SELF-EFFICACY, STRESS, AND ACCULTURATION AS PREDICTORS OF FIRST YEAR SCIENCE SUCCESS AMONG LATINOS AT A SOUTH TEXAS UNIVERSITY

A Dissertation

By

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This dissertation meets the standards for scope and quality of
Texas A&M University- Corpus Christi and is hereby approved.

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ABSTRACT

SELF-EFFICACY, STRESS, AND ACCULTURATION AS PREDICTORS OF FIRST YEAR SCIENCE SUCCESS AMONG LATINOS AT A SOUTH TEXAS UNIVERSITY

(October 2012)

Mark W. McNamara, M.S.

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The study tested the hypothesis that self-efficacy, stress, and acculturation are useful predictors of academic achievement in first year university science, independent of high school GPA and SAT scores, in a sample of Latino students at a South Texas Hispanic serving institution of higher education. The correlational study employed a mixed methods explanatory sequential model. The non-probability sample consisted of 98 university science and engineering students. The study participants had high science self-efficacy, low number of stressors, and were slightly Anglo-oriented bicultural to strongly Anglo-oriented. As expected, the control variables of SAT score and high school GPA were statistically significant predictors of the outcome measures. Together, they accounted for 19.80% of the variation in first year GPA, 13.80% of the variation in earned credit hours, and 11.30% of the variation in intent to remain in the science major. After controlling for SAT scores and high school GPAs, self-efficacy was a statistically significant predictor of credit hours earned and accounted for 5.60% of the variation; its unique contribution in explaining the variation in first year GPA and intent to remain in the science major was not statistically significant. Stress and acculturation were not statistically significant predictors of any of the outcome measures. Analysis of the

qualitative data resulted in six themes (a) high science self-efficacy, (b) stressors, (c) positive role of stress, (d) Anglo-oriented, (e) bicultural, and (f) family. The quantitative and qualitative results were synthesized and practical implications were discussed.

DEDICATION

I dedicate this dissertation to my son, Nathan David who was just two years old when I began this degree as single parent. I will never forget all the times he came up to me and said, “Put computer down Daddy, put computer down. Snuggle me.” I am forever grateful for his unconditional love and support during all the times I could not be there with him when I wanted to be. I also dedicate this dissertation to my amazing wife, Dr. Laura McNamara, for believing in me, for choosing me as a life mate, for completing me, and for bringing into the world the last person I dedicate this dissertation to, our beautiful new daughter, Brynlee Beth. Thank you all for living according to our family mission *to support one another and lead extraordinary lives*.

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CHAPTER I

INTRODUCTION

Background and Setting

There is an educational crisis looming in the United States. We are losing our global competitive edge in science, exporting high tech jobs to other countries, and failing to keep up as world leaders in science and technology. We live in times of exponential growth in globalization, the ability to transfer knowledge across great distances instantaneously, and rapidly changing global demographics (Freidman, 2007; National Academies, 2006).

The National Academies, consisting of the National Academy of Sciences, National Academy of Engineering, and Institute of Medicine prepared a report for the U.S. Senate entitled, "Rising Above The Gathering Storm: Energizing and Employing America for a Brighter Economic Future" (National Academies, 2006, p. 1). The Gathering Storm report stated, "It is the unanimous view of our committee that America today faces a serious and intensifying challenge with regard to its future competitiveness and standard of living" (National Academies, 2006, p. 1). The report cited the "flattening" of the world in terms of aviation and the World Wide Web, making transfer of knowledge essentially free, as sources of a very real decline in the standard of living in the United States. The report stated that, "[…] with the end of the Cold War and the evaporation of many of the political barriers that previously existed throughout the world, nearly three *billion* new, highly motivated, often well educated, new capitalists entered the job market" (National Academies, 2006, p. 2).

United States' 12th graders performed below the international average among 21 countries on a test of general knowledge in mathematics and science in 1995 and 15-year-olds ranked 24th out of 40 countries that participated in a 2003 examination administered by the Program for International Student Assessment (PISA) of students' ability to apply mathematical concepts to real-world problems (National Academies, 2006).

The Gathering Storm report was a call to action for policy makers and educators. The report helped bring about some positive changes such as the American Competitive Incentive Act of 2006, the America COMPETES Act of 2007, and funding through the American Recovery and Reinvestment Act of 2009, but more still needs to be done to address the shortage of qualified students in Science, Technology, Engineering, and Mathematics (STEM) career fields in the United States (National Research Council, 2011). As the title of the National Academies' (2010) follow-up report, "Rising Above the Gathering Storm, Revisited: Rapidly Approaching Category 5" strongly suggests, America's global competitiveness has not improved. At the same time, as we are experiencing a crisis in our ability to compete with other nations in science and technology, there exists yet another educational crisis in America, the Latino education crisis (Gándara & Conteras, 2009). Numerous studies have shown fewer Latino students achieving positive university science outcomes such as completion rate, retention, persistence, credit hours earned, and grade point average (GPA) than do Non-Latino white and Asian students (Banks, 2004; Llagas & Snyder, 2003; National Research Council, 2011; Tinto, 1994). While a college degree is now required more than ever to succeed in America, about half of all Latinos fail to graduate even from high school (Gándara & Conteras, 2009).

One proposed solution to the shortage of scientists and engineers in America is to increase Latino success in STEM fields because Latinos are a large rapidly growing segment of the population, are poorly represented in science fields, and tend to have poorer educational outcomes in science when compared to non-Latino whites and Asians (Banks, 2004; Gándara & Conteras, 2009; Llagas & Snyder, 2003; National Research Council, 2011; Tinto, 1994; Tomás Rivera Policy Institute, 2008). Latinos are the fastest growing segment of the United States population, but they are poorly represented in science (Barton, 2003). According to the 2010 Census, Latinos accounted for 50.5 million of the 308.7 million people in the United States, representing 16% of the total population (Ennis, Ríos-Vargas & Albert, 2011). According to the 2010 Census, the United States has the second highest population of Latinos (50.5 million), second only to Mexico, which has 122 million Latinos. Because they are a rapidly growing population that is underrepresented in science, Latinos represent an enormous potential for increasing STEM participation in America.

Latinos accounted for more than half of the growth in the total population of the United States between 2000 and 2010 (Ennis et al., 2011). The Latino population grew by 43% from 2000 to 2010, which was over four times the growth in the total population at 10% (Ennis et al., 2011). The Latino population is projected to reach 132.8 million by 2050 and comprise 30% of the population (Zambrana, 2011). Latinos are not only a large segment of the U.S. population, but are also a young population with 25% of the total Latino population under the age of five, and 22% under the age of 18 (Zambrana, 2011), which means they are currently in the educational pipeline or soon will be.

Exacerbating the STEM crisis in the United States, the population of Americans of European ancestry, who overwhelmingly dominate STEM fields, is declining as those from the post-World War II baby boom are aging and leaving the workforce (Kelly, 2008). In the United States, according to the National Science Foundation, a shocking 78% of doctoral level scientists and engineers are Non-Latino whites (Tsapogas, 2006). In contrast, Latinos represented just 4% of the total science and engineering workforce and underrepresented minorities, including blacks, Hispanics, and Native Americans, comprised just 6% of the full time, full professors with science and engineering doctorates (National Science Foundation, 2011). While increasing Latino participation in STEM fields might once have been an issue of social equity and justice, it is now also an economic imperative in America as we continue to lose our competitiveness in science and technology (Kelly, 2008).

The study took place at a South Texas Hispanic serving university with a Latino student population of 41%. According to the 2010 United States Census, more than three-quarters of the Latino population in the United States lived in the west or south. The Texas Latino population in 2010 was 9.5 million and made up 19% of the total Latino population of the United States (Ennis et al., 2011). Texans are 38.1% Latino, the majority of which are of Mexican origin. The highest percentage of Latinos in America was 96% in Webb County in South Central Texas along the Rio Grande border, according to the 2010 census. Because of the high Latino population in South Texas, research at South Texas universities is crucial if we are to increase Latino participation and persistence in STEM because institutions with high minority enrollment play a significant role in educating minority students (Committee on Equal Opportunities in

Science and Engineering (CEOSE, 2011). It is imperative that educators find ways to improve success for this fast growing segment of the population if we are to increase the number of qualified scientists and engineers in America and maintain our global competiveness.

To do this, we must answer many questions. What are the factors that determine success in university science and how do we promote and encourage Latino students to challenge themselves appropriately in middle and high school so that they have the knowledge, skills, and attitudes needed when they enter college? What teaching practices will both challenge Latino students appropriately and encourage positive lifelong attitudes toward science so that they have the skills needed for first year college success in science? How might we better prepare Latinos in South Texas to succeed in university science? How might universities improve first year science programs to support the needs of Latino science students in the critical first year? To answer these questions, we must understand what factors predict success in university science and this knowledge must include smaller, regional, Hispanic Serving Institutions (HSIs) that serve high numbers of Latino students. The predictors must not only include traditional academic factors such as GPA, high school rank, and Scholastic Aptitude Test (SAT) scores, but non-academic factors as well, since SAT scores do not explain all variation in success and their utility for minority applicants has been brought into question (Hoffman & Lowitski, 2005; Nettles, Millet & Ready, 2003). As educators, we must ensure that our current practices support all students, including Latinos, and that we are adequately preparing students for university science success.

Academic Predictors

There have been many attempts to predict college success in science using independent variables such as high school GPA, number of science classes taken, highest mathematics course, SAT or ACT test scores, and high school rank (ACT, 2004; Kobrin, Patterson, Shaw, Mattern, & Barbuti, 2008). These measures of academic ability partially predict retention and other measures of academic success, such as college GPA. Predictors such as high school GPA and high school rank are useful indicators of academic ability in the first year, but according to College Board's national validity study of the SAT, using high school GPA, SAT-Critical reading, SAT-Mathematics, and SAT-Writing to predict first year GPA resulted in an adjusted correlation coefficient of 0.62, explaining 38% of the variation in first year GPA (Kobrin et al., 2008). When High School GPA was removed from the model, the SAT scores explained just 28% of the variation in first year GPA (Kobrin et al., 2008). While standardized test scores correlate with college achievement, some have questioned the usefulness of standardized test scores among minorities, contending that they discriminate against certain minorities (Hoffman & Lowitski, 2005; Nettles et al., 2003).

While measures of academic ability, such as SAT score and high school GPA combined, are useful predictors of college success in science, other researchers have examined factors such as self-efficacy, emotional intelligence, stress, financial factors, motivation, acculturation of minorities, and other psychosocial predictors (ACT, 2004). These factors rely on various constructs, but in general they assume that student's success is predicted not only by academic factors, but by non-academic factors as well. While academic predictors such as SAT score and high school GPA are useful predictors of

college success in science, they do not explain all of the variation in success outcomes and may not be as useful for minority students; therefore, more research is needed on non-academic predictors of first year science success among Latinos.

To address the need for more research on non-academic predictors of first year success among Latino science students, this study was designed to explain academic success in the first year of science curriculum among Latinos at a South Texas Hispanic serving institution on the basis of (a) students' academic self-efficacy in science, (b) life stressors, and (c) level of acculturation, while controlling for academic ability, as measured by SAT score, and high school GPA. It was hypothesized that the three factors are useful predictors of academic success in science, as measured by first year GPA, earned credit hours, and intent to remain in the science major, after controlling for SAT score and high school GPA.

Self-Efficacy in Science

Self-efficacy is defined as a self-evaluation of one's competence to successfully execute a course of action necessary to reach desired outcomes (Bandura, 1977, 1997, 2006; Pajares, 1996). The higher one's confidence is that he or she can complete a task, more likely he or she is to achieve that task. As an example, high self-efficacy in college chemistry would be a useful predictor of success in an organic chemistry course. General measures of self-efficacy are less likely to predict college outcomes, but the more specific the domain, the more likely the self-efficacy measure is to predict a targeted outcome (Bandura, 2006, Pajares, 1996). Many studies have shown positive correlation between academic self-efficacy and academic grades and persistence (Hsieh, Sullivan, & Guerra, 2007; Lent, Brown, & Larkin, 1984, 1986, 1987; Lent & Larkin, 1989; ACT, 2004;

Zajacova, Lynch, & Espenshade, 2005). Fewer have looked specifically at science self-efficacy as a construct predictive of college success in science.

Stress

Stress is a state of physiological arousal that results when an external demand, called a stressor, exceeds an individual's capacity to cope with the demand (Lazarus, 1966). Traditional first year university students experience stress as they make the transition from their parent's home to the greater independence and challenges of university life (Condren & Greenglass, 2011; Dyson & Renk, 2006). Moving away from home for the first time may result in stress from loneliness, homesickness, or friendsickness, as students are removed from their former support network (Willis, Stroebe, Hewstone, 2003; Paul & Brier, 2001). First year students experience stress from greater academic, personal, and financial demands (Condren & Greenglass, 2011). The inability to cope with stress has been associated with physical illness and depression (Dyson & Renk, 2006). Zajacova, Lynch, and Espenshade (2005) investigated the combination of self-efficacy, stress, and background variables as predictors of success in college as defined by first year college GPA, retention to second year, and first year credit hours earned. The study was conducted with 107 first-semester college freshmen, beginning the spring semester of 1997–1998, at a 4-year New York City university. The students were mainly nontraditional, minority, and immigrant students who commuted to school and often studied part-time. The researchers postulated that academic stress should have a negative affect on success but the affect should be mediated by a high self-efficacy. Zajacova et al. (2005) also suggested that stress should be higher in minorities or recent immigrants, but did not include a specific measure of acculturation in their

research. Zajacova et al. did not find a significant correlation between stress and first year college GPA, retention at second year, or first year credit hours earned.

Acculturation

Acculturation refers to the psychological, behavioral, and attitudinal changes that occur when individuals or groups from different cultures come into continuous contact (Berry, Poortinga, Breugelmans, Chasiotis, & Sam, 2011). Acculturation, rather than assimilation, was chosen as the measure of these changes in this study. Assimilation, sometimes called "the melting pot theory" implies a complete unidirectional change in which an individual or group loses former culture in order to conform to the dominant culture (Bennett, 2003; Smokowski & Bacallao, 2011). Even though the United States has experienced a multicultural movement and elected a multicultural president in 2008, the issue of whether full assimilation is achievable or desirable for Latinos is still politically debated. While this may be debated politically, many scholars agree that assimilation is undesirable and biculturalism should be favored as it leads to better mental health and educational outcomes among Latinos in America (Acuña, 2003; Smokowski & Bacallao, 2011, Valenzuela, 1999).

Acculturation results in changes in attitude, cultural identity, values, and behaviors (Cuéllar, Arnold, & Maldonado, 1995). Two theoretical models exist to explain these changes, namely, the unidimensional model and bidimensional model. The unidimensional model assumes that the members of the immigrating culture change as a result of exposure to the dominant or host culture *in one direction*. The bidimensional model assumes both a maintenance of the culture of origin and adherence to the dominant or host culture. The bidimensional model assumes that both cultures are changed

(Cuéllar et al., 1995). Few studies have examined acculturation of Latinos as a possible predictor of college success. It may be postulated that higher levels of acculturation to the dominant culture might be correlated with less stress and therefore higher success.

Statement of the Problem

Latinos are poorly represented in science compared to non-Latino whites and Asians, yet they are the fastest growing ethnic group in the United States. Much work has been done using traditional academic predictors (e.g., high school GPA, and SAT scores) of academic success in college. Less research has focused on non-academic factors of self-efficacy, life stressors, and acculturation of Latino students as predictors of science success as measured by GPA, credit hours earned, and retention in science in the first year of college, especially among Latinos at Hispanic serving South Texas institutions. Much effort has been made at the study's institution, hereafter referred to as The University to support its 41% Latino population, however, few studies have examined Latino science students in detail. Few studies have attempted to predict first year student science success among Latinos using both academic and non-academic predictors.

Theoretical Framework

The study examines academic and non-academic predictors of college success in science. It is clear that academic preparation correlates highly with university success and that subjects' specific academic preparation are good predictors. Academic predictors, such as SAT score and high school GPA, do not explain all the variation in student success in university science. We must understand the role of non-academic factors to have a better understanding of the complex issues of university science

achievement among Latinos in South Texas. The non-academic predictors in this study were self-efficacy in science, stress, and acculturation, which are rooted in social and cognitive psychology.

Academic self-efficacy in science is grounded in the social cognitive theory (SCT) of learning espoused by Bandura (1977, 1997). Self-efficacy is a self-evaluation of one's ability to accomplish an outcome. Bandura described self-efficacy from an agentic perspective in which people are self-organizing, proactive, self-regulating, and self-reflecting (Bandura, 2006). According to Bandura, people learn by observing others and through a reciprocal interplay of three interacting determinants, which he referred to as: personal, environmental, and behavioral. In this model, self-efficacy beliefs are important in determining decisions about whether to persevere or give up when faced with stress. Self-efficacy has been shown to correlate with academic achievement in numerous studies (Hsieh et al., 2007; Lent et al., 1984, 1986, 1987; Lent & Larkin, 1989; Zajacova et al., 2005). It is useful in explaining why some students may view college demands as challenges while others view them as insurmountable obstacles.

Stress is a state of physiological arousal that results when an external demand, called a stressor, exceeds an individual's capacity to cope with the demand (Lazarus, 1966). Lazarus proposed the cognitive appraisal model whereby a person cognitively appraises whether a stressor is threatening or non-threatening and this cognitive appraisal in part determines the degree of the associated stress response (1966). One can see how stress and self-efficacy are related such that a higher degree of self-efficacy would tend to moderate a response to a stressor (Zajacova et al., 2005). For example, if a student has low science self-efficacy, s/he will experience more stress during a science examination

than does a student with high science self-efficacy who may perceive a science exam as less threatening.

Acculturation is a theoretical construct that measures the degree of change in attitude, cultural identity, values, and behaviors of an individual or group of individuals that become immersed in another dominant culture (Cuéllar et al., 1995). Cuéllar et al. (1995) viewed acculturation as interactive, developmental, multifactorial, multidirectional, and multidimensional. Stress and acculturation have been combined into the concept of "*acculturative stress*" proposed by Berry (2006a) to describe stress that may come about during adjustment of an individual to a new dominant culture.

These three constructs are related such that if a student has high self-efficacy beliefs toward his/her success in university science, this would tend to mediate the effects of any other stressors he/she may be experiencing. Latino students may experience additional stress associated with issues of acculturation that students of the dominant culture may not.

Purpose of the Study

The primary purpose of the study was to explain academic success in the first year of science curriculum among Latinos at a South Texas Hispanic serving institution on the basis of (a) students' self-efficacy in science, (b) life stressors, and (c) level of acculturation, while controlling for academic ability, as measured by SAT and high school GPA. It was hypothesized that the three factors are useful predictors of academic success in science, as measured by first year GPA, earned credit hours, and intent to remain in the science major, after controlling for SAT score and high school GPA. The secondary purpose of the study was to document the perspectives of the science students

on the role of the above-mentioned variables in influencing academic success. The study employed an explanatory sequential mixed methods model (Creswell & Plano Clark, 2011). The study was guided by the following research questions:

1. What are the combined and unique contributions of self-efficacy, stress, and acculturation in explaining academic success, as measured by GPA, independent of high school GPA and SAT scores, in a non-probability sample of first year science students at a university in South Texas?
2. What are the combined and unique contributions of self-efficacy, stress, and acculturation in explaining academic success, as measured by earned credit hours, independent of high school GPA and SAT scores, in a non-probability sample of first year science students at a university in South Texas?
3. What are the combined and unique contributions of self-efficacy, stress, and acculturation in explaining academic success, as measured by the intent to remain in the major, independent of high school GPA and SAT scores, in a non-probability sample of first year science students at a university in South Texas?
4. What are the perspectives of first year science students regarding the influence of self-efficacy, stress, and acculturation on first year academic success in science?

Operational Definitions

- Science Self-Efficacy was measured by Science Grade Self-Efficacy Scale (Britner & Pajares, 2001).
- Stress was measured by Young Adult-Family Inventory of Life Events and Strains (YA-FILES) devised by McCubbin, Patterson, and Grochowski (McCubbin & Thompson, 1991).

- Acculturation was measured by Acculturation Rating Scale for Mexican Americans II (ARSMA-II) (Cuéllar et al., 1995).
- Grade Point Average was measured by the student's GPA at the end of the spring semester, which included only fall and spring semester at The University.
- Credit Hours Earned was measured by the number of hours earned at The University in the fall and spring semesters.
- Intent to Remain in the Science Major was measured by a binary variables (0 = no, 1 = yes).
- High School Grade Point Average was student's self-reported high school GPA.
- SAT Score was measured by student's mathematics and verbal SAT score or an equivalent ACT score.
- Perspectives of students regarding self-efficacy, stress, and acculturation were documented by analyzing focus group participants' responses.

Delimitations, Limitations, and Assumptions

The study was delimited to (a) freshman science students at one South Texas university; (b) predictor variables of science self-efficacy, stress, and acculturation; and (c) outcome measures of first year GPA, earned credit hours, and intent to remain in the major. Due to non-probability nature of the sampling technique, external validity was limited to the study participants. Due to non-experimental nature of the study, no casual inferences were drawn. The underlying assumption for self-reported data was that the participants' recollections and evaluations of past events were accurate, that they understood the language in which the instrument items were written, and that they responded to the items honestly. The interpretation of the qualitative data followed the

assumption that truth and realities could not be triangulated, because of lack of multiple data sources that could be combined to contribute to verification and validation. It was assumed that the researcher remained academically rigorous with objectivity and subjectivity in both the quantitative and qualitative portions of the study, respectively.

Significance of the Study

Much has been written about college retention and persistence as universities have been pushed toward greater efficiency and accountability. In a rapidly technologically advancing world, the need for highly qualified scientists is ever increasing. If America is to maintain global economic competitiveness, we must increase the number of STEM graduates. Latinos are the fastest growing population in the United States, but are poorly represented in science and experience less favorable science education outcomes than do non-Latino whites and Asians. One way to address the need for more STEM graduates is to discover ways to increase Latino participation in STEM. The study intended to aid educators in understanding what factors contribute to first year Latino college student's success and retention in science so that all stakeholders can prepare students for first year science curriculum. When students drop out of science fields, there is both a monetary loss to society and loss of intellectual capital. The study further aimed to understand how acculturation of Latino students in South Texas predicts university success in science, which may be an important key to increasing minority participation in STEM fields in this rapidly growing U.S. demographic.

CHAPTER II

LITERATURE REVIEW

The study examined academic success on the basis of academic self-efficacy in science, stress, and acculturation, independent of high school grade point average and Scholastic Aptitude Test scores, among Latino first year science students at a South Texas university.

The literature review was divided into six sections: (a) the first year of college, (b) Latinos in science, (c) academic predictors of university success, (d) science self-efficacy, (e) stress, and (f) acculturation. The theoretical frameworks underlying self-efficacy, stress, and acculturation were addressed in Chapter I. Also provided in Chapter I, was a review of current Latino demographic trends in the United States.

The First Year of College

The study attempted to predict success outcomes of GPA, credit hours earned, and intent to remain in the science major among Latinos in the first year of college. The first year of college is critical to a university students' success because of the vast amount of knowledge gained and because it serves as the foundation on which academic success and persistence is built (Reason, Terenzini & Domingo, 2006), yet over 25% of students are not retained from freshman to sophomore level among four-year institutions (ACT 2012). Pascarella and Terenzini (2005) estimated that 80% to 95% of the knowledge gained in English, science, and social studies occurs in first 2 years of college. Most students leave college before the second year of college (Tinto, 1994) thus it is critical to retain science students into the sophomore year.

There are two often cited theories of college persistence. Tinto's Student Integration Theory (1975, 1993) described persistence as the outcome of the interaction between the student and the institution. The student's background characteristics are deemed important in Tinto's view because they determine how the student will fit in with the culture of the institution. Key variables such as academic performance and social involvement combine to in part determine a student's integration into the institution's culture and desire to persist and graduate. In theory, higher persistence rates will result from a good fit between institution and student.

Many researchers have noted the importance of academic performance to college persistence in college (Bean, 1980,1985; Blinne & Johnston, 1998, Cabrera et al., 1992, 1993, Tinto, 1975, 1994). First year GPAs have been found to be important predictors of persistence from freshman to sophomore year (Kahn & Nauta, 2001). Because retention from freshman to sophomore year is critical to students overall persistence (Tinto, 1994) it is important to find ways to predict retention particularly among Latino science majors.

Bean proposed the student attrition model to explain college persistence and retention (1980, 1985). His model emphasized behavioral intentions and posited that student's intentions to stay at the institution are shaped by their attitudes and beliefs about the institutional culture, friends, and faculty. If students have positive experiences, such as positive grades, social interaction, and feelings of connectedness, they are more likely to persist. In both models the match between student and institution are considered key to a student's decision to persist. These frequently cited models serve as the theoretical foundation upon which to build our understanding of first year university success among Latinos because they provide useful frameworks for understanding retention. These

models are important to the present study since a Latino students' acculturation level could negatively impact how well he/she fits it to the dominant culture of the institution, in this case defined as the science major or department. As previously discussed, 78% of doctoral level scientists and engineers are Non-Latino whites (Tsapogas, 2006) Latinos represent just 4% of the total science and engineering workforce and underrepresented minorities, including blacks, Latinos, and Native Americans, comprise just 6% of the full time, full professors with science and engineering doctorates (National Science Foundation, 2011). To successfully enter STEM professions, Latinos must acculturate to the overwhelmingly dominant non-Latino white culture. Having high self-efficacy could positively affect a student's grades, number of credit hours earned and retention in the science major. High stress, whether the result of acculturation or other factors, might hinder a students' social involvement on campus and in turn might make the student more likely to leave the science major. High self-efficacy may mediate stress associated with acculturation. There have been few studies of the transition from high school to college for students interested in pursuing STEM careers, particularly among minorities (Hurtado et al., 2007). More research is needed to fully understand the first year university science experience among Latinos.

Latinos in Science

Latinos are the fastest growing demographic in America (Zambrana, 2011) and have great potential as a source to increase the number of STEM scientists in America (CEOSE, 2011), yet they face disparities in educational attainment at every stage of the STEM pipeline and are greatly underrepresented in STEM fields when compared to non-Latino whites and Asians (Gándara, 2006; Museus, Palmer, Davis, & Maramba, 2011;

Tomás Rivera Policy Institute, 2008). Demographic information concerning Hispanics has been collected since 1970 in an effort to comply with federal anti-discrimination policies such as the Civil and Voting Rights Acts. The terms Hispanic and Latino are both panethnic terms that refer to many ethnic groups. These are problematic and politically charged terms. A lengthy discussion of these terms is outside the scope of the study, however, it should be noted that the term Latino is preferred, but out of necessity will often be used synonymously with Hispanic, as data have been aggregated under this term since the 1970s. See Alcoff (2005) and Calderon (1992) for discussions of sociological and political ramifications of terms Latino and Hispanic.

The 2010 United States Census dealt with the ambiguity of terminology for Latinos and Hispanics, by asking respondents if they are "Hispanic, Latino, or Spanish" with subsequent questions to determine specific country of origin. In practical terms, according to the United States Census Bureau, American Community Survey (2006), 64% of the over 44 million US Hispanics were of Mexican origin. There is a need to disaggregate the Latino/Hispanic data (Museus et al., 2011) to get a better picture of each subgroup's participation in STEM, but since most historical data have been collected in aggregate, this too presents a problem with making comparisons to previous work and gauging improvement. Though the current study covers all Latinos, it takes place in South Texas, where the vast majority of subjects self-describe themselves as Mexican-American, Mexican, or Chicano. Current demographic trends among the U.S. Latino population were detailed in Chapter I. While Latinos are a young and rapidly expanding population, they are not as successful in STEM as their non-Latino white and Asians contemporaries.

Numerous studies show a higher percentage of non-Latino white and Asian students than Latinos achieving positive university science outcomes such as completion rate, retention, persistence, credit hours earned, and grade point average (Banks, 2004; Llagas & Snyder, 2003; Tinto, 1994). Many Latinos begin their education at a disadvantage because poverty rates among Latinos are significantly higher than non-Latino whites and Asians (Acuña, 2003; Zambrana, 2011). Gándara (2006) asserted that the gap in achievement between Latinos and their White and Asian peers begins before Latinos enter school, citing health care, nutrition, adequacy and stability of housing, neighborhood environments, the number and ability of adults in a young person's life who can provide support and guidance. This gap tends to persist over time and become wider at higher educational levels (Lucas, 1999). Many Latino students begin school as English language learners but often school's curricula are not sufficient to meet their needs (Gándara & Contreras, 2009). Latino children in the United States are more likely to live in low-income, urban school districts (Swanson, 2009). Museus et al. (2011) reported that Latinos achieve below non- Latino whites and Asians/Pacific Islanders at 4th and 8th grade levels and had the smallest improvement in mathematics at those levels from 1990 to 2007. This is problematic, because mathematics achievement in high school has been shown to be a predictor of science persistence (Gándara, 2006; Holt, 2006). Oakes (1990) found that Latinos are more likely to be placed in low curriculum tracks independent of their test scores. Though estimates vary, Latinos have the lowest high school completion rate of any ethnic group (American Council on Education, 2008). About half of all Latinos fail to graduate from high school (Gándara & Conteras, 2009). In 2010, 15% of Latinos age 16 to 24 were not enrolled in school and had not completed

high school, compared with 5% of whites (Child Trends Databank, 2012). Participation in STEM typically requires a bachelor's degree or higher that these students are unlikely to achieve. Latinos perform lower on the mathematics portion of the SAT than do non-Latino whites, Asians/Pacific Islanders, and Native Americans (Museus et al., 2011), which limits their ability to succeed in STEM fields. A substantially lower percentage of Latinos (16%) graduate with STEM bachelor's degrees when compared to non-Latino whites (32%), and Asians/Pacific Islanders (24%) (Museus et al., 2011).

