ABSTRACT

EXAMINING LATINA/O STEM DEGREE ASPIRATIONS

By

Elyzza M. Aparicio

May 2015

This quantitative study examined the Science, Technology, Engineering and Mathematics (STEM) degree aspirations of Latina/o students. Harper's Anti-Deficit Achievement framework on students of color in STEM was utilized to frame this study. Secondary data from the Cooperative Institutional Research Program's (CIRP) Freshman and Your First Year in College surveys were used to complete *t*-tests, correlations, and hierarchical regression analyses to explore gender differences in STEM degree aspirants and habits of the mind among Latinas/os. Findings include probable major in STEM, faculty interaction, highest degree planned, academic self-concept and the habits of the mind CIRP construct were significant predictors of degree aspirations. Habits of the mind at the end of the first year in college were predicted by academic disengagement, positive cross-racial interactions, academic self-concept, and college involvement. Implications for STEM policy, student affairs practice and future research are discussed.

EXAMINING LATINA/O STEM DEGREE ASPIRATIONS

A THESIS

Presented to the Department of Educational Leadership

California State University, Long Beach

In Partial Fulfillment

of the Requirements for the Degree

Master of Science in Counseling

Option in Student Development in Higher Education

Committee Members:

Angela M. Locks, Ph.D. (co-Chair)
Anna M. Ortiz, Ph.D. (co-Chair)
Leticia Oseguera, Ph.D.

College Designee:

Marquita Grenot-Scheyer, Ph.D.

By Elyzza M. Aparicio

B.A., 2006, University of California, San Diego

May 2015

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

ACKNOWLEDGEMENTS

This thesis is dedicated to my parents, Adela and Marco, who have shown me the value of hard work, the importance of familia and that although life has its ups and downs, to keep pushing forward with a smile. Thank you for caring for me during this writing process and for being so critical in providing childcare to your grandchild. Los quiero!

To my sweet husband Michael for dealing with my breakdowns and grumpiness in the most thoughtful way and for being positive when I was lacking in that area. For being okay with me not being home and coming home late because you understood that that was part of the thesis process, my writing process and deadlines. Thank you for being a wonderful husband, best friend, father to Pascal and for not hesitating to sign-up for the next adventure in our life. I love you Flaquito!

Pascal, my baby boy. Thank you for smiles and kisses, and providing me with such great hugs when I most needed it. You will not remember this thesis writing process that I experienced, but I will make sure to let you know how pivotal you were in motivating me.

To my sister Maritza, for your unconditional support throughout this process. Nutella I love you to the moon and back. The many late texts and conversations of life and questioning what we were doing with our lives. For your endless hugs that kept me motivated during this process. Love stinky!

To my family and friends, the Aparicio family and the Dan family, thank you for your support and encouragement, and the various conversations I had with many of you during the writing process, as those things inspired me and motivated me to continue.

A big thank you to Dr. Angela Locks, for challenging me and supporting me through the thesis process. Now that I have gotten through the thesis process I can truly value the significance of you reassuring me when I had my moments of doubts and pushing me even if it made me slightly uncomfortable. To my co-Chair Dr. Anna Ortiz, and Dr. Leticia Oseguera, thank you for your time and critical feedback. It has been a pleasure to work with women who motivate me and who I aspire to be like. To my cohort for being the best group of people that one could wish for (Love you all!). Markeshia and Julio, this thesis process could not have been done without the two of you, thank you! Harvey, Tiffany and David, thank you for always checking in to see how I was doing and encouraging me. Lastly, to the College of Education and the Graduate Research Fellowship for providing encouragement and support for my thesis.

TABLE OF CONTENTS

CHAPTER Page

CHAPTER Page

LIST OF TABLES

TABLE Page

CHAPTER 1

INTRODUCTION

Latinas/os in Higher Education

By the year 2050, the census estimates that there will be 20 million school-aged Latinas/os between the ages of 5 to 17 living in the United States (Chapa & De La Rosa, 2004), with more than half (55%) of the U.S. Latino population residing in California, Texas and Florida (Pew, 2013). Latinas/os are a heterogeneous group that is comprised of individuals from diverse ethnicities that differ in their educational attainment, acculturation, social economic status, and family structure (Pino, Martinez-Ramos, & Smith, 2012). Although the Latina/o population is increasing, overall Latinos are at a competitive disadvantage because of academic readiness for college stemming from high school preparation, high school grade point average (GPA) and college admission test scores (Miller, 2005). In addition, Latinas/os have the highest dropout rates at the high school level (National Center for Education Statistics [NCES], 2010). Such dropout rates are due to the school curriculum generally being designed for White middle-class students and lacking in cultural relevance for Latinas/os (Gonzalez et al., 2005). Despite increases in enrollment rates for Latina/o college students, data shows that they still remain underrepresented at almost every level of the educational pipeline (Solórzano, Villalpando, & Oseguera, 2005). This brings up the need to understand the factors that positively influence the Latina/o academic pathway faced by the Latina/o population.

In post-secondary education, Latinas/os represent a minority majority. Chapa and De La Rosa (2004) mention in their study that even though Latinas/os in higher education have increased, they still account for less than 10% of total enrollments in 2-year and 4-year, and graduate institutions. A strong indicator of social mobility is educational attainment. Unfortunately, 43% of all Latinas/os have less than a high school degree (Chapa & De La Rosa, 2004). Recent research has indicated indicators that positively influence the educational advancement of Latinas/os in higher education including family factors, peer and faculty interactions, and the college involvement (Haro, 2004; Cole & Espinoza, 2008).

Higher education research offers a plethora of literature that focuses on the navigational pathway of Latinos. The research literature has noted that some of the challenges this population of students face, include socioeconomic status and parental education (Cole & Espinoza, 2011; Perna, 2000, 2006), academic preparation (Boden, 2011; Bonous-Hammarth, 2000; Borman & Hansen, 2007; Simpson, 2001; Tyson, Lee, Borman, & Hansen, 2007), family involvement (Gandara, 1994; Gloria & Rodriguez, 2000), faculty and mentor interactions (Cole, 2010; Hernandez, 2000; Hurtado & Carter, 1997; Hurtado et al., 2011) among other challenges. Latina/o graduation rates in both high school and college continue to trail behind the rates of their White counterparts and other minorities (Swail, Cabrera, & Lee, 2004). As the number of Latinas/os attending college has increased progressively over the past recent decades, the Latina and Latino representation continues to decline in in STEM related fields.

Latinas/os in STEM

Science, technology, engineering, and mathematics (STEM) fields have become increasingly central to U.S. economic growth (United States Department of Labor, 2007). As prior research has shown, Latinas/os will continue to be a growing part of the American community but there is very little said about their aspirations and persistence in STEM fields, and they continue to be underrepresented in STEM education and occupations. Although there has been an increase in Latinos' taking part in science related fields, their underrepresentation increases as they move into higher education and careers (Babco, 2001; Lewis et al., 2009). Cole and Espinoza (2008) found that high school GPA played a significant role in positively influencing the college GPA of Latino students' majoring in STEM. There have been studies that have reported that GPA is more of a traditional measure of a student's success and that high school GPA was not related to the transition of Latino students in college (Hernandez & Lopez, 2004; Hurtado, Carter, & Spuler, 1996), but such findings were not centered on findings that were specific to STEM fields.

Latinas in STEM

Various scholars attribute a high attrition of women of color from STEM fields to lack of developing science talent through educational and occupational fields (Carlone & Johnson, 2007; Hanson, 1996, 2006; Ong, 2005). The difference in women's participation in STEM disciplines has received a great deal of attention from higher education scholars who are trying to understand why women do not participate in STEM at the rate their male counterparts do. While there is a decreased participation from both men and women in STEM participation during high school and college, women's

participation decreases at a higher rate (Fouad et al., 2010). Latinas may show interest in a STEM field, but culturally they are not encouraged to proceed in such fields or informed about them because for many Latino families, gender norms are still very present. Latina/o families may or may not encourage their daughters to pursue higher education and it is likely that many Latina/o families believe that STEM fields are largely dominated by men (Flores, 2011). STEM fields have been and continue to be viewed as a male sector of work, where women are not always encouraged to pursue a career. The Department of Commerce, in a recent report, addressed low number of women in the STEM workforce, "Although women fill close to half of all jobs in the U.S. economy, they hold less than 25 percent of STEM jobs. This has been the case throughout the past decade, even as college educated women have increased their share of the overall workforce" (Beede et al., 2011, p. 1). These current realities have a strong link to the women's undergraduate aspirations, experiences, and support at post-secondary institutions.

Latinos in STEM

STEM education has garnered a plethora of scholarly and media attention in recent years as President Obama and organizations such as the Gates Foundation continue to bring attention to the need to better prepare students in STEM related fields. While the need to better prepare students to pursue STEM fields is critical to the U.S. work force, very limited research exists on Latino males and how they are doing in regard to aspirations in STEM majors and persisting in these fields. Various studies have highlighted the importance of STEM fields, and revealed the high attrition rates for students of color. While there is a plethora of literature that focuses on Latinas/os in

higher education and students pursuing STEM fields, few studies focus specifically on the persistence and aspirations of Latino males in science, technology, engineering and mathematics fields.

Habits of Mind

Essential to education is the ability for a student to approach learning from both a practical and critical lens. Habits of mind are learning behaviors that college faculty have identified as essential for success in college level work (Conley, 2005). Incorporating habits of mind into school curriculum can help students develop and master tools that help them better understand subject matter and think critically. Specifically for math, "once this type of thinking is established, students can apply it in the context of geometry, trigonometry, calculus, data and statistics, or other advanced courses" (Achieve, 2008, p. 4). The limited amount of literature on habits of mind and the role it plays for STEM majors in college highlights the importance for more research on the role that habits of mind have on these fields of study.

The literature on this topic is imperative as more and more Latinas/os pursue higher education and with the interest of majoring in a STEM field. Although Latino males enroll in STEM fields at the same rates as their White counterparts, the attrition rates for Latino males is higher than any other underrepresented minority. Looking at those things that affect Latinos positively should be considered when working with this group of students. Gilroy (2012) noted in a report for the Association of Public and Land-Grant Universities (APLU) that for minority males faculty engagement, involvement in undergraduate research, and financial support are key to academic success in STEM disciplines. Exploring the experiences like the formerly mentioned can be

implemented when working with Latino males to focus on the positive aspects that contribute to success in STEM disciplines.

Purpose of Study

The primary purpose of this study was to better understand the gendered experiences of Latina/o undergraduates interested in STEM majors through a longitudinal lens. The proposed study examined factors that are predictive of STEM degree attainment for Latinas/os, and explored strategies, which facilitate the opportunities to succeed in degree completion within these majors.

Research Questions

1. What contributes to degree aspirations of first-year Latinas/os?
2. Are there gender differences in first-year Latinas/os STEM degree aspirants?
3. What are predictors for the CIRP construct *habits of mind* at the end of the first-year for Latinas/os?

Theoretical Framework

Harper's (2010) anti-deficit achievement framework for studying students of color in STEM frames his study to evaluate the three pipeline points for Black males in STEM fields. Harper (2010) has identified three pipeline points (pre-college socialization and readiness, college achievement, and post-college persistence in STEM). Additionally, the framework consists of nine researchable dimensions of achievement (familial factors, K-12 school forces, out-of-school college predatory experiences, classroom interactions, out-of-class engagement, experiential and external opportunities, industry careers, graduate school enrollment, and research careers). A longitudinal examination of pipeline points and the dimensions of achievement will assist with the empowerment and development of students

Definitions

CIRP: The Cooperative Institutional Research Program (CIRP) Freshman and First Year in College surveys are administered annually. Both surveys are administered across the United States at participating institutions. CIRP is a part of the Higher Education Research Institute (HERI) housed at the University of California, Los Angeles, (UCLA; HERI, 2015).

The Freshman Survey (TFS): This survey includes a wide range of characteristics: parental income and education, ethnicity, and other demographic items; financial aid; secondary school achievement and activities; educational and career plans; and values, attitudes, beliefs, and self-concept (HERI, 2010).

Your First College Year (YFCY): This survey includes several measures of adjustment during the first year of college, such as students' level of satisfaction with various aspects of campus life, institutional facilities, and student services; personal challenges that they face during their transition from high school to college; and feelings of personal success at the end of the first year (HERI, 2011).

Habits of mind: A unified measure of the behaviors and traits associated with academic success. These learning behaviors are seen as the foundation for lifelong learning.

Latinas/os: For purpose of this study, Latinas/os will be used to describe people from Latin American countries.

STEM: Science, Technology, Engineering, and Mathematics.

Significance of Study

By conducting this thesis research project, the goal is to explore the different relationships between degree aspirations at the beginning of college and habits of mind after the first year among Latinas/os. The majority of research that has been conducted within the field of higher education centers on the attrition of students in STEM; however, there is currently a gap in the literature, as there are limited studies that focus specifically on anti-deficit approaches for Latina/os in STEM fields. This study will highlight specific information that contributes to degree aspirations and degree completion for Latinas/os pursuing STEM majors. A potential contribution of this proposed study is to inform institutions and practitioners of effective strategies to help support both Latinas/os in pursuit of STEM degrees. Additional implications stemming from this research might include a need for additional studies from an anti-deficit perspective on Latinas/os pursuing STEM fields. Finally, the findings of this research inquiry may indicate ways to better serve this population and provide the support needed to the student and family, and campus resources that are key to this student population.

CHAPTER 2

REVIEW OF THE LITERATURE

Latinas/os in the United States are projected to reach a 128.8 million in the year 2060 (U.S. Census Bureau, 2013). As the population of Latinas/os continues to increase, it is critical to provide this group of students with the guidance needed to succeed academically. Specifically, the Latina/o college-age population has increased rapidly compared to the overall increase in the number of Latinas/os in the United States, thus demonstrating the youthfulness of the Latino population (Chapa & De La Rosa, 2004). As the Latina/o population in the United States increases, secondary and post-secondary institutions are faced with continued issue of high dropout rates and underachievement among Latinos (Calaff, 2007). In particular, it is vital that those Latinas/os pursing higher education and focusing on majors in science, technology, engineering and mathematics education have the skill set to succeed in STEM fields. Higher education institutions must do more to improve the educational attainment of groups such as Latinas/os, who are underrepresented in STEM fields (Perna, Gasman, Gary, Lundy-Wagner, & Drezner, 2010).

Interest alone in a STEM major is not enough to guarantee that students majoring in STEM fields will complete their degrees. For those students who arrive at a post-secondary level institution with the goal of pursuing a STEM field, courses taken in high school will play a likely factor in them remaining in the STEM major. Therefore, student persistence and achievement in STEM fields require consistent motivation and

strengthening of student interest in the sciences, academic preparation to increase competency in mathematics and analytical thinking (Bounous-Hammarth, 2000). Grade point average was also found to be a positive indicator of students selecting a discipline in a STEM field (Cole & Espinoza, 2008; Moakler & Kim, 2014). Lastly, the support of faculty is imperative to the success of Latino students, especially those students who are interested in majoring in a STEM field (Cole & Espinoza, 2008). Overall, institutions must do more to improve the educational attainment of groups that are underrepresented in STEM fields. (Perna et al., 2010).

Theoretical Framework

Harper (2010) developed an anti-deficit achievement framework that researchers, educators and administrators can utilize to better understand the success of Black male college students, but also emphasizes the importance of being able to use this framework with all students of color interested in or studying in STEM fields. The author's focus of his study is on the positive achievements of Black students, instead of the usual amplification of failures for this population of students. The author interviewed 219 participants with a GPA of 3.0 from colleges and universities across the United States, which included six different institution types--small liberal arts colleges, large public research universities, highly selective private research universities, private Historically Black Colleges and Universities (HBCUs), and public HBCUs. The author interviews placed considerable emphasis on the precollege experiences and the role of parents, peers, and significant others in the formation of college aspirations. The results of the study indicated six major groups, which include getting to college, choosing colleges,

paying for college, transitioning to college, matters of engagement and responding productively to racism.

Getting to college: The men reported that their path in getting to college and selection of type of college was influenced by parents, extended family members and high school teacher. Surprisingly, guidance counselors were found to be more harmful in the selection of college than helpful.

Choosing college: Many of the men attributed their success in being able to pursue a bachelor's degree because they did not have a financial burden of having to pay for college.

Paying for college: Funding was based on institution type. For example, those men at top tier institutions such as Stanford benefited from the institution policy that allowed students to attend at no cost if their family's income was under $50,000. Those who attended public institutions financed their educations by applying to as many scholarships and fellowships as possible. Overall, the study found that among the 219 participants there was a strong habit of applying for as many opportunities as possible.

Transitioning to college: With regard to transitioning to college, participants believed that their success was due to an early start, such as participating in summer bridge programs. In addition, many attributed their success to having Black student male leaders in their lives while in college.

Matters of engagement: When it came to matters of engagement, the men attributed much of their college success to their engagement experiences both on campus and their out-of-class experiences.

Responding productively to racism: Despite being some of the most active in leadership on their college campuses, these men were not immune to racism and stereotypes. Many participants were viewed by their White peers to be academically underprepared and were in turn selected last for group projects and professors were surprised when they performed well academically.

Harper's (2010) book chapter focuses adapting his framework from his original work used in the National Black Male College Achievement study to all students of color interested in STEM fields. The author stresses the importance of adapting his framework to all students of color in STEM who may be at different points in the STEM pipeline. The framework includes a list of possible questions that a researcher can utilize to better understand the experiences of students of color who persisted through the STEM pipeline. The author notes that a majority of empirical studies amplify the failure and deficits of minority students instead of highlighting their achievements in STEM majors. Harper (2010) emphasizes that this framework and the anti-deficit questions are meant to shed light on three pipeline points (pre-college socialization and readiness, college achievement, and post-college persistence in STEM), and nine researchable dimensions of achievement (familial factors, K-12 school forces, out-of-school college preparatory experiences, classroom interactions, out-of-class engagement, experiential and external opportunities, industry careers, graduate school enrollment, and research careers). For the purpose of this study, the first two pipeline points are focused on--pre-college socialization and readiness and college achievement--as well as the following researchable dimensions: familial factors, K-12 school forces, out-of-school college preparatory experiences, classroom interactions and out-of-class engagement.

Pre-College Characteristics

Pre-college factors such as high school GPA, test scores such as SAT and ACT, and high school academic preparation play major roles in the institutional that students select and the majors that students choose to pursue. Crisp, Nora, and Taggart (2009) note pre-college variables, as such high school experiences and prior academic achievement, influence college experiences and create a connection to the institution and selected degree. Additionally, other studies have confirmed that pre-college experiences that play a role in the college experiences of Latina/o students interested in STEM majors include pre-college preparation (Tyson, Lee, Borman, & Hanse, 2007), test scores (Barton, 2003), academic experiences in mathematics and science prior to high school (Eamon, 2005), and prior achievement in mathematics (Astin & Astin, 1992).

High School Grade Point Average and Test Scores

The admission process for today's higher education institutions continues to rely on high school GPA and tests scores such as the SAT. Consequently, a great emphasis is placed on students' academics prior to arriving at higher education institutions, especially for those students whose intention is to pursue a field that falls under the STEM majors. Cheng (2013) discovered that STEM attrition rates also varied by students' precollege academic preparation, as indicated by their high school GPA and the highest level of math course taken in high school. In his findings, 46% of STEM entrants with a high school GPA of less than 2.5 and 41% of those who did not take Algebra II/Trigonometry or higher math courses in high school left STEM fields by dropping out of college, compared with 14% of those with a high school GPA of 3.5 or higher and 12% of those who took calculus in high school. In terms of switching majors out of STEM fields, 33%

of STEM entrants with a high school GPA of between 3.00 and 3.49 did so, compared with 26% of those who earned a GPA of 3.5 or higher.

Bonous-Hammarth (2000) also affirms in her study that high school achievement (defined as strong high school GPA and SAT–Math scores) as well as interest in a STEM field when arriving at college were factors that positively influenced Latinas/os in general, but especially for those pursuing a degree in STEM disciplines. Conversely, Hurtado et al. (1996) indicated that high school GPA was not directly related to the academic adjustment of Latinas/os in the second year of college. Cole and Espinoza (2008) argue against the use of academic achievement as the major point in which access is determined, because of the mediating environmental factors experienced within the college environment, and to consider recent findings that support high school-to-college transition programs that focus on increasing academic performance for students interested in STEM majors.

Academic Self-Concept

Past research has indicated that one's academic self-concept is a strong predictor of college retention (Lotkowsky, Robbins, & Noeth, 2014). For the purpose of this study, academic self-concept is defined as, "one's perceived ability in an academic or learning context" (Von Soom & Donche, 2014, p. 2). Specifically, Latinas/os have a tendency to report lower levels of confidence in their intellectual abilitites (Chang, Denson, Saenz, & Misa, 2006; Nunez, 2009). In their study, Von Soom and Donche (2014) found that academic self-concept in the first-year was a strong indicator of success in STEM. Nunez (2009) found that self-rated academic ability and diversity curriculum have a positive effect on academic self-confidence. Self-confidence for Latina/o students can

begin to create a positive influence on academic self-concept, which continually appears in the literature as significant indicator of motivation and completion in STEM.

Family

Family has and continues to play a crucial role in the academic success of Latina/o students. Culturally, Latina/o families place a major emphasis on familia or *familismo*. *Familismo* is regarded as one of the most prominent and significant cultural values among Latinos (Marin & Marin, 1991). U.S. dominant culture emphasizes individuality and independence, while *familismo* requires individuals to put the needs of family before their own (Sy, 2006). The majority of Latina/o students consider the needs, impact, and support of their families when making major decisions, including the type of higher education institution they will attend, the major they will pursue and their career choice. This type of decision making process places significant emphasis on an individual's identification and attachment to nuclear and extended family members, which includes qualities of loyalty, reciprocity and solidarity (Sabogal, Marin, Otero-Sabogal, Marin, & Perez-Stable, 1987). Researchers have found that maintaining family relationships is among the most important factors impacting college adjustment for Latina/o students attending college full-time (Hurtado, Carter, Spuler, 1996; Gloria & Rodriguez, 2000; Hernandez, 2000; Gándara, 2005). Family also plays a direct role in influencing Latina/o students who want to pursue a STEM major. Many Latina/o families may be unaware of the various majors in STEM and the career outcomes for these majors and may not have the necessary knowledge to assist their son or daughter with the college process, which can be a complicated process.

