THESIS

FIRST GENERATION COLLEGE STUDENTS: PREDICTING ACADEMIC SUCCESS AND RETENTION

Submitted by

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ABSTRACT

FIRST GENERATION COLLEGE STUDENTS: PREDICTING ACADEMIC SUCCESS AND RETENTION

This study sought to better understand the experiences and challenges faced by first generation college students in their first year on campus and what factors predicted academic success and retention for these students. Specifically, this study investigated the impact of demographic variables (gender, ethnicity, family income, and college major), prior academic preparation (high school index) and psychosocial factors (grit, social adjustment, homesickness, financial concern, and institutional commitment) on cumulative first year GPA and retention from the first to second year of college for first generation students. Participants included 3,956 first year college students at a public research university, 950 of which were first generation students. First generation was a significant predictor of both first year GPA and first to second year retention. Specifically, first generations students were more likely to have lower first year GPAs and were less likely to be retained. Minority status was negatively related to retention from the first to second year in first generation students but not in the overall sample. Although, high school index was the strongest predictor of both first year GPA and first to second year retention for all students in the sample, grit, social adjustment, gender and whether or not the student was a STEM major, also significantly impacted first year GPA for first all students. Institutional commitment, financial concern and homesickness were found to be significantly predictive of first to second year retention in all students. There was also a significant interaction between homesickness and generational status for first year GPA.

TABLE OF CONTENTS

CHAPTER I

Introduction

An increasing number of occupations need employees with the skills and credentials gained through a college education. The Center on Education and the Workforce (2010) predicts that approximately 101 million jobs in the United States will require a post-secondary degree by 2018. Studies worldwide have confirmed that higher-educated individuals earn higher wages, experience less unemployment and are employed in more prestigious jobs overall (BLS, 2014). In 2014, individuals in the United States with a bachelor's degree earned 62% more ($48,000 vs. $30,000), as measured by median annual income, in comparison to individuals with only a high school diploma (Kena et. al, 2015). According to the Bureau of Labor Statistics (2014), the unemployment rate in the United States for individuals with a bachelor's degree is nearly half that of those with only a high school diploma (4% and 7.5% respectively in March 2014).

Notable attention has been given in recent decades to the growing number of first-generation college students entering colleges and universities and how their paths and outcomes differ from their more "traditional" continuing-generation counterparts (Thayer, 2000; Engle & Tinto, 2008). First generation students are defined as any student attending a university or college whose parents did not complete a bachelor's degree (Pike & Kuh, 2005). It is estimated that around 24% of the total undergraduate population in the United States are first-generation students, totaling over five million students currently (Engle & Tinto, 2008; National Center for Education Statistics, 2014). If we wish to encourage this trend, it is crucial for researchers, universities, and counselors alike to understand the driving factors that help this population "get in", "get through" and "get out" of college.

In addition, despite the push for increased access to higher education, we continue to see a disproportionately lower percentage of individuals from underserved populations entering college. Although more women are in college than at any time in history, individuals coming from a low socioeconomic status (SES) background, ethnic minorities, and immigrants are much less likely than middle class, European-American individuals to apply, attend, and graduate college (Engle & Tinto, 2008). Because of historic differences in enrollment, many students with minority or underrepresented identities did not have parents who graduated from college, making these current students the first generation in their family to do so. These are the potential college students of the 21st Century. Promoting their academic success will be essential to creating the educated work force of the future.

Who are First Generation College Students?

High school students whose parents never graduated from college are less likely to enroll in any form of post-secondary education. According to Choy (2001), there is a significant gap between the proportion of continuing-generation students (students who had at least one parent obtain a bachelor's degree) who enroll in college immediately after high school and first generation students who do likewise. Based on a report of the Condition of Education (2001), continuing-generation students enroll in college at a rate of 82%, first generation students whose parents graduated high school enroll at a rate of 54%, and first generation students whose parents did not earn a high school diploma or GED enroll at a rate of 36%. Given the push for public institutions of higher education to recruit more diverse populations and provide access to the majority of high school graduates, these numbers are surprising. Perhaps the reason the proportion of first generation students who apply to postsecondary education is lower is because the perceived or actual financial strain of higher education prevents enrollment, or student and

family expectations about college attendance and career options negatively influence the decision. We know, for example, that first generation students are more likely than continuing-generation students to attend a college close to home, have lower levels of academic self-efficacy, have greater financial strain, and feel less socially accepted by their peers (Inman & Mayes, 1999).

Given that only about half of high school graduates whose parents did not complete a bachelor's degree enroll in college directly after receiving their high school diploma, the question is in what ways are these first generation students different from those high school graduates who do not go to college (Choy, 2001). Econometric models, for example, theorize that student enrollment behavior is at least partially influenced by the student and families evaluating the relative value of perceived benefits with the investment of perceived costs (Perna, 2000). In the short term benefits might include participation in "college culture" (e.g. student organizations, athletics, social engagement) and the joy of learning, whereas long-term benefits may include higher overall earnings, participating in more fulfilling work roles, less unemployment and higher overall health. The perceived costs of enrolling in college include the actual costs of attendance as well as the opportunity cost of lost income during their time as a student where they are unable to work fulltime. It is important to note however, that lifetime earnings for those with a bachelor's degree far outpace the earnings of individuals with only a high school diploma, easily compensating for the income lost during college (National Center for Education Statistics, 2014). So, opportunity cost in this case is a short-term cost rather than a long-term cost. Ultimately, although financial factors are important to both the perceived benefits and costs, there are many additional reasons individuals choose to attend college or not. This is applicable to all students considering college enrollment, but may be especially pertinent for certain first

generation students whose decision requires weighing these many important and often conflicting factors.

In addition to the educational background of their family, first generation students may also identify with other populations lacking resources for college access and success. In comparison to continuing-generation students, a higher proportion of first generation students come from a lower SES household, identify as an ethnic or racial minority (particularly Hispanic or African American), are veterans, are non-traditional aged at the time of entering school, have a family or young children, and/or are female (Inman & Mayes, 1999). A possible explanation for these differences is that first generation students entering college currently may come from families that hold an identity historically underrepresented in higher education (ethnic minority or low income families for example). As nationwide efforts to increase access and opportunity to college for underrepresented populations in public postsecondary institutions has increased, more first generation students from these backgrounds are applying and attending. However, acceptance to postsecondary institutions is merely one of many obstacles first generation students encounter on their way to graduation and college success.

What Predicts Retention and Attrition in College Students

Retention, which can be defined as the ability of a college or university to retain a student from admission through graduation, has been an important issue in the higher education literature for a number of decades. Attrition, which is a student's failure to re-enroll in consecutive semesters, has been a topic of interest as well. In the early 19th century, institutions of higher education were typically small, selective and only financially accessible to highly financially privileged individuals (Seidman, 2005). With national changes like the signing of the Morrill Act in 1862, which provided for Land Grant universities, and movements advocating for equality

such as the Civil Rights movement, the population of students applying to and attending colleges began to grow and become more diverse. As the demand and access to higher education increased, the attention given by campus leaders and researchers to retention issues grew as well. Early research indicated the impact of academic failure and financial issues on attrition and retention (McNeely, 1937). Summerskill (1962) advocated for the multicausality for attrition, suggesting that internal factors (psychological, familial, and financial) and external factors (institutional factors) are complexly related and should not be considered to be mutually exclusive. An individual factor that has been studied in relation to retention is choice of college major. Specifically, whether or not a student in a "STEM" major (science, technology, engineering or mathematics major) seems to be related to retention (Chen, 2013). Chen (2013) found that in the United States, student in STEM majors were more likely to be retained than those in other majors (specifically education, humanities and health science majors). Astin (1985) also recognized personal factors (including age, marital status, academic background, study habits and college expectations) and environmental factors (including the academic environment and college characteristics) as having the largest impact. Astin was also one of the first researchers to publish a connection between parental education and attrition. Astin demonstrated that higher levels of parental education (continuing generation students) was correlated to higher levels of persistence through college graduation. Studies have also investigated the impact of adjustment and integration to college on long term academic success and graduation. Tinto's (1987) study found that integration into the social and academic communities of college was the most important factor in retention. Tinto posited that this involved three stages 1) separation from past communities, 2) transition between communities and 3) incorporation into the college communities. Tinto's individual departure theory seems to

be more applicable to four-year colleges, than two-year colleges, however. Ishanti (2006) found that first generation students were more likely to depart from college prior to graduation, especially if their family was also low-income. The interaction between family income and generational status has been well-documented in the literature (Thayer, 2000). Combined, the "disadvantage" captured by the intersection of these two identities help explain the graduation gaps observed in those populations.