In 2010, Latinos accounted for 50.5 million of the 308.7 million people in the United States representing 16 percent of the total population (Ennis et al., 2011). Though they accounted for 16% of the United States population, in 2009 Latinos accounted for just 9% of the STEM bachelor's degrees, 7% of the STEM master's degrees, and just over 5% of STEM doctoral degrees (CEOSE, 2011). At the professional level, Latinos comprised just 4% of the principal investigators whose studies were funded by the National Science Foundation in 2009 compared to 68% whites and 22% Asians (CEOSE, 2011). Clearly there is great need for more research at every stage of the STEM education pipeline, including predictors of first year university success.

Academic Predictors of University Success

The current study was designed to examine self-efficacy, stress and acculturation independent of the academic predictors of high school GPA and SAT score. There have been many attempts at predicting college success in science using independent variables such as high school GPA, number of science classes taken, highest mathematics course, standardized test scores, and high school rank. These measures of academic ability partially predict retention and other measures of academic success, such as GPA.

Predictors such as high school grade point average and high school rank are useful indicators of academic ability in the first year, but according to College Board's own national validity study of the SAT, using high school GPA, SAT-Critical Reading, SAT-Mathematics, and SAT-Writing scores to predict first year GPA resulted in a adjusted correlation coefficient of 0.62 (Kobrin et al., 2008). While this moderate correlation indicates these are useful predictors, they still explain only 38% of the variation in first year GPA. When high school GPA is removed from the model, the SAT scores explained just 28% of the variation in first year GPA (Kobrin et al., 2008). While standardized test scores correlate with college achievement, some have questioned the usefulness of standardized test scores among minorities contending that they discriminate against certain minority groups (Hoffman & Lowitski, 2005; Nettles, Millet & Ready, 2003).

Kahn and Nauta (2001) examined high school rank, ACT score, first and second semester college GPA, academic self-efficacy, outcome expectations, and performance goals as predictors of first-year college persistence using hierarchical logistic regression in a non-probability sample of 400 freshman students at a Midwestern university. They found that high school rank and ACT scores were the only precollege predictors of freshman to sophomore persistence (Kahn & Nauta, 2001). When they included first and second semester college GPAs along with the variables of high school rank, ACT score, and the social cognitive variables measured in the second semester, they found first semester GPA to be the best predictor of retention from freshman to sophomore year (Kahn & Nauta, 2001). The social cognitive factors (academic self-efficacy, outcome expectations, and performance goals) were also found to be significant predictors of

retention as was second semester GPA (Kahn & Nauta, 2001). The precollege social cognitive predictors were not statically significant predictors in this model (Kahn & Nauta, 2001).

Abdel-Salam, Kauffmann, and Williamson (2005) studied high school GPA and SAT scores as predictors of freshman engineering student performance at a North Carolina university and found SAT score to be a weak predictor of college engineering performance while they concluded that high school GPA was a more reliable measure.

Scott, Tolson, and Huang (2010) studied SAT verbal scores, SAT mathematics scores, and high school class rank as predictors of whether students were (a) retained as mathematics and science majors (b) dropped out of mathematics and science majors with a GPA of less than 2.0, or (c) dropped out of science majors with a GPA of greater than 2.0 GPA, at a large Texas research one institution and found that that these variables were good predictors for those students who dropped with a GPA of below 2.0, but their model was less accurate for students who changed from mathematics and science with above a 2.0. Holt (2006) examined National Educational Longitudinal Survey data from 1988 to 2000 and found a significant correlation between 12th grade mathematics achievement and persistence in STEM among minority students. House (2000) found high school percentile rank and ACT scores to be statistically significant predictors of first year grades among 658 freshman biology, chemistry, geology, physics, mathematics, and engineering students. While academic measures can be useful predictors of college success, they do not predict all the variation in first year science student success and may have limited utility for Latinos. For this reason, the current study examined the non-

academic factors of self-efficacy, stress, and acculturation as predictors of first year success while controlling for SAT score and high school GPA.

Self-Efficacy

Self-efficacy is a self-evaluation of one's competence to successfully execute a course of action necessary to reach desired outcomes (Bandura, 1977). Self-efficacy varies according to the domain and must be measured within the outcome domain (Bandura, 1986; Pajares, 1996). For example, high self-efficacy in sports is unlikely to correlate highly with success in chemistry, whereas high self-efficacy in science might be a useful predictor of success in chemistry. General measures of self-efficacy are less likely to predict college outcomes, but the more specific the domain, the more likely the self-efficacy measure is to predict a targeted outcome (Pajares, 1996). Many studies have shown positive correlation between academic self-efficacy and academic grades and persistence (Hsieh et al., 2007; Lent et al., 1984, 1986, 1987; Lent & Larkin, 1989; Zajacova et al., 2005). Few have looked specifically at *science* self-efficacy as a construct predictive of college success in science.

Bandura described self-efficacy from a perspective of human agency, such that people who are self-organizing, proactive, self-regulating, and self-reflecting beings interacting with their surroundings and personal circumstances (Bandura, 2006). According to Bandura, people learn by observing others and through a reciprocal interplay of three interacting determinants, which he referred to as personal, environmental, and behavioral. Through the dynamic reciprocal interplay of these three factors, one's course of life is determined. In this model, self-efficacy beliefs are important in determining decisions about whether to persevere or give up when faced

with stress or with decisions to persist in college or career. According to Bandura, the core belief of self-efficacy is at the foundation of human motivation, well-being, and accomplishments. In his view, "unless people believe they can produce desired effects from their actions, they have little incentive to act or persevere in the face of difficulties. Whatever other factors serve as guides or motivators, they are rooted in the core belief that one has the power to effect changes by one's action" (Bandura, 2006, p. 3). Students with high self-efficacy are motivated to succeed, they set higher goals and work harder to achieve those goals and they are more resilient when faced with stress (Bandura, 1997).

Science Self-Efficacy

While there is a great body of research on self-efficacy in various academic settings, little research has been done in the specific area of *science* self-efficacy. Since self-efficacy varies by domain, self-efficacy researchers have applied these concepts to students' abilities to succeed in science grades, activities, and courses, which in turn influence their goal setting, effort expended, perseverance under stress, and ultimately their success in science (Bandura, 1997; Britner & Pajares, 2001, 2006; Zeldin & Pajares, 2000). Students with low science self-efficacy are more likely to experience additional stress when faced with the high expectations of first year university science curriculum and may give up more readily. Self-efficacy has been found to be a strong predictor of academic achievement, course selection, and career decisions across domains and age levels including science (Britner & Pajares, 2006). One of the few studies involving self-efficacy of first year science majors is a correlational study among nursing majors. In this study, Andrew (1998) found that self-efficacy beliefs predicted science grades in two undergraduate science courses. Britner and Pajares (2001) found a correlation of .60

between 7th grade students' confidence that they would do well in science class and end of year science grades. Britner (2002) found a positive correlation between self-efficacy and science GPA among both male and female middle school students. Britner and Pajares (2006) investigated possible sources of self-efficacy beliefs among middle school science students and found a statistically significant correlation of .48 between self-efficacy and science grades. Britner and Pajares (2006) also found statistically significant correlation between mastery experiences and science self-efficacy, indicating that previous mastery of science tasks is correlated with science self-efficacy. While the study was correlational, this finding implies that previous mastery experiences could be a source of science self-efficacy. Harvey and McMurray (1994) found that low academic self-efficacy and low grade point average, together, were predictive of whether a student would withdraw from a nursing course. House (1995), while not looking at self-efficacy per se, found self-ratings of mathematical ability were statistically significant predictors of earning a grade of C or better in an introductory college chemistry course. House (2000) found academic self-concept, which was operationally defined as the sum of student's self-ratings of overall academic ability, drive to achieve, mathematical ability, writing ability, and self-confidence in intellectual ability to be a statistically significant predictor ($r = .25$) of first year grades among 658 freshman biology, chemistry, geology, physics, mathematics, and engineering students at a Midwestern university. Clearly, further research is needed in science self-efficacy among first year university science students.

Self-Efficacy in Career/Academic Performance

While there is little research on self-efficacy as a predictor of science persistence much work has been done linking self-efficacy to various careers. Drawing on Bandura's self-efficacy work, Lent, Brown, and Hackett (1994) applied social cognitive theory and self-efficacy beliefs to career and academic interest, choice, and performance in a unifying theoretical framework they termed Social Cognitive Career Theory (SCCT). The SCCT states that four factors influence a student's persistence namely, (a) academic ability/past performance, (b) academic self-efficacy (c) the anticipated consequences of persisting and graduating (outcome expectations), and (d) determination to persist and graduate (performance goals). According to Lent et al. (1994), self-efficacy, outcome expectations, and performance goals are influenced by one's ability/past performance, and these three factors in turn affect subsequent performance. This framework could be applied to the current study to gain better understanding of the outcome measure of the intent to remain in the science major.

Stress

Stress is part of everyday student life, but too much stress can negatively affect our psychological and physiological well-being (Zimbardo, Johnson, & Weber, 2006). Stress is defined as a state of physiological arousal that results when external stressors exceed an individual's capacity to cope with the demand (Lazarus, 1966).

Originally an engineering term, stress was first used to describe the area where weight, called a load, is carried by a bridge. Strain is the deformation of the bridge caused by the interplay of the load and stress (Lazarus, 1993). The terms stress and strain

were borrowed by psychologists attempting to understand factors that led to breakdown of soldiers in war.

Selye (1936) discovered some of the physiological mechanisms of stress in his experiments with rats and noticed that when rats were exposed to a variety of different stressors, such as heat, cold, swimming, spinal cord damage, or injections, their bodies responded in a three-stage process. Selye (1956) in his seminal work, *The Stress of Life*, called this response General Adaption Syndrome (GAS). The three stages of GAS are Alarm, Resistance, and Exhaustion. In the alarm phase, or fight or flight response, the hypothalamus, and lower brain structures, such as the amygdala, cause the adrenal glands to release epinephrine and norepinephrine. These hormones result in muscles tensing, higher heart rate, higher breathing and perspiration rates, dilated eyes, and slowing of the digestive system as the body initially prepares to deal with the stressor. If the stressor is removed, the body will return to homeostasis. If the stressor remains, homeostasis must still be achieved, as the body does not have the resources to continue in this heightened state of arousal. Thus, the resistance phase of the GAS is activated. The resistance phase is the body's adaptive response to long-term protection. In this phase, many of the physiological functions return to normal, but stress hormones continue to circulate at elevated levels. Overuse of this defense mechanism ultimately leads to disease. In exhaustion stage of GAS, the organism exhausts all resources and succumbs to disease and eventual death. Selye also noted that not all stress is harmful to the body, he termed positive stress, "eustress", and negative stress "distress".

Psychological Stress

Much research was conducted after the Second World War to better understand the psychology of stress and coping, as researchers tried to explain, "shell shock" or what we now know as post-traumatic stress disorder in returning soldiers. In the process of exploring psychological stress brought about by war, researchers found that stress could occur from everyday experiences, such as getting married, taking exams, or death of a loved one, not just traumatic events associated with battle or physical harm. Lazarus (1966) suggested that stress should be used as a collective term, while the terms sociological stress, physiological stress, and psychological stress may be used for better clarity. Selye's (1936, 1956) strictly physiological view of stress was well accepted at the time, but his theory of stress did not take cognitive processes into account.

Lazarus realized during his early work on stress that the same stressful situation might yield widely varying degrees of stress among human subjects. For the same given stressor, one subject may experience significant stress, while another may experience mild stress, and yet, another subject may show no signs of stress at all (Lazarus, 1993). Lazarus proposed the Cognitive Appraisal Model to explain these differences, which vary according to individual differences in cognitive beliefs and motivation variables. Lazarus argued that in order for a psychosocial situation to be stressful, it must be appraised by the subject to indeed be stressful. Cognitive appraisal is essential for an individual to determine whether a stressor is a threat, how big of a threat it is, and whether the individual has the resources to deal with the threat (Lazarus & Lazarus, 1994). Some stressors, such as being the victim of a violent crime, are universally viewed as threats, while others depend on past experiences with the stressor and the individual's confidence

in coping with the stressor. Someone who has been attacked by a dog in the past may experience a barking dog as a threat, whereas another individual may not. Lazarus identified two stages in the cognitive appraisal process, namely, primary appraisal and secondary appraisal. In primary appraisal, an individual assesses what is occurring, whether it is threatening, and whether action must be taken. If action is deemed necessary, then secondary appraisal begins in which the individual determines whether s/he has the ability to deal with the stressor. The more confidence the individual has that s/he can cope with the stressor, the less stress they may experience. The inability to effectively cope with stress has been associated with physical illness and depression (Dyson & Renk, 2006). Lazarus and Folkman (1984) found that individuals deal with negative stressors by engaging in various coping strategies, which eventually lead to some form of adaptation. This adaptation may or may not result in successful academic outcomes.

While Lazarus (1956, 1993) focused on explaining the stress response, Holmes and Rahe (1967), investigated psychological stressors as well as the cumulative effects of multiple stressors and developed the Social Readjustment Rating Scale to measure psychological stressors (1967). Kanner, Coyne, Schaefer, and Lazarus (1981), compared daily hassles to major life events and found that they were more predictive of psychological symptoms than major life events. A plethora of rating scales measuring stresses, strains, and hassles for a multitude of situations including educational settings have been developed based on the Holmes and Rahe concept. Examples used in educational research among university students include the Student Life Stress Inventory (Gadzella, 1991), Hassles Assessment Scale for Students in College (Sarifino & Ewing,

1999), Academic Stress Scale (Abouserie, 1994), College Chronic Life Stress Survey (Towbes & Cohen, 1996), and the instrument used in this study, the Young Adult Family Inventory of Life Events and Strains (YA-FILES) (McCubbin & Thompson, 1991). The YA-FILES was designed for college freshman students that are making the transition from the family home to the greater independence of university life (McCubbin, Thompson & McCubbin, 2001). It was designed to measure the cumulative "pile-up of life events and strains experienced by freshman and their families during a six month period" (McCubbin et al., 2001, p. 252). This is in accordance with a family systems perspective, suggesting events that happen to any family member are presumed to affect all members to some degree (McCubbin et al., 2001). The first year of college transition is a particularly stressful period as students cope with social, academic, and personal changes (Hudd et al., 2000). Ross et al. (1999) found the most common stressors among college students to be changes in sleeping and eating habits, new responsibilities, and increased workload. Robotham and Julian (2006) reviewed the empirically-based literature on stress and students in higher education, concluded that studies were in particular vocations such as law, medicine, social work, hospitality industry, and nursing and found six articles focusing on medical school students and four articles about stress and nursing students.

Some studies have examined stress and the first year of college transition. Traditional first year university students experience stress as they make the transition from their parents' home to the greater independence and challenges of university life (Condren & Greenglass, 2011; Dyson & Renk, 2006). Moving away from home for the first time may result in stress from loneliness, homesickness, or friendsickness, as

students are removed from their former support network (Willis, Stroebe, Hewstone, 2003; Paul & Brier, 2001). First year students experience stress from greater academic, personal, and financial demands (Condren & Greenglass, 2011). According to the CIRP Freshman Survey, UCLA's annual survey of entering students at U.S. four-year higher education institutions, first-year college students' ratings of their emotional health dropped to record low levels in 2010, indicating that freshmen are more stressed than ever (HERI, 2010). Financial concerns and the current political milieu were cited as major stressors (HERI, 2010). This was unchanged according to the 2011 survey results, though students were found to be more academically oriented than in the past (HERI, 2011). Zajacova, Lynch, and Espenshade (2005) investigated the combination of self-efficacy, stress, and background variables as predictors of success in college, defined as first year college GPA, retention to second year, and first year credit hours earned. The study was conducted with 107 first-semester college freshmen, beginning the spring semester of 1997–1998, at a 4-year New York City university. The students were mainly nontraditional, minority, and immigrant students who commuted to school and often studied part-time. The researchers postulated that academic stress should have a negative affect on success but the affect should be mediated by a high self-efficacy. Zajacova et al. also suggested that stress should be higher in minorities or recent immigrants, but did not include a specific measure of acculturation in their research, only whether respondents belonged to these groups (2005). Zajacova et al. did not find a significant correlation between stress and first year college GPA, retention to second year, or first year credit hours earned, though many studies indicate stress is negatively associated with college outcomes (Robotham & Julian, 2006). This study examined stress as one

factor which may negatively influence first year success among Latino university science students.

Acculturation

The most widely used definition of acculturation (as cited in Berry et al., 2011) is "those phenomena which result when groups of individuals having different cultures come into continuous first-hand contact, with subsequent changes in the original culture patterns of either or both groups…under this definition, acculturation is to be distinguished from cultural change, of which it is but one aspect, and assimilation, which is at times a phase of acculturation" (Redfield, Linton and Herkovits, 1936 p.149-152). Acculturation is a process that has occurred throughout history and across the world as humans have explored and migrated across the planet (Sam & Berry, 2006). Acculturation is a concept that has been applied to a multitude of culturally plural societies to describe the changes that occur when two or more cultural groups come into contact (Berry, 2006a). The concept of acculturation arose in the 1960s as a response to a growing concern about cultural bias as psychologists working with other cultural groups began to realize that they were studied using concepts and instruments that were alien and culturally inappropriate (Berry, 2006a).

The process of acculturation occurs when two or more groups are brought into contact and results in changes in attitude, cultural identity, values, and behaviors (Cuéllar et al., 1995). Two theoretical models exist to explain these changes, namely, the unidimensional model and bidimensional model. The unidimensional model assumes that the members of the immigrating culture change as a result of exposure to the dominant or host culture in one direction. The bidimensional model assumes both

maintenance of the culture of origin and adherence to the dominant or host culture. Acculturation, rather than assimilation, was chosen as the measure of these changes in the current study. The term assimilation is a problematic term, sometimes used as a synonym to acculturation and at other times the words have been used as subsets of each other (Sam, 2006). Assimilation, sometimes called the melting pot theory, is taken to mean a complete unidirectional change in which an individual or group loses their former culture in order to conform to the dominant culture (Bennett, 2003; Smokowski & Bacallao, 2011). Many scholars agree that full assimilation is undesirable and biculturalism should be favored as it leads to better mental health and educational outcomes among Latinos in America (Acuña, 2003; Smokowski & Bacallao, 2011, Valenzuela, 1999).

Valenzuela (1999) performed a landmark ethnographic study of a Texas high school over a 3-year period and found that the educational system was assimilationist and subtractive for many Mexican and Mexican American students in that its relationships and policies were designed to erase valuable aspects of their culture and resulted in a detrimental loss of social capital needed for academic success. The bidimensional model assumes that both cultures are changed (Cuéllar et al., 1995). Most current thinking is that acculturation is a bidimensional and bidirectional in other words one can adapt to a new culture while maintaining original culture and the process may occur in both directions.

Stress may be associated with the acculturation process as an individual copes with the changes of adapting to a new dominant culture with different behaviors, attitudes and values (Berry, 2006b). This stress is referred to as acculturative stress (Berry, 1970) and was described by Oberg (1960) as culture shock. Some people find acculturation

more difficult than others (Berry, 2006b). For example, when the dominant culture has negative attitudes toward an acculturating group, that group may experience hostility, discrimination, and possibly rejection, which can lead to poor long term adaptation (Clark, Anderson, Clark, & Williams, 1999). The Latino population of the United States is unique because the influx of new immigrants has been greater and steadier than that of other nondominant groups, which has resulted in a population with great variation in level of acculturation (Betancourt & Flynn, 2009). Acculturation of Latinos has been studied as a predictor of many psychological, health, and social outcomes. Hovey (2000) found acculturation to be a significant predictor of depression and suicidal ideation among Mexican immigrants. Ghaddar, Brown, Pagán, and Díaz (2010) found lower levels of acculturation to be correlated with higher consumption of fruits, vegetables, and a generally healthier diet among Latinos in United States-Mexico border communities while Chamorro and Flores-Ortiz (2000) found higher levels of acculturation to be associated with eating disorders among Mexican-American women. Vega and Gil (1999) found U.S. Latino youth who had low levels of acculturation and high acculturative stress were the most likely to succumb to substance abuse. Eamon and Mulder (2005) found that mothers' higher level of acculturation was associated with lower levels of antisocial behavior among young Latino Adolescents.

Acculturation may have negative affects on not just individuals but on the functioning of the family unit (Gonzales, Fabrett & Knight, 2009). One mechanism of this may be the more rapid acculturation of Latino children compared to their parents, which has been associated with increased family conflicts (Gonzales, Deardorff,

Formoso, Barr, & Barrera, 2006) and decreased parental involvement (Dinh, Roosa, Tein, & Lopez, 2002).

While many studies have found acculturation to have negative affects, some authors have found that bicultural individuals may be the most resilient as they can function within both their culture of origin and the new dominant culture (Schwartz, Zamboanga, & Jarvis, 2007). Gonzales et al. (2009) posited that bicultural individuals benefit from knowledge and resources they accrue through participation in the host culture, while also retaining the positive, protective factors of their traditional cultures, and concluded bicultural youth can navigate successfully within multiple cultural contexts and thus experience less stress than might result from conflicting cultures.

Few studies have examined acculturation of Latinos as a possible predictor of college success. It may be postulated that higher levels of acculturation as the dominant culture may be correlated with less stress and therefore higher success. Cano and Castillo (2010) used the Acculturation Rating Scale for Mexican Americans-II (ARSMA-II) to predict distress of 141 Latina undergraduates and 73 Latina graduate students at a large Texas predominately non-Latino white university and they found a low correlation (r = .14) between acculturation and distress. Hurtado and Gauvain (1997) found acculturation to be predictive of college attendance among Mexican American adolescents. López, Ehly, and García-Vásquez (2002) found no significant correlation between acculturation level and GPA among 91 Mexican or Mexican American high school students in New Mexico.

Chapter Summary

This chapter focused on the literature pertaining to the first year of college, Latinos in science, academic predictors of university success, science self-efficacy, stress, and acculturation. Without question, academic predictors, such as high school GPA and SAT scores, are useful predictors of university success, but they fail to answer why some students fail in spite of superior SAT scores and others succeed without them. Having worked with first year science students for over a decade at The University and informed by the review of literature, the author concluded that self-efficacy, stress, and acculturation could be predictors of first year science success independent of high school GPA and SAT scores.

The author believes strongly in Tinto's view of persistence as the outcome of an interaction between student and institution and the importance of student's background characteristics in "fitting in" to the institutional culture. Latinos represent a large and growing potential source of future scientists, but are presently severely underrepresented in science fields and perform lower academically than do non-Latino whites and Asians. Perhaps this is in part due to the minority status of Latinos and the dominance of non-Latino whites at American higher education institutions and in science fields. Tinto's Student Integration theory can easily be related to the process of acculturation. While Tinto addressed integration into the university itself, his theory can be applied to the smaller student subculture of a university science department.

The interplay between acculturation and stress among Latino first year university science students lacks adequate study. While recent immigration to a new culture may serve as a powerful motivator to succeed, less is known about second and third

generation immigrants and how acculturation predicts success in these generations in university science curriculum. Perhaps recent immigrants experience what Selye called eustress or good stress, whereas subsequent generations experience distress. Self-efficacy has been shown to correlate highly with positive academic outcomes and is expected to mediate stress arising from general life stressors and from stress of acculturation.

On the basis of an extensive review of the literature, it was hypothesized that high school GPA, SAT score, academic self-efficacy, and acculturation will have positive correlations with the outcome measures of (a) grade point average, (b) earned credit hours, and (c) intent to remain in the science major, whereas stress is expected to show a negative correlation with the outcome measures.

CHAPTER III

METHOD

The primary purpose of the study was to explain academic success on the basis of academic self-efficacy in science, stress, and acculturation, independent of high school grade point average and SAT scores, among first year Latino science students at a South Texas Hispanic serving university. The secondary purpose of the study was to document the perspectives of the science students on the role of the above-mentioned variables in influencing academic success. The study was guided by the following research questions:

Quantitative Research Questions

1. What are the combined and unique contributions of self-efficacy, stress, and acculturation in explaining academic success, as measured by grade point average, independent of high school grade point average and Scholastic Aptitude Test scores, in a non-probability sample of first year Latino science students at a university in South Texas?
2. What are the combined and unique contributions of self-efficacy, stress, and acculturation in explaining academic success, as measured by earned credit hours, independent of high school grade point average and Scholastic Aptitude Test scores, in a non-probability sample of first year Latino science students at a university in South Texas?
3. What are the combined and unique contributions of self-efficacy, stress, and acculturation in explaining academic success, as measured by the intent to remain in the major, independent of high school grade point average and Scholastic

Aptitude Test scores, in a non-probability sample of first year Latino science students at a university in South Texas?

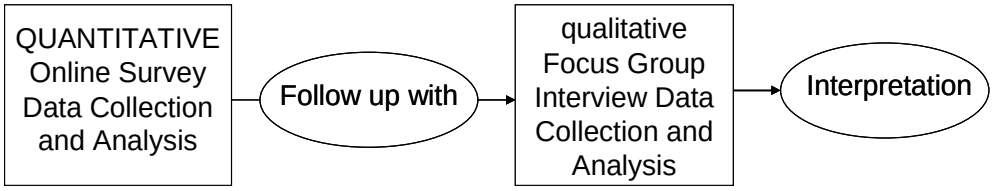
Qualitative Research Question

1. What are the perspectives of first year Latino science students regarding the influence of self-efficacy, stress, and acculturation on first year academic success in science?

Research Design

The study employed a mixed methods model, namely, explanatory sequential (Creswell & Plano Clark, 2011), to collect, analyze, interpret, and synthesize the quantitative and qualitative data, which were needed to answer the research questions. Mixed methods research designs focus on collecting, analyzing, and mixing both quantitative and qualitative data in a single study (Creswell & Plano Clark, 2011). Mixed methods research designs provide strengths that offset the weaknesses of both quantitative and qualitative research (Creswell & Plano Clark, 2011). The explanatory sequential design is valuable in further explaining initial quantitative results. When a researcher finds significant (or nonsignificant) results, the qualitative phase adds greater depth to the research by helping to explain the mechanism or reasons behind the quantitative results (Creswell & Plano Clark, 2011). Figure 1 depicts the study's mixed methods model.

Figure 1. Explanatory Sequential Model



Quantitative

The quantitative component of the study employed a correlational design (Gall, Gall, & Borg, 2007). Specifically, the study was predictive in nature, in which (a) self-efficacy, (b) stress, and (c) acculturation were used to explain variation in (a) GPA, (b) earned credit hours, and (c) intent to remain in the science major, controlling for SAT scores and high school GPA. Due to non-experimental nature of the study, no causal inferences were drawn.

Qualitative

The qualitative component of the study employed a focus group. Focus groups are a form of group interview led by the interviewer, which rely primarily on the interaction within the group, not the interaction between the interviewer and the group. The purpose is to yield a collective, rather than an individual, view of the subject from the participants' perspectives (Cohen, Mansion & Morrison, 2007).

Subject Selection

The University in which the study took place is a public, Master's I Carnegie Classification institution of higher learning with approximately 10,000 students. The University is a Hispanic Serving Institution (HSI). The study was delimited to freshman Latino students who were required to take part in the science component of the University's First Year Learning Community Program (FYLCP), hereafter referred to as the Science First Year Learning Community (SFYLC). The First Year Learning Community Program is designed to help students succeed in the first year. All first year students participate in the program.

Quantitative

A non-probability sample, consisting of all first year Latino students entering the SFYLC in fall 2011, was recruited to participate in the study. The sample consisted of 98 students. Due to non-probability nature of the sampling, external validity was limited to study participants.

Qualitative

For the qualitative component of the study, a non-probability sample of seven students from the quantitative phase was recruited for the focus group. A recommended sample size for focus groups is five to eight participants (Krueger, 2009).

Permission to conduct the study was obtained from the Institutional Review Board at Texas A&M University-Corpus Christi (Appendix A).

Instrumentation

Quantitative

A four-part survey instrument (Appendix C) was developed to collect the quantitative data. Parts 1 – 3 consisted of published instruments, namely, (a) the Science Self-Efficacy Scale (Briton & Pajares, 2001), (b) the Young Adult-Family Inventory of Life Events and Strains (Corcoran & Fischer, 2000), and (c) the Acculturation Rating Scale for Mexican Americans-II (Cuéllar, Arnold, and Maldonado, 1995). The fourth part consisted of a demographic questionnaire to collect data on selected characteristics of the study participants. Permission to use the published instruments for the purpose of the study were obtained. Outcome measures were obtained from The University records. A description of the survey instrument follows.

Science Self-Efficacy Scale

Self-efficacy is a self-evaluation of one's competence to successfully execute a course of action necessary to reach desired outcomes (Bandura, 1977). Social cognitive theory, upon which the concept of self-efficacy is based, maintains that self-efficacy measures should correspond to the outcome measures they are to be compared with (Pajares, 1996).

The Science Self-Efficacy Scale (Briton & Pajares, 2001) used in the study is a five-item scale in which subjects are asked to provide ratings of their confidence that they could earn either an A, B, C, or D in their science courses on a six-point Likert-type scaling. Briton and Pajares (2001) reported reliability coefficient of .86 for the instrument. Briton and Pajares (2001) found self-efficacy to be a significant predictor of GPA in 262 Grade 7 students from four urban public schools in the Southeast. The scale is scored by summing the responses to derive a global science self-efficacy score. A higher score indicates higher science self-efficacy.

Young Adult-Family Inventory of Life Events and Strains

Stress is a state of physiological arousal that results when an external demand exceeds an individual's capacity to cope with the demand (Lazarus, 1966). The study employed the Young Adult-Family Inventory of Life Events and Strains (YA-FILES), which is a measure of the stressors that subjects have experienced from the last six months to the present (McCubbin & Thompson, 1991). The scale is a 77-item instrument, consisting of two parts. Part one measures family life changes for the subject and the subject's family in the past 6 months while part two is designed to measure college changes for the respondent.

