# Community College Student Performance: The Effects of a Remedial Intervention, Demographic Factors, and Psychological Factors on Student Achievement and Retention

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## Abstract

Community colleges are integral to American education because they provide accessible education for all citizens (Jacobson, LaLonde, & Sullivan, 2005). There is a growing need, however, to improve upon the educational practices of these colleges so that more students can successfully earn degrees. Despite the many opportunities that higher education affords, a large percentage of students are underprepared for college-level coursework and are not able to complete degree requirements. Remedial coursework is available to those who need basic skills training, but the additional time and tuition required to complete these programs can actually deter student engagement and decrease their motivation to earn degrees. This three-paper dissertation, conducted with an urban community college student sample, utilizes archival and self-report data sets to investigate the impact of a college-wide intervention aimed at students in need of remedial classes, the impact of demographic factors on performance, and the effect of psychological factors on performance. In the first paper, I examine the effectiveness of a course designed to prepare students in remedial education courses for college work. In the second paper, I investigate the relationship between various demographic factors and student GPA and retention. In the third paper, I focus on the relationships between psychological factors and student GPA and retention. Results indicated that the metacognitive courses did not impact GPA or retention, yet demographic and psychological factors do impact these two outcome variables. These results aid in understanding the elements that contribute to community college student success so that education and organizational behavior researchers can develop interventions based on empirical evidence.

## Understanding Performance and Retention Rates in Community College

Community colleges are 2-year, public higher education institutions that grant associate's degrees, certificates, and diplomas, and provide work force training. They are the largest, fastest-growing, and most affordable sector in the U.S. higher education system. There are 1,167 community colleges in the nation, and they educate thirteen million students each year (Lucore, 2014). Students can use these colleges as an entryway to a baccalaureate degree at a 4-year institution, or use them as a way to prepare for a job or career. Society, too, benefits from community colleges because the institutions contribute to generating an educated and informed population. Community college education has broad, positive social implications, as educating adults positively impacts children's education, household wealth, and the U.S. economy.

Although community colleges benefit a large population, some policy makers and educators debate their effectiveness, due to student attrition and low graduation rates (Fike & R. Fike, 2008). Nearly half of students enrolled in the fall term drop out before enrolling in the spring term (American Association of Community Colleges [AACC], 2014). One factor contributing to the high drop-out rate is the fact that 60% of the community college population is not ready for college-level work (AACC, 2014). In fact, three-fifths of incoming community college students nationwide do not have the basic skills needed to complete a college course. Remedial education is the generally recommended solution for both improving retention and buttressing students' academic skills; however, remedial coursework has not been found to increase graduation rates (Bailey, 2008). Remedial coursework requires that students pay tuition for the additional classes, as well as take the time to complete the coursework. Students' motivational levels and self-esteem might waiver given the additional obstacles of having to pass and pay for classes that do not earn them college credit.

Although remedial courses are costly, colleges still perceive them as valuable to the educational experience. One way that educators buttress these remedial classes is through developing and teaching metacognitive courses designed to teach students skills that are essential to student success. These skills pertain to study habits, communication, goal setting, and self-evaluation. The skills are taught to students so that they become aware of their thought processes as they pertain to education (Shea et al., 2014). Metacognitive courses can hypothetically improve student success because they are designed to assist students in developing cognitive control, which improves learning and decision-making processes. Prior research has found that teaching metacognitive skills to community college students improved their performance (Nash-Ditzel, 2010; O'Neill & Todaro, 1991). O'Neill and Todaro (1991) and Nash-Ditzel (2010) designed studies to specifically examine the effect of metacognitive skills for reading-intensive courses. However, O'Neill ad Todaro (1991) and Nash-Ditzel (2010) focused on only one subject area and did not investigate the impact of metacognitive skills on a broader scale. The studies reported positive findings with regards to metacognitive skills improving reading performance. However, despite these positive findings, no empirical study to date examines the effectiveness of a formalized, semester-based metacognitive course designed specifically for community college students. Knowledge of such a course's effectiveness is imperative as these classes are ubiquitous among community colleges. Faculty members teach these courses with the aim of improving student achievement and retention; however, there is still very little evidence indicating that they are effective. My research fills this gap by investigating the effectiveness of a course aimed at providing students the meta skills needed to succeed in college.

In this dissertation, I sought to understand the impact and effectiveness of a metacognitive course for remedial students on GPA and retention. In addition, I examined how

demographic and psychological variables affect student outcomes. The three papers of the dissertation research draw from the same archival and self-report data sets. The first paper utilized a regression discontinuity design to analyze the effect of a metacognitive course—a college preparatory course—on retention. The second paper used multiple linear regression to analyze the various demographic factors that impact student GPA and retention. The third paper used multiple linear regression tests to examine the relationships between psychological variables and student retention and achievement. The psychological factors I included in this study are: academic motivation, self-regulation, perceived social support, interpersonal social support, organizational identity, student social identity, self-efficacy, grit, and ability.

## Community College Context

The research site that I used for Papers 1, 2, and 3 is a large, urban community college. Students at this college are classified as being in one of two coursework levels: remedial or general college. These levels are determined by students' standardized test scores. Although there are two formal coursework levels, I introduce a third level, named *just above remedial*. The third level is composed of students who scored just above the remedial threshold. Thus, they are eligible to enroll in the general college courses, but scored on the lower end of that spectrum. This group of students is interesting because the students technically qualified for general coursework, but scored low enough that they could have easily been placed into remedial courses. Hence, they are a good comparison group for assessing the effectiveness of the remedial coursework.

The research site recently launched a metacognitive course as an intervention program to better serve students in need of remediation coursework. The purpose of the course is to prepare students for collegiate work. The course specifically targets students who are enrolled in at least

one remedial course, and its main purpose is to prepare students who need additional coursework before they enroll in college-level classes. All students who score at or below the remedial cut-off score for the standardized test are required to take the intervention course. The three-credit-hour course builds upon the instructions and encouragement that students receive during their New Student Registration Workshop and New Student Orientation. Information about the course is contained in Appendix A.

Students in the metacognitive course focus on learning more about their study habits and educational goals, as well as how to plan, monitor, and adjust their schedules so that they can achieve those goals. The college emphasizes themes that are essential to student development, such as time management, career exploration, goal setting, problem solving, self-assessment, and financing an education. Students must display their grasp of course concepts by creating portfolios of assigned activities that are tied to skills they will need in future courses. They receive a letter grade at the end of the course, with a "D" as the lowest passing grade.

One of the course's unique features is that each class enrolls only a small number of students. The instructor-to-student ratio is purposefully small in order to provide students with as much individualized attention as possible, as well as to foster a sense of community among students. The course was separated into 107 sections and taught by a total of 84 instructors during the data collection period. Each instructor volunteers to teach the course and is required to complete the instructor training. The course is standardized so that every student receives the same instruction and lessons. Instructors' prior teaching experience ranges from one year to 30 years.

## Overview for Papers of Dissertation

### Paper 1: Effectiveness of a Metacognitive Course

I assessed the effectiveness of a metacognitive course on retention. Metacognitive courses can be utilized to bolster the performance of low-ability students. Although the courses are prevalent in community colleges, I am unaware of any studies of their effectiveness. Thus, I aimed to advance understanding of the effects of these metacognitive courses by examining the effect of the metacognitive course taught at the research site on student retention in a community college. Students in the course learn skills that will benefit them as they navigate the college curriculum. I anticipated that the students within the metacognitive course would have higher retention rates than students who were just above the cut-off and, thus, were not in the metacognitive course. It should be noted that retention was the outcome variable chosen for this study because of the clean binary coding (retained and not retained). Other outcome variables such as GPA were not examined in Paper 1.

### Paper 2: Effect of Demographic Factors

Next, I examined student demographic variables. Factors such as age, race, gender, dependency status, and financial standing can influence student performance. Demographic factors and cultural differences affect student performance because they influence students' views of education, their exposure to role models who have earned college degrees, and their access to resources that can make it easier to complete college. A body of literature investigates the impact of demographic factors on student performance. For example, Conger and Long (2010) found that women outperformed men in 4-year colleges in terms of grades and retention. Bastedo and Jaquette (2011) found that wealthier students performed better than poorer students in 4-year colleges. Most of the research on the effects of demographics on student performance

in colleges, however, has been conducted in 4-year colleges. I extended this work by examining the effects of demographic variables on student grades and retention in a community college context. Investigating these demographic factors can provide a greater understanding of what affects student performance in community colleges. This study is useful to the educational field because it allows professors and academic advisors to focus on bolstering students who are identified as high risk in terms of poor performance based on demographics.

**Paper 3: Effect of Psychological Factors**

To understand further the elements of student performance, I determined relationships among psychological variables, student GPA, and student retention. I delineated the proposed framework of the relationships between the psychological concepts and student outcomes.

The psychological variables for this research were as follows: academic motivation, self-regulation, perceived social support, interpersonal social support, student social identity, and organizational identity. I theorized that these psychological variables would affect student outcomes. Moderators were also a part of the theoretical framework. Moderating variables change the strength of the relationship between variables X and Y; in this case, the X variables were psychological factors and the Y variables were GPA and retention (Frazier, Tix, & Barron, 2004). The moderating psychological variables in this dissertation research were self-efficacy, grit, ability, hours studied, and hours worked. I chose these variables because I expected them to influence how the independent variables would impact student outcomes. Efficacy and grit are relatively stable personality factors, which is a criterion recommended for moderating variables (Baron & Kenny, 1986). I included student ability as a moderating variable in addition to efficacy and grit, because ability is also a relatively stable factor and is integral to examining student success. I will discuss the relationships and the motivations behind the hypotheses in

further detail throughout the review of the literature.

## Paper 1: Effectiveness of the Metacognitive Course

### Introduction

**Remediation**. Remediation is defined as courses and tutoring designed to help students become better prepared for college-level work (Martorell & McFarlin, 2011). Approximately 42% of community college students enroll in remedial coursework (Wirt et al., 2003). Remedial education is widespread in the community college educational system, but there is some debate as to whether it fulfills its purpose of preparing students for college-level coursework. The academic literature contains mixed results about the impact of remedial education on student performance. Bettinger and Long (2009) and Jepsen (2006), for instance, found that students in remedial classes were more likely to persist in school and transfer to 4-year colleges when the researchers controlled for demographics such as age and race. The researchers noted that further investigation was needed to understand how demographic factors might impact performance in remedial courses. Attewell, Lavin, Domina, and Levey (2006) found that community college students enrolled in remedial education courses performed no better or worse than those who did not enroll. Bailey (2008) conducted a study of 83 community colleges from 15 different states and found that remedial education did not impact academic performance for remedial students. Scott-Clayton and Rodriguez (2012), who studied six community colleges belonging to one urban community college system, and Martorell and McFarlin (2011) who studied other community college systems, found that remediation neither helped nor hindered student progress. According to these findings, although remedial education had benefits, it also had costs because students enrolled in remedial education became discouraged, felt stigmatized, and some were unwilling to return to school.

One approach that some colleges have taken is to supplement traditional remedial courses (math, reading, English, etc.) with metacognitive courses that attempt to provide students with the higher-order skills needed to matriculate through college.

**Metacognitive skills.** Metacognition is defined as knowing about knowing (Metcalfe & Shimamura, 1994). Metacognitive courses introduce basic learning skills so that students can understand how to better study and apply their knowledge to tests and exams. According to the literature, metacognitive skills are essential to successful learning. Young and Fry (2012), for instance, found that college students' metacognitive awareness scores were positively correlated with GPA. Jenkins, Zeidenberg, and Kienzl (2009) found that a metacognitive intervention at a community college improved the rate of course credit attainment, as well as increasing retention rates.

Metacognition requires that students and teachers set goals, engage in directed practice, and gain a better understanding of what is required for success in a specific context with the assistance of targeted feedback (Ambrose, Bridges, DiPietro, Lovett, & Norman, 2010). Goal setting is a crucial part of metacognition and is essential to increased performance. Studies have shown that performance increases when people establish goals (Latham & Locke, 1991; Locke, Shaw, Saari, & Latham, 1981; Zimmerman, Bandura, & Martinez-Pons, 1992). Students who set goals have a higher likelihood of returning the next semester than those who do not set goals (Zimmerman, Bandura, & Martinez-Pons, 1992). While students must focus on specific goals, teachers must also know how to create the appropriate level of challenge relative to their students' performance (Ericsson, 2003). Many community college instructors provide students identified as low performers with metacognitive skills to improve their learning processes and performance (Andrade, 2001).

Although several studies (noted above) examined the effectiveness of remedial education, no studies, to my knowledge, investigated the impact of remedial education plus a metacognitive intervention on student retention. Such an analysis will be particularly interesting for community colleges looking for potential mechanisms to promote persistence and success among remedial students. Comparative research about tutoring-intensive courses has offered promising findings. Tutoring-intensive courses are classes in which instructors place an emphasis on individual and group tutoring to buttress in-class lessons and to ensure student success (Jenkins, Speroni, Belfield, gars, & Edgecombe, 2010). Researchers found that tutoring-intensive courses improved the likelihood of success at the college-level by improving course completion (Jenkins et al., 2010). I extend the literature by applying a regression discontinuity analysis to look at students in remedial education at a community college. I collected data from before and after the implementation of a metacognitive course to support students in remedial education. First, I estimated the retention impact of taking remedial courses in the absence of a metacognitive intervention. Then I estimated the retention impact of taking a remedial course along with a metacognitive course. I then use difference-in-differences analysis to assess whether there was an impact of providing the metacognitive course.

**Data and Descriptive Statistics**

My data include all first-time students[1] entering an anonymous[2] mid-west urban community college between fall 2008 (for the 2008-2009 academic year) and fall 2013 with the goal of earning an associate's degree. Table 1 includes the descriptive statistics. Column 1 includes a description of the full sample of 29,988 students. The first three rows include general demographic information for the students[3]: 47% are male, 47% are White, and the average age is about 21.5 years. Row 4 shows the outcome variable of interest used throughout this paper: student retention. I defined students as being retained if they returned to the college in the spring semester following their first fall semester.[4] For the full sample, 58% of students were retained.

Rows 5 and 7 show what percent of the students have placement scores available for English and for reading. These placement scores are important because they determine whether a student is placed in remedial English and/or reading courses. Students below certain pre-defined thresholds are required to take one or two remedial courses before they can move on to college-level courses. Additionally, these placement scores are used to determine whether a student is placed in the metacognitive course I analyzed.[5] I will describe the use of these variables in my analysis in the next section, but for now it is worth noting that the placement scores are available

[1] I dropped 43 students who were entered in the source data as starting school twice.
[2] Throughout this paper I refrain from using the school name and metacognitive course name in order to maintain the anonymity of the college.
[3] All summary statistics refer to the observations for which the relevant data are available. For instance, race data are unavailable in 2008 and race, gender, or age data are unavailable for a smattering of individuals.
[4] I use this definition of retention due to data limitations because my data include information only through spring 2013. If a student entered in fall 2013, I would need data from spring 2014 to assess retention. This data limitation also precluded me from using the outcome of degree completion.
[5] The placement scores come from a computer adaptive standardized test. The remediation thresholds are determined at the college level and are not publicly available.

for approximately 42% of the data. Only students with placement scores can be considered in my analysis. This is an unfortunate limitation of the data set. One reason this occurs is that an alternative measure such as an ACT or SAT score can be used in place of the placement test score.[6] Additionally, some students may have entered with previous college or Advanced Placement credit that would determine their placement. As mentioned above, the placement score determines how many remedial courses a student will be assigned to take. Rows 6 and 8 show the percentage of students, of those with a placement score available, who are above the remediation threshold in English and reading, respectively. These students, therefore, do not have to take any remedial English or reading courses. Notice that only 59% of students reach this bar for English and 39% for Reading. So, based on their placement test scores, a majority of students have to take remedial English and/or reading courses.[7]

Columns 2 and 3 report the same statistics described above, but are delineated based on when the students first enrolled. Column 2 reports the results for those entering from fall 2008 to fall 2011, whereas Column 3 is for those entering in fall 2012 or fall 2013. The data are delineated in this way because the metacognitive course was introduced in fall 2012. Thus, remedial students entering before fall 2012 were not exposed to the metacognitive course, whereas remedial students entering thereafter were. Column 4 reports the difference between

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[6] Very few students reported SAT scores. A larger number had ACT scores alone or along with placement test scores. I explored utilizing a crosswalk between ACT scores and placement test scores. There is no pre-determined crosswalk in the literature, and the granularity of the ACT scores and small sample size made a self-generated crosswalk unreliable. In the ideal data set, a placement score would be available for all students.

[7] Because of the limited availability of ACT or SAT scores and the lack of documentation of other mitigating circumstances (such as college or AP credit), I did not control for the possibility that a student is below the threshold on the placement score but passes out of remediation based on some other factor. In the ideal data set, all pertinent placement information would be available.

Columns 2 and 3. The percent male, percent White, and percent retained were not significantly different between the two time periods. The difference in average age was statistically significant though not practically important. The magnitude and statistical significance of the differences in both English and reading score availability, though, are concerning. It was not clear from the data why this is the case, but it may be due to the fact that another change occurred in fall 2012: the placement test used by the college was changed from one computer adaptive standardized test to another. Perhaps something about the new testing organization or the reporting of the results contributed to the decline in score availability. No matter the reason, these differences must be borne in mind when interpreting the results.

## Estimation Procedure

**Regression discontinuity.** As noted by Martorell and McFarlin (2011), "Isolating the causal impact of remediation is difficult since students participate in developmental education precisely because their academic skills are weak" (p. 440-441). Following their example, I utilized a regression discontinuity (RD) design coupled with difference-in-differences analysis to study the effect of the metacognitive course on retention as retention is a variable that is commonly studied in the community college literature (Martorell & McFarlin, 2011). Regression discontinuity analysis is widely used in the education realm, where randomized controlled trials are often not an option. RD analysis prior to the introduction of the metacognitive course provides an estimate of the impact of remediation on retention. Because the same placement score cutoffs were used for assignment to remediation and assignment to the metacognitive course, the RD analysis using data following introduction of the metacognitive course estimates the combined effect of both remediation and the metacognitive course. I then use a difference-in-

differences analysis to assess whether combined remediation and the metacognitive course had a greater impact that remediation alone.

The hallmark of the RD design is an ordinal "forcing variable" that determines treatment assignment. My "forcing variable" is the English or reading placement score. As described in the previous section, students below a pre-determined threshold are required to take remedial English and/or reading courses. That is, they are assigned to treatment (remedial courses) based on their placement scores. For 2012 to 2013, treatment involves both remedial courses and the metacognitive course.

One potential problem for RD is a discontinuity in the density of the forcing variable at the treatment threshold. This might arise due to a phenomenon that is termed "manipulation" of the forcing variable. Manipulation would be said to occur, for instance, if students could put in just a little extra effort if they knew they were near a threshold. Alternatively, manipulation could reflect "giving the benefit of the doubt" if tests were hand scored and, thus, could be "fudged" up or down. Since the thresholds are not publicly available and the placement tests are given by a computer system, this type of manipulation seems unlikely. However, as Calcagno and Long (2008) noted, retesting is another factor that could cause a discontinuity in the forcing variable. When students are assigned to remediation, they may choose to retake the placement tests, and some students will then end up above the threshold. However, no students above the threshold (not assigned to remediation) would have an incentive to retake the test. The ideal study design circumvents this problem by using only the first test scores as the forcing variable. Unfortunately, it is not clear in my data set whether the available scores are the first, most recent, or highest test scores.

To look for a discontinuity in the density of the forcing variable at the treatment threshold, I utilized both a visual method and a statistical test. Figures 1 to 4 for Paper 1 show frequency histograms for English and reading scores, separated for 2008-2011 and 2012-2013. Recall that the placement test was changed from 2012 onward. In each histogram, two vertical lines indicate the lower and upper remediation thresholds for the relevant test in the relevant time period. Students scoring below the lower threshold must take two remedial courses before reaching a college-level course, whereas those between the two thresholds must take one remedial course. Consider first the reading scores. The "eyeball" test in Figure 3 suggests that fewer students are just below each threshold than just above. As noted above, such "manipulation" may reflect retaking of the placement examination by students who scored just below the thresholds when taking the exam the first time. A similar pattern is evident at the thresholds in Figure 4. Overall, this visual evaluation suggests that manipulation is probably present for Reading. Turning to the English scores, inspection of Figure 1 suggests at most modest manipulation, perhaps because retaking the English exam produces less gain than retaking Reading. This "eyeball" test is trickier in the case of Figure 2, in which the English score for 2012-2013 is choppy because there are several scores that very few or no students obtained. I posit that this is due to the change to a different placement test for 2012 and 2013. This new test clearly gives rise both to more bunching of scores and to less central tendency of scores than observed in Figure 1.

McCrary (2008) developed a method to test for discontinuity and the density of the forcing variable. Table 2 includes the results for the McCrary test at each threshold. A statistically significant result indicates that there is a discontinuity of the forcing variable at the threshold. Here, the test rejects continuity at all four thresholds for Reading. For English for

2008-2011, the test does not reject continuity at the upper threshold. While the test rejects continuity at the lower threshold, the magnitude of the discontinuity is modest. For English for 2012-2013, the test rejects continuity at the upper but not the lower threshold. As is evident from Figure 2, the bunching of scores in 2012-2013 makes conclusions about continuity sensitive to bandwidth around the thresholds. Overall, the McCrary tests point to the need for caution in interpreting the RD and difference-in-differences findings. The McCrary tests suggest manipulation at all Reading thresholds and manipulation at upper English thresholds. The McCrary results suggest at most modest manipulation at the lower English threshold in both periods. These results in turn, suggest that manipulation poses the least threat to the RD and difference-in-difference analyses at the lower English thresholds. This conclusion is qualified by the bunching of English scores in Figure 2. In my later discussion of the findings from the RD and difference-in-differences analysis, I will take into account limitations suggested by my findings regarding manipulation.

Another requirement for RD is that the forcing variable must not have any confounding factors. That is, there should not be any covariates that show a discontinuity at the treatment thresholds. Ensuring continuity within the covariates means that any discontinuity in the outcome at the threshold occurs due to the treatment and not to other factors such as demographic variables. Figure 5 shows the proportion male (top), proportion White (middle), and average age (bottom) by placement score in 2008-2011 (left) and 2012-2013 (right). Again, the vertical lines represent the relevant thresholds. The relative sizes of the circles indicate the frequency of observations at each score. A visual inspection of the data reveals no evidence of discontinuities in these covariates.

