of age: Reflections on the past and outlook for the next generation of research. In M. D. Glantz & J. L. Johnson (Ed.), *Resilience and Development: Positive Life Adaptation*. New York: Kluwer Academic, 281-296.

Masten, A. S. (2010). *Resilience over the lifespan: Developmental perspectives on resistance, recovery and transformation*. New York, London: Guilford Press.

McLeroy, K. R., Steckler, A. B., Simons-Morton, B., Goodman, R. M., Gottlieb, N., & Burdine, J. N. (1993). Social science theory in health education: Time for a new model? *Health Education Research, Theory, and Practice, 9*, 305-312.

Mena, F. J., Padilla, A. M., & Maldonado, M. (1987). Acculturative stress and specific coping strategies among immigrant and later generation college students. *Hispanic Journal of Behavioral Sciences, 9*(2), 207-225.

Mistry R, McCarthy W, Yancey A, Lu Y, Patel M (2009). Resilience and patterns of health risk behaviors in California Adolescents. *Preventive Medicine, 48(3)*, 291-297.

Montgomery, C. (2009). A decade of internationalization: Has it influenced students' views of cross-cultural group work at university? *Journal of Studies in International Education, 13*(2), 256-270.

Mukthyala, S. (2013). *Lived experiences of Indian international students: Migration, acculturation, and resilience.* (Order No. 3554642, Duquesne University). *ProQuest Dissertations and Theses,* , 219. Retrieved from https://search.proquest.com.

Neil, A. W. (2006). Vulnerability. *Global Environmental Change, 16*(3), 268-281

Noels, K., Pon, G., & Clement, R. (1996). Language, identity, and adjustment: The role of linguistic self-confidence in the acculturation process. *Journal of Language and Social Psychology, 15*(3), 246-264.

Noyongoyo, B. (2011). *International students in US colleges and universities: Eating habits, cultural identity, and dietary acculturation.* (Order No. 1505414, East Carolina University). *ProQuest Dissertations and Theses,* 68. Retrieved from https://search.proquest.com.

Nguyen, C. H. (2012). *Individual resilience, social support, and health risk behaviors in adolescents and young adults: Study on cross-sectional and longitudinal samples.* (Order No. 3505157, University of Arkansas). *ProQuest Dissertations and Theses, ,* 171. Retrieved from https://search.proquest.com.

OECD (2013). *Education indicators in focus*. Retrieved from http://www.oecd.org.

Padilla, A. M., Alvarez, M., & Lindholm, K. J. (1986). Generational status and personality factors as predictors of stress in students. *Hispanic Journal of Behavioral Sciences, 8,* 275-288.

Pargament, K. I. (2010). Anchored by faith: Religion as a resilience factor. In J. W. Reich, & A. J. Zautra, & J. Stuart Hall (Eds.), *In Handbook of adult resilience* (193–213). New York, London: Guilford Press.

Pedersen, P. B. (1991). Counseling international students. *The Counseling Psychologist, 19,* 10-58

Poyrazli, S., & Kavanaugh, P. R. (2006). Marital status, ethnicity, academic achievement, and adjustment strains: The case of graduate international students. *College Student Journal*, *40*(4), 767–780.

Rahman, O., & Rollock, D. (2004). Acculturation, competence, and mental health among south Asian students in the United States. *Journal of Multicultural Counseling & Development*, *32*(3), 130-142.

Resilience Research Center (2014). The child and youth resilience measure: User's manual. Retrieved from http://calmhsa.org/wp-content/uploads/2013/06/CYRM-28-Manual_20112.pdf.

Reich, J. W., Zautra, A., & Hall, J. S. (2010). *Handbook of adult resilience*. New York: Guilford Press. *Cognitive Behavior Therapy*, *39*(4), 251-261.

Robinson, C. M., Klenck, S. C., & Norton, P. J. (2010). Psychometric properties of the generalized anxiety disorder questionnaire for DSM-IV among four racial groups.

Rubin, A., & Babbie, E. (2013). *Research methods for social work* (8th ed.). Belmont, CA: Thomson Brooks/Cole.

Rudmin, F. W. (2009). Constructs, measurements and models of acculturation and acculturative stress. *International Journal of Intercultural Relations*, *33*, 106-123.

Rutter, M. (1993). Resilience: Some conceptual considerations. *Journal of Adolescent Health*, *14*, 626-631.

Sa, Seo, Nelson, & Lohrmann (2013). Cigarette smoking among Korean international college students in the United States. *Journal of American College Health, 61*(8), 37-41

Sa, J. (2010). *Binge drinking, drinking and driving, and cigarette smoking among Korean international college students in the U.S.* (Order No. 3432133, Indiana University). *ProQuest Dissertations and Theses,* 300. Retrieved from https://search.proquest.com.

Sandhu, D. S. & Asrabadi, B. R. (1994). Development of an acculturative stress scale for international students: Preliminary findings. *Psychology Reports, 75*, 435-448.

Schafer. J. L. & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods, 7*(2), 147-177.

Schetter, C., & Dolbier, C. (2011). Resilience in the context of chronic stress and health in adults. *Social & Personality Psychology Compass*, *5*(9), 634-652.

Schoon, I. (2006). *Risk and resilience: Adaptations in changing times*. New York: Cambridge University Press.

Schwartz, S. J., Weisskirch, R. S., Zamboanga, B. L., Castillo, L. G., Ham, L. S., Huynh, Q., & ... Cano, M. A. (2011). Dimensions of acculturation: Associations with health risk behaviors among college students from immigrant families. *Journal of Counseling Psychology, 58*(1), 27-41.

SEVP. (2014). General summary quarterly review-July 2014. Retrieved from https://www.ice.gov/doclib/sevis/pdf/by-the-numbers.pdf.

Shaver, J. L. F., Johnston, S. K., Lentz, M. J., & Landis, C. A. (2002) Stress exposure, psychological distress, and physiological stress activation in midlife women with insomnia. *Psychosomatic Medicine, 64*, 793-802.

Sherry, M., Thomas, P., & Chui, W. H. (2010). International students: A vulnerable student population. *The Journal of Higher Education, 60*, 33-46

Smith, R. A., & Khawaja, N. G. (2011). A review of the acculturation experiences of international students. *International Journal of Intercultural Relations*. *35*, 699-713.

Soest, T., Mossige, S., Stefansen, K., & Hjemdal, O. (2010). A valid study of the resilience scale for adolescent (READ). *Journal of psychopathology and behavioral assessment, 32*, 215-225.

Spitzer, R. L., Kroenke, K., Williams, J. B., & Lowe, B. A. (2006). A brief measure for assessing generalized anxiety disorder: the GAD-7. Archives of Internal Medicine, 166, 1092-1097.

Spitzer, R. L., Kroenke, K., Williams, J. B., & Lowe, B. A. (2006). Validation and utility of a self-report version of PRIME-MD: the PHQ primary care study. Primary Care Evaluation of Mental Disorders. Patient Health Questionnaire, JAMA, 282, 1737-1744.

Steiger, J. H. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research*, *25*, 173-180.

Sullivan, C. (2010). *Predictors of acculturative stress for international students in the United States.* (Order No. 3432885, University of Missouri - Saint Louis). *ProQuest Dissertations and Theses*, 150. Retrieved from https://search.proquest.com.

Sümer, S., Poyrzli, S., & Grahame, K. (2008). Predictors of depression and anxiety among international students. *Journal of Counseling & Development*, *86*(4), 429-437.

Taeho, Y., Heewon, Y., & Gordon, B. (2008). Status of participation in physical activity among international students attending colleges and universities in the United States. *College Student Journal*, *42*(4), 1110-1117.

Tan, H., Forgasz, H., Leder, G., McLeod, A. (2012). Survey recruitment using Facebook: Three studies. *International Conference on Internet Studies*. *17 & 18*, 1-11.

Teekens, H. (2000). Teaching and learning in the international classroom. In P. Crowther, M. Joris, M., Otten, B. Nilsson, H. Teenkens, & B. Wchter (Eds.), *Internationalization at home: A Position Paper*. Sweden: European Association for International Education.

Tempelaar, D. T., Schim van der Loeff, S., & Gijselaers, W. H. (2007). A structural equation model analyzing the relationship of students' attitudes toward statistics, prior reasoning abilities, and course performance. *Statistics Education Research Journal, 6*(2), 78–102.

Theron, L. C. (2012). Resilience research with South African youth: caveats and ethical complexities. *Psychological Society of South Africa, 42*(3), 333-345.

Torres, L., Driscoll, M. W., & Voell, M. (2012). Discrimination, acculturation, acculturative stress, and Latino psychological distress: A moderated mediational model. *Cultural Diversity and Ethnic Minority Psychology, 18*(1), 17-25.

Tripodi, T. and M. Potocky- Tripodi. (2007). *International Social Work Research: Issue and Prospects*. Oxford: Oxford University Press.

Trimble, J. E. (2003). Introduction: Social change and acculturation. In K. M. Chun, P. B. Organista, & G. Marin (Ed.), *Acculturation: Advances in theory, measurement, and applied research* (pp. 3-13). Washington, DC: American Psychological Association.

Tucker, L. R., & Lewis, C. (1973). The reliability coefficient for maximum likelihood factor analysis. *Psychometrika*, *38*, 1-10

Wang, C. C., & Mallinckrodt, B. (2006). Acculturation, attachment, and psychosocial adjustment of Chinese/Taiwanese international students. *Journal of Counseling Psychology, 53*(4), 422-433.

Wang, D., Ou, C., Chen, M., & Duan, N. (2009), Health-promoting lifestyles of university students in Mainland China. *BMC Public Health, 9*(379), 1-9.

Wang, J. (2004). A study of the adjustment of international graduate students at American universities, including both resilience characteristics and traditional background factors. *Dissertation Abstracts International Section A, 64,* 3616.

Ward, C., & Kennedy, A. (1994). Acculturation strategies. Psychological adjustment and sociocultural competence during cross-cultural transitions. *International Journal of Intercultural Relations, 18,* 329-343.

Wayman, J. C. (2003). *Multiple imputation for missing data: What is it and how can I use it?* Paper session presented at the 2003 Annual Meeting of the American Educational Research Association, Chicago, IL.

Werner, E., & Brendtro, L (2012). Risk, resilience, and recovery. *Reclaiming Children & Youth, 21*(1), 18-22.

Wei, M., Heppner, P. P., Mallen, M. J., Ku, T., Liao, K. Y., & Wu, T. (2007). Acculturative stress, perfectionism, years in the United States, and depression among Chinese international students. *Journal of Counseling Psychology, 54*(4), 385-394.

Wei, M., Liao, K. Y., Heppner, P. P., Chao, R. C., & Ku, T. (2012). Forbearance coping, identification with heritage culture, acculturative stress, and psychological distress among Chinese international students. *Journal of Counseling Psychology, 59*(1), 97-106.

Wei, M., Ku, T., Russell, D. W., Liao, K., & Mallinckrodt, B. (2008). Moderating effects of three coping strategies and self-esteem on perceived discrimination and depressive symptoms: A minority stress model for Asian international students. *Journal of Counseling Psychology, 55*(4), 451-462.

Wei, M., Tsai, P., Chao, R. C., Du, Y., & Lin, S. (2012). Advisory working alliance, perceived English proficiency, and acculturative stress. *Journal of Counseling Psychology, 59*(3), 437-448.

White, A. M., & Hingson, R. (2013). The burden of alcohol use: Excessive alcohol consumption and related consequences among college students. *Alcohol Research: Current Reviews, 35*(2), 201-218.

Wright, M.O., & Masten, A. S. (2005). *Resilience process in development: Fostering positive adaptation in the context of diversity*. New York: Springer.

Yakunina, E. S., Weigold, I. K., Weigold, A., Hercegovac, S., & Elsayed, N. (2013). International students' personal and multicultural strengths: Reducing acculturative stress and promoting adjustment. *Journal of Counseling & Development*, *91*(2), 216-223.

Yeh, C. J., & Inose, M. (2003). International students' reported English fluency, social support satisfaction, and social connectedness as predictors of acculturative stress. *Counseling Psychology Quarterly*, *16*, 15-28.

Yeramaneni, S., & Sharma, M. (2009). Predictors of alcohol use and binge drinking among Asian Indian students. *American Journal of Health Studies, 24*(2), 287-297.

Ying, Y., & Han, M. (2006). The contribution of personality, acculturative stressors, and social affiliation to adjustment: A longitudinal study of Taiwanese students in the United States. *International Journal of Intercultural Relations, 30*(5), 623-635.

Yoo, M., Choi, S. Y., Kim, Y. M., Han, S., Yang, N., Kim, H., Son, Y. (2014). Acculturative stress, resilience, and depression among Chinese students in Korea. *The Journal of Korean Academic Society of Nursing Education*, *19*(3), 320-329.

Zait, A., & Bertea, E. (2011). Methods for testing discriminant validity. *Management & Marketing, 4*(2), 217-224.

Zamboanga, B. L., Raffaelli, M., & Horton, N. J. (2006). Acculturation status and heavy alcohol use among Mexican American college students: An investigation of the moderating role of gender. *Addictive Behaviors, 31,* 2188–2198.

APPENDIX A

Description of a Population of International Students

	Low risk	High risk
Positive outcome	A (normative development)	B (resilience)
Negative outcome	C (inadequate risk assessment)	D (vulnerability)

Adapted from: Fergus & Zimmerman, 2005.