Part one of the inventory includes items such as: "parents separated or divorced;" "parent died;" and "increase in arguments between parents." Stressors measured by Part two of the inventory include examples such as: "felt pressure to get good grades;" "felt pressure from your parents to make a career choice;" and "felt your being in college has placed added strain on your family" (Corcoran & Fischer, 2000). The YA-FILES has very good internal consistency and test-retest reliability, .85 and .85, respectively (Corcoran & Fischer, 2000). The YA-FILES has fair concurrent validity and is a good predictor of GPA according to Corcoran and Fischer (2000). The scale is scored by assigning one point for each item if it is endorsed by the respondent, zero if it is not, and summing the items scores to derive a global stress score. Higher scores indicate higher levels of stress.

Acculturation Rating Scale for Mexican Americans-II

Acculturation entails the social and psychological exchanges that take place when there is continuous contact and interaction between individuals from different cultures (Berry, 1997; Cabassa, 2003; Ryder, Alden, & Paulhus, 2000).

The measure of acculturation for the study was the Acculturation Rating Scale for Mexican Americans II, Scale 1, created by Cuéllar, Arnold, and Maldonado (1995). The ARSMA-II contains two scales. Scale one yields a Mexican Orientation Score (MOS), and an Anglo Orientation Score (AOS), consistent with current consensus that acculturation is a bi-directional construct. Scale two is referred to as the Marginality Scale and is designed to measure the degree of marginalization; the scale was not used due to its lack of validity (Gutierrez, Franco, Powell, Peterson & Reid, 2009).

The ARSMA-II, Scale 1, is a 30-item Likert-style inventory utilizing questions such as: “I speak Spanish;” “I speak English;” “my friends while I was growing up, were of Mexican origin;” or “my friends while I was growing up were of Anglo origin” (Cuéllar et al., 1995). Mean values for each subscale are calculated to determine AOS and MOS mean scores (Cuéllar et al., 1995). The MOS mean is then subtracted from the AOS mean to obtain a value that represents an individual’s score along a continuum, ranging from very Mexican to very Anglo (Cuéllar et al., 1995). Anglo is a term used in the Southwestern United States referring not just to people of English descent, but to all non-Latino whites of European origin excluding Spaniards and Portuguese.

Cuéllar et al., (1995) tested the reliability of the AOS and MOS subscales, using a non-probability sample of 171 South Texas/Northern Mexico college students and found the subscales to have good internal consistency, .83 and .88, respectively. Test-retest reliabilities were .94 for the AOS and .96 for the MOS (Cuéllar et al., 1995). Cuéllar et al. (1995) developed a list of cutting scores, which can be used to interpret the ARSMA-II scores, as shown in Table 1.

Table 1
ARSMA-II Cutting Scores

Acculturation Levels	Description	ARSMA-II Acculturation Score
Level I	Very Mexican oriented	< -1.33
Level II	Mexican oriented to approximately balanced bicultural	≥ -1.33 and $\leq -.07$
Level III	Slightly Anglo oriented bicultural	$> -.07$ and < 1.19
Level IV	Strongly Anglo oriented	≥ 1.19 and < 2.45
Level V	Very assimilated; Anglicized	> 2.45

Demographic Questionnaire

A 17-item questionnaire was designed to collect data on selected characteristics of the subjects, which was used to describe the sample. The items were: (a) gender, (b) age, (c) marital status, (d) religious preference, (e) mother's highest education level, (f) father's highest education level, (g) generations since family immigration, (h) high school grade point average, (i) SAT composite score, if applicable, (j) SAT mathematics score, if applicable, (k) ACT composite score, if applicable, (l) ACT mathematics score, if applicable, (m) highest mathematics course in high school, (n) subject's willingness to participate in a focus group interview, (o) student identification number, (p) is subject 18 years or older?, and (q) can subject's ethnic or cultural background be described as Mexican-American, Latino/a, or Hispanic?

Qualitative

The perspectives of the students were documented by the qualitative data obtained from the focus group. In accordance with the explanatory sequential mixed-method model, quantitative data were analyzed first and results were used to formulate the lead questions for the focus group.

Data Collection

Quantitative

The quantitative data were collected through an on-line questionnaire delivered via a link to the student's Blackboard online learning system in their First Year Seminar Course during the first 17 days of the fall semester, beginning on August 22, 2011. An email was sent during the first week of classes to all potential participants, informing them of the purpose of the study and inviting them to participate. Up to three additional

follow-up emails were sent to encourage students, who had not yet completed the survey, to participate. As an incentive to complete the survey, participants were eligible for a random drawing to win one of three Barnes & Noble Gift cards valued at 100, 50, and 25 dollars. Data collection of the predictor variables concluded on August 7, 2011. Consent to participate in the study was obtained electronically (Appendix B). All data were kept confidential.

The outcome variables of GPA, earned credit hours, and intent to remain in the science major were collected on May 25, 2012, via university records, 10 days after the end of the spring semester grade deadline. Only course work completed at The University between fall 2011 and spring 2012 were included. The GPA and earned credit hours were recorded directly from The University's records. The third outcome measure, intent to remain in the science major, was obtained by examining The University's records to determine if the student's official declared major was science and whether s/he enrolled in science classes for future semesters. When these conditions were not met, or when a student's intent to remain in the major was unclear, the researcher contacted the student directly via email or telephone and asked if s/he was still attending The University and if so, what his/her current major was. Those remaining in science were coded as a one (1) and those who had left science or planned to do so before their next enrollment were coded as zero (0).

Qualitative

Qualitative data were collected via a focus group interview conducted on June 19, 2012, in a classroom at The University. The focus group lasted approximately 90 minutes. All students read and signed a consent form at the beginning of the interview

session (Appendix B). Participants were advised that their identity would remain confidential. A glossary of terms (Appendix D) was provided to assist the participants in understanding the terminology. A slideshow of the lead questions was used to help focus the interview. The lead questions are presented in Table 2. The questions were divided into three sections, corresponding to the study's predictor variables of stress, acculturation, and science self-efficacy. Each section began with an open-ended lead question, followed by closed-ended yes or no questions, and concluded with an open-ended final question. The questions were designed to provide a deeper understanding of and to help explain the quantitative results in accordance with the study's explanatory sequential mixed methods model. The qualitative phase of the study was conducted based on the theoretical perspective of interpretivism. Interpretivism, according to Crotty (1998), is an attempt to understand an individual or individuals' social reality. Based on this theoretical perspective, the researcher attempted to understand and explain the perspectives of the focus group participants. All participants were given the chance to respond to all questions posed by the researcher. The researcher facilitated the interview by asking the lead questions, while encouraging a natural discussion in order for themes to develop, independent of the researcher as much as possible. A tape recorder was used to record the session and the researcher transcribed the audiotape verbatim (Appendix C).

The coding process, modeled after Creswell (2005), consisted of reading the transcription, identifying text segments with brackets, assigning a code word or phrase to describe the meaning of the text segment, making a list and grouping the words, reviewing the transcription, and reducing the codes to themes to form the major ideas of the transcription. The coding process was done without the use of analytical software.

Table 2
Focus Group Lead Questions

Stress
1. Tell me about the effect of stress prior to your first year of college on your success in the first year of science?
2. Did stress prior to college affect your GPA at the end of the spring 2012 semester?
3. Did stress prior to college affect your total number of hours earned at [The University] at the end of the spring semester?
4. Did stress prior to college affect your intention to remain as a science major at the end of the spring semester?
5. What else can you tell me about the effect of stress on your first year college success in science?
Acculturation
1. Tell me about the effect of acculturation on your success in the first year of science?
2. Did your level of acculturation affect your GPA at the end of the spring 2012 semester?
3. Did your level of acculturation affect your total number of hours earned at [The University] at the end of the spring semester?
4. Did your level of acculturation affect your intention to remain as a science major at the end of the spring semester?
5. What else can you tell me about the effect of acculturation on your success in the first year of science?
Science Self-efficacy
1. Tell me about the effect of science self-efficacy on your success in the first year of college science?
2. Did your science self-efficacy prior to the beginning of the fall 2011semester affect your GPA at the end of the spring semester?
3. Did your science self-efficacy prior to the beginning of fall 2011 affect your total number of hours earned at TAMUCC at the end of the spring semester?
4. Did your science self-efficacy prior to the beginning of fall 2011 affect your intention to remain as a science major at the end of the spring semester?
5. What else can you tell me about the effect of science self-efficacy on your success in the first year of science?
Final Question
Is there anything else you would like to share?

Data Analysis

Quantitative

The study was predictive in nature and employed correlational techniques to explain the direction and magnitude of the relationships between independent and dependent variables, while controlling for the covariates.

The data collected on-line were downloaded into the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were used to summarize and organize the study variables.

Hierarchical multiple regression (HMR) and logistic regression (LR) were used to explain the variation in the outcome measures, using the predictor variables, while controlling for the confounding variables (Field, 2009; Pedhazur & Schmelkin, 1991).

In HMR, the two covariates were entered into the prediction equation first as a block, followed by the predictor variables, which were entered one a time on the basis of the strength of the simple correlation between each of the predictor variables and the outcome measure. The unique contribution of each predictor was evaluated by examining the percentage of the explained variation. The editing of the data included (a) examination of the standard residuals to look for outliers on the dependent variable; (b) examination of Hat Leverage to identify outliers on a set a predictors; and (c) calculation of Cook's distance to determine if there were any influential data points (Pedhazur & Schmelkin, 1991)

The LR regresses a dichotomous criterion variable on a set of predictor variables, has a non-linear model, and is used to estimate the probability of an event occurring. The criterion variable is between zero and one (i.e., not retained or retained as a science

major). The LR uses logistic transformation to transform the dichotomous variable in such a way that it ranges from minus infinity to plus infinity. The LR assesses the likelihood of each of the independent variables contributing to the prediction of the criterion variable while controlling for all other variables in the model; it tests whether any of the predictors are linearly related to the log odds of the event of interest The probability of the event occurring is estimated as, $p(event) = 1/(1 + e^{-z})$, where $Z = Constant + B_1X_1 + B_2X_2 + ... + B_pX_p$. Constant and Bs are parameter estimates for the logistic regression model from the data. The Wald statistic is used to test that a parameter is 0 in large sample sizes; it has a chi-square distribution (Pedhazur & Schmelkin, 1991; Hosmer & Lemeshow, 2000; Field, 2009).

Qualitative

The qualitative portion of the study consisted of content analysis of the focus group interview transcript. The primary purpose of the content analysis was to derive themes to document the perspectives of the participants regarding influence of self-efficacy, stress, and acculturation on their first year academic success in science. The audio recording of the focus group interview was transcribed and analyzed into codes, categories, and themes to summarize the qualitative data. The researcher investigated frequencies of occurrence of discussion items to include self-efficacy, stress, and acculturation themes looking for possible explanations of quantitative results as well as unexpected items not considered in the quantitative phase. Discussion of unexpected items were also recorded and investigated for their relevance to first year student science success.

Quantitative and qualitative results were synthesized to better understand the contribution of academic self-efficacy in science, stress, and acculturation in explaining first year university science success, independent of high school GPA and SAT scores.

CHAPTER IV

RESULTS

The primary purpose of the study was to explain academic success on the basis of academic self-efficacy in science, stress, and acculturation, independent of high school grade point average and Scholastic Aptitude Test scores, among first year Latino science students at a South Texas Hispanic serving university. The secondary purpose of the study was to document the perspectives of the science students on the role of the above-mentioned variables in influencing academic success.

A non-probability sample of 98 first year university science and engineering students was recruited for the study. An electronic survey questionnaire was administered during the first two weeks of fall semester 2011 to collect the data to measure the predictor variables as well as selected demographic data to profile the study participants. The data on outcome measures were collected in May 2012. The raw data were exported into the Statistical Package for the Social Sciences (SPSS), which was used to manipulate and analyze the data.

Quantitative Results

A Profile of the Subjects

Of the 98 subjects, 64 (65.30%) were female and 34 (34.70%) male. The participants ranged in age from 18 to 26 (M = 18.21, SD = 0.90). Only 2 participants were over the age of 19. The majority (53.10%) was Catholic, followed by 22.40 % Protestant, 15.30% who indicated no religion, 6.10% Evangelical Christian, and 3.10% who indicated other. Most subjects came from households where the highest education achieved by mother and father was a high school diploma, 27.60% and 31.60%,

respectively.

All students in the survey indicated that they were of Mexican-American, Chicano/a, Latino/a, or Hispanic origin. When asked to specify a country of cultural origin, 69 out of 98 (70.00%) indicated Mexico, while 15 (15.00%) did not respond to the question. Other Latino/Hispanic countries indicated were Cuba, El Salvador, Peru, Honduras, and Guatemala. Ten subjects indicated they were of mixed cultural origin, most often European and Mexican. All but three subjects were citizens of the United States. Of the three international students, two were Mexican citizens and one Bolivian (though this subject indicated Mexico as his/her country of cultural origin).

Subjects ranged widely in generational status. Generational status, as used in the study, referred to the number of generations the student's family had been in the United States. There were five categories, namely, 1st Generation - born in another country; 2nd Generation - born in the USA, either parent born in another country; 3rd Generation - born in the USA, both parents born in the USA and all grandparents born in another country; 4th Generation – subject and parents born in the USA and at least one grandparent born in another country with remainder born in the USA; 5th Generation – the subject, parents, and all grandparents born in the USA. Fifth generation was the mode (31.60%), followed by 4^{th} generation (24.50%), 2nd generation (22.40%), 3rd generation (12.20%), and 1st generation (9.20%).

The subjects' SAT scores ranged from 680 to 1270 ($M = 977.24$, $SD = 126.72$). Writing scores were not included. High school grade point averages ranged from 2.00 to 4.00 ($M= 3.56$, $SD = 0.38$). Nearly 51.00% of subjects had completed a high school pre-calculus course and 27.60% had completed calculus. On a Likert-type scale of one (not

determined at all) to six (completely determined), the study participants were quite determined to remain in their declared major (M = 5.29). On the basis of a similar 6-point Likert-type scaling (1 = not important at all, 6 = extremely important), the students felt graduating with a science degree would be important in reaching their professional goals (M = 5.63).

In short, a typical first year university student in the study was an 18-year-old female Mexican-American from South Texas who had just graduated from high school. All students were enrolled as science and engineering majors. Results are summarized in Tables 3 and 4.

Table 3
Profile of Subjects, Continuous Variables, n = 98

Variable	Mean	SD
Age	18.21	0.90
SAT Score	977.24	126.72
High School GPA	3.58	0.41
Determination to remain in science major	5.29*	1.19
Importance of graduating with a science degree	5.63**	0.94

* 1 = not determined at all, 6 = completely determined
** 1 = not important at all, 6 = extremely important

Table 4
Profile of Subjects, Categorical Variables, n = 98

	F	%
Gender		
Female	64	65.30
Male	34	34.70
Marital Status		
Single Never married	98	100.00
Generational Status		
1st	9	9.20
2nd	22	22.40
3rd	12	12.20
4th	24	24.50
5th	31	31.60

Table 4- Continued
Profile of Subjects, Categorical Variables, n = 98

Religious Preference		
Catholic	52	53.10
Protestant	22	22.40
Evangelical Christian	6	6.10
None	15	15.30
Other	3	3.10
Highest grade level mother completed		
Less than High School	12	12.20
High School Diploma/GED	27	27.60
Some College	26	26.50
2-year College Degree	11	11.20
4-year College Degree	15	15.30
Master's Degree	5	5.10
Doctoral Degree	0	0.00
Professional Degree	2	2.00
Highest grade level father completed		
Less than High School	14	14.30
High School Diploma/GED	31	31.60
Some College	20	20.40
2-year College Degree	14	14.30
4-year College Degree	12	12.20
Master's Degree	6	6.10
Doctoral Degree	0	0.00
Professional Degree	1	1.00

Predictor Measures

Three published instruments were used to measure the predictor variables, the Science Self-Efficacy Scale (SSES), Young Adult-Family Inventory of Life Events and Strains (YA-FILES), and Acculturation Rating Scale for Mexican Americans-II (ARSMA-II).

The Science Self-Efficacy Scale is a 5-item instrument in which the respondents are asked to provide ratings of their confidence that they could (a) pass their science courses, (b) earn an A, (c) earn a B, (d) earn a C, or (e) earn a D on a 6-point Likert-type

scaling (1 = not confident at all, 6 = completely confident). For the purpose of the study, the mean of the respondents' responses was used to measure the science self-efficacy scale score in which higher scores indicated higher science self-efficacy. The reliability coefficient for the instrument on the basis of the participants' data was .91. On the theoretical range of 1.00 to 6.00, the mean science self-efficacy was 4.52 (SD = 1.06). A summary of results is shown in Table 5.

Table 5
Science Self-Efficacy Scale, Summary of Results

	N	Min	Max	Mean	SD
1. How confident are you that you will pass science class at the end of the semester?	97	3	6	4.89	1.10
2. How confident are you that you will pass science class at the end of the semester with a grade better than a D?	97	1	6	5.09	1.12
3. How confident are you that you will get a grade better than a C?	98	2	6	4.84	1.16
4. How confident are you that you will get a grade better than a B?	98	2	6	4.21	1.25
5. How confident are you that you will get a grade better than an A?	98	1	6	3.60	1.52

Stress was measured, using the Young Adult-Family Inventory of Life Events and Strains, a 77-item questionnaire in which the respondents are asked to indicate the presence of stressful life events during the past six months. Items 1 – 46 and 47 - 77 are family-related and college-related stressors, respectively. For the purpose of the study, the total number of stressful life events was used to measure the severity of stress. Table 6 shows a summary of the results.

Table 6
Stressors, Summary of Results

		Yes		No	
	n	F	%	F	%
1. Family member started new business (farm, store, etc.)	98	14	14.30	84	85.70
2. Parent quit or lost job	98	34	34.70	64	65.30
3. Parents separated or divorced	98	17	17.30	81	82.70
4. Parent remarried	96	6	6.30	90	93.80
5. Family member was married	97	26	26.80	71	72.40
6. Family member was found to have a learning disorder	98	16	16.30	82	83.70
7. Parents adopted a child	98	7	7.10	91	92.90
8. A member started junior high or high school	97	63	64.90	34	35.10
9. Child or teenage member entered college, vocational training, or armed forces	98	69	70.40	29	29.60
10. Parent started school	97	11	11.30	86	88.70
11.Brother or sister moved away from home	98	46	46.90	52	53.10
12. Young adult member entered college, vocational training, or armed forces	98	63	64.30	35	35.70
13. Parent(s) started or changed to a new job	98	34	34.70	64	65.30
14. Family moved to new home	98	24	24.50	74	75.50
15. Unmarried family member became pregnant	98	22	22.40	76	77.60
16. Family member had an abortion	97	4	4.10	93	95.90
17. Birth of a brother or sister	97	8	8.20	89	91.80
18. Unmarried young adult member began having sexual intercourse	98	39	39.80	59	60.20
19. Family went on welfare	98	10	10.20	88	89.80
20. Damage or loss of family property due to fire, burglary, or other disaster	98	12	12.20	86	87.80
21. Brother or sister died	98	1	1.00	97	99.00
22. Parent died	97	1	1.00	96	99.00
23. Close family relative died	97	32	33.00	65	67.00
24. Death of a close friend or family member	97	44	45.40	53	54.60
25. Family member or close family friend attempted or committed suicide	98	9	9.20	89	90.80
26. Family member became seriously ill or injured	97	45	46.40	52	53.60
27. Family member was hospitalized	97	57	58.80	40	41.20
28. Family member became physically disabled or was found to have a long term health problem (e.g., asthma)	97	34	35.10	63	64.90
29. Family member has emotional problems	97	34	35.10	63	64.90
30. Grandparent(s) became seriously ill	98	38	38.80	60	61.20
31. Parent(s) have more responsibility to take care of grandparent(s)	98	34	34.70	64	65.30
32. Family member ran away	98	6	6.10	92	93.90
33. More financial debts due to use of credit cards or charges	98	26	26.50	72	73.50

Table 6- Continued
Stressors, Summary of Results

		Yes		No	
	n	F	%	F	%
34. Increased family living expenses for medical care, food, clothing, energy cost (gasoline, heating)	98	54	55.10	44	44.90
35. Increase in parent's time away from family	97	32	33.00	65	67.00
36. Young adult member resists doing things with family	98	33	33.70	65	66.30
37. Increase in arguments between parents	98	34	34.70	64	65.30
38. Teens/young adults have more arguments with one another	97	36	37.10	61	62.90
39. Parent(s) and young adult(s) have increased arguments (hassles) over personal appearance (clothes, hair, etc.)	98	27	27.60	71	72.40
40. Increased arguments about getting the jobs done at home	98	43	43.90	55	56.10
41. Family member uses drugs (not given by doctor)	98	19	19.40	79	80.60
42. Family member drinks too much alcohol	98	39	39.80	59	60.20
43. Teen/young adult was suspended from or dropped out of school	98	8	8.20	90	91.80
44. Parent(s) and young adults have increased arguments (hassles) over use of cigarettes, alcohol, or drugs	98	17	17.30	81	82.70
45. Family member went to jail, juvenile detention, or was placed on court probation	98	17	17.30	81	82.70
46. Family member was robbed or attacked (physically or sexually)	98	7	7.10	91	92.90
47. Felt pressure to get good grades	98	77	78.60	21	21.40
48. Had difficulty getting needed information and help from your college advisor	98	23	23.50	75	76.50
49. Had difficulty finding a college counselor for your personal needs (e.g., academic, career, emotional, etc.)	98	19	19.40	79	80.60
50. Had difficulty getting the help you needed from a college counselor	98	15	15.30	83	84.70
51. Felt pressure to make a career choice	97	34	35.10	63	64.90
52. Felt pressure from your parents to make a career choice	97	21	21.60	76	78.40
53. Felt pressure from your parents to succeed in college	98	63	64.30	35	35.70
54. Been unable to find a quiet place to study	97	17	17.50	80	82.50
55. Been unable to use the library to study	98	10	10.20	88	89.80
56. Been unable to use the athletic and recreational facilities when you wanted to	98	9	9.20	89	90.80
57. Felt financial pressures regarding how to pay for tuition, books, etc.	98	78	79.60	20	20.40
58. Had conflict or hassles with your roommate(s)	97	9	9.30	88	90.70
59. Felt the need to have more privacy	98	28	28.60	70	71.40

Table 6- Continued
Stressors, Summary of Results

60. Felt uncertainty regarding how to act as a college student in social settings	97	40	41.20	57	58.80
61. Had difficulty making friends with on-campus students	98	23	23.50	75	76.50
62. Had difficulty making friends with commuting students	98	14	14.30	84	85.70
63. Had difficulty making friends with students living in apartments	98	16	16.30	82	83.70
64. Felt lonely because you missed your family	98	36	36.70	62	63.30
65. Felt conflict between time to study and time to make friends and party	98	28	28.60	70	71.40
66. Worried about driving to class in bad weather	98	17	17.30	81	82.70
67. Worried about finding a place to park at school	98	40	40.80	58	59.20
68. Felt isolated from the college community	98	17	17.30	81	82.70
69. Felt your being in college has placed added strain on your family	98	34	34.70	64	65.30
70. Had difficulty participating in social activities held at the college during evening hours or on weekends	97	33	34.00	64	66.00
71. Felt strain from missing contact with your high school friends	98	44	44.90	54	55.10
72. Been unable to study when you wanted to for as long as you wanted	98	26	26.50	72	73.50
73. Felt pressure to drink when you didn't want to	98	8	8.20	90	91.80
74. Felt pressure to use non-prescription drugs when you didn't want to	98	3	3.10	95	96.90
75. Worried about being sexually active	98	10	10.20	88	89.80
76. Worried about how sexually active to be	98	11	11.20	87	88.80
77. Felt confused about your priorities, values, beliefs	98	20	20.40	78	79.60

Acculturation was measured, using the Acculturation Rating Scale for Mexican Americans-II. The ARSMA-II consists of a 13-item Anglo Orientation Subscale and a 17-item Mexican Orientation Subscale, using a 5-point Likert-type scaling. For the purpose of the study, the difference between Mexican Orientation Subscale and Anglo Orientation Subscale was used to measure acculturation. The mean acculturation score for the subjects was 1.34 (SD= .87), which when compared to the cutting scores suggested by Cuéllar et al. (1995), equated to between Level III- slightly Anglo oriented bicultural and Level IV- strongly Anglo oriented. Results are summarized in Table 7.

Table 7
Acculturation, Summary of Results

Item*	N	Min	Max	Mean	SD
1. I speak Spanish	98	1	5	2.61	1.22
2. I enjoy speaking Spanish	98	1	5	2.64	1.33
3. I associate with people of my country of cultural origin	98	1	5	3.84	1.04
4. I enjoy listening to Spanish language music	98	1	5	2.85	1.31
5. I enjoy Spanish Language TV	98	1	5	2.03	1.26
6. I enjoy Spanish language movies	96	1	5	1.92	1.13
7. I enjoy reading (e.g., books in Spanish)	98	1	5	1.57	0.98
8. I write (e.g., letters in Spanish)	98	1	5	1.64	1.06
9. My thinking is done in the Spanish language	98	1	5	1.65	1.13
10. My contact with people of my country of cultural origin has been	98	1	5	2.83	1.32
11. My father identifies or identified himself as a member of his country of cultural origin	98	1	5	3.07	1.59
12. My mother identifies or identified herself as a member of her country of cultural origin	97	1	5	3.37	1.47
13. My friends, while I was growing up, were of the country of my cultural origin	97	1	5	3.12	1.24
14. My family cooks foods of the country of my cultural origin	98	1	5	3.88	0.92
15. My friends now are of the country of my cultural	97	1	5	2.99	0.82
16. I like to identify myself as an American and a member of the country of my cultural origin	98	1	5	3.80	1.22
17. I like to identify myself as a member of the country of my cultural origin	98	1	5	2.86	1.34
18. I speak English	98	4	5	4.97	0.17
19. I associate with Anglos	97	1	5	3.67	1.15
20. I enjoy listening to English language music	98	3	5	4.66	0.61
21. I enjoy English language TV	96	1	5	4.62	0.76
22. I enjoy English language movies	96	2	5	4.73	0.66
23. I enjoy reading (e.g., books in English)	98	1	5	4.06	1.21
24. I write (e.g., letters in English)	97	1	5	4.32	1.10
25. My thinking is done in the English language	98	3	5	4.87	0.40
26. My contact with the USA has been	9	1	5	4.84	0.55
27. My friends, while I was growing up, were of Anglo origin	95	1	5	2.92	1.16
28. My friends now are of Anglo origin	97	1	5	3.03	1.04
29. I like to identify myself as an Anglo American	98	1	5	2.01	1.21
30. I like to identify myself as an American	98	1	5	4.39	1.07

* Items 1 – 17, Mexican Orientation Scale, 18 – 30, Anglo Orientation Scale

Summary statistics for the predictors are summarized in Table 8. As can be seen, the internal consistency for all measures was adequate, as estimated by Cronbach's Coefficient Alpha.

Table 8
Summary Statistics for Predictor Variables

Inventory	Item	Coefficient Alpha	Theoretical Range	Mean	SD
Self-Efficacy*	5	0 .91	1-6	4.52	1.06
Family-related Stress	46	0.88	1-46	12.78	7.35
College-related Stress	31	0.79	1-31	8.40	4.78
Total Stress*	77	0.88	1-77	21.17	10.23
Acculturation MOS	17	0.83	1-5	2.75	0.72
Acculturation AOS	13	0.72	1-5	4.09	0.44
Acculturation Score* (MOS-AOS)			1-5	1.34	0.87

* Predictors

Outcome Measures

The outcome measures were grade point average, earned credit hours, and intent to remain in the science major. The University's records were used to obtain the data for the 98 participants.

Grade point average (GPA) ranged from .07 to 4.00. The distribution was negatively skewed (skew coefficient = -.80). The median GPA was 2.63.

Earned credit hours ranged from 1 hour to 34 hours. The distribution was negatively skewed (skew coefficient = -1.42). The median number of credit hours earned by the 98 students at The University during the fall 2011 and spring 2012 semesters was 26.00.

Intent to remain in the science major was measured as a binary variable (yes or no). Analysis of student records showed that the majority of the study participants (77.60%) would remain in science major and the other 22.40% had either already

changed majors or expressed that they intended to do so before their next enrollment.

Research Question 1

What are the combined and unique contributions of self-efficacy, stress, and acculturation in explaining academic success, as measured by grade point average, independent of high school grade point average and Scholastic Aptitude Test scores, in a non-probability sample of first year science students at a university in South Texas?

Hierarchical multiple regression (HMR) analysis was performed to answer the research question. The predictor variables were found to be uncorrelated with each other, which ruled out multicollinearity.

Bivariate correlations between each of the predictor variables and the outcome measure of GPA were computed and ranked from the highest to the lowest. Stress had the highest correlation (r =.16), followed by acculturation difference (r = .07), and self-efficacy (r = .06). Results are summarized in Table 9.

Table 9
Rank Order of Bivariate Correlations Between the Predictors and GPA

Independent Variable	r	p
Total Stress Score	.16	.12
Acculturation Score	.07	.52
Self-Efficacy Score	.06	.56

The covariates of SAT score and high school GPA were entered into the regression equation first, followed by the entry of the predictor variables, one at a time, on the basis of the strength of the simple correlations reported in Table 7.

The SAT score and high school GPA accounted for 19.80% of the variation, which was statistically significant, *F(2,95) = 11.75, p <.001*. The total stress score was the first predictor variable which was entered into the prediction equation and accounted for 0.80% of the variation, *F(1,94) = 0.97, p =.33*. Acculturation score was entered second and accounted for 0.00% of the variation, *F(1,93) = 0.02, p = .89*. Self-efficacy score was entered into the prediction equation last and accounted for 0.90% of the variation, *F(1,92) = 1.09, p = .30*.