In addition to a visual inspection of the data, I conducted hypothesis tests to investigate whether there are discontinuities in the covariates. Table 3 tests for differences in means around the admission thresholds, using a with a 5-point bandwidth around each admission threshold. The results show that there is no evidence of discontinuity at the treatment thresholds for the three variables in question (gender, age, and race) and for all years (2008-2013) at either the upper or lower cut-off.

Another important consideration is attrition within the sample. Here attrition refers to availability of data. If the proportion of students for whom information is available differs between those just above and those just below the threshold, then results may be biased. By using retention as the outcome, I had zero sample attrition since I know for all students whether or not they returned for the spring term. I could examine my data and tell whether a student in the data set was present or not, and it was possible to do so for each student. If analysis were extended to other outcome variables, sample attrition would need to be further explored and appropriately addressed.

Having investigated the important pre-requisites for applying an RD design, I conclude that the second and third requirements were fully satisfied. I found no differences in covariates across the admission thresholds and I do not have sample attrition. The analysis of manipulation necessitates a qualified interpretation of the findings that follow.

The outcome of interest in RD is the difference between the outcome just below the threshold and the outcome just above the threshold. To test the sensitivity of the results, the analysis was implemented using all available data and a subset of data. That is, I first included all students, no matter how close to or far from the threshold, in the analysis. Using all available data has the potential to provide more power and a more precise estimate, but the analysis

requires use of a flexible functional form to assure that data far from the threshold do not drive findings in the neighborhood of the threshold. In a second analysis, I used the method of only including students within a certain "bandwidth" in the analysis. Here, I chose a bandwidth of 5 points on a scale of 120 for the 2008-2011 years and a scale of 100 points for the 2012-2013 years (see Figures 6 and 7). Therefore, students within 5 points of the threshold (below and above) were included in the analysis. If the results between these two analyses differed significantly, or if one gives statistically significant results but the other does not, more sensitivity analysis (such as other bandwidth choices) would have been conducted.

I know which students were and were not assigned to remediation, but I do not have a reliable measure of whether students actually adhered to the assignment. For example, some students not assigned to remediation might have decided that they needed to take a remedial course. Therefore, I implemented a sharp RD design, which provides an Intent to Treat (ITT) estimate for the impact of assignment to remediation (or the impact of assignment to remediation plus the metacognitive course for the years 2012 and 2013). If data on taking remedial classes (and the metacognitive course) were available, the analysis could have been expanded to also include a fuzzy RD design to estimate the effect of Treatment on the Treated (TOT). The sharp RD design is easy to visualize: fit a line or curve to the data just above the threshold and just below the threshold and find the difference in the intercepts of these two lines (curves) at the threshold. This difference is the estimated impact of treatment. I discuss the interpretation of the results with an example in the next section.

**Results**

Due to the issues with discontinuities in the density of the reading scores, I focused on English scores as my forcing variable. As discussed above, my outcome of interest is retention,

here defined as returning to the college in the spring semester following the student's first fall semester. First, I implement the analysis with all students. Results are presented for 2008 to 2011 in Table 4 and for 2012 to 2013 in Table 5. In both cases, I included a linear and a quadratic specification and estimated the difference at both the lower and upper threshold. Recall that students below the lower threshold must take two remedial courses before reaching a college-level course; students between the lower and upper threshold must take one remedial course, and students above the threshold can go directly to college-level courses. From 2012 to 2013, students below either threshold also received the metacognitive course.

The estimate on the indicator variable "Above" is the key estimate of interest in this study. It shows the difference between the intercepts of the fitted lines/curves above and below the threshold. Figures 8, 9, 10, and 11 contain graphical representations of the analyses by showing the fitted lines for each specification. The figures are shown to assess the fit of the lines with the underlying data. The underlying data show that a quadratic specification may fit the data better than a linear specification. The quadratic specification is a good fit for the data because the data have a slight curve and are more suited for a quadratic model.

The estimated coefficient of "Above" is the percentage point difference in retention between those not assigned to remediation and those assigned to remediation. For example, the "Upper Linear" column in Table 5 yields an estimated one percentage point lower retention rate for those not in remediation relative to those in remediation. As Tables 4 and 5 show, the estimate of interest (on "Above") is not statistically significant in any of the specifications. Hence, the results in Tables 4 and 5 provide little evidence that remediation impacts retention. This accords with findings of Calcagno & Long (2008) and Martorell & McFarlin (2011).

As mentioned in the previous section, I also conducted the analysis using a narrower subset of data—here, a bandwidth of five points. With this narrow bandwidth, the linear specification adequately represented the data, so I present only those results (see Table 6). As above, I also provide a graphical representation of the analyses (see Figures 6 and 7). In this case, not all of the data were used, so the fitted lines are shown only in the 5-point bandwidth used for analysis. The results indicate that there was no statistically significant impact on retention at any threshold in either set of years (see Figures 8, 9, 10, 11).

Given the results thus far, I wanted to determine whether the effect of remediation is the same at the two thresholds. I did this by testing the null hypothesis that the population coefficients of a1 and a2 for the model in Table 7 are equal. I found no significant difference between the upper and lower thresholds with regards to the effects of remediation. Thus, we accept the null hypothesis.

While there were some caveats to conducting an RD analysis with this data set, there were still some interesting results that led me to investigate a difference-in-difference approach. It is important to note that the results from 2012-2013 are of particular interest to community colleges contemplating the implementation of a metacognitive course to supplement their remedial courses. Thus, I used a difference-in-difference estimator to isolate the impact of the metacognitive course. That is, the 2008 to 2011 estimate gave me the impact of assignment to remedial courses, and the 2012 to 2013 estimate gave me the impact of assignment to remedial courses plus the metacognitive course, so subtracting the 2008 to 2011 estimate from the 2012 to 2013 estimate would leave just the impact of the metacognitive course. Table 8 shows the results for a difference-in-difference estimate at the upper and lower thresholds using a bandwidth of 5 points. The coefficient on A shows the impact of being above the threshold. The coefficient on

M shows the impact of the metacognitive course existing (i.e., years 2012-2013). Finally, the coefficient of interest is A*M which shows the impact of just the metacognitive course. The estimate for the upper threshold is -0.04. The estimate was negative but not statistically significant, giving no evidence of an impact of the metacognitive course on retention. The estimate for the lower threshold is 0.05. The estimate was positive but not statistically significant, giving no evidence of an impact of the metacognitive course on retention. This insignificant finding is not surprising given that the individual RD estimates were also not significant.

**Paper 1 Discussion**

As Martorell and McFarlin (2011) discussed, there can be many different explanations why a study on remediation would find no evidence of positive results. For instance, the results might be confounded by unobservable factors; effects might be positive only for a certain subset of the population; the effort and time to take remedial courses might offset any otherwise positive impacts; or the program might, indeed, not provide positive help. In this study, there was the added difficulty of data limitations and the discontinuities in the placement scores. For instance, one of the data limitations is that data were available only through 2013. Because of this, the only retention outcome available for all students who entered in 2013 was whether they enrolled in the spring semester following their first fall semester. With more years of data, measures such as number of semesters over a given time frame or completion of an associate's degree could be used as outcome variables. In addition, I was unable to use GPA data due to a lack of information pertaining to number of courses and level of course difficulty (as well as problems with attrition). Later, I propose several ways that these limitations might be overcome in future studies.

Results for this study showed that remediation did not have either an adverse or a positive effect on retention at either the upper or lower remediation threshold for 2008-2011. These results are consistent with prior literature that finds no adverse effects of remediation on retention. Two important caveats to this analysis are the following. First, I focused on English remediation because the McCrary test showed stronger manipulation of the forcing variable for Reading than for English. For English, the lower threshold exhibits less evidence of manipulation than the upper threshold. Hence, the results for the lower threshold for English are closest to satisfying the no-manipulation condition. A shortcoming of English scores, however, is that the school changed to a different placement examination for 2012-2013. The new placement examination shows much more bunching of scores than the examination used for 2008-2011. Thus, while the new evidence presented here is valuable, the limitations of the data make the findings less than definitive.

**Implications for Community College Administration**

Education policy makers and educators seek to rely on empirical evidence to provide guidance about how to govern community colleges. As such, it is imperative that implementation of innovations, such as the metacognitive course, be designed to facilitate evaluation of the effectiveness of the innovation. Hence, to the extent possible, the implementation should be designed as an experiment. My research in this chapter highlights four categories of factors that administrators should consider: test characteristics, data management, study design, and measures of student outcomes. I offer some suggestions for each of these.

Standardized tests are used in community colleges to determine students' ability levels. Thus, it is vital to understand how the tests are scored and how those scores are interpreted by colleges. Once the tests are understood, it is important to not change the testing criteria during a

period when an innovation such as the metacognitive course is being implemented. Changes to cut-off scores and/or switching to an entirely new test can cause complications that might make it very difficult to adequately evaluate the effect of an intervention. Holding the test and testing criteria constant across a study minimizes noise. Despite the fact that it is beneficial for colleges to hold the test and testing criteria constant, consistency is sometimes not feasible. Therefore, I suggest that colleges and researchers ensure that, if a change in standardized test is made, there is a crosswalk between the two different tests so that a comparison is possible. This crosswalk will ensure that a score of 60 on test A, for instance, can be matched to a comparable score on test B.

Colleges should also consider using different cut-off scores for remediation and for the intervention. Using scores that differ by at least 10 percentage points for assignment to different "treatments" would allow separate RD analyses with a bandwidth of 5 percentage points for each impact. Had such differences in score cut-offs been used for implementation of the metacognitive course, those differences would have eliminated the confounding of impacts of remediation with the intervention, thus permitting a much more information evaluation of the effects of the intervention.

This point about test characteristics pertains to the policy that allows students to take standardized tests multiple times. Colleges often permit students to re-take standardized tests because students want a chance to obtain higher scores to place out of remediation. This policy could be advantageous for the student, but the multiple scores add a layer of complexity for evaluating of an innovation. Because there is turnover of college personnel, it is very important that clear policies be implemented and documented delineating which of the multiple scores is used for course placement, assignment to remediation, or assignment to other interventions. For instance, colleges might elect to report and use the highest score obtained for each student. This

is fine from a school policy standpoint, but, as shown in my study, the potential for students to retake examinations can adversely affect the validity of Regression Discontinuity analysis. Retaining the score for each student for the first time the test is taken is thus essential. Retention of all scores is highly desirable and would permit addressing interesting questions such as comparison of outcomes between the students with multiple scores and those with only one score. More generally, capturing all test data for all students provides the opportunity for researchers to aid administrators by providing a more complete understanding of the student population. Missing test data can invalidate evaluation of innovations or evaluation of remediation. Additionally, it would be ideal if the data included a placement test score on the same examination for all students. However, due to administrative or financial reasons, this might not be feasible. If so, the alternate method for placement (scores on SAT, ACT, AP, etc.) should be included in the data for all students.

Several student-specific characteristics impact outcome measurement, so colleges and researchers must also take these characteristics into account when designing an implementation. Course credit volume and course difficulty are important factors to consider and document to evaluate how an intervention impacts GPA. These factors are important because GPA can be impacted by the number of courses a student is taking. For instance, one could argue that students with two classes have an easier course load and would obtain higher GPAs than students with five classes who have higher demands on their time due to the greater number of courses. The other factor to note is the course difficulty. Students in lower-level classes may have fewer academic hurdles to face in class than those enrolled in higher-level classes.

Retention and graduation are key outcomes for any college. It is easy to see which students are retained; however, it can often be difficult to determine the reasons for attrition.

Some students might leave because they have dropped out of college completely. Others might have enrolled in different community colleges or in 4-year colleges. If colleges could carefully label why students leave, researchers could make a more accurate retention analysis model that would provide clearer results for the college. Pinpointing retention even further would require colleges to note the date that each student left. For example, it is of interest to investigate whether assignment to remediation has a discouragement effect, defined as students leaving a college shortly after learning their assignment to remediation.

The last consideration that I would implore colleges to contemplate is random assignment to treatment or a design that implements a treatment to all students at different times in order to test effectiveness. In this case, the treatment is the metacognitive course. Random assignment in education is typically not utilized because educators view it as undesirable to withhold an intervention that could be effective for all students. Many practitioners feel that there are very few benefits to withholding interventions, and their inclination is to enroll every student who might benefit. On the other hand, it is also undesirable to administer interventions that do not have empirical evidence of their effectiveness. As I have emphasized above, careful implementation of an innovation can permit informative evaluation using regression discontinuity and other quasi-experimental designs. Under some conditions, random assignment provides more powerful evidence than regression discontinuity. Where random assignment is viable, it would be more prudent for colleges in the long term to use random assignment so that there is no confusion about what is impacting the outcome variables. Of course, randomization itself can raise challenges if students assigned to different "treatments" interact with each other. Hence, the design of random assignment of students to an innovation needs to account for the effects on validity if there are interactions among students receiving different assignments.

There were caveats to the RD design for this paper, but there were interesting results to note. An ITT RD analysis was utilized to examine the effect of remediation on retention and the RD analysis coupled with a difference-in-differences analysis was used to assess the effect of a metacognitive course on retention. The results showed no significant effect of remediation on retention, and no significant effect of the metacognitive course on retention. I wanted to extend the research from Paper 1 and determine other variables besides the metacognitive course that impact retention. Thus, I examined the impact of demographic factors on both retention and GPA.

**Paper 2: Demographic Factors and Their Impact on Student Performance**

I used the data to determine the effect of demographic factors on student performance. Other researchers have identified demographic trends and norms specific to college students. These trends are so important that researchers developed retention models to better understand the likelihood of a student's premature departure from a campus (Astin, 1993; Bean, 1990; Tinto, 1993), but these models use assumptions found primarily in traditional 4-year colleges (Wild & Ebbers, 2002). My research contributes to the education field by examining demographic factors specific to the community college setting. I investigated age, race, gender, income, financial aid, dependency status, and enrollment status (Alhajraf & Alasfour, 2014; Bastedo & Jaquette, 2011; Conger & Long, 2010; Fike & R. Fike, 2008; Sheard, 2009; Thayer, 2000). I examined relationships between demographic factors and student performance in order to identify which demographics affect community college students.

Relative to traditional college students, community college students tend to be older and are more likely to be first-generation college students and minorities (Thayer, 2000). Consequently, the percentage of students involved in remedial education is higher for

community college students than for traditional college students. Community college students also tend to be from low-income families and in greater need of financial aid than 4-year college students. Another important difference between community college and 4-year college students is their status as full or part-time students. Approximately two-thirds of community college students attend school on a part-time basis (Powers, 2007). Empirical findings showed statistically significant relationships between demographic factors and performance; consequently, educators and administrators are encouraged to be attentive to these factors and to find ways in which they can better predict which students might need additional assistance and resources in order to succeed (Fike & R. Fike, 2008).

**Theoretical Background and Hypothesis Development**

Age, Race, and Gender. Specific surface-level factors directly impact student performance, including age, race, and gender. Surface-level diversity refers to social categories that are often physical, such as age, race, and gender (Harrison & Klein, 2007; Lawrence, 1997; Phillips & Loyd, 2006; Tsui, Egan, & Xin, 1995). Empirical evidence on the effect of age on student retention and achievement is mixed. Several studies found that older students achieve higher grades than younger students (Bean & Metzner, 1985; Guney, 2009; Simpson & Sumrall, 1979). Older students are more mature than younger students and are more capable of handling a college course load. However, other results indicate that younger students have higher GPAs than older students because they have fewer responsibilities and can focus primarily on studying (Lane & Porch, 2002). These conflicting results, though, derive from data using traditional college students. My proposition was that in the case of community college students, age would impact performance such that older students would have higher GPAs and higher retention rates than younger students. Older students are more likely than younger students to be committed to

completing their education so that they can focus on their responsibilities outside of school. Older students may also be more likely than younger students to be financially responsible for their education, prompting them to focus more on completing their coursework in a timely and cost-effective manner.

**Hypothesis 1**. Older students will have higher GPAs than younger students.

**Hypothesis 2**. Older students will have higher retention rates than younger students.

Race plays a similarly integral part in education: studies have shown that White students had higher GPAs than non-White students (Fischer, 2007). In addition, White students were more likely to be retained than minority students (Astin, 1993; Murtaugh, Burns, & Schuster, 1999). One of the theorized mechanisms behind the impact of race on student performance is stereotype threat. This theory holds that minorities perform worse than the majority group due to the immense cognitive energy that minorities use to combat stereotypes against them. Preoccupation with these stereotypes interfered with minorities' actual behaviors, which prompted low performance (Steele & Aronson, 1995). I postulated that community college student performance would be impacted by race such that White students would have higher GPAs and retention rates than non-White students.

**Hypothesis 3**. White students will have higher GPAs than non-White students.

**Hypothesis 4**. White students will have higher retention rates than non-White students.

Gender is also a factor in student performance. Studies have found that women had higher GPAs than men (Ferguson, James, & Madeley, 2002; Strahan, 2003; Woodfield, Jessop, & McMillan, 2006). Women were also more likely than men to return to school semester after semester (Perrakis, 2008). Researchers have also posited that women were more determined, better able to adjust to academic schedules, more proficient in setting academic goals, and had a

higher level of desire to finish college than male students had (Allen, 1999; Reisberg, 2000; Vallerand & Bissonnette, 1992; Van den Berg & Hofman, 2005; Wintre & Yaffe, 2000). I expected that women enrolled in community college would be more likely than men to have high GPAs and high retention rates.

**Hypothesis 5**. Women will have higher GPAs than men.

**Hypothesis 6**. Women will have higher retention rates than men.

**Income, Financial Aid Factors, Dependency**

Dependency status plays a role in student performance. Students who are independent do not have the safety net of parents or guardians who financially support them in some way. This lack of dependency can mean that these students are more burdened with financial pressures than students who are dependents of parents and guardians. Independents' lack of support can mean that studying and learning are not as paramount in their lives due to lack of bandwidth to devote to those activities.

**Hypothesis 7**. Students who are independents will have lower GPAs than students who are dependents.

**Hypothesis 8**. Students who are independents will have lower retention rates than students who are dependents.

Because community college students tend to be older than 4-year college students, many community college students have children and families of their own. Family responsibilities often force these students to focus on financially supporting their dependents while simultaneously focusing on their studies—obligations that could become overwhelming.

**Hypothesis 9**. Students who have dependents will have lower GPAs than students who do not have dependents.

**Hypothesis 10**. Students who have dependents will have lower retention rates than students who do not have dependents.

College can be an expensive endeavor for most students, even with the help of financial aid. Community college students are particularly affected by the cost of college education because they tend to come from low-income households (Bastedo & Jaquette, 2011). Prior research has indicated that students with low incomes were more likely to have lower GPAs and lower retention rates than those with higher incomes. The rationale is that low-income students often must work to pay for their school-related expenses and living expenses. The result of having to work during college significantly and negatively impacts factors related to achieving high grades and retention. I predicted that lower income would negatively impact student performance.

**Hypothesis 11**. Students with lower household incomes will have lower GPAs than students with higher incomes.

**Hypothesis 12**. Students with lower household incomes will have lower retention rates than students with higher incomes.

Students awarded with high levels of financial aid have the opportunity to meet their financial obligations regarding their education. Thus, they experience less financial strain than those who are awarded less financial aid. High levels of aid might result in higher GPAs and higher retention rates than those of students with low levels of financial aid.

**Hypothesis 13**. Students with higher amounts of financial aid will have higher GPAs than students with lower amounts of financial aid.

**Hypothesis 14**. Students with higher amounts of financial aid will have higher retention rates than students with lower amounts of financial aid.

**Enrollment Status and Goals**

More than half of community college students enroll as part-time students (AACC, 2014). Enrollment status is important when determining student performance because students who are enrolled part-time in a semester are more likely to have lower grades and more likely to leave school than those enrolled for a full semester course load (Chen, 2007). One reason part-time students might be more at risk of lower performance than full-time students is that they lack the resources needed to be full-time students. Not having enough funds to continue with education might distract them and discourage them from finishing their degrees with strong GPAs. I hypothesized that students enrolled part-time might lose the willpower needed to complete a degree, be preoccupied with other factors in their lives, and be less committed to finishing school than they would be if they were full-time students. These reasons could impact GPA and retention.

**Hypothesis 15**. Students who are enrolled as part-time students will have lower GPAs than students who are enrolled as full time students.

**Hypothesis 16**. Students who are enrolled as part-time students will have lower retention rates than students who are enrolled as full time students.

Likewise, I hypothesized that the students who have the goal of obtaining associate's degrees will obtain higher GPAs and have higher retention rates than those without the goal of obtaining associate's degrees. My rationale is that students with clear goals of obtaining a degree will put forth more effort to obtain high GPAs and thus be more prone to remain in school.

**Hypothesis 17**. Students who state that obtaining an associate's degree is the goal of their education will have higher GPAs than students who do not have an associate's degree as a goal.

**Hypothesis 18**. Students who state that obtaining an associate's degree is the goal of their education will have higher retention rates than students who do not have an associate's degree as a goal.

## Method

Participants. Participants were drawn from the population of 29,988 first-year, degree-seeking students enrolled within years 2008-2012 (see Table 1). These students recorded Accuplacer and Compass English scores.

Procedure. I conducted several multiple linear regression analyses to determine the effect of demographic factors on student success. Each regression model contained related variables that I used to predict GPA and retention, controlling for ability. The college elected to use one ability test during years 2008 until 2011 and then switched to another ability test. Thus, there are two sets of regressions within each variable model to control for the two ability scores.

Measured **v**ariables. The independent variables were surface-level factors (age, race, gender, native English speaker); financial status (income, dependency, financial aid, and ratio of income to financial aid); and enrollment status. All of the variables were binary variables except the income and financial aid variables, which were continuous. The dependent variables were GPA and retention.

## Results

I first discuss findings when subgroups of variables are considered separately. These are presented in Tables 2 through 5. While these are of interest, it is important to keep in mind that coefficients of variables included in these regressions may be impounding effects of variables not included. Hence, in Tables 6 and 7, I include all of these variables in a single regression.