What Factors Predict Success in College for First Generation Students

According to Engle and Tinto (2008), once in college first generation students earn lower GPAs, take less classes, are more likely to live off campus, and are less likely to join campus clubs and organizations. First generation students overall are less engaged in their campus community and are more likely to report being dissatisfied with college (Pike & Kuh, 2005). These results may give insight to the attrition and decreased persistence rates of this population. In a sample of 1,747 college students in a four-year public institution, the risk of attrition in the first year was 71% higher than their continuing-generation peers (Ishitani, 2003). Additionally, according to Engle and Tinto (2008), only 11% of first generation students have earned a bachelor's degree six years after entering college compared to 55% of continuing-generation students. First generation students who started at a four-year university were also seven times more likely to complete a bachelor's degree than those who started at a two-year institution. However, only one in four first generation students start in a four-year university (Engle & Tinto, 2008). Among students who take the Advanced Placement (AP) and/or Standardized Achievement Test (SAT) through College Board, there are no significant differences in educational aspiration or expected educational attainment level between first generation students and continuing-generation students (Balemian & Feng, 2013). So, there is an obvious disconnect

between educational aspirations and actual college success for first-generation students that does not exist for continuing generation students. Not only do fewer first generation students consider college as an option and enroll, once in college they face significant barriers to success. As a result, first generation students graduate at much lower rates than continuing-generation students.

In addition, there are a number of pre-college characteristics that influence first generation outcomes in post-secondary environments. According to Engle and Tinto (2008) first generation students take less rigorous high school coursework, have lower SAT scores, and less advanced mathematics experience when they enter college as compared to continuing-generation students. This under preparedness is one factor that likely influences the lower rates at which first generation students apply to and enroll in college, but it also puts first generation students at an immediate disadvantage when they step on campus resulting in less academic achievement their first year (Engle & Tinto, 2008). Deberard, Scott, Speilmans and Julka (2012) and Wolfe and Johnson (1995) have found standardized test scores on the SAT and high school GPA to be a good predictor of first year GPA and persistence in college - accounting for around 25% of the variance across all college students. Deberard et. al. (2012) found that incorporating factors such as social support and health-related quality of life into the statistical model predicted 56% of first year academic success. However, these findings have not been studied specifically within a first generation population, so it is unclear if such predictive relationships hold up for first generation students or are as robust.

Financial strain is also a significant factor in predicting academic persistence and retention. Cabrera, Nora and Casteneda (1992) found that not only does a student's family income influence the institution of higher education they select, it also influences social interactions in college and retention. Joo, Durband, and Grable (2008), found that students who

were financially strained (worried about debt and academic costs, in credit card debt, have parents with credit card debt, employed while in school, and were older) were more likely to drop out of college before completing their degree. The study also demonstrated the nature of the cycle of financial strain. It was found that students who are highly stressed about finances are likely to reduce their course load and/or increase their income by working or working more outside of school. This additional time commitment to their employment reduces the time they have available to dedicate to academics resulting in poorer academic performance, increased levels of stress and the decision to leave the institution. It is known that first generation students as a population have less annual family income and higher financial strain on average (Inman & Mayes, 1999). So, it is likely that this financial strain contributes to the retention gaps between first generation and continuing generation students.

A number of studies have investigated the influence of self-efficacy, resilience, social and academic adjustment and other protective factors as additional promoters of positive college outcomes. Vuong (2010) for example, found that there is a significant, positive relationship between self-efficacy and academic outcomes in first generation students, as measured by GPA and persistence rates. Unfortunately, this study also found that first generation students have lower levels of academic self-efficacy overall in comparison with continuing-generation students. Self-efficacy can be defined as belief's about one's ability to successfully execute a behavior required to produce a certain result, and academic self-efficacy refers specifically to confidence in ability to succeed academically, such as studying for tests and earning "good" grades (Bandura, 1997). Similarly, Robbins et al. (2004), found that academic self-efficacy and achievement motivation were the best predictors of college GPA based on a meta analysis of 109 studies.

Resilience, which is the ability to adapt successfully despite the presence of adversity, appears to be another important factor in student retention and academic success. Resilience was found to explain a significant amount of the variance of cumulative college GPA in a sample of undergraduate students (Hartley, 2012). Resilience is strongly related to a construct referred to in the literature as "grit," described as a hardiness of character and perseverance towards goals (Duckworth, Peterson, Matthews & Kelly, 2007). Duckworth et al. (2007) studied high achieving individuals in Ivy league schools, West Point cadets, and national spelling bee competitors to better understand the individual differences contributing to success. Her study found that higher levels of "grit" were predictive of higher levels of educational attainment and higher GPA (Duckworth et al., 2007). In addition, Singh and Jha (2008) found "grit" to be significantly, positively correlated with life satisfaction, happiness, and positive affect in college students. Resilience to adversity and individual perseverance appear to have notable implications for college student success academically, psychologically and socially. However, how these findings apply to first generation college students is yet to be investigated.

College adjustment has also been identified as an important factor in predicting retention and academic achievement. College adjustment, can be understood through a number of subfactors. Two of interest to the current study include academic adjustment and social adjustment. Academic adjustment captures the extent to which an individual is motivated to succeed, meets academic demands of college, and satisfaction of the academic environment (Gerdes & Mallinckrodt, 1994). Social adjustment includes formation of a support network, integration of social college life and managing new social freedoms. Gerdes and Mallinckrodt (1994) found that social adjustment to college predicted retention, graduation and academic performance as well or better than academic adjustment. Dennis, Phinney and Chauteco (2005),

found that lack of peer support negatively influenced college adjustment and career motivation positively influenced college adjustment in a sample of ethnic minority, first generation students. However, the influence of college adjustment (academic and social) on academic outcomes and retention for first generation students specifically requires additional investigation.

Current Study

These gaps in enrollment and graduation have huge implications on individuals as well as on a national policy level. For individual students, enrollment and successful graduation will likely substantially alter their own lifetime earnings as well as those of their children. Institutionally, it is to the benefit of the college or university to give first generation students the attention and resources needed for their success in order to recruit and retain larger and more diverse cohorts. Ultimately, first generation students are a growing population that cannot be ignored and warrant attention and support by universities, counselors, and policy makers alike.

The current study aims to better understand the unique experiences, attitudes, and outcomes of first generation students at a public four-year university. Specifically, I am interested in determining the most important factors in predicting academic success and attrition in the first year of college for first generation students and how those factors may differ from continuing generation students. The relevant research questions are as follows:

RQ1: Are first generation students more likely than continuing generation students to have lower first year GPAs and not return to CSU for their second year?

RQ2: What factors (demographic and psychosocial) are most important in explaining the variation in first-year GPA for first generation college students? Are the factors that predict first generation GPA the same as those that explain GPA for the whole first year student population?

RQ3: What factors (demographic and psychosocial) are most important in explaining the variation in retention from the first to second year of college for first generation college students? Are the factors that predict first generation attrition after the first year the same as those that explain attrition for the whole first year student population?

CHAPTER II

Method

Participants

Participants for this study included 4011 first year college students living on a college campus in fall of 2014. Participants who were only enrolled part time (16), were non-degree seeking students (2), were international students (34), did not have responses for the items (2), and who were identified as deceased in fall 2015 (1) were removed from the sample. The remaining number of participants was 3956. Participants came from a large, western United States university, and included 2,227 (56.3%) females and 1,729 (43.7%) males with an average age of 18.13 years (*SD* = .53). Furthermore, 111 (2.8%) identified as African American/Black, 33 (0.8%) as Native American, 124 (3.1%) as Asian American/Asian, 499 (12.6%) as Hispanic/Latino, 8 (0.2%) as Native Hawaiian/Pacific Islander, 3071 (77.6%) as White non-Hispanic, 58 (1.5%) as Multi-racial, and 52 (1.3%) provided no response. First generation students comprised 24% (950) of the sample. Additionally, 820 students were identified as being eligible for the Pell Grant (20.7%).

Measures

Demographic Information

Demographic information was obtained from the student's school record. The information in the school record was provided by the student at the time of admission to CSU. Demographic information gathered includes generational status (first generation college or continuing generation college), gender, ethnicity, STEM status, veteran/military status, and Pell eligibility. All demographic information for this study was based on self-report. Generational status was measured based on the educational attainment of a student's parents. If the student

indicated that neither parent received a bachelor's or graduate/professional degree they were designated as first generation. Family income in this study was measured by Pell eligibility. Pell eligibility refers to whether or not a student is eligible to receive a Federal Pell Grant, which is a scholarship program for those with financial need. The eligibility requirements are different at every college and university based on cost of attendance. "STEM" majors, which stands for science, technology, engineering and mathematics majors, were designated as anyone with one of the following as their primary major: animal science, anthropology, biology, biochemistry and molecular biology, biomedical sciences, chemical and biological engineering, chemistry, civil and environmental engineering, computer science, construction management, ecosystem science and sustainability, electrical and computer engineering, fish/wildlife/conservation biology, food science and human nutrition, forest and rangeland stewardship, geosciences, horticulture and landscape sciences, mathematics, mechanical engineering, microbiology/immunology, physics, soil and crop sciences, or statistics.

Outcome Measures

The two outcome variables measured in this study were first year cumulative grade point average (GPA) and retention from the first year to the second year. First year cumulative GPA was obtained from the students' university records in fall 2015. First year GPA reflects cumulative GPA of fall 2014 and spring 2015 semesters but not summer 2015 GPA. Retention was also obtained from the students' university records. If a student was enrolled at CSU in fall 2015 they were designated as retained, if they were not they were designated as not retained.