The prediction equation was statistically significant, *F(5, 92) = 5.07, p < .001*, and formulated to be: earned credit hours = -2.56 + .88(HS GPA) + .01(SAT Score) +.01(Stress) - .01(Acculturation) + .08(Self-efficacy). The standard error of the estimate for the model was .79. The unique contributions of self-efficacy, stress, and acculturation were not statistically significant after controlling for SAT score and high school GPA. Results are summarized in Table 10.

Table 10
Unique Contributions of the Predictor Variables in Explaining the Variation in GPA

Predictor	R	R^2	Uniqueness	F Change	p
SAT Score/High School GPA *	.45	.20	19.80%	11.75	<.001
Total Stress	.45	.21	0.80%	0.97	.33
Acculturation Score	.46	.21	0.00%	0.02	.89
Self-Efficacy	.47	.22	0.90%	1.09	.30

*Control Variables

Research Question 2

What are the combined and unique contributions of self-efficacy, stress, and acculturation in explaining academic success, as measured by earned credit hours, independent of high school grade point average and Scholastic Aptitude Test scores, in a non-probability sample of first year science students at a university in South Texas?

To answer the research question, another HMR analysis was performed. The predictor variables were found to be uncorrelated with each other, which ruled out multicollinearity.

Bivariate correlations between each of the predictor variables and the number of credit hours earned were computed and ranked from highest to lowest. Self-efficacy had the highest correlation (r = .22), followed by acculturation score (r = .12), and stress total (r = .09). Results are summarized in Table 11.

Table 11
Rank Order of Bivariate Correlations Between the Predictors and Earned Credit Hours

Independent Variable	r	p
Self-Efficacy	.22	.03
Acculturation Score	.12	.22
Total Stress	.09	.40

The control variables were entered into the prediction equation first, followed by the predictor variables, one at a time, on the basis of the above rankings. The control variables, SAT score and high school GPA, accounted for 13.8% of the variation, which was statistically significant, $F(2,95) = 7.59, p < .001$. The self-efficacy score was the first predictor variable in the model and accounted for 5.60% of the variation, which was statistically significant, $F(1,94) = 6.47, p = .01$. Acculturation score was entered second and accounted for 0.30% of the variation, $F(1,93) = 0.37, p = .54$. Stress was entered last and accounted for 0.30% of the variation, $F(1,92) = 0.40, p = .53$. All together, the control and predictor variables accounted for 20% of the variation in earned credit hours, whereas the predictor variables alone accounted for 6.5% of the variation in earned credit hours.

The prediction equation, earned credit hours = -20.69 + 6.50(HS GPA) + .01(SAT Score) + 1.81(Self-efficacy) + .54(Acculturation) +.05(Stress), was statistically significant, $F(5, 92) = 4.60, p < .01$. The standard error of the estimate for the model was 7.29. After controlling for the two covariates, self-efficacy was useful in predicting earned credit hours and showed that high self-efficacy was associated with high earned credit hours. Results are summarized in table 12.

Table 12
Unique Contributions of the Predictor Variables in Explaining the Variation in Earned Credit Hours

Predictor	R	R^2	Uniqueness	F Change	p
SAT Score/High School GPA *	.37	.14	13.80%	7.59	.001
Self-Efficacy	.44	.19	5.60%	6.473	.01
Acculturation Score	.44	.20	0.30%	.37	.54
Total Stress	.45	.20	0.30%	.40	.53

*Control Variables

Research Question 3

What are the combined and unique contributions of self-efficacy, stress, and acculturation in explaining academic success, as measured by the intent to remain in the major, independent of high school grade point average and Scholastic Aptitude Test scores, in a non-probability sample of first year science students at a university in South Texas?

To answer the research question, Logistic Regression (LR) was performed. The outcome measure was a binary variable. Students that intended to continue in the science major after Spring 2012 were coded as one (1), indicating they were retained in the science major, and those who left science for other disciplines were coded as zero (0). The covariates, high school GPA and SAT score, were entered into the regression model first and accounted for 11.3% of the variation, as determined by Nagelkerke R^2, which

was statistically significant ($p < .05$). In the second step, the total stress score was entered into the regression model; it accounted for 3.30 % of the variation, as determined by Nagelkerke R^2, which was not statistically significant ($p = .14$). Acculturation score was entered third and accounted for .90% of the variation, according to Nagelkerke R^2, which was not statistically significant ($p = .43$). Self-efficacy was entered fourth and accounted for .40% of the variation, which was not statistically significant ($p = .60$). The two covariates and three predictors accounted for 15.9% of the variation in retention in the science major which was not statistically significant, $\chi^2 (5, N = 98) = 10.76, p = .06$. Results are summarized in Table 13.

Table 13
Prediction Model Explaining Retention in Science Major

Variable	B	S.E.	Wald	df	p	Odds Ratio
Constant	-7.52					
High School GPA*	1.26	.64	3.91	1	.05	3.52
SAT Score*	.01	.00	1.60	1	.21	1.00
Stress	.05	.03	2.49	1	.12	1.05
Acculturation Score	.23	.29	.69	1	.41	1.27
Self-efficacy	.13	.24	.27	1	.60	1.13

*Control Variables

Qualitative Results

The qualitative component of the study was directed by the following research question: What are the perspectives of first year science students regarding the influence of self-efficacy, stress, and acculturation on first year academic success in science? To answer the question, a focus group interview was conducted. Results are presented in four sections, (a) a profile of the subjects, (b) the focus group interview process, (c) the coding process, and (d) the results.

A Profile of the Subjects

The researcher contacted all 98 study participants via electronic mail and invited them to participate in the focus group interview. A recommended sample size for a focus group is five to eight (Krueger, 2009) and there were seven students (5 female, 2 male) who agreed to participate in the focus group**.** All students that attended the focus group were still enrolled as science and engineering majors at The University. The mean GPA of the focus group participants was 2.64 and on the average, they had earned 29 credit hours. All were Mexican Americans from South Texas.

Focus Group Process

The focus group was conducted on June 19, 2012, in a classroom at The University and lasted approximately 90 minutes; pizza and soft drinks were provided. The researcher recorded the interview and took field notes. All students read and signed a consent form at the beginning of the interview session. Participants were advised that their identity would remain confidential. A glossary of terms (Appendix D) was provided to assist the participants in understanding the terminology. A slideshow of the lead questions was used to help focus the interview. The questions were divided into three sections, corresponding to the study's predictor variables of stress, acculturation, and science self-efficacy. Each section began with an open-ended lead question, followed by closed-ended yes or no questions, and concluded by an open-ended final question. The questions were designed to provide a deeper understanding of and to help explain the quantitative results in accordance with the study's explanatory sequential mixed methods model. All participants were given the chance to respond to all questions posed by the

researcher. The focus group questions were presented in Chapter 3, Table 1. The researcher facilitated the interview by asking the lead questions, while encouraging a natural discussion in order for themes to develop, independent of the researcher as much as possible. A tape recorder was used to record the session and the researcher transcribed the audiotape verbatim (Appendix E).

Coding Process

The coding process, modeled after Creswell (2005), consisted of reading the transcription, identifying text segments with brackets, assigning a code word or phrase to describe the meaning of the text segment, making a list and grouping the words, reviewing the transcription, and reducing the codes to themes to form the major ideas of the transcription. The coding process was done manually without the use of any analytical software.

Stress

Two themes were derived from the qualitative data surrounding stress. They were *Stressors* and *The Positive Role of Stress.*

Stress, Theme 1: Stressors

In the first theme, several common stressors emerged from the data: *No Stress*, *Financial Stress, Health Stress and Other Hardships*, and *Academic Stress in High School*.

No Stress

Some students reported that they experienced little or no stress prior to college or that the stress they experienced did not affect their GPA, hours earned, or intent to remain in science. Typical comments were, “for me there was no stress” or “stress prior to

college didn't really affect my first year at all." "I don't know, the stress prior to college didn't really affect my first year at all after like my first semester. That's when the real stress came in. Prior to college nothing was that bad." One respondent was very candid about the difference between high school and university life, "Yeah, comparing college and high school, that [high school] is easy, it is simple and then you have that summer after high school, your last senior summer or whatever, and you are like la, de, da, de, da, de, da…Everything is wonderful and then you go to college and it is like OH!" The reported lack of stress was consistent with the quantitative results, which showed a mean score of 21.17 out of a possible 77 for stress.

Financial Stress

The most commonly experienced stressor among the focus group participants was *financial stress*. Whether they considered their families to be low or middle income, they all reported financial stress. Comments like, "I wasn't sure if I was going to come to college because I didn't have the financial, like money for it" or "the financial burden because my brother is in college as well and so like applying for financial aid, like my parents make money, but they make enough money to where you won't get that much financial aid, but college is still really expensive and you can't afford it, but like the government says we make enough money already, but we don't" were common.

Frequently, the burden of additional siblings at home or in college was said to add additional stress and one student reported that the college debt and college attendance of his/her parents was a significant added burden. Students made frequent mention of other siblings presently in college such as, "then there's the financial burden because my brother is in college as well." Others had concerns for younger siblings, "Um, I think just

like trying to figure out like where do you apply to get money because I mean we are like a low income family, so just trying to figure out how to pay for school and where to apply and since I am the first one and I have a smaller sister and a smaller brother then I am trying to guide them in the right direction when they are coming to college."

Perhaps a sign of rising tuition and the increased need for higher level degrees was evident in one student's concerns about her parents' concurrent college attendance and previous loan debt, "Um mine was like the pressure from my parents because my Mom has her MBA and she wants to go back for her doctorate and my Dad is about to go for his master's too and they were the first ones that ever went to college in my family so they took all the grants and they have a lot of loans that they have to pay off so that was another thing, you know, I was really worried about. Plus I didn't do good on my SATs so I didn't qualify for enough financial assistance because apparently they do make a lot and they could contribute but in reality they are still paying off their loans. So again was financial."

Health Stress and Other Hardships

Other participants experienced significant health-related stress and spent time in the hospital. Though they reported these events as very stressful, they felt that such experiences better prepared them for college life because they were forced to study autonomously, which taught them to manage time better, handle stress better, and be more self-directed. One participant described it this way, "It [health stress] made me manage my time better, it made me learn how to handle my stress, it taught me some things like how to teach myself from a book because I had to do that in high school a lot."

Academic Stress in High School

A few students reported low academic stress in high school stating, "My high school was easy," but the majority of the group felt their high school experience was rigorous and prepared them well for college. "My real stress was just, you know, finishing up your senior year. I didn't take, like, any classes off. I still went to school full time and I was into decathlon and theater and that was- school was my biggest stress." "Our AP classes, they, our teachers at my high school, expected so much from us right off the bat." Another respondent described the rigor of her high school and her strong work ethic this way, "I was going so fast paced that I knew that I was looking forward to that end day. You know, when I could just, like, know that it was over and I was like, burnt out, and I knew I was going to be burnt out and I am not even kidding, I slept two days straight after the last week of high school." It appears that these students were indeed well prepared for college and highly motivated, which they often attributed to stress they had experienced prior to college. Theme 1 is summarized in Table 14.

Table 14
Stress, Theme 1: *Stressors*

No Stress
• "Uh, for me there was no stress"
• "Stress prior to college didn't really affect my first year at all after like my first semester"
• "Yeah, comparing college and high school, that [high school] is easy, it is simple and then you have that summer after high school, your last senior summer or whatever, and you are like la, de, da, de, da, de, da…Everything is wonderful and then you go to college and its like OH!"
Financial Stress
• "I wasn't sure if I was going to come to college because I didn't have the financial, like money"
• "I have an older brother and sister that are going to college too and it gets financially burdening."
• "So that, financial, I guess was the only burden really"

Table 14- Continued
Stress, Theme 1: *Stressors*

Health Stress and other Hardships • "I had to have surgery towards the end of my senior year and it kept me out of school for a month and a half and so I didn't pass the AP exams I was expecting to pass and I missed a lot of deadlines to submit scholarships" • "I had to go to [large out of state research hospital] at the end of my senior year to try to get diagnosed and in doing that it was a big financial stress on our family" • "I don't know if I got kicked out of my mom's house or if I, like, left but I wasn't living with her or my aunt anymore so I ended up living with my best friend." *Academic Stress in High School* • "My real stress was just, you know, finishing up your senior year. I didn't take, like any classes off. I still went to school full time and I was into decathlon and theater and that was- school was my biggest stress" • "Our AP classes, they, our teachers at my high school, expected so much from us right off the bat" • "I was going so fast paced that I knew that I was looking forward to that end day. You know, when I could just, like, know that it was over and I was like, burnt out, and I knew I was going to be burnt out and I am not even kidding, I slept two days straight after the last week of high school"

Stress, Theme 2: Positive Role of Stress

While a few students reported experiencing little stress, most did experience stressful life events before college. Interestingly, they reported stress as a positive influence on their success in the first year of college. It appeared that the *financial stress, health stress and other hardships,* and *high school academic stress* served as good preparation for the challenges of university life.

Financial Stress

While all students reported financial stress, every student also reported that they had done something to relieve that stress. "I just think financially, was the hardest, most stressful, but other than that I think I am always on time to submit applications and so I am always trying to look for ways to help pay for school."

When asked if they all had some form of financial aid, they all said yes very

enthusiastically. Many mentioned scholarships, “For a while I thought I was going to have to stay home but it ended up that some big scholarships came through and so I was able to come after all.” Others explained the importance of grants, “So that was a big stress but, um, the Texas grants and stuff, oh my God, beautiful! Beautiful! I would not be here if I did not have, like, the grants from stuff.” Other students indicated that they had found jobs to relieve the financial stress of preparing for college, “I wasn’t sure if I was going to come to college because I didn’t have the financial, like, money for it, so in the end, like, at the very start of summer, I found a job and I started working and that’s how I got here.” In short, it appeared that this group of students experienced a lot of financial stress, but that stress was mediated by a pragmatic effort on their part to cope with the stress and solve their financial worries via financial aid and employment.

Health Stress and Other Hardships

Though participants reported significant health related stress, they felt that these experiences better prepared them for college life for a variety of reasons. One participant described it this way, “It [health stress] made me manage my time better, it made me learn how to handle my stress, it taught me some things like how to teach myself from a book because I had to do that in high school a lot.” Some students cited their health stress as a positive motivator stating, “It made me become a science major,” referring to being inspired by her illness to become a medical professional to help others. Another described it this way, “I’m kind of glad I went through it all my life being, like, going in and out of hospitals. Like it really made me a harder worker. When I came to college, my first fall I was kind of used to, you know, being home bound and having teachers, learning things on my own. The kind of stress prior, was actually better for me for

college, because it helped me learn."

Another student, who moved out of his parents' home following an argument, described how his living arrangement motivated him to succeed in school, "My personal stuff from home [moving out of parents home following an argument] helped me get ready for college…it made me not want to give up in college and stuff like that which is why I stayed a science major."

Academic Stress in High School Prepared Students for College

While a few students indicated that their high school was "easy," most indicated that their high school experience was rigorous and prepared them well for college. For example, "When I first went into a college class, it didn't seem any different. It seemed like I still had to stay on my toes and take notes and know that if I had any questions, if I didn't ask, then there was a good chance it wasn't going to get answered" or "The kind of stress prior was actually better for me for college, because it helped me learn." Theme 2 for stress is summarized in Table 15.

Table 15
Stress, Theme 2: *Positive Role of Stress*

Financial Resources Relieve Stress
• "For a while I thought I was going to have to stay home but it ended up that some big scholarships came through and so I was able to come after all"
• "It was a really big financial stress on our family in general and we didn't qualify for financial aid at first and then finally this big scholarship kicked in and then we got help from other local scholarships, so that was like a really big stress on our family"
• "I wasn't sure if I was going to come to college because I didn't have the financial, like, money for it, so in the end I, like, at the very start of summer, I found a job and I started working and that's how I got here."
• "So that was a big stress but, um, the Texas grants and stuff, oh my God, beautiful! Beautiful! I would not be here if I did not have, like, the grants from stuff."

Table 15- Continued
Stress, Theme 2: *Positive Role of Stress*

High School Stress Leads to Positive Outcomes

- "It [stress] motivated me to stay a science major"
- "Coming out of my surgery I was expected to catch up and, like, do all the work I missed out on. Teachers would actually go to my house and, like give me exams there, like you know, and just so that I could catch up on stuff and, um, when I first went into a college class it didn't seem any different."
- "I'm kind of glad I went through it all my life being, like, going in and out of hospitals. Like it really made me a more hard worker. When I came to college, my first fall I was kind of used to, you know, being home bound and having teachers- learning things on my own. The kind of stress prior was actually better for me for college, because it helped me learn."
- "It [health stress] made me manage my time better, it made me learn how to handle my stress, it taught me some things like how to teach myself from a book because I had to do that in high school a lot"
- "I feel my personal stuff from home actually helped me to get ready for college not in the sense of studying and stuff because I had to do that- I had to pick that up as I went into college, but more for, like, the stress as far as it made me not want to give up in college and stuff like that, which is why I stayed a science major."

Academic Stress in High School Prepared Students for College

- "[W]hen I first went into a college class it didn't seem any different. It seemed like I still had to stay on my toes and take notes and know that if I had any questions if I didn't ask then there was a good chance it wasn't going to get answered"
- "When I came to college my first fall I was kind of used to, you know, being home bound and having teachers- learning things on my own. So it really wasn't that big of a deal. The kind of stress prior was actually better for me for college, because it helped me learn."

Stress: Yes/No Questions

When asked, "Did stress prior to college affect your GPA at the end of the spring 2012 semester?" three participants answered yes and four answered no. Follow-up questions indicated that those answering yes felt that their stress was a positive motivator for college success, as described above. When asked, "Did stress prior to college affect your total number of hours earned at [The University] at the end of the spring semester?" one answered yes and six answered no. When asked, "Did stress prior to college affect

your intention to remain as a science major at the end of the spring semester?" two students answered yes and five answered no. Those answering yes were inspired by their hardships to enter or stay in science because they wish to help others as a medical professional.

Acculturation

Three themes arose from the qualitative data surrounding acculturation. They were *Anglo-oriented, Bicultural,* and *Family.*

Acculturation, Theme 1: Anglo-Oriented

The first theme that emerged was, *Anglo-oriented*. Some participants indicated that acculturation had no effect on their college success because they felt they were very acculturated into Anglo culture through their childhood experiences. Four of the participants had lost their Spanish language use to varying degrees. One put it this way, "I felt like it [level of acculturation] didn't affect me because honestly I have lost a lot of my Spanish culture ever since I was little when I started going to elementary school and stuff like that, because I wasn't around people that were speaking Spanish as much, so I lost what I knew because of that, because of public school." Two participants explained that they had lost their Spanish speaking ability completely or could only understand spoken Spanish but not speak it themselves. "I don't think it affected me in any way because when I was growing up, I kind of learned Spanish but then I lost it, but I am still able to understand it, so its funny when people get with me and they are talking Spanish and they think I don't know it and I am just, like, whatever…but I don't think it has affected me." Another participant never learned Spanish at home yet his parents and grandparents did speak Spanish. The participant stated, "I'm like him [don't speak

Spanish], but the only difference is I didn't grow up speaking Spanish at all. The only time I learned Spanish was in Spanish class and that's completely different from the Spanish that my parents and grandparents speak, so I can't really use it around them."

These students described some negative aspects of losing Spanish speaking ability such as feeling isolated from Spanish oriented family members, not being able to communicate as effectively with parents or grandparents, not always being able to understand a more Mexican-oriented friend, or feeling uncomfortable when visiting more Mexican-oriented extended family members in the Rio Grande Valley of Texas. One student explained how she interacted with a friend from the Rio Grande Valley this way, "One of my friends [Friend Y], she goes here and she's from [small border town in the Rio Grande Valley of Texas], and she's coming to visit, to stay with me, and hang out and like when I talk with her and stuff, there's some times when I am, like, OK stop talking, I don't understand what you just said because the accent is so thick or she will say something and, like, half her sentence will be Spanish and half her sentence will be English and I am, like, girl you've got to repeat yourself. I don't even know what you're saying to me. I, we, are from the same culture and everything, so sometimes it's a little weird, you know?" This respondent described "weird" feelings when visiting more Mexican-oriented extended family, "It's a bad thing in a way though because if I go to where my dad is from, Laredo, I don't know anything that they're saying. I feel so weird and I feel like I don't fit there with that family because they don't speak as much English as I do." The consensus was that students did not report any affect on their academic achievement from their loss of Spanish, but they did mention many implications to their social lives. The *Anglo-oriented* theme is summarized in Table 16**.**

Table 16
Acculturation, Theme 1: *Anglo-Oriented*

Anglo-Oriented • "I felt like it [level of acculturation] didn't affect me because honestly I have lost a lot of my Spanish culture ever since I was little when I started going to elementary school and stuff like that, because I wasn't around people that were speaking Spanish as much, so I lost what I knew because of that- because of public school." • "I don't think its affected me in any way because when I was growing up I kind of learned Spanish but then I lost it, but I am still able to understand it, so its funny when people get with me and they are talking Spanish and they think I don't know it and I am just, like, whatever…but I don't think it has affected me." • "I'm like him [don't speak Spanish], but the only difference is I didn't grow up speaking Spanish at all. The only time I learned Spanish was in Spanish class and that's completely different from the Spanish that my parents and grandparents speak so I can't really use it around them." *Anglo-orientation Outcomes* • "It's a bad thing in a way though because if I go to where my dad is from, Laredo, I don't know anything they are saying. I feel so weird and I feel like I don't fit in there with that family because they don't speak as much English as I do." • "The only time I learned Spanish, was in Spanish class and that is completely different from the Spanish my parents or my grandparents speak so I can't really use it around them." • "I mean, I can understand it, but I can't speak it and, I mean, I do feel a little…One of my friends [Friend Y], she goes here and she's from [small border town in the Rio Grande Valley of Texas], and she's coming to visit, to stay with me and hang out and, like, when I talk with her, and stuff, there's some times when I am, like, OK stop talking I don't understand what you just said because the accent is so thick or she will say something and, like, half her sentence will be Spanish and half her sentence will be English and I am, like, girl, you've got to repeat yourself." • "I don't even know what you are saying to me. I, we, are from the same culture and everything, so sometimes it's a little weird, you know?"

Acculturation, Theme 2: Bicultural

Bicultural is the next acculturation theme that emerged from the coded data, as three participants indicated that they were fluent in both Spanish and English, were from the Rio Grande Valley of Texas along the Mexican border, and had strong ties to Mexico and/or Mexican family members. These individuals appeared able to fully function in both cultures. "I speak both fluently English and Spanish, so I don't know if it affects me

but, um, just there are some things where I want to know. I wish my mom spoke English then she could maybe help me in a way of, like, OK do this or do that with school, but since she doesn't, I have to do everything on my own and I do speak English and Spanish so I think it's a plus on both sides."

Biculturalism as a Motivator

The respondents who indicated they were bicultural, perceived it as a motivator. One respondent described how being part of both cultures had motivated her by saying, "It has affected me kind of because, like, out of my family only my cousins that were born here ever…I think they went to college because they went to military and stuff so I assume they went afterwards and my father went back at the age of 45 to get his degree in, um, theology so like it motivated me that, like, all my family in Mexico and all my cousins here that I guess didn't take advantage of America or whatever, like their lives just aren't what I want. It motivated me, like, I am going to be a marine biologist, I am going to be scientist, I am not going to be like my cousins and just stay in the *barrio,* and do nothing with my life. Like, because I am fluent in Spanish and in English, I think it gives me a leg up on the competition. I am bilingual." The respondent described her Mexican stubbornness and how it helped her to persevere during a mid-semester loss of confidence, "And, like, that I was brought up with that attitude [emphatic] that stubbornness, that Mexican stubbornness, where you're right and that's it. So that really affected me, because I was, like, oh this isn't for you, I was having like an academic crisis where I didn't know what I wanted to do with my career. And I was like NO, I want to do science, screw that class [emphatic]. I will do, I will be better, I will make it work. I don't care if [Professor X] says I shouldn't be in science, I'm going to do it

because I want to be in science." She derived a lot of motivation from being Latino, "And then just more Hispanic people, a lot of people just don't go to college, don't achieve what they can. I want to do that, I want to break up the stereotype of [non-Latino] white males dominating science." Others shared similar feelings about how being bicultural served as a motivation in the challenging first year of college science. See Table 17 for a summary of the *Bicultural* Theme.

Table 17
Acculturation, Theme 2: *Bicultural*

Bicultural

- "I am bilingual"
- "I speak two languages."
- " I speak both fluently English and Spanish so I don't know if it affects me but, um, just there are some things where I want to know. I wish my mom spoke English then she could maybe help me in a way of, like, OK do this or do that with school, but since she doesn't, I have to do everything on my own and I do speak English and Spanish so I think it's a plus on both sides."
- I grew up speaking Spanish and English at the same time because I would just speak Spanish with my Grandma and English with my Mom and Dad and they also spoke Spanish when they didn't want us to know what they were talking about, but they didn't know that, I was talking with my Grandma.

Biculturalism a Motivator

- "My father went back at the age of 45 to get his degree in, um, theology so like it motivated me that, like, all my family in Mexico and all my cousins here that I guess didn't take advantage of America or whatever, like their lives just aren't what I want."
- "It motivated me, like; I am going to be a marine biologist. I am going to be a scientist. I am not going to be like my cousins and just stay in the barrio, and do nothing with my life."
- "I feel like Anglos still kind of have that stereotype towards us that like that intermediate point where we are like trying, I guess, not to be more like our family, like they still see us like that, but to our family we are, well I don't know about ya'll but in my family, I am like the American one where I am in college I'm getting my degree, going to have my career, and then get a husband, and then have children as opposed to, like, getting pregnant, having a husband then never going to school, which is what everyone else does. I feel like that is the American perspective that has influenced my life."

Acculturation, Theme 3: Family

The last acculturation theme that emerged from analysis of the transcript was *family.* Family was deemed very important by all students, and family members such as siblings, cousins, parents, and grandparents were all mentioned as motivators and supporters of success among the respondents. Latinos tend to live in family households that are larger than Non-Latino whites and Non-Latino black families (Zambrana, 2011). This greater support network could help Latino students by providing a larger support network to draw upon during difficult times in college. Respondents explained how cousins and siblings, who were not achieving college success, motivated them, how family members' pride in their accomplishments was a strong motivator and support factor, how sick family members served to motivate them to pursue a career in the medical field, and how extensive family networks, including extended family members living in the same home, provided much needed support during the first year of college. All seemed motivated to overcome a stereotype of low Latino achievement and their own ongoing acculturation. One described her motivation like this, "For me it was still that motivation from, like, my background, like, my Spanish side, I wanted to achieve more I guess, I don't know, just to do it, just I don't want to be like them [Mexican family members]." One student described how her families pride in her accomplishments supported and motivated her, **"**[W]hen we used to go over there [Mexico], my Mom was so proud, talking, she will talk on the phone, **'**[my daughter] is doing great in college and she's going to get that degree, blah, blah, blah, blah, blah,**'** and just, like, the feeling, the overwhelming feeling of pride your family has in you doing something with your life. That is such encouragement that they look at you and they feel pride and you are doing

the family good, like, you are bettering the name, I guess." Another student described how his sick family members motivated him, "They always get sick, like I've had a lot of members die of cancer, a lot, like, all through my Mom's side they all had breast cancer or some form of cancer, and, uh, I just wanted to do that, like, I wanted to stay in the science community, be either a synthetic chemist, make medicines or become a doctor. That's what I originally wanted to do, but I haven't really changed my major as far as that I'm going to keep going. That's what I want to do. I want to say it's all because of my family, that's pretty much my motivation." One student described how the extended family, all living together, served to support one another, "Um, Yeah, I think its because usually… because from my experience, you grow up like… they needed our grandma to take care of us or our aunts and they would all kind of, like, raise us together. When my parents divorced, we moved into my grandma's house and two of our other aunts moved in also and they helped raise us, so you know…my dad was still there, but they just thought, like, my mom needed the help and, um, their support just constantly, like I am not kidding when I say my Grandma was my best friend and her opinion matters the most to me and she constantly tries to support me any way possible, emotionally financially, she's always there." In summary, *Family,* through support and motivation was one of the most universal and abundant themes that emerged from the transcript (Table18).

Table 18
Acculturation, Theme 3: *Family*

Motivation

- "I live in the U.S.- I speak two languages. Like, Anglos, I guess, usually only speak one so I kind of have a leg up I guess, so it motivated me"
- "For me it was still that motivation from, like, my background, like, my Spanish side, I wanted to achieve more I guess, I don't know, just to do it, just I don't want to be like them and it also because I was brought up, you know with like Hispanic, well Mexican we live in Mexico, well like Mexican, that stubbornness or whatever"
- "Uh, my reason, I grew up in [Large border city and surrounding area in the Rio Grande Valley of Texas], all my relatives they are all Hispanic, Mexican, whatever you want to say. Uh, but they are all, like, sick and stuff. They always get sick, like I've had a lot of members die of cancer, a lot, like, all through my Mom's side they all had breast cancer or some form of cancer, and, uh, I just wanted to do that, like, I wanted to stay in the science community be either a synthetic chemist, make medicines or become a doctor. That's what I originally wanted to do, but I haven't really changed my major as far as that I'm going to keep going. That's what I want to do. I want to say it's all because of my family, that's pretty much my motivation."
- "Its just, like, yeah, my little cousins I want to be, like, come on you can do it too, like you don't have to be like your mom or your dad or our uncles or whatever, and, like, I want to be an example of, like, it was hard and we didn't have any money, but I did it, I have my degree and I'm doing wonderful things with my life. I want to just be, like, see I did it, you can do it too. Like, you just got to stick with it."
- "Yeah one of my sisters, she's a junior now and I'm pretty much the first one to go to college other than my other cousin that graduated with me and went to UT. Both us two were the only ones that went to college out of the other four cousins that graduated with us and uh me and her we are pretty much wanting to show… She wants to show her little brother something and I want to show my little sisters something, and my little sister is going to graduate in, like, two years, hopefully in the top of her class, top three, and I'm going to be super proud of her and I told her not do way worse than I did. I want her to succeed."
- "Cuz, like when I was growing up, I at least lived with my grandparents at least once in my life to recall, because when my parents were so low and like my Grandma's are, like, so proud of me because some of the cousins, there's three other cousins that were born close to me and none of them are in school or actually I am the youngest to be in school right now and all of my other cousin… she has four kids and she's my same age and its like all of them had kids young and I'm the only one that sticks out and everyone's really proud of me and they push me and they're just always there."