As I predicted, age significantly impacted performance, with older students obtaining higher GPAs than younger students who took the Accuplacer test during 2008-2011; $\beta = .02$, $p < .01$, which supports hypothesis 1 (see Table 2 column 1). On the other hand, younger students who took the Accuplacer test were retained more than older students in 2008-2011; $\beta = -.0046$, $p < .01$ (see Table 2 column 2), which is opposite of my prediction in hypothesis 2. Older students who took the Compass test had higher GPAs than younger students; $\beta = .02$, $p < .01$ (see Table 2 column 3). However, there was no significant finding for retention for the years in which students took the Compass test (see Table 2 column 4). It should be noted that these significant differences could be due to the different years that the student data were collected.

As I predicted, race significantly impacted performance for Accuplacer test takers, with White students obtaining higher GPAs than non-White students; $\beta = .41$, $p < .01$, which supports hypothesis 3 (see Table 2 column 1). Consistent with hypothesis 4, White student Accuplacer test takers were retained more than non-White students; $\beta = .15$, $p < .01$ (see Table 2 column 2). The same pattern of results for race was sustained for Compass test takers with white students obtaining higher GPAs, $\beta = .22$, $p < .01$ and higher retention rates $\beta = .15$ $p < .01$ than non-white students (see Table 2 columns 3 and 4, respectively).

Gender significantly impacted performance, with female student Accuplacer test takers obtaining higher GPAs than male students; $\beta = -.22$, $p < .01$, which supports hypothesis 5 (see Table 2 column 1). Consistent with hypothesis 6, female student Accuplacer test takers were retained more than male students; $\beta = - .05$, $p < .01$ (see Table 2 column 2). The same pattern of results persists with Compass test takers with female students obtaining higher GPAs $\beta = -.33$, $p < .01$ and retention rates $\beta = -.05$, $p < .01$ than male students (see Table 2 column 3 and 4, respectively). The interaction of race and gender was negative and statistically significant, with

White female Accuplacer test-taking students having higher GPAs $\beta$ = -.07, $p$ < .05 and higher retention $\beta$ = -.04, $p$ < .05 than males and non-White students (see Table 2 columns 1 and 2, respectively). However, the findings were not robust for later years when students took the Compass test (see Table 2 columns 3 and 4, respectively).

Outcomes differed markedly as a function of age between Dependent and Independent students. For dependency status, the reference group in Table 3 is Dependent students. For those students, GPA did not vary significantly by age in either the first period (–.00495) or the second period (–.0145). By contrast, the estimated effect of age on retention for dependent students was large, negative, significant and comparable in magnitude in both regressions. In period one the estimated effect is –.0417 and in period two –.0436. These results imply a decline in retention of more than four percentage points for each year increase in age for dependent students. In interpreting this result, it is useful to bear in mind that dependent students are clustered in a fairly narrow age range. Mean age for dependent students is nineteen and the standard deviation of age is one.

Consider next the estimated effect of age for Independent students, beginning with the relationship of GPA and age for independent students who took the Accuplacer test. For those students, GPA increases significantly with age by an estimated approximately .028 points per year of age (.0329–.00495). The standard deviation of age is 9 for dependent students. Hence, a one standard deviation difference in age translates to a .25 difference in GPA. The estimated relationship for GPA in column (3) also exhibits a pattern of increasing effect of age for independent students, but the estimates are not significant. The estimated effect of age on retention for independent students in period one is small (.0462-.0417) is small and insignificant, and the same is true for retention in period 2 (.0493-.0436).

In sum, then the findings with respect to dependency and age are the following. Independent students show some increase in GPA with age while dependent students do not. Dependent students have substantially higher average retention rates than independent students, .46 vs. .59. The former show a decline in retention of approximately 4 percentage points per year of age while the latter show little effect of age on retention.

The fraction of students claiming dependents is relatively small, 2.2%. There were no statistically significant results for GPA or retention concerning the students who claimed dependents (see Table 3 columns 1-4).

Income impacted student performance for students who took the Accuplacer test, with higher household income resulting in higher grades; $\beta = .15$, $p < .01$, supporting hypothesis 11 (see Table 4 column 1). The relationship between household income and GPA for Compass test takers was also positive and significant $\beta = .19$, $p < .01$ (see Table 4 column 3). However, household income did not significantly impact retention (see Table 4 columns 2 and 4).

Financial aid was predictive of GPA such that Accuplacer students with high amounts of financial aid had lower grades; $\beta = -.13$, $p < .01$, which was opposite of the predicted outcome in hypothesis 13 (see Table 4 column 1). Increased financial aid resulted in increased retention rates; $\beta = .10$, $p < .01$, which was the predicted outcome in hypothesis 14 (see Table 4 column 2). The same pattern of results held for students who took the Compass test as financial aid was negatively and significantly related to GPA; $\beta = -.15$, $p < .01$ (see Table 4 column 3). The relationship between financial aid and retention was significant and positive $\beta = .11$, $p < .01$ (see Table 4 column 4).

Part-time or full-time enrollment status did not impact GPA for students who took the Accuplacer test and the Compass test (see Table 5 columns 1 and 3, respectively). However,

enrollment status was positively and significantly related to retention for Accuplacer test takers; $\beta = .20$, $p < .01$ and Compass test takers; $\beta = .17$, $p < .01$ (see Table 5 columns 2 and 4, respectively). Students' goal of obtaining an associate's degree did not impact GPA for Accuplacer test takers or Compass test takers (see Table 5 columns 1 and 3, respectively). However, goals did impact retention such that Accuplacer test takers who had goals of obtaining an Associate's degree had higher retention rates that those who did not have goals; $\beta = .04$, $p < .01$, as predicted in hypothesis 18 (see Table 5 column 2).

Several variables within each of the models could be confounded. As such, I developed a model using all of the observed variables. These results are presented in Table 6. The results for age changed in the full model. Age no longer had a positive influence on GPA. The negative effect of age on retention persisted and became statistically significant for both time periods.

Consider first the results relating GPA and Retention to dependency status and age. The results regarding these variables Table 6 are strikingly similar to those in Table 3. The coefficient of the Age*Independent interaction differs somewhat between the two tables for the GPA regression for students who took the Compass examination, but the coefficient is not significant in either, so this differences is quite minor. Thus, the findings in Table 3 regarding dependency status and age are quite robust to inclusion of the full set of variables in Table 6.

The household income variable in the full model continued to be significant and positive for GPA and became significant and positive for both retention models; $\beta = .035$, $p < .01$ and $\beta = .12$, $p < .05$. Although the significance levels differed somewhat, the signs of the financial aid variable were similar in the full models to models previously discussed in Table 4. Financial aid was negatively and significantly associated with GPA in the full model for the first time period and positively and significantly associated with retention in the full model for both time periods.

The full-time status variable changed in the full model. Full-time status was no longer a statistically significant predictor of retention. Similarly, the associate's degree was no longer a statistically significant predictor of retention.

In summary, GPA increased with age for Independent students but not for Dependent students whereas I hypothesized increasing GPA with age for all students. There was also a differential impact of age on retention between Independent and Dependent students. Retention declined significantly with age for Dependent students but not Independent students. These results are opposite of my hypothesis where I posited that older students would be more likely to return to school. More striking than the effect of age within dependency status is the difference in mean retention rates across dependency status. Dependent students are younger than Independent students (average ages of 19 and 27, respectively), and Dependent students have much higher average retention rate than Independent students (.46 vs. .59). These results corroborate my hypotheses. Similar to results discussed previously, neither the claimed dependent variable nor the interaction of claimed dependents and age was statistically significant in any of the models. Household income had a positive and significant effect on GPA in the full model as it had in the previous model (see Table 4) and household income became a significant, positive predictor of retention in the full model. Financial aid was negatively related to GPA in the full model for the first time period and positively related to retention in both time periods in the full model. Full-time status and associate's degree goal were no longer statistically significant predictors of retention in the full model.

Missing data was a significant issue in this paper, particularly for the financial aid variable. Thus, additional analyses were needed to determine if the missing data impacted the overall analyses, particularly with regards to Table 6. I conducted three regression analyses using

the retention data. The first regression in Table 7 column 1 contains all of the variables listed in Table 6 except for the financial aid and income variables. The second regression in Table 7 column 2 contains all of the variables in column 1 but only uses the 3,835 observations found in Table 6 column 2. The third regression contains all variables, including financial aid and income, and pertains to the 3,835 observations found in Table 6. The comparison of regressions 1 and 2 in columns 1 and 2 show that results based on the subsample of 3,835 respondents are very similar to those based on the larger sample. The robustness of the results despite the different sample sizes is quite encouraging. Additionally, the comparison of regressions 2 and 3 in columns 2 and 3 provides evidence that the signs of the other variables are similar when income and financial aid are included, and the significance levels of most variables are also comparable across columns (2) and (3). Exceptions to this overall pattern of significance are the coefficients of Fulltime, Goal Associate, and Accuplacer. These three variables become insignificant when Household Income and Financial Aid are included. This likely reflects collinearity of these two variables with the three variables that became insignificant. For example, further investigation revealed a positive correlation of .34 between full-time status and financial aid ($p<.01$), i.e., students with higher financial aid are more likely to be full-time.

**Paper 2 Discussion**

In this paper, I proposed that demographic factors would impact GPA and retention (Table 8 for Paper 2 provides a summary of my findings). Students come to college with various demographic factors that are already set: thus, there is little to no variation in these factors during the student's college tenure. These stable factors significantly impact students' experiences in education. Some demographics trigger external pressures: for instance, low income can result in decreased ability to study due to economic and time constraints. Other demographics elicit

internal stress: race, for example, is a variable that can prompt poor performance due to the stimulation of stereotype threat. Results from this dissertation extend results in the literature by confirming the importance of demographic factors on performance of community college students. Prior research focused on demographic factors in traditional 4-year colleges, but there is little to no work about the effect of demographic factors in community colleges. I did not have any a priori hypotheses as to whether community college and 4-year college results would differ, but I wanted to use the research opportunity to test empirically the demographic factors on performance. The results, which will be discussed in detail in the following paragraphs, also corroborate specific empirical findings discovered in prior literature. My dissertation research demonstrated that race, age, gender, dependency status, income, and financial aid have statistically significant robust relationships with GPA and/or retention.

Results from the full model containing all of the demographic variables examined found significant relationships between GPA and retention and race; gender; dependency status; the interaction of age and dependency status; household income; financial aid. White students had higher GPAs and retention rates than non-White students across both time periods. One explanation for these results is that White students have more student role models than non-White students. As an abundance of research has shown, role modeling is a powerful tool to modify behavior (Bandura, 1969; Rosenthal & Bandura, 1978), and more White students (62%) graduate from U.S. colleges in comparison to non-White students (40%) (The Condition of Education, 2014). White students are disproportionately offered role models, whereas non-White students do not have as many opportunities to identify with college graduates. White students have more opportunities to experience role models who provide evidence that people with similar backgrounds who look like them can succeed academically.

Another way these demographic results regarding race could be explained is by the robust empirical findings that support stereotype threat, which is defined as the risk of personally confirming a negative stereotype (Steele & Aronson, 1995). Studies have found that non-White students performed worse than White students when stereotype threat was activated in laboratory and field settings. Researchers have manipulated stereotype threat by stressing the evaluative and diagnostic nature of lab tests and manipulating experimenters' race (Spencer, Steele, & Quinn, 1999; Steele & Aronson, 1995). Stereotype threat diminished academic performance in numerous studies. It is plausible that threat impacted students in this paper's sample, which would explain the low performance for non-White students. Educators could assist non-White students in the classroom by understanding and acknowledging the negative implications of stereotype threat. Mentor programs specifically designed for minority students could bolster student esteem and efficacy that could, in turn, lead to improved performance.

Gender impacted student performance as women had higher GPAs than men in both time periods. Women also had higher retention rates than men for the first time period with the Accuplacer test. These results corroborate literature indicating that women outperform men in academics (i.e. Ferguson, James, & Madeley, 2002; Strahan, 2003; Woodfield, Jessop, & McMillan, 2006; Perrakis, 2008)

Students' dependent status was also an important factor. Students claimed as dependents for tax purposes are financially supported by either a parent or a guardian. Being claimed as dependents means that these students have less financial responsibility than those who are independent. I theorized that dependents would have higher GPAs and retention rates than independents because dependents would have fewer responsibilities and would be able to focus more on school than would independents. For retention, my hypotheses were strongly supported.

Dependents have substantially higher average retention rates than independents. While retention declines with age among dependents, age variation among dependent students is relatively small. Hence, in the age range relevant for the bulk of dependent students, the decline in retention with age among dependents is not sufficient to offset the large difference in average retention rates between dependents and independents. Results with respect to GPA were more nuanced. Young independent students obtain lower GPAs than dependent students, but this differential declines with age and reverses for older students. I also investigated the relationship between students who have dependents and performance. A quite small fraction of students in the sample have dependents, roughly 2.3%, and there was no statistically significant relationship between those who have dependents and GPA or retention.

Other demographic factors relevant to student performance are income and financial aid. Attending college often places a large financial burden on students, which could hinder them from focusing on their studies. The results for household income supported my hypothesis as students with high income had higher GPAs and retention rates than students with low income. These results were found across both time periods.

Results from the financial aid data differed from my hypothesis for GPAs as students with high amounts of financial aid had lower GPAs than those with low amounts of financial aid in the first time period with the Accuplacer test. However, the direction of results changed for retention as students with high amounts of financial aid had high retention rates. The retention result pattern remained for the second time period with the Compass test. The results for grades may be due to the fact that students who have the financial means may have more time and resources to dedicate to their education; thus, they are likely to study and regularly attend classes. Whereas a previous study found that students with low income and high financial aid

were less likely to return to school (Bailey, Alfonso, Scott, & Leinbach, 2004), another study found that financial aid was positively correlated with retention (Fike & R. Fike, 2008). My paper contributes to the literature by providing more nuanced evidence about the effect of financial aid on community college student performance. Having high income and high financial aid were positively associated with retention.

In sum, demographic factors play a large role in student performance. Gender, age, race, dependency status, income, and financial aid impacted GPA and/or retention (See Table 6 for an overview of results). These results suggest the possibility of creating a predictive model that will allow educators to anticipate which students might need additional assistance with matriculation. Further research is needed to examine whether these effects hold over longer periods of time. The current data capture each entering class from 2008 to 2012, but it would be interesting to obtain a data set that includes graduation. That would allow researchers to see how demographic factors impact graduation. As mentioned previously, I did not have any hypotheses about the difference in results between community college and 4-year college students. The lack of empirical evidence pertaining to community college demographics made it difficult to conjecture about the comparison. However, utilizing psychology and education literature provided me with the knowledge to theorize about the relationship between demographic factors and performance.

This paper provided insights into how demographic factors influenced performance, but there is more to the puzzle of student performance. The demographic factor results led me to think about how students' perceptions might influence outcomes. I wanted to investigate how students' perceptions about subjects such as school, motivation, and the amount of social support they received impacted their GPA and retention. Thus, I developed a study about psychological factors in order to supplement the demographic findings.

## Paper 3: Effect of Psychological Variables on Retention and GPA

Paper 2 emphasized the influence of demographic factors on student performance. The purpose of Paper 3 is to gather insights about the impact of psychological factors on performance. Previous studies have examined how various psychological factors affect student performance (Robbins et al., 2004). Researchers found that psychological factors such as motivation and efficacy positively and significantly impacted GPA and retention. These findings are encouraging because they suggest that psychological factors can influence outcomes that are important to students and to educators. Although the psychological factor findings provide some insight, they are often limited to the 4-year college context and do not necessarily represent students in 2-year community college programs. Thus, I decided to investigate the impact of psychological factors on student performance within the community college context. Specifically, I focused on the following factors: academic motivation, self-regulation, interpersonal social support, perceived social support, organizational identity, and social identity. These factors were examined as main effects. I also investigated the interaction of the aforementioned variables with self-efficacy, grit, ability, hours studied, and hours worked outside of school. These interaction relationships could change the strength and direction of the main effect variables and student outcomes (see Figure 1 for a theoretical model).

### Theoretical Background and Hypothesis Development

Motivation and ability: An overview. The fundamental question motivation researchers ask is the "why?" behind behaviors; the answers explain the purpose for behaviors as well as its energy, direction, and persistence (Maehr, 1989). The word "motivation" comes from a Latin word meaning "to move." Psychologists have defined motivation as the amount, persistence, and

direction of effort. Researchers are interested in motivation because it serves as a predictor of performance.

Multiple theories of motivation and its impact on behavior exist. I focused specifically on the effect of motivation on educational outcomes. Researchers apply motivation theory to educational settings in order to comprehend students' performance. Empirical evidence suggested that increased academic motivation can produce higher course grades and self-efficacy levels, and can help students to better identify with the overall student population (Walker, Greene, & Mansell, 2006). I proposed that academic motivation is positively associated with higher GPA. Motivation impacts the direction, level, and persistence of effort, which will translate into higher GPA scores (Vroom, 1964).

**Hypothesis 1**. Students with high levels of motivation will have higher GPAs than students with low levels of motivation.

**Hypothesis 2**. Students with high levels of motivation will have higher retention rates than students with low levels of motivation.

Several theoretical frameworks indicate how motivation affects outcomes such as satisfaction, performance, and persistence (Vroom, 1964). Vroom's (1964) model of motivation focused primarily on the consequences of not attaining a goal. He hypothesized that the interaction of ability and motivation predicts performance. Although motivation is essential to achieving goals, it is not the only factor that impacts goal attainment. Ability is crucial to the formula, and it is defined as the degree to which a person has the capacity to attain the highest level of performance (Vroom, 1960). Vroom's (1960) formula for the interaction is as follows:

$$\text{Performance} = f(\text{Ability} \times \text{Motivation})$$

The formula indicates that ability and motivation combine in a multiplicative fashion to affect performance. According to this formula, people need both ability and motivation to perform well: if either is absent, performance will suffer.

**Hypothesis 3**. The strength of the positive relationship between ability and GPA will be stronger when motivation is high than when it is low.

**Hypothesis 4**. The strength of the positive relationship between ability and retention will be stronger when motivation is high than when it is low.

**Motivation in the Community College Context**

As mentioned previously, motivation is a widely studied concept; however, the majority of the empirical work in schools has been conducted in the context of 4-year colleges. My dissertation is unique and brings value to the education field because I studied how motivation functions within the community college setting. In the following section, I theorize how motivation operates with a community college setting. There are several categories of motivation. My research focused on two: external and internal motivation and their impact on performance. External motivation is derived from rewards and drivers outside of the individual (Ryan & Deci, 2000a). Internal motivation is defined as the desire to seek knowledge and information in order to grow as a learner. I determined that it would be beneficial to take a closer look at motivational theory in the community college setting—in particular, the internal and external motivation theories.

As mentioned previously, community college students have unique characteristics that I hypothesize could produce an interesting pattern of results. One of these characteristics is the number of challenges that community college students face that are often disproportionate to those of traditional college students. Community college students face many challenges that can

deter them from graduating, such as obligations outside of school, inability to pay tuition, and courses that require high levels of academic skill. In addition, these students are often categorized as at-risk, meaning that they have a higher likelihood of dropping out of school and obtaining low GPAs. Other groups, such as Black students, first-generation college students, and low-income students, are also categorized as at-risk. These students can be theoretically referred to as one at-risk group. Even though I am not directly testing the effect of risk on student outcomes, I hypothesize that the risk indirectly impacts psychological factors such as motivation. Motivation is one of the key predictors of academic performance for at-risk students (Mealey, 1990). Studies have shown that at-risk students—Black students in this case—are driven both by internal and external motivations and, thus, are helped by both types of motivational support (Cokley, 2003; Hwang, Echols, & Vrongistinos, 2002; Kaplan & Maehr, 1999). Students reported higher levels of self-esteem and academic confidence when they were recognized for their academic achievements than when they were not. Black students reported higher levels of external motivation than White students. Hwang et al. (2002) reported that Black students were compelled by high-status job potential and were driven by the societal and economic benefits that high academic achievement would award them. Griffin (2006) also found that Black students cited tremendous drive to improve their socio-economic status, which is an external motivator, in addition to citing internal motivators such as wanting to learn about new subjects. These empirical results suggested that external motivation and internal motivation are beneficial to student success.

**The Impact of Internal and External Motivation on Outcomes**

One of the motivational theories most pertinent to this paper is intrinsic motivation, which is defined as the need to seek new and challenging opportunities for growth and learning

in the absence of rewards (Harter, 1978). This type of internal drive is often accompanied by a sense of autonomy and an internal locus of control as people look within themselves for motivation (Ryan & Deci, 2000b). Empirical evidence corroborates this theory of motivation. A study on physical education in high school found that internal motivation was positively correlated with positive outcomes, such as high levels of effort, intentions to be physically active after school, and low levels of boredom (Ntoumanis, 2001). Another study found that high school female sports players who dropped out of their physical education classes had lower levels of internal motivation and higher levels of amotivation as compared to the levels of players who remained (Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002). Laboratory studies that manipulated types of rewards have also shown interesting results about the relationship between motivation and education performance. One study found that providing an intrinsic and long-term explanation for learning materials—as opposed to not providing an explanation—resulted in increased autonomy, deeper processing, less superficial processing, greater persistence, and better grades for college students (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). Overall, framing learning goals through the use of intrinsic motivation inspires students to be dedicated and engaged.

The opposite of intrinsic theory and internal motivation is extrinsic theory and external motivation. External motivation is defined as the performance of activities for the sake of receiving an external outcome, such as a reward administered by someone else (Ryan & Deci, 2000b). People who experience external motivation do so to satiate an external demand. Research in education settings has found that external motivation correlates with negative outcomes such as lessened interest, decreased value placed on a task, and decreased effort towards a task (Ryan & Connell, 1989). However, researchers in the health field found results

suggesting that external motivation, when paired with high levels of autonomy, promoted weight loss, improved glucose control, and increased attendance for addiction treatment programs (Williams, Rodin, Ryan, Grolnick, & Deci, 1998).

Scholars continue to debate about whether internal motivation is better than external motivation at compelling people to succeed. Researchers have generally pointed towards internal motivation as the more advantageous of the two, stating that external motivation has adverse effects on learning, performance, and goal setting (Deci, Koestner, & Ryan, 1999). However, I hypothesized that both internal and external motivation would have positive outcomes on student GPA and retention. The rationale was that community college students, much like traditional at-risk students, were motivated both internally and externally as evidenced by research from Cokley (2003), Griffin (2006), and Hwang et al. (2002).