Taking Stock Survey

All participants in this study filled out the Taking Stock Survey (TSS), designed to assess psychosocial functioning and college adjustment in first year college students. The TSS was

developed in 2014 by a committee of campus leaders to better understand and positively impact the experiences of first year college students. The TSS was designed primarily to be an assessment of experiences and concerns of students in their first month on campus as a way for RAs to facilitate a one on one conversation with each of their residents about their initial adjustment. The committee that developed the TSS included individuals from Orientation and Transition Services; Housing and Dining Services; the Office of International Programs; the Campus Health Network; Institutional Research, Planning and Effectiveness; and the Office of Student Affairs. Committee member developed proposed factors TSS based on literature on the important components of first-year college student experiences and their own expertise. Items were written to imitate existing measures of adjustment, well-being, resiliency, homesickness and well-being. Additional items were written to capture financial concern and institutional commitment. After a series of revisions, the TSS included 52-items thought to measure 7 domains: Resiliency (13 items), Social Adjustment (7 items), Academic Adjustment (6 items), Confidence and Well-Being (9 items), Family Impact on campus adjustment (6 items), Financial Concern (6 items) and Institutional Commitment (6 items). Each item was rated on a seven point likert-styled scale with anchors of "strongly disagree" to "strongly agree", with "not applicable" provided as an alternate option. Example items include “No matter what obstacles are placed before me, I'm confident in my abilities to succeed”, “Financial obligations are interfering with my ability to focus on academics” and “So far this semester I've been able to make friends with other students” (see Appendix A).

Procedure

All fall 2014 newly matriculated first year undergraduate students living on campus were recruited to complete the survey through an email communication from the university's

institutional research department and through conversations with their Residence Assistant (RA) during their weekly hall meeting. The survey link was open for one week. Participants who did not complete the survey were verbally and electronically reminded three times before closing the survey to encourage follow-through. The surveys were linked to the participant's student ID and student profile used for administrative purposes. Identifying information was replaced in all datasets with a researcher-created participant identification numbers to maintain anonymity and allow response matching.

Data Analysis

The TSS had been used primarily to facilitate one-on-one developmental counseling conversations with students, thus psychometric analysis on the scale had not been previously conducted. Therefore, Exploratory Factor Analysis (EFA) was used in this study in order to identify the factor structure of the TSS.

Additionally, a series of multiple regression analyses were conducted in this study in order to determine the combination of psychosocial and economic factors that best predict cumulative first year GPA in first-generation students. In order to do so, cumulative first year GPA was regressed on all TSS factors and demographic variables (first generation status, gender, minority status, Pell eligibility, STEM major status, and high school index) for all first generation students. Following this, cumulative first year GPA was regressed on the TSS factors and demographic variables for all first year students (first generation and continuing generation) together. Interaction terms were created to determine if the impact of the TSS factors and demographic variables varied based by generational status.

In addition to multiple regression, logistic regression analyses were conducted to determine the impact of the TSS factors on attrition from first year (Fall 2014 - Spring 2015) to

Fall 2015 for first generation students. Attrition was regressed on all TSS factors, and gender, minority status, Pell eligibility, STEM major status, and high school index for first generation students only. Then, attrition was regressed on all TSS factors, and gender, minority status, Pell eligibility, STEM major status, high school index, generational status and the interactions between the TSS factors and generational status for the combined sample (first generation and continuing generation).

CHAPTER III

Results

Exploratory Factor Analysis of the TSS

Since the TSS is a newly developed instrument, it necessitated the use of EFA to explore the number and structure of factors. Means and standard deviations of the 52 TSS items are included in Table 1.

The TSS data, including responses of both first generation and continuing generation students, were subjected to primary axis factoring with oblique rotation. An oblique rotation was selected based on an analysis of the item correlations, which ranged from .030 to.752. This range in item correlations suggests that an oblique rotation is most appropriate for this data. The TSS was created to measure seven factors important in the first year college student experience: Sense of Belonging, Institutional Commitment, Homesickness, Well-being, Self-perception, Grit, Financial Concern, and Adjustment. Factors were retained based on the following criteria. First, factors had to have an Eigen value greater than 1 to be retained (Kaiser, 1958). Nine factors had an Eigen value greater than 1 in this case. In addition to considering factors with Eigen values greater than 1, factors were retained based on factor loadings. Items with loadings below .50 were deleted (Tabachnick & Fidell, 2001). Next factors were retained that approximated simple structure, in that items that loaded significantly (>.3) on multiple factors were deleted. Fourth, factors were retained based on the recommendation that a factor should have at least three items (Tabachnick & Fidell, 2001). Lastly, factors were retained that were theoretically interpretable (DeVellis, 2012).

After deleting items, the factor structure decreased to five (Table 2). This structure remained intact when the remaining items were subjected to principal axis factoring with oblique

rotation. In order to assess what the extracted factors represented, the rotated loadings were examined. The first factor, comprised of 7 items, most accurately reflected the domain of Social Adjustment, with representative items including “So far this semester I’ve been able to make friends with other students” and “I feel I am adjusting well to CSU socially”. The second factor most accurately describes Grit, with the 8 items including “I feel I can handle most things that come my way” and “By working hard I can almost always achieve my goals”. The third factor is best classified as Financial Concern, and was comprised of 5 items, including “I often feel worried about paying for college”. The fourth factor, Institutional Commitment, was composed of 5 items, including “I’m committed to completing my degree at CSU” and “If I could do things over again, I would still choose to attend CSU”. The fifth factor, comprised of 3 items, is best described as Homesickness, and includes items such as “It is hard being away from my home, family, significant other and/or friends”.

TSS data for first generation students only was also subjected to primary axis factoring with an oblique rotation to determine if there was a different relationship between the factors and first generations students in comparison to the entire TSS Fall 2014 cohort. The five factor structure was replicated in the first generation group. However, the factor with the largest Eigen value and most percent of variance for first generation students was Grit (Eigen value = 8.679), rather than Social Adjustment (Eigen value = 8.679). See Table 3 for additional Eigen values.

Reliability Analysis

The internal consistency of the TSS was determined by examining inter-item correlations. According to George and Mallery (2003), a Cronbach’s alpha (α) above .7 is acceptable, above .8 is good, and above .9 is excellent. Coefficient alpha’s for the five individual subscales of the TSS ranged from .71 to .91**,** demonstrating acceptable to excellent internal consistency (Table 4).

Coefficient alpha for the full scale was .793, demonstrating acceptable internal consistency (Table 5).

T-tests

A series of independent t-tests were conducted to examine differences in high school index, cumulative first year GPA, and the five TSS factors between first generation and continuing generation students. There was a significant difference between first generation and continuing generation students on high school index ($t(3948) = 9.38$, $p < .001$). There was a significant difference between first generation and continuing generation students on cumulative first year GPA as well ($t(3720) = 6.41$, $p < 0.001$). There was not a significant difference in the mean scores based on generational status for grit ($t(3953) = -1.62$, $p = .106$) or institutional commitment ($t(3954) = 1.72$, $p = .084$). See Table 7 for means and standard deviations. There was however a significant difference between first generation students and continuing generation students on the means of social adjustment ($t(3954) = 2.21$, $p < .05$), financial concern ($t(3953) = -15.607$, $p < .001$) and homesickness ($t(3954) = -.363$, $p < .001$. See Table 7 for means and standard deviations.

Chi-Squared tests

A series of Chi squared tests were conducted on demographic variables in order to assess for differences between the first generation and continuing generation student sample. Chi squared tests were chosen based on the categorical nature of the demographic information. Results suggest that the proportion of individuals in the first generation and continuing generation student samples were significantly related to the following demographic characteristics: gender, ($\chi^2(2, 3956) = 8.654$, $p = .003$); Pell eligibility, ($\chi^2(2, 3956) = 413.34$, $p < .001$); minority, ($\chi^2(2, 3956) = 288.20$, $p < .001$); STEM status, ($\chi^2(2, 3956) = 10.83$, $p = 0.001$)

and attrition, ($\chi^2(2, 3956) = 50.212$, $p < .001$). See Table 8 for details. There was a significant relationship between generational status and gender ($\chi^2(2, 3956) = 8.654$, $p = .003$) such that there were a greater proportion of females in the first generation sample than in the continuing generation sample. A significant relationship between generational status and Pell eligibility was also found, such that a greater proportion of first generation students were Pell eligible than continuing generation students ($\chi^2(2, 3956) = 413.34$, $p < .001$). This same trend was found for minority status, in that a significantly greater proportion of first generation students identified as minorities in comparison to continuing generation students ($\chi^2(2, 3956) = 288.20$, $p < .001$). A significant relationship with generational status was found such that there were a greater proportion of continuing generation students were in a STEM major in comparison to first generation students ($\chi^2(2, 3956) = 10.83$). Finally, attrition was found to be significantly related to generational status as well. A higher proportion of continuing generation students enrolled for their second year of college at CSU in comparison to first generation students ($\chi^2(2, 3956) = 50.212$, $p < .001$).

Bivariate Linear Regression

A series of simple linear regression analyses were conducted to determine if cumulative first year GPA could be predicted by the demographic variables to determine what variables should be retained for inclusion in the multiple linear regression model. The results of the simple linear regression of GPA on minority status suggest that a significant proportion of the total variation in GPA was predicted by minority status ($r^2 = .007$, p <.001), generational status ($r^2 = .011$, p <.001), STEM status ($r^2 = .012$, p <.001), Pell eligibility($r^2 = .012$, p <.001), gender ($r^2 = .028$, p <.001), and high school index ($r^2 = .207$, p <.001) independently (Table 6). In other

words, a student's minority status, generational status, STEM status, Pell eligibility, gender, and high school index are all independently good predictors of their cumulative first year GPA.