Table 18- Continued
Acculturation, Theme 3: *Family*

Support

- "I talked to the counselors and everything and I am not a big racist or anything, but they are all pretty much white and talked to them and they were, like, well if you are not doing well you should change, you should do this, blah, blah, blah, and maybe it is the best for you, and then I would go talk to my parents and they are, like, if you want to do it, go and do it [firm emphatic voice]."
- "Um, Yeah, I think its because usually… because from my experience, you grow up like… they needed our grandma to take care of us or our aunts and they would all kind of, like, raise us together. When my parents divorced, we moved into my grandma's house and two of our other aunts moved in also and they helped raise us, so you know…my dad was still there, but they just thought, like, my mom needed the help and, um, their support just constantly, like I am not kidding when I say my Grandma was my best friend and her opinion matters the most to me and she constantly tries to support me any way possible, emotionally financially, she's always there."
- "She wants me to, like, really succeed because my older sister and my older brother they are still in college but, like, they have made their share of mistakes and being the third born I have been able to learn from them and not make the same ones so it automatically places me as a favorite right now."
- "So my grandma just kind of sees me as the one that's being able to succeed right now, and she just has always been there to love me when I'm, like, in my lowest places, you know, and when I want to quit. I don't know how many times I called her this year… After coming out of one of Professor X's exams and like [crying voice] Grandma I don't want to be here anymore and she's, like, yes, you have to stay there or else you are not going to get to do what you want to do and so she's a big reason why I'm here."
- "Family definitely, like my mom does hair and she loves telling her customers that my daughter is in college and she's a marine biologist, and my son's getting his degree in business, like, and then like when I go, or when I used to visit my family in Mexico, not now because everybody's killing everyone [referring to violence among Mexican drug cartels]. So everyone's killing everyone so, uh, not going over there, but, um, when we used to go over there my mom was so proud, talking, she will talk on the phone, '[my daughter] is doing great in college and she's going to get that degree, blah, blah, blah, blah, blah,' and just, like, the feeling the overwhelming feeling of pride your family has in you doing something with your life. That is such encouragement that they look at you and they feel pride and you are doing the family good, like, you are bettering the name, I guess. Not necessarily in, like, a bad way but they are just so proud that you are excelling and that support just, it's a great push to go even harder and work even better."
- "Like, family is a big thing with me, like, they're my number one because they're always there no matter what."

Table 18- Continued
Acculturation, Theme 3: *Family*

- "I wish, if my Mom spoke English then she could maybe help me in a way of like, OK do this or do that with school, but since she doesn't, I have to do everything on my own… I think I have suffered just because I am learning to have to do everything on my own and it is hard when your parent doesn't know what you are doing and… but she does care she is always telling me go through school and graduate college, but she doesn't know… she pushes me and she has my back for everything but she doesn't know where she can, like, push me more towards or, like, help me more because she doesn't know how this works at all."
- "It's just something I want to help with like as far as…every time I tell my family about what I want to be, or what I want to do, or why I came to college, they are just like… they are just, oh I support you that much and it just kind of feels good for them to actually count on me to actually succeed in something."

Acculturation: Yes/No Questions

Three yes or no questions were asked concerning acculturation's effect on the three outcome variables. All respondents answered no to the questions, "Did your level of acculturation affect your GPA at the end of the spring 2012 semester?" and "Did your level of acculturation affect your total number of hours earned at The University at the end of the spring semester?" Two respondents answered yes and five answered no to, "Did your level of acculturation affect your intention to remain as a science major at the end of the spring semester?" The first student who answered yes felt acculturation was a positive force in supporting her decision to remain in the major when faced with a mid-semester crisis. The other respondent that answered yes felt that his many sick family members in the Rio Grande Valley were a powerful source of motivation and support of his decision to pursue a degree in the medical field. Those who answered no were those who felt they were highly acculturated.

Self-Efficacy

One major theme emerged from the focus group transcript in terms of science

self-efficacy namely, *high science self-efficacy.*

Self-Efficacy, Theme: 1 High Science Self-Efficacy

Students overwhelmingly reported that they had high or very high feelings of self-efficacy in science prior to the Fall 2011 semester. This was consistent with the quantitative results in which the Science Self-efficacy mean score was 4.52 on a theoretical scale of 1-6. Some reported that their high confidence level resulted in positive outcomes such as persevering through difficult times, "Basic [science courses] I thought would be easy and then I came in- it was a rude awakening, but I saw it as [Professor X] can't take away what I have been wanting for four years, or where I want to be, because, like, [Professor X] is just one person that's going to tell me I can't do this but I am going to still get through it so I can do what I want to do." Other respondents felt that they were perhaps too confident, which resulted in a lower work ethic and thus a poorer than expected outcome, "Yeah just because I had that high confidence, like, thinking I was going to be good and then, like, I guess I was too confident in myself so, like, I don't know, I guess that messed with my head a lot and my GPA suffered because I was overly confident." Table 19 is a summary of the *High Science Self-Efficacy* theme.

Table 19
Self-Efficacy, Theme 1: *High Science Self-Efficacy*

- "I didn't doubt whether I could succeed as a science student just because grades have always been an important thing in my family and my mom's a teacher so she's always been there to help me study, write, or anything like that and like I said my courses in high school I feel like really prepared me."
- "I did feel like I was going to come here and still be a straight A student, so the B in Biology was devastating and I probably cried a little bit, or a LOT, but um I have never doubted whether I could pass because I feel like as long as I pay attention and I do what the professor instructs us to do that there's no way we can't pass."
- "I came in thinking I was really prepared from everything."

Table 19- Continued
Self-Efficacy, Theme 1: *High Science Self-Efficacy*

- "I have never been worried about school. Came into college confident I could get straight A's."

Reasons for High Science Self-efficacy

- "Before, prior to my first year of college, I was so confident [emphatic] in my science skills, like, during high school I had not, intentionally, but I looked back my senior year I was like wow, a lot of my electives were science classes. I didn't know that when I was taking them. I was just, like, oh this is cool, I got in, this is cool, it turns out all my electives were, like, science classes so that is why I went into science in the first place. I was, like, subconsciously I am in love with science and I have just always been good at science."
- "I am super nerdy and I like to know how things work and so, like, I had utmost confidence coming into college."
- "So I was always good at school, got good grades, was good at science, I had the utmost confidence coming in"
- "I mean I am doing good in school. When I was in high school I made straight A's and I graduated 4th in my class so I never really had that, where I won't do good in college."

Effects of high science self-efficacy

- "Basic [science courses] I thought would be easy and then I came in- it was a rude awakening, but I saw it as [Professor X] can't take away what I have been wanting for four years, or where I want to be, because, like, [he/she] is just one person that's going to tell me I can't do this but I am going to still get through it so I can do what I want to do."
- "Yeah just because I had that high confidence, like, thinking I was going to be good and then, like, I guess I was too confident in myself so, like, I don't know, I guess that messed with my head a lot and my GPA suffered because I was overly confident."
- "Yeah, first semester I kind of took…because I never needed to study either, I just made good grades and I took all AP classes and I just aced them, like, I really didn't have to work so hard for it and so coming into freshman year was just so, like, I have never really had to work so hard, blah, blah, blah, and then my GPA was, like, [whistling in simulation of a bomb falling from sky]. I was just a little overconfident and now having one year under my belt I am more realistic and I understand, like, what my abilities are how to improve them, and, yeah, I kind of screwed up there."
- "I guess for me it helped, because I had standards for myself and I expected myself to live up to them, you know, and from what I hear when you are a science major you have to apply yourself like that or else there's not a way that your going to be able to handle the classes, so I feel like it helped me to finish me first year."
- "For me it was just, like, it didn't affect me because I was always worried about my stress and stuff, back home and other stuff to worry about my actual grade, I just wanted to pass."

Self-Efficacy: Yes/ No Questions

The same three yes/no questions were asked corresponding to the three outcome measures. When asked, "Did your science self-efficacy prior to the beginning of the fall 2011 semester affect your GPA at the end of the spring semester?" two responded yes and five said no. Those responding yes explained that they might have been too confident which might have negatively affected their grades. When asked, "Did your science self-efficacy prior to the beginning of fall 2011 affect your total number of hours earned at The University at the end of the spring semester?" all responded no. As one put it, "Well, I still earned all the credits I set out to earn." Interestingly, this was the only statistically significant predictor of earned credit hours in the quantitative phase of the study. To the question, "Did your science self-efficacy prior to the beginning of fall 2011 affect your intention to remain as a science major at the end of the spring semester?" One answered that her self-efficacy motivated her to persevere during a crisis because she could recall her former confidence and pushed to regain it. She described it this way, "Cause the same thing, I was so confident, it was kind of my kryptonite because my GPA suffered because I thought I was a hotshot, but then it was also, like, when I had my little academic crisis, I remembered how confident I was and how much I loved it [science] and how kind of, like, fulfilling, I felt prior to starting school in science, like, this is what I want to do with my life, I am gonna, this is it, I am so confident about it, just remembering how I was back then that was another reason I just stuck with science. I was like that once. I will be that way again."

In short, the qualitative component of the study resulted in six themes, namely, *Stressors, The Positive Role of Stress, Anglo-Oriented, Bicultural, Family*, and *High*

Science Self-efficacy. In accordance with the explanatory sequential mixed methods model, the focus group participants' responses provided a deeper understanding of the quantitative results. A synthesis of the quantitative and qualitative results is presented in chapter five.

CHAPTER V

SUMMARY OF RESULTS AND CONCLUSIONS, DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS FOR FURTHER RESEARCH

Summary

In a rapidly technologically advancing world, America must graduate more scientists to remain competitive in the global economy. Many students leave the science major during the first year of college. Latinos represent the fastest growing and youngest segment of the U.S. population, yet they are poorly represented in science and achieve college success at lower levels than do non-Latino whites and Asians. Latinos have perhaps the greatest potential for increased first year college success in science. To help more Latino students succeed in the critical first year of college, we must understand what factors predict college success, especially at Hispanic Serving Institutions in South Texas, where there is a great potential to increase Latino participation in science.

The study was designed to test the hypothesis that self-efficacy, stress, and acculturation are useful predictors of academic achievement in science, independent of high school grade point average and SAT scores, in a sample of Latino students. Additionally, the perspectives of students regarding the influence of the three theoretically-derived predictors were examined and documented. The study was guided by the following research questions:

1. What are the combined and unique contributions of self-efficacy, stress, and acculturation in explaining academic success, as measured by grade point average, independent of high school grade point average and Scholastic Aptitude

Test scores, in a non-probability sample of first year science students at a university in South Texas?

2. What are the combined and unique contributions of self-efficacy, stress, and acculturation in explaining academic success, as measured by earned credit hours, independent of high school grade point average and Scholastic Aptitude Test scores, in a non-probability sample of first year science students at a university in South Texas?
3. What are the combined and unique contributions of self-efficacy, stress, and acculturation in explaining academic success, as measured by the intent to remain in the major, independent of high school grade point average and Scholastic Aptitude Test scores, in a non-probability sample of first year science students at a university in South Texas?
4. What are the perspectives of first year science students regarding the influence of self-efficacy, stress, and acculturation on first year academic success in science?

The correlational study was conducted between fall 2011 and summer 2012, utilizing an explanatory sequential mixed methods design, which consisted of an initial quantitative phase, followed by a qualitative explanatory phase, and concluded by synthesizing the quantitative and qualitative components. For the quantitative components of the study, a non-probability sample of 98 students was recruited from a South Texas Hispanic serving institution of higher education that serves approximately 10,000 students. A 4-part online questionnaire was used to collect the predictor and demographic data during the first weeks of the fall 2011 semester. Parts 1 – 3 of the questionnaire consisted of the following published instruments: the Science Self-

Efficacy Scale (Briton & Pajares, 2001), the Young Adult-Family Inventory of Life Events and Strains (Corcoran & Fischer, 2000), and the Acculturation Rating Scale for Mexican Americans-II (Cuéllar, Arnold, and Maldonado, 1995). The fourth part consisted of a demographic questionnaire to collect data on selected characteristics of the study participants. Outcome measures were obtained from The University's records after the spring 2012 semester.

Following the analysis of the quantitative data, the qualitative component of the study, a focus group interview, was conducted to explore the perspectives of first year science students regarding the influence of self-efficacy, stress, and acculturation on first year academic success in science. The non-probability sample for the focus group consisted of 7 study participants from The University that had completed their first year of university science. The researcher transcribed the focus group interview, reduced the data to codes, categories, and identified major themes.

Summary of Results and Conclusions

Quantitative

The study participants had a high science self-efficacy, with a mean of 4.52 (SD = 1.06) on a theoretical scale of 1 - 6, indicating that they were confident in passing their science classes and scoring high marks. The students had experienced a relatively low number of stressors and thus a low amount of stress prior to beginning their first year of college education at The University, as evidenced by an average of 21.17 stressors (SD = 10.23) on theoretical scale, ranging from 1 to 77. The mean acculturation score for the subjects was 1.34 (SD = .87), which compared to the cutting scores suggested by Cuéllar et al. (1995), showed that an average first year Latino science student at The University

was likely to be slightly Anglo oriented bicultural to strongly Anglo oriented**.** Analysis of outcome measured suggested that the participating first year Latino science students had a moderate level of first year success, as evidenced by median GPA of 2.63, median number of earned credit hours of 26.00, and the retention rate of 77.60% in the science major.

As expected, the control variables of SAT score and high school GPA were statistically significant predictors of the three outcome measures. Together, they accounted for 19.80% of the variation in first year GPA, 13.80% of the variation in earned credit hours, and 11.30% of the variation in intent to remain the science major. It is concluded that these are useful in predicting first year science success at The University.

After controlling for SAT scores and high school GPAs, self-efficacy was a statistically significant predictor of credit hours earned and accounted for 5.60% of the variation; its unique contribution in explaining the variation in first year GPA and intent to remain in the science major was not statistically significant. Stress and acculturation were not statistically significant predictors of any of the three outcome measures.

The hypothesis that after controlling for SAT scores and high school GPAs, self-efficacy, stress, and acculturation are useful predictors of first year GPA and intent to remain in the science major was concluded not to be tenable. It is concluded that self-efficacy is a predictor of credit hours earned, while stress and acculturation are not. The study participants had a high sense of science self-efficacy prior to college, which is consistent with the findings reported by Bandura (1997) and Pajares (1997) who reported that most students tend to exaggerate their academic-related abilities. However, science

self-efficacy did not correlate with first year GPA and intent to remain in the science major, which contradicts findings in previous studies on science self-efficacy (Andrew, 1998; Britner & Pajares, 2001) and academic self-efficacy (Hsieh et al., 2007; Lent et al., 1984, 1986, 1987; Lent & Larkin, 1989; Zajacova et al., 2005), which reported association between self-efficacy on one hand and grades and persistence on the other hand.

Stress was not found to be a statistically significant predictor of the outcome measures and its practical significance was also negligible. This conclusion is consistent with that of Zajacova et al. (2005) who found no significant relationship between stress and success outcomes of GPA or college credits and only a moderate relationship between stress and persistence. However, it differs from most research on stress and academic achievement which report a negative correlation between stress and various success outcomes.

The statistical and practical significance of acculturation in predicting the outcome measures were concluded to be negligible. This is consistent with the findings of Cano and Castillo (2010), who examined the role of enculturation and acculturation on Latinas at a large Texas university, and with the work of López, Ehly and García-Vásquez (2002) who found no significant correlation between acculturation level and GPA among Mexican American high school students in New Mexico.

Qualitative

The qualitative phase of the study consisted of a focus group interview of seven students recruited from the quantitative phase. The purpose of the focus group, conducted at the end of the first year in college, was to provide a deeper understanding

and better explanation of the quantitative results. A typical focus group participant had a mean GPA of 2.64, completed 29 credit hours, and remained in the science major.

Based on the qualitative results, it is concluded that the participants perceived that they had a high science self-efficacy prior to attending The University. They perceived that their high confidence perhaps resulted in overconfidence, which may have affected their first year success; however, they felt that they achieved a reasonable level of success, earned the number of credit hours they had planned to earn, and all focus group participants had remained in the science major at the time of the interview.

Based on qualitative results, it is concluded that the stressors experienced by the focus group participants played a positive role in preparing them for college life academically, financially, and emotionally. The stressors may serve as motivators of success among the students.

In terms of acculturation, it is concluded that students perceived themselves as ranging from bicultural to Anglo oriented and that their level of acculturation did not affect their success in the first year of college. Strongly Anglo oriented participants described some negative social aspects of losing Latino culture and language when interacting with other Latinos, but because they felt highly acculturated, they believed their first year success in science was unaffected by acculturation. The students who described themselves as bicultural perceived that being bicultural was a motivating force and helped them succeed in the first year of university science. They felt that Latinos often do not achieve highly and that this perceived lack of success among some Latinos motivated them to succeed.

All the Latino students perceived that they had large supportive families, which is a characteristic of Latino culture (Zambrana, 2011) and that the families served as both motivation and strong support networks while struggling in their first year of college science. While large families were deemed as a source of support and motivation, multiple siblings were sometimes perceived as exacerbating financial stress. A surprising finding arose when one student indicated that not just siblings in college can increase financial stress, but that the student loan debt of parents can also be a financial burden. This could be a serious future impediment to higher education access since some analysts are predicting a student loan crisis similar to the subprime mortgage collapse that led to the current global economic downturn (Martin & Lehren, 2012).

Discussion

Synthesis of Quantitative and Qualitative Results

In the qualitative phase of the study, high self-efficacy was a theme that arose from the focus group. Possibly many students were overconfident, because they understandably expected to earn grades similar to those they had earned in high school. This may explain why self-efficacy scores were inflated and perhaps lacked sufficient variation to serve as a significant predictor of GPA or intention to remain in the science major because students were accustomed to earning high marks, which is consistent with other researchers who found that most students are overconfident about their academic capabilities (Bandura, 1997; Pajares, 1997).

Overconfidence was mentioned prominently in the focus group as an effect of high-self efficacy and may explain why no significant correlation was found between the predictor, self-efficacy, and GPA. Perhaps this gulf between high school GPA and

university GPA might explain the high feelings of self-efficacy in this sample. This could explain why some students reported that they were overconfident. This seems to point to a need for higher academic rigor in high school and less grade inflation. So that high school and college expectations are in greater alignment.

When asked if self-efficacy affected their credit hours earned, all focus group participants responded no with most indicating that they had earned all the credit hours they had set out to as an explanation. It should be noted that the focus group participants earned 3 credit hours more on average than did the full sample.

The qualitative portion of the study supports the fact that students experienced few stressors prior to college. The students who reported experiencing stressful events noted that the stress served as either a motivator or played a positive role in preparing them for the first year of university science. The reported stressors were financial, health, other hardships, and high school academic stress. This mirrors the stressors most often experienced by the study participants, as reported in Table 20 (derived from Table 5 in chapter 4).

Table 20
Stressors Experienced by Over 50% of the Study Participants

Stressor	%
Felt financial pressures regarding how to pay for tuition, books, etc.	79.60
Felt pressure to get good grades	78.60
Child or teenage member entered college, vocational training, or armed forces	70.40
A member started junior high or high school	64.90
Felt pressure from your parents to succeed in college	64.30
Family member was hospitalized	58.80
Increased family living expenses for medical care, food, clothing, energy cost (gasoline, heating)	55.10

For example, 79.60% of the subjects answered yes to the question, “Felt financial pressures regarding how to pay for tuition, books, etc.” and 55.10% answered yes to “Increased family living expenses for medical care, food, clothing, energy cost (gasoline, heating)” in the quantitative phase of the study. In the qualitative phase of the study, financial stressors were the category of stressor most commonly reported, which coincides with the quantitative results. The financial stress resulted in the students actively seeking a variety of financial solutions, including grants, scholarships, loans, and employment, according to the focus group participants who all reported receiving some form of financial aid. In this way, they felt that stress prior to their first year made college less difficult because they sought out solutions to relieve the stress. Similarly, “Felt pressure to get good grades” and “Felt pressure from your parents to succeed in college” can be related to the high school academic stressor that emerged from the focus group discussion. Health stress was one of the stressors that emerged from the focus group and mirrors the “Family member was hospitalized” stressor in table 20. Students often indicated that multiple family members in school increased financial hardships. This theme is mirrored in two items from Table 12, “Child or teenage member entered college, vocational training, or armed forces” and “A member started junior high or high school”.

It was clear from both the quantitative and qualitative phases of the study that financial stress, including that arising from multiple siblings, health, other major hardships, and high school academic stress are important stressors among these students.

Stress was not found to be a predictor of GPA, earned credit hours, or intent to remain in the science major in the quantitative phase of the study. The qualitative phase

helped to explain these results. When asked, “Did stress prior to college affect your GPA at the end of the spring 2012 semester?” three participants answered yes and four answered no. Those answering yes felt that the stress was a positive motivator for college success. They felt that financial stress, health stress, other hardships, and high school academic stress assisted them to be better prepared for the academics of university life. Those answering no did not report any significant stressful events. When asked, “Did stress prior to college affect your total number of hours earned at [The University] at the end of the spring semester?” one answered yes and six answered no. Most expressed that they had earned the number of hours that they had intended to earn, which may explain why they felt stress did not affect their number of hours. When asked, “Did stress prior to college affect your intention to remain as a science major at the end of the spring semester?” two students answered yes and five answered no, which supports the quantitative findings. Those answering yes were inspired by health-related stressors they had experienced themselves which motivated them to stay in science with the hope of becoming medical professionals.

In summary, the quantitative and qualitative results were consistent with one another and showed a low number of stressors. They further demonstrated why stress was not found to be a predictor of GPA, earned credit hours, or intent to remain in the major.

The subjects’ acculturation level was found to be between slightly Anglo oriented bicultural to strongly Anglo oriented, which is consistent with the qualitative themes of bicultural and Anglo oriented. Acculturation was not found to be a predictor of GPA, earned credit hours, or intent to remain in the science major. When focus group

participants were asked whether acculturation affected their GPA or number of credit hours earned, all seven felt that it did not. This strongly supports the quantitative results. When asked if acculturation affected their intent to remain in the major, five out of seven felt that it did not, which supported the quantitative findings. Those who answered no felt that they had a high level of acculturation and therefore it was not a negative factor in their first year of university science. This was consistent with the quantitative result of slightly Anglo oriented bicultural to strongly Anglo oriented. Interestingly, the two that answered yes felt that their level of acculturation had a positive impact on their intent to remain the science major. One student felt that her Latino culture was a very strong motivator, because of "Mexican stubbornness;" she described how other Latinos that do not take advantage of opportunities in America was a motivator for her; she was inspired by the fact that Latinos are poorly represented in science and accepted it as a challenge; and she received great motivation and support from her families' pride in her accomplishments as a Latina science student. This student experienced a mid-semester crisis during which she lost her confidence and doubted whether she should continue in science. She reported that these factors, along with her previously high feelings of science self-efficacy, helped her through the crisis.

Another student described that he had many sick family members who had died of cancer back home in the Rio Grande Valley of Texas and that the sick family members were a motivator to pursue a career in pharmaceutical research or medicine so that he could help other Latinos. He felt that his family and their pride and support of his goal to give back to them motivated him to continue as a science major during difficult times in the first year of college when he had doubts about whether to continue as a science major.

In summary the quantitative results showed the students' acculturation level to be slightly Anglo oriented bicultural to strongly Anglo oriented. In the qualitative phase of the research, the focus group transcript analysis revealed that the students who were strongly Anglo oriented understandably felt that acculturation had no influence on their first year success. Those who were Anglo oriented bicultural appeared to have derived motivation and support from being bicultural and felt being part of an under-represented minority in science was a challenge to overcome and a motivation to persevere. Several issues arise as a result of the study. First, there appears to be no correlation between acculturation and first year science success at The University, which welcomes international second language learners from all over the world, yet many students in the study described how they had lost their Latino culture and language as early as elementary school. Ennis et al. (2011) reported that the United States had the second largest Latino population (50.5 million) in 2010, second only to Mexico (112 million), yet, according to Valenzuela (1999) our educational system subtracts the culture and language of Latinos at an early age**.** Valenzuela (1999) referred to this as subtractive schooling, which results in a loss of social capital needed for Latinos to succeed. The study supports Valenzuela's conclusions. If the United States is to compete in an increasingly technology driven global economy, it must reverse this trend of devaluing Latinos and their culture, and instead encourage more Latinos to enter science fields, while maintaining a healthy balance and appreciation for their two cultures so they can receive familial support.

Financial stress was the stressor that was most prevalent in both the quantitative and qualitative portions of the study. Poverty rates among Latinos are significantly

higher than non-Hispanic whites and Asians and this poverty gap is widening (Acuña, 2003; Zambrana, 2011). If we are to increase Latino participation in science, we must provide significant assistance to Latino students and ensure that this is not an impediment to pursuing science degrees. Many focus group participants indicated the fear that they would not be able to attend college because they did not have the necessary financial resources. Though the students interviewed obviously rose to the challenge and found ways to pay for college, it begs the question, how many qualified Latino students do not attend college because of financial fears or constraints? This is a question that needs to be addressed if we are to increase Latino participation in science.

The second most prominent stress factor identified in the study is health stress. Students discussed the impacts of their own health problems and the health issues of family members. Latino adults are more likely to report fair or poor health than non-Latino whites, and Latinos and are 1.5 times more likely to die from diabetes (Zambrana, 2011). Health issues, which are complex and often related to poverty, must be addressed if we are to increase Latino participation in science.

The rigor of high school was surprisingly a major stressor that arose from the Stress theme of the focus group. Participants reported that their high school was very rigorous and prepared them well for university science; however, students also reported struggling greatly in the first year of university science and achieved a median GPA of just 2.63, compared to the groups' high school GPA of 3.58 which was much higher. Grade inflation is a serious problem in the United States (Johnson, 2003). It is possible that the high grades earned in high school set these students up for failure. Similarly, some students felt their advanced placement (AP) science classes were easy and yet they failed

to qualify for advanced placement. It is evident that the students felt that "acing" a science AP class meant they should be prepared for university level science, but that earning a score that would qualify them for advanced placement was not an indicator of university level science ability. This is a problem that needs to be investigated, because it appears that the combination of low expectations in advanced placement courses and high school grade inflation may be contributing to a unrealistically high science self-efficacy assessment.

Family was the qualitative theme that was mentioned the most during the focus group interview. It was concluded that first year Latino science students at The University are very resilient, in part because they have strong family systems, which provide strong motivation and support through large support networks. Latinos tend to live in family households that are larger than Non-Latino whites and Non-Latino black families and have close ties to extended family (Zambrana, 2011) and yet the university experience is often a solitary one. This incongruence seems worthy of further investigation as is applies to Latino science students. While the study found the family to be important in motivating and supporting Latino science students through the difficult first year of university science, it was also reported by some students that their non English speaking family members often lacked the necessary understanding of higher education needed to be fully supportive because they do not speak English. Because family support and motivation are so important to Latinos, Hispanic serving institutions must find ways to ensure that family members are part of the students' higher education experience. This runs counter to the individualistic nature of higher education, which may conflict with the collective attitudes of Latinos (Cano & Castillo, 2010). This is an

area of research that needs further investigation so that we can support Latino families in higher education. Simple steps such as providing more Spanish language materials to non-English speaking family members could go a long way in helping the family members, who often have not attended college, to understand the complexities of higher education so that they can better support and motivate their Latino family members attending college. Because of the importance of family among Latinos, higher education needs to be more flexible in structuring the campus environment and policies to support the needs of Latinos. For example, The University is located in a Texas county with one of the highest teenage pregnancy rates in America and yet has no provisions for childcare and no married student housing. The individualistic nature of higher education at HSI's and how Latinos perceive the institutions needs to be better studied. The question of whether being a science major, a highly demanding academic choice, necessitates even further isolation from one's family is another interesting question ripe for study.

Implications

The study revealed a number of ways that might help to ensure Latino success in the first year of science at The University. In terms of self-efficacy, students may come to The University too overconfident, which might lead them to study less and experience less success. This has implications for K-12 science teachers and administrators who should help students understand what university level science preparation looks like. The K-12 teachers and administrators must seek to combat grade inflation because it may lead to inflated confidence.

In terms of stress, although the Latino students experience some stress, they have mechanisms to deal with the stress through large family networks. This has implications

for professors, administrators, and students attending Hispanic serving institutions. Perhaps choosing a university close to home and maintaining close ties to the family may assist students in completing school. Perhaps administration and faculty can be more sensitive when scheduling examinations around Latino holidays and implement flexibility so that students may maintain ties with family when needed. The HSIs can structure the campus environment and policies to better accommodate not just Latino students, but their family members, because families provide much needed support and motivation. Institutions can provide married student housing and childcare, increase Spanish language orientation materials, and provide a welcoming atmosphere to families as well as students. Most importantly, the University as a Hispanic Serving Institution in South Texas should recognize the importance of Mexican Americans to the United States by creating a Mexican American studies program as a forum to further explore Latino issues.

Knowing that acculturation among Latinos appears to have no impact on success in the first year of science at The University implies that there is no need to push Latinos toward assimilation in K-12 schools. Indeed, maintaining the knowledge embodied in Spanish language and culture should be strongly encouraged in schools.

Knowing that the biggest stressor of Latino science students is financial worries, stakeholders can ensure that financial assistance for Latinos increases at the same rate as the rapidly growing population and that access to information about financial aid is readily available in both English and Spanish.