**Hypothesis 5**. Students with high levels of external motivation will have higher retention rates than students with low levels of external motivation.

**Hypothesis 6**. Students with high levels of internal motivation will have higher retention rates than students with low levels of internal motivation.

**Hypothesis 7**. Students with high levels of external motivation will have higher GPAs than students with low levels of external motivation.

**Hypothesis 8**. Students with high levels of internal motivation will have higher GPAs rates than students with low levels of internal motivation.

**Self-Regulation**

Self-regulation is necessary for students to make self-improvements in their academics. Self-regulation is defined as a metacognitive task that enables people to evaluate their own learning behavior (Boekaerts & Corno, 2005; Butler & Winne, n.d.; Perry, Phillips, &

Hutchinson, 2006; Winne & Perry, 2000; Zimmerman, 1990). I tested the hypothesis that community college students who self-regulated would have higher course grades and higher retention rates than students who did not self-regulate. The existing literature indicates that students who self-regulate have better chances of overcoming academic challenges and developing a more comprehensive understanding of subjects than those who are not self-regulated (Perry et al., 2006). Previous studies have provided evidence to support these hypotheses, demonstrating that students who self-regulate excel in their academics and learn more than those who do not self-regulate. Several researchers showed that self-regulators were able to advance in learning, which positively impacts GPA and retention (Lovett, Meyer, & Thille, 2008; Palincsar & Brown, 1984; Pintrich, Roeser, & De Groot, 1994; Whyte 1978). I proposed that there was a positive relationship between self-regulation and student performance.

**Hypothesis 9**. Students with high levels of self-regulation will have higher GPAs than students with low levels of self-regulation.

**Hypothesis 10**. Students with high levels of self-regulation will have higher retention rates than students with low levels of self-regulation.

**Interpersonal Support and Perceived Social Support**

Social support systems influence individuals' outlooks, health, education attainment, wealth, and life expectancy, to name a few outcomes. Literature in this area has demonstrated that social support is integral to an individual's well-being. Yet, one aspect of support that is not thoroughly addressed in this literature is the role of family and significant others (Zimet, Dahlem, S. Zimet, & Farley, 1988). Most community college students live at home because there are no dormitories on campus. If these students have families, then their families can provide

support. It is important to understand how the level of family and significant other support impacts community college students' outcomes.

Support is especially important during trying and uncertain times. Interpersonal support and perceived social support have been found to directly affect psychological health (Cohen, Gottlieb, & Underwood, 2000). Negative psychological factors increase a person's chances of developing physical and/or psychological diseases (Berkman, Vaccarino, & Seeman, 1993; Cohen, 1988; Cohen & Wills, 1985).

Social support is a concept that explains how people within a network influence each other through peer influence and support (Cohen et al., 2000). Some social networks provide a sense of belonging as well as stability, which increases feelings of self-worth and decreases feelings of hopelessness. Given previous evidence (i.e., Cohen, Gottlieb, & Underwood, 2000), I theorized that interpersonal support and perceived social support were valuable in the community college setting. Students sometimes face enormous challenges during their educational tenure and need support from a community as a result. The support ranges from academic advising and study tips to financial aid to managing personal finances while at school. Advantages from social support may involve being more aware of how to navigate academic challenges or fund college expenses. I hypothesized that students who reported higher levels of interpersonal support would be more likely to have higher course grades. Interpersonal support can provide information that enables students to obtain better grades and resources that enable them to persist in their studies.

**Hypothesis 11**. Students with high levels of interpersonal support and perceived social support will have higher GPAs than students with low levels of interpersonal support.

**Hypothesis 12**. Students with high levels of interpersonal support and perceived social support will have higher retention rates than students with low levels of interpersonal support.

## Organizational Identity

Organizational identity is perceived oneness with an organization as well as the feeling that the organization's successes and failures are one's own (Ashforth & Mael, 1989). This concept is theoretically similar to social identity in that it defines how people situate themselves within social groups. Gioia (1998) suggested that organizational identity is a shift upward in level of analysis from the individual to the organization without the need for much translation between the two levels. However, one major difference between social identity and organizational identity is that organizational identity is more fluid than social identity (Gioia, Schultz, & Corley, 2000). It is common for people to remain consistent in their core values and beliefs, which manifest in outward identifications with groups; thus, social identity does not change rapidly (Gioia et al., 2000). On the other hand, organizations often change faster than people can change. This constant change makes it important for individuals to shift their focus towards the newest organization norms to stay current.

Many studies have examined the impact of organizational identity on employee performance (Riketta, 2005). Although this concept has been studied mainly in the corporate context, its ideas can be applied to community college students by examining how their organizational identification impacts their performance and attitudes.

Tompkins (2005) found that organizational identification helped create positive work attitudes such as motivation, job performance, and satisfaction. Organizational identification also increased retention as well as employee interaction. One of the main factors of organizational identity is that individuals base their own identities on those of their organizations; this powerful phenomenon can shift people's behaviors and attitudes. Organizational identity helps people define how to navigate their own lives, because it helps to satisfy the human need to belong to a

larger group (Ashforth, Harrison, & Corley, 2008). A sense of belonging enables people to feel positive about themselves and the organization, thereby increasing the likelihood that they will be satisfied, willing to engage in leadership roles, and behave justly within the organization (Cheney, 1983; Scott, Corman, & Cheney, 1998).

Community college students belong to an organization as well: They are members of the colleges in which they have enrolled. Although they do not work for their colleges, they have the same importance as employees do, in that their performance directly impacts colleges' operations.

**Hypothesis 13**. Students with high levels of organizational identity will have higher GPAs than students with low levels of organizational identity.

**Hypothesis 14**. Students with high levels of organizational identity will have higher retention rates than students with low levels of organizational identity.

**Student Social Identity**

Social identity is defined as a person's knowledge that he or she belongs to social groups and that those groups have emotional significance (Tajfel, 1972). People use social comparisons in order to develop distinctiveness between the groups to which a person does and does not belong. These distinctions between groups create ingroups and outgroups. Social identity research has found that identifying with a group can drastically impact individuals' behaviors. I predicted that, in the academic setting, students' identities would influence their outcomes and perceptions of college.

Identity is also studied with regards to students. Burke and Reitzes (1981) found that students who identified themselves as more academically responsible than sociable were more likely to make plans to continue education beyond college. Student outcomes and perceptions are

influenced by their conceptualization of what it means to be a student (Reitzes & Burke, 1980). These perceptions matter because students are more likely to act in accordance with how they perceive themselves, which is consistent with social identity theory (Burke & Reitzes, 1981). Data also suggest that student identity forms over time (Collier, 2000). Students performing in a senior capstone course reported a statistically significant, positive change in identity during the capstone course period of time versus those students not in the capstone course.

Social identity has the power to modify students' behaviors; consequently, it is important to understand how community college students view themselves in relation to being students. This information may shed light on why some students perform well, whereas others do not. One aspect of being a student in community college is the emphasis on attending college in order to gain employment. Becoming eligible for future careers through education is an important factor for community college students. As such, it is important to understand how students identify with their future careers. I predicted that community college students would focus on the goal of obtaining jobs more than they would focus on the experience of being a student.

I hypothesized that students with high levels of college student social identity were more likely to earn higher GPAs and were more likely to remain in school than those with low levels of identity.

**Hypothesis 15**. Students with high levels of college student social identity will have higher GPAs than students with low levels of social identity.

**Hypothesis 16**. Students with high levels of college student social identity will have higher retention rates than students with low levels of social identity.

## Self-Efficacy

Self-efficacy is an individual's belief that he or she can achieve in a specific situation (Bandura, 1977; Luszczynska, Scholz, & Schwarzer, 2005). Researchers have studied this concept in many contexts, and through several social-psychology perspectives such as social learning theory, self-concept theory, attribution theory, and social cognitive theory. Bandura (1977) stated that those with high levels of self-efficacy believe that they can master difficult tasks instead of feeling as if they should avoid those difficult tasks.

As stated earlier, community college students face many challenges. The existing literature indicates that students' perceptions of difficult tasks and the students' self-perceptions that they would not be able to succeed in those situations negatively affected their outcomes. On the basis of the literature, I hypothesized that there was a positive relationship between self-efficacy, a fixed trait, and student performance. I also hypothesized that self-efficacy would interact with psychological variables (motivation, self-regulation, interpersonal social support, perceived social support, student social identity, and organizational identity) to affect the outcomes of GPA and retention.

**Hypothesis 17**. The strength of the positive relationship between the psychological variables and GPA will be stronger when self-efficacy is high than when it is low.

**Hypothesis 18**. The strength of the positive relationship between the psychological variables and retention will be stronger when self-efficacy is high than when it is low.

## Grit

Grit is the perseverance and passion for a long-term goal, and it is often used to describe highly successful people (Duckworth & Quinn, 2009). Grit is stable, meaning that grit levels stay relatively similar over time and are maintained by the individual. Thus, there is no need for

immediate feedback to sustain grit. Those with high grit are able to uphold their resolve despite adversity and long periods of failure because they are more focused on achieving their long-term goals than on the trials they must endure to complete their objectives.

Empirical evidence suggested that there is a positive relationship between grit and academic performance. Researchers found that 12-year-old spelling bee students with more grit deliberately practiced more than their less gritty counterparts. In addition, deliberate practice fully mediated the relationship between grit and spelling performance (Duckworth, Kirby, Tsukayama, Berstein, & Ericsson, 2011).

Community college students must be resolute throughout their academic careers as they simultaneously work, raise families, and participate in their communities. These challenges can stop people from attaining their goals, so grit is important to make it through some of the trials. Grit is a stable trait, and I expected it to interact with psychological variables such as motivation to predict student outcomes. I predicted that students' levels of perseverance over time would impact the way that they responded to factors such as student social identity and motivation.

**Hypothesis 19**. The strength of the positive relationship between the psychological variables and GPA will be stronger when grit is high than when it is low.

**Hypothesis 20**. The strength of the positive relationship between the psychological variables and retention will be stronger when grit is high than when it is low.

**Ability, Hours Studied, and Hours Worked**

Ability, hours studied for school, and hours worked at an occupation outside of school were variables that I thought would interact with the psychological factors. I used the variables as moderators throughout the model in order to examine the possibility of boundary conditions due to ability, hours studied, and hours worked.

## Method

I used multiple linear regression analysis to determine how student retention and GPA were affected by the following variables as measured by self-report surveys: academic motivation (external and internal), self-regulation, student social identity, organizational identity, interpersonal support, perceived social support from family, self-efficacy, and grit. I used ability (as measured by test scores), hours studied, and hours worked as moderators and controlled for gender and race because those variables were likely to influence student retention and performance.

## Participants

Participants for this study were from the same population used in Papers 1 and 2, with data spanning the years 2008-2012; however, the sample for this paper was collected and classified separately from that of the previous papers. I sampled students who were right above and below the remedial English cut-off score ($\pm$ 10 points from the remedial cut-off score). In addition, those students who scored $\pm$ 2 points from the remedial cut-off score on the ACT in both reading and writing were added to the sample. I completed the sampling schema by adding a randomly selected group of students from each decile of test scores. I chose to sample in this manner because I wanted to obtain a sample of students within the range of interest (right above and below the remedial cut-offs) and I wanted the opportunity to include non-remedial students, to introduce variability within the sample. I recruited 1,847 community college students via email to participate in this survey study. There were 149 participants who responded, with more females than males (42 males, 75 females, 32 nonresponses for gender), an average age of 21(*SD* = 6.87), an average GPA of 2.76, and an average Compass score of 60.4. There were 65 White

students, 53 non-White students, and 31 nonresponses. The majority of the sample came back to school the following semester ($N$ = 142) while only 7 were not retained (see Table 2).

I used chi-square tests and *t*-tests to determine how the group of participants compared to the sample of students exposed to the study for key variables: gender, age, race, GPA, and retention. These tests indicate whether the participants who took the survey are representative of the sample of students emailed on key variables. I used a chi-square analysis to assess gender, race, and retention. The gender ratio in the respondents was not comparable to the sample (see Table 2). The sample had a male-to-female ratio of 92:100, whereas the respondents used in this paper had a male to female ratio of 56:100. There was no differences in the race variable across the respondents and sample (see Table 3). I found that retention was not comparable across the respondents and sample in that more of the students who responded were retained than were retained in the sample (see Table 4).

I used a *t*-test analysis to assess GPA and age. Grade-point average was not comparable across the respondents and sample (see Table 5): the grade-point average of respondents was less than the grade point average of students in the sample. Age did not differ significantly between the sample and respondents (see Table 6).

**Procedures**

Students chosen by my sampling method received an electronic link via email requesting that they complete a survey about their experiences as students. They received the link between late November 2013 and early December 2013. Students were allowed to participate in the study if they were enrolled in the community college as first-time students and if they were over the age of 18. They were asked to sign a consent form in order to proceed. They answered a battery of psychological questions, as well as some social network and demographic questions. The

questionnaire took approximately 15-20 minutes for each student to complete. Each participant received a $10 Amazon gift card. Their survey answers were linked with their year GPA and their enrollment status for the following school year by linking their student identification numbers on the archival data sheet to the matching identification number on the survey. This study was approved by the study site's Institutional Review Board, as well as the research university's Institutional Review Board.

**Measures and Materials**

I used survey scales that measured key constructs of interest. I used a combination of existing and validated scales as well as scales that I modified to fit the current study (see Appendix B). The survey items were administered in a randomized order to each participant.

**Academic motivation**. I used two subscales from the Academic Motivation Scale (Vallerand, Blais, Brière, & Pelletier, 1989) to assess students' levels of motivation towards their education. I used two subscales from within the overall scale: four items for external motivation and four items for internal motivation (see Appendix B). I asked participants to think about the reasons they attended college for both the external and internal items (e.g., "Because with only a high-school degree I would not find a high-paying job later on," "Because I experience pleasure and satisfaction while learning new things;" 1 = *strongly disagree,* 5 = *strongly agree*). Items were scored and averaged, and a high score indicated high academic motivation, whereas a low score indicated low academic motivation (overall Cronbach's $\alpha$ = .82; external motivation Cronbach's $\alpha$ = .77; internal motivation Cronbach's $\alpha$ = .89). Cronbach's alpha is a reliability statistic that indicates the consistency and intercorrelations between each scale item. A satisfactory statistic is .60 and above (Gliem & R. Gliem, 2003).

**Self-regulation**. I used the Self-Regulation Scale (Pintrich et al., 1994) to measure students' metacognitive strategies for planning, monitoring, and modifying their thinking. The 9-item scale assesses students' awareness of their ability to plan and monitor their academic behaviors (e.g., "I ask myself questions to make sure I know the material I have been studying," 1 = *strongly disagree,* 5 = *strongly agree*). Items were scored and averaged, and a high score indicated high self-regulation, whereas a low score indicated low self-regulation (Cronbach's $\alpha$ = .74).

**Perceived social support**. I measured students' perceptions of social support from their family members by using the Perceived Social Support Scale (Zimet et al., 1988). The 12- item scale measures students' perception of the social support that they receive, particularly from their families (e.g., "There is a special person who is around when I am in need," 1 = *strongly disagree,* 7 = *strongly agree*). Items were scored and averaged, and a high score indicated high perceived social support, whereas a low score indicated low perceived social support (Cronbach's $\alpha$ = .95).

**Interpersonal social support.** The Interpersonal Social Support Evaluation List (ISEL) measures availability of social support (Cohen, Mermelstein, Kamarck, & Hoberman, 1985). The 12-item scale assesses students' feelings of being supported (e.g., "If I wanted to go on a trip for a day, it would be hard to get a person to go with me," 1 = *strongly disagree,* 7 = *strongly agree*). The four subscales were belonging, tangible aid, self-esteem, and appraisal. Belonging is defined as perceived availability of people one can do things with. The tangible subscale is perceived availability of concrete help. The self-esteem subscale is perceived ability to have positive outcomes when comparing one's self to others. The appraisal subscale is perceived ability to be able to talk with someone about problems. Items were scored and averaged, and a high score

indicated high social support, whereas a low score indicated low social support (Cronbach's $\alpha$ = .84).

**Student social identity.** I measured social identity by using the Collective Self Esteem Scale (Luhtanen & Crocker, 1992). The scale has four subscales: membership esteem, public collective self-esteem, private collective self-esteem, and importance to identity. I elected to use the importance to identity scale, as I was most interested in the identity items that assess the importance of social group membership to a person's self-concept. (e.g., "Overall, being a student has very little to do with how I feel about myself," 1 = *strongly disagree,* 7 = *strongly agree*). I modified these items to pertain to self-esteem as a student. In addition, I added items to measure students' identity towards their future careers (e.g., "The career that I will have in the future reflects who I am," 1 = *strongly disagree,* 7 = *strongly agree*) as well as their identity towards being students (e.g., "I can easily be viewed as a college student because of my actions," 1 = *strongly disagree,* 7 = *strongly agree*). Items were scored and averaged, and a high score indicated high student social identity, whereas a low score indicated low student social identity (Cronbach's $\alpha$ = .71).

**Organizational identity.** I used the Organizational Identification Scale (Mael & Ashforth, 1992) to measure how students defined themselves in terms of their membership in an organization (e.g., "When someone talks badly about my school, it is like they talk badly about me," 1 = *strongly disagree,* 7 = *strongly agree*). Items were scored and averaged, and a high score indicated high organizational identity, whereas a low score indicated low organizational identity (Cronbach's $\alpha$ = .88).

**Self-efficacy.** I used the Self Efficacy Scale to evaluate students' beliefs that they can accomplish a desired result (Chen, Gully, & Eden, 2001). The 8-item scale examines

participants' amount of efficacy (e.g., "How confident are you in your ability to do your job well?" 1 = *strongly disagree,* 7 = *strongly agree*). Items were scored and averaged, and a high score indicated high self-efficacy, whereas a low score indicated low self-efficacy (Cronbach's $\alpha$ = .92).

**Grit.** I utilized the Grit Scale to evaluate students' ability to persevere through long-term goals (Duckworth & Quinn, 2009). The 12-item scale examines levels of perseverance (e.g., "I have overcome setbacks to conquer an important challenge," 1 = *strongly disagree,* 7 = *strongly agree*). Items were scored and averaged, and a high score indicated high grit, whereas a low score indicated low grit (Cronbach's $\alpha$ = .70).

**Demographics.** I asked demographic questions at the end of the survey. These questions pertained to participants' sex, race, household income, personal income, birth year, amount of dependents claimed, and how many miles away from campus they lived. Other questions focused on how many hours per week were dedicated to studying and working at paying jobs (see Table 1).

## Results

I calculated the mean, range, and standard deviation for each variable analyzed in this paper (see Table 1). I proposed and tested a model that included main effects and interactions between ability, self-efficacy, grit, ability, hours worked, and hours studied and the main effects (see Figure 1). I analyzed the main effects of the psychological factors on GPA and retention as shown in Figure 1.

### Main Effects

**GPA regressed on overall academic motivation.** The first set of regression analyses focused on overall motivation (the sum of the external and internal scales) and its relationship

with GPA. Descriptive statistics for overall academic motivation, external motivation, and internal motivation are presented in Table 7. Correlations are presented in Table 8. The Cronbach's alpha statistics for each scale was above .70, which indicates acceptable reliability. I conducted multiple linear regression analysis to determine if race and gender predicted student GPA (see Table 9). These results are presented in Model 1 in Table 9. I found that race did not predict student GPA, but gender significantly predicted GPA, ($\beta$ = -.41, $p$ < .05). The results showed that women had higher GPAs than men. I conducted the next regression to determine if race, gender, and the interaction of race and gender predicted student GPA (see Model 2 in Table 9). No coefficients in this model or in models 3 or 4 were significant. The final model examined if race, gender, the interaction of race and gender, ability, motivation, and the interaction of ability and motivation predicted student GPA. As demonstrated by Model 5 in Table 9, ability significantly predicted GPA ($\beta$ = .08, $p$ < .01); motivation significantly predicted GPA (β = 1.05, p < .1); and the interaction of ability and motivation significantly predicted GPA ($\beta$ = -.02, $p$ < .01). The overall model was statistically significant, $F(6, 74) = 2.47$, $p$ < .05. These results indicate that students with higher ability obtained higher GPAs and students with higher motivation obtained higher GPAs. These main effects were qualified by a significant interaction between motivation and ability.

This interaction is depicted in Figure 2. As Figure 2 shows, increases in motivation were associated with increasing GPA for low-ability students and decreasing GPA for high-ability students. I used planned contrasts to test which of the four cells differed from each other with regards to the combinations of high and low motivation and ability. Those with high ability and low motivation obtained higher GPAs than those with high ability and high motivation, low ability and high motivation, and low ability and low motivation (see Figure 3).

**GPA regressed on external academic motivation.** The second set of regression analyses focused on external motivation and its relationship with GPA. I conducted regression analyses predicting GPA from race, gender, the interaction between race and gender, ability, motivation and the interaction of ability and motivation; these analyses yielded results similar to those of the overall motivation models (see Table 10). The difference for this set of analyses was the use of external motivation rather than the sum of external and internal motivation in the model. The final model (see Model 5 in Table 10) revealed that ability significantly predicted GPA ($\beta$ = .09, $p$ < .05); external motivation significantly predicted GPA, ($\beta$ = 1.09, $p$ < .10); and the interaction of ability and external motivation significantly predicted GPA ($\beta$ = -.03, $p$ < .05). The interaction is plotted in Figure 4. As can be seen from Figure 4, external motivation decreased GPA for high-ability students and increased GPA for low-ability students. Lastly, I conducted contrast tests to investigate the relationship between external motivation and ability (see Figure 5). Students with low levels of external motivation and high levels of ability had higher GPAs than students with low levels of external motivation and low ability.

**GPA regressed on internal academic motivation.** The third set of regression analyses focused on internal motivation and its relationship with GPA. The difference for this set of analyses was the use of internal motivation in the model. The final model (see Model 5 in Table 11) predicted GPA from race, gender, the interaction of race and gender, ability, internal motivation, and the interaction of ability and internal motivation. The analysis showed that internal motivation marginally predicted GPA ($\beta$ = .04, $p$ < .10), and the interaction of ability and internal motivation significantly predicted GPA ($\beta$ = -.018, $p$ < . 01).
The interaction, which is depicted in Figure 6, is the same pattern as that shown earlier for overall motivation or external motivation. I conducted contrast tests to investigate the

relationship between internal motivation and ability (see Figure 7). Students with low levels of internal motivation and high levels of ability had higher GPAs than students with low levels of internal motivation and low ability and students with high levels of internal motivation and high levels of ability. In addition, students with high levels of internal motivation and low levels of ability had higher GPAs than students with low levels of internal motivation and low levels of ability.