Predicting First Year GPA: Multiple Linear Regression

First Generation Students Only

The purpose of this analysis was to determine the combination of psychosocial factors that best predict cumulative first year GPA among first generation college students. We began by examining all five psychosocial factors from the Taking Stock Survey. Using hierarchical regression, cumulative first year GPA was regressed on all five factors as well as Pell eligibility, gender, STEM major status, minority status, and high school index for first generation students only. A two stage hierarchical multiple regression was conducted with first year GPA as the dependent variable. We were interested in isolating the effect of the TSS factors on first year cumulative GPA. So, only the demographic variables (high school index, Pell eligibility, STEM status, gender, and minority status) were entered into the first stage of the regression model to see what proportion of the variance those factors alone accounted for. The TSS factors (grit, social adjustment, institutional commitment, financial concern, and homesickness) were entered at stage two. The hierarchical multiple regression revealed that at Stage one, gender (β=.216, p< .001), high school index (β=.028, p< .001), and STEM status (β=-.237, p< .001) contributed significantly to the regression model, and accounted for 20.1% of the variation in first year cumulative GPA (F (5,862) = 43.46, p< .001). Specifically, being female, a non-STEM major, and having a higher high school index were positively related to first year GPA. Introducing the TSS variables explained an additional 1.3% of variation in GPA and this change in R^2 was significant, F (2,88) = 60.10, p < .001. When all five TSS factors were included, the following factors remained significant predictors of GPA: gender (β=.229, p< .001), high school index

(β=.027, p< .001), STEM status (β=-.236, p< .001), and grit (β=.114, p< .002). Higher mean grit score was associated with higher first year GPA.

Of all the significant variables in the two-step model, high school index produced the largest squared semi-partial correlation (r=.143), indicating that about 14.3% of the variance in first year GPA could be uniquely predicted by high school index. The squared semi-partial correlation for gender (r=.022) and STEM status (r=.023) and grit (r=.008) were substantially smaller. Together, these four factors (high school index, gender, STEM status and grit) predicted about 21.4% of the variance in first year GPA for first-generation students.

Because high school index is responsible for so much of the variance and also impactful and impacted by the other demographic variables in this study, a second hierarchical regression model was run without high school index. Cumulative first year GPA was regressed on the TSS factors and the demographic variables of the previous MLR for first generation students. The demographic variables of high school index, Pell eligibility, STEM status, gender, and minority status were entered at stage one of the regression to control for the influence of those demographic variables. The TSS factors (grit, social adjustment, institutional commitment, financial concern, and homesickness) were entered at stage two. The hierarchical multiple regression revealed that at Stage one, gender (β= .193, p< .001) was the only factor that contributed significantly to the regression model, and accounted for 4.3% of the variation in first year cumulative GPA (F (4,865) = 9.70, p< .001). Introducing the TSS variables explained an additional 2.7% of variation in GPA and this change in R^2 was significant, F (9,860) = 7.16, p < .001. When all five TSS factors were included, the following factors remained significant predictors of GPA: gender (β= .199, p< .001), Pell eligibility (β= -.070, p< .05), and grit (β= .165, p< .001). Social adjustment was near significant (β= -.084, p = .054). Gender produced the

largest squared semi-partial correlation (*pr2*=.369), indicating that about 3.69% of the variance in first year GPA could be uniquely predicted by gender for first generation students. The squared semi-partial correlation for grit was (.0185), indicating about 1.85% of the variance in first year GPA for first generation students can be explained by grit. The squared semi-partial correlation for Pell eligibility was significantly smaller (.0045). Together, these three factors (gender, Pell eligibility, and grit) predicted about 6% of the variance in first year GPA for first-generation students.

All First Year Students

To determine if there are in differences between first generation students in comparison to continuing generation students in the extent and way demographic variables and TSS factors influence GPA, a three stage hierarchical regression model was run on the entire sample (n = 3956). The demographic variables of high school index, Pell eligibility, STEM status, gender, and minority status were entered at stage one of the regression to control for the influence of those demographic variables. The TSS factors (grit, social adjustment, institutional commitment, financial concern, and homesickness) were entered at stage two, and the interaction terms (grit*first generation, social adjustment*first generation, Institutional commitment*first generation, financial concern*first generation, and homesickness*first generation) were entered in stage three. The hierarchical multiple regression revealed that at Stage one, gender (β=.129, p< .001), high school index (β=.479, p< .001), STEM status (β= -.173, p< .001), Pell eligibility (β= -.049, p< .005), and generational status (β= -.042, p< .05), contributed significantly to the regression model, and accounted for 25.8% of the variation in first year cumulative GPA (F (6, 3709) = 214.85, p< .001). Being female, having a higher high school index, not being in a STEM major, not being Pell eligible, and being continuing generation were all associated with higher

first year GPA. Introducing the TSS variables explained an additional 1.7% of variation in GPA and this change in R^2 was significant, F (11,3704) = 127.44, $p < .001$. When all five TSS factors were included, the following factors remained significant predictors of GPA: gender (β= .130, p< .001), high school index (β= .479, p< .001), STEM status (β= -.173, p< .001), Pell eligibility (β=-.049, p< .005), grit (β= .153, p< .001), and social adjustment (β= -.052, p< .05).

At stage three the interaction terms were introduced. Gender (β=.129, p< .001), high school index (β=.029, p< .001), STEM status (β= -.173, p< .001), Pell eligibility (β= -.049, p< .005), generational status (β= -.042, p< .05), grit(β= .166, p< .05), and social adjustment (β= -.053, p< .05), remained significant predictors. However, homesickness (β= .043, p< .05) and the interaction between homesickness and generational status (β= -.045, p< .05) emerged as significant predictors of GPA in this model as well. See Table 12 for details. Introducing the interaction terms only explained an additional .2% of variation in GPA. The significant interaction between generational status and homesickness indicates that the impact of the homesickness on GPA is greater for first generation students than continuing generation students. High school index produced the largest squared semi-partial correlation (pr^2=.189), indicating that about 18.9% of the variance in first year GPA could be uniquely predicted by high school index. The squared semi-partial correlation for STEM status (pr^2=.026), gender (pr^2=.015) and grit (pr^2=.014) were smaller, and the semi-partial correlations for generational status (pr^2= .001), Pell eligibility(pr^2=.002), social adjustment(pr^2=.001), homesickness (pr^2=.001), and the interaction between homesickness and generational status (pr^2=.001) were still significant but substantially smaller. Together, these factors predicted about 25% of the variance in first year GPA for first year students. The overall three-step model was significant (F(16, 3699) = 88.322, $p < .001$), but the .2% increase in R2 was not significantly different than

the two stage model (ΔX^2=1.91, p=.089), indicating that adding the interaction terms did not predict GPA significantly better than just the TSS factors and demographic variables alone.

Predicting Retention: Logistic Regression

First Generation Students Only

A logistic regression analysis was conducted to predict retention from the first to second year of college in first generation students using the five TSS factors, Pell eligibility, minority status, gender, STEM status, and high school index as predictors. A test of the full model against a constant only model was statistically significant, indicating that the predictors as a set reliably distinguished between students who returned to CSU for their second year and students who did not (X^2 = 87.354, p < .001). Nagelkerke's R2 of .138 indicated a moderate relationship between prediction and grouping. Prediction success overall was 81.3% (98.9% for retained and 12.4% for not retained. The Wald criterion demonstrated that only high school index (Wald = 4.54, p < .05), minority status (Wald = 6.54, p <.05), institutional commitment (Wald = 32.35, p <.001), financial concern (Wald = 13.34, p <.001) and homesickness (Wald = 8.34, p <.05) made a significant contribution to prediction. Gender, STEM status, Pell eligibility, grit, and social adjustment were not significant predictors. The Exp(B) value indicates that when high school index is raised by one unit (one point) the odds ratio of a student enrolling in fall semester 2015 is 1.02 times larger when all other predictors are held constant. The Exp(B) value for minority status was .625, indicating that minority students are 1.375 times more likely than non-minority students to leave before the second year of college at CSU. The Exp(B) value for institutional commitment indicates that when an individual's mean institutional commitment score is raised by one point, the odds of that student enrolling for their second year at CSU is 1.78 times greater holding all other predictors constant. The Exp(B) value of .77 for financial concern indicates that

when mean financial concern score is raised by one point the odds ratio is 1.23 times greater that the student will not be retained from the first to second year. Finally, homesickness was found to be significantly related to enrollment in that a one-point increase in mean homesickness score makes a student 1.32 times more likely to not return to CSU for their second year. See Table 9.