Although family is viewed as a key for students to transition into college, students are not always equipped with the tools necessary to include their families in their academic lives. Often time students of color believe they have to decide between family and culture or school success (Nieto, 1996). More specifically, Saenz and Ponjuan (2008) stated that, "the *familismo* orientation among Latino families serves to define gender roles and expectations for family members such that sacrificing the needs of the individual over the needs of the family is commonplace" (p. 63). For first-generation students, family is extremely significant when it comes to pursuing higher education, as there is value in finishing and being able to provide for their families financially. Boden (2011) found that it was important for first generation students to obtain a career so they could support themselves as well as their families.

Family involvement during a student's transition from high school to college is critical as it provides a sense familiarity when students are going through a new experience in their lives. Hurtado, Carter, and Spuler (2006) described that a strong area of support for students during their transition from high school to college was their family. In addition to support during the transition phase family can also play a vital role in the retaining students in higher education. Hernandez (2000) reported the role of the family and the home environment can be utilized as an effective retention tool by familiarizing Latino families with the college environment and providing opportunities for them to get involved.

Parental Education

A critical precursor to Latinas/os aspiring and enrolling in post-secondary institutions is the education level their parents attained. Parents who have obtained a

post-secondary degree have the ability to provide students with firsthand experience of attending a college and the benefits that obtaining that type of degree entail. Students whose parents attended a college or university were more likely to attend a post-secondary institution (Cabrera & La Nasa, 2000). Studies have shown that students who have educated parents also possess higher levels of cultural capital and in turn possess higher levels of cultural congruity, which positively affects academic success (Lohfink & Paulsen, 2005; Dennis et al., 2005). Laden (2011) notes that it is indisputable that a key factor that influences the educational attainment of students is their parents' educational levels. More specifically, Hurtado et al., (2013) found that a mother's education level was a positive predictor of student's intentions to pursue a STEM graduate program, as those students who came from a family where their mother had a formal education had a higher probability of reporting intentions for a post baccalaureate degree in STEM. Furthermore, it is critical that institutions of higher education be prepared to support these students during their educational careers. Laden (2011) mentions the importance of programs that focus on bicultural counselors and faculty, outreach recruiters and other program specialists who work closely with Latina/o families, as they help them understand what college entails and what economic mobility can provide to their children. At the same time such programs provide an environment that is sensitive to their culture expectations (Laden, 2011).

Environmental Characteristics

Hernandez (2010) noted that the influence of the college environment must be considered in order to fully examine Latinas/os in college and their retention in higher education institutes. Research by Rong and Gable (1999) emphasized the importance

that living environment, social support, and making meaningful relationship connections have on students' overall adjustment to the college environment. Institutions that provide opportunities for not only academic support, but also social and personal support increase their retention rates (Consolvo, 2002).

Degree Aspirations

The aspirations of students of color are not always easy to predict, as students of color have unique characteristics such as their culture, ethnicity, culture and race (Carter, 2002) Educational aspirations are important and allow students to think and dream of what is possible (Carter, 1997). Specifically, degree aspirations' are critical to student success as it allows students to focus on an area of interest and to take courses and get involved around that field of interest. Around half of all undergraduates who express initial intentions to major in STEM, change their field of interest within their first two years of study (Commission on the Advancement of Women and Minorities in Science, Technology, Engineering, and Technology Development, 2000). Student aspirations have been documented in scholarly research, but a paucity of research exists with regard to the degree aspirations of Latinas/os interested in STEM majors at the undergraduate level, however, there is existing literature that can provide insight to the degree aspirations of this student population.

Carter (2002) developed a theoretical conceptual framework of factors influencing college student's degree aspirations, which is based on prior scholarly work. Although Carter's conceptual model does not frame this study, it allows future researchers to look at the unique characteristics that are salient to students of color, and provides a conceptual framework that can assist in interpreting what and how those

characteristics shape the degree aspirations of students of color. Looking at specific factors that impact degree aspirations for Latina/o students is critical to assisting this student population, as more-and-more students enroll in higher education institutions and even more show interest in a STEM related fields. Strayhorn (2011) examined the relationship between engagement in purposeful research activities and STEM graduate degree aspirations among racially diverse students. Strayhorn (2011) found that engagement in purposeful research for graduate students can shed light on the importance of purposeful research activities, and how the possible outcome is that it may be positive for undergraduate Latina/o students. Kao and Tienda (1998) found that Latina/o youth had lower aspirations than African American or White youth. "Students' degree goals are a function of their own individual backgrounds and circumstances, their institutional choices (such as they are), and the socializing influences of their institution" (Carter, 2002, p.149).

Transition to College

A major transition that occurs for students is that from high school to a higher education institution. Transition to college is defined, "as students' first-time college attendance post-high school diploma or certification" (Carter, Locks, & Winkle-Wagner, 2013, p.115). A wealth of scholarly work exists that focuses on the transition experience of Latino students (Hurtado, Carter & Spuler, 1996; Locks, Hurtado, Bowman & Oseguera, 2008; Miller, 2005; Romo & Salas, 2003; Saunders & Serna, 2004). During this transition, students experience new environments, new peers, and different expectations from family and professors. Adelman (2006) noted that the most important factor in determining how successful a student is in making the transition from high

school to college regardless of their ethnicity is the academic intensity and quality of one's high school curriculum. Specifically, Latina/o students have a tendency to graduate from underperforming high schools that do not prepare them academically for college-level work (Swail et al, 2004). High schools need to provide Latina/o students with high-level access to science and mathematics courses, as the preparation is significant for interest and persistence in STEM majors. Tyson et al., (2007) found that taking high-level mathematics and science courses, specifically calculus, chemistry, and physics in high school prepares Latinas/os for STEM fields.

Hurtado, Carter and Spuler (1996) studied factors that affect the heterogeneous Latino student population and their adjustment to college life. One of the aspects explored in the authors study, was the transitional experiences of Latina/o students in their first year. The authors assessed individual attributes, college structural and climate characteristics, student transitional experiences, and student behaviors in order to comprehend the difficulties and facilitators of college adjustment in four areas: academic, social, personal-emotional and attachment to the institution. The findings revealed that successful management of student resources (times, schedules, and finances) during the first year have a strong impact on the academic and personal-emotional adjustment in the second year of college. The authors found that even the most talented Latino students are likely to have difficulty adjusting if they perceive a climate where the majority students think all minorities are special admits, making Latino students feel like they do not "fit in" in the campus environment. Pascarella and Terrenzini (2005) determined that during students' first year of college, interactions with peers could have a major influence on students' intellectual growth.

First-generation Latina/o students encounter additional complex challenges as they transition to college (Boden, 2011). These challenges include lack of financial support, language barriers, and academic underpreparedness (Oseguera, Locks & Vega, 2009). In addition, for first generation Latina/o student peers can play a critical role in helping them become familiar with campus activities, campus environments, and new relationships on campuses, thus potentially adding to a positive transition process for them.

Ease of Academic Adjustment

Once students are in college, a part of the adjustment process to this new environment is the ease in which students adjust academically. The process of adjusting to the academic rigor of college will be different for each student, as students arrive with different educational, social, and familial backgrounds. Finances play a major role in a student's academic adjustment, as finances can provide access or create barriers. The financial barriers of students of color have been shown to have a negative impact on their adjustment (Hurtado et al., 2007). Those students of color who are low-income are less likely to get involved in campus life, which can affect their persistence in continuing through their second year (Bozick, 2007; Cabrera, Nora & Castaneda, 1992, St. John, 1991).

The American system of higher education was created for privileged, White men, and continues to be influenced by a legacy of inclusion and exclusion of minority groups (Spring, 2013). While much has changed today with regard to higher education and the diverse student population that it serves, many students, especially student of color encounter negative racial climates at predominantly White institutions (PWIs). Hurtado,

Carter and Spuler (2006) noted that students of color who attended PWIs are less likely to receive adequate support from their institutions, which negatively impacts the students' academic, social and personal adjustments. In addition, findings indicated that maintaining family support in the first year as positively associated with personal-emotional adjustment. A sense of family can also be created on campus environments where support systems exist that include peers, faculty, and advisors (Carter & Spuler, 2006). Lastly, Latina/o students expressed academic adjustment during their first year as being the most difficult. Many Latina/o students arrive at their higher education institutes having been at the top of their class, and are now faced with emotions and pressure that come with being among other bright students.

Habits of Mind

In order for students to succeed at the college level, students must have a strong foundation of habits of mind that enables them to learn across disciplines. That is, they must have, "the intelligent behaviors necessary for college readiness and ability to emphasize that these behaviors need to be developed over a period of time such that they become ways of thinking" (Conley, 2007, p. 10). Regrettably, not all high schools prepare students with a strong foundation, and students arrive at college ill-prepared. In order for ill-prepared students to be successful in their academic and career pursuits, it is imperative that they understand that college readiness can be developed over time, while in college. Specifically for those Latinas/os who aspire to major in STEM related fields, it is key for them to know that they can still be successful even if they encounter academic hurdles early on.

Not only are habits of mind tools that may assist students in learning but they are behaviors and traits that are critical for lifelong learning (AAC&U, 2007). The construct habits of mind were introduced to the CIRP surveys starting Fall 2007 with The Freshman Survey. College readiness is critical for students being successful at the post-secondary level and although not all students arrive college ready, it is something that can be learned while students are in college. Specifically for Latina/o students there has been a lot of deficit literature that they and their families do not care about college readiness and college success. Martinez, Cortez and Saenz (2013) noted in their study that parents perceived school as being equal partners in the role of education for Latina/o students to be college ready. In addition, the authors elaborated how Latina/o parents provided examples of the way schools, "had stifled Latina/o students' college readiness by (a) not providing sufficient up-to-date college information to students and families, (b) inequitably and inconsistently disseminating college information, opportunities and support" (p. 112). Latina/o families do care about the college readiness of their children and do value partnerships among institutions of education to work as a collective to prepare students.

Cross Racial Interaction with Diverse Others

Interactions with diverse others is significant to higher education as more and more institutions are made up of a variety of students from different social identity groups. For many students, especially some students of color, college attendance can provide students with the opportunity to interact with diverse others, perhaps for the first time. Current research has demonstrated that attending racially and ethnically institutions can promote cross-racial interactions, which can create educational benefits for students

(Antonio, 2001; Chang, Denson, Saenz, & Misa, 2006; Hurtado, 2003; Saenz, Ngai, & Hurtado, 2007). Interactions with diverse groups can promote self-awareness and awareness of others; it can also encourage people to challenge their own biases. Intercultural capital is defined, "as any resource enhancing students' capacity to be aware of their own social identity in relation to others, to interact constructively with diverse others, and/or to challenge exclusionary practices and privilege" (Nunez, 2009, p. 182). Opportunities for cross-racial interactions can occur both inside and outside of classroom, and can also have educational benefits, as it offers a diverse perspective that can be applied to everyday life, as well as in classroom activities and discussions.

Latina/o academic self-confidence can be affected by the institutional climate with regard to diversity (Hurtado & Ponjuan, 2005). In their study, Saenz, Ngai and Hurtado, 2005 found that for Latino students social abilities were important to positive interactions. The authors noted that Latinas were more likely to report positive interactions than Latinos were. Creating an environment that promotes diverse interactions is key to the growth and development of students in order to prepare them for interacting in a diverse society. Nunez's (2009) findings indicate that policies or programs that promote academic, cultural, social, and intercultural capital during the early years can create positive benefits. Therefore, Latinas/os student college experiences are critical in shaping their academic self-confidence.

Satisfaction with College

Students who are satisfied with their college experiences are more likely to remain engaged in college activities, as their needs are being met not only academically, but also socially, and they are able to better integrate in the college they attend.

Hallenbeck (1978) defines it as contentment with the overall college experience. College satisfaction differs from student to student. Feeling like one is part of the campus and socially integrated plays a role in being satisfied with college. For some students age may play a factor, as they may be at a different point in not just their academic life, but also in their personal and family life outside of college. Research indicates that cultural resources can contribute positive outcomes in college for Latina/o students (Hurtado & Gurin, 2002; Hurtado & Ponjuan, 2005; Milem & Chang, & Antonio, 2005).

Involvement Characteristics

Student involvement at higher education institutions outside of the classroom plays a vital role in the overall experiences students have and provides them with navigational capital at their institutions. Astin (1984, 1993) found that students who become involved in various aspects of college life tend to have both better short and long-term outcomes. Research has suggested that once Latino students arrive at higher education institutions, getting involved in cocurricular activities plays a major role in their retention (Hurtado & Carter, 1997; Gloria, Castellanos, Lopez, & Rosales, 2005; Hernandez, 2000; Hernandez & Lopez, 2004, Anaya & Cole, 2001, Cole & Espinoza, 2008). To delve further, Milem (1999) found that getting involved in campus activities in the 1st year, not only predicted future involvement in activities but also have institutional commitment. In addition to campus involvement, Weidman (1998) suggested that various groups such as parents, peers and faculty shape the perceptions of college for undergraduate students not only during their college experience but also prior to arriving at post-secondary intuitions.

Faculty-Student Interaction

Empirical studies have repeatedly found that faculty members play an important role in shaping educational outcomes for students. Micari and Pazos (2012) explained, "despite all of the literature based evidence pointing to the importance of student-faculty interactions in college many faculty overlook, or underestimate, the impact they have on their students" (p. 45). Faculty-student relationships are critical as they provide students with insights into how faculty navigated their educational and career path, which can provide students with vital information for their own professional outlook. For students enrolled in STEM fields, faculty members play a pivotal role in their academic success. Leslie et al. (1998) found that ethnic minority students who completed their science and engineering degree typically emphasized the instrumental role that faculty members played in their academic success. STEM fields in particular while in high demand can be lacking in diverse student populations and in the diversity of faculty. Calls have been made to increase the number and diversity of underrepresented minority students and faculty and STEM if the U.S. wants to remain competitive (National Academy of Sciences, 2007). It is because of this that Latinas/os who are in pursuits of a STEM degree can particularly benefit from having the support and interaction of racially diverse faculty. Regular contact with faculty has been linked with increased student access, especially among underrepresented students (Cole, 2010). The earlier students begin to interact with faculty, the sooner students can begin to identify those faculty who can provide a positive mentorship or role-model connection. Faculty members play a major role in student persistence in a major (Braxton, Milem, & Sullivan, 2000; Pascarella & Terenzini, 2005). Cole and Espinoza (2008) examined the impact that faculty had on

African American and Latina/o students' academic performance or educational satisfaction. While faculty interaction is critical in the classroom, engagement with faculty outside of the classroom is also pivotal for students. Those students who experience out-of-class engagement with faculty tend to be motivated, engaged, and actively involved in learning (Thompson, 2001; Woodside, Young & Weist, 1999).

Mentoring

Mentoring can occur both formally (in-class) and informally (outside of class), formally when a student is matched to a faculty member by their institution (Mullen, 2005) or informally when student and faculty member make a commitment (Johnson and Ridley, 2004). Formally, mentoring relationships with faculty members can be particularly beneficial outside of the classroom. In their study, Fuentes et al., (2013) found that the sooner that faculty and student interactions occurred, such as during the first year of college the greater the mentorship during students senior year. The authors study affirmed that student-faculty interactions during a students' first year lead to a strong mentoring relationship by their senior year. Benefits of mentoring for students has been documented as having positive outcomes such as higher GPA and student persistence (Crisp & Cruz, 2009). Furthermore, Bordes & Arredondo (2005) found a positive relationship between Latina/o students' perceptions of mentoring and their comfort with the university environment.

Role Models

Role models can provide students with inspiration and allow to aspire and set goals. In particular, for students, role models are critical as they may be what sparks interest in a particular major once in college. Salinas (2002) maintains that "it is

important for students of color to have role models that they can look up to, role models who look like them, who have come from similar backgrounds, and who are important and influential in their lives" (p. 613). When students are able to see similarities in faculty members, staff or administrators, students can set goals for themselves and begin to look into how their role models achieved being in the positions they are in. Cole and Espinoza (2008) emphasized that faculty or staff members serve as role models and examples of individuals who have successfully navigated the educational system. Role moles do not only consist of faculty but others such as staff, administrators, and graduate students can also serve as role models for students.

Peer Interactions

Studies indicate that peer interactions inside and outside of the classroom are critical to student success in college (Pascarella & Terenzini, 2005). Specifically, Student engagement in peer relationships and activities demonstrates positive student outcomes. The Arbona and Nora (2007) study supports the role that peers have on Latino students who share similar educational goals and who have similar plans about their preference with regard to institution type. The authors concluded that Latinas/os in high school who were exposed to a large number of students who want to begin their academic careers at a four-year university right upon high school graduation have a high likelihood of doing the same. Interactions with peers allow students to gain insights usually in a setting that is comfortable and from which they expand their knowledge base. In fact, according to Astin (1993), peers are "the single most potent source of influence" (p. 398).

Transition and Supplemental Programs

Even though science, technology, engineering, and mathematics fields have generated a great deal of interest from students, STEM disciplines face special retention challenges, with attrition rates the highest of any academic disciplines nationally (Capri et al., 2013). In their study, Capri et al. (2013) addressed the importance of providing minority student population with a number of interventions. These programs include support that focuses on areas of academic performance, faculty-staff interactions, extracurricular activities, and peer group interactions. The programs also address students' intentions, goals, and institutional commitments; external commitments, and pre-entry attributes such as prior schooling and family background. Additionally, program development also focuses on the faculty. Specifically the authors focused on full-time faculty in the sciences and mathematics.

Capri et al. (2013) noted in their study that the faculty workshops were created with the goal of improving teaching effectiveness and pedagogical practice. Topics that were covered included integrating writing into science courses, using instructional technology, using science examples in math courses, and enhancing student engagement through active learning. Also noted by the authors, was that the effect on students is indirect, as this program is designed to enhance teacher effectiveness.

Bayliss et al. (2007) affirmed in their research the positive impact that supplemental instruction played in the academic careers of students in STEM majors. The authors noted that while the intention of supplemental instruction is to improve the performance of low-achieving students, the emphasis of supplemental instruction is not to

focus on students, but instead to identify those courses, which are high-risk, and create and provide an environment that fosters learning in those courses.

Socio-Cultural Characteristics

There are aspects of student lives that do not immediately factor in prior to attending college. Some students may not know their citizenship status until they begin applying to colleges. For others, gender roles in their Latina/o families play a major role in selecting major and career goals. Hernandez and Lopez (2004) define socio-cultural factors as, "multiple forces that can shape the personal and environmental experiences of Latina/o college students" (p. 49). Arrival at a higher education institution brings on new experiences that can significantly influence and make students question the formerly mentioned.

Sense of Belonging

A student's first year experience plays a major role in their sense of belonging to the college they attend. Bollen and Hoyle (1990) stated that a "sense of belonging is fundamental to a member's identification with a group and has numerous consequences for behavior" (p. 484). Sense of belonging allows researchers to assess which forms of social interaction (academic and social) further add to students' affiliation and identity with their college (Hurtado & Carter, 1997). Students who possess high levels of social and intercultural capital in college have a greater sense of belonging and ultimately more positive outcomes as cross-racial interactions (Maestas, Vaquera, & Zehr, 2007; Nunez, 2009; Stanton-Salazar, 1997). Like a majority of students who arrive at college, Latina/o students want to succeed, and while GPA is a salient aspect of the college process and degree attainment, it is not the only factor that determines sense of belonging for Latina/o

students. Hurtado and Carter (1997) found that students GPA in both their second and third years of college were not significant to a students' sense of belonging. This suggests that for Latina/o students, academic performance does not necessarily enhance or diminish their affiliation with the college and they may generate a greater sense of belonging from other activities. A disturbing finding that the authors noted was that working on an independent research project, working with a faculty member on a research project or having been a guest in a professor's home did not have a significant impact on the sense of belonging of Latina/o students. This may be due to students not having these opportunities until a later point in their academic years. Strayhorn (2008) found that academic and social experiences influence Latina/o students' sense of belonging. The author noted that time spent studying and grades were a positive influence on Latina/o students' sense of belonging. This finding may indicate that Latina/o students who excel academically may feel a greater connection to their campus. For Latinas/os in a STEM major, a sense of belonging is critical, as the majors encompassed in STEM tend to be highly demanding and competitive.

Citizenship Status

Student immigration status is extremely salient at all educational levels, but becomes very critical once a student moves in to higher education, as there are barriers that are unique to those students who are not U.S. citizens. While not exclusive to Latinas/os, citizenship status is more likely to impact Latina/o families. For some students, the fear of deportation for undocumented status is extremely stressful and may even impede their pursuits of higher education due to lack of information or to monetary resources. A vast majority of Latina/o students are either immigrants or children of

immigrants (Suarez-Orozco & Paez, 2002). Yet this does not imply that all Latinas/os fit into one of the two formerly mentioned categories, as many Latinas/os have been in the United States for generations.

Gender Roles

Gender roles can play a significant role in the career choices of men and women, especially in STEM related careers. Research has shown that gender is a powerful indicator of college major for minority students (Simpson, 2001). In their study, Larose et al. (2008) followed men and women during their college years who were studying science and technology. Men who persisted had higher feelings of competence, academic involvement, and institutional involvement. Whereas, the women did not and the authors attributed such findings to environmental factors such as lack of mentoring experiences and messages received from family and teachers. Gender limitations in the lives of Latinas/os impact them greatly, as culturally Latinos are viewed as traditionally getting involved in careers that are male dominated such STEM careers, and encouraged to do those by families. On the other hand Latinas many times must adhere to the role of being a caregiver and mother, and consequently may have to forego a higher education degree or selecting a major that is more in line with the cultural beliefs of their families. Although Latinas are entering institutions of higher education at far greater rates than Latino men (Lopez, 2003), they are not highly represented in STEM fields. Latinas are not exposed to STEM curriculum or career possibilities in these fields at an early point in their educational pathways. Overall, the general perception of the Latina/o community is that STEM careers are male dominated (Flores, 2011). Research indicates that despite having higher levels of parental support (Ceja, 2004) undergraduate Latinas experience

higher stress levels than their male counterparts (Munoz, 1985). Past research has found that overall women have less positive experiences in STEM, however, Buday, Stake and Peterson (2011) discovered, in their research that women participants felt supported and optimistic about their ability to pursue a career in science, and that was attributed to their talent or due to participation in high school science programs. While current research may indicate that this is unique for women in STEM, it is an indicator that women can have positive and supportive environments in STEM majors.