Knowing that health-related stress is a major issue among first year Latino science students suggests that more research needs to be done in this area so that we can better understand its effect on Latino college attendance and persistence.

While this one study cannot possibly solve all the problems Latino students face, The University, as a Hispanic Serving institution in South Texas, has an obligation to develop and implement specific policies to address the needs of Latinos so that we may one day erase racial and ethnic inequality in America. It is suggested that a task force be created to study and implement needed policies.

Recommendations for Further Research

It is recommended that the study be replicated, using a larger more heterogeneous sample with greater variation among its science students. It is recommended that the predictors be measured later in the semester since many students may begin college with an unrealistically high sense of self-efficacy and experience low stress until about one third of the semester has passed. Attempting to measure science self-efficacy prior to college may not be the best time for students in transition from high school to college since students tend to arrive at college feeling very confident about their abilities and are accustomed to earning higher grades as this study shows. A better time to measure science self-efficacy for first year students would likely be after they have experienced university level examinations so that they may better assess their abilities. It is recommended to conduct a study to determine what other non-academic factors may be better predictors of science success among Latinos at The University. Factors to be explored may include academic self-confidence, academic related skills, academic goals, and social support (Lotkowski et al., 2004). It is recommended that the impact of

financial stress and health be further explored at The University to ensure that Latino students' needs are being met and addressed.

REFERENCES

Abdel-Salam, T., Kauffmann, P. & Williamson, K. (2005). A case study: Do high school GPA/SAT scores predict the performance of freshmen engineering students? Proceedings from FIE 2005: *The 35th Frontiers in Education Annual Conference.* Indianapolis, Indiana.

Abouserie, R. (1994). Sources and levels of stress in relation to locus of control and self-esteem in university students, *Educational Psychology, 14*(3), 323–330.

ACT (2004). The role of academic and non-academic factors in improving college retention. Iowa City, IA: ACT Policy Report.

ACT (2012). National collegiate retention and persistence to degree rates. ACT Retrieved from: http://www.act.org/research/policymakers/reports/graduation.html

Acuña, R. F. (2003). U.S. Latino issues. Westport, Connecticut: Greenwood Press.

American Council on Education (2008). *Minorities in Higher Education: 2009 Supplement.* Washington, DC.

Andrew, S. (1998). Self-efficacy as a predictor of academic performance in science. *Journal of Advanced Nursing, 27*(3), 596-603.

Alcoff, L. (2005). Latino vs. Hispanic: The politics of ethnic names. *Philosophy & Social Criticism, 31*(4), 395-407.

Bandura. A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84,* 191-215

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice-Hall

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: W.H. Freeman and Co.

Bandura, A. (2006). Adolescent development from an agentic perspective. In F. Pajares & T. Urdan (Eds.), *Self-efficacy beliefs of adolescents* (pp. 1-43). Greenwich, CT: Information Age Publishing.

Banks, J. A. (Ed.). (2004). *Handbook of research on multicultural education* (2nd ed.). San Francisco: Jossey-Bass.

Barton, P. E. (2003, May). *Hispanics in Science and Engineering: A matter of Assistance and Persistence. Policy Information Report*. Princeton, NJ: Educational Testing Service.

Bean, J. P. (1980). Dropouts and turnover: The synthesis and test of a causal model of student attrition. *Research in Higher Education, 12*(2), 155–187.

Bean, J. P. (1985). Interaction effects based on class level in an explanatory model of college student dropout syndrome. *American Educational Research Journal, 22*(1), 35–64.

Blinne, W. R., and Johnston, J. A. (1998). Assessing the relationships between vocational identity, academic achievement, and persistence in college. *Journal of College Student Development 39*(6), 569–576.

Bennett, C. I. (2003). *Comprehensive multicultural education theory and practice*. Boston: Allyn and Bacon.

Betancourt, H. & Flynn, P. M. (2009). The psychology of health: Physical health and the role of culture and behavior. In Villarruel, F.A., Gustavo, C., Grau, J.M., Azmitia, M., Cabrera, N.J., Chahin, T.J. (Eds.), *Handbook of U.S. Latino psychology: Developmental and community-based perspectives* (pp. 347-361). Thousand Oaks, CA: Sage Publications.

Berry, J. W. (1970). Marginality, stress and ethnic identification in an acculturated Aboriginal community. *Journal of Cross-Cultural Psychology, 1*, 239-252.

Berry, J. W. (1997). Immigration, acculturation, and adaptation. *Applied Psychology: An International Review*, *46*(1), 5-33.

Berry, J. W. (2006a). Contexts of acculturation. In D. L. Sam & J. W. Berry (Eds.), *The Cambridge handbook of acculturation psychology* (pp. 27-42). Cambridge: Cambridge University Press.

Berry, J. W. (2006b). Stress perspectives on acculturation. In D. L. Sam & J. W. Berry (Eds.), *The Cambridge handbook of acculturation psychology* (pp. 27-42). Cambridge: Cambridge University Press.

Berry, J. W., Poortinga, Y. H., Breugelmans, S. M., Chasiotis, A. & Sam, D. L. (2011). *Cross cultural psychology: Research and Applications.* Cambridge: Cambridge University Press.

Britner, S. L., (2002). *Science self-efficacy of African American middle school students: Relationship to motivation self-beliefs, achievement, gender, and gender orientation.* (Doctoral Dissertation). Emory University, Georgia.

Britner, S. L., & Pajares F. (2001). Self-efficacy beliefs, motivation, race, and gender in middle school science. *Journal of Women and Minorities in Science and Engineering, 7,* 271–285.

Britner, B. L., & Pajares, F. (2006). Sources of science self-efficacy beliefs of middle school students. *Journal of Research in Science Teaching, 43*(5), 485-499.

Brown, S. D., Lent, R. W., and Larkin, K. C. (1989). Self-efficacy as a moderator of scholastic aptitude- Academic performance and relationships. *Journal of Vocational Behavior, 35*, 64-75

Cabassa, J. C. (2003). Measuring acculturation: Where we are and where we need to go. *Hispanic Journal of Behavioral Sciences, 25*(2), 127-146.

Cabrera, A. F., Castaneda, M. B., Nora, A., & Hengstler, D. (1992). The convergence between two theories of college persistence. *Journal of College Student Development, 63*(2), 143-164.

Cabrera, A. F., Nora, A., & Castaneda, M. B. (1993). College persistence: Structural equations modeling test of an integrated model of student retention. *Journal of Higher Education, 64*(2), 123-139.

Calderón, P. (1992). "Hispanic and "Latino" the viability of categories for panethnic unity. *Latin American Perspectives, 19*(4), 37-44.

Child Trends Databank. (2012). High school dropout rates: Indicators on children and youth. www.childtrendsdatabank.org

Clark, R., Anderson, N., Clark, V., Williams, D. (1999). Racism as a stressor for African Americans: A biopsychosocial model. *American Psychologist, 54,* 805-816.

Cohen, L., Mansion, L., Morrison, K. (2007). *Research Methods in Education* (6th ed.) New York: Routledge.

Committee on Equal Opportunities in Science and Engineering (CEOSE) (2011). Broadening participation in America's STEM workforce: 2009-2010 Biennial report to Congress. National Science Foundation.

Condren, M., & Greenglass, E. (2011). Optimism, emotional support, and depression among first-year university students: Implications for psychological functioning within the educational setting. In, G. Reevy & E. Frydenberg (Eds.), *Research on Stress and Coping in Education Volume VI: Personality, Stress, and Coping: Implications for Education.* Charlotte, North Carolina: Information Age Publishing, Inc.

Cano, M. A. & Castillo, L. G. (2010). The role of enculturation and acculturation on Latina college student distress. *Journal of Hispanic Higher Education 9*(3), 221–231.

Chamorro, R. & Flores-Ortiz, Y. (2000). Acculturation and disordered eating patterns among Mexican American women. *International Journal of Eating Disorders, 28*(1), 125-129.

Corcoran, K., & Fischer, J. (2000). Measures for clinical practice: A sourcebook (3rd ed., Vol. 2). Adults. New York: The Free Press.

Creswell, J. W. (2005). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research.* Upper Saddle River, NJ: Pearson.

Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Cuéllar, I., Arnold, B., & Maldonado, R. (1995). Acculturation Rating Scale for Mexican Americans-II: A revision of the original ARSMA scale. *Hispanic Journal of Behavioral Sciences, 17*(3), 275-304.

Dinh, K. T., Roosa, M. K., Tein, J. Y., & Lopez, V. A. (2002). The relationship between acculturation and problem behavior proneness in Hispanic youth sample: A longitudinal mediation model. *Journal of Abnormal Child Psychology, 30*(3), 295-309.

Dyson, R., & Renk, K. (2006). Freshman adaptation to university life: Depressive symptoms, stress, and coping. *Journal of Clinical Psychology,* 1231-1244.

Eamon, M. K. & Mulder, C. (2005). Predicting antisocial behavior among Latino young adolescents: An ecological systems analysis. *American Journal of Orthopsychiatry. 75*(1), 117-127.

Ennis, S. R., Ríos-Vargas, M., & Albert, N. C. (2011). The Hispanic population: 2010. 2010 Census Briefs. U.S. Census Bureau.

Field, A. (2009). *Discovering statistics using SPSS.* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Friedman, T. L. (2007). *The world is flat: A brief history of the twenty-first century* (3rd ed.). New York: Picador.

Ghaddar, S., Brown, C. J., Pagán, J. A. & Díaz, V. (2010). Acculturation and healthy lifestyle habits among Hispanics in United States-Mexico border communities. *Rev Panam Salud Publica*. *28*(3), 190–197.

Gadzella, B. M. (1991). *Student life stress inventory*. Commerce, TX: Gadzella.

Gándara, P. (2006). Strengthening the academic pipeline leading to careers in math, science, and technology for Latino students. *Journal of Hispanic Higher Education, 5*(3), 222-237.

Gándara, P., & Contreras, F. (2009). *The Latino education crisis: The consequences of failed social policies.* Cambridge, MA: Harvard University Press.

Gonzales, N. A., Deardorff, J., Formoso, D., Barr, A., & Barrera, M. (2006). Family mediators of the relation between acculturation and adolescent mental health. *Family Relations, 55,* 318-330.

Gonzales, N. A., Fabrett, F. C. & Knight, G. P. (2009). Acculturation, enculturation, and the psychosocial adaptation of Latino youth. In Villarruel, F.A., Gustavo, C., Grau, J. M., Azmitia, M., Cabrera, N. J., Chahin, T. J. (Eds.), *Handbook of U.S. Latino psychology: Developmental and community-based perspectives* (pp. 347-361). Thousand Oaks, CA: Sage Publications.

Gutierrez, M. A., Franco, L. M., Gilmore Powell, K, Peterson, N. A. & Reid, R. J. (2009). Psychometric properties of the Acculturation Rating Scale for Mexican Americans–II Exploring dimensions of marginality among a diverse Latino population. *Hispanic Journal of Behavioral Sciences. 31*(3) 340-356.

Harvey, V., & McMurray, N. (1994). Self-efficacy: A means of identifying problems in nursing education and career progress. *International Journal of Nursing Studies, 3*(5), 471-485.

HERI (2010). The American freshman: National norms Fall 2010, research brief. Los Angeles CA, Higher Educational Research Institute.

HERI (2011). The American freshman: National norms Fall 2010. Los Angeles CA, Higher Educational Research Institute.

Hoffman, J. L. & Lowitski, K. E. (2005). Predicting college success with high school grades and test scores: Limitations for minority students. *The Review of Higher Education 28*(4), 455-474.

Holmes, T., & Rahe, R. (1967). The social readjustment rating scale. *Journal of Psychosomatic Research, 11,* 213-218.

Holt, J. K. (2006). An Evaluation of Math and Science Educational and Occupational Persistence among Minorities. *Proceedings from Annual Meeting of the Eastern Education Research Association.* Hilton Head, SC.

Hosmer, D.W. & Lemeshow, S. (2000). *Applied logistic regression.* (2nd ed.) John Wiley & Sons.

House, D. J. (1995). Noncognitive predictors of achievement in introductory college chemistry. *Research in Higher Education, 36*(4) 473-490.

House, D. J. (2000). Academic background and self-beliefs as predictors of student grade performance in science, engineering and mathematics. *International Journal of Instructional Media, 27*(2) 207-220.

Hovey, J. D. (2000). Acculturative stress, depression, and suicidal ideation in Mexican immigrants. *Cultural Diversity and Ethnic Minority Psychology, 6*(2), 134-151

Hsieh, P., Sullivan, J. R., & Guerra, N. S. (2007). A closer look at college students: Self-efficacy and goal orientation. *Journal of Advanced Academics, 18*(3), 454-476.

Hudd, S. S., Dumlao, J., Erdmann-Sager, D., Murray, D., Phan, E., Soukas, N., et al. (2000). Stress at college: Effects on health habits, health status and self-esteem. *College Student Journal, 34*, 217-227.

Hurtado, S., Han, J. C., Sáenz, V. B., Espinoza, L. L., Cabrera, N. L., Cerna, O.S. (2007). Predicting transition and adjustment to college: Biomedical and behavioral science aspirants' and minority students' first year of college. *Research in Higher Education, 48*, (7), 841-887.

Johnson, V. E., (2003). *Grade inflation: A crisis in college education*. New York: Springer-Verlag

Kahn, J. H. & Nauta, M.M. (2001). Social-cognitive predictors of first-year college persistence: The importance of proximal assessment. *Research in Higher Education, 42*, (6) 633-652.

Kanner, A. D., Coyne, J. C., Schaefer, C., & Lazarus, R. S. (1981). Comparison of two modes of stress measurement: Daily hassles and uplifts versus major life events. *Journal of Behavioral Medicine, 4*(1), 1-25.

Kelly, P. J. (2008). Beyond social justice: The threat of inequality to workforce development in the western United States. Western Interstate Commission for Higher Education.

Kobrin, J. L., Patterson, B. F., Shaw, E. J., Mattern, K. D., & Barbuti, S. M. (2008). *Validity of the SAT for predicting first-year college grade point average*. College Board.

Krueger, R.A. (2009). Focus groups: A practical guide for applied research. Thousand Oaks, California. Sage Publications, Inc.

Lazarus, R. S. (1966). *Psychological stress and the coping process*. New York: McGraw-Hill.

Lazarus, R. S. (1993). From psychological stress to the emotions: A history of changing outlooks. *Annual Review of Psychology, 44,* 1-21.

Lazarus, R.S. & Folkman, S. (1984). *Stress, appraisal and coping.* New York: Springer.

Lazarus, R. S., & Lazarus, B. N. (1994). *Passion and reason: Making sense of our emotions*. New York: Oxford University Press.

Lent, R. W., Brown, S. D., & Larkin, K. C. (1984). Relation of self-efficacy expectations to academic achievement and persistence, *Journal of Counseling Psychology 31*, 356-362.

Lent, R. W., Brown, S. D., & Larkin, K. C. (1986). Self-efficacy in the prediction of academic performance and perceived career options. *Journal of Counseling Psychology*, 33, 265-269.

Lent, R. W., Brown, S. D., & Larkin, K. C. (1987). Comparison of three theoretically derived variables in predicting career and academic behavior: Self-efficacy, interest congruence, and consequence thinking. *Journal of Counseling Psychology*, 34, 293- 298.

Lent, R. W., Brown, S. D., and Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior 45*(1), 79–122.

Lent, R. W. & Larkin, K. C. (1989). Self-efficacy as a moderator of scholastic aptitude-academic performance relationships. *Journal of Vocational Behavior 35,64-75*

Llagas, C., & Snyder, T. D. (2003). *Status and Trends in the Education of Hispanics* (NCES 2003-008). Washington, DC: U.S. Government Printing Office.

López, E. J., Ehly, S. and García-Vásquez, E. (2002). Acculturation, social support and academic achievement of Mexican and Mexican American high school students: An exploratory study. *Psychology in the Schools 39*(3), 245-257.

Lucas, S. (1999). *Tracking inequality: Stratification and mobility in American schools.* New York: Teachers College Press.

Martin, A. & Lehren, A.W. (May 13, 2012). A generation hobbled by college debt. *The New York Times*, pp. A1.

McCubbin, H. I., & Thompson, A. I. (1991). *Family assessment inventories for research and practice*. Madison, WI: University of Wisconsin.

McCubbin, H. I., & Thompson, A. I., McCubbin, M. A. (2001). *Family Measures: Inventories for research and practice*. Honolulu, Hawaii: Kamehameha Schools.

Museus, S. D., Palmer, R. T., Davis, R. J.& Maramba, D. C. (2011). *Racial and ethnic minority students' success in STEM education.* ASHE Higher Education Report, Hoboken, New Jersey: Jossey-Bass.

National Academies. (2006). *Rising above the gathering storm: Energizing and employing America for a brighter economic future*. Washington, DC: The National Academies Press.

National Academies. (2010). *Rising above the gathering storm, revisited: Rapidly approaching category 5*. Washington, DC: The National Academies Press.

National Research Council. (2011). *Expanding underrepresented minority participation: America's science and technology talent at the crossroads.* Washington, DC: The National Academies Press.

National Science Foundation, Division of Science Resources Statistics. (2011). Women, minorities, and persons with disabilities in science and engineering: 2011. Special Report NSF 11-309. Arlington, VA. Retrieved May 17, 2012, from National Science Foundation Website: http://www.nsf.gov/statistics/wmpd/.

Nettles, M. T., Millet, C. M., & Ready, D. D. (2003). Attacking the African American-white achievement gap on college admissions tests. In D. Ravitch (Ed.), *Brookings Papers on Educational Policy, 2003* (pp. 215–238). Washington, DC: Brookings Institution Press.

Oakes, J. (1990). Opportunities achievement and choice: Women and minority students in science and mathematics. *Review of Research in Education, 16*(2) 153-166.

Oberg, K. (1960). Culture shock: adjustment to new cultural environments. *Practical Anthropology, 7*, 177-182.

Paul, E. L. & Brier, S. (2001). Friendsickness in the transition to college: Precollege predictors and college adjustment correlates. *Journal of Counseling & Development, 79*, 77-89.

Pajares, F (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research*, 66(4), 543-578.

Pascarella, E. T., and Terenzini, P. T. (2005). *How college affects students: A third decade of research. San* Francisco: Jossey-Bass.

Pedhazur, E. J. & Schmelkin, L. P. (1991). *Measurement, Design, and Analysis An integrated approach.* Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.

Reason, R. D., Terenzini, P. T., & Domingo, R. J. (2006). First things first: Developing academic competence in the first year of college. *Research in Higher Education, 47*, (2), 149-175.

Ross, S. E., Niebling, B. C. & Heckert, T. M. (1999). Sources of stress among students. *College Student Journal, 33*(2), 312–317.

Robotham, D. & Julian, C. (2006). Stress and the higher education student: A critical review of the literature. *Journal of Further and Higher Education 30.* (2), 107–117.

Ryder, A. G., Alden, L. E., & Paulhus, D. L. (2000). Is acculturation unidimensional or bidimensional? A head to head comparison in the prediction of personality, self-identity, and adjustment. *Journal of Personality and Social Psychology, 79*(1), 77-88.

Sam, D. L. (2006). Acculturation: conceptual background and core components. In D. L. Sam & J. W. Berry (Eds.) *The Cambridge handbook of acculturation psychology.* (11-26). Cambridge: Cambridge University Press.

Sam, D. L. & Berry, J. W., (2006). Introduction. In D.L. Sam & J.W. Berry (Eds.) *The Cambridge handbook of acculturation psychology.* (1-7). Cambridge: Cambridge University Press.

Sarafino, E. P. & Ewing, M. (1999). The hassles assessment scale for students in college: Measuring the frequency and unpleasantness of and dwelling on stressful events, *Journal of American College Health, 48*(2), 75–84.

Schwartz, S.J., Zamboanga, B.L., & Jarvis, L.H. (2007). Ethnic identity and acculturation in Hispanic early adolescents: Mediated relationships to academic grades, prosocial behaviors, and externalizing symptoms. *Cultural Diversity and Ethnic Minority Psychology, 13*(4), 364-373.

Selye, H. (1936). A syndrome produced by diverse nocuous agents. *Nature*, 138, 32.

Selye, H. (1956). *The stress of life.* New York: McGraw Hill.

Smokowski, P. R. & Bacallao, M. (2011). *Becoming bicultural: Risk, resilience, and Latino youth.* New York: New York University Press.

Swanson, C. B. (2009). *Closing the graduation gap: Educational and economic conditions in America's largest cities. Cities in Crisis*. Bethesda, MD: Editorial Projects in Education.

Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research 45*(1) 89–125.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition* (2nd ed.). Chicago: University of Chicago Press.

Tomás Rivera Policy Institute. (2008). *STEM professions: Opportunities and challenges for Latinos in science, technology, engineering, and mathematics: A review of literature.* Los Angeles, CA: Taningco, M. T. V., Mathew, A. B., Pachon, H. P.

Towbes, L. C. & Cohen, L. H. (1996). Chronic stress in the lives of college students: Scale development and prospective prediction of stress. *Journal of Youth & Adolescence*, *25*,199–217.

Tsapogas, J. (2006, June). *Characteristics of Doctoral Scientists and Engineers in the United States: 2003* (NSF 06-320). Retrieved September 15, 2008 from http://www.nsf.gov/statistics/nsf06320/pdf/nsf06320.pdf

U.S. Census Bureau (2006). *American Community Survey.* Washington, DC: Government Printing Office.

Valenzuela, A. (1999). *Subtractive schooling: U.S. –Mexican youth and the politics of caring.* Albany: State University of New York

Vega, W. A., & Gil, A. G. (1999). A model for explaining drug use behavior among Hispanic adolescents. *Drugs and Society, 14,* 57-74.

Willis, H., Stroebe, M., & Hewstone, M. (2003). Homesick blues. *The Psychologist, 16,* 526-528.

Zajacova, A., Lynch, S. M., & Espenshade, T. J. (2005). Self-efficacy, stress, and academic success in college. *Research in Higher Education, 46*(6), 677-706.

Zambrana, R. E. (2011). *Latinos in American society: Families and communities in transition.* Ithaca, NY. Cornell University Press.

Zeldin, A. L., & Pajares, F. (2000). Against the odds: Self-efficacy beliefs of women in mathematical, scientific, and technological careers. *American Educational Research Journal, 37,* 215 – 246.

Zimbardo, P. G., Johnson, R. L., Weber, A. L. (2006). *Psychology: Core Concepts* (5th Ed.) Boston: Allyn and Bacon.

Appendices

APPENDIX A
IRB Approval
IRB Continuation Approval
Program Director Approval

ERIN L. SHERMAN, MAcc, CRA, CIP
Research Compliance Officer

6300 Ocean Drive, Unit 5844
Corpus Christi, Texas 78412
O 361.825.2497 • F 361.825.2755

June 7, 2011

Mr. Mark McNamara
Texas A&M University – Corpus Christi
6300 Ocean Drive, Unit 5812
Corpus Christi, TX 78412-5812

Dear Mr. McNamara,

The research project titled "Self-Efficacy, Stress, and Acculturation as Predictors of First Year Science Success among Latino Students at a South Texas University" (IRB#360-11) has been granted approval through an expedited review under category 7.2.1(9) by the Texas A&M University – Corpus Christi Institutional Review Board (IRB). You are authorized to conduct the project as outlined in the IRB protocol application.

IRB approval is granted for one year from the date approval is granted. You must submit an IRB Continuing Review Application for IRB committee review and approval should the project continue beyond June 7, 2012. Please submit the IRB Continuing Review Application one month prior to the approval expiration date to allow time for IRB review.

Please submit an IRB Amendment Application for any modifications to the approved study protocol. Changes to the study may not be initiated before the amendment is approved. Please submit an IRB Completion Report to the Compliance Office upon the conclusion of the project. Both report formats can be downloaded from IRB website.

All study records must be maintained by the researcher for three years after the completion of the study. Please contact me if you will no longer be affiliated with Texas A&M University – Corpus Christi before the conclusion of the records retention timeframe to discuss retention requirements.

We wish you the best on the project. Please contact me with any questions.

Sincerely,

Erin L. Sherman

Erin L. Sherman

ERIN L. SHERMAN, MAcc, CRA, CIP
Research Compliance Officer
Division of Research, Commercialization and Outreach

6300 Ocean Drive, Unit 5844
Corpus Christi, Texas 78412
O 361.825.2497 • F 361.825.2755

June 6, 2012

Mr. Mark McNamara
Texas A&M University – Corpus Christi
6300 Ocean Drive, Unit 5812
Corpus Christi, TX 78412-5812

Dear Mr. McNamara,

The research project entitled "Self-Efficacy, Stress, and Acculturation as Predictors of First Year Science Success among Latino Students at a South Texas University" (IRB# 60-11) has been granted continued approval through an expedited review by the Texas A&M University – Corpus Christi Institutional Review Board (IRB). You are authorized to continue the project as outlined in the IRB continuing review application.

IRB approval is granted for one year from the date the committee reviewed your continuation. You must submit an IRB Continuing Review Application for IRB committee review and approval should the project continue beyond June 7, 2013. Please submit the IRB Continuing Review Application one month prior to the approval expiration date to allow time for IRB review.

Please submit an IRB Amendment Application for any modifications to the approved study protocol. Changes to the study may not be initiated before the amendment is approved. Please submit an IRB Completion Report to the Compliance Office upon the conclusion of the project. Both report formats can be downloaded from IRB website.

All study records must be maintained by the researcher for three years after the completion of the study. Please contact me if you will no longer be affiliated with Texas A&M University – Corpus Christi before the conclusion of the records retention timeframe to discuss retention requirements.

We wish you the best on the project. Please contact me with any questions.

Sincerely,

Erin L. Sherman

Erin L. Sherman

TEXAS A&M UNIVERSITY
CORPUS CHRISTI

UNIVERSITY CORE CURRICULUM PROGRAM
FIRST-YEAR PROGRAM
6300 OCEAN DRIVE, UNIT 5812
CORPUS CHRISTI, TEXAS 78412-5812
O 361.825.2150 • F 361.825.2240

4/21/2011

Dear Mr. McNamara:

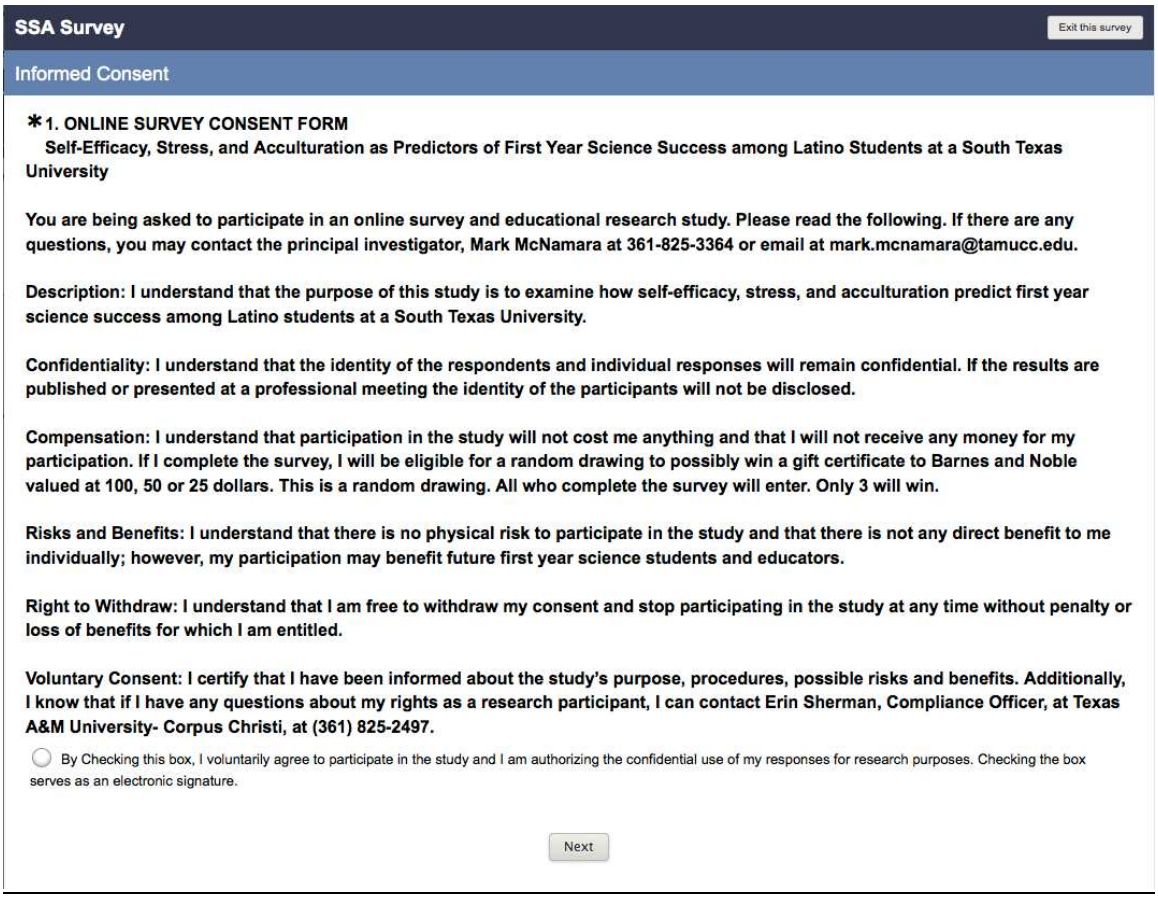
Formal permission is granted to you to conduct your research in the First Year Learning Communities Program science learning communities.

I wish you well in your research...

Sincerely,

Juan Carlos Huerta, Ph.D.
Director First-Year Learning Communities Program

APPENDIX B
Online Consent Form
Focus Group Consent Form



SSA Survey

Exit this survey

Informed Consent

*1. ONLINE SURVEY CONSENT FORM

Self-Efficacy, Stress, and Acculturation as Predictors of First Year Science Success among Latino Students at a South Texas University

You are being asked to participate in an online survey and educational research study. Please read the following. If there are any questions, you may contact the principal investigator, Mark McNamara at 361-825-3364 or email at mark.mcnamara@tamucc.edu.