Table 2-1: Evaluation of Most Frequently Used Scales

Variable	Scale	Author (year)	Scale Type	Theory/ model	Number of items	Domains	Reliability (Cronbach's alpha)	Validity	Development/ testing
Acculturative Stress	Acculturative Stress Scale for International Students (ASSIS)	Sandhu & Asrabadi (1994)	Multi-dimensional	No	36 items	1) Perceived discrimination, 2) homesickness, 3) perceived hate, 4) fear, 5) stress due to change/ culture shock, 6) guilt, & 7) nonspecific concerns	1) 0.92 - 0.94 (Duru & Poyrazli, 2007; Wei et al., 2007; Wei et al., 2012; Yakunina et al., 2013); 2) Guttman's split-half test (*r*=0.94).	High convergent validity- significant negative correlations with international college students' English fluency and social self-efficacy and positive correlations with self-concealment and depressive symptoms" (Constantine et al., 2004)	International students
	Index of Life Stress (ILS)	Yang & Clum (1995)	Multi-dimensional	No	31 items	1) Financial concerns, 2) language difficulties, 3) perceived discrimination, 4) cultural adjustments, & 5) academic pressure	1) Internal consistency estimates (Kuder-Richardson [KR]-20) 0.86; 2) Cronbach's alpha: 0.83-0.94 (Chen et al., 2002; Misra et al., 2003); 3) test-retest reliability: r=0.87 (Yang & Clum, 1995)	Predictive validity: ILS was significantly correlated with measures of depression, loneliness, and suicide ideation	International students
Resilience	Connor-Davidson Resilience Scale (CD-RISC).	Conner & Davidson (2003)	Multi-dimensional	Coping, adaption and stress research	25 items	1) Personal competence, high standards, and tenacity, 2) trust in one's instinct, tolerance of negative effects, and strengthening effects, 3) positive acceptance of change and secure relationships, 4) control, 5) spiritual influence	Chronbach's alpha: .89 & test–retest reliability: r=.87.	Convergent & discriminant validity: significant positive correlation with the Sense of Coherence Scale (SOC) and negative correlation with the Hopkins Symptom Checklist-25 (HSCL)	Multi-study sample
	Resilience Scale for Adults (RSA)	Friborg et al. (2003)	Multi-dimensional	Drawn from past resilience research	33 items	1) Positive perception of self, 2) positive perception of future, 3) social competence, 4) structured style, 5) family cohesion, 6) social resources	Chronbach's alpha of the subscales: 0.67-0.90 & test–retest reliability for the subscales: r=0.69-0.84 ($p<0.01$)	High convergent & discriminant validity: significant positive correlation with the Sense of Coherence Scale (SOC) and negative correlation with the Hopkins Symptom Checklist-25 (HSCL)	Adults

Depression	The Patient Health Questionnaire 9 (PHQ 9)	Spitzer et al. (1999)	Uni-dimensional	No	9 items	9 items derived from the DSM-IV classification system pertain to: a) anhedonia, b) depressed mood, c) trouble sleeping, d) feeling tired, e) change in appetite, f) guilt or worthlessness, g) trouble concentrating, h) feeling slowed down or restless, i) suicidal thoughts.	Cronbach's α of 0.89 in the PHQ Primary Care Study & good test-retest reliability (interclass correlation =0.84)	N/A	Patients aged 18 years or older
Anxiety	Generalized Anxiety Disorder 7 (GAD-7)	Spitzer et al. (2006)	Uni-dimensional	No	7 items	a) Nervous, anxious, or on edge; b) easily annoyed or irritable; c) afraid as if something awful might happen; d) worried about different things; e) restless and unable to sit still; f) unable to stop or control worrying; or g) had trouble relaxing	Cronbach α = .92, & good test-retest reliability (interclass correlation = 0.83).	1) At a cut point of 10 or greater, sensitivity and specificity exceed 0.80; 2) high convergent validity: correlations with 2 anxiety scales: the Beck Anxiety Inventory (r = 0.72) and the anxiety subscale of the Symptom Checklist-90 (r = 0.74); 3) high criterion, construct, factorial, and procedural validity were reported.	Patients aged 18 years or older
Health Risk Behaviors	National College Health Risk Behavior Survey	Douglas et al. (1997)	Multi-dimensional	Drawn from CDC's Youth Risk Behavior Survey (YRBS)	33 items	(a) Behaviors leading to intentional or unintentional injury, (b) tobacco use, (c) alcohol band other drug use, (d) sexual behaviors, (e) dietary behaviors, & (f) physical inactivity	N/A	N/A	College students

APPENDIX B

Summary of Selected Empirical Literature on Acculturative Stress

Authors (year)	IV & DV	Research Design	Sample & Data Collection	Demographic Characteristics	Major Analysis	Findings	Scale	Limitations
Duru & Poyrazli (2007).	IV-Age, gender, marital status, years of study in the U.S., English language competency, social connectedness, adjustment difficulties, and personality (neuroticism and openness). DV-acculturative stress	Cross-sectional survey design	229 Turkish international students studying in 17 universities throughout the United States. Online survey	Gender (female - 39% & male - 59%, missing-2%), Age (M[SD]=26.37[4.4] & range 18-41), Education level (23%-master's students, 55%-doctoral students, 1%-post doctoral fellows, & missing-21%), & Length of stay in the U.S. (M=2.0 years [SD=0.65] & range 1-3.83).	Correlations & hierarchical regression to investigate acculturative stress based on students' demographics, personality, level of social connectedness, and English language competency.	1) Acculturative stress was positively correlated with adjustment difficulties and was negatively correlated with social connectedness; 2) marital status, English language competency, social connectedness, adjustment difficulties, neuroticism, and openness to experiences were significant predictors of acculturative stress; 3)Age and gender were not significant predictors.	Acculturative Stress Scale for International Students (ASSIS; Sandhu & Asrabadi, 1994).	1) only two aspects of personality were studied in relation to acculturative stress - other types of personalities should be considered as well. 2) most of the participants were graduate students. 3) cross-sectional study 4) didn't use a standardized measure of language proficiency
Koyama & Belli (2011)	IV-Acculturative stress. DV-drinking motivations. DV-alcohol use	Cross-sectional survey design	262 students in English as a second language programs in a U.S. community college. Nonprobability sampling	F1 students n=126 (Gender- female - 52% & male - 48%, Age- M=26, Countries of origin – Central or South America 10%, South Korea-73%, Europe 9%, & Others 6%, & Length of stay in the U.S.- M=1.7 years). Non-F1 students n=136 (Gender-female 55% & male 45%, Age-M=26, Countries of origin-Vietnam 23%, Korea 22%, Central or South America 23%, Africa 9%, other area 9%, & missing)	Correlations & hierarchical multiple regression to test the three hypotheses regarding alcohol use, acculturative stress, and drinking motivations.	Acculturative stress variables were not related to any of the drinking variables and only a few were slightly related to the motivation variables. Hierarchical regression analysis to predict alcohol use at the 4th step: gender ($p<.01$) legal status ($p>.05$), acculturative stress factor ($p<.05$), drinking motivation factor ($p<.01$).	Index of Life Stress (ILS) (Yang & Clum, 1995).	limited generalizability
Eustace (2007)	IV- Acculturative stressors, demographic variables, modes of acculturation, perceived cultural values, and English language usage. DV- acculturative stress	Cross-sectional survey design	1) 606 international students from eleven U.S. universities; 2) online survey	Gender (female - 48.5% [n=294] & male - 51.5% [n=312] & range=17-50), Age (M[SD]=27[5.23]), Education level (55.9%-PhD, 24%-masters, 17.4%-under grate students, 2.1%-non-degree, & 0.7%-other), Length of stay in the U.S. (82.1%-less than 6 years)	Regression analysis to determine the factors influencing acculturative stress among international students.	Lower income and self-identified lower social class prior and during the acculturation predict higher acculturative stress levels. Genders, age, years in the U.S., were not significant predictors of acculturative stress.	Index of Life Stress (ILS) (Yang & Clum, 1995)-modified.	1) Cross-sectional study prohibits causal inferences; 2) the timing of the study (September 11th) and the length of the survey (too long) contributed to lower responding rates; 3) lack of information about the validity of the measures

Lau (2006)	IV- (Internal and external) acculturative stress, (active and passive) collective coping. DV- psychological well-being (depression and anxiety)	Cross-sectional survey design	1) 184 Chinese international students; 2) convenience sampling	Gender (female - 44% & male - 56%), Age (M[SD]=29.35[4.83] & range 19-48), Countries of origin (China-88%, Taiwan-9%, Hong Kong-2%, other-1%), Education level (graduate students + undergraduate students- n(%) was not given, & 3%-post doctoral fellows), Length of stay in the U.S. (M=36.86 months [SD=26.76] & range 10 months-11 years).	Correlations & regression analysis to investigate the relationship between acculturative stress and psychological well-being and the mediating role of collective coping strategies on the relationship between them.	Acculturative stress was negatively associated with positive psychological outcomes and positively associated with negative psychological outcomes. Passive collective coping partially mediated the relationship between acculturative stress and depression as well as anxiety.	Acculturative Stress Scale for International Students (ASSIS; Sandhu & Asrabadi, 1994).	1) Convenience sampling; 2) cross-sectional design; 3) used invalidated-Chinese-version of the questionnaire.
Sullivan (2010)	IV- Acculturation orientation, sources of social support, perceived English ability, perceived discrimination, and mental health. DV- acculturative stress	Cross-sectional survey design	1) 648 international students enrolled at three public universities in Missouri and three public universities in Iowa, Texas, and Oklahoma; 2) online survey & nonprobability sampling	Gender (female - 48% [n=312] & male - 52% [n=341]), Age (M[SD]=25.06[5.07] & range 17-52), Countries of origin (Asian - 69.4%, Europe-11.4%, Middle East-7.7%, Latin-6.2% and Africa-3.4%), Education level (Doctoral students-31.1%, Master's- 35.3%, undergraduate students-33.3%)	Correlations & hierarchical multiple regression to examine the relationship between acculturation orientation, sources of social support, and the level of acculturative stress among international students	1) Increased levels of acculturative stress were significantly associated with higher levels of perceived discrimination and higher levels of mood and anxiety disturbances. 2) in the final step of hierarchical regression model, perceived English ability, perceived discrimination, and mental health were significant predictors of acculturative stress	Index of Life Stress (ILS) (Yang & Clum, 1995)-modified.	1) Cross-sectional design - threat to internal validity; 2) self-report instrument-distortion; 3) linguistically and culturally diverse group-response errors; 4) online survey; 5) nonrandom sampling
Wei et al. (2007)	IV- Acculturative stress, maladaptive perfectionism, years in the U.S. DV-depression	Cross-cultural survey design	189 Chinese international students from China and Taiwan attending a Midwestern university. Online survey.	Gender (female - 51% [n=96] & male - 49% [n=92]), Age (M[SD]=29.97[4.65]), Countries of origin (China-71.4%, Taiwan-22.8%, did not report 5.8%), Education level (81%-graduate students, 19%-other) & Length of stay in the U.S. (M=2.86 years [SD=1.98]).	Hierarchical regression to examine whether maladaptive perfectionism (i.e., discrepancy between expectations and performance) and length of time in the U.S. moderated the association between acculturative stress and depression.	1) There were significant main effects of acculturative stress (AS) and maladaptive perfectionism (MP) on depression; 2) no significant two-way interactions, and 3) a significant three-way interaction, indicating that AS, MP, and length of time in the United States interacted to predict depression. 4) Low MP buffered the effect of AS on depression only for those who had been in the United States for a relatively longer period of time.	Acculturative Stress Scale for International Students (ASSIS; Sandhu & Asrabadi, 1994).	1) online survey-lower response rate (39%); 2) the sample may be biased-only students who are interested in this topic, depression or willing to participate; 3) a high percentage of unusable surveys (55 of 252, 22%); 4) all measures are self-report; 5) 80% were graduate students; 6) used a single subscale to represent the construct of maladaptive perfectionism.

Wei et al. (2012).	IV-Perceived general stress, acculturative stress, general advisory working alliance, perceived English proficiency. AS×GAWA, AS×PEP, GAWA×PEP. DV-psychological distress	Cross-sectional survey design.	1) 143 East Asian international graduate students at a large university in the Midwest; 2) Online survey	Gender (female - 52% & male - 47%, missing-1%), Age (M[SD]=28.03[4.44] & range 22-42), Countries of origin (China-69%, South Korea-18%, & Taiwan-13%), & Length of stay in the U.S. (M=2.96 years [SD=2.38] & range 22-42 months).	Multivariate regression to examine the moderators of (a) general or cross-cultural advisory working alliances and (b) perceived English proficiency, on the association between acculturative stress and psychological distress.	Acculturative stress was significantly associated with psychological distress only when students perceived lower English proficiency and had a stronger general or cross-cultural advisory working alliance. Acculturative stress was also not significantly related to psychological distress when these students perceived higher English proficiency and had either a stronger or weaker cultural advisory working alliance.	Acculturative Stress Scale for International Students (ASSIS; Sandhu & Asrabadi, 1994)	1) Limited to East Asian international students, 2) limited generalizability, 3) other types of outcomes can be considered as well for future studies (life satisfaction, happiness, intercultural competence, or satisfaction with the advisor, graduate program, department, and university).
Yakunina et al. (2013)	IV- Multicultural strengths variables (Personal growth initiative, hardiness, and universal-diverse orientation), IV as a mediator - Acculturative stress. DV-Psychological adjustment	Cross-sectional survey design.	1) 336 international students from a national directory of the top 20 colleges and universities in which 2000- 6000 international students were enrolled; 2) Online recruitment + convenience sampling	Gender (female - 51% [n=169] & male - 49% [n=165]), Age (M[SD]=25.1[4.78] & range 18-46), Race (Asian -65%, South and Central America-13%, Europe-11%, Middle East-6%, Africa-2%, Other), Education level (58%-graduate students, 37%-undergraduate students, & 3%-post doctoral fellows), & Length of stay in the U.S. (M=30.60 months [SD=22.44] & range 1-120 months).	Path analysis (Hombeck, 1997) to determine if international students' personal and multicultural strengths would reduce their experiences of acculturative stress, thus leading to optimal adjustment.	Acculturative stress was a mediator in the relationship between hardiness and universal-diverse orientation and adjustment (Greater levels of hardiness and universal-diverse orientation significantly predicted lower levels of acculturative stress, which in turn led to more positive adjustment)	Acculturative Stress Scale for International Students (ASSIS; Sandhu & Asrabadi, 1994)	1) Online recruitment + convenience sampling → non-representative sample. 2) A culturally diverse and heterogeneous sample → ignored possible within-group differences based on countries of origin. 3) Language barrier→ potential response errors. 4) cross-sectional design → limited generalizability

APPENDIX C

Summary of Selected Empirical Literature on Resilience

Authors (year)	IV & DV	Research Design	Sample & Data Collection	Demographic Characteristics	Major Analysis	Findings	Scale	Limitations
Cheung & Yue (2012)	IV- Resilience, connectedness with the host, residency, age, gender, level of study, & years of study. DV- Depression	Cross-sectional survey design.	1) 215 Chinese international students in Hong Kong; 2) Online survey	Age (M[SD]=21.9[2.9]), Length of stay in the U.S. (M[SD]=1.9 years[1.1])	Structural Equation Model (SEM)	1) Analysis of the structural relations showed that local connectedness showed a significant positive direct effect on resilience and negative effect on depressed mood; 2) local connectedness also had a significant total effect on depressed mood, due to mediation by resilience; 3) resilience exhibited a significant negative effect on depressed mood.	Resilience scale developed by Shek et al. 2007	Limited generalizability
Kim & Kim (2014)	IV-Gender, acculturative stress (a), depression (b), ego-resilience (c), (a) × (c), & (b) × (c), DV-drinking problem	Cross-sectional survey design.	1)169 Chinese international students in Korea, 2) convenience sampling	Gender- 38.5% male & 61.5 female. Age-(15.4% under 20, 70.4% 21-23 .14.3% over 24)	Hierarchical regression to investigate the effect of ego resilience on drinking problem	1) Acculturative stress, depression, and ego resilience were significant predictors of drinking problem	Ego-resilience scale (Kim, 2005)	not given
Lee & Park (2013)	IV- Gender, age, length of stay in South Korea, acculturative stress, resilience, & acculturative stress × resilience. DV- Depression	Cross-sectional survey design.	1) 116 undergraduate students from North Korea; 2) Online survey + snowball sampling	Gender (female - 54.3% [n=63] & male - 45.7% [n=53]), Age (M[SD]=25.82[6.16])	Hierarchical regression to examine the effects of acculturative stress and resilience on depression as well as the moderating effect of resilience in the relationship between acculturative stress and depression	1) An increase in the level of acculturative stress increased the level of depression; 2) an increase in the level of resilience decreased the level of depression; 3) the moderating effect of resilience in the relationship between acculturative stress and depression was statistically significant.	Connor-Davidson Resilience Scale (CD-RISC) (Conner & Davidson, 2003)	1) Snowball sampling; 2) online survey: low responding rate + face to face survey

Yoo et al. (2014)	IV- Acculturative stress & resilience. DV-Depression	Cross-sectional survey design.	1) 276 Chinese international students from 3 universities located in Chungnam province in Korea; 2) Convenience sampling	Gender (female - 68.8% [n=190] & male - 31.2% [n=86]), Age (M[SD]=22.8[2.2]), & Education level (15.9%-graduate students, 54.0%-under grate students, & 30.1%-language school)	Regression analysis based on Moderator-Mediator Variable Distinction (Baron and Kenny, 1986) & Sobel test	Resilience correlated to acculturative stress and depression, by showing a mediating effect between acculturative stress and depression	Trait resilience measured by the Resilience Scale (Wagnild & Young, 1993).	1) Language barrier→ potential response errors. 2) cross-sectional design → limited generalizability