All First Year Students

To determine if the factors most important in predicting retention for first generation students are different to what is most important for continuing generation students, logistic regression was run with all the students in the sample. Prior to this, a series of bivariate logistic regression analyses were conducted to determine if retention from the first to second year could be predicted by the demographic variables. The results of these analyses were used to determine what variables should be retained for inclusion in the multivariate logistic regression model. The Wald criterion demonstrated that generational status (Wald= 48.87, Exp(B) = .50, $p < .001$), high school index (Wald= 55.58, Exp(B) = 1.03, $p < .001$), minority status (Wald= 9.29, Exp(B) = .72, $p < .005$), STEM status (Wald= 5.28, Exp(B) = 1.25, $p < .005$), and Pell eligibility (Wald= 12.99, Exp(B) = .68, $p < .001$) were all significantly, independently predictive of retention. Specifically, being continuing generation, white, in a STEM major, not Pell eligible and coming into college with a higher high school index all independently increased the likelihood of being retained from the first to second year. The Wald criterion for gender indicated that gender is not a significant predictor of retention in this sample (Wald= .138, Exp(B) = .97, $p = .711$).

Next a series of logistic regression models with just the demographic variables of just the TSS factors were run to determine which uniquely contributed to significantly explaining the variance in retention. When the demographic variables of generational status, high school index, STEM status, minority status, and Pell Eligibility were run together in a model, the Negelkerke

R^2 of .043 indicated a weak relationship between demographic variables and prediction of retention. The overall model was significant (X^2 = 92.79, p <.001). Generational status (Wald= 27.90 Exp(B) = .56, p < .001) and high school index (Wald= 37.98, Exp(B) = 1.03, p < .001) continued to significantly predict retention. However, minority status (Wald= .07, Exp(B) = .97, p = .791), Pell eligibility (Wald= .49, Exp(B) = .92, p = .485) and STEM status (Wald= .041, Exp(B) = .98, p = .840), did not significantly predict retention above and beyond that of generational status and high school index.

Additionally, a logistic regression of retention on just the five TSS factors (grit, social adjustment, homesickness, financial concern and institutional commitment) was run. When grit, social adjustment, homesickness, financial concern and institutional commitment were run together in a model, the Negelkerke R^2 of .102 indicated about 10% of the variance in retention could be explained by the TSS factors. The overall model was significant (X^2 = 226.6, p <.001). Retention was significantly predicted by homesickness (Wald= 10.16, Exp(B) = .88, p < .001) financial concern (Wald= 31.35, Exp(B) = .83, p < .001) and institutional commitment (Wald= 106.61, Exp(B) = .88, p < .001) in this model. However, grit (Wald= .31, Exp(B) = 1.04, p = .577) and social adjustment (Wald= 3.01, Exp(B) = .89, p = .08) did not significantly predict retention above and beyond that of homesickness, institutional commitment and financial concern. Overall, the model was able to successfully predict whether or not the student would be retained in 87% of the cases (99.7% retained, 5.4% for not retained).

Finally, retention was regressed on generational status, high school index, institutional commitment, financial concern and homesickness. A test of the full model against a constant only model was statistically significant, indicating that the predictors as a set reliably distinguished between students who continued and students who did not (chi square = 284.55, p

< .001). Nagelkerke's R2 of .127 indicated a small but significant relationship between prediction and grouping. Prediction success overall was 87.0% (99.5% for retained and 6.0% for not retained). The Wald criterions demonstrated that all the variables included in the model made a significant contribution to prediction. See Table 10. The Exp(B) value for high school index indicates that when an individual's index score is raised by one point, the odds of that student enrolling for their second year at CSU is 1.024 times greater holding all other predictors constant. For example, in a situation where a student with a high school index of 105 and a student with a high school index of 130 who are the same on all other variables (TSS factors, demographics etc.) were being compared, the student with the 130 high school index would be expected to be 1.72 times more likely than the student with a 105 index to be retained to the second year (based on the 25 point difference in index). The results also indicate that first generation student are significantly less likely than continuing generation students to be retained from the first to second year of college (Exp(B) = .61, p <.001). Additionally, for every one point increase in institutional commitment, the odds of enrollment in year two of college at CSU increase by 1.70 (p <.001). For every one point increase in financial concern, the odds of retention decrease by .85 (p <.001). Each one point increase in homesickness corresponded to a .90 decrease in the odds of retention (p < .01). No significant interactions between generational status and the TSS factors were found for retention.

CHAPTER IV

Discussion

The purpose of this study was two-fold. First, to explore the underlying factor structure of the Taking Stock Survey (TSS) and secondly to understand the impact of the psychosocial factors measured by the TSS as well as demographic variables on first year college GPA and retention in first generation students. Results indicated that the TSS measures five factors: Social Adjustment, Grit, Financial Concern, Institutional Commitment and Homesickness. Being a first generation student was significantly predictive of lower GPAs at the end of the first year and a lower probability of being retained from year one to year two. Meaning, first generation students are more likely to get lower GPAs and not come back to CSU their second year of college. Other factors that impacted the GPAs of first generation students included Pell eligibility, STEM status, grit, social adjustment and homesickness. Minority status, institutional commitment, financial concern and homesickness were significant predictors of attrition for first generation students. For all first year students (first generation and continuing generation), gender, Pell eligibility, high school index generational status, grit, and social adjustment uniquely contributed to explaining the differences observed across individuals in first year GPA. For retention from the first to second year, generational status, high school index, institutional commitment, financial concern, and homesickness were the most important influences for all first year students.

The process of uncovering the underlying factor structure of the TSS followed the recommendations of Worthington and Wittaker (2006) and Kahn (2006). Factors were retained based on four criteria: eigenvalues greater than 1, factor loadings above .5, approximating simple structure, and theoretical relevance. After these criteria were applied, the EFA suggested a 5-

factor structure, with standardized factor loadings ranging from 0.50 to 0.93. Homesickness was the weakest factor of the five. It may be that more items about homesickness need to be written and analyzed to fully capture the construct. Interestingly, most of the items initially written to fit the proposed factors of well-being, self-perception, and academic adjustment did not load strongly onto any one factor, and many were subsequently deleted from the analyses. This could reflect poorly written items, or items that did not adequately capture the constructs of academic adjustment, well-being, and self-perception. It may be that better items need to be written about the well-being, self-perception, and academic adjustment in general in order to tap into the relevant constructs.

To determine if the factor structure found in the EFA run with all first year students was also representative of first generation students separately, an additional EFA was run with just first generation students. The five-factor structure generally held up. However, the factor capturing the most variance and with the largest Eigen value was different for first generation students. Although further analysis is needed to determine what meaning that difference in variance has, it indicates that there is something different in the way first generation students are responding to the survey in comparison to their continuing generation peers and warrants further attention.

Consistent with previous research, group differences were found between first generation and continuing generation students on the demographic variables of gender, prior academic performance and preparation (high school index), family income (Pell eligibility), minority identities (ethnicity), and STEM status. Proportionally more first generation students were female, had low high school index scores, were Pell eligible, identified as an ethnic minority, and were not in STEM majors. These pre-existing group differences provide further evidence for the

challenges due to academic under-preparedness and low family income especially first generation students face when starting college. First generation students had significantly lower mean scores on social adjustment and significantly higher scores on homesickness and financial concern. They also are significantly less likely to enroll in the fall semester their second year. However, first generation students were just as high in their scores of institutional commitment. So, first generation students in this sample were less socially adjusted, more homesick, more stressed about finances and more likely to leave the institution, yet when taking the TSS survey in their first semester they report being equally committed to staying at CSU until graduation as their continuing generation counterparts. Clearly, there is a disconnect between interest in college achievement and enrollment behavior. It is possible that the detrimental effect of having more financial stress, homesickness and social adjustment are responsible for this gap between student expectations and attrition.

A second purpose of this study was to better understand what predicts academic achievement and attrition in first generation students. To do this a series of regression analyses were conducted. The hierarchical linear regression analyses of first year GPA indicated the significance of gender, high school index, choice in major (STEM vs. non-STEM), and grit for first generation students. Specifically, being female, having a higher high school index, not being in a STEM major and having higher levels of grit were related to higher GPA. These findings were mostly consistent with previous literature (Engle & Tinto, 2008). However, it is somewhat surprising that homesickness was not a significant in this analysis. A possible explanation might be that the survey was taken early enough in the semester that homesickness was not as present as it might be at a later time.

High school index was consistently the factor that predicted the highest amount of variability across analyses. For first generation students, high school index predicted about 14% of the variance in cumulative GPA. For the combined sample of first generation and continuing generation students high school index predicted about 19% of the variability in cumulative first year GPA. Interestingly, when high school index was removed from the regression, Pell eligibility became a significant predictor of GPA for first generation students. Meaning, somehow the variance in GPA associated with high school index and with Pell eligibility are related. Further investigation is needed to determine the relationship between these two variables.