CHAPTER 3

METHODOLOGY

Introduction

In Chapter 2, literature points to the constructs that may influence Latina/o degree aspirations in STEM fields, including ease of academic adjustment, faculty interaction, and grade point average. While the literature is consistent for Latina/o students pursuing higher education, it does not clearly show this for the degree aspirations for Latinas/os who aspire to major in a STEM related field. Secondary data collected from the Cooperative Institutional Research Program (CIRP) at University of California, Los Angeles (UCLA) analyzed for the quantitative piece of the study. Data utilized sought to answer the three research questions:

1. What contributes to degree aspirations of first-year Latinas/os?

2. Are there gender differences in first-year Latinas/os STEM degree aspirants??

3. What are predictors for the CIRP construct *habits of mind* at the end of the first-year for Latinas/os?

Anticipated Results

The anticipated results for this study based on the literature and prior to data analyses are as follows:

1. High school GPA and first year GPA lead to higher degree aspirations in STEM for Latinas/os.

2. Having interactions with faculty members and peer interaction will predict aspirations in STEM.

3. Faculty interactions and academic self-concept are predictors of habits of mind for Latina/o students.

Having interactions with faculty members and peer interaction will predict aspirations in STEM. In this chapter I describe in detail, the methodological approach I took to carry out this study, including, survey, data, data analysis and limitations. I completed secondary data analyses utilizing data from the Cooperative Institutional Research Project (CIRP) 2010 Freshman Survey (TFS) and 2011 Your First College Year Survey (YFCY). Recall the purpose of this study was to predict degree aspirations at the beginning of college and habits of mind at the end of the first year in college for Latinas/os interested STEM fields.

Role of the Inquirer

I am a Latina female graduate student currently pursuing her Master of Science in Counseling, with an emphasis in Student Development in Higher Education. Prior to entering a master's program, I earned a Bachelor of Arts in Literatures in English. I developed an interest in research with regard to STEM and the Latinas/os population when individuals in my life found out that my spouse who is a Latino male is a Software Engineer, and their reactions were one of surprise. This peaked my interest to research what the numbers for Latino males in software engineering looked like and it confirmed that they are anomalies in the field. My interest also expanded to include Latina women in STEM because when visiting my spouse at his place of work there was only one

female that worked for the company, which made me aware that if there were few women there, what did it look like overall for women in STEM careers.

As academic advisor and a program coordinator working with undergraduate students who are interested in research, and more specifically students who are interested in pursuing STEM majors, has allowed me to see the challenges and barriers that Latina/o students face in their aspirations and pursuits of STEM fields. Additionally, this experience has given me the opportunity to encourage students of their aspirations and provide them with additional resources and support that can create a positive impact on their aspirational goals.

Survey

For this thesis, data from the Cooperative Institutional Research Program (CIRP) surveys were used to analyze the three research questions. The CIRP survey is administered each year at participating institutions of higher education. The surveys take approximately an hour to complete. The freshman survey CIRP survey serves as a pre-survey to subsequent CIRP follow-up surveys such as the YFCY. The items on the survey covers (a) high school attributes, (b) probable major, (c) post-baccalaureate aspirations, (d) habits of mind, (e) academic self-concept, (f) social self-concept, (g) demographic information and (h) likelihood of college involvement. Habits of mind is made up of the following variables: ask questions in class, support your opinions with a logical argument, seek solutions to problems and explain them to others, revise your papers to improve your writing, evaluate the quality or reliability of information received, take a risk because you felt you had more to gain, seek alternative solutions to a problem look up scientific research articles and resources, explore topics on your own, even

though it was not required for class, accept failure as part of the learning process and seek feedback on your academic work. The 2010 CIRP freshmen survey contained questions relevant to answering the three research questions for this study. The questions included students' demographics characteristics, faculty interaction, and grade point average. The YFCY CIRP survey included information related to academic self-concept, faculty interaction, and ease of academic adjustment. Using a regression, the researcher examined each block and its influence on students' aspirations for STEM majors. TFS is typically administered to incoming freshman during their first semester and the YFCY at the end of the first year of college. The population for the 2010 survey was defined as, "all institutions of higher education admitting first-time first-year students and granting a baccalaureate-level or higher" (Pryor, et. al., 2010, p. 139). For this study, 2010 TFS and 2011 YFCY data were used (see Appendix A and B).

Data

I requested secondary data from the Cooperative Institutional Research Program (CIRP) survey, a nation-wide instrument, which provided a national data set of information pertinent to Latina/o students aspiring to pursue STEM degrees. To protect the confidentiality of the campuses involved, no unique identifiers were requested nor are they accessible through the data. In addition, data was accessed and analyzed only on password-protected computers. The CIRP survey was given to freshmen each year at participating higher education institutions. In order to gain access to CIRP data the researcher developed a proposal detailing the (a) objective of the study, (b) key variables, and (c) requested access to the specific survey years that will be used in the study. Since the most recent three years of CIRP data is restricted for research purposes, the researcher

applied to gain access to the freshmen data that was collected in 2010. The researcher compared data that was collected in the 2011 YFCY and 2010 TFS (see Table 1) surveys to reveal developments within the 2010 freshman cohort. All secondary data was analyzed using the software Statistical Package for the Social Sciences (SPSS) Version 22. The researcher began analyzing the data by running frequencies to determine if recoding was needed to attain a normal distribution or modify independent variable.

Sample

The study's sample came from CIRP surveys. The researcher selected Latina/o undergraduates at four-year public institutions who showed interest in pursuing STEM majors. The students volunteered to complete the 2010 TFS survey upon matriculation to the university, and were administered the 2011 YFCY during their second year. The students were provided with consent forms, which allow for the results of their responses to be included in future research. For this thesis study, survey results of Latina/o students of the 2010 entering freshman class were used. A total of 397 Latina/o student responses were recorded from the surveys. The researcher examined the data set to ensure integrity of the regression analysis was reinforced.

The sample included 397 Latina/o students whose probable major would be in a STEM major at four-year institutions across the United States (see Table 4). There were 168 males (42.3%) and 229 females (57.7%). Fifty-four percent (n = 217) marked Mexican as their race, followed by 10.6% (n = 42) marked Puerto Rican as their race, 41.1% (n = 163) marked other Latino. Seventy percent (n = 279) reported their age to be 18, followed by 24.4% (n = 97), 2.5% (n = 10) reported their age as 17, 2.0% (n = 8) reported their age as 20, and .3% (n = 1) was reported for both 16 or younger and 21 to

24 years old. Eighty nine percent (n = 356) reported that their citizenship status was that of a U.S. citizen, 6.8% (n = 27) reported that they were a permanent resident (green card), and 2.8% (n = 11) reported neither. Lastly the dependent variable, degree aspirations, had reporting rate of 94.5% (n = 375), habits of mind at time 1 had a reporting rate of 99.5% (n = 395), and habits of mind at time 2 had a reporting rate of 77.3% (n = 77.3).

The TFS gender variable indicating more females with 57.7% were include within the same. Race was used to determine how students self-identified within the ethnicity of Latino. As part of the survey students were asked to identify with which background of Latino they identified with. 54.7% of the students surveyed identified as Mexican, 10.6% identified as Puerto Rican and 41.1% identified as Other Latino. Habits of mind score at time one had a means of 49.9660 and a standard deviation of 9.25667, and habits of mind score at time two had a means of 46.5120 and a standard deviation of 11.53725.

Pre-college academic attributes. This section describes for students' pre-college academic background, which was compiled of the following independent variables for the sample: SAT verbal and math scores, high school type, probably major and high school grade point average. The mean for the math SAT score was 581.46 with a standard deviation of 94.77. The mean for the verbal SAT score was 549.60 with a standard deviation of 87.66. SAT scores reported by students on the TFS were measure on a scale of 1600. 69% of the survey respondents identified attending a public school, 4% public charter and 54% attended private institutions. The independent variable student's probable field of study/major indicated which STEM field students were likely to declare. 68% males and 32% female selected engineering as a probable major. The biological sciences probable major had 50.6% for males and 49.4% for females. The

probable major in physical sciences and mathematics for males was 81.4% and 18.6% for females. The final independent variable in the pre-college attributes is high school grade point average, with 60.7% as at a 4.0, 36.8% at a 3.0 and 1.5% at a 2.0.

Independent Variables

Descriptive statistics of Latina/o students' demographic, background characteristics, pre-college characteristics, academic background, degree aspirations, and the CIRP constructs habits of mind, academic adjustment, academic disengagement, student-faculty interaction, overall satisfaction, sense of belonging and positive cross-racial interaction were used for this study. Means and standard deviations are reported later in this chapter for dependent and independent variables for the entire sample and gender were computed with degree aspirations and habits of mind serving as the dependent variable. Degree aspirations pertained to students' self-selecting a STEM major as a probable field of study. The independent variables that were analyzed included: demographic characteristics, pre-college attributes, and the CIRP constructs (a) academic self-concept: (b) social self-concept, (c) likelihood of college involvement, (d) academic disengagement, (e) ease of academic adjustment to college, (f) faculty interaction, (g) overall satisfaction, (h) sense of belonging and (i) positive cross-racial interaction (see Table 1). Students' demographic characteristics encompassed independent variables that consisted of students' gender, race and ethnicity, citizenship status and year entering college. Pre-college attributes referred to students' verbal and mathematic SAT scores, secondary school grade point average, type of high school and students probably major. CIRP's academic self-concept is compiled of independent variables: academic ability, drive to achieve, mathematical ability. The social self-

concept includes: leadership ability, public speaking ability, self-confidence (social), and popularity. The likelihood of college involvement construct includes: participate in student government, socialize with someone of another racial/ethnic group, participate in student clubs/groups, and participate in a study abroad program. Construct academic disengagement is comprised of: came late to class, turned in course assignment(s) late, skipped class, turn in course assignments that did not reflect my best work, and feel asleep in class. Ease of academic adjustment to college included: understand what your professors expect of you academically, develop effective study skills, adjust to academic demands of college, and manage your time effectively. The faculty interaction construct refers to the independent variables: faculty during office hours, faculty outside of class, asked a professor for advice after class, communicated regularly with your professors, and received advice or guidance from your professor about your educational program. Construct overall satisfaction is compiled of independent variables: overall quality of instruction, overall college experience, if you could make college choice over. The sense of belonging refers to independent variables: I see myself as part of the campus community, and I feel a sense of belonging with this college. Lastly, the positive cross-racial interactions construct included: had meaningful and honest discussion about race/ethnic relations outside of class, shared personal feelings and problems, had intellectual discussion outside of class, studied or prepared for class, and socialized or partied.

Data Analysis

The researcher completed data transformations, t-tests, correlations, and ran a regression for the study. To answer the three research questions: Are there gender

differences in first year Latinas/os overtime? Are there gender differences in first year Latinas/os STEM degree aspirations overtime? and Are CIRP constructs for student faculty interaction and academic self-concept predictors of retention for 1st year Latinas/os interested in STEM majors? The researcher computed descriptive statistics and frequencies to inspect the data. T-tests were computed to examine any differences in the mean for Latina females and Latino males in the sample. Significant levels for the independent variables were calculated at $p < 0.05$. The researcher employed a regression to further investigate the dataset. T-tests were completed on dichotomous variables of gender (male, female) to determine if there were significant differences among the 397 respondents.

Re-Coded Variables

To help ensure the normal distribution of variables necessary for regression analytic techniques, I analyzed preliminary descriptives and frequencies to determine those variables that needed to be recoded. The three variables that were recoded included high school GPA, high school type, and SAT and ACT scores.

High school GPA. The high school GPA variable originally consisted of eight possible categories: 1 = A or A+, 2 = A-, 3 = B+, 4 = B, 5 = B-, 6 = C+, 7 = C, 8 = D. These values were re-coded into the following groups: 4 = A, 3 = B, 2 = C. This recoding allowed for a more normal distribution and to maintain the integrity of the most frequent responses.

High school type. The high school type variable originally separated the institution type into six categories including: 1 = public school (not charter or magnet), 2 = public charter, 3 = public magnet school, 4 = private religious/parochial school, 6 =

home school. The values were re-coded to reflect a normal distribution and group high school values as follows: 0 = public, 1 = private.

SAT and ACT scores. SAT verbal and SAT math scores and ACT composite scores were recoded to achieve a normalized distribution (Astin & Oseguera, 2005) SAT verbal and SAT math added to get SAT composite score. Recoded ACT composite to SAT and labeled RC converting ACT to SAT. The variable was then recoded to create the final SAT comp score RCSATCOMP.

Dummy Coding

Dummy codes were used for the probable major variable to identify what branch of STEM survey participants were indicating as a probable major. The original variable included 12 = Biology (general), 13 = biochemistry or biophysics, 14 = botany, 15 = environmental science, 16 = marine (life) science, 17 = bacteriology, 18 = zoology, 19 = other biological science, 35 = aeronautical or astronautical engineering, 36 = civil engineering, 37 = chemical engineering, 38 = computer engineering, 39 = electrical or electronic engineering, 40 = industrial engineering, 41 = mechanical engineering, 42 = other engineering, 43 = astronomy, atmospheric science (incl. meteorology), 45 = chemistry, 46 = earth science, 47 = marine science (incl. oceanography), 48 = mathematics, 49 = physics, 50 = other physical science. The dummy coding resulted in three different variables: biological sciences, engineering, physical science and mathematics. Biological sciences was comprised of 13 = biochemistry or biophysics, 14 = botany, 15 = environmental science, 16 = marine (life) science, 17 = bacteriology, 18 = zoology, 19 = other biological science. Engineering included 35 = aeronautical or astronautical engineering, 36 = civil engineering, 37 = chemical engineering, 38 =

computer engineering, 39 = electrical or electronic engineering, 40 = industrial engineering, 41 = mechanical engineering, 42 = other engineering. Lastly, physical sciences and mathematics consists of 43 = astronomy, atmospheric science (incl. meteorology), 45 = chemistry, 46 = earth science, 47 = marine science (incl. oceanography), 48 = mathematics, 49 = physics, 50 = other physical sciences. The dummy coding was done to get a more succinct view of probable majors. The reference group was the recoded physical sciences and mathematics variable.

Correlations

Correlations between the two outcome variables and independent variable to determine positive and negative relationships between independent variables and dependent variables (see Tables 2 – 3). Only those variables that had a significant correlation to the dependent variables, degree aspirations and habits of mind at time 2, were included in the regression model. The exception to this for degree aspirations regression was Puerto Rican, because I wanted to retain all three, Puerto Rican and Mexican as the ethnicity variables and use Other Latino as the reference group. I made the same decision for the habits of the mind regressions.

t-Tests

Independent *t* tests were done in order to determine the differences in the Latina/o student population. Between male and female, there were no significant findings in the demographic or pre-college academic attribute items. Independent sample t-tests were conducted to compare choice to attend, highest academic degree planned, family support to succeed, tutored another student, studied with other students and construct scores for: habits of mind at time 1, academic self-concept at time 1 and 2, social self-concept at

time 1 and 2, college involvement at time 1, academic adjustment at time 2, academic disengagement at time 2, faculty interaction at time 2, overall satisfaction at time 2, and sense of belonging at time 2. In addition, there were significant findings in CIRP construct scores: academic self-concept at time1 and time 2, and college involvement at time.

Degree aspirations. Variance between males and females were clear with regard to degree aspirations was significant. The TFS independent variable, highest academic degree planned proved to be significant between females and males (t(-2.33)). Females had a mean of 5.81 and males had a mean of 5.48. The results indicated that men and women had similar degree aspirations outcomes.

Academic self-concept. Academic self-concept at time 1 comprised of three independent variables: academic ability, drive to achieve, and mathematical ability were significant ($p < 000$). Males had a mean of 52.17 and females had a mean of 48.70. The YFCY construct score academic self-concept comprised of four independent variables: academic ability, drive to achieve, mathematical ability, and self-confidence (intellectual) were found to be significant ($p < .001$) between males and females (t(3.033)). Males had a mean of 49.77 and females had a mean of 46.26.

Positive cross-racial interaction. Positive cross-racial interaction which includes: had meaningful and honest discussion about race outside of class, shared personal feelings and problems, had intellectual discussions outside of class, studied or prepared for class, and socialized or partied were significant ($p < .05$) between males and females (t(-2.445)). Males had a mean of 53.45 and females had a mean of 56.20.

College involvement. Likelihood of college involvement at time 1 which is comprised of: participate in student government, participate in volunteer or community service work, socialize with someone of another race/ethnic group, participate in student club/groups and participate in a study abroad program were significant ($p < 000$) between males and females (t(-4.320)). Males had a mean of 48.97 and females had a mean 52.91.

T-tests that did not show significant mean difference between men and women were: relatives wanted me to come here, I wanted to live near home, family support to succeed, tutored another student, studied with other students, and construct scores: academic adjustment at time 2, academic disengagement at time 2, faculty interaction at time 2, overall satisfaction at time 2, sense of belonging at time 2, academic self-concept at time 1 and 2, social self-concept at time 1 and 2, positive cross-racial interaction, habits of mind at time 1.

Regression

A hierarchical regression analysis was completed to examine the degree to which respondents' background, pre-college attributes, college expectations, to predict degree aspirations for STEM aspirants for Latinas/os. The final block reported with dependent variable degree aspirations consisted, of demographic variables, background characteristics, and habits of mind at time 1. For the second final block reported variables included were demographic characteristics, pre-academic attributes, family, involvement with peers, and CIRP construct scores: college involvement, academic self-concept at time 1 and 2, social self-concept at time 1 and 2, faculty interaction, habits of

mind at time 1, academic disengagement, academic adjustment, overall satisfaction, sense of belonging, and positive cross-racial interaction (see Tables 5-7).

Summary

The purpose of this study was investigating the experiences of Latina/o student's degree aspirations in STEM. The study's sample was obtained from CIRP surveys from the incoming 2010 Freshman class and the 2011 First year. The researcher completed data transformations, t-tests, correlations and developed a regression model for the study. Findings from both data findings will be discussed in the next chapter.

CHAPTER 4

FINDINGS

Introduction

The purpose of this study was to examine factors shaping degree aspirations for Latina/o students' pursuing STEM by analyzing secondary quantitative data from the 2010 Freshman Survey (TFS) and 2011 The First Year of College Survey (YFCY), developed by the Cooperative Institutional Research Program (CIRP). The literature informed my decision to analyze demographic characteristics, pre-college attributes, role of family, academic self-concept, social self-concept, habits of mind at time 1 and 2, role of peers and faculty interactions. These variables were looked at for both women and men to compare, and reveal differences and similarities among the genders.

Results

Final Regression: Degree Aspirations for Highest Degree Planned

All students. Demographic characteristics of race, pre-academic attributes of probable major and *habits of mind* score at time 1 accounted for 3.7% of the variance for degree aspirations (R^2 = . 009, F = 3.787, p = .052). The variables with significant beta coefficients (all negative predictors) were Mexican/Chicano (β = -0.228, t = -2.042, p = .042), engineering (β = -0.282, t = -5.380, p = .000), physical science and mathematics (β = -0.182), p = 001). Race for Puerto Rican and other Latino, and habits of mind score at time 1 were not significant.

Males. Demographic characteristics of race, pre-academic attributes of probable major and *habits of mind* score at time 1 accounted for 3.1% of the variance for degree aspirations (R^2 = .017, F = 3.180, p = .077). The variables with significant beta coefficients that was negative was Mexican/Chicano (β = -.483, t = -2.530, p = .012) and the only positive predictor was biological sciences (β = .343, t = 4.371, p = .000). Race for Puerto Rican and other Latino, physical sciences and mathematics, and habits off mind score at time 1 were not significant predictors.

Females. Demographic characteristics of race, pre-academic attributes of probable major and *habits of mind* score at time 1 accounted for 1.0% of the variance for degree aspirations (R^2 = .005, F = 1.042, p = .308). The only variable with significant beta coefficients (negative) was physical sciences and mathematics (β = -.159, t = -2.294, p = .023). Race for Mexican/Chicano, Puerto Rican and other Latino, engineering, and *habits of mind* score at time 1 were not significant predictors.

Final Regression Model: Habits of Mind at Time 2

All students. Demographic characteristics, pre-academic attributes, family, involvement with peers, and CIRP constructs scores: college involvement, academic self-concept at time 1 and 2, social self-concept at time 1 and 2, faculty interaction at time 2, *habits of mind* at time 1, academic disengagement at time 2, academic adjustment at time 2, overall satisfaction at time 2, sense of belonging at time 2, and cross-racial interaction at time 2 accounted for 2.6% of the variance for habits of mind during time 2 (R^2 = .016, F = 2.658, p = .049). The variable with significant beta coefficients (negative) was Mexican/Chicano (β = -.218, t = -1.974, p = .050). The scores with significant beta coefficients (positive) were likelihood of college involvement at time 1 (β = .103, t =

2.122, $p = .035$), student-faculty interaction at time 2 ($\beta = .152$, $t = 2.783$, $p = .006$), habits of mind at time 1 ($\beta = .426$, $t = 7.276$, $p = .000$), academic disengagement at time 2 (negative) ($\beta = -.113$, $t = -2.333$, $p = .020$), academic self-concept at time 2 (positive) ($\beta = .197$, $t = 2.242$, $p = .026$), and overall satisfaction at time 2 (positive) ($\beta = .149$, $t = 1.970$, $p = .050$). Race for Puerto Rican and other Latino, average grade in high school, degree aspiration, family, engineering, physical sciences and mathematics, academic self-concept time 1, involvement with peers, academic adjustment at time 2, social self-concept at time 2, sense of belonging, positive cross-racial interaction were not significant predictors.

Males. Demographic characteristics, pre-academic attributes, family, involvement with peers, and CIRP construct scores: college involvement at time 1, academic self-concept at time 1 and 2, social self-concept at time 1 and 2, *faculty* interaction at time 2, habits of mind at time 1, academic disengagement at time 2, academic adjustment at time 2, overall satisfaction at time 2, sense of belonging at time 2, and cross-racial interaction at time 2 accounted for 3.3% of the variance for habits of mind at time 2 ($R^2 = .042$, $F = 3.310$, $p = .024$). The variables with significant beta coefficients (negative) were Mexican/Chicano ($\beta = -.490$, $t = -2.437$, $p = .017$), highest academic degree planned (positive) ($\beta = .181$, $t = 2.131$, $p = .036$). The scores with significant beta coefficients were habits of mind at time 1 (positive) ($\beta = .342$, $t = 3.346$, $p = .001$), academic disengagement at time 2 (negative) ($\beta = -.169$, $t = -2.122$, $p = .037$), and cross-racial interactions at time 2 (positive) ($\beta = .249$, $t = 2.998$, $p = .004$). Race for Puerto Rican and other Latino, citizenship status, average grade in high school, family, involvement with peers, college involvement at time 1, academic self-concept at time 1

and 2, social self-concept at time 1 and 2, academic adjustment at time 2, overall satisfaction, and sense of belonging were not significant predictors (see Table 10).