APPENDIX D

Summary of Selected Empirical Literature on Mental Health

Author (year)	IV & DV	Research Design	Sample & Data Collection	Demographic Characteristics	Major Analysis	Findings	Scale	Limitations
Constantine et al. (2004)	IV- English language fluency, self-concealment, self-efficacy, and acculturative stress DV- depression.	Cross-sectional survey design	320 international college students from 33 countries. Sampling methods not given	59.4% female (n=190) & 40.6% male (n=130). Age-range (17-51 years) & M=23.63 (SD=4.73). Educational level-undergraduate students (72.5%), graduate students (27.5%).	Hierarchical regression to examine predictors of depression and the mediating effects of self-concealment behaviors and social self-efficacy skills in the relationship between acculturative stress and depression	1) English language fluency was negatively associated with depression, such that international students who rated their English skills as lower were more depressed; 2) acculturative stress was a significant predictor of depression; 3) the relationship between acculturative stress and depression was not significantly mediated by self-concealment behaviors and social self-efficacy skills.	The Center for Epidemiologic Studies Depression Scale (CES-D)	1) Self-report measures; 2) did not gather third-party assessments of international students' English language fluency, social self-efficacy, acculturative stress, and depression levels; 3) general social desirability concerns
Dao et al. (2007)	IV-age, gender, marital status, length of stay in U.S., perceived social support, perceived English fluency, and acculturation level. DV-depression.	Cross-cultural survey design	1) 112 graduate Taiwanese international students from a Division I university in southern United States; 2) Convenience & criterion-group sampling	Age ranged from 19 to 46 years (M=32.03). 43% female (n=48) 57% male (n=64). Being married -n=78 & being single - n=30	Regression analysis to examine 1) the relationship between predictors (acculturation, perceived English fluency, social support) and depression as well as 2) regression analysis (Barron and Kenny, 1986) to investigate the mediating role of English fluency in the relationship between acculturation and depression	1) The mean scores for depression for females were significantly greater than males (Male's M=25.1, Female's M=30.3); 2) perceived English fluency completely mediated the effects of acculturation level on depression; 3) depression was regressed on socio-demographic variables, acculturation level, perceived English fluency, and perceived social support level.	The Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977)	1) Convenience, criterion-group sampling → the true effect of the IVs on the DV should be carefully interpreted. 2) limited generalizability

Han et al. (2013)	IV- age, sex, religion, main financial source, relationship with advisor, Internet (hours/week), reading (hours/week), exercising (hours/ week), and self-evaluation of current health. DV- Depression and anxiety.	Cross-sectional survey design	130 Chinese students at Yale University. Online survey	Gender (female - 46.2% [n=48] & male - 53.8% [n=56]), Age (18-20 [6.8%], 21-25 [45.6%], 26-30 [42%], 31-39 [6.8%]), Education level (13.5%-undergraduate, 22.1%-master's, 55.8%-doctoral, 8.7%-other)	1) Descriptive analysis to examine the prevalence of depression and anxiety symptoms in Chinese international students and 2) *t*-test to identify factors that might be associated with these 2 symptoms complexes, and to investigate their perception of mental health issues and counseling services.	45% reported symptoms of depression, and 29% reported symptoms of anxiety. A self-evaluation of poor current health, a poor relationship with one's advisor, and a low exercise regimen were associated with a higher prevalence of depression and anxiety symptoms.	The Patient Health Questionnaire 9 (PHQ-9) for depression assessment (Spitzer, Kroenke, & Williams, 1999) and the Generalized Anxiety Disorder 7 (GAD-7) for anxiety assessment (Spitzer, Kroenke, Williams, & Lowe, 2006).	(1) Cross-sectional design - weak causal relationship. (2) limited to Chinese international students (3) participation bias → the prevalence of depression and anxiety symptoms may be overestimated because those students who experience these symptoms may be more likely to participate
Iwamoto & Liu. (2010)	IV-gender, Asian American race-related stress inventory (AARRSI), ethnic identity, and racial identity subscale. DV- psychological well-being.	Cross-sectional survey design	1) 402 Asian American and Asian international college students. 2) online survey	82% undergraduates, 18%- graduate students. Age- M=21.02 (SD=3.6). 63.7%-female (n=256).	Hierarchical regression to examine whether racial identity, ethnic identity, Asian Value Scale (AVS), and Asian American Race-Related Stress Inventory (AARRSI) would predict depression	1) Racial identity statuses internalization, immersion-emersion, dissonance, Asian values, and ethnic identity affirmation and belonging were significant predictors of well-being. 2) Asian values, dissonance, and conformity were found to moderate the relationship between race-related stresses on well-being. 3) Individuals in low race-related stress conditions who had low Asian values, high Conformity, and low Dissonance attitudes started high on well-being but decreased as race-related stress increased.	The SPWB (Ryff, 1989).	1) no causality can be concluded. 2) generalizing the findings to all Asian American college students must be avoided 3) social desirability

Sümer et al. (2008).	IV- gender, age, length of stay in U.S., social support, English proficiency, race/ethnicity. DV- depression and anxiety.	Cross-sectional web-based survey	1) 440 international students from 2 universities. 2) Online survey	Gender (female - 43% & male - 57%), Age (M[SD]=26.15 [4.78] & range 18-49), Education level (doctoral -50%, master's-28%, undergraduate-21%, & other -1%), countries of origin (India -38%, China-28%, Korea-13%, Taiwan-8%, Singapore-3%, Thailand-2%, other-8%), Length of stay in the U.S. (M=2.9 years [SD=1.82] & range 2 months-10 years)	1) Correlations among gender, age, length of stay, academic achievement, social support, pattern of social contact, English proficiency, and international students' depression and anxiety levels 2) Hierarchical multiple regression analysis to examine predictors of international students' depression and anxiety levels.	The role of gender, age, race/ethnicity, length of stay, social support, and proficiency in English in the variance in depression and anxiety among international students revealed that social support was a significant predictor of depression and anxiety among international students. Age significantly contributed to the variance in anxiety and self-related English proficiency uniquely contributed to the variance in both.	The Goldberg Depression Scale (GDS) and the State Anxiety scale of the State Trait Anxiety Inventory	1) Online survey- low response rates (15%); 2) most of the data were collected when respondents were possibly stressed, working on classes assignments and taking tests; 3) cross-sectional design - no causal conclusions can be drawn; 4) used different levels of scales for depression (6-point) and anxiety (4-point). 5) race groups in the sample did not have an equal number of students. 6) The sample was large enough, but it was a highly self-selected group
Wei et al. (2007)	IV- Acculturative stress, maladaptive perfectionism, years in the U.S. DV- depression	Cross-cultural survey design	189 Chinese international students from China and Taiwan attending a Midwestern university. Online survey.	Gender (female - 51% [n=96] & male - 49% [n=92]), Age (M[SD]=29.97[4.65]), Countries of origin (China-71.5%, Taiwan-22.8%, did not report-11%), Education level (81%-graduate students, 19%-other) & Length of stay in the U.S. (M=2.86 years [SD=1.98]).	Hierarchical regression to examine whether maladaptive perfectionism (i.e., discrepancy between expectations and performance) and length of time in the U.S. moderated the association between acculturative stress and depression.	1) There were significant main effects of acculturative stress (AS) and maladaptive perfectionism (MP) on depression; 2) no significant two-way interactions, and 3) a significant three-way interaction, indicating that AS, MP, and length of time in the United States interacted to predict depression. 4) low MP buffered the effect of AS on depression only for those who had been in the United States for a relatively longer period of time	Acculturative Stress Scale for International Students (ASSIS; Sandhu & Asrabadi, 1994).	1) online survey-lower response rate (39%); 2) the sample may be biased-only students who are interested in this topic, depression or willing to participate; 3) a high percentage of unusable surveys (55 of 252, 22%); 4) all measures are self-report; 5) 80% were graduate students; 6) used a single subscale to represent the construct of maladaptive perfectionism.

Wei et al. (2008)	IV- perceived general stress, perceived discrimination, reflective coping, suppressive coping, reactive coping, and self-esteem. DV- depression.	Cross-sectional online survey design	354 Asian international students. Sampling method not given.	42% female (n=147), 58% male (n=207). Age - M= 26.58 (SD=4.09). Country of origin – 45% China/Hong Kong (n=158,), 29% India (n=104), 17% Korea (n=61), & 8% Taiwan (n=29)	Hierarchical regression to examine the role of perceived discrimination on depressive symptoms in Asian international students after controlling for their general level of perceived stress. 2) The second purpose of the study was to examine how coping strategies and self-esteem served to moderate the effect of perceived discrimination on depression for Asian international students	Hierarchical regression analyses showed a significant direct effect of perceived discrimination, a significant 2-way interaction of perceived discrimination and suppressive coping, and a significant 3-way interaction of perceived discrimination, reactive coping, and self-esteem in predicting depressive symptoms.	The Center for Epidemiologic Studies Depression Scale (CES-D)	Only focused on Asian international students - Limited generalization to other racial and ethnic minority populations or other international student groups.
Wei et al. (2012)	IV-English proficiency, length of time in U.S., age, forbearance coping, identification with heritage culture, & acculturative stress. DV- psychological distress.	Cross-sectional survey design	1) 188 international students from a large public Midwestern university; 2) online survey	51% female (n=94). Countries of origin- 88% - China/Hong Kong (n=166) and Taiwan -11% (n=21). Age-M=26.6 years (SD=4.4, range=18-39 years). Average length of time in U.S.- 2.6 years (SD=2.0)	Hierarchical regression to examine a three-way interaction effect (i.e., Forbearance Coping Identification with Heritage Culture Acculturative Stress) on psychological distress.	1) Acculturative stress was positively and moderately ($r = .50$, $p = .001$) associated with psychological distress. 2) a significant 3-way interaction of forbearance coping, identification with heritage culture, and acculturative stress on psychological distress.	The Hopkins Symptom Checklist (HSC; Green, Walkey, McCormick, & Taylor, 1988)	1) limited generalizability; 2) limited psychometric information for Chinese international students; 3) cross-sectional design- no causality can be concluded.

APPENDIX E

Summary of Selected Empirical Literature on Health Risk Behaviors

Authors (year)	IV & DV	Research Design	Sample & Data Collection	Demographic Characteristics	Major Analysis	Findings	Scale	Limitations
Koyama & Belli (2011)	IV-Gender, legal status, acculturative stress, drinking motivation. DV-Alcohol use	Cross-sectional survey design.	1) 262 students in English as a second language programs in a U.S. community college; 2) Specific sampling methods used not given.	F1 students n=126 (Gender- female - 52% & male - 48%, Age- M=26, Countries of origin – Central or South America 10%, South Korea- 73%, Europe 9%, & Others 6%, & Length of stay in the U.S.- M=1.7 years). Non-F1 students n=136 (Gender- female 55% & male 45%, Age- M=26, Countries of origin- Vietnam 23%, Korea 22%, Central or South America 23%, Africa 9%, other area 9%, & missing)	1) Correlations; 2) regression analysis to examine predictors of alcohol use.	1) Acculturative stress was not related to drinking use, but acculturative stress was slightly related to drinking motivation; 2) gender, acculturative stress, and drinking motivation were significant predictors of alcohol use.	Core Alcohol and Drug Survey (CADS) Community College Long Form (Presley, Meilman, & Lyerla, 1993)	Students in ESL program has less acculturative stress than international students in undergraduate or graduate program
Kanaparthi (2009)	IV-Acculturation, acculturative stress, peer alcohol use, injunctive social norms. DV-Alcohol use	Cross-sectional survey design.	1) 226 international students attending Florida International University; 2) Online survey	Gender (male-58%, female-42%), Education level (undergraduates-41.2%, graduates-58.8%), Race (white-18.6%, African American-8.4%, Hispanic/Latino-29.2%, Asian-28.3%, other-15.5%)	Structural Equation Modeling (SEM) via AMOS 17.0. to evaluate structural relations among variables	1) Fear and cultural shock were significantly correlated with alcohol use (quantity, frequency, binge, and audit); 2) in the final model, acculturative stress did not have significant direct effect on alcohol use.	Daily Drinking Questionnaire developed by Collins et al. (1985)	1) Self-report data reduced validity due to potential bias; 2) restriction of response choices for specific continuous variables- under-represented or over-represented students' behavior: 3) limited causal relationship
Koyama (2005)	IV-Acculturative stress and negative consequences. DV-alcohol use, drinking motivations		126 F-1 students and 136 non-F-1 students enrolled in ESL program in a U.S. community college.	F1 group-Gender (male-48% & female-52%), Age (M=26.1), Non-F1 group- Gender (female 55% & male 45%), Age (M=26.2%),	Hierarchical regression to predict alcohol use and drinking motivations by acculturative stress	1) Lower alcohol use for both the F-1 group and the non-F-1 group; 2) Acculturative stress was not a significant predictor not only of alcohol use but drinking motivations	Core Alcohol and Drug Survey (CADS) Community College Long Form (Presley, Meilman, & Lyerla, 1993)	1) Nonprobability sampling- limited generalizability; 2) self-report questionnaire; 3) survey instruments were written in English-limited participation, 4) due to lack of literature on the norms of alcohol use in a variety of ethnic groups-interpretation of results was limited.

Sa (2010)	3 DV- Binge drinking, drinking and driving, & cigarette smoking	Cross-sectional survey design.	1) 1,201 students from 52 universities; 2) online survey	Gender (male-53%, female-47%), Age (M[SD]-26[5.74]), Education level (bachelor's-42%, master's-26%, doctoral-29%, other-2%, missing-1%). Length of stay as a student in the U.S. (<1 year-11%, 1-2 years-21%, 3-4 years-29%, 5-6 years-24%, >6 years-15%)	Logistic regression and regression analysis	1) Association between acculturation & an increase in the three outcome behaviors (binge drinking, drinking and driving behavior, & cigarette smoking behavior) → length of stay (≥5 years) and English proficiency were significant predictors; 2) significant differences between male and female international students in the 3 outcome behaviors. 3) significant relationships were found between levels of acculturative stress and an increase in the three outcome behaviors 4) significant relationships were found between levels of anxiety and depression and an increase in the three outcome behaviors.5) anxiety and depression contributed most to the prediction of the three outcome behaviors, when demographic status is controlled.	National College Health Risk Survey (CDC, 1997), Harvard University College Alcohol Survey (CAS) (Wechsler et al., 1994; Wechsler et al., 2002b), and drinking and driving (Wagenaar, O'Malley, & LaFond, 2001)	1) Self-report questionnaire; 2) cross-sectional survey design-limited causal relationship; 3) limited generalizability
Holguin (2011)	IV- Sex, age, ethnicity, prior social network, prior substance abuse, length of stay in the U.S., place of living. DV- Current substance use, current social network	Cross-sectional survey design.	1) 52 international freshman and first-year graduate students attending Villanova University during the 2010-2011 academic year; 2) online survey	Gender (female n=28, male n=23), Age (range 18-34 years old)	1) paired-samples to test to compare the mean rate of prior substance use score, before coming to the U.S., with the mean rate of current substance use, after coming to the U.S.; 2) regression analysis to test the influence of current social network and prior substance use on current substance abuse	1) international students after living in the U.S. increased consumption of illegal and legal substances-significant; 2) prior substance use was associated with higher levels of current substance use after coming to the U.S.	Youth Risk Behavior Surveillance System for Alcohol and other drug use (YRBSS) developed by the Center for Disease Control and Prevention (CDC, 2008).	1) sample from only one university -limited generalizability; 2) online survey-low response rate; 3) small sample size