In the three stage hierarchical regression on the entire sample (first generation and continuing generation) gender, STEM status, Pell eligibility, high school index, and generational status, accounted for about 25% of the differences in GPA while grit, social adjustment and homesickness accounted for a little less than 2% of the differences in GPA. Specifically, being female, not being in a STEM major, not being Pell eligible, not being a first generation student, and having a higher high school index were all associated with better outcomes on first year GPA for the combined sample. Additionally, higher levels of grit and lower levels of social adjustment were associated with higher GPA. The findings of the impact of grit are consistent with expectations. It seems logical that having long term perseverance towards goals would related to academic endeavors. However, the findings on social adjustment are a bit counter-intuitive. Since higher levels of adjustment are generally considered a positive predictor of favorable outcomes in college, it is curious that social adjustment was negatively correlated with GPA in this study. Meaning, in this study students that were more socially adjusted had lower GPA that students with lower levels on social adjustment. It may be the case that students who

are already feeling highly socially connected in their sixth week of college may be spending more time and energy socializing than their less socially adjusted peers resulting in less time and commitment to their academics. There was also a significant interaction between generational status and homesickness indicating there is a joint predictive effect of the two together, above and beyond that of their contributions individually, meaning the extent to which homesickness influences a student's GPA depends on whether or not that student is first generation. The results of this study indicate that higher levels of homesickness are significantly more academically detrimental for first generation students than for continuing generation students. However, this interaction explained a very small amount of the variance. The impact of grit, homesickness and adjustment on GPA were quite small as while, though statistically significant. It may be that the psychosocial factors in this study truly do only predict a small amount of the variance in first year GPA. It may also be the case that there is a mediation relationship between some of the TSS factors and the demographic variables. For example, it is possible that high school index mediates the relationship between grit and first year college GPA. Essentially, doing well in high school may cause "grittiness" to occur in that seeing one's own diligent, consistent efforts positively impact performance makes one more likely to be gritty in college. Further investigation into this relationship is warranted.

The results of the logistic regression conducted in this study indicate that high school index, minority status, institutional commitment, financial concern and homesickness significantly predicted which first generation students returned to CSU for their second year and which did not. First generation students who were also minority students or who had a lower high school index were less likely to enroll in their second year of college (fall 2015). Students with higher mean scores on institutional commitment were more likely to be retained. Those who

reported more homesickness and/or more financial concerns were less likely to be retained. The results of the logistic regression analysis are consistent with past findings on the impacts on college attrition and retention (Cabrera, Nora & Casteneda, 1992; Seidman, 2005). However, it was surprising that Pell eligibility did not emerge as a significant predictor of enrollment behavior. It is possible that receiving a Pell grant serves its intended purpose well for this population and significantly lessens the detrimental effects of financial need on attrition. However, given that the maximum amount of assistance provided by a Pell grant is about $5,000 per year, it is likely that many students who qualify for Pell still have unmet financial needs outside of the portion covered by Pell. It is more likely reflective of the ways in which the factors in this study overlap. Generational status, minority status and Pell eligibility are highly correlated for example. So, if we removed generational status and minority status from the analyses it is very possible Pell eligibility would have shown up as a significant predictor of retention from the first to second year. However, to better understand the role that Pell eligibility plays in retention, various alternate explanations should be explored.

In the combined sample (of first generation and continuing generation students), logistic regression revealed that generational status, high school index, institutional commitment, financial concern and homesickness significantly explained retention from the first to second year. Being continuing generation, having a higher high school index, being more committed to staying a CSU, feeling less stressed about finances and being less homesickness positively predicted returning to CSU for the fall semester of their second year. The impact of generational status, high school index and institutional commitment were particularly strong. First generation students were 1.4 times more likely to leave before their second year in comparison to continuing generation students. A one point increase in mean institutional commitment score (from a four to

a five – with seven being the highest possible score) was responsible for a 1.7 times greater odds of staying at CSU. A ten-point increase in high school index (from a 105 to a 115 for example) resulted in a 1.24 times greater likelihood of being retained. Surprisingly, no significant interactions between generational status and the other factors in this model (high school index, institutional commitment, financial concern, and homesickness) were found.

Limitations

There were a number of limitations to this study in regards to research design and interpretation. In regards to the TSS, an EFA was conducted to explore the underlying factor structure of the scale. However, to more thoroughly evaluate the scale a Confirmatory Factor Analysis (CFA) should be conducted on a separate sample. Additionally, convergent and discriminant validity with similar scales (self-esteem, growth mindset and existing grit scales for example) should be investigated. If other researchers are interested in utilizing the TSS, it is recommended that they follow these steps and attempt to replicate the findings in this paper to better understand the factor structure and validity of this scale.

Another limitation is that we are unable to determine the impact of the TSS factors on the academic progress of student who did not finish their first year. Since these students do not have a recorded GPA for after they left, we cannot be sure that the TSS factors have similar relationships with their academic progress as was demonstrated in students who were retained. Future studies should consider tracking academic progress through multiple time point such as first semester midterm grades, first semester GPA, and second semester midterm grades to determine the patterns that may exist for students who ultimately do not return for their second year.

Additionally, this study utilized a student sample from one individual university. For convenience, all the students in this study were recruited from the sample public, research university. A new sample from a different university will help to make the instrument more psychometrically sound. Furthermore, given that research has shown that proportionally more first generation students live off-campus their first year than continuing generation students, the fact that the sample in the current study was comprised entirely of on-campus students limits it generalizability. It may be the case that students who live off campus their first year are significantly different than those who live on-campus (perhaps in age, dependents, family location, income level, etc.). Although the size of the sample was a strength of this study, future studies should address off-campus and non-traditional first generation student populations that were not of primary focus on this study.

Additionally, the extent to which the participants were invested in the research and completed the TSS in a valid manner is unknown. There were not any validity check items included in this measure, and therefore it is theoretically possible that the results were impacted by students who did not answer the questions honestly and validly the entire way through the survey. Similarly, a significant limitation of this study is that the TSS is all self-report and prone to social desirability. It may be that students answered questions based on invalid self-perceptions of their own traits or responded based on what participants believed their RA wanted to see or how they wanted to be perceived. Future studies should consider multimodal approaches to better assess the validity of the TSS as a self-report measure.

Also, it is important to note that the TSS scores provide a single "snapshot" of those self-reported psychosocial traits. The TSS survey is taken by students during their second month on campus, in which their levels of social adjustment, homesickness, and institutional commitment

are likely still evolving. These students have likely only experienced one round of college tests, are just being exposed to campus involvement opportunities, and are still developing social networks in and outside of their residence halls. If we had participants take the survey again in the spring semester of their first year we might see fairly large within participant differences in their responses. Similarly, a follow-up survey during the students' fourth year on campus might provide a very different profile of psychosocial functioning than what was observed in this study. Further studies should seek to understand the ways in which the TSS factors fluctuate over time and how that may impact retention to graduation, campus engagement, post-graduate employment, well-being at the time of graduation and other long term outcomes of interest.

Implications

Despite these limitations, this research makes a meaningful contribution to the literature on first generation college students. This study demonstrates the pre-college differences in academic preparation and the demographic identities (such as minority status and Pell eligibility) that are significantly associated with the first generation population. It also demonstrated the small but significant influence of grit and social adjustment on academic success in the first year of college. The impact of financial concern, homesickness and institutional commitment on enrollment behavior was also demonstrated in this study. High school index was by far the strongest predictor of both first year GPA in college and retention from the first to second year.

This indicates that early interventions targeting improving academic performance early on may be the most effective way to assist first generation students in their college experience. By strengthening academic skills and motivation in high school or before, students are more likely to have better college GPAs and a higher likelihood of staying at CSU. Existing intervention programs like Upward Bound and Talent Search may be effective examples of how

early intervention may impact long term education attainment and success. Continuing to fund and expand the educational opportunity programs will be crucial to providing first generation students the academic and personal support needed to allow this population to thrive on college campuses. Additionally, better understanding the way early academic success influences the development of psychosocial factors (like grit and social adjustment) is a gap in the literature that should also be addressed by future researchers.

Additionally, the results emphasize the complex and impactful roles of intersecting identities in college students. The results indicate a significant overlap in minority status, Pell eligibility and generational status. This intersection makes it difficult to determine which identities truly cause the most challenge in the college setting. In applying the findings of this study, consideration for the many identities and social forces at play with any one student is crucial.

Conclusion

Moving forward, it will be important for both researchers and administrators of higher education to continue to seek to understand the unique, challenging experiences of first generation students in their first year of college. Early interventions targeting academic skills and college preparation as well as reducing homesickness and increasing grit and institutional commitment should take place at both an individual and institutional level. Ultimately, providing access and true opportunity to success for students, first generation and otherwise, who have experienced systemic barriers in education is crucial to creating a more egalitarian campus and global community.