Females. Demographic characteristics, pre-academic attributes, family, involvement with peers, and CIRP construct scores: college involvement at time 1, academic self-concept at time 1 and 2, *social self-concept* at time 1 and 2, *faculty interaction* at time 2, habits of mind at time 1, academic disengagement at time 2, academic adjustment at time 2, overall satisfaction at time 2, sense of belonging at time 2, and cross-racial interaction at time 2 accounted for 2.0 % of the variance for habits of mind at time 2 (R^2 = .021, F = 2.061, p = .109). The variable with significant beta coefficient (negative) was physical sciences and mathematics (β = -.157, t = -2.365, p = .020). The scores with significant beta coefficients (positive) were habits of mind at time 1 (β = .498, t = 6.531, p = .020), faculty interaction at time 2 (β = .192, t = 2.609, p = .010), and academic disengagement at time 2 (negative) (β = -.137, t = -.053, p = .042). Race for Mexican/Chicano, Puerto Rican, and Other Latino, citizenship status, pre-college attributes, peer involvement, family, engineering, college involvement at time 1, academic social-concept at time 1 and 2, social self-concept at time 1 and 2, academic adjustment at time 2, overall satisfaction, sense of belonging and positive cross-racial interaction were not significant predictors (see Table 9).

Discussion

The purpose of this study was to add to the body of literature given the limited literature looking at Latinas/os degree aspirants in STEM by identifying factors that influence Latinas/os in similar and distinct ways, and looking at those variables that are significant for this group of students. In addition, I explored predictors of CIRP construct

habits of mind at time *2,* as past research has indicated the importance of habits of mind for college readiness and academic success.

My first research question was: What contributes to degree aspirations of first-year Latinas/os? This question sought to understand what are the differences and similarities among this group of students and their aspiration to highest degree planned. The anticipated outcome was that probable major in a STEM major would have a positive impact on highest degree planned by Latina/o students. Race identification as a predictor for degree aspirations was not consistent for Latinas/os. When students self-reported race as Mexican/Chicano for all Latinas/os was a significant negative predictor for degree aspirations. This can be attributed to the negative portrayal of Mexican/Chicanos by media outlets and by the views of some educators in k-12 and higher education that Mexican/Chicanos do not do well academically. When Mexican/Chicano was disaggregated by gender Mexican/Chicano was significant for Latinas but was not for Latinos. This can also be due Latinas who consider a field in STEM do not receive encouragement at the rate their male counterparts do or the lack of role models who might be women or individuals of color. Another racial ethnicity that was of negative significant for all Latinas/os was identifying as Puerto Rican, which tends to carry the same stigma as identifying as Mexican/Chicano. Similar to the negative significance on degree aspirations of Mexican/Chicano for Latinas/os, identifying as Puerto Rican was also of negative significance for Latino males. Differences in all groups of probable major were expected by gender as previous research has indicated that men and women's selection of STEM majors varies. Surprisingly, the results of this study revealed that probable major in a STEM field was not of significance for all, male or female. Lastly, a

positive predictor of degree aspirations that was significant for all survey participants was habits of mind at time 1. Students having the information and tools to utilize elements that are included in habits of the mind such as seeking feedback on academic work and accepting failure as the part of the learning process are more likely to view learning as a process and open to including others such as peers and faculty in their academic development.

Gender in STEM

The second research question was: Are there gender differences in the first year Latinas/os STEM degree aspirations*?* This question sought to investigate the variables and constructs within a gender comparison to view if there were any differences or similarities among Latinas/os aspiring to a higher degree. T-tests revealed that independent variable degree aspirations with regard to highest degree planned indicated significant for both genders. CIRP construct score in the TFS academic self-concept at time 1 and time 2, which included independent variables: academic ability, drive to achieve and mathematical ability were significant for both genders. Studies that have looked at predictors for aspirations and completion in STEM fields have noted that a curriculum that is rigorous provides students with the tools to be successful in STEM majors (Rochin & Mello, 2007). In addition, having a positive academic self-concept plays a major role in degree aspirations in STEM. Lastly, positive cross-racial interactions and college involvement were significant for both Latinas and Latinos.

The scant amount of literature that exists on Latina/o students who aspire to pursue STEM majors and the findings may begin to indicate those things that can create aspirational goals for this population of students. A growing number of literature

indicates the importance a student's first year plays in their aspirations and degree attainment. The construct of habits of mind at time 1 were not significant for individual gender groups: Latinas/os. The construct habits of mind at time 1 however was significant ($p < .000$) for all (t(7.276). Harper (2010) identified one component in the anti-deficit model as college achievement, which is comprised of classroom interactions, out-of-class engagement, and experiential/external opportunities, which can at various points, include peers, persistence, and faculty. The findings of the hierarchical regression indicate that for Latinas/os as a whole group their understanding of their habits of mind is significant not just in the classroom, but also outside of the classroom and can take place with both peers and faculty inside and outside of the classroom. Furthermore, it reveals that by it not being significant once the genders are disaggregated, that there is the possibility that the variables that make up habits of mind do not resonate with the learning styles that are unique to the specific gender groups of Latinas/os.

Habits of Mind After First Year of College

The third research question was: What are predictors for the CIRP construct habits of mind at time 2 for first year Latinas/os interested in STEM majors? With this research question I sought to examine what predicted habits of mind at time *2* and if there were differences between Latina and Latino students within the sample. I anticipated as with the previous regression, that major, family and faculty interactions would be predictors of this outcome. Positive predictors were degree aspirations for Latino males, which may be explained because in order to pursue higher degrees, students need to navigate some of the elements that make up the construct habits of mind. Habits of mind at time 1 was a positive indicator of habits of mind at time 2, which is not

surprising and likely indicates the importance of habits of mind being a developmental process that is critical to begin taking place at the high school level. Conley (2007) notes that the development of habits of mind is likely not being explored in high school because of instructional focus, classroom management, and high-stakes standardized tests eclipses it. This study affirms what prior literature has noted that habits of mind plays a significant role in the academic lives of students and the need to have students incorporate habits of the mind during the first year of college is critical for interest in probable major.

Biology was a positive variable for women. Luckenbill-Edds (2002) found that women earn half the bachelor's degrees in biology, which has been contributed to less men studying biology and increase in numbers in the higher education system. Faculty interaction for all and for women proved to be a positive predictor of habits of the mind. The role of faculty in the STEM fields is essential to student aspirations in STEM. While this thesis study did not reveal faculty as significant for student degree aspirations, it did reveal the importance that faculty interactions played after the first year for all participants in the study.

Academic disengagement was a negative predictor of habits of mind for Latinas/os, which is like due to the negative stigma that comes with not engaging in and outside of the classroom. Academic self-concept showed positive impact for both genders, which is likely to due to self-concept in academics being critical in shaping the way students view their academic abilities. Lastly, for males positive cross-racial interactions proved a positive predictor of habits of mind. Studies indicate that positive cross-racial interactions with someone of a different race during college had educational

benefits for students (Antonio, 2001; Chang, Denson, Saenz, & Misa, 2006; Hurtado, 2003; Saenz, Ngai, & Hurtado, 2007). However, findings from this thesis study found that positive cross-racial interaction was only significant for Latino males. Chang, Denson, Saenz, & Misa (2006) contend that those students who "have higher levels of cross-racial interactions tend to report gains made since entering college in their knowledge of and ability to accept different races/cultures, growth in general knowledge, critical thinking ability, and problem-solving skills, and intellectual and social self-confidence than their peers who had lower levels of interaction" (p. 449).

Although for this study, family was not a significant predictor negatively or positively with regard to degree aspirations or habits of mind at time 2, prior research has shown that family in Latina/o culture is salient. Zalaquett (2005) noted in his study that for those students who reported that family helped them succeed in high school and in pursuits of higher education, that family played a fundamental role in their educational lives. The importance of family and parental involvement in the lives of Latinas/os students has repeatedly been identified as key to academic success (Santiago-Rivera, Arredondo, & Gallardo-Cooper, 2002).

Limitations

There are several limitations to this study, which need to be researched in more detail. Although the CIRP survey is administered throughout the United States, participation depends on a particular institution consenting to participation. There is the possibility there were more Latina/o students whose probable major in STEM contribute to higher degree aspirations. Furthermore, a majority of the study participants identified Mexican/Chicano, which is not indicative of the experiences of all Latinas/os. The CIRP

survey also creates some limitations, as it is a survey that has been created around the academia of majority populations, which is not indicative of the unique learning styles of Latinas/os and those elements, which may influence their learning or career goals. For example, while family appears as a positive factor in the literature for Latinas/os in higher education, family was not a significant factor in this study and this can be attributed to the type of questions asked, which may not ask about the specific roles that family play for Latina/o students. Lastly, the quantitative nature of the study does not allow the Latina/o voice to confirm if the findings depict their degree aspirations in STEM.

The study's results have indicated the factor that predicts degree aspirations among Latina/o is racial identification, which is different for Latinas/os. CIRP construct habits of mind at 2 also indicated the significant differences among Latina/o students affirming the need to look at the overall experiences of Latina/o students, but disaggregating the data by gender is critical given the cultural expectations that are placed on Latinas/os in different ways. Implications for findings for practitioners and educators, and recommendations for future research are discussed in Chapter 5.

CHAPTER 5

CONCLUSION

Interpretation of the Findings

The purpose of this quantitative study was to add to the body of literature of Latina/o STEM degree aspirants, as a limited amount of literature exists on those factors which motivated this population of students. The analysis revealed several significant CIRP constructs, as well as significant gender differences among Latinas/os aspirations in STEM. These findings have significant implications for scholars, faculty and staff and administrators to better encourage and support their Latina/o students who have aspirations of pursuing a STEM field.

Theoretical Implications

Harper's (2010) anti-achievement framework for studying students of color in STEM focuses on three pipeline points (pre-college socialization and readiness, college achievement, and post-college persistence). For the purpose of this study, specific concepts from Harper (2010) were used: pre-college socialization and readiness and post-college persistence were used to frame this study.

Pre-College and Socialization Readiness

K-12 forces. Beginning to shape the social and academic self-concept of Latina/o students at an early point in their academic careers is K-12, which is critical to students developing a positive outlook on degree aspirations. High school is a significant time where students can begin to develop positive habits of mind that can be a tool for students

to engage in their academic interests. For Latinas/os in STEM creating opportunities where students can engage in positive peer engagement with other students who are interested in STEM and who have had positive outcomes can begin to create development of habits of mind. Role models and mentors can help Latina/o students develop their "science identity" (Harper, 2010, p. 70) at an earlier point in their educational pathways. In addition, community programs that promote awareness of STEM can develop college readiness in math and science subjects, and can create STEM cognizance and preparation before arriving at post-secondary institutions.

College achievement. Attending a post-secondary institution brings with it a myriad of expectations that students place on themselves, and the expectations of family and peers, in addition to the institutional expectations placed on students. The findings within this study found that for all participants academic self-concept was significant for students to their development of habits of mind. Higher education institutions should work to help students develop positive outcomes for both and to be aware that all students arrive to college with different views of their academic abilities.

Classroom interactions. A lot of time spent by students in college classrooms and their respective higher education institutions, which is why it is imperative for first year students to know how to negotiate "onlyness" (Harper, 2010). When students feel like they are the only ones in a particular major and do not see other students similar to them, such as other Latinas/os in STEM, it is easy to become disengaged, especially in the classroom. Academic disengagement was found in this study to be a negative predictor of habits of mind for Latinas and Latinos. Additionally, the first year of college was a

critical time for the development of habits of mind and most likely predicted a positive outcome for habits of mind into the second year for both Latina/o students.

Out-of-class-engagement. Experiences that occur outside of the classroom can take place in many different ways such as getting involved in student organizations and clubs, taking advantage of the myriad of campus resources available to students. Out-of-class-engagement is also a place where students may have the opportunity to develop or expand their leadership, which may contribute to preparation in STEM. Lastly, some peer interactions out-of-class can be valuable for interest in STEM. Many engaging with graduate students in a lab or student organization or current STEM students can positively influence STEM achievement.

Implications for Practice

Degree Aspirations

Degree aspirations for Latina/o play a significant role in probable major and while support from higher education institutions in needed and encouraged, additionally, colleges and universities need to be aware that gender among Latinas/os does make a difference with regard to probably major in STEM. This requires that post-secondary institutions promote information with regard to STEM in different ways to Latinas and Latinos. This may mean to be more specific when reaching out to Latinas about potential career outcomes in the physical sciences and mathematics given the history of it being a male dominated field.

Habits of Mind

Habits of mind is a term that may not be familiar to all in higher education and from this study it has shown that it is salient term when working with Latina/o students.

Degree aspirations, college involvement, faculty interaction, and academic self-concept were positive predictors of habits of the mind, which is a term for behaviors that are necessary for college readiness. When students feel ready for college they are equipped with a skill set that allows them to ask questions, to receive and provide critical feedback and to accept failure as part of the learning process among other things. Many Latina/o students arrive at college feeling overwhelmed and not necessarily ready for a new environment and what it entails. Exposing aspects of habits of mind to first-Latina/o students can begin to familiar them with different tools to be successful in college.

Cross-Racial Interactions

More and more discussions have been taking place with regard to the role that cross-racial interactions plays in the role of undergraduate students (Chang, 2006). This study has shown that positive cross-racial interactions, which encompasses interactions with diverse others was a positive predictor of habits of mind for Latinos. Engaging students in diverse relationships inside and outside of the classroom and with faculty, mentors and peers are critical to learning to work and engage in diverse academic and work environments.

Recommendation for Policy and Practice

Policy conversations with regard to STEM among administrators need to discuss gender if disparities among Latinas/os STEM majors at higher education institutions is going to change. The motivation to address diversity in STEM fields is apparent given the current discussion about the need for a more diverse workforce that includes Latinas and Latinos. While four-year institutions each have unique student populations of

Latina/o students, in order to best give these students the opportunity to aspire to a major in a STEM field suggestions for practice are discussed.

Recommendation for Policy

Acceptance at higher education institutions is done by a number of things such as personal statement, GPA and SAT scores, and can begin to shape degree aspirations and probable major even before students arrive at their selected institution. Individual colleges can work to promote STEM majors the same way they would to those students who demonstrate through their high GPA, SAT scores and number of AP classes passed to all students, and present all students with the economic and career outlook for STEM careers. In addition, looking into the timing of declaring a major should be revisited, as many colleges require students to declare a major by a specific unit count or upon entering college. Latinas/os do not always have the same access to a rigorous high school education given their lower socio economic status, because of this they arrive at a colleges and universities underprepared for the demands of STEM fields and many times have to pass remedial classes before they can make it to upper division math and science classes. By the time Latina/os have passed the remedial coursework required, many have to declare a major and cannot do so in STEM as they do not have the upper division coursework needed to pursue a STEM major.

Recommendation for Practice

Mathematics and science departments should not just focus on disseminating information online, but also providing students with information during student orientation, first-year experiences, and university 100 programs. Undergraduate research programs can also play a significant role in providing students interested in STEM

opportunities to get involved in research. While not all undergraduate research opportunity programs serve first-year students, this is a great way to give access at an earlier point of students educational careers. According to Pascarella and Terenzini (2005), "under- graduate research programs are an amalgam of situational and behavioral factors intended both to provide a window on the intellectual life of the scholar and to promote students' active involvement in their own learning, increased and more meaningful interaction with faculty members, opportunities to apply course-related theory and skills in solving real problems, and a challenging intellectual activity" (p. 406). This type of high impact practice allows students to begin career exploration early, and to determine for themselves if it is a career they want to aspire to.

In addition, institutions can be intentional about recruiting past alumni who pursued STEM fields and have continued to further their education or who are currently working in the field. By having alumni speak with students who are not yet sure of what major they want to pursue, or those who aspire to a degree in STEM, an example of individuals who are currently in the field, and who are transparent about their experiences can create a connection for students that goes far beyond what is taught in the classroom.

Recommendations for Further Research

Current literature on Latina/o in STEM is very limited and is even less abundant from an anti-deficit educational view. Continuing quantitative work and disaggregating Latinas/o from underrepresented minorities in STEM and additionally disaggregating the data among Latinas and Latinos will help to identify those specific characteristics that are unique to this student population, and then to each gender. This study revealed that gender for Latinas/os was significant in terms of degree aspirations in STEM, and based

on the literature conclusions can be inferred as to why Latina women thrive in areas that Latinos do not and vice versa. Using frameworks such as Latina/o Critical Theory, which examine those experiences, which are unique to the community of Latinas/os such as immigration status, language, ethnicity, and culture (Solórzano & Delgado Bernal, 2001) can provide insight and tools to better serve Latinas/os in STEM.

Furthermore, using national databases may also reveal additional factors that can add and develop an anti-deficit literature that will shape recruitment, persistence and policy development for Latinas/os whose aspirational interests are in the STEM fields. In addition, expanding the qualitative research to get a sense, and understanding of the lived experiences of Latinas/os, and exploring in more detail those elements that affect aspirations and persistence with a focus on the students who have had positive experiences, and completion of degrees versus the traditional route of the deficit model.

In addition, with more and more Latinas/os pursuing higher education, there has been more designation of HSIs (Hispanic Serving Institutions) in states like California. More research with regard to HSIs, which account for almost 6% of all postsecondary institutions and enroll 1.4 million Latina/o students, and STEM will add to the body of literature and continue to inform higher education. Lord and Camacho (2011) stated that institution type can have a significant effect on Latino graduation in engineering; HSIs show the most growth in graduating Latino engineers.

Conclusion

As Latinas/os continue to pursue higher education, and in order to diversify the fields of science, technology, engineering and mathematics (STEM), more outreach needs to take place at higher education institutions. This thesis study has shown that

Latinas are impacted by different factors when aspiring to STEM fields, and such differences needed to be addressed individually, as many of the gender implications are brought on by the cultural elements of identifying as Latina/o. Continued research needs to be done from the anti-deficit approach focusing on those positive outcomes that are working for Latina/o students. As well as the importance of collaboration both inside and outside of the classroom among administrators, campus programs such as: outreach, undergraduate research, orientation and first-year experience, high school bridge programs and departments that oversee STEM fields. Furthermore, research is needed to recognize those factors such as faculty-interactions, socio-economic status and academic preparedness, and their role in degree aspirations and persistence for Latinas and Latinos. Diversity in STEM not only brings about inclusion of diverse backgrounds, but also of diverse perspectives and innovation to STEM fields and careers.

APPENDICES

APPENDIX A

THE FIRST YEAR SURVEY

2010 CIRP FRESHMAN SURVEY

PLEASE PRINT IN ALL CAPS YOUR NAME AND PERMANENT/HOME ADDRESS (one letter or number per box).

NAME: FIRST | MI | LAST

When were you born? Month (01-12) | Day (01-31) | Year

ADDRESS:

CITY: STATE: ZIP: PHONE: – –

STUDENT ID# *(as instructed)*: EMAIL *(print letters carefully)*:

SERIAL #

MARKING DIRECTIONS

- Use a black or blue pen.
- Fill in your response completely. Mark out any answers you wish to change with an "X".

CORRECT MARK INCORRECT MARKS

Group Code A B

1. Your sex: ○ Male ○ Female

2. How old will you be on December 31 of this year? (Mark one)

16 or younger ○ | 17 ○ | 18 ○ | 19 ○ | 20 ○ | 21-24 ○ | 25-29 ○ | 30-39 ○ | 40-54 ○ | 55 or older ○

3. Is English your native language?

○ Yes ○ No

4. In what year did you graduate from high school? (Mark one)

2010 ○ | 2009 ○ | 2008 ○ | 2007 or earlier ○ | Did not graduate but passed G.E.D. test ○ | Never completed high school ○

5. Are you enrolled (or enrolling) as a: (Mark one)

Full-time student? ○ | Part-time student? ○

6. How many miles is this college from your permanent home? (Mark one)

5 or less ○ | 6-10 ○ | 11-50 ○ | 51-100 ○ | 101-500 ○ | Over 500 ○

7. What was your average grade in high school? (Mark one)

A or A+ ○ | A– ○ | B+ ○ | B ○ | B– ○ | C+ ○ | C ○ | D ○

8. What were your scores on the SAT I and/or ACT?

SAT VERBAL

SAT MATH

SAT WRITING

ACT Composite

9. From what kind of high school did you graduate? (Mark one)

○ Public school (not charter or magnet)
○ Public charter school
○ Public magnet school
○ Private religious/parochial school
○ Private independent college-prep school
○ Home school

10. Prior to this term, have you ever taken courses for credit at this institution?

○ Yes ○ No

11. Since leaving high school, have you ever taken courses, whether for credit or not for credit, at any other institution (university, 4- or 2-year college, technical, vocational, or business school)?