Noyongoyo (2011)	IV- Continent of origin, food availability, buying imported food, length of residency in the U.S., living place, eating out, & interaction terms, DV- Changing in eating habits	Cross-sectional survey design.	142 international students. Online survey	Gender (Female 66.2%, male 33.8%). Age (18-22 34.5%, 23-27 40.8%, 28-32 16.9%, 33+ 7.7%), Continent of origin (Asia 48.6%, Africa 16.2%, Asia 14.2%, Australia 2.8%, North & South America 14.8%). Education level (freshman 5.6%, sophomore 11.3%, junior 12.0%, senior 19.0%, master 25.4%, PhD 26.8%)	Correlations and multiple regression to assess international students' dietary acculturation issues	1) Food choices of international students are guided by the availability of students‘ native foods in local stores, as well as the time spent in the United States; 2) Dietary acculturation is a consequence of length of time, friendship ties, and availability of imported native foods.	N/A	1) Limited generalizability; 2) self-reporting & unreliability of reporting from memory; 3) small sample size
Sa et al. (2013)	IV-Gender, current living place, description of living situation, length of stay in the U.S., acculturative stress, anxiety & depression, home smoking rules, campus-wide tobacco-free policy. DV-Cigarette smoking	Cross-sectional survey design.	1) 1,201 students from 52 4-year U.S. universities; 2) online survey (34% response rate).	Gender (male 52%), Education level (48% were undergraduates, 52% graduate students), Age (18- 28 years 64%; M[SD]=26 [5.7]), Length of stay in the U.S. The median length of stay in the United States (M[SD]= 3.0 years [1.2]); living situation (living off campus 62%, living on campus 38%)	Multivariate logistic regression analysis to predict to predict increased cigarette use among all current smokers.	1) Overall smoking prevalence was 43.5%; 2) gender, living place, living situation, length of stay as a student in the U.S., home smoking rules, campus-wide tobacco-free policies, and levels of acculturative stress, anxiety, and depression were significantly associated with an increase in smoking.	National College Health Risk Survey	1) Cross-sectional design-unsuitable for making causal inferences; 2) used non-validated measures; 3) limited generalizability; 4) low response rate
Yeramaneni & Sharma (2009)	IV- demographic variables, alcohol-related self-efficacy, & self-control for quitting alcohol DV-Alcohol use & binge drinking	Cross-sectional survey design	245 Asian Indian students (undergraduates, graduates, & doctoral students)	From a total of 1,336 Asian Indian students from two universities, about 18.3% (245) students responded to the survey. In the entire sample of 245 college students, 68.6% (168) were males, and 31.4% (77) were females. The mean age was 25 years (S.D = 3.04).	Chi-square and regression analysis	The prevalence of binge drinking was 51.3% in the study sample. From those who reported binge drinking, 44.1% were males (7.2% females). 62% of Indian students consumed alcohol in the past 30 days. Alcohol-related self-efficacy and self-control for quitting alcohol were significant predictors for average number of drinks consumed in a typical week.	Core Alcohol and Drug Survey (CORE) & Alcohol Expectancy Questionnaire (AEQ) – Revised Adult (Brown, Christiansen, & Goldman, 1987; Presley, Meilman, & Lyerla, 1994).	1) Non probability sampling-sampling bias; 2) Self-reported questionnaire → respondents may have under or over reported their drinking behaviors → measurement bias; 3) Because of inaccurate memory, recall over one week and one month may not accurately depict the true picture

APPENDIX F

COLLEGES AND UNIVERSITIES WITH MORE THAN 5000 INTERNATIONAL STUDENTS

State	School	IS Population (#)	State	School	IS Population (#)
AZ	Arizona State University	8683	MN	University of Minnesota - Twin Cities	6,621
CA	University of Southern California	10,932	NY	New York University	11,164
	University of California - Los Angeles	9,579		Columbia University	10,486
	University of California – Berkeley	6,372		SUNY University at Buffalo	6,594
	Academy of Art University	5,233		Cornell University	5,403
FL	University of Florida	6,135	OH	Ohio State University - Main Campus	6,800
GA	Georgia Institute of Technology	5,068	PA	Penn State University - University Park	7,024
IL	University of Illinois - Urbana-Champaign	10,843		University of Pennsylvania	6,024
IN	Purdue University - Main Campus	9,988		Carnegie Mellon University	5,501
	Indiana University – Bloomington	6,661	TX	University of Texas - Dallas	6,296
MA	Northeastern University	9,078		University of Texas - Austin	5,663
	Boston University	7,143		Texas A&M University	5,582
	Harvard University	5,244		Houston Community College	5,208
MI	Michigan State University	7,704	WA	University of Washington	7,469
	University of Michigan - Ann Arbor	7,273		**Total**	**211,771**

APPENDIX G

UNIVERSITY INTERNATIONAL CLUBS FOR CONDUCTING ONLINE SURVEYS

University	No	Website Link	Information
Academy of Art University	3 clubs	http://www.academyart.edu/students/clubs-organizations	Facebook pages, contact people and emails
Arizona State University	17 clubs	https://students.asu.edu/international/support/orgs	Facebook pages, contact people and emails
Cornell University	16 clubs	http://www.alumni.cornell.edu/participate/international/InternationalCornellClubsAlumuniGroups.cfm	Webpages, Facebook pages, contact people and emails
Georgia Institute of Technology	2 clubs	http://oie.gatech.edu/content/student-organizations	Facebook pages, contact people and emails
Northeastern University	35 clubs	http://www.northeastern.edu/issi/organizations.html	Contact emails, but no info. about the club website
Michigan State University	23 clubs	http://internationalcenter.umich.edu/intlstudents/orgs.html	Organization websites & Facebook pages
SUNY University at Buffalo	20 clubs	http://wings.buffalo.edu/intlservices/clubs.html#Bangladeshi_Student_Association	Facebook pages, contact people and emails
University of Illinois – Urbana-Champaign	7 clubs	http://www.isss.illinois.edu/involved/rso.html#africa	Facebook pages, contact people & emails
Total	**123 clubs**		

APPENDIX H

103 COLLEGES AND UNIVERSITIES WITH LESS THAN 1000 INTERNATIONAL STUDENTS

State	School	IS Population (#)	State	School	IS Population (#)
AL	Troy University	801	NV	University of Nevada – Reno	668
	University of Alabama – Birmingham	767		College of Southern Nevada	443
	University of Alabama-Huntsville	497		Truckee Meadows Community College	48
AK	University of Alaska Anchorage	284		DeVry University-Nevada	12
	University of Alaska – Fairbanks	235	NH	University of New Hampshire	727
	Thunderbird School of Global Management	528		New England College	74
	Mesa Community College	311		University of New Hampshire School of Law	58
AR	University of Central Arkansas	517	NM	Eastern New Mexico University - Main Campus	158
	Arkansas Tech University	427		New Mexico Highlands University	132
	John Brown University	130		Saint John's College	57
CO	Colorado School of Mines	767	NC	University of North Carolina - Greensboro	700
CT	University of Hartford	503	ND	University of North Dakota - Main Campus	960
D.C.	Catholic University of America	552		Minot State University	384
	Gallaudet University	177		Dickinson State University	136
HI	Hawaii Pacific University	866		Jamestown College	62
	Kapiolani Community College	721	OK	Oklahoma City University	401
	University of Hawaii - Hilo	178	OR	Portland Community College	757
ID	Boise State University	812		Lane Community College	355

	University of Idaho	801	RI	Rhode Island School of Design	747
	Brigham Young University	652		University of Rhode Island	489
	Lewis-Clark State College	137		Bryant University	256
IA	Drake University	339	SC	Trident Technical College	289
	Kirkwood Community College	332		Winthrop University	211
	University of Northern Iowa	520		College of Charleston	165
			SD	South Dakota State University	669
KS	Johnson County Community College	851		University of South Dakota - Main Campus	217
	Pittsburg State University	530		Northern State University	193
KY	University of Louisville	728		South Dakota School of Mines and Technology	150
	Northern Kentucky University	639		Augustana College	135
LA	Louisiana Tech University	839	TN	University of Memphis	706
	University of New Orleans	783	UT	Utah State University	945
	McNeese State University	376		Utah Valley State College	559
ME	University of Maine	537		Weber State University	442
	Colby College	153	VT	University of Vermont	432
	Bates College	116		Middlebury College	327
	University of Southern Maine	98		Saint Michael's College	151
	Bowdoin College	86		Norwich University	62
MD	Towson University	681	WV	Marshall University	435
MN	Minnesota State University – Moorhead	506		University of Charleston	150
	University of St. Thomas	486		Fairmont State University	123
MS	Mississippi State University	846		Concord University	113
	University of Mississippi - Main Campus	748	WI	Marquette University	714
	University of Southern Mississippi	389		University of Wisconsin - La Crosse	362
	Jackson State University	317		University of Wisconsin – Stout	307
	Belhaven University	109	WY	University of Wyoming	887

MT	Montana State University – Bozeman	676	Northwest College	73
	University of Montana – Missoula	541	Western Wyoming Community College	35
	Montana Tech of the University of Montana	191	Casper College	24
	Montana State University-Billings	164	Sheridan College	20
	Rocky Mountain College	49	**Total**	**41,859**
NE	University of Nebraska – Omaha	983		
	University of Nebraska-Kearney	519		
	University of Nebraska Medical Center	272		
	Creighton University	272		

APPENDIX I

UNIVERSITY INTERNATIONAL CLUBS FOR CONDUCTING ONLINE SURVEY

School	Club	Website Link
[L][1] Arizona State University	Indian Student Association	https://www.facebook.com/groups/IndianStudentsAssociationASU/?ref=
[M][2] Case Western Reserve University	Taiwanese Student Association	https://www.facebook.com/groups/157716070335/?ref=browser
[S][3] Dallas Baptist University	International Chinese Fellowship (ICF)	https://www.facebook.com/groups/DBUICF/?ref=browser
[L] Georgia Tech	Vietnamese Student Association	https://www.facebook.com/groups/375220185927697/?ref=browser
[M] Indiana State University	Hispanic Student Association (HAS)	https://www.facebook.com/groups/160392252753/
[L] Indiana University Bloomington	Indian Student Association (ISA)	https://www.facebook.com/groups/ub.indian.sa/?ref=browser
[M] Pittsburg State University	International student Association	https://www.facebook.com/groups/ISA.PSU.2013/members/
[M] Purdue University	Asian American Association	https://www.facebook.com/groups/277739318908328/?ref=browser
	American India Foundation (AIF) Purdue Chapter	https://www.facebook.com/groups/107578199343453/?ref=browser
[S] Texas A&M International University	Indian Student Association	https://www.facebook.com/groups/145711058968734/?ref=browser
[L] The Ohio State University	Vietnamese Student Association	https://www.facebook.com/groups/2200345383/members/
	Korean International Student Organization	https://www.facebook.com/groups/osukiso/?ref=browser
	Japanese Student Organization	https://www.facebook.com/groups/570894209641143/?ref=browser
	Korean Student Association	https://www.facebook.com/groups/7279998763/?ref=browser
[M] University of Houston	Vietnamese Student Association	https://www.facebook.com/groups/2213284591/?ref=browser
	Korean Student Association	https://www.facebook.com/groups/uhkorean/?ref=browser
	Turkish Student Association (TSA)	https://www.facebook.com/groups/tsa.uh/?ref=browser
	Multicultural Greek Counsel	https://www.facebook.com/groups/118539842529/?ref=browser
	Nigerian Student Association	https://www.facebook.com/groups/UH.NSA/?ref=browser
[L] University of Illinois Urbana-Champaign	Brazilian Student Association	https://www.facebook.com/groups/144056828965513/

	Asian American Association	https://www.facebook.com/groups/aaauiuc/?ref=browser
[L] University of Michigan-Ann Arbor	Brazilian Student Association	https://www.facebook.com/groups/144056828965513/
	Russian Student Association	https://www.facebook.com/groups/14294538929/?ref=browser
	Lebanese Student Association	https://www.facebook.com/groups/2200515191/?ref=browse
[M] University of North Texas	International Student Association (ISA)	https://www.facebook.com/groups/isaunthsc/?ref=browser
[M] University of Texas Arlington	Taiwanese Student Association	https://www.facebook.com/groups/153987744686308/?ref=browser
	African Student Organization	https://www.facebook.com/groups/2202034219/members/
	International Student	https://www.facebook.com/groups/utainternational/?ref=browser
	Chinese Student Association	https://www.facebook.com/groups/1404334606467073/members/
	Asian Student Association	https://www.facebook.com/groups/UTAASA/?ref=browser
	Korean Student Association (KSA)	https://www.facebook.com/groups/utaksa/?ref=browser
	Vietnamese Student Association	https://www.facebook.com/groups/UTAVSA/members/
[L] University of Texas Austin	Japanese Student Association	https://www.facebook.com/groups/437276219641853/?ref=browser
	Hindu Student Association	https://www.facebook.com/groups/2201237396/?ref=browser
N/A	French American Student Organization (FASO)	https://www.facebook.com/groups/2236016999/?ref=browser
	Meehan Adjournment of a Meeting Organization	https://www.facebook.com/groups/466243253511036/?ref=browser
	International Student Association (ISA)	https://www.facebook.com/groups/2201433311/?ref=browser
	Madison Bridges Internatio	https://www.facebook.com/groups/718547368199809/?ref=browser

Note[1-3]. [L]= universities with more than 5000 international students, [M]= universities with 1000–5000 international students, [S]= universities with less than 1000 international students.

APPENDIX J

INFORMED CONSENT (ONLINE VERSION)

PRINCIPAL INVESTIGATOR:
Youn Kyoung/Lily Kim
Ph.D. Candidate
Graduate Research Assistant
Adjunct Faculty
School of Social Work
211 S. Cooper Street
Suite SWCA-313
Arlington, Texas 76019-0129
(817) 908-8457
younkyoung.kim@mavs.uta.edu

FACULTY ADVISOR:
Courtney Cronley, Ph.D., M.S.S.W.
Assistant Professor
University of Texas, Arlington
School of Social Work
211 South Cooper St.
Box 19129
Arlington, TX 76019

TITLE OF PROJECT
Testing the Mediating Effects of Resilience and Mental Health on the Relationship between Acculturative Stress and Alcohol Use among International Students

INTRODUCTION
Thank you for considering my invitation to take part in this study. Participation in the study is completely voluntary. There will be no loss of benefit to those who choose not to participate in the study and those who decide to withdraw from the study before completing it. However, your participation is highly appreciated and your contribution will be very valuable because the result of this study could eventually benefit you as well as your fellow international students.

PURPOSE
The purpose of this study is to examine the direct effects of acculturative stress, resilience, and mental health on alcohol use. In addition, it is to test the mediating roles of resilience and mental health in the relationship between acculturative stress and alcohol use among international students to determine whether or not the process of resilience can reduce the negative impact of acculturative stress on alcohol use.

DURATION
Your participation in this study will last approximately 20-30 minutes.

NUMBER OF PARTICIPANTS
The number of anticipated participants in this research study is 1000.

PROCEDURES
Once you agree to this online survey, you will complete the online, confidential survey about your opinions and experiences related to acculturative stress, resilience, mental health, and alcohol use. If you are not an international student, you will be automatically exited from the survey. As you complete the questions, your answers will be automatically saved. At the end of the survey, there will be a link that will lead to a different survey for compensation.

POSSIBLE BENEFITS
You will have the opportunity to reflect upon the stress, mental health, and resilience to adapt to a new cultural and educational environment as well as your use of alcohol. More importantly, the results of this study may be useful in informing U.S. colleges and universities as they make decisions about the services or programs for international students and may thus benefit other international students.

POSSIBLE RISKS/DISCOMFORTS
The risks for participating in this study are minimal. Some of the survey questions may make you feel uncomfortable. Reflections on your experiences regarding acculturative stress, resilience, mental health, and alcohol use may also make you feel unpleasant. Should you experience any discomfort, you can inform the researcher immediately or contact one of the resources listed at the end of the survey.