Table 1: *Means and Standard Deviations of TSS Items*

Items	Mean	SD
Financial Concern		
1. College expenses are causing strain on my family	4.19	1.81
2. I feel confident that I will be able to pay for next semester's tuition	5.31	1.53
3. Financial obligations are interfering with my ability to focus on academics	3.09	1.65
4. I often feel worried about paying for college	4.16	1.93
5. I have concerns about my ability to pay for my college education through graduation	4.00	1.93
Institutional Commitment		
6. I intend to return to CSU in the spring	6.46	.89
7. I will most likely transfer to another institution	2.34	1.42
8. If I could do things over again, I would still choose to attend CSU	5.79	1.29
9. I would recommend CSU as a good place to go to school	6.30	.85
10. I'm committed to completing my degree at CSU	6.13	1.12
11. I'm not sure if attending college was the best decision for me	1.96	1.36
Grit		
12. I give up when things become difficult	2.30	1.26
13. When I fail at something, I work harder to succeed the next time	5.92	.95

14. I am able to make a plan when a challenge arises	5.66	1.00
15. I am confident I will succeed at CSU	5.86	.95
16. I am able to ask for help when needed	5.53	1.18
17. No matter what obstacles are placed before me, I'm confident in my abilities to succeed	5.79	1.00
18. I feel that I cope with academic stress in a healthy way	5.21	1.32
19. By working hard I can almost always achieve my goals	6.01	.87
20. I feel I can handle most things that come my way	5.91	.86
21. I'm generally optimistic, even when things are difficult	5.50	1.25
22. I feel that I have become a stronger person based on my experiences at CSU	5.31	1.16
23. Sometimes I feel hopeless	3.47	1.70
24. I would rather give up on something than experience failure	2.52	1.31
Family impact on matriculation adjustment		
25. It is hard being away from my home, family, significant other and/or friends	4.65	1.74
26. I feel like everyone else is having an easier time adjusting to college	3.55	1.67
27. My homesickness is affecting my ability to engage at CSU	2.66	1.47
28. My concerns about my family make it difficult to be at CSU	2.58	1.44
29. Family obligations are interfering with my ability to focus on my academics	2.48	1.36

30. I feel I have people who support me in my decision to attend college	6.44	.84
Confidence and Well-being		
31. I am self-confident	5.45	1.31
32. I am comfortable in groups	5.50	1.35
33. I am emotionally healthy	5.54	1.31
34. I am physically healthy	5.93	1.07
35. I lead a purposeful and meaningful life	5.93	1.05
36. I feel competent and capable in the activities that are important to me	6.01	.83
37. I tend to be an optimistic person	5.57	1.28
38. I am easily frustrated	3.75	1.54
39. I am understanding of others	6.10	.84
Adjustment		
CSU/Academic		
40. I feel I am adjusting to CSU well academically	5.82	1.03
41. I feel at home at CSU	5.65	1.23
42. I've been able to adjust to living on campus	6.00	.97
43. I am engaged and interested in my daily activities	5.74	1.03
44. CSU is meeting my expectations academically	5.75	1.00
45. I feel that I am part of the CSU community	5.60	1.11
Social		

46. So far this semester I've been able to make friends with other students	5.99	1.08
47. So far this semester I've been able to connect with others who share common interests with me	5.72	1.21
48. I feel I am adjusting well to CSU socially	5.64	1.19
49. CSU is meeting my expectations socially	5.62	1.23
50. My social relationships are supportive and rewarding	5.87	.99
51. I'm not sure I fit very well at CSU	2.42	1.41
52. I have people to support me when I need help	6.18	.91

Table 2:

Eigenvalues and Percentage of Variance Explained by TSS Factors

Factor	Eigenvalue	% of Variance Explained	Cumulative %
1	10.513	31.859	31.859
2	3.457	10.475	42.334
3	2.535	7.681	50.014
4	1.826	5.534	55.549
5	1.546	4.683	60.232

Table 3:
Eigenvalues and Percentage of Variance Explained by TSS Factors for First Generation Students Only

Factor	Eigenvalue	% of Variance Explained	Cumulative %
1	8.679	29.929	29.929
2	3.417	11.782	41.711
3	2.409	8.308	50.019
4	1.987	6.851	56.870
5	1.618	5.580	62.450

Table 4:
Coefficient Alphas for TSS Subscales

Subscale	A
Grit	0.86
Social Adjustment	0.91
Institutional Commitment	0.85
Financial Concern	0.89
Homesickness	0.71

Table 5:
Coefficient Alphas for TSS Subscales for First Generation Students Only

Subscale	α
Grit	0.86
Social Adjustment	0.90
Institutional Commitment	0.84
Financial Concern	0.88
Homesickness	0.70

Table 6: *Simple Linear Regressions of Demographic Variables and Cumulative First Year GPA*

Variable	Slope	R squared	P-value
Minority Status	-.145	.007	<.001*
Pell Eligibility	-.193	.012	<.001*
STEM Status	-.142	.012	<.001*
Gender	.241	.028	<.001*
Generational Status	-.175	.011	<.001*
HS index	.028	.207	<.001*

*indicates significant p-value at $\alpha = .05$

Table 7:

Independent Groups T Tests for First Generation and Continuing Generation Students on High School Index, Cumulative First Year GPA, and TSS Factors

	First Generation		Continuing Generation	
	M	*SD*	*M*	*SD*
HS Index*	112.23	10.72	116.23	11.90
Year 1 GPA*	2.88	.712	3.00	.704
Grit	5.84	.727	5.79	.734
Social Adjustment*	5.64	.962	5.72	.928
Institutional Commitment	6.023	.919	6.080	.884
Financial Concern*	4.261	1.445	3.424	1.437
Homesickness*	3.756	1.305	3.581	1.292

*indicates significant p-value at $\alpha = .05$

Table 8: *Chi square tests of demographic variables and attrition for first generation students vs. continuing generation students*

Variable	X^2	P-value
Minority Status	288.20	<.001*
Pell Eligibility	413.34	<.001*
STEM Status	10.83	<.001*
Gender	8.65	<.005*
Attrition	50.21	<.001*

Table 9
Final five-factor structure: Grit, social adjustment, financial concern, institutional commitment and homesickness

Items	Loading
Grit (8 items)	
1. No matter what obstacles are placed before me, I'm confident in my abilities to succeed	.802
2. I feel I can handle most things that come my way	.795
3. By working hard I can almost always achieve my goals	.703
4. I give up when things become difficult	-.685
5. I feel competent and capable in the activities that are important to me	.676
6. When I fail at something, I work harder to succeed the next time	.627
7. I feel that I cope with academic stress in a healthy way	.626
8. I am able to make a plan when a challenge arises	.596
Social Adjustment (7 items)	
9. I feel I am adjusting well to CSU socially	.899
10. So far this semester I've been able to make friends with other students	.899
11. So far this semester I've been able to connect with others who share common interests with me	.863
12. CSU is meeting my expectations socially	.802
13. I am comfortable in groups	.665

14. I feel that I am a part of the CSU community	.576
15. My social relationships are supportive and rewarding	.576
Financial Concern (5 items)	
16. I often feel worried about paying for college	.914
17. I have concerns about my ability to pay for my college education through graduation	.873
18. College expenses are causing strain on my family	.756
19. Financial obligations are interfering with my ability to focus on my academics	.720
20. I feel confident that I will be able to pay for next semester's tuition and fees	-.678
Institutional Commitment (5 items)	
21. I'm committed to completing my degree at CSU	
22. I will most likely transfer to another institution before graduating	.833 -.822
23. If I could do things over again, I would still choose to attend CSU	.666
24. I intend to return to CSU in the spring	
25. I would recommend CSU as a place to go to school	.724
Homesickness (5 items)	.594
26. My homesickness is affecting my ability to engage at CSU	
27. It is hard being away from my home, family, significant other and/or friends	.737 .671

28. I feel like everyone else is having an easier time adjusting to college .500

Table 10: *Logistic regression of retention with first generation students only*

Variable	Slope	Wald	Exp(B)	P-value
Gender	-.253	2.00	.776	.157
High school index	.018	4.54	1.019	<.05*
Minority status	-.470	6.54	.625	<.05*
STEM status	.091	.228	1.095	.633
Pell eligibility	.015	.007	1.015	.934
Grit	-.113	.651	.893	.420
Social adjustment	-.110	.909	.896	.340
Institutional commitment	.578	32.36	1.78	<.001
Financial concern	-.252	15.37	.78	<.001
Homesickness	-.208	8.34	.812	<.005
Constant	-.571	1.33	.565	<.668

Table 11: *Logistic regression of retention with all first year students*

Variable	Slope	Wald	Exp(B)	P-value
Generational status	-.497	21.578	.608	<.001
High school index	.023	28.96	1.024	<.001
Institutional commitment	.532	116.51	1.70	<.001
Financial concern	-.158	20.97	.85	<.001
Homesickness	-.102	6.88	.90	<.01
Constant	-.278	21.05	.062	<.001

Table 12: *Multiple linear regression of cumulative first year GPA with all first year students*

Variable	β	R^2	P-value
Gender*	.129	.015	<.001
STEM status*	-.173	.026	<.001
Minority status	-.006	.004	.686
Pell Eligibility*	-.049	.002	<.001
Generational status*	-.042	.001	<.01
High school index*	.479	.189	<.001
Grit*	.166	.014	<.001
Social adjustment*	-.053	.001	<.05
Institutional commitment	-.012	.006	.557
Financial concern	-.027	.048	.119
Homesickness*	.010	.001	<.05
Grit*Generational status	-.025	.032	.191
Social adjustment*Generational status	.002	.0001	.937
Financial Concern*Generational status	.032	.068	.061
Institutional commitment*Generational status	.008	.004	.684
Homesickness*Generational status*	.040	.001	<.05

REFERENCES

Aspelmeier, J., Love, M., Mcgill, L., Elliott, A., & Pierce, T. (2012). Self-Esteem, Locus of Control, College Adjustment, and GPA Among First- and Continuing-Generation Students: A Moderator Model of Generational Status. *Research in Higher Education, 53,* 755-781

Astin, A. W. (1985). Involvement the cornerstone of excellence. *Change: The Magazine of Higher Learning*, *17*(4), 35-39.

Balemian, K., & Feng, J. (2013, July 13). *First generation students: College aspirations, preparedness and challenges*. Lecture presented at College Board AP Annual Conference, Las Vegas, Nevada.