Description: I understand that the purpose of this study is to examine how self-efficacy, stress, and acculturation predict first year science success among Latino students at a South Texas University.

Confidentiality: I understand that the identity of the respondents and individual responses will remain confidential. If the results are published or presented at a professional meeting the identity of the participants will not be disclosed.

Compensation: I understand that participation in the study will not cost me anything and that I will not receive any money for my participation. If I complete the survey, I will be eligible for a random drawing to possibly win a gift certificate to Barnes and Noble valued at 100, 50 or 25 dollars. This is a random drawing. All who complete the survey will enter. Only 3 will win.

Risks and Benefits: I understand that there is no physical risk to participate in the study and that there is not any direct benefit to me individually; however, my participation may benefit future first year science students and educators.

Right to Withdraw: I understand that I am free to withdraw my consent and stop participating in the study at any time without penalty or loss of benefits for which I am entitled.

Voluntary Consent: I certify that I have been informed about the study's purpose, procedures, possible risks and benefits. Additionally, I know that if I have any questions about my rights as a research participant, I can contact Erin Sherman, Compliance Officer, at Texas A&M University- Corpus Christi, at (361) 825-2497.

By Checking this box, I voluntarily agree to participate in the study and I am authorizing the confidential use of my responses for research purposes. Checking the box serves as an electronic signature.

Next

Informed Consent Form for Focus Group Interview

Dear Student,

I, Mark McNamara, am currently a Doctoral Candidate in the Department of Educational Administration and Research at Texas A&M University- Corpus Christi. For my dissertation research I am investigating self-efficacy, stress, and acculturation as predictors of first year science success among Latino students at a South Texas university.

Last fall, you completed an online survey during which you indicated your willingness to participate in a focus group interview of 5-12 students.

You are invited to participate in this focus group, which will be conducted to collect qualitative data that will be used to further understand the quantitative data collected during the surveys. The focus group will be audiotaped and later transcribed.

Your highly appreciated participation is voluntary. All individual responses will remain confidential. If the results are published or presented at scientific meetings, identity of the participants will not be disclosed. There is minimal risk to participants in this focus group. You will be asked questions similar to those asked on the initial survey. Your participation will not cost you anything and you will not receive any money for your participation. You are free to withdraw your consent and stop participating in the study at any time without penalty or loss of benefits for which you may be entitled.

Voluntary Consent: I certify that I have been informed about the study's purpose, procedures, possible risks and benefits; that I have been given the opportunity to ask questions before I sign; and that I can ask questions at any other time. Additionally, I know that if I have any questions about my rights as a research participant, I can contact Erin Sherman, Compliance Officer, at Texas A&M University- Corpus Christi at (361) 825-2497. I have received a copy of this form, and by signing it; I voluntarily agree to participate in this study.

_____ _____

Signature of Subject Date

_____

Printed Name of Subject

_____ _____

Signature of Principal Investigator Date

_____

Printed Name of Principal Investigator

APPENDIX C
Online Survey Instrument

ONLINE SURVEY INSTRUMENT

This study is designed for students who are 18 years of age and whose ethnic or cultural background could be described as Mexican-American, Chicano/a, Latino/a, or Hispanic.

1. Online Survey Consent Form (See Appendix B).

2. Are you at least 18 years old?

□ Yes □ No

[If the answer is yes, survey will proceed to next question]
[If the answer is no, survey concludes]

3. Is your ethnic or cultural background Mexican-American, Chicano/a, Latino/a, or Hispanic?

□ Yes □ No

[If the answer is yes, survey will proceed to next question]
[If the answer is no, survey concludes]

4. What is your country or countries of cultural origin? (i.e., Mexico, Columbia, Germany)

_____

Life Changes

This section of survey asks about life changes you or your family members have experienced in the last 6 months prior to your first day of class.

Read each family life change and decide if it happened in your family during the last 6 months. Mark one of the following responses:

□YES, Happened to me personally
□YES, Happened to another family member
□ NO, Did not happen in my family

5. Did this change happen in your family during the past 6 months?

Family member started new business (farm, store, etc.)
□YES, Happened to me personally
□YES, Happened to another family member
□ NO, Did not happen in my family

6. Parent quit or lost job
   - □YES, Happened to me personally
   - □YES, Happened to another family member
   - □ NO, Did not happen in my family

7. Parents separated or divorced
   - □YES, Happened to me personally
   - □YES, Happened to another family member
   - □ NO, Did not happen in my family

8. Parent remarried
   - □YES, Happened to me personally
   - □YES, Happened to another family member
   - □ NO, Did not happen in my family

9. Family member was married
   - □YES, Happened to me personally
   - □YES, Happened to another family member
   - □ NO, Did not happen in my family

10. Family member was found to have a learning disorder
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

11. Parents adopted a child
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

12. A member started junior high or high school
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

13. Child or teenage member entered college, vocational training, or armed forces
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

14. Parent started school
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

15. Brother or sister moved away from home
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

16. Young adult member entered college, vocational training, or armed forces
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

17. Parent(s) started or changed to a new job
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

18. Family moved to new home
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

19. Unmarried family member became pregnant
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

20. Family member had an abortion
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

21. Birth of a brother or sister
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

22. Unmarried young adult member began having sexual intercourse
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

23. Family went on welfare
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

24. Damage or loss of family property due to fire, burglary, or other disaster
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

25. Brother or sister died
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

26. Parent died
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

27. Close family relative died
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

28. Death of a close friend or family member
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

29. Family member or close family friend attempted or committed suicide
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

30. Family member became seriously ill or injured
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

31. Family member was hospitalized
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

32. Family member became physically disabled or has a long term health problem
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

33. Family member has emotional problems
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

34. Grandparent(s) became seriously ill
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

35. Parent(s) have more responsibility to take care of grandparent(s)
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

36. Family member ran away
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

37. More financial debts due to use of credit cards or charges
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

38. Increased family living expenses for medical care, food, clothing, energy cost (gasoline, heating)
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

39. Increase in parent's time away from family
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

40. Young adult member resists doing things with family
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

41. Increase in arguments between parents
    - □YES, Happened to me personally
    - □YES, Happened to another family member
    - □ NO, Did not happen in my family

42. Teens/young adults have more arguments with one another
□YES, Happened to me personally
□YES, Happened to another family member
□ NO, Did not happen in my family

43. Parent(s) and young adult(s) have increased arguments (hassles) over personal appearance (clothes, hair, etc.)
□YES, Happened to me personally
□YES, Happened to another family member
□ NO, Did not happen in my family

44. Increased arguments about getting the jobs done at home
□YES, Happened to me personally
□YES, Happened to another family member
□ NO, Did not happen in my family

45. Family member uses drugs (not given by doctor)
□YES, Happened to me personally
□YES, Happened to another family member
□ NO, Did not happen in my family

46. Family member drinks too much alcohol
□YES, Happened to me personally
□YES, Happened to another family member
□ NO, Did not happen in my family

47. Teen/young adult was suspended from or dropped out of school
□YES, Happened to me personally
□YES, Happened to another family member
□ NO, Did not happen in my family

48. Parent(s) and young adults have increased arguments (hassles) over use of cigarettes, alcohol, or drugs
□YES, Happened to me personally
□YES, Happened to another family member
□ NO, Did not happen in my family

49. Family member went to jail, juvenile detention, or was placed on court probation
□YES, Happened to me personally
□YES, Happened to another family member
□ NO, Did not happen in my family

50. Family member was robbed or attacked (physically or sexually)
□YES, Happened to me personally
□YES, Happened to another family member
□ NO, Did not happen in my family

This section of the survey asks about college changes.

Did this happen in your family in the last six months? Select Yes or No.

51. Felt pressure to get good grades
□ Yes □ No
52. Had difficulty getting needed information and help from your college advisor
□ Yes □ No
53. Had difficulty finding a college counselor for your personal needs (e.g., academic, career, emotional, etc.)
□ Yes □ No
54. Had difficulty getting the help you needed from a college counselor
□ Yes □ No
55. Felt pressure to make a career choice
□ Yes □ No
56. Felt pressure from your parents to make a career choice
□ Yes □ No
57. Felt pressure from your parents to succeed in college
□ Yes □ No
58. Been unable to find a quiet place to study
□ Yes □ No
59. Been unable to use the library to study
□ Yes □ No
60. Been unable to use the athletic and recreational facilities when you wanted to
□ Yes □ No
61. Felt financial pressures regarding how to pay for tuition, books, etc.
□ Yes □ No
62. Had conflict or hassles with your roommate(s)
□ Yes □ No
63. Felt the need to have more privacy
□ Yes □ No
64. Felt uncertainty regarding how to act as a college student in social settings
□ Yes □ No
65. Had difficulty making friends with on-campus students
□ Yes □ No
66. Had difficulty making friends with commuting students
□ Yes □ No
67. Had difficulty making friends with students living in apartments
□ Yes □ No
68. Felt lonely because you missed your family
□ Yes □ No
69. Felt conflict between time to study and time to make friends and party
□ Yes □ No
70. Worried about driving to class in bad weather
□ Yes □ No

71. Worried about finding a place to park at school
□ Yes □ No
72. Felt isolated from the college community
□ Yes □ No
73. Felt your being in college has placed added strain on your family
□ Yes □ No
74. Had difficulty participating in social activities held at the college during evening hours or on weekends
□ Yes □ No
75. Felt strain from missing contact with your high school friends
□ Yes □ No
76. Been unable to study when you wanted to for as long as you wanted to
□ Yes □ No
77. Felt pressure to drink when you didn't want to
□ Yes □ No
78. Felt pressure to use non-prescription drugs when you didn't want to
□ Yes □ No
79. Worried about being sexually active
□ Yes □ No
80. Worried about how sexually active to be
□ Yes □ No
81. Felt confused about your priorities, values, beliefs
□ Yes □ No

This section of the survey asks about your cultural/ethnic identity.

Select the number between 1 and 5 that best applies to you.

82. I speak Spanish

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

83. I speak English

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

84. I enjoy speaking Spanish

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

85. I associate with Anglos

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

86. I associate with people of my country of cultural origin.

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

87. I enjoy listening to Spanish language music

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

88. I enjoy listening to English Language music

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

89. I enjoy Spanish Language TV

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

90. I enjoy English Language TV

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

91. I enjoy English Language movies

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

92. I enjoy Spanish Language movies

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

93. I enjoy reading (e.g., books in Spanish)

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

94. I enjoy reading (e.g., books in English)

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

95. I write (e.g., letters in Spanish)

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

96. I write (e.g., letters in English)

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

97. My thinking is done in the English Language

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

98. My thinking is done in the Spanish Language

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

99. My contact with people of my country of cultural origin has been

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

100. My contact with the USA has been

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

101. My father identifies or identified himself as a member of his country of cultural origin.

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

102. My mother identifies or identified herself as a member of her country of cultural origin.

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

103. My friends, while I was growing up, were of the country of my cultural origin.

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

104. My friends, while I was growing up, were of Anglo origin

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

105. My family cooks foods of the country of my cultural origin.

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

106. My friends now are of Anglo origin

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

107. My friends now are of the country of my cultural origin

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

108. I like to identify myself as an Anglo American

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

109. I like to identify myself as an American and a member of the country of my cultural origin.

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

110. I like to identify myself as a member of the country of my cultural origin.

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

111. I like to identify myself as an American

1	2	3	4	5
Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always

This section asks questions about the science courses you are taking this semester. Using the scale from 1 (not confident at all) to 6 (completely confident), answer the questions below.

112. How confident are you that you will pass science class at the end of the semester?

1	2	3	4	5	6
Not confident at all					Completely confident

113. How confident are you that you will pass science class at the end of the semester with a grade better than a D?

1	2	3	4	5	6
Not confident at all					Completely confident

114. How confident are you that you will get a grade better than a C?

1	2	3	4	5	6
Not confident at all					Completely confident

115. How confident are you that you will get a grade better than a B?

1	2	3	4	5	6
Not confident at all					Completely confident

116. How confident are you that you will get an A?

1	2	3	4	5	6
Not confident at all					Completely confident

117. How determined are you to remain in your major and graduate?

1	2	3	4	5	6
Not confident at all					Completely confident

118. How important is graduating with a science degree to accomplishing your preferred life goals?

1	2	3	4	5	6
Not confident at all					Completely confident

Please answer the following demographic questions:

119. Your gender
□Male □Female

120. Age in years: _____

121. Marital Status:
□ Single, Never Married
□ Married
□ Separated
□ Divorced
□ Widowed

122. What is your religious preference?
□ Protestant Christian
□ Roman Catholic
□ Evangelical Christian
□ Jewish
□ Muslim
□ Hindu
□ Buddhist
□ Other
□ None

123. What is the highest level of education your mother has completed?
□ Less than High School
□ High School/GED
□ Some College
□ 2-Year College Degree (Associates)
□ 4-Year College Degree (BA, BS)
□ Master's Degree
□ Doctoral Degree
□ Professional Degree (MD, JD)

124. What is the highest level of education your mother has completed?
□ Less than High School
□ High School/GED
□ Some College
□ 2-Year College Degree (Associates)
□ 4-Tear College Degree (BA, BS)
□ Master's Degree
□ Doctoral Degree
□ Professional Degree (MD, JD)

125. Select the generation that best applies to <u>you.</u> Select only one.

□ 1st generation = You were born in another country.

□ 2nd generation = You were born in USA; either parent born in another country.

□ 3rd generation = You were born in USA, both parents born in USA and all grandparents born in another country.

□ 4th generation = You and your parents born in USA and at least one grandparent born in another country with remainder born in the USA.

□ 5th generation = You and your parents born in the USA and all grandparents born in the USA.

126. What was your High School Grade Point Average?

_____

127. What was your SAT Composite score (if you took the SAT)?

_____

128. What was your SAT Math Score (if you took the SAT)??

_____

129. What was your ACT Composite score (if you took ACT)?

_____

130. What your ACT Math score (if you took the ACT)?

_____

131. What was the highest math course you took in High School?

□ Algebra I
□ Algebra II
□ Pre-Calculus
□ Calculus

132. You may be asked to participate in a focus group interview at the end of you spring semester. Would you be willing to discuss this survey in an interview with 5-12 other students?

□ Yes □ No

133. You may be asked to complete a short exit survey at the end of spring semester. Your responses to both surveys will be kept strictly confidential. In order to match your responses, your student ID number (A number) is required.

Please provide your student ID ("A") number:

A_____

134. If you are willing to participate in a focus group which will be conducted in July or August of 2012, please provide your name, phone number, and email address:

Name: _____

Phone: _____

Email: _____

You are done. Thank you very much for completing the survey! You have been entered into a random drawing to possibly win one of 3 Barnes and Noble Gift Certificates valued at 100, 50, and 25 dollars.

If you have any comments, questions, or concerns please type them below:

_____

You may now log out.

APPENDIX D
Focus Group Interview Glossary

Focus Group Interview Glossary

This study is about trying to identify predictors of first year science success among Latino science students.

Stress

Stress for this discussion is defined as the psychological and physiological response to life stressors and strains in the 6 months prior to enrolling in the fall 2011 semester. Stressors and strains are life events such as: arguments with family members, a death in the family, pressure to succeed in college, financial aid hassles, etc.

Acculturation

Acculturation is a measure of the psychological, behavioral, and attitudinal changes that occur when individuals or groups from different cultures come into continuous contact. Everyone in this study indicated that they, his or her parents, or grandparents emigrated from a Spanish speaking country. Acculturation is a measure of how well you fit in to the Anglo culture of the United States and how well you fit in to the culture of your country of origin.

Science Self-Efficacy

Science Self-efficacy is defined as a self-evaluation of one's competence to successfully execute a course of action necessary to reach desired outcomes. For this study it is your confidence prior to the fall 2011 semester that you would succeed in your college science courses. For example: That you would pass, make an A, B, C, or D.

Note*

This research covers the time period before you first attended this university until the end of the Spring 2012 semester. It does not include work you did since then, prior work, or work at any other college or university.

APPENDIX E
Focus Group Interview Transcript

FOCUS GROUP INTERVIEW TRANSCRIPT

Place: The University

Date: June 19, 2012

Participants: Seven Latino study participants that have completed their first year of science at The University.

Researcher	Respondents
Today is June 19th and I am conducting a focus group interview with some students that have completed their first year of college. As you all know I am Mark McNamara. I am an instructor here and I am pursuing a doctoral degree. The purpose of this focus group is for you to provide information on the questions I will be asking you. They are very broad questions. There are no right or wrong answers. Feel free to express yourself. You are all individuals and your experiences and thoughts may vary. I want to know your thoughts. The first question I would like for you to think about is stress. Think back to any stressful events you may have experienced in the 6 months before you came to college in fall 2011. So just reflect for a minute and think about any stress you may have had before you came to college in fall 2011. OK, *Tell me about the affect of stress prior to your first year of college on your success in the first year of science.*	
	I had to have a surgery towards the end of my senior year and it kept me out of school for a month and a half and so I didn't pass the AP exams that I was expecting to pass and I missed a lot of deadlines to submit scholarships and I'm here just basically on scholarships because I have an older brother and sister that are going to college too and it gets financially burdening. For a while I thought that I was going to have to stay home but it ended up that some big

	scholarships came through and so I was able to come here after all.
Yeah, that's a lot of stress. OK.	
	Yeah, mine was actually really similar. I had to go to [large out of state research hospital] at the end of my senior year to try to get diagnosed and in doing that it was a really big financial stress on our family in general and we didn't qualify for financial aid at first and then finally this big scholarship kicked in and then we got help from other local scholarships, so that was like a really big stress on our family.
Interesting. How about you? There is no right or wrong answer. These two obviously had a lot of stress, but you may not have had stress so you might feel like, whoa! This is not a contest, so I just want you all to know that.	
	Uh for me there wasn't much stress. The only thing was I guess a lot of my cousins would tell me that I didn't need to go to college and my mom was kind of pushing to go to college. Because they were all doing real good in the refineries. So that was pretty much the only thing. I had a lot of arguments with them. That's all. Other than that I didn't really worry about anything.
Is it arguments over values, like hey dude you don't need to go to college. College is for, like, smart people or whatever. Was it like that?	
	No, it was more like they were making over 100,000 in the refineries right now and they didn't go to college so they see it as college is pointless.
OK, that is interesting because I was a refinery operator right before I came back to college to get my master's and now I am getting my doctorate, and so I can really relate to that. Yeah, you make a lot of money and I took a huge pay cut to come here but I think it is a more fulfilling life.	

	I guess for me it would have to be like I wasn't living with anybody. At the time uh I don't know if I got kicked out of my mom's house or if I like left but I wasn't living with her or my aunt anymore so I ended up living with my best friend. I stayed at his house like after graduation and I wasn't sure if I was going to come to college because I didn't have the financial, like money for it so in the end I like at the very start of summer I found a job and I started working and that's how I got here. I asked my friends to bring me.
	My real stress was just you know finishing up your senior year. I didn't take like any classes off. I still went to school full time and I was into decathlon and theater and that was- school was my biggest stress and then there's the financial burden because my brother is in college as well and so like applying for financial aid, like my parents make money, but they make enough money to where you won't get that much financial aid, but college is still really expensive and you can't afford it, but like the government says we make enough money already, but we don't.
Yes.	
	So that was a big stress but um the Texas Grants and stuff oh my God, Beautiful! Beautiful! I would not be here if I did not have like the grants from stuff.
Really?	
	So that, financial, I guess was the only burden really.
Interesting. Is everybody on some form of financial aid? Yes? No?	
	[Everyone nods yes]
Every single person, Wow! Cool! That's good to know that that's helping.	
	My stress I think was, um, being the first one to go to college in my family because my parents didn't, you know, finish high school. Um, I think just like trying to figure out like where do you apply to get

	money because I mean we are like a low income family, so just trying to figure out how to pay for school and where to apply and since I am the first one and I have a smaller sister and a smaller brother then I am trying to guide them in the right direction when they are coming to college. I think just financially, was the hard most stressful, but other than that I think I am always on time to submit applications and so I am always trying to look for ways to help pay for school.
You feel a lot of pressure from that? Like from your family wanting to make sure you don't…	
	Um…
burden them I guess?	
	Uh yeah there is a little pressure just because also my Mom doesn't speak English, so I have to do everything on my own. I am my own parent so I have to figure out, where do I apply, where do I look for scholarships and she can't really help me much, so she doesn't know like how it works. So…
Yeah that's… I saw on the university website. I happened to be on the student affairs page and there was one document that I have ever seen on the whole website of The University that you could click it and it was in Spanish but it was like a "dear parents" you know… But it was the only thing I have ever seen in Spanish on the whole web site.	
	Umm mine was like the pressure from my parents because my Mom has her MBA and she wants to go back for her doctorate and my Dad is about to go for his master's too and they were the first ones that ever went to college in my family so they took all the grants and they have a lot of loans that they have to pay off so that was another thing, you know, I was really worried about. Plus I didn't do good on my SAT's so I didn't qualify for enough because apparently they do make a lot and

	they could contribute but in reality they are still paying off their loans. So again was financial.
Alright, wow that was a lot of information. I like that. Ok, so I have a specific question. This actually a yes or no question. So you have all had some stress is sounds like. *Did stress prior to college affect your GPA at the end of the spring 2012 semester?*	
	No
	No
	Yes
	Yes
	No
	No
	Yes
OK	
A similar question. It is a yes/no question. *Did stress prior to college,* so think back before college, *affect your total number of hours earned at The University at the end of the spring semester.* Think about that for a second.	
	Like you are asking if the same stress before we started college affected us at the end of this last semester we took?
Basically this study is looking at fall and spring just at this university. Does that make sense?	
	So if our like prior to college stresses affected us during the semester?
Right. Did that affect the total number of hours you earned in fall and spring? So in other words, you know, if you had a lot of stress, you might have taken fewer hours to begin with or you might have dropped a class or, you know, in spring you might have taken fewer hours, maybe based on those stresses. So that is kind of where we are going with that.	
	No
	No
	Yes
	No
	No

	No
	No
OK. Easy questions.	
Did stress prior to college affect your intention to remain as a science major at the end of the spring semester? I guess I should ask you first, if you are all science majors still or has anybody changed to a different major? Everybody is a science major?	
	[Everyone nods in agreement or says yes]
OK	
So did that stress prior to college in family or personal life, did that affect your intention to remain as a science major at the university at the end of the spring semester?	
	No
	Yes, it made me become a science major.
It made you become a science major?	
	It motivated me to stay a science major.
OK	
	No
	I am going to say yeah.
	No
	No
	No
Great! OK. Last question, *what else can you tell me about the affect of stress prior to your first year of college on your success in science?* This is the last question about stress. You guys can talk about it amongst yourselves whatever, you know, whatever you want to do.	
	I don't know, the stress prior to college didn't really affect my first year at all after like my first semester. That's when the real stress came in. Prior to college nothing was that bad.
So is prior to college kind of like a carefree time, like hey you know, high school senior, relaxed…	
	Yeah, comparing college and high school, that [High school] is easy, it is simple and

	then you have that summer after high school, your last senior summer or whatever, and you are just like la, de, da, de, da, de, da… Everything's wonderful and then you go to college and its like OH!
Researcher nodding, this [college] is hard… [Laughing]	
	This really hard!
	See that transition it didn't happen for me, and our AP classes they, our teachers at my high school, expected so much from us right off the bat, that I, kind of like coming out of my surgery I was expected to catch up, and like, do all the work I missed out on. Teachers would actually go to my house and, like, give me exams there. Like, you know, and just so that I could catch up on stuff and, um, when I first went into a college class it didn't seem any different. It seemed like I still had to stay on my toes and take notes and know that if I had any questions if I didn't ask then there was a good chance it wasn't going to get answered.
	Mine were like the same. Like going through all that, like it… I'm kind of glad I went through it all my life being, like, going in and out of hospitals. Like, it really made me a harder worker. When I came to college my first fall I was kind of used to, you know, being home bound and having teachers- learning things on my own. So it really wasn't that big of a deal. The kind of stress prior was actually better for me for college, because it helped me learn.
Interesting.	
	[Barely audible affirmations from other students]
	It, yeah, I know exactly what you mean.
So in other words you had so much stress that it made you maybe more serious about college even?	
	It made me manage my time better, it made me learn how to handle my stress, it taught

	me some things like how to teach myself from a book because I had to do that I high school a lot, like, the teachers would just come to my house and be, like, here's your exam, its over chapter duh, duh, duh and I was, like, OK? So I had to reteach myself and that helped me for college a lot.
	Except one thing that I would say is, that I felt I was going so fast paced that I knew that I was looking forward to that end day. You know, when I could just, like, know that it was over and I was like, burnt out, and I knew I was going to be burnt out and I am not even kidding, I slept 2 days straight after the last day of school and actually did that again at the end of the fall and spring semesters of college.
I bet the same thing will happen when you all graduate from college, it will be, like, whew! I know the same thing is going to happen when I finish my doctorate that's for sure.	
	[Laughter]
You had something you wanted to say?	
	My high school was easy. Like the only class was the AP English which they actually expected a lot citation-wise and stuff, but I feel like my personal stuff from home actually helped me to get ready for college not in the sense of studying and stuff because I had to do that- I had to pick that up as I went into college, but more for like the stress as far as it made me not want to give up in college and stuff like that which is why I stayed a science major.
Cool. That's interesting. Anybody else? Anything to add? OK, um...OK- Does anybody need to pause for pizza or to grab a drink? Alright so the next questions are very similar questions except they are about acculturation, so grab the handout and read again, what acculturation means, because I know some of you may have never heard that term. So think about for a moment, your own	

level of acculturation, in other words how do you fit in to America, South Texas, the university, whatever… Ok, I am going to switch it up we will start on this side of the table. Just *tell me about the affect of acculturation on your success in the first year of science?*	
	I feel like it didn't affect me because honestly I have lost a lot of my Spanish culture ever since I was little when I started going to elementary school and stuff like that. Because I wasn't around people that were speaking Spanish as much so I lost a lot of what I knew because of that- because of public school.
Hmm. Is that a good thing or a bad thing?	
	It's a bad thing in a way though because if I go to where my dad is from, Laredo, I don't know anything that they're saying. I feel so weird and I feel like I don't fit there with that family because they don't speak as much English as I do.
Interesting. Hmm. [Researcher calls next student by name]	
	Um, well I speak both fluently English and Spanish so I don't know if it affects me but, um, just there are sometimes things where I want to know. I wish, if my Mom spoke English then she could maybe help me in a way of like, OK do this or do that with school, but since she doesn't, I have to do everything on my own and I do speak English and Spanish so I think it's a plus on both sides. It doesn't really affect me. It seems speaking Spanish fluently helps me I think. There are some words in English that sometimes I don't understand but they are similar to Spanish words so it does help me.
There are a lot of medical words; I know you are planning on a medical career. A lot of medical words, the Spanish word makes perfect sense, like, it is the same word. That is interesting to me. But do you think- I know my Mom helped me a lot	

with the navigation and just encouragement. I was also first generation and she'd never been to college but you know she would handle some of the, like, paperwork type stuff. Just trying to understand college and the process. Do you think you may have suffered a little bit because of the language issue?	
	I think I have suffered just because I am learning to have to do everything on my own and it is hard when your parent doesn't know what you are doing and… but she does care she is always telling me go through school and graduate college, but she doesn't know… she pushes me and she has my back for everything but she doesn't know where she can, like, push me more towards or, like, help me more because she doesn't know how this works at all.
Well of course all of our documents and everything are in English so I understand that.	
	It has affected me kind of because, like, out of my family only my cousins that were born here ever…I think they went to college because they went to military and stuff so I assume they went afterwards and my father went back at the age of 45 to get his degree in, um, theology so like it motivated me that, like, all my family in Mexico and all my cousins here that I guess didn't take advantage of America or whatever, like their lives just aren't what I want. It motivated me, like, I am going to be a marine biologist, I am going to be scientist, I am not going to be like my cousins and just stay in the *barrio* [spoken with Spanish accent and emphasis], and do nothing with my life. Like, because I am fluent in Spanish and in English I think it gives me a leg up on the competition. I am bilingual.
Yeah it does I think.	
	I live in the U.S.- I speak two languages. Like, Anglos, I guess, usually only speak one so I kind of have a leg up I guess, so it

	motivated me, but I think I fit in rather well because, you know, going through public school, you just, it Americanizes you, you know, you just, everyone, your teachers speak English, your friends speak English, every show you watch is like the Fairly Odd parents, like, just English! Just normal things, and then you have your family that does all the Spanish stuff, watches the novelas the, like, Spanish soap operas, and so, like, I think I fit in, but then there's little cases where I realize that to other people I am not because I went down here to, like, a study abroad program to talk with one of the ladies with my friend, [Friend X]. Friend X is ridiculously white [laughter], you all know Friend X, she's ridiculously white, so I went with her and we were talking to the lady about financial aid and she was, like, yes, and she's talking to Friend X, and she says I know these trips are not within *your* means and she pointed at me. She was really nice, she wasn't rude about, she was just older, nice old white lady. She's like I know it's out of your means, but she [Friend X] can do this and we have cheaper stuff for you to do and I was just, like, excuse me…? I have brown hair and brown eyes that does not mean it is outside my means. I have been to Europe, six different countries, I am going to New York this Christmas, I have means, [Chuckling]. It's stupid.
Wow.	
	So I think I fit in but then I realize to other people I don't fit in as much as I think I do because to them I still stick out when to me I don't, I guess.
That's a pretty cool story. It's interesting.	
	Yeah.
	I don't think its affected me in any way, because when I was growing up I kind of learned Spanish but then I lost it, but I am still able to understand it so its funny when people get with me and they are talking Spanish and they think I don't know it, and