COMPENSATION
All participants will have the opportunity to be entered into a raffle for **one of three $50 Walmart gift certificates, *which will be distributed at the end of data collection.*** You will be informed by email if you have won.

ALTERNATIVE PROCEDURES
There are no alternative procedures offered for this study. However, you can elect not to participate in the study or quit at any time at no consequence.

VOLUNTARY PARTICIPATION
Participation in this research study is voluntary. You have the right to decline participation in any or all study procedures or quit at any time at no consequence. Should you choose not to complete all study procedures, you will not receive the opportunity to be entered into a raffle for the gift certificates.

CONFIDENTIALITY
No identifiable information will be required in order to participate in the online survey to ensure the confidentiality of all participants. However, you can provide your email address if you choose to participate in the raffle. Your responses will not be tied to your email address. All information you provide will be kept confidential and will not be disclosed unless otherwise required by law. Only the researcher will have access to the data. No research records will be

released without your consent. The finding may be used in future research, but data will not contain any identifying information that would associate it with you.

CONTACT FOR QUESTIONS

You may contact the researcher, Youn Kyoung Kim, to discuss your feelings and any questions, concerns, and complaints you might have. Questions about this research study may be directed to Youn Kyoung/Lily Kim at 817-908-8457 or via email at younkyoung.kim@mavs.uta.edu. Any questions you may have about your rights as a research participant or a research-related injury may be directed to the Office of Research Administration Regulatory Services at 817-272-2105 or regulatoryservices@uta.edu.

CONSENT

By beginning the survey, you acknowledge that you have read this information and agree to participate in this research, with the knowledge that you are free to withdraw your participation at any time without penalty.

Once you agree to this online survey, you can start the survey. If you are not an international student, you will be automatically exited from the survey. As you complete the questions, your answers will be automatically saved.

If you are 18 years of age or older and after reading this informed consent you choose to participate in this study, please check the box below and then hit "Next."

a. I AGREE to participate
b. I Do Not agree to participate

Are you an international student in the United States?

a. Yes
b. No

If yes, what is your visa type (for example F-1 or J-1, etc.)? _____

ONLINE QUESTIONNAIRE

Section I: Alcohol Use

Direction: Please read each statement and choose the number on the scale next to the statement that best indicates how well the statement describes you.

1. Have you ever had any alcoholic beverage to drink-more than just a few sips? (Alcoholic beverages include beer, wine, liquor, and any other beverage that contains alcohol)
   ☐ No
   ☐ Yes – If yes, what was your age when you first had any alcoholic beverage _____

2. How many times (if any) have you had alcoholic beverages to drink-more than just a few sips in your life time?
   ☐ 0 times ☐ 1-2 times ☐ 3-5 times
   ☐ 6-9 times ☐ 10-19 times ☐ 20-39 times
   ☐ 40+ times

3. How many times (if any) have you had alcoholic beverages to drink-more than just a few sips during the last 12 months?
   ☐ 0 times ☐ 1-2 times ☐ 3-5 times
   ☐ 6-9 times ☐ 10-19 times ☐ 20-39 times
   ☐ 40+ times

4. How many times (if any) have you had alcoholic beverages to drink-more than just a few sips during the last 30 days?
   ☐ 0 times ☐ 1-2 times ☐ 3-5 times
   ☐ 6-9 times ☐ 10-19 times ☐ 20-39 times
   ☐ 40+ times

5. When you do drink alcoholic beverages, how often do you drink enough to feel pretty high?
   ☐ I don't drink alcohol ☐ on none of the occasions
   ☐ on few of the occasions ☐ on about half of the occasions
   ☐ on most of the occasions ☐ on nearly all of the occasions

6. Think back over the LAST TWO WEEKS. How many times have you had five or more drinks in a row? (A "drink" is a bottle of beer, a glass of wine, a wine cooler, a shot glass of liquor, a mixed drink, etc.)
   ☐ None ☐ once ☐ twice
   ☐ Three or five times ☐ six to nine times ☐ ten or more times

7. How many times (if any) have you been drunk or very high from drinking alcoholic beverages in your life time?
   ☐ 0 times ☐ 1-2 times ☐ 3-5 times
   ☐ 6-9 times ☐ 10-19 times ☐ 20-39 times
   ☐ 40+ times

8. How many times (if any) have you been drunk or very high from drinking alcoholic beverages during the last 12 months?
   ☐ 0 times ☐ 1-2 times ☐ 3-5 times
   ☐ 6-9 times ☐ 10-19 times ☐ 20-39 times
   ☐ 40+ times

9. How many times (if any) have you been drunk or very high from drinking alcoholic beverages during the last 30 days?
   ☐ 0 times ☐ 1-2 times ☐ 3-5 times
   ☐ 6-9 times ☐ 10-19 times ☐ 20-39 times
   ☐ 40+ times

Section II: Acculturative Stress

Modified Index of Life Stress (ILS; Yang & Clum, 1995)

Direction: Please rate how much you agree with the following statements using your own experiences for the past 3 months.

	Statements	Never	A little	Sometimes	Often
1	My English embarrasses me when I talk to people	0	1	2	3
2	I don't like the religions in the U.S.	0	1	2	3
3	I worry about my academic performance	0	1	2	3
4	I'm not doing as good as I want to in school	0	1	2	3
5	My English makes it hard for me to read articles, books, etc.	0	1	2	3
6	I don't like the things people do here for their entertainment	0	1	2	3
7	I can't express myself well in English	0	1	2	3
8	I worry about my financial situation	0	1	2	3
9	My financial situation in influences my academic study	0	1	2	3
10	My English makes it hard for me to understand lectures	0	1	2	3
11	My financial situation makes my life here very hard	0	1	2	3
12	Many opportunities are denied to me	0	1	2	3
13	People are biased against me	0	1	2	3
14	I feel that I receive unequal treatment	0	1	2	3
15	I am treated differently because of my race/color	0	1	2	3

Section II: Resilience

Modified Resilience Scale for Adults (Friborg et al., 2003)

Direction: Please read each statement and choose the number on the scale next to the statement that best indicates how well the statement describes you.

Statements		Not at all Well	Not very Well	Slightly Well	Somewhat Well	Well	Very Well	Extremely Well
1	I trust my judgments and decisions	1	2	3	4	5	6	7
2	No matter what happens, I always find a solution	1	2	3	4	5	6	7
3	I believe in my abilities	1	2	3	4	5	6	7
4	In difficult periods I can find something good to become successful at	1	2	3	4	5	6	7
5	I know how to reach my future goals	1	2	3	4	5	6	7
6	I have clear goals for the future	1	2	3	4	5	6	7
7	I feel that my future looks very promising	1	2	3	4	5	6	7
8	I'm good at meeting new people	1	2	3	4	5	6	7
9	I make new friendships easily	1	2	3	4	5	6	7
10	I enjoy being with other people	1	2	3	4	5	6	7
11	I prefer a plan before starting new things	1	2	3	4	5	6	7
12	Rules and regular routines simplify my everyday life	1	2	3	4	5	6	7
13	I'm good at organizing my time	1	2	3	4	5	6	7
14	There are strong bonds in my family	1	2	3	4	5	6	7
15	My family and I communicate well	1	2	3	4	5	6	7
16	My family and I have a common understanding of what's important in life	1	2	3	4	5	6	7
17	When needed, I always have someone who can help me	1	2	3	4	5	6	7
18	I have friends/family members that encourage me	1	2	3	4	5	6	7
19	The bonds among my friends are strong	1	2	3	4	5	6	7
20	I can discuss personal issues with friends/family	1	2	3	4	5	6	7

Section III: Depression & Anxiety

PHQ-9 (Kroenke, Spitzer, & Williams, 2001) & GAD-7 (Spitzer, Kroenke, Williams, & Lowe, 2006)

Direction: Over the last 2 weeks, how often you have been bothered by any of the following problems?

Statements		Not at all	Several days	More than half the days	Nearly every day
GAD-7					
1	Feeling nervous anxiety or on edge	0	1	2	3
2	Not being able to stop or control worrying	0	1	2	3
3	Worrying too much about different things	0	1	2	3

4	Trouble relaxing	0	1	2	3
5	Being so restless that it is hard to sit still	0	1	2	3
6	Becoming easily annoyed or irritable	0	1	2	3
7	Feeling afraid as if something awful might happen	0	1	2	3
PHQ-9					
1	Little interest or pleasure in doing things	0	1	2	3
2	Feeling down, depressed, or hopeless	0	1	2	3
3	Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4	Feeling tired or having little energy	0	1	2	3
5	Poor appetite or overeating	0	1	2	3
6	Feeling bad about yourself – or that you are a failure or have let yourself or your family down	0	1	2	3
7	Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8	Moving or speaking so slowly that other people could have noticed? Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9	Thoughts that you would be better off dead of or hurting yourself in some way	0	1	2	3

Section V: Demographic Characteristics

1. How old are you? _____

2. What is your gender?
   ☐ Male ☐ Female ☐ Other

3. Do you have any religious affiliation?
   ☐ None ☐ Catholic ☐ Jewish
   ☐ Muslim ☐ Hinduism ☐ Buddhism
   ☐ Other _____

4. What is your marital status?
   ☐ Never married ☐ Married ☐ Divorced
   ☐ Separated ☐ Widowed ☐ Other

5. Do you live with your family in the U.S.?
   ☐ I don't live with my family
   ☐ Mother only ☐ Father only ☐ Sibling(s) only
   ☐ Mother and Father only ☐ Other

6. How many years have you lived in the U.S.?
   ☐ Less than 6 months ☐ 6 months to 1 year ☐ up to 2 years
   ☐ up to 3 years ☐ up to 4 years ☐ up to 5 years
   ☐ more than 5 years

7. Have you had other educational experiences in the U.S. before the university you are attending now (for example, studying abroad at a prior point in time)?
   ☐ No ☐ Yes

8. What is your country of origin? Please specify: _____

9. What is your major of study? Please specify: _____

10. What university/school do you attend? Please specify: _____

11. What is your educational level now?
   ☐ College freshman ☐ College sophomore ☐ College junior
   ☐ College senior ☐ Master-1st year ☐ Master-2nd year
   ☐ Master-3rd year ☐ Master-4th year ☐ PhD -1st year
   ☐ PhD – 2nd year ☐ PhD – 3rd year ☐ PhD – 4th year
   ☐ PhD – 5th or more than 5th year ☐ Other

12. What is your current GPA?
   ☐ Below 1.0 ☐ 1.0-1.49 ☐ 1.5-1.9
   ☐ 2- 2.49 ☐ 2.5-2.9 ☐ 3-3.49
   ☐ 3.5-4.0

13. What is your current source of funding for your studies? **(Choose just one primary source)**
   ☐ Graduate teaching/research assistantship ☐ Department/school scholarship
   ☐ Family funds ☐ Fellowship
   ☐ On-campus job ☐ Loans
   ☐ Previous personal savings ☐ Other

14. If you would like to participate in the raffle for a $50 Wal-Mart gift card please click the link below to go to a completely separate survey to enter your email address. Your email address for compensation will not be linked to your responses. The raffle will be held at the end of the data collection.

    https://uta.qualtrics.com/SE/?SID=SV_3jIgK2fqu0hrHNj

If you are concerned that you may have severe depression, alcohol problems, or suicidal ideation contact the SAMHSA National Helpline @ 1-800-662-HELP FREE (4357)

SAMHSA's National Helpline (also known as the Treatment Referral Routing Service) is a

confidential, free, 24-hour-a-day, 365-day-a-year, information service, in English and Spanish, for individuals and family members facing mental health and/or substance use disorders. This service provides referrals to local treatment facilities, support groups, and community-based organizations. Callers can also order free publications and other information. Call 1-800-662-HELP FREE (4357) or visit the online treatment locators.

APPENDIX K
INFORMED CONSENT (PAPER VERSION)

PRINCIPAL INVESTIGATOR:
Youn Kyoung/Lily Kim
Ph.D. Candidate
Graduate Research Assistant
Adjunct Faculty
School of Social Work
211 S. Cooper Street
Suite SWCA-313
Arlington, Texas 76019-0129
(817) 908-8457
younkyoung.kim@mavs.uta.edu

FACULTY ADVISOR:
Courtney Cronley, Ph.D., M.S.S.W.
Assistant Professor
University of Texas, Arlington
School of Social Work
211 South Cooper St.
Box 19129
Arlington, TX 76019

TITLE OF PROJECT
Testing the Mediating Effects of Resilience and Mental Health on the Relationship between Acculturative Stress and Alcohol Use among International Students

INTRODUCTION
Thank you for considering my invitation to take part in this study. Participation in the study is completely voluntary. There will be no loss of benefit to those who choose not to participate in the study and those who decide to withdraw from the study before completing it. However, your participation is highly appreciated and your contribution will be very valuable because the result of this study could eventually benefit you as well as your fellow international students.

PURPOSE
The purpose of this study is to examine the direct effects of acculturative stress, resilience, and mental health on alcohol use. In addition, it is to test the mediating roles of resilience and mental health in the relationship between acculturative stress and alcohol use among international students to determine whether or not the process of resilience can reduce the negative impact of acculturative stress on alcohol use.

DURATION
Your participation in this study will last approximately 20-30 minutes.

NUMBER OF PARTICIPANTS
The number of anticipated participants in this research study is 1000.

PROCEDURES
Once you agree to this survey, you will complete the confidential survey about your opinions and experiences related to acculturative stress, resilience, mental health, and alcohol use. If you are not an international student, you can't participate in the survey. At the end of the survey, you may fill out the form to provide your email address for the $50 Walmart gift card.

POSSIBLE BENEFITS
You will have the opportunity to reflect upon the stress, mental health, and resilience to adapt to a new cultural and educational environment as well as your use of alcohol. More importantly, the results of this study may be useful in informing U.S. colleges and universities as they make decisions about the services or programs for international students and may thus benefit other international students.

POSSIBLE RISKS/DISCOMFORTS
The risks for participating in this study are minimal. Some of the survey questions may make you feel uncomfortable. Reflections on your experiences regarding acculturative stress, resilience, mental health, and alcohol use may also make you feel unpleasant. Should you experience any discomfort, you can inform the researcher immediately or contact one of the resources listed at the end of the survey.

COMPENSATION
All participants will have the opportunity to be entered into a raffle for **one of three $50 Walmart gift certificates, *which will be distributed at the end of data collection.*** You will be informed by email if you win.

ALTERNATIVE PROCEDURES
There are no alternative procedures offered for this study. However, you can elect not to participate in the study or quit at any time at no consequence.

VOLUNTARY PARTICIPATION
Participation in this research study is voluntary. You have the right to decline participation in any or all study procedures or quit at any time at no consequence. Should you choose not to complete all study procedures, you will not receive the opportunity to be entered into a raffle for the gift certificates.

CONFIDENTIALITY
No identifiable information will be required in order to participate in the survey to ensure the confidentiality of all participants. However, you can provide your email address if you choose to participate in the raffle. Your responses will not be tied to your email address. All information you provide will be kept confidential and will not be disclosed unless otherwise required by law. Only the researcher will have access to the data. No research records will be released without

your consent. The finding may be used in future research, but data will not contain any identifying information that would associate it with you.

CONTACT FOR QUESTIONS

You may contact the researcher, Youn Kyoung Kim, to discuss your feelings and any questions, concerns, and complaints you might have. Questions about this research study may be directed to Youn Kyoung/Lily Kim at 817-908-8457 or via email at younkyoung.kim@mavs.uta.edu. Any questions you may have about your rights as a research participant or a research-related injury may be directed to the Office of Research Administration Regulatory Services at 817-272-2105 or regulatoryservices@uta.edu.