Bureau of Labor Statistics (BLS), U.S. Department of Labor, *The Economics Daily*, Median weekly earnings by educational attainment in 2014 on the Internet at http://www.bls.gov/opub/ted/2015/median-weekly-earnings-by-education-gender-race-and-ethnicity-in-2014.htm (visited *April 25, 2016*).

Bui, V. T. K. (2002). First generation college students at a four-year university: Background characteristics, reasons for pursuing higher education, and first year experiences. *College Student Journal*, 36 (1), 3-11

Cabrera, A. F., Nora, A., & Castaneda, M. B. (1992). The role of finances in the persistence process: A structural model. *Research in Higher Education, 33*(5), 571-593.

Carneval, A., Smith, N., & Strohl, J. (2010). Help wanted: Projections of jobs and education requirements through 2018. Retrieved April 27, 2015, from https://cew.georgetown.edu/wp-content/uploads/2014/12/fullreport.pdf

Chen, X. (2013). STEM Attrition: College Students' Paths Into and Out of STEM Fields(NCES 2014-001). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.

Choy, J. (2001). Students whose parents did not go to college: Postsecondary, access, persistence and attainment. Washington, DC: U.S. Department of Education, National Center for Educational Statistics.

Coˆte´, J., & Levine, C. (1997). Student motivations, learning environments, and human capital acquisition: Toward an integrated paradigm of student development. *Journal of College Student Development, 38,* 229–243.

Covarrubias, R., & Fryberg, S. A. (2014, September 8). Movin' on up (to College): First-Generation College Students' Experiences With Family Achievement Guilt. *Cultural Diversity and Ethnic Minority Psychology*. Advance online publication. http://dx.doi.org/10.1037/a0037844

Dennis, J. M., Phinney, J. S., & Chuateco, L. I. (2005). The role of motivation, parental support, and peer support in the academic success of ethnic minority first-generation college students. *Journal of College Student Development,* 46, 223–236. doi:10.1353/csd.2005.0023

DeVellis, R. F. (2012). *Scale development: Theory and applications* (Vol. 26). Sage publications.

Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: perseverance and passion for long-term goals. *Journal of personality and social psychology*, *92*(6), 1087.

Engle, J., & Tinto, V. (2008). Moving beyond access: College success for low-income, first-generation students. Washington, DC: The Pell Institute for the Study of Opportunity in Higher Education.

George, D., & Mallery, M. (2003). Using SPSS for Windows step by step: a simple guide and reference. *Boston, MA: Allyn y Bacon.[Links]*.

Gerdes, H., & Mallinckrodt, B. (1994). Emotional, social, and academic adjustment of college students: A longitudinal study of retention. *Journal of Counseling & Development*, *72*(3), 281-288.

Hartley, M. T. (2011). Examining the relationships between resilience, mental health, and academic persistence in undergraduate college students. *Journal of American College Health*, *59*(7), 596-604.

Inman, W. E., and Mayes, L.D. (1999). The importance of being first: Unique characteristics of first-generation community college students. Commun. Coll. Rev. 26(4): 3-22.

Ishitani, T.T. (2003). A Longitudinal Approach to Assessing Attrition Behavior Among First-Generation Students: Time-Varying Effects of Pre-College Characteristics. Research in Higher Education, 44(4): 433–449.

Kena, G., Musu-Gillette, L., Robinson, J., Wang, X., Rathbun, A., Zhang, J., Wilkinson-Flicker, S., Barmer, A., and Dunlop Velez, E. (2015). *The Condition of Education 2015* (NCES 2015-144). U.S. Department of Education, National Center for Education Statistics. Washington, DC. Retrieved September 20, 2015, from http://nces.ed.gov/pubsearch

National Center for Education Statistics: Back to school statistics. (2014). Retrieved April 27, 2015, from http://nces.ed.gov/fastfacts/display.asp?id=372

Orbe MP (2004). Negotiating multiple identities within multiple frames: An analysis of first-generation college students. *Communication Education*. 2004;53(2):131–149.

Pascarella, E., & Terenzini, P. (1991). *How college affects students: Findings and insights from twenty years of research.* San Francisco: Jossey-Bass.

Pascarella, E., Pierson, C.T., Wolniak, G.C.,& Terenzini, P.T. (2004). First generation college students: Additional evidence on college experiences and outcomes. *Journal of Higher Education*, 75 (3), 249-284

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

Phinney, J. S., Dennis, J., & Osorio, S. (2006). Reasons to attend college among ethnically diverse college students. *Cultural Diversity and Ethnic Minority Psychology*, 12, 347-366.

Pike, G. R., & Kuh, G. D. (2005). First and second generation college students: A comparison of their engagement and intellectual development. *Journal of Higher Education*, 76 (3), 276-300.

Ramos-Sanchez, L., & Nichols, L. (2007). Self-efficacy of first-generation and non-first-generation college students: The relationship with academic performance and college adjustment. *Journal of College Counseling*, 10, 6-18.

Robbins, S. B., Lauver, K., Le, H., Davis, D., Langley, R., & Carlstrom, A. (2004). Do psychosocial and study skill factors predict college outcomes? A meta-analysis. *Psychological bulletin*, *130*(2), 261.

Seidman, A. (2005). *College student retention: Formula for student success*. Greenwood Publishing Group.

Singh, K., & Jha, S. D. (2008). Positive and negative affect, and grit as predictors of happiness and life satisfaction. *Journal of the Indian Academy of Applied Psychology*, *34*(2), 40-45.

Tabachnick, B. G., Fidell, L. S., & Osterlind, S. J. (2001). Using multivariate statistics.

Terenzini, P., Springer, L.,Yaeger, P., Pascarella, E., & Nora, A. (1996). First-generation college students: Characteristics, experiences, and cognitive development. *Research in Higher Education*, *37*, 1–22.

Thayer, P. B. (2000). Retaining First Generation and Low Income Students. *Opportunity Outlook*, *2*, 8.

Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student attrition*. University of Chicago Press, 5801 S. Ellis Avenue, Chicago, IL 60637.

Vuong, M., S. Brown-Welty, and S. Tracz. 2010. The effects of self-efficacy on academic success of first-generation college sophomore students. Journal of College Student Development 51, no. 1: 50–64.

Warburton, E., Bugarin, R., & Nunez, A. (2001). *Bridging the gap: Academic preparation and postsecondary success of first-generation students* (NCES 2001–153). Washington, DC: National Center for Education Statistics, U.S. Government Printing Office.

APPENDIX

Taking Stock Survey (TSS)

Please indicate your level of agreement with the following statements:
Scale: Strongly Disagree, Disagree, Slightly Disagree, Neither Agree nor Disagree, Slightly Agree, Agree, Strongly Agree, Not Applicable.

Items
1. I feel I am adjusting well to CSU academically.
2. College expenses are causing a strain on my family.*
3. I feel that I have become a stronger person based on my experiences at CSU.
4. I am engaged and interested in my daily activities.
5. I feel confident that I will be able to pay for next semester's tuition and fees.*
6. I intend to return to CSU in the spring.
7. Financial obligations are interfering with my ability to focus on my academics.*
8. I'm not sure if attending college was the best decision for me.*
9. I give up when things become difficult.*
10. I feel at home at CSU.
11. When I fail at something, I work harder to succeed the next time.
12. I am self-confident.
13. I often feel worried about paying for college.*
14. I will most likely transfer to another institution before graduating.*
15. I am able to make a plan when a challenge arises
16. I'm not sure I fit in very well at CSU.*
17. I've been able to adjust to living on campus.
18. I would rather give up on something than experience failure. *

19. If I could do things over again, I would still choose to attend CSU.

20. I tend to be an optimistic person.

21. It is hard being away from my home, family, significant other, and/or friends.*

22. I feel like everyone else is having an easier time adjusting to college.*

23. I am comfortable in groups.

24. I am easily frustrated.*

25. I am confident that I will succeed at CSU.

26. I feel that I am a part of the CSU community.

27. I am able to ask for help when needed.

28. I am understanding of others.

29. My social relationships are supportive and rewarding.

30. No matter what obstacles are placed before me, I'm confident in my abilities to succeed.

31. I lead a purposeful and meaningful life.

32. I feel that I cope with academic stress in a healthy way.

33. CSU is meeting my expectations academically.

34. Sometimes I feel hopeless.*

35. I know where to go on campus to find answers to any financial questions I have.

36. By working hard I can almost always achieve my goals.

37. I feel I can handle most things that come my way.

38. I feel competent and capable in the activities that are important to me.

39. CSU is meeting my expectations socially.

40. My homesickness is affecting my ability to engage at CSU.*

41. I am emotionally healthy.

42. I feel I am adjusting well to CSU socially.

43. I'm generally optimistic, even when things are difficult.

44. I have concerns about my ability to pay for my college education through graduation.*

45. Family obligations are interfering with my ability to focus on my academics.*

46. I feel I have people who support me in my decision to attend college.

47. I would recommend CSU as a place to go to school.

48. I am physically healthy.

49. I'm committed to completing my degree at CSU.

50. I have people to support me when I need help.

51. So far this semester I've been able to make friends with other students.

52. My concerns about my family makes it difficult to be at CSU.*

53. So far this semester I've been able to connect with others who share common interests with me.

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*indicates reverse scored item