○ Yes ○ No

12. Where do you plan to live during the fall term? (Mark one)

With my family or other relatives ○
Other private home, apartment, or room ○
College residence hall ○
Fraternity or sorority house ○
Other campus student housing ○
Other ○

13. To how many colleges other than this one did you apply for admission this year?

None ○ | 1 ○ | 2 ○ | 3 ○ | 4 ○ | 5 ○ | 6 ○ | 7-10 ○ | 11 or more ○

14. Were you accepted by your first choice college? ○ Yes ○ No

15. Is this college your: (Mark one)

First choice? ○ | Second choice? ○ | Third choice? ○ | Less than third choice? ○

16. Citizenship status:

○ U.S. citizen
○ Permanent resident (green card)
○ Neither

17. Do you currently have veteran status with the US Armed Forces, Military Reserves or National Guard? (Mark one)

○ Yes ○ No

18. Are your parents: (Mark one)

Both alive and living with each other? ○
Both alive, divorced or living apart? ○
One or both deceased? ○

19. During high school (grades 9-12) how many years did you study each of the following subjects? (Mark one for each item)

	None	1/2	1	2	3	4	5 or more
English	○	○	○	○	○	○	○
Mathematics	○	○	○	○	○	○	○
Foreign Language	○	○	○	○	○	○	○
Physical Science	○	○	○	○	○	○	○
Biological Science	○	○	○	○	○	○	○
History/Am. Gov't.	○	○	○	○	○	○	○
Computer Science	○	○	○	○	○	○	○
Arts and/or Music	○	○	○	○	○	○	○

20. Do you have any of the following disabilities or medical conditions? (Mark yes or no for each item)

(Y) (N) Learning disability (dyslexia, etc.)
(Y) (N) Attention-deficit/hyperactivity disorder (ADHD)
(Y) (N) Physical disability (speech, sight, mobility, hearing, etc.)
(Y) (N) Chronic illness (cancer, diabetes, autoimmune disorders, etc.)
(Y) (N) Psychological disorder (depression, etc.)
(Y) (N) Other

21. What is the highest academic degree that you intend to obtain? (Mark one in each column)

	Highest Planned	Highest Planned at This College
None	○	○
Vocational certificate	○	○
Associate (A.A. or equivalent)	○	○
Bachelor's degree (B.A., B.S., etc.)	○	○
Master's degree (M.A., M.S., etc.)	○	○
Ph.D. or Ed.D.	○	○
M.D., D.O., D.D.S., or D.V.M.	○	○
J.D. (Law)	○	○
B.D. or M.DIV. (Divinity)	○	○
Other	○	○

22. How would you describe the racial composition of the high school you last attended and the neighborhood where you grew up? (Mark one in each row)

	Completely non-White	Mostly non-White	Roughly half non-White	Mostly White	Completely White
High school I last attended	○	○	○	○	○
Neighborhood where I grew up	○	○	○	○	○

23. How much of your first year's educational expenses (room, board, tuition, and fees) do you expect to cover from each of the sources listed below?
(Mark one answer for each possible source)

	None	Less than $1,000	$1,000 to 2,999	$3,000 to 5,999	$6,000 to 9,999	$10,000+
Family resources (parents, relatives, spouse, etc.)	○	○	○	○	○	○
My own resources (savings from work, work-study, other income)	○	○	○	○	○	○
Aid which need not be repaid (grants, scholarships, military funding, etc.)	○	○	○	○	○	○
Aid which must be repaid (loans, etc.)	○	○	○	○	○	○
Other than above	○	○	○	○	○	○

24. What is your best estimate of your parents' total income last year? Consider income from all sources before taxes. (Mark one)

○ Less than $10,000	○ $50,000-59,999
○ $10,000-14,999	○ $60,000-74,999
○ $15,000-19,999	○ $75,000-99,999
○ $20,000-24,999	○ $100,000-149,999
○ $25,000-29,999	○ $150,000-199,999
○ $30,000-39,999	○ $200,000-249,999
○ $40,000-49,999	○ $250,000 or more

25. Do you have any concern about your ability to finance your college education? (Mark one)

- None (I am confident that I will have sufficient funds) ○
- Some (but I probably will have enough funds) ○
- Major (not sure I will have enough funds to complete college) ○

26. Current religious preference:
(Mark one in each column)

	Yours	Father's	Mother's
Baptist	Ⓨ	Ⓕ	Ⓜ
Buddhist	Ⓨ	Ⓕ	Ⓜ
Church of Christ	Ⓨ	Ⓕ	Ⓜ
Eastern Orthodox	Ⓨ	Ⓕ	Ⓜ
Episcopalian	Ⓨ	Ⓕ	Ⓜ
Hindu	Ⓨ	Ⓕ	Ⓜ
Jewish	Ⓨ	Ⓕ	Ⓜ
LDS (Mormon)	Ⓨ	Ⓕ	Ⓜ
Lutheran	Ⓨ	Ⓕ	Ⓜ
Methodist	Ⓨ	Ⓕ	Ⓜ
Muslim	Ⓨ	Ⓕ	Ⓜ
Presbyterian	Ⓨ	Ⓕ	Ⓜ
Quaker	Ⓨ	Ⓕ	Ⓜ
Roman Catholic	Ⓨ	Ⓕ	Ⓜ
Seventh Day Adventist	Ⓨ	Ⓕ	Ⓜ
United Church of Christ/Congregational	Ⓨ	Ⓕ	Ⓜ
Other Christian	Ⓨ	Ⓕ	Ⓜ
Other Religion	Ⓨ	Ⓕ	Ⓜ
None	Ⓨ	Ⓕ	Ⓜ

27. Do you consider yourself: (Mark yes or no for each item)

	Yes	No
Born-Again Christian	○	○
Evangelical	○	○

28. For the activities below, indicate which ones you did during the past year. If you engaged in an activity frequently, mark Ⓕ. If you engaged in an activity one or more times, but not frequently, mark Ⓞ (Occasionally). Mark Ⓝ (Not at all) if you have not performed the activity during the past year.
(Mark one for each item)

	Frequently	Occasionally	Not at All
Attended a religious service	Ⓕ	Ⓞ	Ⓝ
Was bored in class	Ⓕ	Ⓞ	Ⓝ
Demonstrated for/against a cause	Ⓕ	Ⓞ	Ⓝ
Tutored another student	Ⓕ	Ⓞ	Ⓝ
Studied with other students	Ⓕ	Ⓞ	Ⓝ
Was a guest in a teacher's home	Ⓕ	Ⓞ	Ⓝ
Smoked cigarettes	Ⓕ	Ⓞ	Ⓝ
Drank beer	Ⓕ	Ⓞ	Ⓝ
Drank wine or liquor	Ⓕ	Ⓞ	Ⓝ
Felt overwhelmed by all I had to do	Ⓕ	Ⓞ	Ⓝ
Felt depressed	Ⓕ	Ⓞ	Ⓝ
Performed volunteer work	Ⓕ	Ⓞ	Ⓝ
Asked a teacher for advice after class	Ⓕ	Ⓞ	Ⓝ
Voted in a student election	Ⓕ	Ⓞ	Ⓝ
Socialized with someone of another racial/ethnic group	Ⓕ	Ⓞ	Ⓝ
Came late to class	Ⓕ	Ⓞ	Ⓝ
Used the Internet for research or homework	Ⓕ	Ⓞ	Ⓝ
Performed community service as a part of a class	Ⓕ	Ⓞ	Ⓝ
Discussed religion	Ⓕ	Ⓞ	Ⓝ
Discussed politics	Ⓕ	Ⓞ	Ⓝ
Worked on a local, state, or national political campaign	Ⓕ	Ⓞ	Ⓝ
Skipped school/class	Ⓕ	Ⓞ	Ⓝ
Publicly communicated my opinion about a cause (e.g. blog, email, petition)	Ⓕ	Ⓞ	Ⓝ
Helped raise money for a cause or campaign	Ⓕ	Ⓞ	Ⓝ
Fell asleep in class	Ⓕ	Ⓞ	Ⓝ
Failed to complete homework on time	Ⓕ	Ⓞ	Ⓝ

29. Rate yourself on each of the following traits as compared with the average person your age. We want the most accurate estimate of how you see yourself.
(Mark one in each row)

	Highest 10%	Above Average	Average	Below Average	Lowest 10%
Academic ability	○	○	○	○	○
Artistic ability	○	○	○	○	○
Competitiveness	○	○	○	○	○
Computer skills	○	○	○	○	○
Cooperativeness	○	○	○	○	○
Creativity	○	○	○	○	○
Drive to achieve	○	○	○	○	○
Emotional health	○	○	○	○	○
Leadership ability	○	○	○	○	○
Mathematical ability	○	○	○	○	○
Physical health	○	○	○	○	○
Popularity	○	○	○	○	○
Public speaking ability	○	○	○	○	○
Self-confidence (intellectual)	○	○	○	○	○
Self-confidence (social)	○	○	○	○	○
Self-understanding	○	○	○	○	○
Spirituality	○	○	○	○	○
Understanding of others	○	○	○	○	○
Writing ability	○	○	○	○	○

30. Rate yourself on each of the following traits as compared with the average person your age. We want the most accurate estimate of how you see yourself.
(Mark one for each item)

	Highest 10%	Above Average	Average	Below Average	Lowest 10%
Ability to see the world from someone else's perspective	○	○	○	○	○
Tolerance of others with different beliefs	○	○	○	○	○
Openness to having my own views challenged	○	○	○	○	○
Ability to discuss and negotiate controversial issues	○	○	○	○	○
Ability to work cooperatively with diverse people	○	○	○	○	○

31. What is the highest level of formal education obtained by your parents?
(Mark one in each column)

	Father	Mother
Grammar school or less	○	○
Some high school	○	○
High school graduate	○	○
Postsecondary school other than college	○	○
Some college	○	○
College degree	○	○
Some graduate school	○	○
Graduate degree	○	○

32. How often in the past year did you?
(Mark one for each item)

	Frequently	Occasionally	Not at All
Ask questions in class	Ⓕ	Ⓞ	Ⓝ
Support your opinions with a logical argument	Ⓕ	Ⓞ	Ⓝ
Seek solutions to problems and explain them to others	Ⓕ	Ⓞ	Ⓝ
Revise your papers to improve your writing	Ⓕ	Ⓞ	Ⓝ
Evaluate the quality or reliability of information you received	Ⓕ	Ⓞ	Ⓝ
Take a risk because you feel you have more to gain	Ⓕ	Ⓞ	Ⓝ
Seek alternative solutions to a problem	Ⓕ	Ⓞ	Ⓝ
Look up scientific research articles and resources	Ⓕ	Ⓞ	Ⓝ
Explore topics on your own, even though it is not required for a class	Ⓕ	Ⓞ	Ⓝ
Accept mistakes as part of the learning process	Ⓕ	Ⓞ	Ⓝ
Seek feedback on your academic work	Ⓕ	Ⓞ	Ⓝ
Take notes during class	Ⓕ	Ⓞ	Ⓝ
Work with other students on group projects	Ⓕ	Ⓞ	Ⓝ
Integrate skills and knowledge from different sources and experiences	Ⓕ	Ⓞ	Ⓝ

33. Mark only three responses, one in each column.

(M) Your mother's occupation
(F) Your father's occupation
(Y) Your probable career occupation

	Y	F	M
Accountant or actuary	Y	F	M
Actor or entertainer	Y	F	M
Architect or urban planner	Y	F	M
Artist	Y	F	M
Business (clerical)	Y	F	M
Business executive (management, administrator)	Y	F	M
Business owner or proprietor	Y	F	M
Business salesperson or buyer	Y	F	M
Clergy (minister, priest)	Y	F	M
Clergy (other religious)	Y	F	M
Clinical psychologist	Y	F	M
College administrator/staff	Y	F	M
College teacher	Y	F	M
Computer programmer or analyst	Y	F	M
Conservationist or forester	Y	F	M
Dentist (including orthodontist)	Y	F	M
Dietitian or nutritionist	Y	F	M
Engineer	Y	F	M
Farmer or rancher	Y	F	M
Foreign Service worker (including diplomat)	Y	F	M
Homemaker (full-time)	Y	F	M
Interior decorator (including designer)	Y	F	M
Lab technician or hygienist	Y	F	M
Law enforcement officer	Y	F	M
Lawyer (attorney) or judge	Y	F	M
Military service (career)	Y	F	M
Musician (performer, composer)	Y	F	M
Nurse	Y	F	M
Optometrist	Y	F	M
Pharmacist	Y	F	M
Physician	Y	F	M
Policymaker/Government	Y	F	M
School counselor	Y	F	M
School principal or superintendent	Y	F	M
Scientific researcher	Y	F	M
Social, welfare, or recreation worker	Y	F	M
Therapist (physical, occupational, speech)	Y	F	M
Teacher or administrator (elementary)	Y	F	M
Teacher or administrator (secondary)	Y	F	M
Veterinarian	Y	F	M
Writer or journalist	Y	F	M
Skilled trades	Y	F	M
Laborer (unskilled)	Y	F	M
Semi-skilled worker	Y	F	M
Unemployed	Y	F	M
Other	Y	F	M
Undecided	Y		

34. Are you: (Mark all that apply)

- White/Caucasian
- African American/Black
- American Indian/Alaska Native
- Asian American/Asian
- Native Hawaiian/Pacific Islander
- Mexican American/Chicano
- Puerto Rican
- Other Latino
- Other

35. Mark one in each row:

(1) Disagree Strongly
(2) Disagree Somewhat
(3) Agree Somewhat
(4) Agree Strongly

Wealthy people should pay a larger share of taxes than they do now	4	3	2	1
Affirmative action in college admissions should be abolished	4	3	2	1
The federal government should do more to control the sale of handguns	4	3	2	1
The federal government is not doing enough to control environmental pollution	4	3	2	1
A national health care plan is needed to cover everybody's medical costs	4	3	2	1
The federal government should raise taxes to reduce the deficit	4	3	2	1
Addressing global warming should be a federal priority	4	3	2	1
The chief benefit of a college education is that it increases one's earning power	4	3	2	1
Gays and lesbians should have the legal right to adopt a child	4	3	2	1

36. How would you characterize your political views? (Mark one)

- Far left
- Liberal
- Middle-of-the-road
- Conservative
- Far right

37. In deciding to go to college, how important to you was each of the following reasons? (Mark one answer for each possible reason)

	Very Important	Somewhat Important	Not Important
To be able to get a better job	V	S	N
To gain a general education and appreciation of ideas	V	S	N
To make me a more cultured person	V	S	N
To be able to make more money	V	S	N
To learn more about things that interest me	V	S	N
To get training for a specific career	V	S	N
To prepare myself for graduate or professional school	V	S	N

38. During your last year in high school, how much time did you spend during a typical week doing the following activities?

Hours per week:	None	Less than 1 hour	1-2	3-5	6-10	11-15	16-20	Over 20
Studying/homework								
Socializing with friends								
Talking with teachers outside of class								
Exercise or sports								
Partying								
Working (for pay)								
Volunteer work								
Student clubs/groups								
Watching TV								
Household/childcare duties								
Reading for pleasure								
Playing video/computer games								
Online social networks (MySpace, Facebook, etc.)								

39. Below are some reasons that might have influenced your decision to attend this particular college. How important was each reason in your decision to come here? (Mark one answer for each possible reason)

	Very Important	Somewhat Important	Not Important
My parents wanted me to come here	V	S	N
My relatives wanted me to come here	V	S	N
My teacher advised me	V	S	N
This college has a very good academic reputation	V	S	N
This college has a good reputation for its social activities	V	S	N
I was offered financial assistance	V	S	N
The cost of attending this college	V	S	N
High school counselor advised me	V	S	N
Private college counselor advised me	V	S	N
I wanted to live near home	V	S	N
Not offered aid by first choice	V	S	N
Could not afford first choice	V	S	N
This college's graduates gain admission to top graduate/professional schools	V	S	N
This college's graduates get good jobs	V	S	N
I was attracted by the religious affiliation/orientation of the college	V	S	N
I wanted to go to a school about the size of this college	V	S	N
Rankings in national magazines	V	S	N
Information from a website	V	S	N
I was admitted through an Early Action or Early Decision program	V	S	N
The athletic department recruited me	V	S	N
A visit to the campus	V	S	N
Ability to take online courses	V	S	N

40. The current economic situation significantly affected my college choice: (Mark one)

- Agree Strongly
- Agree Somewhat
- Disagree Somewhat
- Disagree Strongly

41. Below is a list of different undergraduate major fields grouped into general categories. Mark only one oval to indicate your probable field of study.

ARTS AND HUMANITIES
- Art, fine and applied (1)
- English (language and literature) (2)
- History (3)
- Journalism (4)
- Language and Literature (except English) (5)
- Music (6)
- Philosophy (7)
- Speech (8)
- Theater or Drama (9)
- Theology or Religion (10)
- Other Arts and Humanities (11)

BIOLOGICAL SCIENCE
- Biology (general) (12)
- Biochemistry or Biophysics (13)
- Botany (14)
- Environmental Science (15)
- Marine (Life) Science (16)
- Microbiology or Bacteriology (17)
- Zoology (18)
- Other Biological Science (19)

BUSINESS
- Accounting (20)
- Business Admin. (general) (21)
- Finance (22)
- International Business (23)
- Marketing (24)
- Management (25)
- Secretarial Studies (26)
- Other Business (27)

EDUCATION
- Business Education (28)
- Elementary Education (29)
- Music or Art Education (30)
- Physical Education or Recreation (31)
- Secondary Education (32)
- Special Education (33)
- Other Education (34)

ENGINEERING
- Aeronautical or Astronautical Eng (35)
- Civil Engineering (36)
- Chemical Engineering (37)
- Computer Engineering (38)
- Electrical or Electronic Engineering (39)
- Industrial Engineering (40)
- Mechanical Engineering (41)
- Other Engineering (42)

PHYSICAL SCIENCE
- Astronomy (43)
- Atmospheric Science (incl. Meteorology) (44)
- Chemistry (45)
- Earth Science (46)
- Marine Science (incl. Oceanography) (47)
- Mathematics (48)
- Physics (49)
- Other Physical Science (50)

PROFESSIONAL
- Architecture or Urban Planning (51)
- Family & Consumer Sciences (52)
- Health Technology (medical, dental, laboratory) (53)
- Library or Archival Science (54)
- Medicine, Dentistry, Veterinary Medicine (55)
- Nursing (56)
- Pharmacy (57)
- Therapy (occupational, physical, speech) (58)
- Other Professional (59)

SOCIAL SCIENCE
- Anthropology (60)
- Economics (61)
- Ethnic Studies (62)
- Geography (63)
- Political Science (gov't., international relations) (64)
- Psychology (65)
- Public Policy (66)
- Social Work (67)
- Sociology (68)
- Women's Studies (69)
- Other Social Sciences (70)

TECHNICAL
- Building Trades (71)
- Data Processing or Computer Programming (72)
- Drafting or Design (73)
- Electronics (74)
- Mechanics (75)
- Other Technical (76)

OTHER FIELDS
- Agriculture (77)
- Communications (78)
- Computer Science (79)
- Forestry (80)
- Kinesiology (81)
- Law Enforcement (82)
- Military Science (83)
- Other Field (84)
- Undecided (85)

42. Please indicate the importance to you personally of each of the following: (Mark one for each item)

(N) Not Important (S) Somewhat Important (V) Very Important (E) Essential

	E	V	S	N
Becoming accomplished in one of the performing arts (acting, dancing, etc.)	E	V	S	N
Becoming an authority in my field	E	V	S	N
Obtaining recognition from my colleagues for contributions to my special field	E	V	S	N
Influencing the political structure	E	V	S	N
Influencing social values	E	V	S	N
Raising a family	E	V	S	N
Being very well off financially	E	V	S	N
Helping others who are in difficulty	E	V	S	N
Making a theoretical contribution to science	E	V	S	N
Writing original works (poems, novels, etc.)	E	V	S	N
Creating artistic works (painting, sculpture, etc.)	E	V	S	N
Becoming successful in a business of my own	E	V	S	N
Becoming involved in programs to clean up the environment	E	V	S	N
Developing a meaningful philosophy of life	E	V	S	N
Participating in a community action program	E	V	S	N
Helping to promote racial understanding	E	V	S	N
Keeping up to date with political affairs	E	V	S	N
Becoming a community leader	E	V	S	N
Improving my understanding of other countries and cultures	E	V	S	N
Adopting "green" practices to protect the environment	E	V	S	N

43. What is your best guess as to the chances that you will: (Mark one for each item)

(N) No Chance (L) Very Little Chance (S) Some Chance (V) Very Good Chance

	V	S	L	N
Change major field?	V	S	L	N
Change career choice?	V	S	L	N
Participate in student government?	V	S	L	N
Get a job to help pay for college expenses?	V	S	L	N
Work full-time while attending college?	V	S	L	N
Join a social fraternity or sorority?	V	S	L	N
Play club, intramural, or recreational sports?	V	S	L	N
Play intercollegiate athletics (e.g., NCAA or NAIA-sponsored)?	V	S	L	N
Make at least a "B" average?	V	S	L	N
Need extra time to complete your degree requirements?	V	S	L	N
Participate in student protests or demonstrations?	V	S	L	N
Transfer to another college before graduating?	V	S	L	N
Be satisfied with your college?	V	S	L	N
Participate in volunteer or community service work?	V	S	L	N
Seek personal counseling?	V	S	L	N
Communicate regularly with your professors?	V	S	L	N
Socialize with someone of another racial/ethnic group?	V	S	L	N
Participate in student clubs/groups?	V	S	L	N
Participate in a study abroad program?	V	S	L	N
Have a roommate of a different race/ethnicity?	V	S	L	N
Discuss course content with students outside of class?	V	S	L	N
Work on a professor's research project?	V	S	L	N
Get tutoring help in specific courses?	V	S	L	N
Take courses from more than one college simultaneously?	V	S	L	N

The remaining ovals are provided for questions specifically designed by your college rather than the Higher Education Research Institute. If your college has chosen to use the ovals, please observe carefully the supplemental directions given to you.

44. A B C D E	48. A B C D E	52. A B C D E	56. A B C D E	60. A B C D E
45. A B C D E	49. A B C D E	53. A B C D E	57. A B C D E	61. A B C D E
46. A B C D E	50. A B C D E	54. A B C D E	58. A B C D E	62. A B C D E
47. A B C D E	51. A B C D E	55. A B C D E	59. A B C D E	63. A B C D E

THANK YOU!

Data Recognition Corp.-6G0044-10816-54321

APPENDIX B

YOUR FIRST COLLEGE YEAR

2011 YOUR FIRST COLLEGE YEAR SURVEY

CIRP

Please print in ALL CAPS.
Your name and email address here helps to facilitate follow-up studies to improve the college experience.

NAME: FIRST MI LAST

EMAIL *(print letters carefully)*:

When were you born?
Month (01-12) Day (01-31) Year

STUDENT ID# *(as instructed)*:

SERIAL #

MARKING DIRECTIONS
- Use a black or blue pen.
- "X" out any answer you wish to change.

CORRECT MARK INCORRECT MARKS

Group Code A B

Congratulations on your progress during your first college year. We are very interested in your experiences as a first-year college student. This form has been designed to provide feedback that can help improve the first-year college experience. Thank you very much for your help with this important project.