	I am just, like, whatever…but I don't think its affected me.
OK.	
	I'm like him/her, but the only difference is I didn't grow up speaking Spanish at all. The only time I learned Spanish, was in Spanish class and that's completely different from the Spanish that my parents or my grandparents speak so can't really use it around them.
	[Lots of laughter]
They will laugh at you or what? [Chuckling]	
	Well there's a lot of different words that they use and its completely different than what I learned, so.
I see. OK.	
	I don't think it has affected me at all really. I don't know Spanish or anything. I mean I can understand it, but I can't speak it and, I mean, I do feel a little… One of my friends [Friend Y], she goes here and she's from [small border town in the Rio Grande Valley of Texas], and she's coming to visit, to stay with me, and hang out and like when I talk with her and stuff there's some times when I am, like, OK stop talking I don't understand what you just said because the accent is so thick or she will say something and, like, half her sentence will be Spanish and half her sentence will be English and I am, like, girl you've got to repeat yourself. I don't even know what you're saying to me. I, we, are from the same culture and everything, so sometimes it's a little weird, you know?
Right.	
	Because, like, I probably should be more like that but I am not, but like school-wise I don't think I has really affected me, but socially kind of, I guess.
OK.	
	Academically, I don't think it affected me much, but socially I know it did. I grew up speaking Spanish and English at the same time because I would just speak Spanish

	with my Grandma and English with my Mom and Dad and they also spoke Spanish when they didn't want us to know what they were talking about, but they didn't know that, I was talking with my grandma.
	[Lots of laughter and apparent ability to relate]
	So like I came over here, I guess we use a lot of Spanish words even when we are talking English, like, words you don't think twice about being in Spanish like chorizo or tacos [spoken with Spanish accent] or I say [says the Spanish name of her hometown along the Rio Grande border with Spanish accent and correct pronunciation] and everyone says it [in the Anglicized pronunciation] and I, like, noticed since I was here I started, like, "whitening up" the way I spoke…
	[lots of laughter]
	because one time I met some people and they were having a taco Friday and I was helping a girl cook and I said, hey do you want me to pass you the tortillas [spoken with Spanish accent and pronunciation] and she was, like, the what? And so I said the tortillas [with an extreme Anglo accent and pronunciation] and she said oh yeah that would be great…
	[Laughter]
	I, like, I go home and I am saying things like hey mom, where are the tortillas [with a Anglo accent and pronunciation] and she is like, why are you talking like that? But it kind of just happens to be like that socially and sometimes I feel kind of, like, I stop in my sentences when I know the person that I am talking to is, like, really white and won't know what word I am going to say, so I try to think like, how do I say this to where she's going to be able to understand, but yeah that's just like basically the challenge it gave me, but not academically it didn't affect me.
That's pretty interesting.	
	[Laughter and lots of simultaneous side

	comments]
Can everybody relate to that, do you have to speak like two different Englishes?	
	Yeah I have to "white up" everything, like I try to say everything, like my last name the way it is supposed to be said, it comes out completely different. Because like it's [Says her last name with Spanish accent and pronunciation] you know [says her last name in Anglicized form]. But like every time I say, like, what's you name [Says first and last name correctly] they look at me like [confused expression] what…? And I am just, like, [says her last name in extreme Anglicized form] and they are like, oh I get it… and I am just like you are stupid [joking tone].
	[Everyone laughs]
	But it happens all the time, you try to say things like they are supposed to be spoken and then they look at you like, who are you? What? What did you say? And you have to, like, change the way you say things to make people, like, understand.
	[Whispers of agreement]
That's so interesting that you say that because I remember in lab one time, I was at Texas A&M main campus as a freshman and in the lab someone asked me, where are you from? I must have said something with a little bit of Spanish accent or something and they thought, what's wrong with you white boy? Interesting.	
	[whispers]
Ok, any more thoughts on that before we move on? Very cool, Ok so again we are back to Yes/No questions. The first one. *Did your level of acculturation affect your GPA at the end of the Spring 2012 semester?*	
	No
	No
	No
	No
	No
	No

	No
OK. Very good. *Did your level of acculturation affect your total number of hours earned at The University at the end of the spring semester?*	
	No
	No
	No
	No
	No
	No
	No
Another Yes/No question, *did your level of acculturation affect your intention to remain as a science major at the end of the spring semester?* Think about that for a second. Ready?	
	No, it didn't.
	No
	Yes
	No
	Yes
	No
	No
OK, I am going to pick on the yes's- might I ask why?	
	For me it was still that motivation from, like, my background, like, my Spanish side, I wanted to achieve more I guess, I don't know, just to do it, just I don't want to be like them and it also because I was brought up, you know with like Hispanic, well Mexican we live in Mexico, well like Mexican, that stubbornness or whatever, OK, after [Professor X] I was seriously, like maybe I shouldn't be a scientist, maybe its not for me, maybe I should change. I talked to the counselors and everything and I am not a big racist or anything, but they are all pretty much white and talked to them and they were, like, well if you are not doing well you should change, you should do this, blah, blah,

	blah, and maybe it is the best for you, and then I would go talk to my parents and they are, like, if you want to do it, go and do it [firm emphatic voice]. Like, if that's what you want it doesn't matter what [Professor X] says, it doesn't matter if you get a D or whatever, just retake the course, get a better grade, like, just do it, like don't take no for an answer, if that's what you want. And, like, that I was brought up with that attitude [emphatic] that stubbornness, that Mexican stubbornness, where you're right and that's it. So that really affected me, because I was, like, oh this isn't' for you, I was having like an academic crisis where I didn't know what I wanted to do with my career. And I was like NO, I want to do science, screw that class [emphatic]. I will do, I will be better, I will make it work. I don't care if Professor X says I shouldn't be in science, I'm going to do it because I want to be in science.
Do you think it is specifically because [Professor X] is an Anglo? I mean do you think that in some ways it's like that, that makes a difference?	
	That [Professor X] is an Anglo? No, I just thought [Professor X] was just a cruel little [person]. [Laughter] It didn't really matter that [he/she] was Anglo.
Did you say cool or cruel?	
	Cruel, cruel.
	[Laughter]
OK. I had to clarify that.	
	No, it didn't matter to me that [he/she] was Anglo, um…
Well, the reason I bring that up is because most college science professors and most scientists in North America are white, and in fact they are male, they are usually male and white.	
	That also did motivate me and was like, I'm Hispanic, I'm a woman, I am going to be a scientist, I'm special [partly emphatic tone and partly joking]. [Laughter] I don't know? I want to do that since- I want to

	open this field up for not only women, like more women, I think women should be scientists you know, we're smart.
Uh Huh.	
	And then just more Hispanic people- a lot of people just don't go to college, don't achieve what they can.
	I want to do that, I want to break up the stereotype of white males dominating science.
Very cool.	
	Uh, my reason, I grew up in [Large border city and surrounding area in the Rio Grande Valley of Texas], all my relatives they are all Hispanic, Mexican, whatever you want to say. Uh, but they are all, like, sick and stuff. They always get sick, like I've had a lot of members die of cancer, a lot, like, all through my Mom's side they all had breast cancer or some form of cancer, and, uh, I just wanted to do that, like, I wanted to stay in the science community be either a synthetic chemist, make medicines or become a doctor. That's what I originally wanted to do, but I haven't really changed my major as far as that I'm going to keep going. That's what I want to do. I want to say it's all because of my family, that's pretty much my motivation.
So your quote, "Mexican-ness", kind of, did effect your staying in this field because you feel like you've got something to prove maybe… or…I don't want to put words in your mouth, but…?	
	It's just something I want to help with like as far as…every time I tell my family about what I want to be, or what I want to do, or why I came to college, they are just like… they are just, oh I support you that much and it just kind of feels good for them to actually count on me to actually succeed in something.
	Especially when you are, like do you have any little anything? [referring to younger siblings]

	Yeah, I have sisters.
	Its just, like, yeah, my little cousins I want to be, like, come on you can do it too, like you don't have to be like your mom or your dad or our uncles or whatever, and, like, I want to be an example of, like, it was hard and we didn't have any money, but I did it, I have my degree and I'm doing wonderful things with my life. I want to just be, like, see I did it, you can do it too. Like, you just got to stick with it.
	Yeah one of my sisters, she's a junior now and I'm pretty much the first one to go to college other than my other cousin that graduated with me and went to UT. Both us two were the only ones that went to college out of the other four cousins that graduated with us and uh me and her we are pretty much wanting to show… She wants to show her little brother something and I want to show my little sisters something, and my little sister is going to graduate in, like, two years, hopefully in the top of her class, top three, and I'm going to be super proud of her and I told her not do way worse than I did. I want her to succeed.
Interesting. I know that in Latino culture, a lot of times there is a lot of focus on family and things like that. I see a lot of heads nodding in agreement. Has that ever affected, you know, any of these things- your success in college- the fact that you have a lot of family obligations?	
	Yes
	Definitely.
	Um, Yeah, I think its because usually… because from my experience, you grow up like… they needed our grandma to take care of us or our aunts and they would all kind of, like, raise us together. When my parents divorced, we moved into my grandma's house and two of our other aunts moved in also and they helped raise us, so you know…my dad was still there, but they just thought, like, my mom needed

	the help and, um, their support just constantly, like I am not kidding when I say my Grandma was my best friend and her opinion matters the most to me and she constantly tries to support me any way possible, emotionally financially, she's always there. She wants me to, like, really succeed because my older sister and my older brother they are still in college but, like, they have made their share of mistakes and being the third born I have been able to learn from them and not make the same ones so it automatically places me as a favorite right now [grins].
	[Supportive laughter].
	So my grandma just kind of sees me as the one that's being able to succeed right now, and she just has always been there to love me when I'm, like, in my lowest places, you know, and when I want to quit. I don't know how many times I called her this year… After coming out of one of Professor X's exams and like [crying voice] Grandma I don't want to be here anymore and she's, like, yes, you have to stay there or else you are not going to get to do what you want to do and so she's a big reason why I'm here.
Cool.	
	Family definitely, like my mom does hair and she loves telling her customers that my daughter is in college and she's a marine biologist, and my son's getting his degree in business, like, and then like when I go, or when I used to visit my family in Mexico, not now because everybody's killing everyone [referring to violence among Mexican drug cartels]…
	[lots of laughter]
	which sucks.
	[Laughter]
Ha ha, there is that.	
	So everyone's killing everyone so, uh, not going over there, but, um, when we used to go over there my mom was so proud, talking, she will talk on the phone, "[my

	daughter] is doing great in college and she's going to get that degree, blah, blah, blah, blah, blah", and just, like, the feeling the overwhelming feeling of pride your family has in you doing something with your life. That is such encouragement that they look at you and they feel pride and you are doing the family good, like, you are bettering the name, I guess. Not necessarily in, like, a bad way but they are just so proud that you are excelling and that support just, it's a great push to go even harder and work even better.
That's cool.	
	Cuz, like when I was growing up, I at least lived with my grandparents at least once in my life to recall, because when my parents were so low and like my Grandma's are, like, so proud of me because some of the cousins, there's three other cousins that were born close to me and none of them are in school or actually I am the youngest to be in school right now and all of my other cousin… she has four kids and she's my same age and its like all of them had kids young and I'm the only one that sticks out and everyone's really proud of me and they push me and they're just always there. Like, family is a big thing with me, like, they're my number one because they're always there no matter what.
OK, so you say it was a cousin that has lots of kids, four kids, do you think that is sort of a quote Anglo attitude? Do you think that, that's, I don't know, what you think about that?	
	I just think it's, I don't know because I'm used to it I guess, like all- everyone had their kids young, everyone married young. I just see it as; I don't want to be that way. She didn't even graduate high school and its just more of a motivation to stay in school and not be that other statistic of people getting pregnant this young and...
I guess my question is that like, is having a lot of kids and big family- do you feel like	

that is being more Mexican and you are maybe a little less Mexican in that regard? I don't know if you are Mexican, but I am assuming you are.	
	Yeah, well I see it as, I do want it, but not that young, so I am not saying it's a bad thing, well it is because she's so young, but I'm saying I do want a lot of kids and stuff and a big family, but later in my life.
	I feel like we were kind of influenced like that. Like here like all our friends I remember in high school, well some of them got pregnant, but like it is more of an Anglo attitude to go out and get a career, stabilize your finances and *then* have children, where like all my cousins are my age too, over in Mexico, they are just popping 'em out like crazy.
	[Laughter]
	But that's what they are expected to do, they are expected to get married, have babies, cook and clean and have more babies and then teach their babies to cook and clean so they can have babies, but, like here, you know the attitude is different… I feel like Anglos still kind of have that stereotype towards us that like that intermediate point where we are like trying, I guess, not to be more like our family, like they still see us like that, but to our family we are, well I don't know about ya'll but in my family, I am like the American one where I am in college I'm getting my degree, going to have my career, and then get a husband, and then have children as opposed to, like, getting pregnant, having a husband then never going to school, which is what everyone else does. I feel like that is the American perspective that has influenced my life.
Well, the reason I ask is that's really what acculturation is about, it changes both cultures. In our case Latino culture and Anglo culture are both changing.	
	Like I said, I have four cousins that graduated all in 2011, we are all Mexican,

	and its funny because two of us, me and my cousin, she's a girl went to college. The other two- one stayed home and worked who's looking for a girlfriend, the other one got married, my other cousin he's a guy, he got married and he broke up with her, whatever, and he got with another girl and I guess still looking to get married and have a kid but, whatever… I, on the other hand, went to college and I wouldn't mind having a girl at the same time, whatever, and my cousin [Cousin X] she went to school to be an engineer at UT, but she changed her major to, like, an English major now so it went from, like, the family all supporting her because she wanted to be an engineer to, like, supporting me. I am not going to say they don't support my other two cousins, they do. But just the one got married they are just like not, ok that's what we see in all of our families, you should have went to college or to the army whatever and they don't really support him as for the other one he's looking after his little siblings and for us we kind of went and did what we could to kind of get ourselves out there.
OK cool. *What else can you tell me about the affect of acculturation on your success in the first year of college science?*	
	Nothing beyond motivation.
Yeah we really covered, but I have to ask it.	
All right, the next questions are about science self-efficacy, so review the handout if you want to review the definition of that means. Then think for a moment about your confidence prior to college that you could succeed in college science. So think about that. OK, *tell me about the affect of science self-efficacy on your success in the first year of college science?*	
	I didn't doubt whether I could succeed as a science student just because grades have always been an important thing in my family and my mom's a teacher so she's

	always been there to help me study, write, or anything like that and like I said my courses in high school I feel like really prepared me. I did feel like I was going to come here and still be a straight A student, so the B in Biology was devastating and I probably cried a little bit, or a LOT, but um I have never doubted whether I could pass because I feel like as long as I pay attention and I do what the professor instructs us to do that there's no way we can't pass.
OK.	
	Um, I feel like the same. I mean, I came in thinking I was really prepared from everything. I mean, I felt like stress-wise and school-wise I was really prepared. My high school, well, my high school was a little different from everyone else's because I was little bit more homebound, so I felt prepared for college that way, and then, like, my biggest was math. I was scared coming in. I still haven't taken statistics or calculus because I am still scared to take it, because I am scared I might make a D.
	[supportive laughter]
	But, uh, with my dad he is really good into math he works for [top science organization] so I know he will, like, be my tutor, so I guess I am not, as scared, but I am still, I want to wait till my senior year to take it.
OK. So, if I had said math self-efficacy it might have been different [joking tone]?	
	Yeah, but with science, I am completely fine with that one.
	I have never been worried about school. Came into college confident I could get straight A's. The only problem with me is that I try to go for the bare minimum, see how far I can push it to get the lowest and still get good. So, yeah, I could get straight A's, if I <u>wanted</u> to…
	[Laughter]
	but that would take too much work, too much time out of my day. I got a lot of

	stuff to do.
	[More laughter]
	I do [have a lot of stuff to do].
OK	
	As far as coming to this college I felt like emotionally I was prepared, as far as study prepared I had to pretty much get on that as quickly as I could- pick up the pace, but I felt like I could. I wanted straight A's, Professor X didn't let that happen, that [professor] just, NO, and after that it was just, like, I just kept it like, OK, I can get a C you know, but I wanted to go for at least a B, or be more realistic.
So study skills or do think study habits were, do you think, an issue?	
	A little of both because I know the first semester my friends always wanted to hang out so I was just, like… I wouldn't say no, just go do everything. Make time to study make time for everything that I had to do that day, but then second semester came around and I was just, like, no I am not going to do that again.
	For me it was the opposite.
You were the [person] saying lets go hang out?	
	I was the [person] who studied the first one, and then second semester I completely blew it off.
Oh I see.	
	That messed me up pretty good. Cause I figured I got through the first semester pretty good why can't I get through the second and then it just kind of went down hill.
Hmm.	
	That's why I got a D in chemistry.
It gets harder. It does get harder as you go on, in most cases anyway.	
	Before, prior to my first year of college, I was so confident [emphatic] in my science skills, like, during high school I had not, intentionally, but I looked back my senior year I was like wow, a lot of my electives were science classes. I didn't know that

	when I was taking them. I was just, like, oh this is cool, I got in, this is cool, it turns out all my electives were, like, science classes so that is why I went into science in the first place. I was, like, subconsciously I am in love with science and I have just always been good at science. It was never really a big problem for me, so, and I love reading. I am super nerdy and I like to know how things work and so, like, I had utmost confidence coming into college. School was always my thing. My brother sucked at it. He was one of those lazy people. So I was always good at school, got good grades, was good at science, I had the utmost confidence coming in and then Professor X happened, and I just spiraled downward into my little academic crisis, but prior to Professor X everything was beautiful.
I have to ask the question, umm…because several people have mentioned his/her name. Is that one professor, do you really feel like that really affected your confidence a lot?	
	[Strong reaction, everyone talking at once]
	Yes
	It did.
	He's a good professor.
	It's just…
	[Professor X] is so brilliant, I hold [him/her] in such high regard, because I know [Professor X] knows [his/her] stuff. [Professor X] is great.
	Yeah [Professor X] knows everything about everything when it comes to science. [Professor X] expects ME to know everything about everything my first semester of college, so, like, I thought I was sufficient, I understand the material and how stuff worked and then [Professor X] comes and just takes it to a whole new level and it's, like, I <u>was</u> confident, and then I saw what real confidence is and I just went down the poophole [dejected]. [Lots of laughter]

	There's that thing on Facebook, where it is, like, 1) before college, 2) take Professor X's class, 3) change your major to business.
	[Lots of laughter]
	Fall 2011, science major, take [Professor X's] class, spring 2012, business [major].
	And that's really true. A lot of my friends change.
	Exactly, a lot of them just switched. After professor X they are like I'm not going to do this any more. That's what I was saying. I had that point where I was, like, should I not do it, should I do something else, blah, blah, blah, because it was just a really rude awakening of just how hard all your other classes are going to be and this is just [a freshman science course] and so it was a real wake up call, like, your life is gonna suck for the next, like, 8 years if you are going to get your doctorate or something. Or however long it takes, its gonna suck and so a lot of people switched. Don't know, I guess [professor X] is one of those make it or break it kind of things. Like if you are meant to be in science you will stick with [him/her] and if you are not then [he/she] is glad to kick you on your butt.
	And then when you [take professor Y for another challenging science course in sophomore year] that's another make it or break it. Yeah everybody I talk to, like, older friends, they are, like, yeah, we made it through professor X's classes and then we decided to stick with it and then once we took [professor Y's] classes then like OK, its done. Forget it.
Any other follow-ups to the Professor X issue?	
	I never really doubted that I would do bad I school. I mean I am doing good in school. When I was in high school I made straight A's and I graduated 4th in my class so I never really had that, where won't do good in college. I am always thinking, I am

	going to do good in college and the only thing for me was just being the first one in my family and just going out there and just taking it as it is. I didn't know what to expect. But, I mean, I am making good grades now and always made straight A's.
OK	
	And me, um, I had a high school where I went into the health sciences so I thought college was going to be, oh, its going to prepare you to be a doctor, and this and that, and I was really good at that and they just put me in the field, so I thought I would know everything. Basic [science courses] I thought would be easy and then I came in it was a rude awakening, but I saw it as [Professor X] can't take away what I have been wanting for four years, or where I want to be, because, like, he/she is just one person that's going to tell me I can't do this but I am going to still get through it so I can do what I want to do.
You guys should form a support group.	
	We can make a T-shirt; I survived [Professor X].
	It's funny when I talk to my old friends they are, like, oh what major are you and I am, like, Biomedical science, and they say, oh, [Professor X]. That's all they ever say, like everybody, [Professor X]. And out of all four years of being here like it's the one person it's the one person they, like, remember.
	Exactly, all my friends, upper classmen in the science field, I told them I wanted to be a marine biologist and they said, like, "You are going to have to do [Professor X]". Or, like, "if you can help it avoid these people" and [Professor X] was one of them and you can't avoid him/her.
	[Laughter]
	And you are just like…I heard horror stories about [Professor X] before I ever met him/her because I went to the freshman, like, summer camp thing, before, those counselors had some, much, to say

	about that professor. They told me, like, "[Professor X] is the worst, blah, blah, blah". "If you have [Professor X] you'd better be scared for your first semester, blah, blah, blah". Cause you know they are upper classmen so they tell you which professors are awesome which ones aren't, which ones are hard, which ones are easy, and so [Professor X] was, like, on, like, the most- difficultly level of 1000 on the scale, and then I got here, and realized why.
	On rate my professor, its like one star.
	Yeah.
Anything else before we move on?	
OK, then we get into our yes/no questions, so *did your science self-efficacy*, in other words, the confidence that you could succeed as a science student, *prior to the beginning of the fall 2011 semester*, did that *affect your GPA at the end of the spring semester?*	
	No
	No
	Yes
	Yes
	No
	No
	No
Ok, then we move on to, *did your science self-efficacy prior to the beginning of fall 2011, affect your total number of hours earned, at The University, at the end of the spring semester?*	
	No
	No
	No
	No
	No
	No
	No
Alright. *Did your science self-efficacy prior to the beginning of fall 2011 affect your intention to remain as a science major at the end of the spring semester?*	
	No
	No

	No
	Yes
	No
	Yes
	No
OK, so I am going to go back to GPA. I had two yes's for this question. Would you be able to elaborate?	
	It was me.
	Yeah just because I had that high confidence, like, thinking I was going to be good and then, like, I guess I was too confident in myself so, like, I don't know, I guess that messed with my head a lot and my GPA suffered because I was overly confident.
OK so I can see how that could affect…alright [acknowledging next person speaking by name].	
	Yeah it, pretty much, the same thing, I answered that in the previous questions, I came here thinking I was going to get straight A's just because, so.
So your confidence actually maybe hurt you because maybe you didn't study as much or didn't take it as seriously, or…?	
	Well I never usually need to study, just…
	[Interjecting] Yeah, first semester I kind of took…because I never needed to study either, I just made good grades and I took all AP classes and I just aced them, like, I really didn't have to work so hard for it and so coming into freshman year was just so, like, I have never really had to work so hard, blah, blah, blah, and then my GPA was, like, [whistling in simulation of a bomb falling from sky]. I was just a little overconfident and now having one year under my belt I am more realistic and I understand, like, what my abilities are how to improve them, and, yeah, I kind of screwed up there.
OK and let's see, I had two yes's for did you science self-efficacy prior to the beginning of fall 2011 affect your intention to remain as a science major at the end of	

the spring semester. Who said yes and why?	
	That was me again.
Why did you say yes?	
	Cause the same thing, I was so confident it was kind of of my kryptonite because my GPA suffered because I thought I was a hotshot, but then it was also, like, when I had my little academic crisis, I remembered how confident I was and how much I loved it and how kind of, like, fulfilling, I felt prior to starting school in science, like, this is what I want to do with my life, I am gonna, this is it, I am so confident about it, just remembering how I was back then that was another reason I just stuck with science. I was like that once. I will be that way again. I will, like, surpass the average for, like, science again.
Gotcha.	
	She [last respondent] pretty much covers everything.
	[Laughter]
	I don't like to fail, so if I don't do good in a class, or if it tries to keep me from doing good then I just keep going till I pass it or get a degree. That's how I have always been about everything.
OK, and I had a lot of no's, so I want to pick on the no people a little bit, ok? So why do you think your confidence that you could succeed as a science student- why do you think that that had no affect on your GPA, credit hours earned or whether you remained as a science major?	
	Well, I still earned all the credits I set out to earn. I never questioned whether I could pass the classes just what letter grade. You know when I got a B in [Professor X's] class, I called my mom and I said, "Mom I failed" and she says, "what do you mean you failed?" and I was, like, "I got an 88" and she was, like, "that's passing sweety, you're OK". But that just, I know, like, I have always applied myself to where I could pass the classes, so just my

	confidence level was just, I guess, maybe a little bit under because I could have probably done better in [Professor X's] class but I don't know what I could have done more honestly.
So you did OK? Your grades were OK? Anybody else?	
	For me it was just, like, it didn't affect me because I was always worried about my stress and stuff, back home and other stuff to worry about my actual grade, I just wanted to pass and, uh, I couldn't really talk to anybody back home about it because nobody has gone to college in my family besides me and my cousin. I wasn't going to bother her. It was my- it was like all for me, pretty much whatever I wanted to make out of it could do it.
	Yeah, that's how I was, I would call home crying to my parents, but they didn't really understand what I was going through because they hadn't been to college. I would tell my father, my mom was kind of like what?
All right anybody else want to comment on why they said no? Alright, last question about self-efficacy, *what else can you tell me about the effect of self-efficacy on your success in the first year of science?*	
	I guess for me it helped, because I had standards for myself and I expected myself to live up to them, you know, and from what I hear when you are a science major you have to apply yourself like that or else there's not a way that your going to be able to handle the classes, so I feel like it helped me to finish me first year.
OK. Alright, I want to go back, lets see… I want to go back to stress just for a few seconds. We are almost done so don't panic. I had quite a few yes's to, "did stress prior to college affect your GPA" and I don't know if we covered it. Do you guys care to comment on how you think stress affected your GPA? I think we covered it	

but just want to give you one more chance.	
	Mine was more in fall not really spring because I didn't really know how to manage time, because I was doing two internships and then trying to do [Professor X's] class and so that kind of affected my GPA. I got a C [Professor X's] class, which is why I am retaking it now with [Professor X] which sucks because I have to see [Professor X] in summer.
	[Laughter]
	So, but I did a lot better in spring because I learned how to manage my stress and time better, so I ended up making an A in Spring.
OK, anybody else have anything to throw in…	
	Just for me, it was like finding out my Grandma had cancer. I had just found out so I was, like, it got me pretty hard, I am shaken up right now, uh, it was around the time of finals actually I lost all focus that week and it got me during [Professor X's] exam. It kind of messed up my GPA the most, but other than that it was just like, natural, like, what was I going to do and, like its not, like, something I should be worried about but they are my family and its just my culture. Family is everything, especially to me. I feel like it's everything to me so. It just kind of bothered me.
Yeah there's a famous saying. They say that college is the most selfish time of your life. Do you agree with that?	
	I would have to agree with that.
You, kind of, have to be selfish because you are so busy trying to survive and take all these classes and you are bettering yourself, and it is all about you, you, you.	
	Yeah.
It can be like that sometimes.	
	I guess in the end you can make up for it by like helping whoever you've neglected, financially, or whatever when you are making money but it is pretty selfish.
	You have to, like, not disappoint, but you

	have to put yourself and college ahead of other people, like my sister was, like, she was pregnant and then she had her baby but when she had her baby there was an exam in [Professor X's] class and I was just, like, it was, and I was, like, "I can't go I am sorry, like no I can't". "I have to take this exam". I was, like, sick and the exam [counted a lot] and she had her baby and I was just like, "I can't go down there I can't see you". I can't see my niece, I have to take this exam and I have to pass and I have to boost up my GPA and I have to make sure my grades are high enough so I don't loose my financial aid, like you just have to sacrifice things. She was mad at me for a while because my family went down to visit a second time, and it was another exam in [Professor X's] class [everyone laughs] and so I couldn't go either. So I didn't meet my niece until she was like 8 months old already because of school.
	So, like, you have to sacrifice a lot, I guess. You have to be really selfish.
Yeah, it's tough. Alright, so any other thoughts about that? Ok and again about, stress before coming to college affecting your success, a lot of people answered no, so I just want to follow up on that because I am not sure I did earlier. Any comment on why stress didn't affect your GPA, hours earned or your intention to remain a science major?	
	I didn't have any real stress prior to college it was just financially, like honestly in my family that's always been a burden.
Right	
	Like we've never had a time where we are just like, "yes, we are grade A perfect and we can just spend oodles and oodles of money", like, no, its never been like that. There wasn't a big change just my GPA, my hours that was pretty much all me, not stress, just what I wanted to do.
OK.	

Last question, *is there anything else you would like to share* or talk about? Anything else?	
	I just feel like all of it motivated me. Like the stress, the being Hispanic, self-efficacy, just everything just motivated you.
	I am kind of glad everything happened because everything just motivated me to be better.
Anybody agree or disagree?	
	Yeah.
	Yes.
	I agree.
	I agree.
	[Nods of agreement]
	All that pretty much, like, I guess how you are able to adapt to stress, acculturation, and self-efficacy, or whatever, all that just contributes to your success or your failure and I suppose for all of us it just worked out like we made the most of our stress, like you guys, amazing [motions to those who described hospital stays prior to college] had awful things ands they just beat it. We used our culture to our advantage with two languages. We are going to make more money, we have that attitude, that support system, that pride, self- efficacy, we all believe in ourselves, always have always will. All of that just makes your experience as a science major at least for me, I see heads nodding.
	I want to say yeah, I am, like, what she said is true. Throughout all my life I have always made the most out of what I had and never back down for anything.
	Yeah.
You guys are tough. You are just succeeding. You are just grinding. Alright. Very cool. We are done. This concludes the interview. Thank you very much for helping me out. It was all very helpful. I really appreciate it.	