CONSENT

By beginning the survey, you acknowledge that you have read this information and agree to participate in this research, with the knowledge that you are free to withdraw your participation at any time without penalty.

If you are an international student, 18 years of age or older and after reading this informed consent you choose to participate in this study, by signing below, you agree that you have been informed about this study and given the chance to ask questions before you sign. You can ask other questions at any time.

Signature _____

Date _____

SURVEY QUESTIONNAIRE (SEPARATE DOCUMENT)

Section I: Alcohol Use

Direction: Please read each statement and choose the number on the scale next to the statement that best indicates how well the statement describes you.

10. Have you ever had any alcoholic beverage to drink-more than just a few sips? (Alcoholic beverages include beer, wine, liquor, and any other beverage that contains alcohol)
    - ☐ No
    - ☐ Yes – If yes, what was your age when you first had any alcoholic beverage _____

11. How many times (if any) have you had alcoholic beverages to drink-more than just a few sips in your life time?
    - ☐ 0 times
    - ☐ 1-2 times
    - ☐ 3-5 times
    - ☐ 6-9 times
    - ☐ 10-19 times
    - ☐ 20-39 times
    - ☐ 40+ times

12. How many times (if any) have you had alcoholic beverages to drink-more than just a few sips during the last 12 months?
    - ☐ 0 times
    - ☐ 1-2 times
    - ☐ 3-5 times
    - ☐ 6-9 times
    - ☐ 10-19 times
    - ☐ 20-39 times
    - ☐ 40+ times

13. How many times (if any) have you had alcoholic beverages to drink-more than just a few sips during the last 30 days?
    - ☐ 0 times
    - ☐ 1-2 times
    - ☐ 3-5 times
    - ☐ 6-9 times
    - ☐ 10-19 times
    - ☐ 20-39 times
    - ☐ 40+ times

14. When you do drink alcoholic beverages, how often do you drink enough to feel pretty high?
    - ☐ I don't drink alcohol
    - ☐ on none of the occasions
    - ☐ on few of the occasions
    - ☐ on about half of the occasions
    - ☐ on most of the occasions
    - ☐ on nearly all of the occasions

15. Think back over the LAST TWO WEEKS. How many times have you had five or more drinks in a row? (A "drink" is a bottle of beer, a glass of wine, a wine cooler, a shot glass of liquor, a mixed drink, etc.)
    - ☐ None
    - ☐ once
    - ☐ twice
    - ☐ Three or five times
    - ☐ six to nine times
    - ☐ ten or more times

16. How many times (if any) have you been drunk or very high from drinking alcoholic beverages in your life time?
    - ☐ 0 times
    - ☐ 1-2 times
    - ☐ 3-5 times
    - ☐ 6-9 times
    - ☐ 10-19 times
    - ☐ 20-39 times
    - ☐ 40+ times

17. How many times (if any) have you been drunk or very high from drinking alcoholic beverages during the last 12 months?

☐ 0 times ☐ 1-2 times ☐ 3-5 times
☐ 6-9 times ☐ 10-19 times ☐ 20-39 times
☐ 40+ times

18. How many times (if any) have you been drunk or very high from drinking alcoholic beverages during the last 30 days?

☐ 0 times ☐ 1-2 times ☐ 3-5 times
☐ 6-9 times ☐ 10-19 times ☐ 20-39 times
☐ 40+ times

Section II: Acculturative Stress

Modified Index of Life Stress (ILS; Yang & Clum, 1995)

Direction: Please rate how much you agree with the following statements using your own experiences for the past 3 months.

	Statements	Never	A little	Sometimes	Often
1	My English embarrasses me when I talk to people	0	1	2	3
2	I don't like the religions in the U.S.	0	1	2	3
3	I worry about my academic performance	0	1	2	3
4	I'm not doing as good as I want to in school	0	1	2	3
5	My English makes it hard for me to read articles, books, etc.	0	1	2	3
6	I don't like the things people do here for their entertainment	0	1	2	3
7	I can't express myself well in English	0	1	2	3
8	I worry about my financial situation	0	1	2	3
9	My financial situation in influences my academic study	0	1	2	3
10	My English makes it hard for me to understand lectures	0	1	2	3
11	My financial situation makes my life here very hard	0	1	2	3
12	Many opportunities are denied to me	0	1	2	3
13	People are biased against me	0	1	2	3
14	I feel that I receive unequal treatment	0	1	2	3
15	I am treated differently because of my race/color	0	1	2	3

Section II: Resilience

Modified Resilience Scale for Adults (Friborg et al., 2003)

Direction: Please read each statement and choose the number on the scale next to the statement that best indicates how well the statement describes you.

Statements		Not at all Well	Not very Well	Slightly Well	Somewhat Well	Well	Very Well	Extremely Well
1	I trust my judgments and decisions	1	2	3	4	5	6	7
2	No matter what happens, I always find a solution	1	2	3	4	5	6	7
3	I believe in my abilities	1	2	3	4	5	6	7
4	In difficult periods I can find something good to become successful at	1	2	3	4	5	6	7
5	I know how to reach my future goals	1	2	3	4	5	6	7
6	I have clear goals for the future	1	2	3	4	5	6	7
7	I feel that my future looks very promising	1	2	3	4	5	6	7
8	I'm good at meeting new people	1	2	3	4	5	6	7
9	I make new friendships easily	1	2	3	4	5	6	7
10	I enjoy being with other people	1	2	3	4	5	6	7
11	I prefer a plan before starting new things	1	2	3	4	5	6	7
12	Rules and regular routines simplify my everyday life	1	2	3	4	5	6	7
13	I'm good at organizing my time	1	2	3	4	5	6	7
14	There are strong bonds in my family	1	2	3	4	5	6	7
15	My family and I communicate well	1	2	3	4	5	6	7
16	My family and I have a common understanding of what's important in life	1	2	3	4	5	6	7
17	When needed, I always have someone who can help me	1	2	3	4	5	6	7
18	I have friends/family members that encourage me	1	2	3	4	5	6	7
19	The bonds among my friends are strong	1	2	3	4	5	6	7
20	I can discuss personal issues with friends/family	1	2	3	4	5	6	7

Section III: Depression & Anxiety

PHQ-9 (Kroenke, Spitzer, & Williams, 2001) & GAD-7 (Spitzer, Kroenke, Williams, & Lowe, 2006)

Direction: Over the last 2 weeks, how often you have been bothered by any of the following problems?

Statements		Not at all	Several days	More than half the days	Nearly every day
GAD-7					
1	Feeling nervous anxiety or on edge	0	1	2	3
2	Not being able to stop or control worrying	0	1	2	3
3	Worrying too much about different things	0	1	2	3

4	Trouble relaxing	0	1	2	3
5	Being so restless that it is hard to sit still	0	1	2	3
6	Becoming easily annoyed or irritable	0	1	2	3
7	Feeling afraid as if something awful might happen	0	1	2	3
PHQ-9					
1	Little interest or pleasure in doing things	0	1	2	3
2	Feeling down, depressed, or hopeless	0	1	2	3
3	Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4	Feeling tired or having little energy	0	1	2	3
5	Poor appetite or overeating	0	1	2	3
6	Feeling bad about yourself – or that you are a failure or have let yourself or your family down	0	1	2	3
7	Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8	Moving or speaking so slowly that other people could have noticed? Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9	Thoughts that you would be better off dead of or hurting yourself in some way	0	1	2	3

Section V: Demographic Characteristics

15. How old are you? _____

16. What is your gender?
☐ Male ☐ Female ☐ Other

17. Do you have any religious affiliation?
☐ None ☐ Catholic ☐ Jewish
☐ Muslim ☐ Hinduism ☐ Buddhism
☐ Other _____

18. What is your marital status?
☐ Never married ☐ Married ☐ Divorced
☐ Separated ☐ Widowed ☐ Other

19. Do you live with your family in the U.S.?
☐ I don't live with my family
☐ Mother only ☐ Father only ☐ Sibling(s) only
☐ Mother and Father only ☐ Other

20. How many years have you lived in the U.S.?
☐ Less than 6 months ☐ 6 months to 1 year ☐ up to 2 years
☐ up to 3 years ☐ up to 4 years ☐ up to 5 years
☐ more than 5 years

21. Have you had other educational experiences in the U.S. before the university you are attending now (for example, studying abroad at a prior point in time)?
☐ No ☐ Yes

22. What is your country of origin? Please specify: _____

23. What is your major of study? Please specify: _____

24. What university/school do you attend? Please specify: _____

25. What is your educational level now?
☐ College freshman ☐ College sophomore ☐ College junior
☐ College senior ☐ Master-1st year ☐ Master-2nd year
☐ Master-3rd year ☐ Master-4th year ☐ PhD -1st year
☐ PhD – 2nd year ☐ PhD – 3rd year ☐ PhD – 4th year
☐ PhD – 5th or more than 5th year ☐ Other

26. What is your current GPA?
☐ Below 1.0 ☐ 1.0-1.49 ☐ 1.5-1.9
☐ 2- 2.49 ☐ 2.5-2.9 ☐ 3-3.49
☐ 3.5-4.0

27. What is your current source of funding for your studies? **(Choose just one primary source)**
☐ Graduate teaching/research assistantship ☐ Department/school scholarship
☐ Family funds ☐ Fellowship
☐ On-campus job ☐ Loans
☐ Previous personal savings ☐ Other

Incentive for Study Participation (SEPARATE DOCUMENT)

All participants will have the opportunity to be entered into a raffle for one of three $50 Walmart gift certificates, *which will be distributed at the end of data collection.* You will be informed by email if you have won.

If you would like to participate in the raffle for a $50 Wal-Mart gift card please click the link below to go to a completely separate survey to enter your email address. Your email address for compensation will not be linked to your responses. The raffle will be held at the end of the data collection.

https://uta.qualtrics.com/SE/?SID=SV_3jIgK2fqu0hrHNj

Mental Health Resource

Also, if you are concerned that you may have severe depression, alcohol problems, or suicidal ideation contact the SAMHSA National Helpline @ 1-800-662-HELP FREE (4357)

SAMHSA's National Helpline (also known as the Treatment Referral Routing Service) is a confidential, free, 24-hour-a-day, 365-day-a-year, information service, in English and Spanish, for individuals and family members facing mental health and/or substance use disorders. This service provides referrals to local treatment facilities, support groups, and community-based organizations. Callers can also order free publications and other information. Call 1-800-662-HELP FREE (4357) or visit the online treatment locators.

APPENDIX L

Flyer for Focus Group Meeting

APPENDIX M

Focus Group Meeting (April 16th, 2015)

APPENDIX N

E-mail to University International Student Club Moderators

Dear Club president

I am writing to ask about the feasibility of advertising an online survey through your university international student club website for the purposes of my dissertation research. The survey asks questions about acculturative stress, mental health, resilience, and alcohol use among international students in the U.S.

I am a doctoral student at the University of Texas (UT) at Arlington School of Social Work. Specifically, I am studying how resilience may prevent and/or reduce problematic alcohol use among international students. My dissertation chair is Dr. Courtney Cronley (cronley@uta.edu), and the study has been approved by the UT Arlington Office of Research's Institutional Review Board.

I am hoping that your organization would be willing to advertise the study on its webpage. Participants would complete one online survey that takes about 20-30 minutes to complete. I've attached the survey for your review.

As the international student body grows, it is critical that colleges and universities address the unique stress that many of us face adjusting to a new culture and resultant health risk behaviors (e.g., substance abuse). My research may provide much needed information about how resilience may mediate the negative effects of acculturative stress on alcohol use and hopefully inform prevention and intervention efforts to help reduce problematic alcohol use among international students.

Thank you very much for your time and attention. I am looking forward to hearing from you soon. Please feel free to contact either me (younkyoung.kim@mavs.uta.edu) or my dissertation chair, (Dr. Cronley, cronley@uta.edu), regarding this request.

Sincerely,
Youn Kyoung/Lily Kim
Ph.D. Candidate
Graduate Research Assistant
Adjunct Faculty
School of Social Work
Box 19129
211 S. Cooper Street
Suite SWCA-313
Arlington, Texas 76019-0129
younkyoung.kim@mavs.uta.edu

APPENDIX O

Online Survey Invitation

Dear Student

Welcome! My name is Youn Kyoung/Lily Kim. I am a PhD candidate at University of Texas at Arlington (UTA). As part of my dissertation research, I would like to invite you to participate in an online survey. The research has been approved by the UTA Office of Research's Institutional Review Board. In the study, I am examining the mediating effects of resilience and mental health on the relationship between acculturative stress and alcohol use among international students. As international students, we have all encountered acculturative stress as we adjust to life in the U.S. and the U.S. academic system. There is more information needed to improve behavioral health outcomes for international students in the United States. This is the purpose of my study.

To participate in this survey, you must be an international student. You will be asked to complete a series of questions online in which you select the option that best represents you, your experiences and feelings. They survey should take 20-30 minutes to complete. You may exit the survey at any time. Your responses will be securely stored on the UTA's server. No name or identifying information will be required to complete the survey. Participation is strictly confidential. There are no known significant risks associated with participating in the study.

You will have an opportunity to participate in a raffle for one of three $50 Walmart gift cards. To participate in the raffle you will provide your email address. That email address will not be linked to your responses. The raffle will be held at the end of the data collection process – anticipated to be in late October.

Remember, participation is completely voluntary. By clicking on the "agree" on the consent form you will then be able to complete this study.

Sincerely,
Youn Kyoung/Lily Kim
Ph.D. Candidate
Graduate Research Assistant
Adjunct Faculty
School of Social Work
Box 19129
211 S. Cooper Street
Suite SWCA-313
Arlington, Texas 76019-0129
younkyoung.kim@mavs.uta.edu

Online Survey Invitation (Shorter Version for Twitter)

Hi, I am Lily at UTA. You are invited to complete a dissertation survey on improving health risk behaviors. If interested, click this link.

In order to post my invitation on Twitter, characters with spaces should be 140. The above invitation is 140 characters. I will post my complete invitation letter on my Facebook website and it will be linked to the qualtrics site to participate in the question.

APPENDIX P

E-mail to University International Student Club President for Conducting the Paper-Based Survey

Dear Club president

For the purpose of my dissertation research, I am writing to ask about the feasibility of conducting a survey at any of your informal and/or formal international student events. The survey asks questions about acculturative stress, mental health, resilience, and alcohol use among international students in the U.S.

I am a doctoral student at the University of Texas (UT) at Arlington School of Social Work. Specifically, I am studying how resilience may prevent and/or reduce problematic alcohol use among international students. My dissertation chair is Dr. Courtney Cronley (cronley@uta.edu), and the study has been approved by the UT Arlington Office of Research's Institutional Review Board.

I am hoping that your organization would be willing to help me conduct a survey at your international student meetings. Participants would complete one paper survey that takes about 20-30 minutes to complete. I've attached the survey for your review.

As the international student body grows, it is critical that colleges and universities address the unique stress that many of us face adjusting to a new culture and resultant health risk behaviors (e.g., substance abuse). My research may provide much needed information about how resilience may mediate the negative effects of acculturative stress on alcohol use and hopefully inform prevention and intervention efforts to help reduce problematic alcohol use among international students.

Thank you very much for your time and attention. I am looking forward to hearing from you soon. Please feel free to contact either me (younkyoung.kim@mavs.uta.edu) or my dissertation chair, (Dr. Cronley, cronley@uta.edu), regarding this request.