1. Compared with when you entered this college, how would you now describe your: (Mark one for each item)

	Much Stronger	Stronger	No Change	Weaker	Much Weaker
General knowledge	○	○	○	○	○
Knowledge of a particular field or discipline	○	○	○	○	○
Knowledge of people from different races/cultures	○	○	○	○	○
Understanding of the problems facing your community	○	○	○	○	○
Understanding of national issues	○	○	○	○	○
Understanding of global issues	○	○	○	○	○
Ability to conduct research	○	○	○	○	○
Ability to work as part of a team	○	○	○	○	○
Critical thinking skills	○	○	○	○	○
Problem-solving skills	○	○	○	○	○
Leadership ability	○	○	○	○	○

2. Since entering this college, how often have you interacted with the following people (e.g., by phone, e-mail, Instant Messenger, or in person): (Mark one for each item)

	Daily	2 or 3 times per week	Once a week	1 or 2 times per month	1 or 2 times per term	Never
Faculty during office hours	○	○	○	○	○	○
Faculty outside of class or office hours	○	○	○	○	○	○
Academic advisors/counselors	○	○	○	○	○	○
Close friends at this institution	○	○	○	○	○	○
Close friends not at this institution	○	○	○	○	○	○
Your family	○	○	○	○	○	○
Graduate students/teaching assistants	○	○	○	○	○	○
Close friends from your high school	○	○	○	○	○	○

3. Do you have any concern about your ability to finance your college education? (Mark one)

- ○ None (I am confident that I will have sufficient funds)
- ○ Some (but I probably will have enough funds)
- ○ Major (not sure I will have enough funds to complete college)

4. Since entering this college, how often have you felt: (Mark one for each item)

	Frequently	Occasionally	Not at all
Lonely or homesick	○	○	○
Isolated from campus life	○	○	○
Unsafe on this campus	○	○	○
Worried about your health	○	○	○
That your courses inspired you to think in new ways	○	○	○
That your job responsibilities interfered with your schoolwork	○	○	○
That your family responsibilities interfered with your schoolwork	○	○	○
Family support to succeed	○	○	○
That faculty provided me with feedback that helped me assess my progress in class	○	○	○
That my contributions were valued in class	○	○	○
That faculty encouraged me to ask questions and participate in discussions	○	○	○

5. Please rate your satisfaction with this institution on each of the aspects of college life listed below: (Mark one for each item)

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied	Can't Rate/No Experience
General education and core curriculum courses	○	○	○	○	○	○
Your overall academic experience	○	○	○	○	○	○
Classroom facilities	○	○	○	○	○	○
Computer facilities/ labs	○	○	○	○	○	○
Library facilities	○	○	○	○	○	○
Laboratory facilities and equipment	○	○	○	○	○	○
Computing assistance	○	○	○	○	○	○
Academic advising	○	○	○	○	○	○
Student housing (e.g., res. halls)	○	○	○	○	○	○
Financial aid office	○	○	○	○	○	○
Financial aid package	○	○	○	○	○	○
Student health services	○	○	○	○	○	○
Student psychological services	○	○	○	○	○	○
Orientation for new students	○	○	○	○	○	○
Opportunities for community service	○	○	○	○	○	○
First-year programs (e.g., first-year seminar, learning community, linked courses)	○	○	○	○	○	○

6. Since entering this college, how often have you utilized the following services: (Mark one for each item)

	Frequently	Occasionally	Not at all
Study skills advising	○	○	○
Financial aid advising	○	○	○
Student health services	○	○	○
Student psychological services	○	○	○
Writing center	○	○	○
Disability resource center	○	○	○
Career services	○	○	○
Academic advising	○	○	○

7. Rate yourself on each of the following traits as compared with the average person your age. We want the most accurate estimate of how you see yourself. (Mark one for each item)

	Highest 10%	Above Average	Average	Below Average	Lowest 10%
Academic ability	○	○	○	○	○
Artistic ability	○	○	○	○	○
Competitiveness	○	○	○	○	○
Computer skills	○	○	○	○	○
Cooperativeness	○	○	○	○	○
Creativity	○	○	○	○	○
Drive to achieve	○	○	○	○	○
Emotional health	○	○	○	○	○
Leadership ability	○	○	○	○	○
Mathematical ability	○	○	○	○	○
Physical health	○	○	○	○	○
Public speaking ability	○	○	○	○	○
Risk-taking	○	○	○	○	○
Self-confidence (intellectual)	○	○	○	○	○
Self-confidence (social)	○	○	○	○	○
Self-understanding	○	○	○	○	○
Spirituality	○	○	○	○	○
Understanding of others	○	○	○	○	○
Writing ability	○	○	○	○	○

8. Since entering this college, how has it been to: (Mark one for each item)

	Very Easy	Somewhat Easy	Somewhat Difficult	Very Difficult
Understand what your professors expect of you academically	○	○	○	○
Develop effective study skills	○	○	○	○
Adjust to the academic demands of college	○	○	○	○
Manage your time effectively	○	○	○	○
Develop close friendships with other students	○	○	○	○

9. How would you characterize your political views? (Mark one)

- ○ Far left
- ○ Liberal
- ○ Middle-of-the-road
- ○ Conservative
- ○ Far right

10. Rate yourself on each of the following traits as compared with the average person your age. We want the most accurate estimate of how you see yourself. (Mark one for each item)

	Highest 10%	Above Average	Average	Below Average	Lowest 10%
Ability to see the world from someone else's perspective	○	○	○	○	○
Tolerance of others with different beliefs	○	○	○	○	○
Openness to having my own views challenged	○	○	○	○	○
Ability to discuss and negotiate controversial issues	○	○	○	○	○
Ability to work cooperatively with diverse people	○	○	○	○	○

11. Since entering this college, how often have you: (Mark one for each item)

	Frequently	Occasionally	Not at all
Attended a religious service	F	O	N
Been bored in class	F	O	N
Demonstrated for a cause (e.g., boycott, rally, protest)	F	O	N
Tutored another student	F	O	N
Studied with other students	F	O	N
Been a guest in a professor's home	F	O	N
Smoked cigarettes	F	O	N
Drank beer	F	O	N
Drank wine or liquor	F	O	N
Felt overwhelmed by all you had to do	F	O	N
Felt depressed	F	O	N
Performed volunteer work	F	O	N
Asked a professor for advice after class	F	O	N
Voted in a student election	F	O	N
Worked on a local, state, or national political campaign	F	O	N
Socialized with someone of another racial/ethnic group	F	O	N
Come late to class	F	O	N
Used the Internet for research or homework	F	O	N
Performed community service as part of class	F	O	N
Discussed religion	F	O	N
Discussed politics	F	O	N
Maintained a healthy diet	F	O	N
Had adequate sleep	F	O	N
Helped raise money for a cause or campaign	F	O	N
Publicly communicated your opinion about a cause (e.g., blog, email, petition)	F	O	N

12. Think back over the past two weeks. How many times in the past two weeks, if any, have you had five or more alcoholic drinks in a row? (A drink can be a 12-ounce beer or wine cooler, a 4-ounce glass of wine, or a shot of liquor either straight or in a mixed drink.)

- ○ None
- ○ Once
- ○ Twice
- ○ 3-5 times
- ○ 6-9 times
- ○ 10 or more times

13. Please indicate the extent to which you agree or disagree with the following statements: (Mark one for each item)

	Strongly Agree	Agree	Disagree	Strongly Disagree
I have felt discriminated against at this institution because of my race/ethnicity, gender, sexual orientation, or religious affiliation	○	○	○	○
I see myself as part of the campus community	○	○	○	○
Faculty showed concern about my progress	○	○	○	○
There is a lot of racial tension on this campus	○	○	○	○
I have been able to find a balance between academics and extracurricular activities	○	○	○	○
The admission/recruitment materials portrayed this campus accurately	○	○	○	○
Faculty empower me to learn here	○	○	○	○
If asked, I would recommend this college to others	○	○	○	○
At least one staff member has taken an interest in my development	○	○	○	○
I feel valued at this institution	○	○	○	○
Faculty believe in my potential to succeed academically	○	○	○	○
My college experiences have exposed me to diverse opinions, cultures, and values	○	○	○	○
Staff encouraged me to get involved in campus activities	○	○	○	○
In class, I have heard faculty express stereotypes based on race/ethnicity, gender, sexual orientation, or religious affiliation	○	○	○	○
Staff recognize my achievements	○	○	○	○
People at this college are supportive of me	○	○	○	○
Faculty encouraged me to meet with them outside of class	○	○	○	○
I am interested in seeking information about current social and political issues	○	○	○	○
I feel a sense of belonging to this campus	○	○	○	○
At least one faculty member has taken an interest in my development	○	○	○	○
I feel I am a member of this college	○	○	○	○
I have effectively led a group to a common purpose	○	○	○	○

14. Please rate your satisfaction with this institution on each of the aspects of college life listed below. (Mark one for each item)

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied	Can't Rate/ No Experience
Amount of contact with faculty	○	○	○	○	○	○
Racial/ethnic diversity of faculty	○	○	○	○	○	○
Racial/ethnic diversity of student body	○	○	○	○	○	○
Class size	○	○	○	○	○	○
Interaction with other students	○	○	○	○	○	○
Relevance of coursework to everyday life	○	○	○	○	○	○
Relevance of coursework to future career plans	○	○	○	○	○	○
Overall quality of instruction	○	○	○	○	○	○
Respect for the expression of diverse beliefs	○	○	○	○	○	○
Availability of campus social activities	○	○	○	○	○	○
Your social life	○	○	○	○	○	○
Overall sense of community among students	○	○	○	○	○	○
Overall college experience	○	○	○	○	○	○

15. What is your overall grade average (as of your most recently completed academic term)? (Mark one)

- ○ A or A+
- ○ A-
- ○ B+
- ○ B
- ○ B-
- ○ C+
- ○ C
- ○ D
- ○ I did not receive grades in my courses

16. How often in the past year did you: (Mark one for each item)

	Frequently	Occasionally	Not at all
Ask questions in class	F	O	N
Support your opinions with a logical argument	F	O	N
Seek solutions to problems and explain them to others	F	O	N
Revise your papers to improve your writing	F	O	N
Evaluate the quality or reliability of information you received	F	O	N
Take a risk because you felt you had more to gain	F	O	N
Seek alternative solutions to a problem	F	O	N
Look up scientific research articles and resources	F	O	N
Explore topics on your own, even though it was not required for a class	F	O	N
Accept mistakes as part of the learning process	F	O	N
Seek feedback on your academic work	F	O	N
Integrate skills and knowledge from different sources and experiences	F	O	N

17. Where did you primarily live while attending college this past year? (Mark one)

On Campus

Special interest housing

- ○ First-year student housing
- ○ Cultural or minority student housing
- ○ Single-sex housing
- ○ Special academic program housing
- ○ Other special interest housing

Regular college housing

- ○ Residence hall
- ○ Apartment
- ○ Fraternity or sorority housing
- ○ Other residential housing

Off Campus

- ○ At home with family
- ○ Fraternity or sorority
- ○ Rented apartment or house
- ○ Other

18. Indicate the importance to you personally of each of the following: (Mark one for each item)

	Essential	Very important	Somewhat important	Not important
Becoming accomplished in one of the performing arts (acting, dancing, etc.)	E	V	S	N
Becoming an authority in my field	E	V	S	N
Obtaining recognition from my colleagues for contributions to my special field	E	V	S	N
Influencing the political structure	E	V	S	N
Influencing social values	E	V	S	N
Raising a family	E	V	S	N
Being very well off financially	E	V	S	N
Helping others who are in difficulty	E	V	S	N
Making a theoretical contribution to science	E	V	S	N
Writing original works (poems, novels, etc.)	E	V	S	N
Creating artistic works (painting, sculpture, etc.)	E	V	S	N
Becoming successful in a business of my own	E	V	S	N
Becoming involved in programs to clean up the environment	E	V	S	N
Developing a meaningful philosophy of life	E	V	S	N
Participating in a community action program	E	V	S	N
Helping to promote racial understanding	E	V	S	N
Keeping up to date with political affairs	E	V	S	N
Becoming a community leader	E	V	S	N
Improving my understanding of other countries and cultures	E	V	S	N
Adopting "green" practices to protect the environment	E	V	S	N

19. To what extent have you experienced the following with students from a racial/ethnic group other than your own? (Mark one for each item)

	Very Often	Often	Sometimes	Seldom	Never
Dined or shared a meal	○	○	○	○	○
Had meaningful and honest discussions about race/ethnic relations outside of class	○	○	○	○	○
Had guarded, cautious interactions	○	○	○	○	○
Shared personal feelings and problems	○	○	○	○	○
Had tense, somewhat hostile interactions	○	○	○	○	○
Had intellectual discussions outside of class	○	○	○	○	○
Felt insulted or threatened because of your race/ethnicity	○	○	○	○	○
Studied or prepared for class	○	○	○	○	○
Socialized or partied	○	○	○	○	○

20. Since entering this college, how much time have you spent during a typical week doing the following activities? (Mark one for each item)

	Hours Per Week							
	None	Less than 1 hour	1 - 2	3 - 5	6 - 10	11 - 15	16 - 20	Over 20
Attending classes/labs	○	○	○	○	○	○	○	○
Studying/homework	○	○	○	○	○	○	○	○
Socializing with friends	○	○	○	○	○	○	○	○
Exercising or sports	○	○	○	○	○	○	○	○
Partying	○	○	○	○	○	○	○	○
Working (for pay) on campus	○	○	○	○	○	○	○	○
Working (for pay) off campus	○	○	○	○	○	○	○	○
Student clubs and groups	○	○	○	○	○	○	○	○
Watching TV	○	○	○	○	○	○	○	○
Household/childcare duties	○	○	○	○	○	○	○	○
Commuting	○	○	○	○	○	○	○	○
Online social networks (MySpace, Facebook, etc.)	○	○	○	○	○	○	○	○

21. Since entering this college have you:
(Mark Yes or No)

	Yes	No
Decided to pursue a different major	Y	N
Remained undecided about a major	Y	N
Changed your career choice	Y	N
Participated in student government	Y	N
Held a full-time job (approx. 40 hours) while taking classes	Y	N
Joined a social fraternity or sorority	Y	N
Played club, intramural, or recreational sports	Y	N
Played intercollegiate athletics (e.g., NCAA or NAIA-sponsored)	Y	N
Participated in student groups/clubs	Y	N
Sought personal counseling	Y	N
Strengthened your religious beliefs/convictions	Y	N
Failed one or more courses	Y	N
Participated in leadership training	Y	N
Taken an honors course	Y	N
Taken a remedial or developmental course	Y	N
Enrolled in a formal program where a group of students takes two or more courses together (e.g., FIG, learning community, linked courses)	Y	N
Participated in an academic support program	Y	N
Had a roommate of a different race/ethnicity	Y	N
Accumulated excessive credit card debt	Y	N
Taken a course or first-year seminar designed to:		
Connect faculty and students in focused academic inquiry	Y	N
Help students adjust to college-level academics	Y	N
Help students adjust to college life	Y	N
Been a leader in an organization	Y	N
Voted in the 2010 fall election	Y	N
Communicated regularly with your professors	Y	N

22. Since entering this college, indicate how often you: (Mark one for each item)

	Frequently	Occasionally	Not at all
Turned in course assignment(s) late	F	O	N
Contributed to class discussions	F	O	N
Discussed course content with students outside of class	F	O	N
Skipped class	F	O	N
Received tutoring	F	O	N
Worked on a professor's research project	F	O	N
Turned in course assignments that did not reflect your best work	F	O	N
Had difficulty getting along with your roommate(s)/housemate(s)	F	O	N
Received from your professor advice or guidance about your educational program	F	O	N
Witnessed academic dishonesty/cheating	F	O	N
Went home for the weekend	F	O	N
Received advice/counseling from another student	F	O	N
Fell asleep in class	F	O	N
Had difficulty getting the courses you need	F	O	N
Instant messaged/texted during class	F	O	N
Worked with classmates on group projects:			
During class	F	O	N
Outside of class	F	O	N
Accessed your campus library resources electronically	F	O	N
Made a presentation in class	F	O	N
Applied concepts from courses to everyday life	F	O	N
Used the institution's website to learn about campus resources	F	O	N
Used the institution's course catalog (paper or online)	F	O	N

23. Are you currently registered to vote?
○ Ineligible ○ Yes ○ No

24. If you could make your college choice over, would you still choose to enroll at your current (or most recent) college?
(Mark one)
○ Definitely yes ○ Probably yes ○ Definitely not ○ Probably not ○ Not sure yet

25. What do you think you will be doing in Fall 2011? (Mark one)
○ Attending your current (or most recent) institution
○ Attending another institution
○ Don't know/have not decided yet
○ Not attending any institution

26. Are you currently a full-time or part-time student?
○ Full-time
○ Part-time
○ Not enrolled

27. Did you transfer into this institution from another college/university?
○ Yes
○ No

28. What year did you first enter:
(Mark one in each column)

	Your 1st College	This College
2010 or 2011	○	○
2009	○	○
2008	○	○
2007	○	○
2006 or earlier	○	○

29. Your sex: ○ Male ○ Female

30. Is English your native language? ○ Yes ○ No

31. Are you: (Mark all that apply)
○ White/Caucasian
○ African American/Black
○ American Indian/Alaska Native
○ Asian American/Asian
○ Native Hawaiian/Pacific Islander
○ Mexican American/Chicano
○ Puerto Rican
○ Other Latino
○ Other

The remaining ovals are provided for additional questions that may be supplied by your institution.

32.	A B C D E	42.	A B C D E
33.	A B C D E	43.	A B C D E
34.	A B C D E	44.	A B C D E
35.	A B C D E	45.	A B C D E
36.	A B C D E	46.	A B C D E
37.	A B C D E	47.	A B C D E
38.	A B C D E	48.	A B C D E
39.	A B C D E	49.	A B C D E
40.	A B C D E	50.	A B C D E
41.	A B C D E	51.	A B C D E

THANK YOU!

Data Recognition Corp.-6G1165-11279-54321

APPENDEX C

TABLES

TABLE 1. Description of Demographic and Descriptive Survey Items and Recoded Variable

Variables	Scale	CRIP Survey	Regression
Your sex	M=0 , F=1	TFS	DegAsp/HOM
Are you	6=Mexican American/Chicano, 7=Puerto Rican, 8=Other Latino	TFS	Deg Asp
From what kind of high school did you graduate?	0=Public, 1=Private	TFS	Deg Asp
What was your average grade in high school?	4=A's, 3=B's, 2=C's	TFS	Deg Asp
What were your scores on the SAT 1 and/or ACT?	Range	TFS	DegAsp
Are you enrolled (or enrolling) as a:	1=Part-time Student, 2=Full-time Student	TFS	DegAsp
How old will you be on December 31 of this year?	Range	TFS	DegAsp
Citizenship Status	1=Neither, 2=Permanent Resident (green card), 3=U.S. Citizen	TFS	DegAsp
My parents wanted to come here?	1=Not important, 2=Somewhat important, 3=Very important	TFS	DegAsp
I wanted to live near home?	1=Not important, 2=Somewhat important, 3=Very important	TFS	DegAsp
Engineering	No=0, Yes=1	TFS	Deg Asp
Biology	No=0, Yes=1	TFS	Deg Asp
Physical Sciences and Mathematics	No=0, Yes=1	TFS	Deg Asp

TABLE 1. Continued

Variables	Scale	CIRP Survey	Regression
Future Act: Participate in Student Government	1=No Chance, 2=Very little chance, 3=Some chance, 4=Very good chance	TFS	Deg Asp
Future Act: Participate in Volunteer or Community Service	1=No Chance, 2=Very little chance, 3=Some chance, 4=Very good chance	TFS	Deg Asp
Future Act: Socialize with Someone of Another Racial/Ethnic Group	1=No Chance, 2=Very little chance, 3=Some chance, 4=Very good chance	TFS	Deg Asp
Future Act: Participate in Student Clubs/Groups	1=No Chance, 2=Very little chance, 3=Some chance, 4=Very good chance	TFS	Deg Asp
Future Act: Participate in a Study Abroad Program	1=No Chance, 2=Very little chance, 3=Some chance, 4=Very good chance	TFS	Deg Asp
Academic Ability	1=Lowest 10%, 2=Below average, 3=Average, 4= Above average, 5=Highest 10%	TFS/YFCY	Deg Asp
Drive to Achieve	1=Lowest 10%, 2=Below average, 3=Average, 4= Above average, 5=Highest 10%	TFS/YFCY	Deg Asp
Mathematical Ability	1=Lowest 10%, 2=Below average, 3=Average, 4= Above average, 5=Highest 10%	TFS/YFCY	Deg Asp
Self-Confidence (Intellectual)	1=Lowest 10%, 2=Below average, 3=Average, 4= Above average, 5=Highest 10%	TFS/YFCY	Deg Asp
Leadership Ability	1=Lowest 10%, 2=Below average, 3=Average, 4= Above average, 5=Highest 10%	TFS	Deg Asp

TABLE 1. Continued

Variables	Scale	CIRP Survey	Regression
Public Speaking Ability	1=Lowest 10%, 2=Below average, 3=Average, 4= Above average, 5=Highest 10%	TFS	Deg Asp
Self-Confidence (Social)	1=Lowest 10%, 2=Below average, 3=Average, 4= Above average, 5=Highest 10%	TFS	Deg Asp
Popularity	1=Lowest 10%, 2=Below average, 3=Average, 4= Above average, 5=Highest 10%	TFS	Deg Asp
Ask Questions in Class	1= Not at all, 2=Occasionally, 3=Frequently	TFS/YFCY	Deg Asp/HOM
Support your opinions with a logical argument	1= Not at all, 2=Occasionally, 3=Frequently	TFS/YFCY	Deg Asp/HOM
Seek solutions to problems and explain them to others	1= Not at all, 2=Occasionally, 3=Frequently	TFS/YFCY	Deg Asp/HOM
Revise your papers to improve your writing	1= Not at all, 2=Occasionally, 3=Frequently	TFS/YFCY	Deg Asp/HOM
Evaluate the quality or reliability of information received	1= Not at all, 2=Occasionally, 3=Frequently	TFS/YFCY	Deg Asp/HOM
Take a risk because you feel you have more to gain	1= Not at all, 2=Occasionally, 3=Frequently	TFS/YFCY	Deg Asp/HOM
Seek alternative solutions to a problem	1= Not at all, 2=Occasionally, 3=Frequently	TFS/YFCY	Deg Asp/HOM
Look up scientific research articles	1= Not at all, 2=Occasionally, 3=Frequently	TFS/YFCY	Deg Asp/HOM
Explore topics on your own, even though it was not required for class	1= Not at all, 2=Occasionally, 3=Frequently	TFS/YFCY	Deg Asp/HOM