**Retention regressed on overall motivation.** The first set of regression analyses focused on overall motivation (both the external and internal scales) and its relationship with GPA. The same sequence of regressions that was performed predicting GPA was performed to predict retention. Neither race nor gender (see Model 1 in Table 12) nor the interaction of race and gender (see Model 2 in Table 12) predicted retention. Model 4 examined if race, gender, the interaction of race and gender, ability, and motivation predicted retention. The model was statistically significant and I found that motivation predicted retention ($\beta = .08$, $p < .05$): more motivated students were more likely to return than less motivated students. When the interaction between motivation and ability was added to the model (see Model 5 in Table 12), it was not statistically significant. Thus, Model 5 does not add significant explanatory power over Model 4. We adopt the more parsimonious Model 4, which shows that more motivated students are more likely to return to school.

**Retention regressed on external motivation.** The second set of regression analyses focused on external motivation and its relationship with retention (see Table 13). Results for retention regressed on race, gender, the interaction between race and gender, ability, external motivation, and the interaction between ability and external motivation yielded results similar to those of the overall motivation models. The difference for this set of analyses was the use of

external motivation rather than overall motivation in the model. I conducted a regression model to determine if race, gender, the interaction of race and gender, ability, and external motivation predicted retention. The model (see Model 4 in Table 13) was statistically significant, and I found that external motivation predicted retention, $\beta = .09$, $p < .05$. The interaction between external motivation and ability was not statistically significant (see Model 5 in Table 13). Thus, the retention results for external motivation were very similar to the results for overall motivation.

**Retention regressed on internal motivation.** The third set of regression analyses focused on internal motivation and its relationship with retention. The difference for this set of analyses was the use of internal motivation in the model. As Table 14 indicates, in contrast to the results for external motivation, internal motivation was not a statistically significant predictor of retention.

**Motivation results overview.** Academic motivation plays a significant role in student GPA outcomes. Students with high ability and low motivation had higher GPAs than students with high ability and high motivation, students with low ability and high motivation, and students with low ability and low motivation. The results for GPA were the same for external and internal motivation. By contrast, retention was affected only by external motivation. Students with high external motivation were more likely to be retained than students with low external motivation.

I tested the remaining independent variables (self-regulation, social support, interpersonal social support, organizational identity, and student social identity) to determine their effects on GPA and retention. The models did not yield any statistically significant results (see Tables 15-23). I also tested the moderator variables in the model (grit and efficacy) to determine if they had

an effect on the main effects. The results showed no effects for the moderating variables (see Tables 24-55).

**Moderated Effects**

**Effects of hours studied and worked on motivation.** I found it puzzling that high-motivation and high-ability students performed worse than those with low motivation and high ability. In order to pursue the puzzling finding, I examined the amount of study hours reported for each student in relation to motivation and ability. Using study hours as the dependent variable, I found that the relationship between hours studied and the interaction of ability and academic motivation was not statistically significant. However, a model using GPA as the dependent variable found results showing that the interaction of ability, hours studied, and academic motivation had a positive and statistically significant relationship with GPA, $\beta = .001$, $p < .05$ (see Table 24). Thus, students who were highly motivated and had high ability and studied many hours did better than their counterparts lacking these characteristics. The same pattern occurred for external and internal motivation and GPA (see Tables 26 and 28).

The relationship between the interaction of study hours, ability and motivation on retention was also positive and statistically significant, $\beta = .004$, $p < .05$ (see Table 25). The relationship between study hours and motivation on retention was positive and significant when there was a high level of ability.

I hypothesized that the high-ability and highly motivated students might take on more responsibility than others. This responsibility could manifest through longer work hours on a job outside of school. However, results showed that the relationships between GPA and the interaction of job hours and overall or external motivation were not statistically significant (see Tables 30 and 32). The interaction between job hours and internal motivation negatively

predicted GPA (see Table 34). As internal motivation and hours worked on a job outside of school increased, GPA decreased. Thus, students who are highly motivated and put in considerable hours on a job outside of school have lower GPAs than other students. There were no statistically significant findings for job hours and retention (see Tables 31, 33, 35).

There were several moderated effects that I tested per the theoretical model shown in Figure 1. However, the interaction models did not yield significant results (see Tables 36-55).

**Paper 3 Discussion**

Psychological variables are integral to further understanding behavior, and much can be learned from studying these variables in a community college context. Findings from this paper provide a startling insight about motivation (see Table 56 for an overview of results). The results indicated that being highly motivated and having high academic ability hurts students' GPAs. This result might be due to highly motivated and smart students taking on more difficult course loads than students who are smart but not as motivated.

Another interesting finding pertained to the combination of study hours and motivation and its effect on retention. Students who studied longer than others and were more motivated than others were more likely to return to the community college. This may be due to their aspirations to enroll in a 4-year college after one semester of community college. It is typical for students to use community college credits to bolster a 4-year college transcript. This result might be capturing those students.

This research contributes to existing literature about motivation by providing boundary conditions. It is not accurate to simply state that motivation improves performance. That finding was true for low ability but not high ability students in our sample. High motivation might drive high ability students to take heavier course loads with more challenging classes, which could

decrease their GPA. This issue seems worthy of future research. High levels of motivation might prompt students to arrange additional work outside of school, which could serve as a distraction from obtaining high grades and returning to school. Indeed I found that students who were highly motivated and worked a lot on a job outside of school performed worse than other students. Although these outcomes are not inherently deleterious to students, educational policy makers might count the drops in GPAs and low retention rates as negative. However, I suggest that policy makers and institutional researchers probe the reasons that students might not be returning to school or that their grades dropped. This additional insight would allow educators to tailor their interventions based on students' direct needs.

## General Discussion

Community colleges are unique organizations and educational environments to study because of their inclusive nature. The colleges' comprehensive attributes are ideal for executing the mission of providing education for all, but there are challenges associated with being so inclusive. One of the primary challenges is teaching students with varying abilities, experiences, and backgrounds. Community colleges attempt to mitigate differing abilities by offering remedial coursework for those in need of additional academic preparation. However, empirical evidence indicates that remedial education does not actually impact student performance (Martorell & McFarlin, 2011). One of the ways that educators respond to remedial education's lack of effectiveness is by developing metacognitive courses designed to teach students how to succeed academically (Jenkins et al., 2009). These metacognitive courses are ubiquitous in the community college system, yet their impact has not been empirically studied. Thus, educators and students are still unaware of the courses' effects. My contribution to the existing literature on community college performance is my analysis and interpretation of empirical data that speak to

the impact of metacognitive courses, demographic factors, and psychological variables on student performance.

**Discussion of Results**

The first paper studied the effectiveness of a metacognitive course tailored to bolster remedial students' academic outcomes. Prior research in community colleges focused on the impact of remedial education, but no empirical studies specifically examined the effect of metacognitive course interventions for remedial students. This dissertation provides empirical evidence about the effectiveness of remedial education. The evidence indicates that the metacognitive course was ineffective. These results question the practices that community college educators follow. The practice of providing at-risk students with coursework that teaches them how to matriculate through college does not appear to aid in decreasing attrition. It is important to note, however, that the analysis of the metacognitive course was hampered by data limitations detailed in Chapter 1. Hence, more work is needed in evaluating the metacognitive course before firm conclusions can be drawn.

In order to investigate other factors that differentiated between successful students and unsuccessful students, I studied the impact of demographic factors on student performance. The second paper examined the relationship between demographic variables and student performance. Researchers have provided evidence explaining the effects of demographic factors such as age, gender, race, and financial standing on GPA and retention (Astin, 1993; Lane & Porch, 2002). However, these findings relate to the traditional, 4-year college context. I chose to extend the existing work and contribute empirical findings germane to the community college context. As detailed in Paper 2, I found statistically significant relationships between several demographic factors and performance. GPA and retention were impacted by gender, age, race,

dependency status, income, and financial aid. The results showed that White students had higher GPAs and retention rates than non-White students; women had higher GPAs and retention rates than men; dependents had higher average retention rates than independents; young independent students had lower GPAs than dependent students; high income students had higher GPAs and retention rates than students with low income; students with high amounts of financial aid had lower GPAs than those with low amounts of financial aid; and students with high amounts of financial aid had higher retention rates than students with low amounts of financial aid.

The third paper focused on the impact of psychological factors on GPA and retention. While I examined several psychological variables, academic motivation was the only variable that yielded significant results. I found an interaction between academic motivation and ability as it relates to GPA. Students with low levels of academic motivation and high levels of ability obtained higher GPAs than other students. This puzzling finding could occur because students with high ability and motivation feel ambitious and take on high amounts and levels of coursework so that they can feel academically challenged. The challenge would require a significant amount of work from the students, and a high GPA might not be likely, given their rigorous curriculum. Another explanation for the finding is that highly motivated high-ability students are overconfident about their aptitude and might not seek additional tutoring and guidance when required. This overconfidence might handicap them because they might be less prone than other students to ask for help. In addition to the results for GPA, I found that external motivation was positively and significantly related to retention. These findings supported my hypotheses that motivated students would persist over time. Students who are academically motivated by external factors will want to come back to school to continue their education.

## Implications

The results found in this dissertation provide empirical explanations for the impact of metacognitive courses, demographic factors, and psychological variables on performance. Many implications can be drawn from these results, and the implications could offer tremendous insights to educators and policy makers.

The research in Paper 1 demonstrated that the metacognitive course had no effect on retention. These results suggest that remediation and metacognitive courses are neither helping nor hurting student performance; however, I believe that further investigation is needed to better determine whether remediation and metacognitive courses impact student performance. As I discuss in Paper 1, there is much that educators can do to implement interventions in a way that facilitates evaluation of their effectiveness.

Results from Paper 2 provided a bevy of information indicating how student demographics impact GPA and retention. Educators must understand that academic performance can differ by demographic group.

The main results found in Paper 3 were about academic motivation and performance. Thus, implications can also be drawn from Paper 3 concerning the interesting results about academic motivation and performance. Ability is not enough to obtain high GPAs and retention rates. The participants in Paper 3 showed that having low ability but high motivation allowed for a high GPA. Educators should develop seminars and host speakers to talk to students about the importance of motivation. These speakers can focus on how motivation manifests in an educational context, how to maintain motivation throughout each semester, and how to harness motivation to achieve academic success.

My research contributes to both the psychology and education fields because of the study design. I was able to link students' behavioral outcomes with psychological measures, which allows for the ability to predict the relationship between student perceptions and outcomes.

In addition to making academic contributions, this research has the potential to create a societal impact. The U.S. economy needs more community college graduates, but more than half the student population fails to graduate. My research identifies factors that contribute to students' inability to complete degrees; in turn, educators and advisors can mitigate those factors. Community college educators and academic advisors will be more informed about the factors that impact student achievement. This information will enable them to better understand how students conceptualize their experiences while in school, thus providing educators the opportunity to assist students through challenges such as limited resources, lack of role models who successfully completed school, and time constraints.

**Limitations**

This dissertation has some limitations in terms of the method and data collection. For researchers performing RD analysis, steps should be taken in conjunction with the research site to investigate the discontinuous running variables in order to be compliant with RD assumptions. Paper 3 was limited primarily due to a small sample size. It was my intent to recruit enough participants that I would have enough statistical power to analyze the difference in psychological factors between students within the metacognitive course and those not in the course. The unexpectedly low response rate prohibited me from testing this difference. I believe that the cause of the low response rate was the fact that students in this college typically do not respond to email surveys.

**Future Research**

A greater depth of information could have been obtained by collecting surveys on campus in a centralized location. Researchers should be mindful of the most convenient way for student participants to answer surveys. If researchers had the opportunity to collect large data samples, they could glean a comprehensive depiction of how metacognitive courses impact psychological variables.

A compelling direction for future research is to understand how educators address and activate motivation in metacognitive courses. My results indicated that motivation impacted GPA. Although I discovered compelling results, I was unable to investigate the specific mechanisms of the metacognitive courses as they pertain to motivation. Further investigation is needed to explore the underpinning variables latent in the metacognitive courses that impact motivation.

In addition to investigating motivation, researchers can examine how the demographic variables interact with the mechanisms within metacognitive courses. I am curious to learn how students who typically perform poorly academically are influenced by metacognitive courses.

I encourage education researchers and organizational behavior researchers to investigate the unique characteristics that comprise community colleges. The clear distinctions between community college and traditional colleges are important to investigate. Community colleges provide a low barrier to entry, a wealth of academic majors and certificates, and the ability to create flexible academic schedules that fit around students' additional responsibilities. These opportunities are excellent for students; however, these same opportunities can also be challenges. The low entrance barrier means that students of all ability levels are in the same education system and potentially in the same courses. This variability of ability within the

classroom can be difficult for educators to accommodate. The numerous academic majors provide many course offerings that can be overwhelming to students attempting to navigate school. The complexity of course offerings can be a deterrent for retention and graduation. Students' accessibility to flexible schedules allows the potential for them to become contented with enrolling in few classes. The flexibility may encourage students to delay their graduation. These opportunities and challenges may manifest in psychological outcomes such as social identity and motivation. Researchers can investigate the boundary conditions germane to the community college setting.

Students must understand how to conceptualize their education as it pertains to their future. My finding that external – rather than internal – motivation increased the likelihood that students returned to school underscores the importance of external rewards in encouraging student persistence. Students are more likely to complete their education in a timely manner if they know how obtaining an education can positively impact their future careers. One way that students can better comprehend the effect of education is by learning about the opportunities, income, and career growth that an education can provide. Appreciating the long-term benefits of education may inspire students to obtain degrees.

**Conclusions**

My recommendation based on this research is for educators and researchers to further investigate whether remedial education and metacognitive courses impact student performance. It is clear from numerous literature sources that community colleges add value to society by educating the nation's workforce. However, it is less clear how to most effectively teach community college students. This dissertation is a step in the direction of understanding how interventions such as remedial coursework and metacognitive courses impact GPA and retention.

Results from the research do not provide evidence of impact of the interventions on student performance, but readers need to be mindful of the data limitations discussed in Paper 1. The results also suggest that there are several demographic variables and psychological variables that relate to high GPAs and retention rates. It would be interesting to design studies that manipulate some of the psychological variables that impact performance within the remedial and metacognitive courses to determine their effects.

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## Appendix A

## Metacognitive Course

June 5, 2012
Heather Wathington Ph.D.
Achieving the Dream

### Course Overview

(STR:050) is a three credit hour course designed to enhance students' successful transition to Community College X by building upon foundational knowledge they acquire in New Student Registration Workshop and New Student Orientation. Students engage in active learning activities designed to increase knowledge, strategies, and skills directly related to being a successful STLCC student. Students also gain experience with technology used in many higher education settings. Any student is welcome to take this course! All students who place into RDG:020 or RDG:030 or ENG:020 or ENG:030 are required to take STR:050.

In the STR:050 course, students focus on five themes related to success:

1. Know yourself
2. Know your environment, then . . .
3. Plan
4. Monitor
5. Adjust

STR:050's learning activities help students explore a wide range of topics as they gain expertise with these five themes. Topics include professionalism, time management, career exploration, diversity, goal setting and attainment, problem solving, self-assessment, the academic process, financing an education, brain-based learning, and others. Students advance through the novice, apprentice, and expert levels with these topics as they complete activities throughout the semester. As students complete STR050, they create a portfolio of exemplary activities to guide them toward success in their future courses.

COURSE PROFILE

1. **Course Title:** Metacognitive Course

2. **Course Number:** STR: 050

3. **Course Level:**. 001-079 Developmental courses

4. **Course Description**
    a. This course is designed to enhance students' knowledge, behaviors, and skills needed for successful transition to college.

1. **Credit Hours:** 3.00

2. **Weekly contact hours:**
    a. **Lecture Hours:** 3.00
    b. **Lab Hours:** 0.00
    c. **Studio Hours:** 0.00
    d. **Activity Hours:** 0.00
    e. **Clinical Hours:** 0.00
    f. **Workplace Learning Hours:** 0.00
    g. **Other Hours:** 0.00
3. **Requisites**
    a. Prerequisite: Students test into RDG:020 or RDG:030 or
    b. Prerequisite: Students test into ENG:020 or ENG:030 or
    c. Prerequisite: RDG 017 with a minimum grade of C and
    d. Prerequisite: RDG 016 with a minimum grade of C
4. **Upon successful completion of the course, the student will know or understand:**
    a. The components of self-awareness;
    b. The skills and attitudes necessary for success in college;
    c. The college environment;
    d. The application of time management and goal setting skills for academic success;
    e. How to build a program of study that aligns with career goals, personal interests and abilities;
    f. The need to integrate new knowledge and skills into all aspects of one's academic program;
    g. Behavior appropriate to varied college settings; and
    h. The importance of education as a life-long priority.

5. **Upon successful completion of the course, the student will demonstrate the ability to**

    a. **Foundational Knowledge**

        i. Identify career options, academic offerings, learning styles, personality types, characteristics of emotional intelligence, and characteristics of a healthy life style;

        ii. Identify personal finance skills needed for college completion;

        iii. Identify appropriate interaction with diverse populations in academic environment;

        iv. Describe goal setting, time management, decision making and problem solving;

        v. Identify technology resources and skills needed for academic success; and

        vi. Identify campus services and resources, and define academic terminology and processes.

    b. **Application**

        i. Access information about academic programs consistent with personal goals;

        ii. Demonstrate time management skills;

        iii. Design academic plan based on life and career goals, interests and abilities;

        iv. Use college services and resources related to academics, career planning and personal development;

        v. Use appropriate educational technology; and

        vi. Identify possible impediments to academic success and problem-solve solutions.

    c. **Integration**

        i. Explore and identify programs of study consistent with academic and career goals; and

        ii. Demonstrate the use of skills and strategies from this course in other courses.

d. **Human Dimension**

i. Establish a support network and participate in a community of learners;

ii. Work collaboratively to complete a project;

iii. Develop a personal profile including preferred learning styles, personality type, personal finances, emotional intelligence and health and wellness;

iv. Develop individual success strategies based on personal characteristics;

v. Demonstrate responsibility for individual success; and

vi. Demonstrate appropriate interaction with diverse populations in all college settings.

e. **Caring**

i. Recognize value of individual contributions to the community of learners;

ii. Define value of co-curricular activities; and

iii. Implement own academic success plan.

f. **Learning to Learn**

i. Update the academic success plan to identify resources, services and individuals needed in future semesters to meet student's own goals.

g. **Minimum Requirements**

i. Learning log

ii. Semester Success Plan

iii. Academic Success Plan

iv. Weekly Success Plan

v. Behavior expectations log

vi. Team project

## Appendix B

*All measures will use the following scale:*

| Strongly disagree | Tend to disagree | Neither agree nor disagree | Tend to agree | Strongly agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

**Academic Motivation Scale (College Version)**

*Using the scale below, indicate to what extent each of the following items presently corresponds to one of the reasons why you go to college.*

Extrinsic Motivation-External Regulation

1. Because with only a high-school degree I would not find a high-paying job later on.
8. In order to obtain a more prestigious job later on.
15. Because I want to have "the good life" later on.
22. In order to have a better salary later on.

Intrinsic Motivation-To Know

2. Because I experience pleasure and satisfaction while learning new things.
9. For the pleasure I experience when I discover new things never seen before.
16. For the pleasure that I experience in broadening my knowledge about subjects which appeal to me.
23. Because my studies allow me to continue to learn about many things that interest me.

**Self-Regulation**

1. I ask myself questions to make sure I know the material I have been studying.
2. When work is hard I either give up or study only the easy parts.
3. I work on practice exercises and answer end of chapter questions even when I don't have to.
4. Even when study materials are dull and uninteresting, I keep working until I finish.
5. Before I begin studying I think about the things I will need to do to learn.
6. I often find that I have been reading for class but don't know what it is all about.
7. I find that when the teacher is talking I think of other things and don't really listen to what is being said.
8. When I'm reading I stop once in a while and go over what I have read.
9. 1 work hard to get a good grade even when I don't like a class.

**Collective Self-Esteem Scale (Identity as a student sub-scale)**

INSTRUCTIONS: You are a member of the community college student group. Please think about your membership and respond to the following statements on the basis of how you feel about the group and your membership in it. There are no right or wrong answers to any of these statements; we are interested in your honest reactions and opinions.

1. Overall, being a student has very little to do with how I feel about myself.
2. Being a student is an important reflection of who I am.
3. Being a student is important to my sense of what kind of a person I am.
4. In general, being a student is an important part of my self-image.

**Collective Self-Esteem Scale (Future profession sub-scale)**

1. The career that I will have in the future reflects who I am.

2. Being a professional in the future is an important part of my self-image.
3. My future career is an important part of my self- image.
4. I identify with the career that I will have in the future.
5. Overall, being a good professional in the future has very little to do with how I feel about myself.
6. I am most excited about using my school knowledge to do well in a future career.

**Interpersonal Support Evaluation List**

7. If I want to go on a trip for a day, it would be hard to get a person to go with me.
8. There is no one I share my fears with.
9. If I got sick, I could find a person to help me in my house.
10. There is a person I can talk with about my family.
11. If I want to go to a movie, I can find a person to go with me.
12. I know a person who can help me with troubles.
13. I do not get asked to do things with others a lot.
14. If I left for two weeks, it would be hard to find a person to watch my house.
15. I can find a person to eat lunch with me.
16. If I was stuck far away from home, I could call a person who could get me.
17. I could not find a person to help me if my family needed help.
18. It would be hard to find a person to help me move into a new home.

**Organizational Identity**

INSTRUCTIONS: You are a member of the St. Louis Community College. Please think about your membership and respond to the following statements on the basis of how you feel about the group and your membership in it. There are no right or wrong answers to any of these statements; we are interested in your honest reactions and opinions.

1. When someone talks badly about my school, it is like they talk badly about me.
2. I want to know what others think about my school.
3. When I talk about my school, I say 'we', not 'they'.
4. The school's wins are my wins.
5. When someone says nice things about my school, it is like they are saying nice things about me.
6. If a news story talks badly about my school, I feel hurt.