Sincerely,
Youn Kyoung/Lily Kim
Ph.D. Candidate
Graduate Research Assistant
Adjunct Faculty
School of Social Work
Box 19129
211 S. Cooper Street
Suite SWCA-313
Arlington, Texas 76019-0129
younkyoung.kim@mavs.uta.edu

APPENDIX Q

From: ERA <erahelpdesk@uta.edu>
Sent: Tuesday, August 4, 2015 5:13 PM
To: Kim, Youn Kyoung
Cc: courtneycronley@uta.edu
Subject: Your IRB Protocol 2015-0822 has been approved

Dear Kim, Youn Kyoung,

Your IRB Protocol: 2015-0822 - "Testing the mediating effects of resilience and mental health on the relationship between acculturative stress and alcohol use among international students" has been approved.

You can view the approved Protocol by logging in at: http://www.uta.edu/ra/real/loginscreen.php?view=50&protocol_number=2015-0822&pview=original.

A formal approval letter will be sent to you by mail.

Thank you,
Electronic Research Administration
on behalf of the IRB Coordinator

For any additional help please contact Regulatory Services at regulatoryservices@uta.edu or call 817-272-3723.
For Technical Questions contact ERA Helpdesk at 817-272-1060 or email us at erahelpdesk@uta.edu.
Link to FAQ's & Tutorial:
http://www.uta.edu/ra/real/protocols/irb/faq.htm

APPENDIX R

OUTPUTS OF THE STRUCTURAL MODEL

```
INPUT INSTRUCTIONS

  TITLE: dissertation
  DATA:  File is data0211_2.csv;

  VARIABLE:
  NAMES ARE
  Q6 AS_FC AS_LD AS_PD AS_CA AS_AP
  R_PPS R_PPF R_SC R_SS R_FC R_SR
  Anxiety Depress DUM;

  USEVARIABLES ARE
  AS_FC AS_LD AS_PD AS_CA AS_AP
  R_PPS R_PPF R_SC R_SS R_FC R_SR
  Anxiety Depress DUM;

  MODEL:
  AS BY AS_FC AS_LD AS_PD AS_CA AS_AP ;
  R BY R_PPS R_PPF R_SC R_SS R_FC R_SR ;
  MH BY Anxiety Depress;

        R_PPF    WITH R_PPS  ;
        R_SS     WITH R_PPF  ;
        R_SR     WITH R_PPF  ;
        R_SR     WITH R_FC   ;

        R on AS;
        MH on AS R;
        DUM on AS R MH;

  Model indirect:
        DUM ind R AS;
        DUM ind MH AS;
        MH ind R AS;
        DUM ind MH R AS;

OUTPUT: mod(10) SAMPSTAT STANDARDIZED TECH1 tech4;

INPUT READING TERMINATED NORMALLY

dissertation

SUMMARY OF ANALYSIS

Number of groups                                 1
Number of observations                           321

Number of dependent variables                    14
Number of independent variables                  0
Number of continuous latent variables            3

Observed dependent variables

  Continuous
   AS_FC       AS_LD       AS_PD       AS_CA       AS_AP       R_PPS
   R_PPF       R_SC        R_SS        R_FC        R_SR        ANXIETY
   DEPRESS     DUM

Continuous latent variables
   AS          R           MH

Estimator                                        ML
Information matrix                               OBSERVED
Maximum number of iterations                     1000
Convergence criterion                            0.500D-04
Maximum number of steepest descent iterations    20
Input data file(s)
data0211_2.csv

Input data format  FREE

SAMPLE STATISTICS
```

Means

	AS_FC	AS_LD	AS_PD	AS_CA	AS_AP
1	1.153	0.808	0.699	0.576	1.513

Means

	R_PPS	R_PPF	R_SC	R_SS	R_FC
1	5.205	4.990	4.779	4.932	5.675

Means

	R_SR	ANXIETY	DEPRESS	DUM
1	5.515	0.965	0.846	0.217

Covariances

	AS_FC	AS_LD	AS_PD	AS_CA	AS_AP
AS_FC	0.844				
AS_LD	0.182	0.547			
AS_PD	0.323	0.180	0.491		
AS_CA	0.162	0.157	0.213	0.450	
AS_AP	0.357	0.226	0.270	0.173	0.821
R_PPS	-0.172	-0.229	-0.092	-0.056	-0.120
R_PPF	-0.269	-0.217	-0.202	-0.093	-0.231
R_SC	-0.193	-0.205	-0.152	-0.137	-0.165
R_SS	-0.058	-0.136	-0.025	-0.051	-0.112
R_FC	-0.062	-0.081	-0.124	-0.109	-0.006
R_SR	-0.186	-0.169	-0.164	-0.112	-0.126
ANXIETY	0.239	0.147	0.180	0.137	0.270
DEPRESS	0.247	0.162	0.170	0.161	0.240
DUM	0.002	0.019	0.028	0.009	-0.010

Covariances

	R_PPS	R_PPF	R_SC	R_SS	R_FC
R_PPS	1.279				
R_PPF	1.081	1.789			
R_SC	0.817	1.098	2.165		
R_SS	0.743	1.043	0.821	1.670	
R_FC	0.813	0.966	0.802	0.789	1.814
R_SR	0.845	0.934	0.967	0.675	1.202
ANXIETY	-0.193	-0.128	-0.055	0.021	-0.113
DEPRESS	-0.248	-0.216	-0.119	-0.068	-0.141
DUM	-0.078	-0.094	-0.015	-0.058	-0.096

Covariances

	R_SR	ANXIETY	DEPRESS	DUM
R_SR	1.588			
ANXIETY	-0.216	0.539		
DEPRESS	-0.276	0.397	0.500	
DUM	-0.050	-0.013	0.005	0.172

Correlations

	AS_FC	AS_LD	AS_PD	AS_CA	AS_AP
AS_FC	1.000				
AS_LD	0.267	1.000			
AS_PD	0.501	0.348	1.000		
AS_CA	0.263	0.317	0.453	1.000	
AS_AP	0.428	0.338	0.426	0.285	1.000
R_PPS	-0.166	-0.274	-0.116	-0.074	-0.117
R_PPF	-0.219	-0.220	-0.215	-0.104	-0.191
R_SC	-0.143	-0.188	-0.147	-0.138	-0.124
R_SS	-0.049	-0.142	-0.028	-0.059	-0.096
R_FC	-0.050	-0.081	-0.131	-0.121	-0.005
R_SR	-0.161	-0.181	-0.186	-0.132	-0.110
ANXIETY	0.354	0.270	0.349	0.278	0.406
DEPRESS	0.380	0.310	0.342	0.340	0.375
DUM	0.007	0.062	0.095	0.033	-0.026

Correlations

	R_PPS	R_PPF	R_SC	R_SS	R_FC
R_PPS	1.000				
R_PPF	0.714	1.000			
R_SC	0.491	0.558	1.000		
R_SS	0.509	0.603	0.431	1.000	

R_FC	0.534	0.536	0.404	0.453	1.000
R_SR	0.592	0.554	0.522	0.414	0.708
ANXIETY	-0.232	-0.130	-0.051	0.022	-0.114
DEPRESS	-0.310	-0.229	-0.114	-0.074	-0.148
DUM	-0.166	-0.169	-0.024	-0.109	-0.171

Correlations

	R_SR	ANXIETY	DEPRESS	DUM
R_SR	1.000			
ANXIETY	-0.233	1.000		
DEPRESS	-0.310	0.765	1.000	
DUM	-0.096	-0.041	0.016	1.000

THE MODEL ESTIMATION TERMINATED NORMALLY

MODEL FIT INFORMATION

Number of Free Parameters 51

Loglikelihood

H0 Value -5163.187
H1 Value -5081.489

Information Criteria

Akaike (AIC) 10428.374
Bayesian (BIC) 10620.718
Sample-Size Adjusted BIC 10458.954
(n* = (n + 2) / 24)

Chi-Square Test of Model Fit

Value 163.396
Degrees of Freedom 68
P-Value 0.0000

RMSEA (Root Mean Square Error Of Approximation)

Estimate 0.066
90 Percent C.I. 0.053 0.079
Probability RMSEA <= .05 0.021

CFI/TLI

CFI 0.945
TLI 0.926

Chi-Square Test of Model Fit for the Baseline Model

Value 1826.485
Degrees of Freedom 91
P-Value 0.0000

SRMR (Standardized Root Mean Square Residual)

Value 0.047

MODEL RESULTS

			Two-Tailed	
	Estimate	S.E.	Est./S.E.	P-Value
AS BY				
AS_FC	1.000	0.000	999.000	999.000
AS_LD	0.638	0.088	7.224	0.000
AS_PD	0.859	0.089	9.686	0.000
AS_CA	0.611	0.082	7.470	0.000
AS_AP	0.958	0.109	8.760	0.000
R BY				
R_PPS	1.000	0.000	999.000	999.000
R_PPF	1.252	0.081	15.386	0.000
R_SC	1.058	0.099	10.700	0.000
R_SS	0.876	0.085	10.252	0.000
R_FC	0.960	0.092	10.477	0.000
R_SR	1.028	0.088	11.704	0.000
MH BY				
ANXIETY	1.000	0.000	999.000	999.000

DEPRESS	1.037	0.083	12.482	0.000
R ON				
AS	-0.497	0.111	-4.473	0.000
MH ON				
AS	0.621	0.091	6.819	0.000
R	-0.076	0.042	-1.812	0.070
DUM ON				
AS	0.046	0.065	0.705	0.481
R	-0.082	0.029	-2.807	0.005
MH	-0.068	0.057	-1.176	0.240
R_PPF WITH				
R_PPS	0.045	0.063	0.724	0.469
R_SS WITH				
R_PPF	0.119	0.066	1.800	0.072
R_SR WITH				
R_PPF	-0.104	0.048	-2.170	0.030
R_FC	0.381	0.074	5.171	0.000
Intercepts				
AS_FC	1.153	0.051	22.484	0.000
AS_LD	0.808	0.041	19.591	0.000
AS_PD	0.699	0.039	17.882	0.000
AS_CA	0.576	0.037	15.396	0.000
AS_AP	1.513	0.051	29.927	0.000
R_PPS	5.205	0.063	82.454	0.000
R_PPF	4.990	0.075	66.924	0.000
R_SC	4.779	0.082	58.197	0.000
R_SS	4.932	0.072	68.367	0.000
R_FC	5.675	0.075	75.488	0.000
R_SR	5.515	0.070	78.548	0.000
ANXIETY	0.965	0.041	23.540	0.000
DEPRESS	0.846	0.039	21.421	0.000
DUM	0.217	0.023	9.354	0.000
Variances				
AS	0.347	0.061	5.684	0.000
Residual Variances				
AS_FC	0.497	0.049	10.212	0.000
AS_LD	0.405	0.035	11.427	0.000
AS_PD	0.235	0.027	8.688	0.000
AS_CA	0.320	0.029	11.196	0.000
AS_AP	0.502	0.048	10.380	0.000
R_PPS	0.455	0.063	7.276	0.000
R_PPF	0.494	0.103	4.788	0.000
R_SC	1.243	0.113	10.970	0.000
R_SS	1.039	0.095	10.905	0.000
R_FC	1.055	0.100	10.561	0.000
R_SR	0.712	0.081	8.760	0.000
ANXIETY	0.156	0.029	5.357	0.000
DEPRESS	0.088	0.029	3.024	0.002
DUM	0.166	0.013	12.567	0.000
R	0.738	0.099	7.464	0.000
MH	0.228	0.032	7.191	0.000

STANDARDIZED MODEL RESULTS

STDYX Standardization

	Estimate	S.E.	Two-Tailed Est./S.E.	P-Value
AS BY				
AS_FC	0.641	0.042	15.168	0.000
AS_LD	0.509	0.050	10.235	0.000
AS_PD	0.722	0.038	18.774	0.000
AS_CA	0.537	0.048	11.094	0.000
AS_AP	0.623	0.044	14.278	0.000
R BY				
R_PPS	0.803	0.032	25.173	0.000
R_PPF	0.851	0.035	24.177	0.000
R_SC	0.652	0.038	17.253	0.000
R_SS	0.615	0.042	14.656	0.000

R_FC	0.647	0.040	16.142	0.000
R_SR	0.742	0.035	20.940	0.000

MH BY

ANXIETY	0.843	0.033	25.352	0.000
DEPRESS	0.907	0.033	27.667	0.000

R ON

AS	-0.323	0.063	-5.096	0.000

MH ON

AS	0.591	0.057	10.433	0.000
R	-0.111	0.062	-1.793	0.073

DUM ON

AS	0.065	0.092	0.708	0.479
R	-0.180	0.063	-2.855	0.004
MH	-0.101	0.086	-1.173	0.241

R_PPF WITH

R_PPS	0.096	0.121	0.791	0.429

R_SS WITH

R_PPF	0.166	0.080	2.076	0.038

R_SR WITH

R_PPF	-0.175	0.092	-1.900	0.057
R_FC	0.439	0.056	7.802	0.000

Intercepts

AS_FC	1.255	0.075	16.817	0.000
AS_LD	1.093	0.071	15.499	0.000
AS_PD	0.998	0.068	14.610	0.000
AS_CA	0.859	0.065	13.158	0.000
AS_AP	1.670	0.086	19.338	0.000
R_PPS	4.602	0.190	24.220	0.000
R_PPF	3.735	0.158	23.706	0.000
R_SC	3.248	0.140	23.231	0.000
R_SS	3.816	0.161	23.759	0.000
R_FC	4.213	0.175	24.021	0.000
R_SR	4.384	0.182	24.142	0.000
ANXIETY	1.314	0.076	17.246	0.000
DEPRESS	1.196	0.073	16.359	0.000
DUM	0.522	0.059	8.775	0.000

Variances

AS	1.000	0.000	999.000	999.000

Residual Variances

AS_FC	0.589	0.054	10.857	0.000
AS_LD	0.741	0.051	14.662	0.000
AS_PD	0.478	0.056	8.600	0.000
AS_CA	0.712	0.052	13.683	0.000
AS_AP	0.612	0.054	11.262	0.000
R_PPS	0.356	0.051	6.953	0.000
R_PPF	0.277	0.060	4.622	0.000
R_SC	0.574	0.049	11.637	0.000
R_SS	0.622	0.052	12.045	0.000
R_FC	0.582	0.052	11.215	0.000
R_SR	0.450	0.053	8.571	0.000
ANXIETY	0.290	0.056	5.167	0.000
DEPRESS	0.177	0.060	2.970	0.003
DUM	0.965	0.022	42.960	0.000
R	0.896	0.041	21.916	0.000
MH	0.596	0.060	9.997	0.000

STDY Standardization

	Estimate	S.E.	Two-Tailed Est./S.E.	P-Value

AS BY

AS_FC	0.641	0.042	15.168	0.000
AS_LD	0.509	0.050	10.235	0.000
AS_PD	0.722	0.038	18.774	0.000
AS_CA	0.537	0.048	11.094	0.000
AS_AP	0.623	0.044	14.278	0.000