TABLE 1. Continued

Variables	Scale	CIRP Survey	Regression
Accept failure as part of the learning process	1= Not at all, 2=Occasionally, 3=Frequently	TFS/YFCY	Deg Asp/HOM
Seek feedback on your academic work	1= Not at all, 2=Occasionally, 3=Frequently	TFS/YFCY	Deg Asp/HOM
Ask Questions in Class	1= Not at all, 2=Occasionally, 3=Frequently	YFCY	Deg Asp/HOM
Interact: Your family	1=Never, 2=1 or 2 times per term, 3=1 or 2 times per month, 4=Once a week, 5=2 or 3 times per week, 6=Daily	YFCY	Deg Asp/HOM
Felt that your family responsibilities interfered with your schoolwork	1=Not at all, 2=Occasionally, 3=Frequently	YFCY	Deg Asp/HOM
Felt that family suport to succeed	1=Not at all, 2=Occasionally, 3=Frequently	YFCY	Deg Asp/HOM
Interact: Faculty during office hours	1=Never, 2=1 or 2 times per term, 3=1 or 2 times per month, 4=Once a week, 5=2 or 3 times per week, 6=Daily	YFCY	Deg Asp/HOM
Interact: Faculty outside of class or office hours	1=Never, 2=1 or 2 times per term, 3=1 or 2 times per month, 4=Once a week, 5=2 or 3 times per week, 6=Daily	YFCY	Deg Asp/HOM
Act: Asked a professor for advice after class	1=Never, 2=1 or 2 times per term, 3=1 or 2 times per month, 4=Once a week, 5=2 or 3 times per week, 6=Daily	YFCY	Deg Asp/HOM
Act: Communicated regularly with your professors	1=No, 2=Yes	YFCY	Deg Asp/HOM
Act in Class: Received from your professor advice or guidance about your educational program	1=Not at all, 2=Occasionally, 3=Frequently	YFCY	Deg Asp/HOM

TABLE 1. Continued

Variables	Scale	CIRP Survey	Regression
Turned in course assignment(s) late	1=Not at all, 2=Occasionally, 3=Frequently	YFCY	Deg Asp/HOM
Skipped class	1=Not at all, 2=Occasionally, 3=Frequently	YFCY	Deg Asp/HOM
Turned in course assignments that did not reflect your best work	1=Not at all, 2=Occasionally, 3=Frequently	YFCY	Deg Asp/HOM
Fell asleep in class	1=Not at all, 2=Occasionally, 3=Frequently	YFCY	Deg Asp/HOM
Ease: Understand what your professors expect of you academically	1=Very difficult, 2=Somewhat difficult, 3=Somewhat easy, 4=Very easy	YFCY	HOM
Ease: Develop effective study skills	1=Very difficult, 2=Somewhat difficult, 3=Somewhat easy, 4=Very easy	YFCY	HOM
Ease: Adjust to the academic demands of college	1=Very difficult, 2=Somewhat difficult, 3=Somewhat easy, 4=Very easy	YFCY	HOM
Ease: Manage your time effectively	1=Very difficult, 2=Somewhat difficult, 3=Somewhat easy, 4=Very easy	YFCY	HOM
Satisfaction: Your overall academic experience	1=Can't rate/no experience, 2= Very dissatisfied, 3=Dissatisfied, 4=Neutral, 5=Satisfied, 6=Very satisfied	YFCY	HOM
Campus Satisfaction: Overall quality of instruction	1=Can't rate/no experience, 2= Very dissatisfied, 3=Dissatisfied, 4=Neutral, 5=Satisfied, 6=Very satisfied	YFCY	HOM
Campus Satisfaction: Overall college experience	1=Can't rate/no experience, 2= Very dissatisfied, 3=Dissatisfied, 4=Neutral, 5=Satisfied, 6=Very satisfied	YFCY	HOM
Do Over: If you could make your college choice over, would you still choose to enroll at your current (or most recent) college?	1=Not sure yet, 2=Definitely Not, 3=Probably not, 4= Probably yes, 5=Definitely yes	YFCY	HOM

TABLE 1. Continued

Variables	Scale	CIRP Survey	Regression
Opinion: I feel a sense of belonging with this college	1=Strongly agree, 2=Disagree, 3=Agree, 4=Strongly agree	YFCY	HOM
Leadership Ability	1=Lowest 10%, 2=Below average, 3=Average, 4= Above average, 5=Highest 10%	YFCY	Deg Asp/HOM
Public Speaking Ability	1=Lowest 10%, 2=Below average, 3=Average, 4= Above average, 5=Highest 10%	YFCY	Deg Asp/HOM
Self-Confidence (Social)	1=Lowest 10%, 2=Below average, 3=Average, 4= Above average, 5=Highest 10%	YFCY	Deg Asp/HOM
Ethnic Experience: Dined or shared a meal	1=Never, 2=Seldom, 3=Sometimes, 4=Often, 5=Very often	YFCY	HOM
Ethnic Experience: Had a meaningful and honest discussion about race/ethnic relations outside of class	1=Never, 2=Seldom, 3=Sometimes, 4=Often, 5=Very often	YFCY	HOM
Ethnic Experience: Shared personal feelings and problems	1=Never, 2=Seldom, 3=Sometimes, 4=Often, 5=Very often	YFCY	HOM
Ethnic Experience: Had intellectual discussion outside of class	1=Never, 2=Seldom, 3=Sometimes, 4=Often, 5=Very often	YFCY	HOM
Ethnic Experience: Studied or prepared for class	1=Never, 2=Seldom, 3=Sometimes, 4=Often, 5=Very often	YFCY	HOM
Ethnic Experience: Socialized or partied	1=Never, 2=Seldom, 3=Sometimes, 4=Often, 5=Very often	YFCY	HOM

TABLE 2**.** Means and Standard Deviations for Latina/o and *t*-Tests Degree Aspirations and Habits of Mind at Time 2

	Males			Females			Group Comparisons		
	n	Mean	*SD*	*n*	Mean	*SD*	*t*	*df*	*p*
CHOOSE02_TFS Relatives wanted me to come here	106	1.29	.516	143	1.31	.560	-.220	247	NS
CHOOSE10_TFS Wanted to live near home	106	1.70	.807	143	1.81	.830	-1.075	247	NS
DEGASP_TFS Highest academic degree planned	106	5.48	.997	143	5.81	1.175	-2.335	247	*
AFFACT08 Family support to succeed	106	2.49	.621	143	2.61	.606	-1.502	247	NS
ACT04 Tutored another student	106	1.86	.710	143	1.69	.706	1.909	247	NS
ACT05 Studied with other students	106	2.32	.610	143	2.43	.599	-1.367	247	NS
ACADEMIC_ADJUSTMENT YFCY Score	106	48.1645	8.55161	143	47.7288	9.14462	.382	247	NS
ACAD_DISENGAGEMENT YFCY Score	106	50.5942	7.23466	143	49.8094	7.85028	.806	247	NS
FAC_INTERACTION YFCY Score	106	48.2373	8.79022	143	48.7438	8.41547	-.461	247	NS
SATIS_OVERALL YFCY Score	106	48.4293	7.87423	143	48.7253	9.18043	-.267	247	NS
SENSE_BELONG YFCY Score	106	48.0296	8.26991	143	49.5498	9.30149	-1.336	247	NS
ACADEMIC_SELFCONCEPT YFCY Score	106	49.7780	8.65528	143	46.2666	9.30135	3.033	247	**
SOCIAL_SELFCONCEPT YFCY Score	106	49.3106	8.88649	143	48.9488	7.46891	.348	247	NS
CRI_POSITIVVE YFCY Score	106	53.4598	8.90043	143	56.2030	8.64234	-2.445	247	*
HABITS_OF_MIND TFS Score	106	49.7178	8.90933	143	50.4158	8.65144	-.622	247	NS
ACADEMIC_SELFCONCEPT_TFS Score	106	52.1629	8.08000	143	48.7074	8.43766	3.253	247	***
SOCIAL_SELFCONCEPT_TFS Score	106	48.5352	9.49049	143	48.1951	8.44880	.298	247	NS
COLLEGE_INVOLVEMENT_TFS Score	106	48.9718	7.27773	143	52.9129	6.99779	-4.320	247	***

NOTE: CIRP - 2010 TFS survey items; CIRP - 2011 YFCY survey items
*p≤.005 **p≤.01 ***p≤.001

TABLE 3. Matrix Pearson Correlation Degree Aspirations for All Latina/o Students

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Degree Aspirations	1																		
Mexican/Chicano	-.146**	1																	
Puerto Rican	-.001	-.328**	1																
Other Latino	.116**	-.752**	-.187**	1															
Citizenship Status	.083*	.111**	.104**	-.163**	1														
High School GPA	-.006	-.066**	.017	.047**	-.051**	1													
High School Type	-.062**	-.027	.081**	.066**	.132**	-.027**	1												
SAT	-.083**	.046**	-.067**	.031**	-.037**	-.202**	.105**	1											
Enrollment Status	.057**	-.021**	.030**	.014*	.118**	-.055**	.036**	-.012**	1										
Parents wanted me to attend	.074**	-.066**	-.066**	.116**	.003	.094**	.006	.006	-.004	1									
Relatives wanted me to attend	.026**	-.022**	.018**	.005	.012**	.048**	.027**	-.032**	-.057**	.575**	1								
I wanted to live near home	-.040**	.021**	-.055**	-.022**	-.015**	.053**	-.067**	.021**	-.034**	.185**	.185**	1							
Engineering	-.240**	.039**	-.008	-.045**	-.140**	.091**	.055**	.017**	-.003	-.061**	-.078**	-.052**	1						
Biology	.294**	-.052**	.021**	.046**	.092**	-.053**	-.008	-.038**	-.030**	-.019**	.038**	.094**	-.677**	1					
Physical Sciences & Math	-.089**	.020**	-.017**	-.005	.050**	-.041**	-.057**	.029**	.042**	.097**	.044**	-.058**	-.328**	-.473**	1				
College Involvement TFS	.096**	-.028**	.002	.037**	-.051**	.061**	-.027**	-.080**	.071**	.051**	.066**	-.038**	-.213**	.157**	.052**	1			
Academic Self-Concept TFS	.013**	.017**	-.016**	-.027**	-.078**	.424**	-.057**	-.158**	.023**	.013**	-.024**	-.067**	.188**	-.179**	.004	.069**	1		
Social Self-Concept TFS	.009*	.015*	.039**	-.032**	.026**	.131**	.009**	-.153**	-.021**	-.028**	.040**	-.147**	.022**	-.005	-.020**	.241**	.428**	1	
Habits of Mind TFS	.128**	-.027**	.122**	.079**	-.072**	.247**	.069**	-.034**	.006	.065**	.081**	-.023**	-.097**	.067**	.031**	.322**	.343**	.420**	1

*p<.05, **p<.01, ***p<.001 level NOTE: CIRP - 2010 TFS survey items.

TABLE 4. Matrix Pearson Correlation Habits of Mind for All Latina/o Students

	1	2	3	4	5	6
Habits of Mind at Time 2	1					
Mexican/Chicano	-.150**	1				
Puerto Rican	.047	-.328**	1			
Other Latino	.097	-.752**	-.187**	1		
Citizenship Status	-.158**	.111*	.104*	-.163**	1	
High School GPA	.151**	-.066	.017	.047	-.051	1
High School Type	-.038	-.115*	.081	.066	.132**	-.027
SAT	-.020	.046	-.067	.031	-.037	-.202**
Enrolled Fulltime	-.025	-.021	.030	.014	.118*	-.055
Degree Aspirations	.132*	-.146**	-.001	.116*	.083	-.006
Parents wanted me to attend	.012	-.066	-.066	.116*	.003	.094
Relatives wanted me to attend	.120*	-.022	.018	.005	.012	.048
I wanted to live near home	.065	.021	-.055	-.022	-.015	.053
Engineering	-.102	.039	-.008	-.045	-.140**	.091
Biology	.135*	-.052	.021	.046	.092	-.053
Physical Science & Math	-.054	.020	-.017	-.005	.050	-.041
College Involvement TFS	.262**	-.028	.002	.037	-.051	.061
Academic Self-Concept TFS	.253**	.017	-.016	-.027	-.078	.424**
Social Self-Concept TFS	.338**	.015	.039	-.032	.026	.131**
Habits of Mind TFS	.609**	-.128*	.122*	.079	-.072	.247**
Your Family	-.064	-.017	.007	-.004	.008	.114*
Family Responsibilities	.082	.145**	-.007	-.153**	-.089	-.050
Family Support to Succeed	.158**	-.026	.022	.016	.042	.066
Socialized with racial/ethnic group	.081	-.020	.009	.042	-.096	.127*
Tutored Another Student	.236**	-.056	-.002	.021	-.178**	.098
Studied with Other Students	.248**	-.054	.088	.026	-.031	.148**
Faculty Interactions YFCY	.423**	-.041	.149**	-.024	-.132*	.116*
Academic Disengagement YFCY	-.149**	.059	.012	-.035	.018	-.188**
Academic Adjustment YFCY	.157**	.003	.118*	-.023	.069	.100
Academic Self-Concept YFCY	.343**	-.022	-.005	.018	-.098	.318**
Social Self-Concept YFCY	.425**	.022	.050	-.056	-.046	.102
Overall Satisfaction YFCY	.347**	.038	.031	-.060	-.056	.131*
Sense of Belonging YFCY	.375**	-.039	.107	-.029	-.044	.100
Positive Cross-Racial Interactions	.318	-.065	.051	.053	-.018	.012

TABLE 4. Continued

	7	8	9	10	11	12
Habits of Mind at Time 2						
Mexican/Chicano						
Puerto Rican						
Other Latino						
Citizenship Status						
High School GPA						
High School Type	1					
SAT	105*	1				
Enrolled Fulltime	.036	-.012	1			
Degree Aspirations	-.062	-.083	.057	1		
Parents wanted me to attend	.006	.006	-.004	.074	1	
Relatives wanted me to attend	.027	-.032	-.057	.026	.575**	1
I wanted to live near home	-.067	.021	-.034	-.040	.185**	.185**
Engineering	.055	.017	-.003	-.240**	-.061	-.078
Biology	-.008	-.038	-.030	.294**	-.019	.038
Physical Science & Math	-.057	.029	.042	-.089	.097	.044
College Involvement TFS	-.027	-.080	.071	.096	.051	.066
Academic Self-Concept TFS	-.057	-.158**	.023	.013	.013	-.024
Social Self-Concept TFS	.009	-.153**	-.021	.009	-.028	.040
Habits of Mind TFS	.069	-.034	.006	.128*	.065	.081
Your Family	-.123*	-.066	-.086	-.078	.085	.002
Family Responsibilities	-.115*	.100	-.017	-.013	.069	.060
Family Support to Succeed	.078	.062	-.022	.107*	.098	.047
Socialized with racial/ethnic group	.034	-.060	-.044	.152**	-.095	-.098
Tutored Another Student	-.041	-.017	.082	.112*	-.030	-.048
Studied with Other Students	.016	-.039	-.014	.111	.034	-.003
Faculty Interactions YFCY	-.072	-.050	.068	.075	-.032	.026
Academic Disengagement YFCY	-.027	-.012	.048	.001	.044	.012
Academic Adjustment YFCY	-.053	-.025	.101	.053	-.083	-.018
Academic Self-Concept YFCY	-.097	-.117*	.064	.028	-.007	.010
Social Self-Concept YFCY	-.024	-.104	.015	.047	-.044	.056
Overall Satisfaction YFCY	-.070	-.128*	.101	.050	-.051	.009
Sense of Belonging YFCY	-.010	-.118*	.055	.131*	-.044	.070
Positive Cross-Racial Interactions	-.022	-.050	.095	.192**	-.004	.021

TABLE 4. Continued

	13	14	15	16	17	18
Habits of Mind at Time 2						
Mexican/Chicano						
Puerto Rican						
Other Latino						
Citizenship Status						
High School GPA						
High School Type						
SAT						
Enrolled Fulltime						
Degree Aspirations						
Parents wanted me to attend						
Relatives wanted me to attend						
I wanted to live near home	1					
Engineering	-.052	1				
Biology	.094	-.677**	1			
Physical Science & Math	-.058	-.328**	-.473**	1		
College Involvement TFS	-.038	-.213**	.157**	.052	1	
Academic Self-Concept TFS	-.067	.188**	-.179**	.004	.069	1
Social Self-Concept TFS	-.147**	.022	-.005	-.020	.241**	.428**
Habits of Mind TFS	-.023	-.097	.067	.031	.322**	.343**
Your Family	.286**	.022	-.008	-.016	.021	.045
Family Responsibilities	.200**	-.015	.025	-.015	.021	-.085
Family Support to Succeed	.024	-.002	.095	-.118*	.112*	.077
Socialized with racial/ethnic group	-.099	-.068	.066	-.005	.159**	.086
Tutored Another Student	-.006	.024	-.062	.051	.042	.230**
Studied with Other Students	-.058	-.143**	.092	.049	.150**	.104
Faculty Interactions YFCY	.073	-.039	.018	.022	.102*	.124*
Academic Disengagement YFCY	-.146**	.022	-.062	.053	.020	-.066
Academic Adjustment YFCY	.025	-.033	.013	.022	-.016	.193**
Academic Self-Concept YFCY	-.068	.155**	-.130*	-.015	.043	.801**
Social Self-Concept YFCY	-.135*	.009	.023	-.039	.191**	.386**
Overall Satisfaction YFCY	.011	.043	-.015	-.031	.050	.187**
Sense of Belonging YFCY	-.044	-.035	.017	.019	.105	.144**
Positive Cross-Racial Interactions	-.071	-.147*	.162*	-.037	.218**	.075

TABLE 4. Continued

	19	20	21	22	23	24
Habits of Mind at Time 2						
Mexican/Chicano						
Puerto Rican						
Other Latino						
Citizenship Status						
High School GPA						
High School Type						
SAT						
Enrolled Fulltime						
Degree Aspirations						
Parents wanted me to attend						
Relatives wanted me to attend						
I wanted to live near home						
Engineering						
Biology						
Physical Science & Math						
College Involvement TFS						
Academic Self-Concept TFS						
Social Self-Concept TFS	1					
Habits of Mind TFS	.420**	1				
Your Family	-.022	-.029	1			
Family Responsibilities	-.016	.058	.065	1		
Family Support to Succeed	.098	.139**	.156**	-.066	1	
Socialized with racial/ethnic group	.104	.161**	-.081	-.020	166**	1
Tutored Another Student	.133*	.173**	-.052	.041	.029	.084
Studied with Other Students	.194**	.239**	-.049	-.098	.109*	.181**
Faculty Interactions YFCY	.178**	.270**	.074	.040	.083	.063
Academic Disengagement YFCY	.048	-.016	-.079	.041	.029	.094
Academic Adjustment YFCY	.102	.041	.060	-.209**	.010	-.053
Academic Self-Concept YFCY	.321**	.255**	.062	-.138*	.091	.036
Social Self-Concept YFCY	.878**	.426**	-.050	-.025	.109*	.111*
Overall Satisfaction YFCY	.171**	.138**	-.057	-.204**	.197**	.123*
Sense of Belonging YFCY	.199**	.201**	-.047	-.171**	.213**	.132*
Positive Cross-Racial Interactions	.228*	.340	-.083	-.053	.154**	.359**

TABLE 4. Continued

	25	26	27	28	29	30
Habits of Mind at Time 2						
Mexican/Chicano						
Puerto Rican						
Other Latino						
Citizenship Status						
High School GPA						
High School Type						
SAT						
Enrolled Fulltime						
Degree Aspirations						
Parents wanted me to attend						
Relatives wanted me to attend						
I wanted to live near home						
Engineering						
Biology						
Physical Science & Math						
College Involvement TFS						
Academic Self-Concept TFS						
Social Self-Concept TFS						
Habits of Mind TFS						
Your Family						
Family Responsibilities						
Family Support to Succeed						
Socialized with racial/ethnic group						
Tutored Another Student	1					
Studied with Other Students	296**	1				
Faculty Interactions YFCY	.183**	.278**	1			
Academic Disengagement YFCY	-.056	-.049	-.043	1		
Academic Adjustment YFCY	.164**	.151**	.152**	-.217**	1	
Academic Self-Concept YFCY	.260**	.128*	.237**	-.109*	.369**	1
Social Self-Concept YFCY	.153**	.222**	.308**	-.011	.166**	.426**
Overall Satisfaction YFCY	.164**	.321**	.351**	-.102	.356**	.304**
Sense of Belonging YFCY	.123*	.307**	.470**	-.100	.271**	.264**
Positive Cross-Racial Interactions	.198**	.243**	.213**	.074	.115*	.084

TABLE 4. Continued

	31	32	33	34
Habits of Mind at Time 2				
Mexican/Chicano				
Puerto Rican				
Other Latino				
Citizenship Status				
High School GPA				
High School Type				
SAT				
Enrolled Fulltime				
Degree Aspirations				
Parents wanted me to attend				
Relatives wanted me to attend				
I wanted to live near home				
Engineering				
Biology				
Physical Science & Math				
College Involvement TFS				
Academic Self-Concept TFS				
Social Self-Concept TFS				
Habits of Mind TFS				
Your Family				
Family Responsibilities				
Family Support to Succeed				
Socialized with racial/ethnic group				
Tutored Another Student				
Studied with Other Students				
Faculty Interactions YFCY				
Academic Disengagement YFCY				
Academic Adjustment YFCY				
Academic Self-Concept YFCY				
Social Self-Concept YFCY	1			
Overall Satisfaction YFCY	.244**	1		
Sense of Belonging YFCY	.323**	.741**	1	
Positive Cross-Racial Interactions	.305**	.269**	323**	1

*p<.05, **p<.01, ***p<.001 level NOTE: CIRP - 2010 TFS survey items; CIRP 2011 YFCY survey items

TABLE 5. Regression Model Degree Aspirations for All Students

	B	*SE*	*β*	*p*
RACE6_TFS Mexican/Chicano	-.261	.101	-.140	*
RACE7_TFS Puerto Rican	-.339	.164	-.112	*
RCMAJOR_TFS_ENG Recoded Major TFS Engineering	-.057	.135	-.029	NS
RCMAJOR_TFS_PHYSCI Recoded Major TFS Physical Sciences & Mathematics	.219	.126	.118	NS
HABITS_OF_MIND_TFS Habits of Mind Score	B.014	.005	.139	**

*p≤.005 **p≤.01 ***p≤.001

TABLE 6. Regression Model Degree Aspirations for Females

	B	*SE*	*β*	*p*
RACE6_TFS Mexican/Chicano	-.202	.146	-.101	NS
RACE7_TFS Puerto Rican	-.467	.224	-.153	*
RCMajor_TFS_ENG Recoded 'Major_TFS Engineering	.183	.224	.066	NS
RCMajor_TFS_BIO Recoded 'Major_TFS Biological Sciences	.177	.164	.086	NS
HABITS_OF_MIND_TFS TFS Habits of Mind Score	.014	.007	.129	NS

*p≤.005 **p≤.01 ***p≤.001

TABLE 7. Regression Model Degree Aspirations for Males

	B	*SE*	*β*	*p*
RACE6_TFS Mexican/Chicano	-.329	.131	-.197	*
RACE7_TFS Puerto Rican	-.117	.237	-.039	NS
RCMajor_TFS_ENG Recoded 'Major_TFS Engineering	-.194	.185	-.117	NS
RCMajor_TFS_BIO Recoded 'Major_TFS Biological Sciences	.327	.200	.183	NS
HABITS_OF_MIND_TFS TFS Habits of Mind Score	.011	.007	.120	NS