**Perceived Social Support**

1. There is a special person who is around when I am in need.
2. There is a special person with whom I can share my joys and sorrows.
3. My family really tries to help me.
4. I get the emotional help and support I need from my family.
5. I have a special person who is a real source of comfort to me.
6. My friends really try to help me.
7. I can count on my friends when things go wrong.
8. I can talk about my problems with my family.
9. I have friends with whom I can share my joys and sorrows.
10. There is a special person in my life who cares about my feelings.

11. My family is willing to help me make decisions.
12. I can talk about my problems with my friends.

**Self-Efficacy**

1. How confident are you in your ability to do your job well?
2. How confident are you that you can successfully overcome any challenges you face at your job?
3. How confident are you that at your job, you can succeed at most anything you set your mind to?

**GRIT**

1. I have overcome setbacks to conquer an important challenge.
2. New ideas and projects sometimes distract me from previous ones.*
3. My interests change from year to year.*
4. Setbacks don't discourage me.
5. I have been obsessed with a certain idea or project for a short time but later lost interest.*
6. I am a hard worker.
7. I often set a goal but later choose to pursue a different one.*
8. I have difficulty maintaining my focus on projects that take more than a few months to complete.*
9. I finish whatever I begin.
10. I have achieved a goal that took years of work.
11. I become interested in new pursuits every few months.*
12. I am diligent.

## Tables and Figures for Paper 1

Table 1

Descriptive Statistics

| Variables | All Data | 2008 to 2011 | 2012 to 2013 | Difference |
|---|---|---|---|---|
| Male | .470 (.50) | .467 (.5051) | .473 (.5050) | -.1101 (.01) |
| White | .469 (.51) | .467 (.5050) | .472 (.5050) | -.100 (.01) |
| Age | 21.46 (6.68) | 21.52 (6.64) | 21.31 (6.78) | .921 (.09)** |
| Retention | .585 (.49) | .58 (.49) | .59 (.49) | -.100 (.01) |
| English Placement Score Available | .424 (.43) | .179 (.41) | .66 (.47) | .113 (.01)*** |
| No Remedial English Courses | .585(.48) | .737 (.48) | .434 (.47) | .103 (.001)*** |
| Reading Placement Score Available | .834 (.42) | .80 (.40) | .868 (.47) | .112 (.01)*** |
| No Remedial Reading Courses | .399 (.950) | .392 (.949) | .388 (.949) | .004 (.101) |
| Count | 29988 | 21436 | 8552 | |

*Note*. Standard errors are in parentheses, *** $p < .01$, ** $p < .05$, * $p < 0.1$.

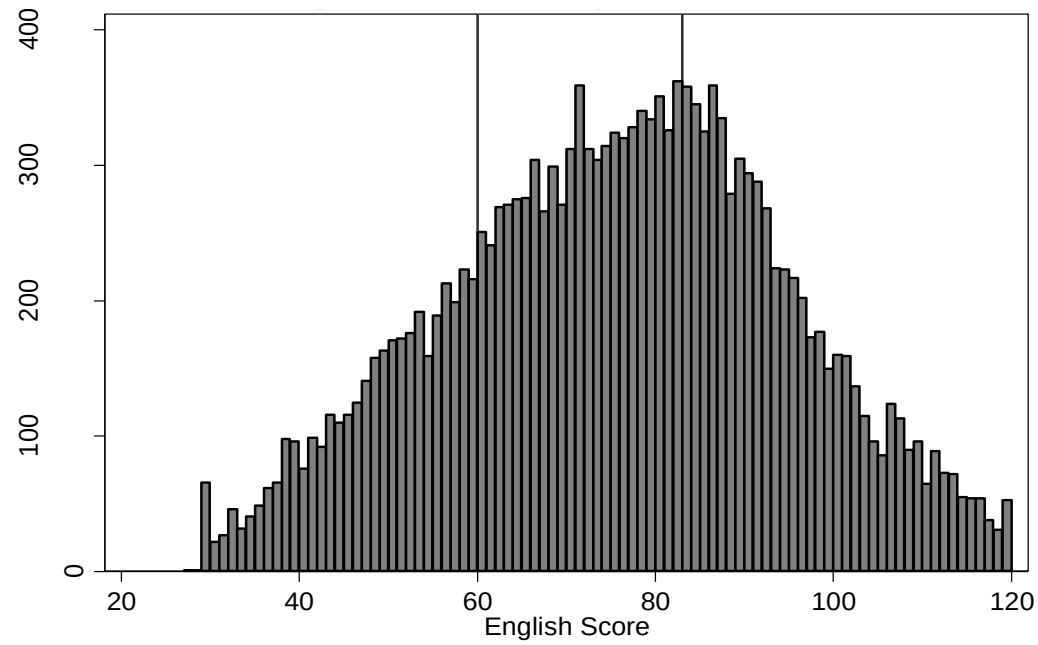



*Figure 1.* English Score Histogram, 2008-2011.

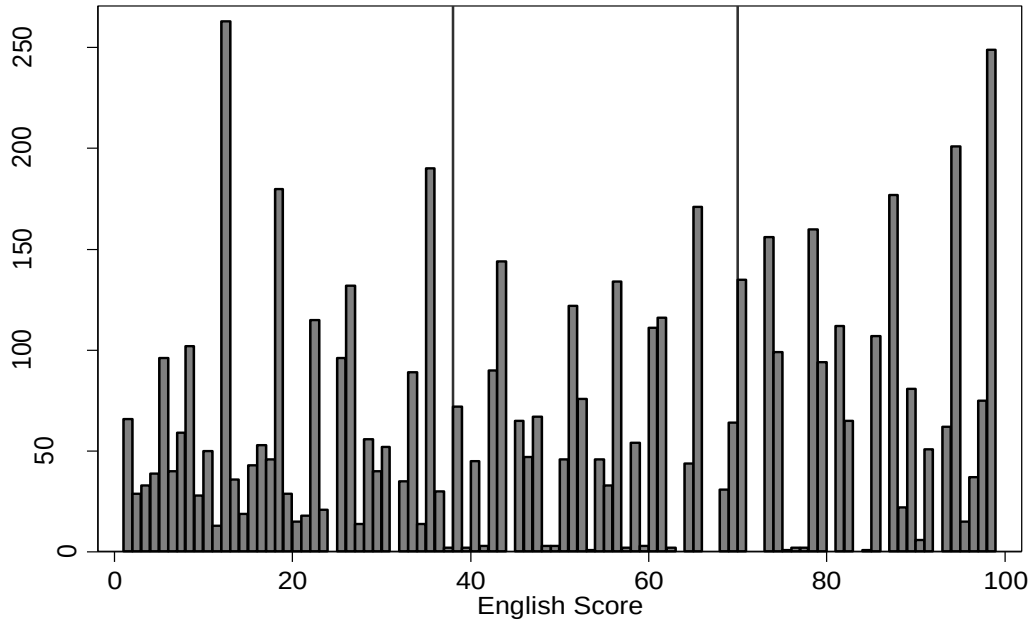



*Figure 2.* English Score Histogram, 2012-2013.

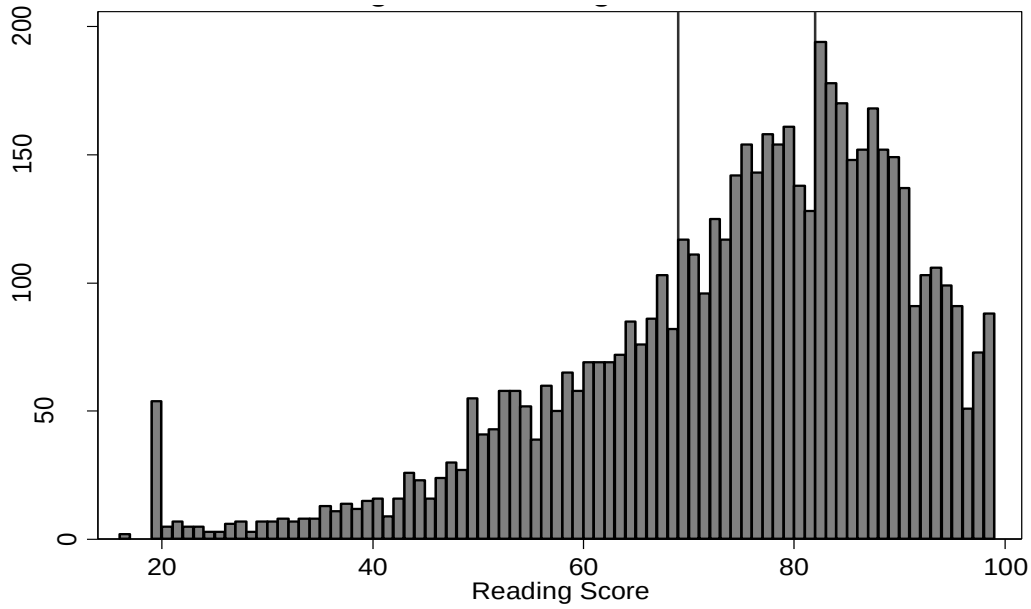



*Figure 3.* Reading Score Histogram, 2008-2011.

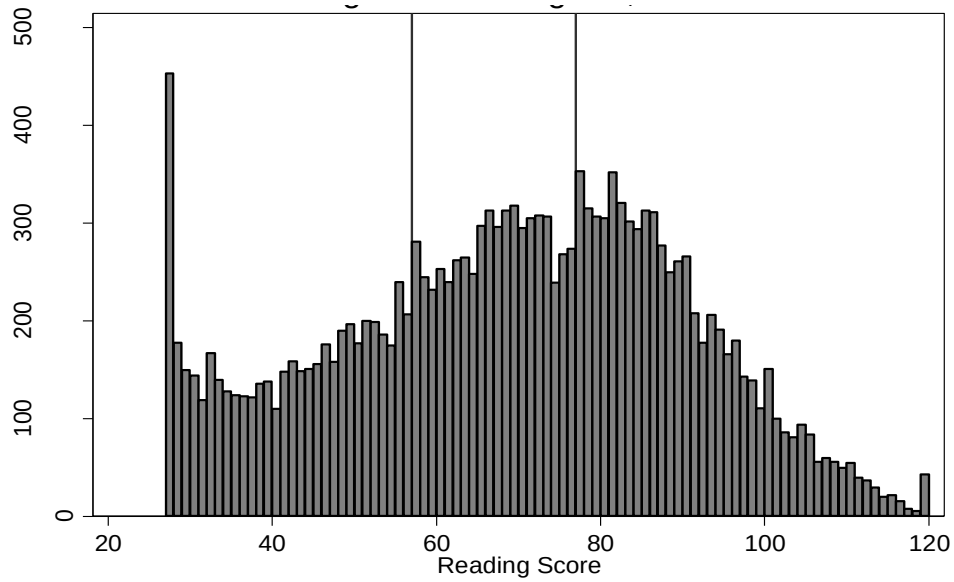



*Figure 4.* Reading Score Histogram, 2012-2013.

Table 2

McCrary Test Results

| Forcing Variable | Years | Cut-off | Discontinuity Estimate (log difference in heights) |
|---|---|---|---|
| English | 2008-2011 | Upper | .505 (.05) |
| English | 2008-2011 | Lower | .10 (.05)** |
| Reading | 2008-2011 | Upper | .25 (.05)*** |
| Reading | 2008-2011 | Lower | .872 (.07)*** |
| English | 2012-2013 | Upper | .32 (.08)*** |
| English | 2012-2013 | Lower | -.802 (.08) |
| Reading | 2012-2013 | Upper | .22 (.06)*** |
| Reading | 2012-2013 | Lower | .12 (.08) |

*Note*. Standard errors are in parentheses, *** $p < .01$, ** $p < .05$, * $p < 0.1$.

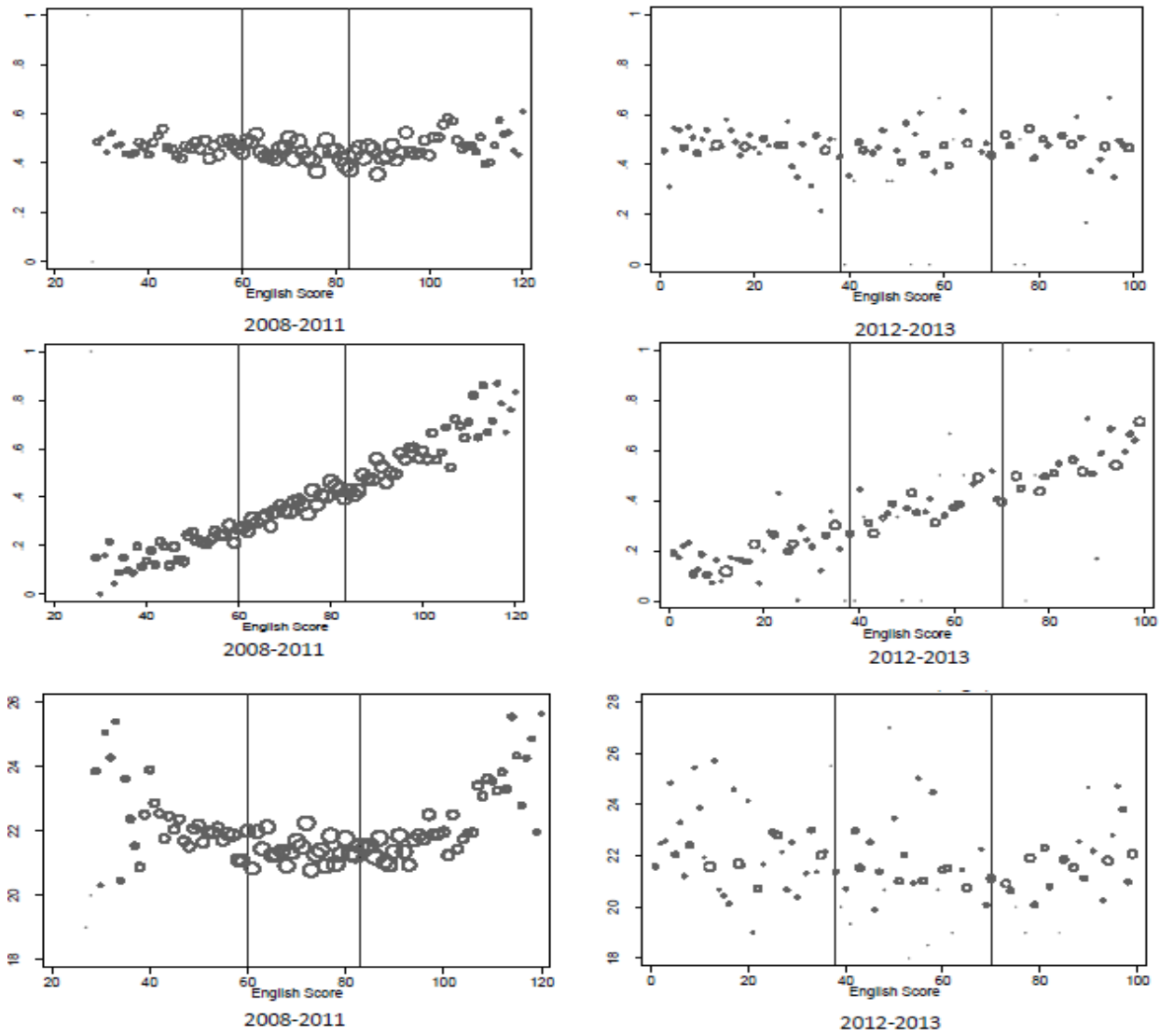



*Figure 5.* Proportion of Male, White, and Average Age.

Table 3

T-Test Analysis for 2008 to 2013; Outcome = Retention; All Data

| Years | Cut-off | Variable | 5 Below | 5 Above | Difference | Significant |
|---|---|---|---|---|---|---|
| 2012-2013 | Upper | Male | .48 (.50) | .48 (.50) | .0017 (.04) | No |
| 2012-2013 | Upper | White | .47 (.50) | .45 (.50) | .025 (.04) | No |
| 2012-2013 | Upper | Age | 20.76 (6.10) | 20.92 (.29) | -.152 (.47) | No |
| 2012-2013 | Lower | Male | .47 (.50) | .43 (.50) | .034 (.04) | No |
| 2012-2013 | Lower | White | .28 (.45) | .32 (.47) | -.042 (.04) | No |
| 2012-2013 | Lower | Age | 22.30 (8.14) | 21.86 (7.09) | .432 (.68) | No |
| 2008-2011 | Upper | Male | .44 (.50) | .43 (.50) | .01 (.02) | No |
| 2008-2011 | Upper | White | .43 (.50) | .43 (.50) | .003 (.02) | No |
| 2008-2011 | Upper | Age | 21.32 (6.00) | 21.50 (6.29) | -.18 (.21) | No |
| 2008-2011 | Lower | Male | .47 (.50) | .48 (.50) | -.00 (.02) | No |
| 2008-2011 | Lower | White | .25 (43) | .28 (.45) | -.03 (.02) | No |
| 2008-2011 | Lower | Age | 21.52 (6.39) | 21.69 (6.74) | -.17 (.28) | No |

*Note*. Standard errors are in parentheses, *** $p < .01$, ** $p < .05$, * $p < 0.1$.

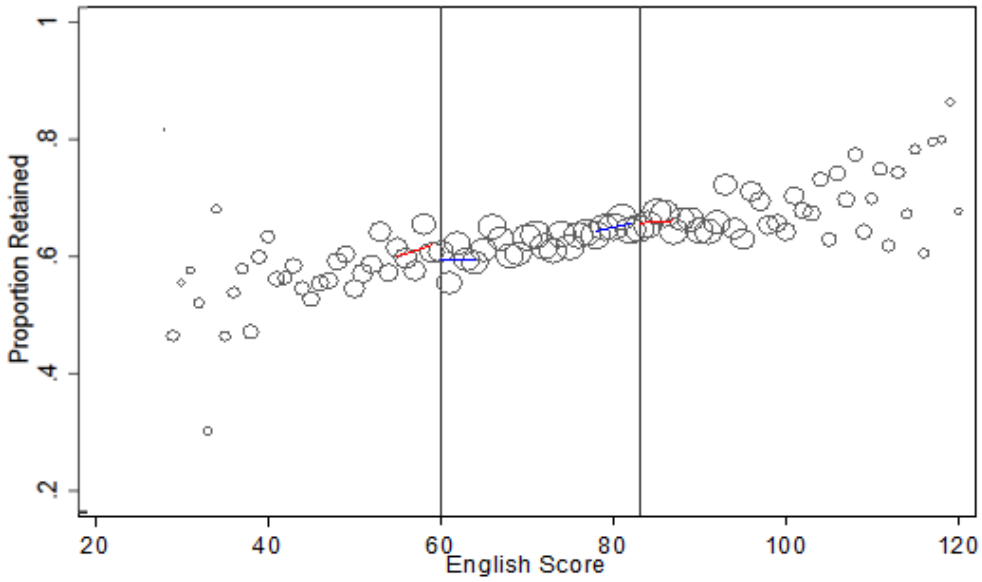



*Figure 6.* Retention, 2008-2011, linear fit lines, BW=5.

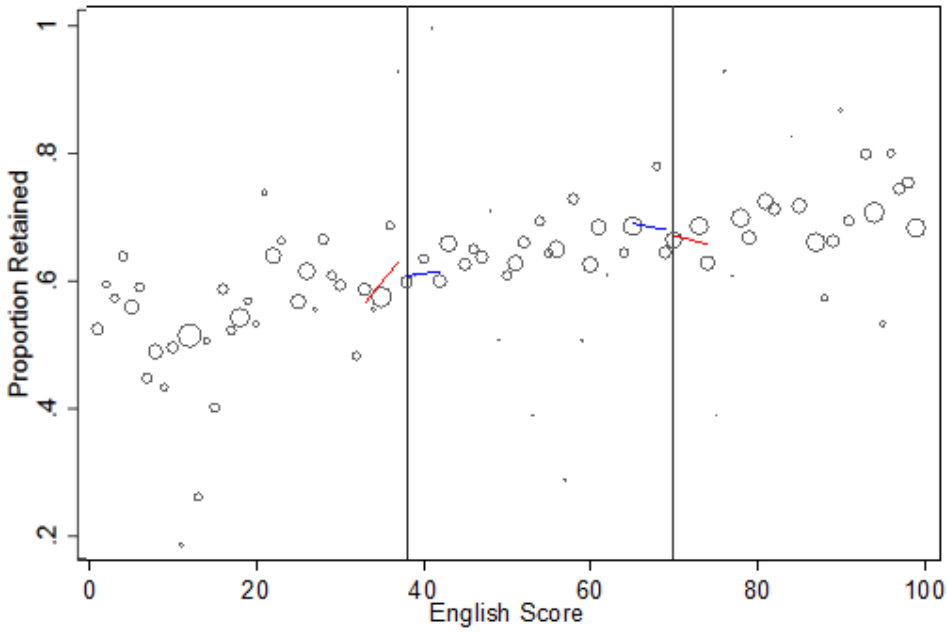



*Figure 7.* Retention, 2012-2013, Linear Fit Lines, BW=5.