R BY

R_PPS	0.803	0.032	25.173	0.000
R_PPF	0.851	0.035	24.177	0.000

R_SC	0.652	0.038	17.253	0.000
R_SS	0.615	0.042	14.656	0.000
R_FC	0.647	0.040	16.142	0.000
R_SR	0.742	0.035	20.940	0.000

MH BY

ANXIETY	0.843	0.033	25.352	0.000
DEPRESS	0.907	0.033	27.667	0.000

R ON

AS	-0.323	0.063	-5.096	0.000

MH ON

AS	0.591	0.057	10.433	0.000
R	-0.111	0.062	-1.793	0.073

DUM ON

AS	0.065	0.092	0.708	0.479
R	-0.180	0.063	-2.855	0.004
MH	-0.101	0.086	-1.173	0.241

R_PPF WITH

R_PPS	0.096	0.121	0.791	0.429

R_SS WITH

R_PPF	0.166	0.080	2.076	0.038

R_SR WITH

R_PPF	-0.175	0.092	-1.900	0.057
R_FC	0.439	0.056	7.802	0.000

Intercepts

AS_FC	1.255	0.075	16.817	0.000
AS_LD	1.093	0.071	15.499	0.000
AS_PD	0.998	0.068	14.610	0.000
AS_CA	0.859	0.065	13.158	0.000
AS_AP	1.670	0.086	19.338	0.000
R_PPS	4.602	0.190	24.220	0.000
R_PPF	3.735	0.158	23.706	0.000
R_SC	3.248	0.140	23.231	0.000
R_SS	3.816	0.161	23.759	0.000
R_FC	4.213	0.175	24.021	0.000
R_SR	4.384	0.182	24.142	0.000
ANXIETY	1.314	0.076	17.246	0.000
DEPRESS	1.196	0.073	16.359	0.000
DUM	0.522	0.059	8.775	0.000

Variances

AS	1.000	0.000	999.000	999.000

Residual Variances

AS_FC	0.589	0.054	10.857	0.000
AS_LD	0.741	0.051	14.662	0.000
AS_PD	0.478	0.056	8.600	0.000
AS_CA	0.712	0.052	13.683	0.000
AS_AP	0.612	0.054	11.262	0.000
R_PPS	0.356	0.051	6.953	0.000
R_PPF	0.277	0.060	4.622	0.000
R_SC	0.574	0.049	11.637	0.000
R_SS	0.622	0.052	12.045	0.000
R_FC	0.582	0.052	11.215	0.000
R_SR	0.450	0.053	8.571	0.000
ANXIETY	0.290	0.056	5.167	0.000
DEPRESS	0.177	0.060	2.970	0.003
DUM	0.965	0.022	42.960	0.000
R	0.896	0.041	21.916	0.000
MH	0.596	0.060	9.997	0.000

STD Standardization

			Two-Tailed	
	Estimate	S.E.	Est./S.E.	P-Value

AS BY

AS_FC	0.589	0.052	11.368	0.000
AS_LD	0.376	0.044	8.635	0.000
AS_PD	0.506	0.039	13.036	0.000
AS_CA	0.360	0.039	9.167	0.000
AS_AP	0.564	0.052	10.930	0.000

R BY				
R_PPS	0.908	0.059	15.350	0.000
R_PPF	1.136	0.073	15.494	0.000
R_SC	0.960	0.079	12.212	0.000
R_SS	0.795	0.072	11.077	0.000
R_FC	0.871	0.074	11.779	0.000
R_SR	0.933	0.067	13.834	0.000
MH BY				
ANXIETY	0.619	0.039	15.781	0.000
DEPRESS	0.642	0.038	17.113	0.000
R ON				
AS	-0.323	0.063	-5.096	0.000
MH ON				
AS	0.591	0.057	10.433	0.000
R	-0.111	0.062	-1.793	0.073
DUM ON				
AS	0.027	0.038	0.707	0.480
R	-0.075	0.027	-2.804	0.005
MH	-0.042	0.036	-1.169	0.242
R_PPF WITH				
R_PPS	0.045	0.063	0.724	0.469
R_SS WITH				
R_PPF	0.119	0.066	1.800	0.072
R_SR WITH				
R_PPF	-0.104	0.048	-2.170	0.030
R_FC	0.381	0.074	5.171	0.000
Intercepts				
AS_FC	1.153	0.051	22.484	0.000
AS_LD	0.808	0.041	19.591	0.000
AS_PD	0.699	0.039	17.882	0.000
AS_CA	0.576	0.037	15.396	0.000
AS_AP	1.513	0.051	29.927	0.000
R_PPS	5.205	0.063	82.454	0.000
R_PPF	4.990	0.075	66.924	0.000
R_SC	4.779	0.082	58.197	0.000
R_SS	4.932	0.072	68.367	0.000
R_FC	5.675	0.075	75.488	0.000
R_SR	5.515	0.070	78.548	0.000
ANXIETY	0.965	0.041	23.540	0.000
DEPRESS	0.846	0.039	21.421	0.000
DUM	0.217	0.023	9.354	0.000
Variances				
AS	1.000	0.000	999.000	999.000
Residual Variances				
AS_FC	0.497	0.049	10.212	0.000
AS_LD	0.405	0.035	11.427	0.000
AS_PD	0.235	0.027	8.688	0.000
AS_CA	0.320	0.029	11.196	0.000
AS_AP	0.502	0.048	10.380	0.000
R_PPS	0.455	0.063	7.276	0.000
R_PPF	0.494	0.103	4.788	0.000
R_SC	1.243	0.113	10.970	0.000
R_SS	1.039	0.095	10.905	0.000
R_FC	1.055	0.100	10.561	0.000
R_SR	0.712	0.081	8.760	0.000
ANXIETY	0.156	0.029	5.357	0.000
DEPRESS	0.088	0.029	3.024	0.002
DUM	0.166	0.013	12.567	0.000
R	0.896	0.041	21.916	0.000
MH	0.596	0.060	9.997	0.000

R-SQUARE

Observed Variable	Estimate	S.E.	Two-Tailed Est./S.E.	P-Value
AS_FC	0.411	0.054	7.584	0.000
AS_LD	0.259	0.051	5.118	0.000
AS_PD	0.522	0.056	9.387	0.000

AS_CA	0.288	0.052	5.547	0.000
AS_AP	0.388	0.054	7.139	0.000
R_PPS	0.644	0.051	12.586	0.000
R_PPF	0.723	0.060	12.088	0.000
R_SC	0.426	0.049	8.627	0.000
R_SS	0.378	0.052	7.328	0.000
R_FC	0.418	0.052	8.071	0.000
R_SR	0.550	0.053	10.470	0.000
ANXIETY	0.710	0.056	12.676	0.000
DEPRESS	0.823	0.060	13.833	0.000
DUM	0.035	0.022	1.573	0.116

Latent Variable	Estimate	S.E.	Two-Tailed Est./S.E.	P-Value
R	0.104	0.041	2.548	0.011
MH	0.404	0.060	6.766	0.000

QUALITY OF NUMERICAL RESULTS

Condition Number for the Information Matrix 0.499E-02
(ratio of smallest to largest eigenvalue)

TOTAL, TOTAL INDIRECT, SPECIFIC INDIRECT, AND DIRECT EFFECTS

	Estimate	S.E.	Two-Tailed Est./S.E.	P-Value
Effects from AS to DUM				
Sum of indirect	-0.004	0.040	-0.087	0.931
Specific indirect				
DUM R AS	0.041	0.017	2.418	0.016
DUM MH AS	-0.042	0.037	-1.148	0.251
DUM MH R AS	-0.003	0.003	-0.981	0.327
Effects from AS to MH				
Sum of indirect	0.038	0.021	1.789	0.074
Specific indirect				
MH R AS	0.038	0.021	1.789	0.074

STANDARDIZED TOTAL, TOTAL INDIRECT, SPECIFIC INDIRECT, AND DIRECT EFFECTS

STDYX Standardization

	Estimate	S.E.	Two-Tailed Est./S.E.	P-Value
Effects from AS to DUM				
Sum of indirect	-0.005	0.057	-0.087	0.931
Specific indirect				
DUM R AS	0.058	0.023	2.485	0.013
DUM MH AS	-0.060	0.051	-1.157	0.247
DUM MH				

R
AS -0.004 0.004 -0.986 0.324

Effects from AS to MH

Sum of indirect 0.036 0.020 1.794 0.073

Specific indirect

MH
R
AS 0.036 0.020 1.794 0.073

STDY Standardization

			Two-Tailed
	Estimate	S.E. Est./S.E.	P-Value

Effects from AS to DUM

Sum of indirect -0.005 0.057 -0.087 0.931

Specific indirect
DUM
R
AS 0.058 0.024 2.451 0.014

DUM
MH
AS -0.060 0.052 -1.152 0.250

DUM
MH
R
AS -0.004 0.004 -0.982 0.326

Effects from AS to MH

Sum of indirect 0.036 0.020 1.794 0.073

Specific indirect

MH
R
AS 0.036 0.020 1.794 0.073

STD Standardization

			Two-Tailed
	Estimate	S.E. Est./S.E.	P-Value

Effects from AS to DUM

Sum of indirect -0.002 0.024 -0.087 0.931

Specific indirect

DUM
R
AS 0.024 0.010 2.450 0.014

DUM
MH
AS -0.025 0.021 -1.154 0.249

DUM
MH
R
AS -0.002 0.002 -0.984 0.325

Effects from AS to MH

Sum of indirect 0.036 0.020 1.794 0.073

Specific indirect

MH
R
AS 0.036 0.020 1.794 0.073

MODEL MODIFICATION INDICES

NOTE: Modification indices for direct effects of observed dependent variables regressed on covariates may not be included. To include these, request MODINDICES (ALL).

Minimum M.I. value for printing the modification index 10.000

		M.I.	E.P.C.	Std E.P.C.	StdYX E.P.C.
BY Statements					
MH	BY R_SS	10.235	0.337	0.208	0.161
MH	BY R_SR	12.254	-0.296	-0.183	-0.146

TECHNICAL 1 OUTPUT

PARAMETER SPECIFICATION

NU

	AS_FC	AS_LD	AS_PD	AS_CA	AS_AP
1	1	2	3	4	5

NU

	R_PPS	R_PPF	R_SC	R_SS	R_FC
1	6	7	8	9	10

NU

	R_SR	ANXIETY	DEPRESS	DUM
1	11	12	13	0

LAMBDA

	AS	R	MH	DUM
AS_FC	0	0	0	0
AS_LD	14	0	0	0
AS_PD	15	0	0	0
AS_CA	16	0	0	0
AS_AP	17	0	0	0
R_PPS	0	0	0	0
R_PPF	0	18	0	0
R_SC	0	19	0	0
R_SS	0	20	0	0
R_FC	0	21	0	0
R_SR	0	22	0	0
ANXIETY	0	0	0	0
DEPRESS	0	0	23	0
DUM	0	0	0	0

THETA

	AS_FC	AS_LD	AS_PD	AS_CA	AS_AP
AS_FC	24				
AS_LD	0	25			
AS_PD	0	0	26		
AS_CA	0	0	0	27	
AS_AP	0	0	0	0	28
R_PPS	0	0	0	0	0
R_PPF	0	0	0	0	0
R_SC	0	0	0	0	0
R_SS	0	0	0	0	0
R_FC	0	0	0	0	0
R_SR	0	0	0	0	0
ANXIETY	0	0	0	0	0
DEPRESS	0	0	0	0	0
DUM	0	0	0	0	0

THETA

	R_PPS	R_PPF	R_SC	R_SS	R_FC
R_PPS	29				
R_PPF	30	31			
R_SC	0	0	32		
R_SS	0	33	0	34	
R_FC	0	0	0	0	35

R_SR	0	36	0	0	37
ANXIETY	0	0	0	0	0
DEPRESS	0	0	0	0	0
DUM	0	0	0	0	0

THETA

	R_SR	ANXIETY	DEPRESS	DUM
R_SR	38			
ANXIETY	0	39		
DEPRESS	0	0	40	
DUM	0	0	0	0

ALPHA

	AS	R	MH	DUM
1	0	0	0	41

BETA

	AS	R	MH	DUM
AS	0	0	0	0
R	42	0	0	0
MH	43	44	0	0
DUM	45	46	47	0

PSI

	AS	R	MH	DUM
AS	48			
R	0	49		
MH	0	0	50	
DUM	0	0	0	51

STARTING VALUES

NU

	AS_FC	AS_LD	AS_PD	AS_CA	AS_AP
1	1.153	0.808	0.699	0.576	1.513

NU

	R_PPS	R_PPF	R_SC	R_SS	R_FC
1	5.205	4.990	4.779	4.932	5.675

NU

	R_SR	ANXIETY	DEPRESS	DUM
1	5.515	0.965	0.846	0.000

LAMBDA

	AS	R	MH	DUM
AS_FC	1.000	0.000	0.000	0.000
AS_LD	0.588	0.000	0.000	0.000
AS_PD	0.878	0.000	0.000	0.000
AS_CA	0.608	0.000	0.000	0.000
AS_AP	0.891	0.000	0.000	0.000
R_PPS	0.000	1.000	0.000	0.000
R_PPF	0.000	1.242	0.000	0.000
R_SC	0.000	1.043	0.000	0.000
R_SS	0.000	0.926	0.000	0.000
R_FC	0.000	1.055	0.000	0.000
R_SR	0.000	0.999	0.000	0.000
ANXIETY	0.000	0.000	1.000	0.000
DEPRESS	0.000	0.000	1.000	0.000
DUM	0.000	0.000	0.000	1.000

THETA

	AS_FC	AS_LD	AS_PD	AS_CA	AS_AP
AS_FC	0.423				
AS_LD	0.000	0.274			
AS_PD	0.000	0.000	0.246		
AS_CA	0.000	0.000	0.000	0.226	
AS_AP	0.000	0.000	0.000	0.000	0.412
R_PPS	0.000	0.000	0.000	0.000	0.000
R_PPF	0.000	0.000	0.000	0.000	0.000

R_SC	0.000	0.000	0.000	0.000	0.000
R_SS	0.000	0.000	0.000	0.000	0.000
R_FC	0.000	0.000	0.000	0.000	0.000
R_SR	0.000	0.000	0.000	0.000	0.000
ANXIETY	0.000	0.000	0.000	0.000	0.000
DEPRESS	0.000	0.000	0.000	0.000	0.000
DUM	0.000	0.000	0.000	0.000	0.000

THETA

	R_PPS	R_PPF	R_SC	R_SS	R_FC
R_PPS	0.642				
R_PPF	0.000	0.898			
R_SC	0.000	0.000	1.086		
R_SS	0.000	0.000	0.000	0.838	
R_FC	0.000	0.000	0.000	0.000	0.910
R_SR	0.000	0.000	0.000	0.000	0.000
ANXIETY	0.000	0.000	0.000	0.000	0.000
DEPRESS	0.000	0.000	0.000	0.000	0.000
DUM	0.000	0.000	0.000	0.000	0.000

THETA

	R_SR	ANXIETY	DEPRESS	DUM
R_SR	0.797			
ANXIETY	0.000	0.270		
DEPRESS	0.000	0.000	0.251	
DUM	0.000	0.000	0.000	0.000

ALPHA

	AS	R	MH	DUM
1	0.000	0.000	0.000	0.217

BETA

	AS	R	MH	DUM
AS	0.000	0.000	0.000	0.000
R	0.000	0.000	0.000	0.000
MH	0.000	0.000	0.000	0.000
DUM	0.000	0.000	0.000	0.000

PSI

	AS	R	MH	DUM
AS	0.050			
R	0.000	0.050		
MH	0.000	0.000	0.050	
DUM	0.000	0.000	0.000	0.086

TECHNICAL 4 OUTPUT

ESTIMATES DERIVED FROM THE MODEL

ESTIMATED MEANS FOR THE LATENT VARIABLES

	AS	R	MH	DUM
1	0.000	0.000	0.000	0.217

ESTIMATED COVARIANCE MATRIX FOR THE LATENT VARIABLES

	AS	R	MH	DUM
AS	0.347			
R	-0.173	0.824		
MH	0.228	-0.170	0.383	
DUM	0.015	-0.064	-0.001	0.172

ESTIMATED CORRELATION MATRIX FOR THE LATENT VARIABLES

	AS	R	MH	DUM
AS	1.000			
R	-0.323	1.000		
MH	0.627	-0.302	1.000	
DUM	0.060	-0.171	-0.006	1.000