*p≤.005 **p≤.01 ***p≤.001

TABLE 8. Regression Model Habits of the Mind All

	B	*SE*	*β*	p
RACE6_TFS Mexican/Chicano	-2.645	1.116	-.118	*
RACE7_TFS Puerto Rican	-3.016	1.830	-.082	NS
CITIZEN_TFS Citizenship status	-2.463	1.538	-.076	NS
RCHSGPA_TFS Recoded What was your average grade in high school?	-.696	1.116	-.033	NS
DEGASP_TFS Highest academic degree planned	-.109	.479	-.011	NS
CHOOSE02_TFS Choose to Attend: My relatives wanted me to come here	.323	.972	.016	NS
CHOOSE10_TFS Choose to Attend: I wanted to live near home	.806	.656	.059	NS
RCMajor_TFS_ENG Recoded 'Major_TFS Engineering	1.130	1.546	.046	NS
RCMajor_TFS_BIO Recoded 'Major_TFS Biological Sciences	2.084	1.421	.094	NS
COLLEGE_INVOLVEMENT_TFS TFS Likelihood of College Involvement Score	.153	.073	.102	*
ACADEMIC_SELFCONCEPT_TFS TFS Academic Self-Concept Score	-.207	.116	-.156	NS
SOCIAL_SELFCONCEPT_TFS TFS Social Self-Concept Score	-.044	.131	-.035	NS
HABITS_OF_MIND_TFS TFS Habits of Mind Score	.549	.076	.423	***
AFFACT08 Felt: Family support to succeed	-.416	.819	-.024	NS
ACT04 Act: Tutored another student	.639	.815	.040	NS
ACT05 Act: Studied with other students	-.486	.941	-.026	NS
FAC_INTERACTION YFCY Student-Faculty Interaction Score	.200	.071	.153	**
ACAD_DISENGAGEMENT YFCY Academic Disengagement Score	-.168	.071	-.114	*
ACADEMIC_ADJUSTMENT YFCY Academic Adjustment Score	-.005	.065	-.004	NS
ACADEMIC_SELFCONCEPT YFCY Academic Self-Concept Score	.237	.108	.194	*
SOCIAL_SELFCONCEPT YFCY Social Self-Concept Score	.177	.146	.131	NS
SATIS_OVERALL YFCY Overall Satisfaction Score	.196	.095	.155	*
SENSE_BELONG YFCY Sense of Belonging Score	-.005	.094	-.004	NS
CRI_POSITIVE YFCY Positive Cross-Racial Interaction Score	.043	.069	.034	NS

*p≤.005 **p≤.01 ***p≤.001

TABLE 9. Regression Model Habits of the Mind Female

	B	*SE*	*β*	*p*
RACE6_TFS Mexican/Chicano	-1.266	1.624	-.056	NS
RACE7_TFS Puerto Rican	-2.179	2.371	-.066	NS
CITIZEN_TFS Citizenship status	-2.682	2.777	-.063	NS
RCHSGPA_TFS Recoded What was your average grade in high school?	-1.601	1.604	-.072	NS
DEGASP_TFS Highest academic degree planned	-.803	.587	-.086	NS
CHOOSE02_TFS Choose to Attend: My relatives wanted me to come here	-1.064	1.233	-.053	NS
CHOOSE10_TFS Choose to Attend: I wanted to live near home	1.362	.866	.101	NS
RCMajor_TFS_ENG Recoded 'Major_TFS Engineering	2.358	2.490	.070	NS
RCMajor_TFS_BIO Recoded 'Major_TFS Biological Sciences	4.172	1.774	.178	*
COLLEGE_INVOLVEMENT_TFS TFS Likelihood of College Involvement Score	.197	.101	.122	NS
ACADEMIC_SELFCONCEPT_TFS TFS Academic Self-Concept Score	-.286	.164	-.212	NS
SOCIAL_SELFCONCEPT_TFS TFS Social Self-Concept Score	-.044	.179	-.034	NS
HABITS_OF_MIND_TFS TFS Habits of Mind Score	.658	.101	.496	***
AFFACT08 Felt: Family support to succeed	-.239	1.145	-.013	NS
ACT04 Act: Tutored another student	.456	1.132	.028	NS
ACT05 Act: Studied with other students	-.608	1.268	-.032	NS
FAC_INTERACTION YFCY Student-Faculty Interaction Score	.262	.099	.194	**
ACAD_DISENGAGEMENT YFCY Academic Disengagement Score	-.193	.094	-.136	*
ACADEMIC_ADJUSTMENT YFCY Academic Adjustment Score	-.009	.087	-.007	NS
ACADEMIC_SELFCONCEPT YFCY Academic Self-Concept Score	.251	.152	.204	NS
SOCIAL_SELFCONCEPT YFCY Social Self-Concept Score	.068	.199	.047	NS
SATIS_OVERALL YFCY Overall Satisfaction Score	.232	.135	.192	NS
SENSE_BELONG YFCY Sense of Belonging Score	.023	.131	.019	NS
CRI_POSITIVE YFCY Positive Cross-Racial Interaction Score	-.086	.094	-.066	NS

*p≤.005 **p≤.01 ***p≤.001

TABLE 10. Regression Model Habits of the Mind Male

	B	*SE*	*β*	*p*
RACE6_TFS Mexican/Chicano	-3.652	1.640	-.164	*
RACE7_TFS Puerto Rican	-3.381	3.520	-.074	NS
CITIZEN_TFS Citizenship status	-1.355	2.000	-.052	.500
RCHSGPA_TFS Recoded What was your average grade in high school?	.186	1.668	.009	.500
DEGASP_TFS Highest academic degree planned	2.020	.934	.186	*
CHOOSE02_TFS Choose to Attend: My relatives wanted me to come here	1.623	1.647	.077	NS
CHOOSE10_TFS Choose to Attend: I wanted to live near home	-.541	1.114	-.039	NS
RCMajor_TFS_ENG Recoded 'Major_TFS Engineering	-2.620	2.428	-.119	NS
RCMajor_TFS_BIO Recoded 'Major_TFS Biological Sciences	-4.859	2.680	-.211	NS
COLLEGE_INVOLVEMENT_TFS TFS Likelihood of College Involvement Score	.014	.124	.009	NS
ACADEMIC_SELFCONCEPT_TFS TFS Academic Self-Concept Score	-.253	.191	-.182	NS
SOCIAL_SELFCONCEPT_TFS TFS Social Self-Concept Score	-.174	.214	-.148	NS
HABITS_OF_MIND_TFS TFS Habits of Mind Score	.398	.129	.315	**
AFFACT08 Felt: Family support to succeed	.556	1.237	.033	NS
ACT04 Act: Tutored another student	1.099	1.319	.070	NS
ACT05 Act: Studied with other students	.631	1.516	.034	NS
FAC_INTERACTION YFCY Student-Faculty Interaction Score	.188	.110	.150	NS
ACAD_DISENGAGEMENT YFCY Academic Disengagement Score	-.294	.124	-.189	*
ACADEMIC_ADJUSTMENT YFCY Academic Adjustment Score	-.029	.102	-.023	NS
ACADEMIC_SELFCONCEPT YFCY Academic Self-Concept Score	.269	.164	.206	NS
SOCIAL_SELFCONCEPT YFCY Social Self-Concept Score	.323	.234	.259	NS
SATIS_OVERALL YFCY Overall Satisfaction Score	.133	.145	.098	NS
SENSE_BELONG YFCY Sense of Belonging Score	-.131	.146	-.103	NS
CRI_POSITIVE YFCY Positive Cross-Racial Interaction Score	.312	.105	.248	**

*p≤.005 **p≤.01 ***p≤.00

REFERENCES

REFERENCES

Achieve. (2008). Closing the expectations gap: An annual 50-state progress report on the alignment of high school policies with the demands of college and a career. Retrieved from http://www.achieve.org/files/50-state-2008-final02-25-08.pdf

Adelman, C. (2006). *Answers in the tool box: Academic Intensity, attendance patterns and bachelor's degree attainment*. Washington, DC: U.S. Department of Education.

Astin, A. W., & Astin, H. S. (1992). *Undergraduate science education: The impact of different college environments on the educational pipeline in the sciences; Final report*. Los Angeles: University of California, Los Angeles, Higher Education, Research Institute.

Astin, A. W., & Oseguera, L. (2005). *Degree attainment rates at American college and universities. Revised Edition*. Los Angeles: Higher Education Research Institute.

Babco, E. L. (2001). Underrepresented minorities in engineering: A progress report. Washington, DC: The American Association for the Advancement of Science.

Barton, P. E. (2003). Hispanics in science and engineering: A matter of assistance and persistence. Princeton, NJ: Educational Testing Service.

Beede, D., Julian, T., Langdon, D., McKittrick, G., Khan, B., & Doms, M. (2011). Women in STEM: A gender gap to innovation. U.S. Department of Commerce. Economics and Statistics Administration.

Boden, K. (2011). Perceived academic preparedness of first-generation Latino college students. *Journal of Hispanic Higher Education, 10*(2), 96-106.

Bonous-Hammarth, M. (2000). Pathways to success: Affirming opportunities for science, mathematics, and engineering majors. *Journal of Negro Education, 69*(1-2), 92-111.

Bordes, V., & Arredondo, P. (2005). Mentoring and 1st year Latino/a college students. *Journal of Hispanic Higher Education, 4*(2), 114-113.

Boyd, H., Falconer, H., Lents, N., Carpi, A., & Ronan, D. (2013). Development and implementation of targeted STEM retention strategies at a Hispanic-serving institution. *Journal of Hispanic Higher Education, 12*(3), 280-299. doi:10.1177/1538192713486279

Cabrera, A. F., & La Nasa, S. M. (2000). *Understanding the college choice of disadvantaged students, New directions for institutional research*. San Francisco, CA: Jossey-Bass.

Calaff, K. P. (2007). Latino students' journeys toward college. *Bilingual Research Journal, 31*(1), 201-225.

Carlone, H., & Johnson, A, (2007). Understanding the science experiences of successful women of color. Science identity as an analytic lens. *Journal of Research in Science Teaching, 44*(8), 1187-1218.

Ceja, M. (2004). Chicana college aspirations and the role of parents; Developing educational resiliency. *Journal of Hispanic Higher Education, 3*(4), 338-362.

Chapa, J., & De La Rosa, B. (2004). Latino population growth, socioeconomic and demographic characteristics, and implications for educational attainment. *Education & Urban Society, 36*(2), 130-149. doi:10.1177/0013124503261320

Chang, M.J., Denson, N., Saenz, V. & Misa, K. (2006). The educational benefits of cross-racial interaction among undergraduates. Journal of Higher Education, 77 (3), 430-455.

Cheng, X. (2013). *STEM attrition: College students' paths into and out of STEM fields* (NCES 2014-001). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics

Cole, D. (2010). The effects of student-family interactions on minority students' college grades: Differences between aggregated and disaggregated data. *Journal of the Professoriate, 3*(2), 137-160.

Cole, D., & Espinoza, A. (2008). Examining the academic success of Latino students in science technology engineering and mathematics (STEM) majors. *Journal of College Student Development, 49*(4), 285-300.

Conley, D. T. (2005). *College Knowledge: What it really takes for students to succeed and what we can do to get them ready*. San Francisco: Jossey-Bass.

Consolvo, C. (2002). Building student success through enhanced, coordinated student services. *Journal of College Student Development, 43*(2), 284.

Crisp, G., & Cruz, I (2009). Mentoring college students: A critical review of the literature between 1990 and 2007. *Research in Higher Education, 50*(6), 525-545.

Crisp, G., Nora, A., & Taggart, A. (2009). Student characteristics, pre-college, college, and environmental factors as predictors of majoring in and earning a STEM degree: An analysis of students attending a Hispanic serving institution. *American Educational Research Journal, 46*(4), 924-942.

Dayton, B., Gonzalez-Vasquez, N., Martinez, C. R., & Plum, C. (2004). Hispanic-serving institutions through the eyes of students and administrators. *New Directions for Student Services, 2004*(105), 29-40. doi:10.1002/ss.114

Eamon, M. K. (2005). Social-demographic, school, neighborhood, and parenting influences on the academic achievement of Latino young adolescents. Journal of Youth and Adolescence, 34(2), 163-174.

Flores, G. (2011). Latino as in the hard sciences: Increasing Latina/o participation in science, technology, engineering and math (STEM) related fields. *Latino Students, 9*(2-3), 327-335.

Fouad, N., Hackett, G., Smith, P., Kantamneni, N., Fitzpatrick, M., Haag, S., and Spencer, D. (2010). Barriers and supports for continuing in mathematics and science: Gender and educational level differences. *Journal of Vocational Behavior, 77*(3), 361-373.

Gándara, P. (1994). Choosing higher education: Educationally ambitious Chicanos and the path to social mobility. *Education Policy Analysis Archives, 2*, 8.

Gándara, P. (2005). *Latino Achievement: Identifying Models that Foster Success,* National Center for the Gifted and Talented, University of Connecticut.

Gilroy, M. (2012). APLU supports practices to increase minority male STEM participation. *The Hispanic Outlook in Higher Education,* pp. 22-23. Retrieved from http://www.issuu.com/hohost/docs/121967-april_15_2013

Gloria, A. M., & Rodriguez, E. R. (2000). Counseling Latino university students: Psychosociocultural issues for consideration. *Journal of Counseling & Development, 78*(2), 145-154.

González, N., L.C. Moll and C. Amanti, (2005). *Funds of knowledge: Theorizing practices in houses, communities, and classrooms* . New Jersey: L. Erlbaum Associates.

Hallenbeeck, T. R. (1978). College student satisfaction: An indication of institutional vitality. *NASPA Journal, 16*(2). 19-25.

Hanson, S. L. (1996). *Lost talent: Women in sciences*. Philadelphia, PA: Temple University.

Hanson, S. L. (2004). African American women in science: Experiences from high school through the post-secondary years and beyond. *NWSA Journal, 16*(1), 96-115.

Haro, R. (2004). Programs and strategies to increase Latino students' educational attainment. *Education and Urban Society, 36*(2), 205-222.

Harper, S. (2010). An anti-deficit achievement framework for research on students of color in stem. *New Directions for Institutional Research*, *2010*(148), 63- 74.

Harper, S. R. (2012). Black male student success in higher education: A report from the National Black Male College Achievement Study. Philadelphia: University of Pennsylvania, Center for the Study of Race and Equity in Education.

Higher Education Research Institute. (2010). *Findings from the 2010 The Freshman Survey.* Retrieved from http://www.heri.ucla.edu/researchers/instruments/CIRP/2010SIF.PDF

Higher Education Research Institute. (2011). *Findings from the 2011 Your First College Year Survey.* Retrieved from http://www.heri.ucla.edu/researchers/instruments/YFCY/2011YFCY.PDF

Higher Education Research Institute. (2015). *Cooperative Institution Research Program.* Retrieved from http://www.heri.ucla.edu/cirpoverview.php

Hernandez, J. C. (2000). Understanding the retention of Latino college students. *Journal of College Student Development, 41*(6), 575-88.

Hernandez, J.C., & Lopez, M.A. (2004). Leaking pipeline: Issues impacting Latino/a college student retention. *Journal of College Student Retention: Research, Theory & Practice, 6*(1), 36-60.

Hurtado, S., Carter, D. F., & Spuler, A. (1996). Latino student transition to college: Assessing difficulties and factors in successful college adjustment. *Research in Higher Education, 37*(2), 135-157. doi: 10.1007?BF01730133

Hurtado, S., & Carter, D. F. (1997). Effects of college transition and perceptions of the campus climate on Latino college students' sense of belonging. *Sociology of Education, 70*(4), 324-345.

Hurtado, S., & Cuellar, M., & Guillermo-Wann, C. (2011). Quantitative measures of students' sense of validation: Advancing the study of diverse learning environments. *Enrollment Management Journal, 5*(2), 53-71.

Hurtado, S., Garcia, G., Garibay, J., Herrera, F., Chang, M., & Eagan, M. (2013). Making a difference in science education: The impact of undergraduate research programs. *American Educational Research Journal, 50*(4), 683-713. doi:10.3102/0002831213482038

Laden, B. V. (2001). Hispanic-serving institutions: Myths and realities. *Peabody Journal of Education, 76*(1), 73-92. doi:10.1207/S15327930PJE7601_05\

Lord, S., & Madsen Camacho, M. (2011). Trends among Latino and Latina undergraduate engineers. *Journal of Hispanic Higher Education, 10*(2), 134-146. doi:10.1177/1538192711402354

Lotkowski, V.A., Robbins, S.B., & Noeth, R.J. (2004). The role of academic and non-academic factors in improving college retention. Iowa City, IA: ACT

Luckenbill-Edds, L. (2002). The educational pipeline for women in biology: No longer leaking? *BioScience, 52*(6), 513-521.

Marín, G., & Marín, B. V. (1991). *Research with Hispanic populations.* Newbury Park, CA: Sage.

Martinez, M., Cortez, L., Saenz, V. (2013). Latino parents' perceptions of role of schools in college readiness. *Journal of Latinos and Education, 12*(2), 108-120.

Moakler, M. W., & Kim, M. M. (2014). College major choice in STEM: Revisiting confidence and demographic factors. *The Career Development Quarterly, 62*(2), 128-142. doi:10.1002/j.2161-0045.2014.00075.x

Miller, L. (2005). Exploring high academic performance: The case of Latinos in higher education. *Journal of Hispanic Higher Education, 4*(3), 252-272.

National Center for Education Statistics. (2010). *Status and trends in the education of racial and ethnic groups*, report: (NCES 2010-2015). Available from http://nces.ed.gov/

National Science Foundation. (2006). *Women, minorities, and persons with disabilities in science and engineering.* Arlington, VA: Division of Science Resources Statistics.

Nuñez, A.-M. (2009). A critical paradox?: Predictors of Latino students' sense of belonging in college. Journal of Diversity in Higher Education, 2(1), 46-61. [Research Line: C] doi: 10.1037/a0014099

O'Brien, E.,M., & Zudak, C. (1998). Minority-serving institutions: An overview. *New Directions for Higher Education, 1998*(102), 5-15. doi:10.1002/he.10201

Ong, M. (2005). Body projects of young women of color in physics: Intersections of gender, race, and science. *Social Problems, 52*(4), 593-617.

Oseguera, A. M., Locks, A. M., & Vega, I. I. (2009). Increasing Latina/o students' baccalaureate attainment: A focus on retention. *Journal of Hispanic Higher Education, 8*(1), 23-53.

Perna, L. W. (2000). Differences in the decision to attend college among African Americans, Hispanics, and whites. *The Journal of Higher Education, 71*(2), 117-141.

Perna, L. W. (2006). Understanding the relationship between information about college prices and financial aid and students' college related behaviors. *American Behavioral Scientist, 49* (12), 1620-1635.

Perna, L. W., Gasman, M., Gary, S., Lundy-Wagner, V., & Drezner, N. D. (2010). Identifying strategies for increasing degree attainment in STEM: Lessons from minority-serving institutions. *New Directions for Institutional Research,* (148), 41-51.

Peterfreund, A. R., Rath, K. A., Xenos, S. P., & Bayliss, F. (2008). The impact of supplemental instruction on students in STEM courses: Results from San Francisco state university. *Journal of College Student Retention, 9*(4), 487-502.

Pew Hispanic Center. (2013). Mapping the Latino population, by state, county, and city. Washington, D.C. http://www.pewhispanic.org/2013/08/29/ii-ranking-latino-populations-in-the-states/

Pino, N. W., Martinez-Ramos, G., & Smith, W. L. (2012). Latinos, the academic ethic, and the transition to college. *Journal of Latinos & Education, 11*(1), 17-31. doi:10.1080/15348431.2012.631437

Pryor, J. H., Hurtado, S., DeAngelo, L., Palucki Blake, L., & Tran, S. (2010). *The American freshman: National norms fall 2010*. Los Angeles: Higher Education Research Institute. UCLA.

Rochin, R., & Mello, S, (2007). Latinos in science: Trends and opportunities, *Journal of Hispanic Higher Education*, 6(4). 305-355.

Rong, Y., & Gable, R. K. (1999). Surveying perceptions of residence hall academic atmosphere. *Journal of College and University Student Housing, 28, 7-15.*

Sabogal, F., Marín, G., Otero-Sabogal, R., Marín, B. V., & Perez-Stable, E. J. (1987). Hispanic familism and acculturation: What changes and what doesn't? *Hispanic Journal of Behavioral Sciences, 9*(4), 397–412.

Simpson, J. C. (2001). Segregated by subject – racial differences in the factors influencing academic major between European Americans, Asian Americans, and African, Hispanic, and Native Americans. *Journal of Higher Education, 72*(1), 63-100.

Solorzano, D., Villalpando, O., & Oseguera, L. (2005). Educational inequities and Latina/o undergraduate students in the United States: A critical race analysis of their educational progress. *Journal of Hispanic Higher Education, 4*(3), 272-294.

Strayhorn, T. L. (2008). Sentido de pertenencia: A hierarchical analysis predicting sense of belonging among Latino college students. *Journal of Hispanic Higher Education, 7*(4), 301-320.

Swail, W.S., Cabrera, A.F., & Lee, C (2004). *Latino you and the pathway to college.* Washington, DC: Educational Policy Institute.

Sy, S. R. (2006). Family and work influences on the transition to college among Latina adolescents. Hispanic Journal of Behavioral Sciences, 28(3), 368-386. doi:10.1177/0739986306290372

Tyson, W., Lee, R., Borman, K.M., & Hanson, M.A. (2007). Science, technology, engineering, and mathematics (STEM) pathways: High school science and math coursework and postsecondary degree attainment *Journal of Education for Students Placed at Risk, 12*(3), 243-270.

U.S. Census Bureau. (2013). U.S. census bureau projections show a slower growing, older, more diverse nation a half century from now. Retrieved from http://www.census.gov/newsroom/releases/archives/population/cb12-243.html

United States Department of Labor. (2007). *The STEM workforce challenge: The role of the public workforce system in a national solution for a competitive science, technology, engineering, and mathematics (STEM) workforce.* Washington, DC: Author

Van Soom, C., & Donche, V. (2014). Profiling first-year students in STEM programs based on autonomous motivation and academic self-concept and relationship with academic achievement. *PloS One, 9*(110), e112489.

Vogt, C. M. (2008). Faculty as a critical juncture in student retention and performance in engineering programs. *Journal of Engineering Education*, *97*(1), 27-36.