Table 4

RD Analysis for 2008 to 2011; Outcome = Retention; All Data

| Variables | Upper Linear | Upper Quadratic | Lower Linear | Lower Quadratic |
|---|---|---|---|---|
| Above | -0.01 | 0.00 | -0.03 | -0.03 |
| | (0.02) | (0.02) | (0.02) | (0.03) |
| Distance | 0.003*** | 0.002 | 0.004*** | 0.004 |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| Distance * Above | -0.001 | -0.002 | -0.002 | -0.003 |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| Distance^2 | | -4.09e-05 | | 4.94e-06 |
| | | (0.00) | | (0.00) |
| Distance^2 * Above | | 0.0001 | | -3.44e-07 |
| | | (0.00) | | (0.00) |
| Constant | 0.58*** | 0.58*** | 0.54*** | 0.54*** |
| | (0.01) | (0.02) | (0.01) | (0.02) |
| Observations | 13,040 | 13,040 | 10,722 | 10,722 |
| $R^2$ | .01 | .01 | .01 | .01 |

*Note*. Robust standard errors appear in parentheses, *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 5

RD Analysis for 2012 to 2013; Outcome = Retention; All Data

| Variables | Upper Linear | Upper Quadratic | Lower Linear | Lower Quadratic |
|---|---|---|---|---|
| Above | -0.02 | -0.04 | 0.01 | -0.01 |
| | (0.03) | (0.05) | (0.03) | (0.05) |
| Distance | 0.00* | 0.00 | 0.00*** | 0.01* |
| | (0.00) | (0.01) | (0.00) | (0.00) |
| Distance * Above | -0.00 | -0.00 | -0.00 | -0.00 |
| | (0.00) | (0.01) | (0.00) | (0.01) |
| Distance^2 | | 7.32e-05 | | 9.30e-05 |
| | | (0.00) | | (0.00) |
| Distance^2 * Above | | -0.00 | | -8.05e-05 |
| | | (0.00) | | (0.00) |
| Constant | 0.60*** | 0.61*** | 0.50*** | 0.53*** |
| | (0.03) | (0.04) | (0.02) | (0.04) |
| Observations | 3,507 | 3,435 | 3,740 | 3,740 |
| $R^2$ | .01 | .00 | .02 | .02 |

*Note*. Robust standard errors appear in parentheses, *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 6

RD Analysis, Linear Specification; Outcome = Retention; Bandwidth = 5 points

| | 2008-2011 | | 2012-2013 | |
|---|---|---|---|---|
| Variables | Upper | Lower | Upper | Lower |
| Above (1 if above, 0 if below) | -0.003 | -0.04 | -0.007 | -0.05 |
| | (0.03) | (0.04) | (0.08) | (0.11) |
| Distance | 0.003 | 0.005 | -0.003 | 0.02 |
| | (0.008) | (0.01) | (0.02) | (0.03) |
| Distance * Above | -0.002 | -0.005 | -0.001 | -0.02 |
| | (0.01) | (0.01) | (0.02) | (0.03) |
| Constant | 0.58*** | 0.54*** | 0.59*** | 0.55*** |
| | (0.03) | (0.04) | (0.07) | (0.10) |
| Observations | 3,435 | 2,347 | 656 | 537 |

*Note*. Standard errors are in parentheses, *** $p < .01$, ** $p < .05$, * $p < 0.1$.

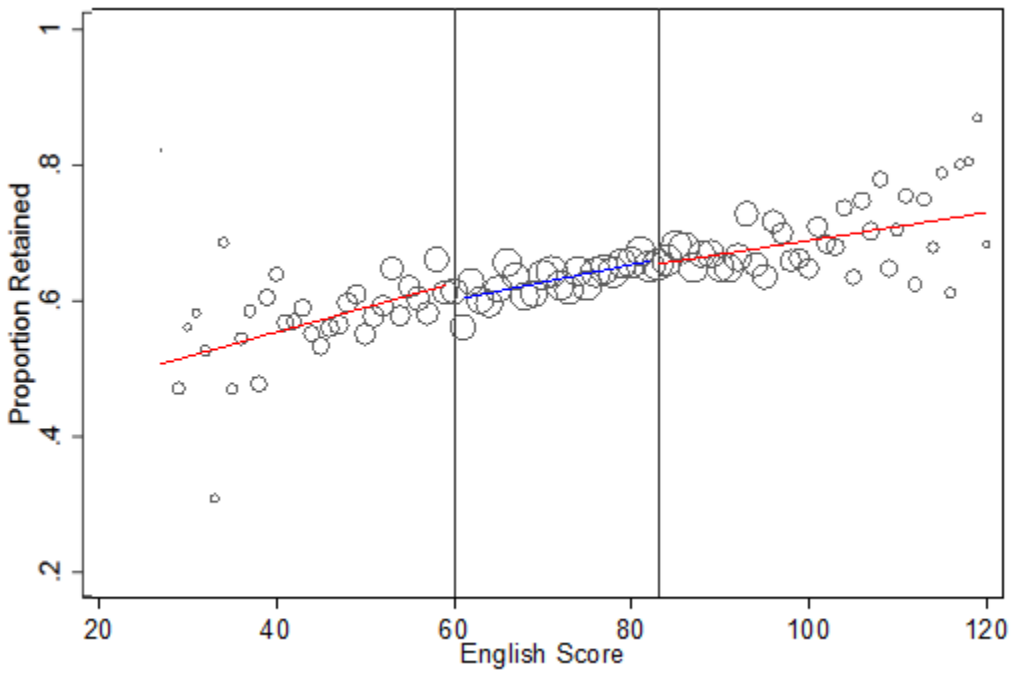



*Figure 8.* Retention, 2008-2011, Linear Fit Lines.

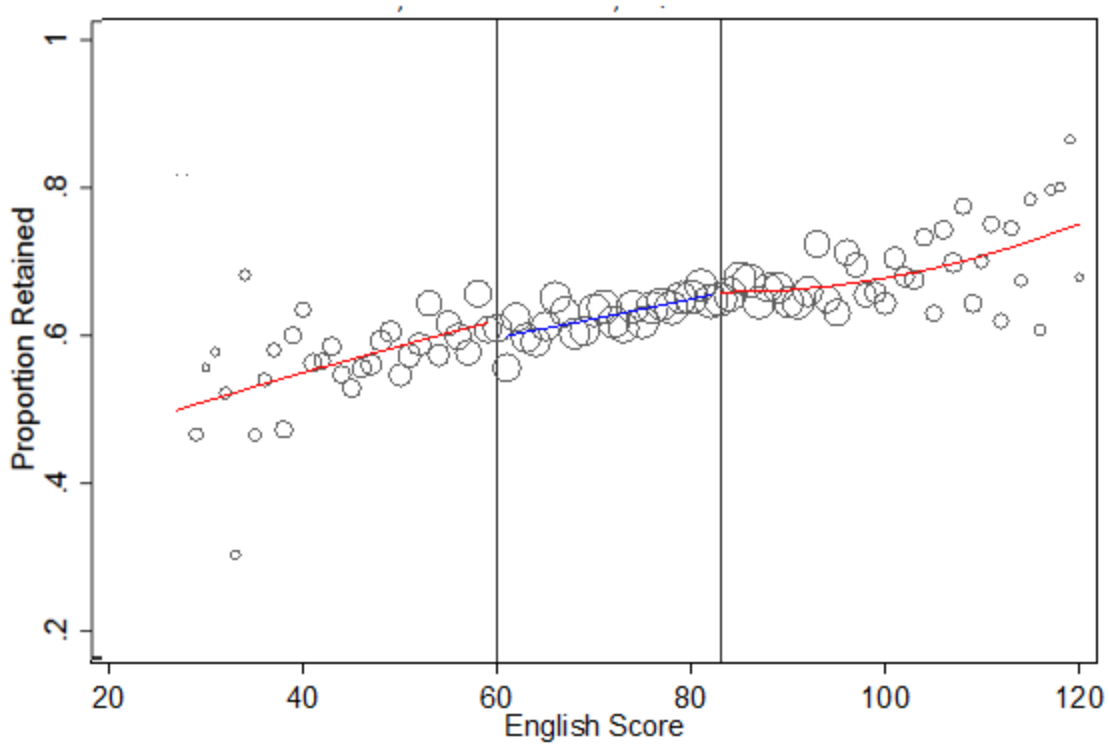



*Figure 9.* Retention, 2008-2011, Quadratic Fit Lines.

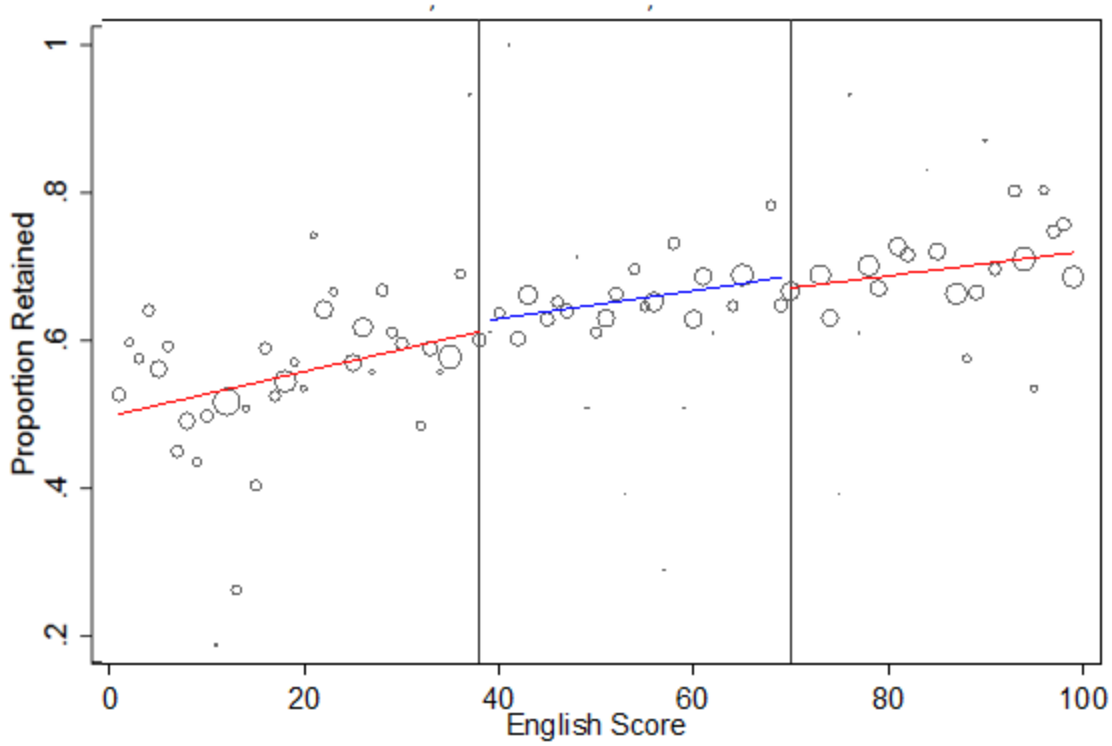



*Figure 10.* Retention, 2012-2013, Linear Fit Lines.

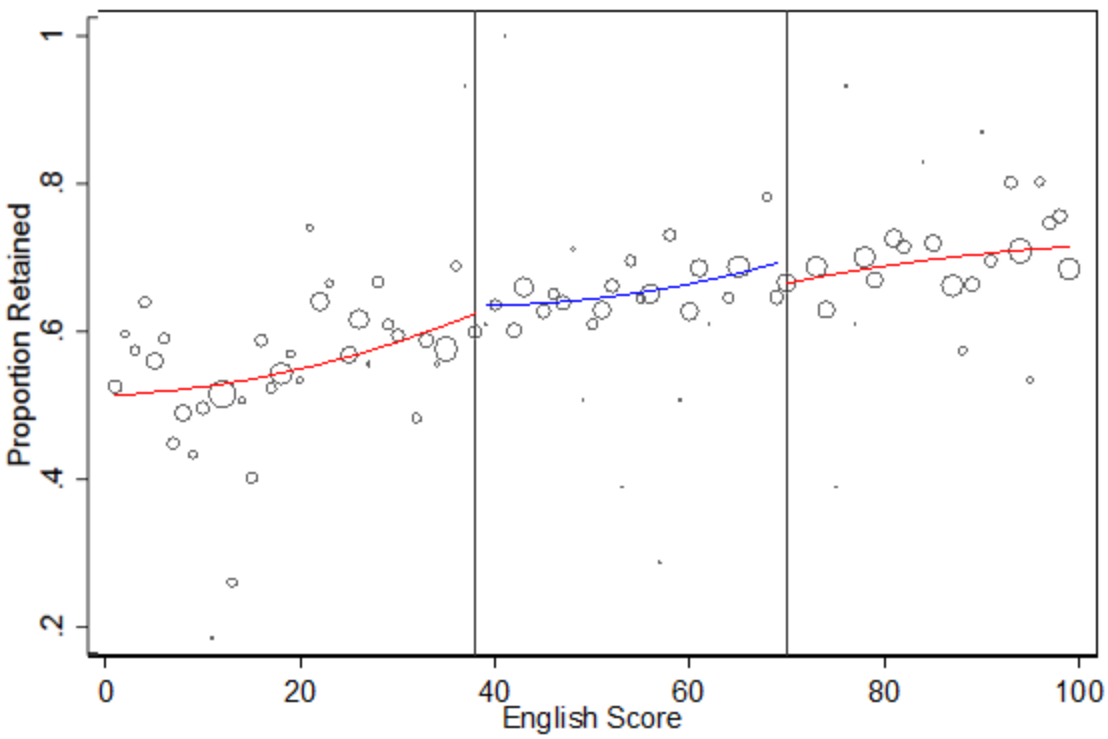



*Figure 11.* Retention, 2012-2013, Quadratic Fit Lines.

Table 7

Linear Regression Analysis Comparing the Effects of Remediation at the Upper and Lower Thresholds (N = 1193)

| | | | | | 95% Conf. Interval | |
|---|---|---|---|---|---|---|
| | Coefficient | *SE* | *t* | *P>t* | Lower | Upper |
| a1 | -.03 | 0.04 | -0.66 | .51 | -0.11 | 0.05 |
| a2 | 0.04 | 0.03 | 0.24 | .24 | -0.03 | 0.10 |
| Constant | .53*** | .02 | 0.00 | .00 | 0.49 | 0.57 |

*Note.* $F(2,1190) = 1.29$, $p = .28$, $R^2 = .00$.
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 8

Difference in Difference Analysis; 5-point Bandwidth

| Variables | Upper Retention | Lower Retention |
|---|---|---|
| A | 0.01 | -0.02 |
| | (0.02) | (0.02) |
| M | 0.03 | -0.05 |
| | (0.03) | (0.03) |
| A*M | -0.04 | 0.05 |
| | (0.04) | (0.05) |
| Constant | 0.57*** | 0.52*** |
| | (0.01) | (0.02) |
| Observations | 4,091 | 2,884 |
| $R^2$ | .00 | .00 |

*Note*. Robust standard errors appear in parentheses, *** $p < .01$, ** $p < .05$, * $p < 0.1$.
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

## Tables and Figures for Paper 2

Table 1

Summary Statistics for 2008-2013

**2008-2011**

| Variable | Observations | Mean | Std. Dev | Min | Max |
|---|---|---|---|---|---|
| White | 16366 | 0.46749 | 0.49896 | 0 | 1 |
| Male | 21403 | 0.46732 | 0.49894 | 0 | 1 |
| Age | 21433 | 21.5242 | 6.64485 | 16 | 80 |
| Independent | 16653 | 0.29868 | 0.4577 | 0 | 1 |
| Claimed Dependent | 16653 | 0.02174 | 0.14583 | 0 | 1 |
| Household Income (log) | 7764 | 8.7592 | 1.03015 | 0 | 12.112 |
| Financial Aid (log) | 13777 | 7.42381 | 0.59282 | 2.49568 | 8.90281 |
| Full Time Status | 21436 | 0.62078 | 0.4852 | 0 | 1 |
| Associate's Degree as a Goal | 21436 | 0.87787 | 0.32744 | 0 | 1 |
| Accuplacer Score (mean centered) | 17004 | -0.0003 | 0.99806 | -2.5108 | 2.34376 |
| GPA | 15513 | 2.40 | .007944 | 0 | 4 |
| Retention | 21436 | .58 | .493012 | 0 | 1 |
| Total Number of Observations | 21436 | | | | |

**2012-2013**

| Variable | Observations | Mean | Std. Dev | Min | Max |
|---|---|---|---|---|---|
| White | 8412 | 0.47183 | 0.49924 | 0 | 1 |
| Male | 8550 | 0.47322 | 0.49931 | 0 | 1 |
| Age | 8552 | 21.3109 | 6.7764 | 13 | 82 |
| Independent | 7294 | 0.24198 | 0.42831 | 0 | 1 |
| Claimed Dependent | 7294 | 0.02509 | 0.15641 | 0 | 1 |
| Household Income (log) | 2924 | 8.69442 | 1.02391 | 4.60517 | 12.9049 |
| Financial Aid (log) | 6053 | 7.49621 | 0.65678 | 1.62137 | 8.83547 |
| Full Time Status | 8552 | 0.70206 | 0.45738 | 0 | 1 |
| Associate's Degree as a Goal | 8552 | 0.93417 | 0.248 | 0 | 1 |
| Compass score (mean centered) | 5650 | -0.0021 | 0.99976 | -1.6725 | 1.60023 |
| GPA | 2862 | 2.41 | .0184185 | 0 | 4 |
| Retention | 3927 | .61 | .48760 | 0 | 1 |
| Total Number of Observations | 8552 | | | | |

Table 2

*Predicting GPA and Retention from Race, Gender, and Age using OLS Regression*

| | Accuplacer Test | | Compass Test | |
|---|---|---|---|---|
| Variables | (1) GPA | (2) Retention | (3) GPA | (4) Retention |
| White | 0.410*** | 0.148*** | 0.221*** | 0.145*** |
| | (0.0276) | (0.0125) | (0.0467) | (0.0201) |
| Male | -0.216*** | -0.0478*** | -0.325*** | -0.0504*** |
| | (0.0262) | (0.0111) | (0.0419) | (0.0166) |
| White*Male | -0.0733* | -0.0388** | 0.0866 | -0.0140 |
| | (0.0403) | (0.0177) | (0.0654) | (0.0275) |
| Age | 0.0235*** | -0.00458*** | 0.0203*** | -0.00139 |
| | (0.00155) | (0.000647) | (0.00224) | (0.000918) |
| Accuplacer score (mean centered) | 0.104*** | 0.0315*** | | |
| | (0.0103) | (0.00451) | | |
| Year 2010 | -0.0521** | -0.00487 | | |
| | (0.0235) | (0.0104) | | |
| Year 2011 | -0.159*** | -0.0544*** | | |
| | (0.0247) | (0.0107) | | |
| Compass score (mean centered) | | | 0.175*** | 0.0563*** |
| | | | (0.0170) | (0.00695) |
| Year 2012 | | | -0.0449 | -0.0355*** |
| | | | (0.0319) | (0.0132) |
| Constant | 1.785*** | 0.636*** | 1.879*** | 0.549*** |
| | (0.0407) | (0.0173) | (0.0577) | (0.0237) |
| Observations | 9,086 | 12,914 | 3,687 | 5,554 |
| $R^2$ | .098 | .037 | .092 | .044 |

White is coded as 0 = not White and 1 = White; Male is coded as 0 = female and 1 = male; Age is coded as: 0 = young and 1 = old.
*Note*. Standard errors are in parentheses, *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 3

*Predicting GPA and Retention from Age as a Function of Independent Status using OLS Regression*

| | Accuplacer Test | | Compass Test | |
|---|---|---|---|---|
| Variables | (1) GPA | (2) Retention | (3) GPA | (4) Retention |
| Independent | -0.808*** | -1.095*** | -0.555 | -1.122*** |
| | (0.212) | (0.0911) | (0.409) | (0.160) |
| Claimed Dependent | 0.0390 | 0.00483 | -0.0467 | 0.0200 |
| | (0.226) | (0.0890) | (0.309) | (0.125) |
| Age | -0.00495 | -0.0417*** | -0.0145 | -0.0436*** |
| | (0.0107) | (0.00461) | (0.0209) | (0.00815) |
| Claimed Dependent*Age | 0.00125 | -0.000266 | 0.00281 | 0.00152 |
| | (0.00721) | (0.00287) | (0.00947) | (0.00390) |
| Independent*Age | 0.0329*** | 0.0462*** | 0.0311 | 0.0493*** |
| | (0.0109) | (0.00468) | (0.0212) | (0.00825) |
| Accuplacer score (mean centered) | 0.154*** | 0.0475*** | | |
| | (0.00977) | (0.00417) | | |
| Year 2009 | -0.0253 | 0.00298 | | |
| | (0.0285) | (0.0123) | | |
| Year 2010 | -0.0885*** | -0.00473 | | |
| | (0.0282) | (0.0122) | | |
| Year 2011 | -0.191*** | -0.0570*** | | |
| | (0.0291) | (0.0123) | | |
| Compass score (mean centered) | | | 0.202*** | 0.0774*** |
| | | | (0.0173) | (0.00691) |
| Year 2012 | | | -0.0450 | -0.0380*** |
| | | | (0.0341) | (0.0138) |
| Constant | 2.442*** | 1.420*** | 2.489*** | 1.407*** |
| | (0.204) | (0.0881) | (0.397) | (0.155) |
| Observations | 9,813 | 13,840 | 3,312 | 5,011 |
| $R^2$ | .052 | .050 | .056 | .051 |

*Note*. Standard errors are in parentheses, *** $p < .01$, ** $p < .05$, * $p < 0.1$.
**Note: Independent is coded as 0=not independent and 1=independent; Claimed dependent is coded as 0=no claimed dependents and 1=claimed dependents; Age is coded as: 0=young and 1=old.*

Table 4

*Predicting GPA and Retention from Financial Status using OLS Regression: Results of Hypotheses 7-12*

| | Accuplacer Test | | Compass Test | |
|---|---|---|---|---|
| Variables | (1) GPA | (2) Retention | (3) GPA | (4) Retention |
| Household Income (log) | 0.153*** | -0.00835 | 0.194*** | -0.00391 |
| | (0.0151) | (0.00700) | (0.0277) | (0.0124) |
| Financial Aid | -0.127*** | 0.0993*** | -0.149*** | 0.112*** |
| | (0.0273) | (0.0113) | (0.0549) | (0.0173) |
| Accuplacer score (mean centered) | 0.144*** | 0.0355*** | | |
| | (0.0157) | (0.00707) | | |
| Year 2009 | -0.00737 | -0.0260 | | |
| | (0.0417) | (0.0191) | | |
| Year 2010 | -0.0985** | -0.0540*** | | |
| | (0.0436) | (0.0199) | | |
| Year 2011 | -0.133*** | -0.115*** | | |
| | (0.0473) | (0.0210) | | |
| Compass score (mean centered) | | | 0.162*** | 0.0869*** |
| | | | (0.0299) | (0.0125) |
| Year 2012 | | | 0.0391 | 0.0127 |
| | | | (0.0578) | (0.0249) |
| Constant | 2.096*** | -0.0178 | 1.855*** | -0.251 |
| | (0.248) | (0.108) | (0.490) | (0.174) |
| Observations | 3,790 | 5,025 | 1,077 | 1,509 |
| $R^2$ | .057 | .029 | .081 | .056 |

*Note*. Standard errors are in parentheses, *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 5

*Predicting GPA and Retention from Enrollment Standing and Goals using OLS Regression*

| | Accuplacer Test | | Compass Test | |
|---|---|---|---|---|
| Variables | (1) GPA | (2) Retention | (3) GPA | (4) Retention |
| Full Time Status | -0.0124 | 0.204*** | -0.0385 | 0.170*** |
| | (0.0190) | (0.00768) | (0.0367) | (0.0139) |
| Associate's Degree as a Goal | -0.00755 | 0.0367*** | -0.0630 | -0.00763 |
| | (0.0303) | (0.0124) | (0.0742) | (0.0287) |
| Accuplacer score (mean centered) | 0.163*** | 0.0308*** | | |
| | (0.00905) | (0.00379) | | |
| Year 2009 | -0.00624 | -0.00251 | | |
| | (0.0251) | (0.0106) | | |
| Year 2010 | -0.0582** | -0.0105 | | |
| | (0.0251) | (0.0106) | | |
| Year 2011 | -0.180*** | -0.0534*** | | |
| | (0.0263) | (0.0109) | | |
| Compass score (mean centered) | | | 0.216*** | 0.0696*** |
| | | | (0.0165) | (0.00652) |
| Year 2012 | | | -0.0435 | -0.0252* |
| | | | (0.0327) | (0.0131) |
| Constant | 2.378*** | 0.414*** | 2.362*** | 0.432*** |
| | (0.0348) | (0.0140) | (0.0803) | (0.0306) |
| Observations | 11,983 | 17,004 | 3,749 | 5,650 |
| $R^2$ | .033 | .052 | .044 | .052 |

Full time status is coded as 0=part-time and 1=full-time; Associates' degree as a goal is coded as 0=not a goal and 1=goal.
*Note*. Standard errors are in parentheses, *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 6

*Predicting GPA and Retention from Demographic Factors, Financial Status, Enrollment Standing and Goals using OLS Regression*

| | Accuplacer Test | | Compass Test | |
|---|---|---|---|---|
| Variables | (1) GPA | (2) Retention | (3) GPA | (4) Retention |
| White | 0.44*** | 0.18*** | 0.25*** | 0.20*** |
| | (0.05) | (0.02) | (0.08) | (0.03) |
| Male | -0.16*** | -0.04** | -0.26*** | -0.01 |
| | (0.05) | (0.02) | (0.09) | (0.03) |
| White*Male | -0.09 | -0.03 | 0.01 | -0.01 |
| | (0.07) | (0.03) | (0.12) | (0.05) |
| Age | -0.01 | -0.05*** | 0.03 | -0.04** |
| | (0.02) | (0.01) | (0.04) | (0.02) |
| Independent | -0.94** | -1.37*** | 0.22 | -1.00*** |
| | (0.45) | (0.20) | (0.72) | (0.30) |
| Age*Independent | 0.04 | 0.06*** | -0.01 | 0.04*** |
| | (0.02) | (0.01) | (0.04) | (0.02) |
| Claimed Dependent | -0.20 | -0.13 | -0.04 | -0.07 |
| | (0.30) | (0.13) | (0.40) | (0.17) |
| Age*Claimed Dependent | 0.01 | 0.00 | -0.00 | 0.00 |
| | (0.01) | (0.00) | (0.01) | (0.01) |
| Household Income (log) | 0.14*** | 0.035*** | 0.12*** | 0.03** |
| | (0.02) | (0.01) | (0.03) | (0.01) |
| Financial Aid (log) | -0.11*** | 0.12*** | -0.10* | 0.12*** |
| | (0.04) | (0.02) | (0.06) | (0.02) |
| Full Time Status | 0.07 | 0.02 | -0.10 | 0.01 |
| | (0.04) | (0.02) | (0.08) | (0.03) |
| Associate's Degree as a Goal | 0.07 | 0.05 | 0.17 | -0.01 |
| | (0.08) | (0.04) | (0.15) | (0.06) |
| Accuplacer Score (mean centered) | 0.08*** | 0.01 | | |
| | (0.02) | (0.01) | | |
| Year 2010 | -0.11*** | -0.04** | | |
| | (0.04) | (0.01) | | |
| Year 2011 | -0.14*** | -0.07*** | | |
| | (0.04) | (0.02) | | |
| Compass score (mean centered) | | 0.65*** | 0.14*** | 0.05*** |
| | | (0.23) | (0.03) | (0.01) |
| Year 2012 | | 3,835 | 0.03 | 0.01 |
| | | 0.11 | (0.06) | (0.02) |
| Constant | 2.08*** | -0.04** | 1.43* | 0.05 |
| | (0.50) | (0.02) | (0.84) | (0.33) |
| Observations | 2,874 | -0.03 | 1,063 | 1,489 |
| R-squared | 0.13 | (0.03) | 0.12 | 0.12 |

White is coded as 0 = not White and 1 = White; Male is coded as 0 = female and 1 = male; Age is coded as: 0 = young and 1 = old; Independent is coded as 0 = not independent and 1 = independent; Claimed dependent is coded as 0 = no claimed dependents and 1 = claimed dependents; Full time status is coded as 0 = part-time and 1 = full-time; Associates' degree as a goal is coded as 0 = not a goal and 1 = goal; Full time status is coded as 0 = part-time and 1 = full-time; Associates' degree as a goal is coded as 0 = not a goal and 1=goal.
*Note*. Year 2009 is omitted due to missing data for the variable race.
*Note*. Standard errors are in parentheses, *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 7

*Three Regression Comparison of Retention*

| Variables | (1) Retention | (2) Retention | (3) Retention |
|---|---|---|---|
| White | 0.12*** | 0.16*** | 0.18*** |
| | (0.01) | (0.02) | (0.02) |
| Male | -0.06*** | -0.06*** | -0.04** |
| | (0.01) | (0.02) | (0.02) |
| White*Male | -0.01 | -0.03 | -0.03 |
| | (0.02) | (0.03) | (0.03) |
| Age | -0.03*** | -0.04*** | -0.05*** |
| | (0.01) | (0.01) | (0.01) |
| Independent | -0.83*** | -1.05*** | -1.37*** |
| | (0.10) | (0.20) | (0.20) |
| Age*Independent | 0.03*** | 0.046*** | 0.06*** |
| | (0.01) | (0.01) | (0.01) |
| Claimed Dependents | -0.00 | -0.13 | -0.13 |
| | (0.10) | (0.13) | (0.13) |
| Age*Claimed Dependents | -0.00 | 0.00 | 0.00 |
| | (0.00) | (0.00) | (0.00) |
| Household Income (log) | | | 0.035*** |
| | | | (0.01) |
| Financial Aid (log) | | | 0.12*** |
| | | | (0.02) |
| Full Time | 0.14*** | 0.08*** | 0.02 |
| | (0.01) | (0.01) | (0.02) |
| Goal Associate | 0.06*** | 0.06 | 0.05 |
| | (0.02) | (0.04) | (0.04) |
| Accuplacer score (mean centered) | 0.02*** | 0.02** | 0.01 |
| | (0.00) | (0.01) | (0.01) |
| Year 2010 | -0.02* | -0.03* | -0.04** |
| | (0.01) | (0.02) | (0.01) |
| Year 2011 | -0.06*** | -0.07*** | -0.07*** |
| | (0.01) | (0.02) | (0.02) |
| Constant | 1.26*** | 1.53*** | 0.65*** |
| | (0.11) | (0.21) | (0.23) |
| Observations | 10,889 | 3,835 | 3,835 |
| R-squared | 0.09 | 0.09 | 0.11 |

White is coded as 0 = not White and 1 = White; Male is coded as 0 = female and 1 = male; Age is coded as: 0 = young and 1 = old; Independent is coded as 0 = not independent and 1 = independent; Claimed dependent is coded as 0 = no claimed dependents and 1 = claimed dependents; Full time status is coded as 0 = part-time and 1 = full-time; Associates' degree as a goal is coded as 0 = not a goal and 1 = goal; Full time status is coded as 0 = part-time and 1 = full-time; Associates' degree as a goal is coded as 0 = not a goal and 1=goal.

*Note*. Year 2009 is omitted due to missing data for the variable race.

*Note*. Standard errors are in parentheses, *** $p < .01$, ** $p < .05$, * $p < 0.1$.

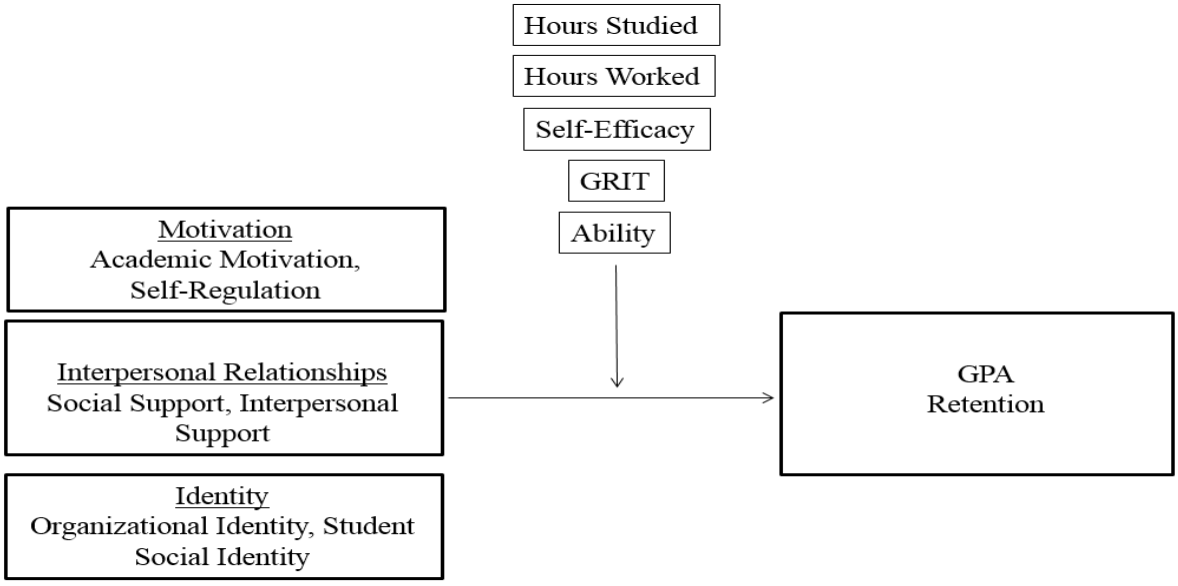
Table 8

*Overview of Paper 2 Results*

| Variable | | Table Number | Hypothesis | Hypothesis Confirmed | Notes |
|---|---|---|---|---|---|
| Age | H1 | 2 | Older students will have higher GPAs than younger students | ✓ | |
| Age | H2 | 2 | Older students will have higher retention than younger students | × | |
| Race | H3 | 2 | White students will have higher GPAs than non-White students | ✓ | |
| Race | H4 | 2 | White students will have higher retention than non-White students | ✓ | |
| Gender | H5 | 2 | Women will have higher GPAs than men | ✓ | |
| Gender | H6 | 2 | Women will have higher retention than men | ✓ | |
| Gender x Race | N/A | 2 | Interaction of race and gender results in high GPA | ✓ | 1) Not an a priori hypothesis. 2) Findings were not robust for the data in year 2012. |
| Gender x Race | N/A | 2 | Interaction of race and gender results in high retention | ✓ | 1) Not an a priori hypothesis |
| Independents | H7 | 3 | Students who claim dependents will have lower GPAs than students who do not claim dependents | × | |
| Independents | H8 | 3 | Students who claim dependents will have lower GPAs than students who do not claim dependents | ✓ | |
| Claimed as Dependents | H9 | 3 | Students who are claimed as dependents will have higher GPAs than students not claimed as dependents | ✓ | |
| Claimed as Dependents | H10 | 3 | Students who are claimed as dependents will have higher retention than students not claimed as dependents | ✓ | |
| Age* Independents | N/A | 3 | | ✓ | |
| Age*Independents | N/A | 3 | | ✓ | |
| Age*Claimed Dependents | N/A | 3 | | × | |
| Age*Claimed Dependents | N/A | 3 | | × | |

| | | | | | |
|---|---|---|---|---|---|
| Income | H11 | 4 | Students with lower incomes will have lower GPAs than students with higher incomes | ✓ | |
| Income | H12 | 4 | Students with lower incomes will have lower retention than students with higher incomes | × | |
| Financial Aid | H13 | 4 | Students with higher amounts of financial aid will have higher GPAs than students with lower amounts of financial aid | ✓ | 1) This result was found only during the first time period |
| Financial Aid | H14 | 4 | Students with higher amounts of financial aid will have higher retention than students with lower amounts of financial aid | ✓ | |
| Enrollment Status | H15 | 5 | Students who are enrolled as part-time students will have lower GPAs than students who are enrolled as full time students | × | |
| Enrollment Status | H16 | 5 | Students who are enrolled as part-time students will have lower retention than students who are enrolled as full time students | ✓ | |
| Associate's Degree Goal | H17 | 5 | Students who state that obtaining an associate's degree is the goal of their education will have higher GPAs than students who do not have an associate's degree as a goal | × | |
| Associate's Degree Goal | H18 | 5 | Students who state that obtaining an associate's degree is the goal of their education will have higher retention than students who do not have an associate's degree as a goal | ✓ | 1) The findings were not robust for the data in year 2012 |

**Tables and Figures for Paper 3**




**This model will control for financial aid, income, gender, age, race, dependency status, and scholastic abilities as measured by Accuplacer scores.*

*Figure 1.* Psychological Variables Theoretical Model for Paper 3.

Table 1

*Descriptive Statistics*

| Measures | Scale | *N* | Minimum | Maximum | Mean | *SD* |
|---|---|---|---|---|---|---|
| GPA | 0.0 to 4.0 | 142 | 0.00 | 4.00 | 2.76 | 0.81 |
| Ability | 1 to 100 | 104 | 4.00 | 99.00 | 60.44 | 25.49 |
| Age | | 149 | 18 | 69 | 20.81 | 6.87 |
| Academic Motivation | 1 to 5 | 123 | 2.88 | 5.00 | 4.17 | 0.58 |
| Self-regulation | 1 to 5 | 119 | 1.92 | 4.67 | 3.53 | 0.52 |
| Interpersonal social support | 1 to 5 | 119 | 2.50 | 4.50 | 3.71 | 0.56 |
| Social support | 1 to 5 | 125 | 1.00 | 5.00 | 3.97 | 1.07 |
| Social identity | 1 to 5 | 112 | 2.80 | 4.60 | 3.67 | 0.43 |
| Organizational identity | 1 to 5 | 120 | 1.00 | 5.00 | 3.34 | 0.84 |
| GRIT | 1 to 5 | 118 | 1.88 | 5.00 | 3.34 | 0.58 |
| Efficacy | 1 to 5 | 122 | 1.00 | 5.00 | 4.16 | 0.64 |
| Study hours | | 105 | 1.00 | 40.00 | 10.50 | 8.78 |
| Job hours | | 110 | 0.00 | 45.00 | 20.58 | 13.78 |
| | | | | | | |
| **Variables** | | ***N*** | **Total** | | | |
| Male | | 42 | | | | |
| Female | | 75 | 117 | | | |
| White | | 65 | | | | |
| Non-White | | 53 | 118 | | | |
| Retained | | 142 | | | | |
| Not retained | | 7 | 149 | | | |

Table 2

*Results of Chi-Square Test and Descriptive Statistics for Gender*

| Variables | Male | Female |
|---|---|---|
| Respondents | 42 | 75 |
| Sample | 882 | 965 |

*Note*. $\chi^2 = 8.38$, $df = 3$. $^*p < .05$.

Table 3

*Results of Chi-Square Test and Descriptive Statistics for Race*

| Variables | White | Non-White |
|---|---|---|
| Respondents | 65 | 53 |
| Sample | 1,017 | 830 |

*Note*. $\chi^2$ = .000, *df* = 1, *Not Significant*

Table 4

*Results of Chi-Square Test and Descriptive Statistics for Retention*

| Variables | Retained | Not Retained |
|---|---|---|
| Respondents | 142* | 7* |
| Sample | 1,340* | 507* |

*Note*. $\chi^2$ = 34.66, *df* = 1, *$p$ < .05.

Table 5

*Results of T-Test-Square Test and Descriptive Statistics for GPA*

| Variables | *M* | *SD* | *N* |
|---|---|---|---|
| Respondents | 2.40 | .99 | 142 |
| Sample | 2.76 | .81 | 1,847 |

*Note*. *t* = -4.25, *df* = 2,859, *p* < .05.

Table 6

*Results of T-Test and Descriptive Statistics for Age*

| Variables | M | SD | N |
|---|---|---|---|
| Respondents | 21.09 | .5050 | 149 |
| Sample | 20.81 | .8787 | 3,784 |

*Note*. $t = 0.51$, $df = 3{,}931$, $p > .05$.

Table 7

*Descriptive Statistics for the AMS Scale and the External and Internal Subscales (N = 125)*

| Measures | Number of items | *M* (*SD*) | Skewness | Kurtosis | Alpha |
|---|---|---|---|---|---|
| Academic Motivation (external and internal) | 8 | 4.17 (.58) | -.27 | -.75 | .82 |
| Academic Motivation External | 4 | 4.21 (.68) | -.58 | -.56 | .77 |
| Academic Motivation Internal | 4 | 4.13 (.76) | -1.0 | 1.3 | .89 |

Table 8

Correlations for Motivation

| Measures | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Motivation | 4.17 | 0.58 | | .98** | .48** | -.52 | -.14 | -.15 | -.81 | -.08 | -.30 | .10 |
| External Motivation | 4.21 | 0.68 | | | .23** | -.81 | -.41 | -.51 | -.03 | -.03 | .07 | .72 |
| Internal Motivation | 4.13 | 0.76 | | | | -.62 | -.10 | -.82 | -.09 | -.09 | .02 | .00 |
| Ability | 60.44 | 25.49 | | | | | .21 | -.23* | .15 | .11 | .12 | .02 |
| Race | 0.56 | 0.50 | | | | | | .14 | .06 | .12 | .09 | .08 |
| Gender | 0.36 | 0.48 | | | | | | | .01 | .02 | -.20* | .12 |
| Study Hours | 10.35 | 8.76 | | | | | | | | .03 | .02 | .04 |
| Job Hours | 20.24 | 13.95 | | | | | | | | | -.15 | .17 |
| GPA | 2.49 | 1.08 | | | | | | | | | | .[c] |
| Retention | 0.95 | 0.21 | | | | | | | | | | |

*Note*. **. Correlation is significant at the .01 level (2-tailed), Correlation is significant at the .05 level (2-tailed),
[c]. Cannot be computed because at least one of the variables is constant.
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 9

*GPA Regressed on Motivation*Ability*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.51 | .16 | | 2.42 | 0.18 | | 1.76 | 0.41 | | 2.24 | 1.07 | | -2.45 | 2.61 | |
| White | .24 | .20 | | 0.42 | 0.25 | | 0.52 | 0.34 | | 0.55 | 0.33 | | 0.53 | 0.32 | |
| Male | -0.41 | 0.21 | * | -0.10 | 0.33 | | 0.13 | 0.42 | | 0.11 | 0.41 | | -0.12 | 0.41 | |
| White*Male | | | | -0.52 | 0.42 | | -0.65 | 0.54 | | -0.48 | 0.54 | | -0.31 | 0.54 | |
| Ability | | | | | | | 0.01 | 0.01 | | 0.01 | 0.01 | | 0.08 | 0.04 | * |
| Motivation | | | | | | | | | | -0.09 | 0.22 | | 1.05 | 0.62 | * |
| Ability*Motivation | | | | | | | | | | | | | -0.02 | 0.01 | * |
| | *N*=115 | | | *N*=112 | | | *N*=76 | | | *N*=74 | | | *N*=74 | | |
| | $R^2$=.08 | | | $R^2$=.06 | | | $R^2$=.08 | | | $R^2$=.07 | | | $R^2$=.12 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

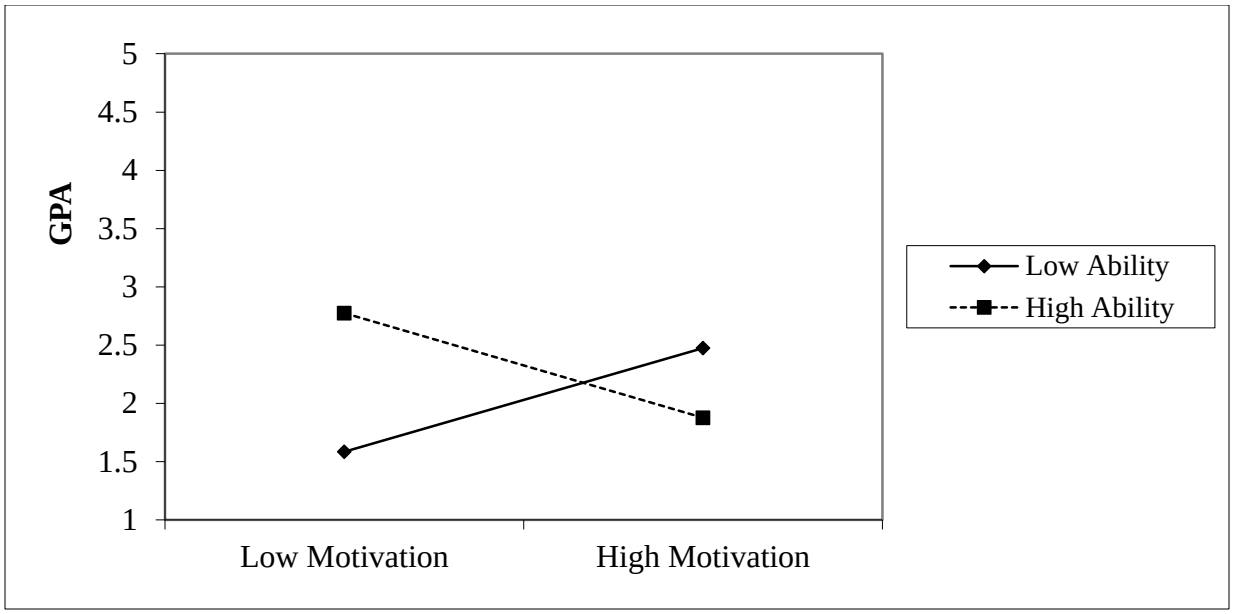



*Figure 2*. Interaction between Motivation and Ability.

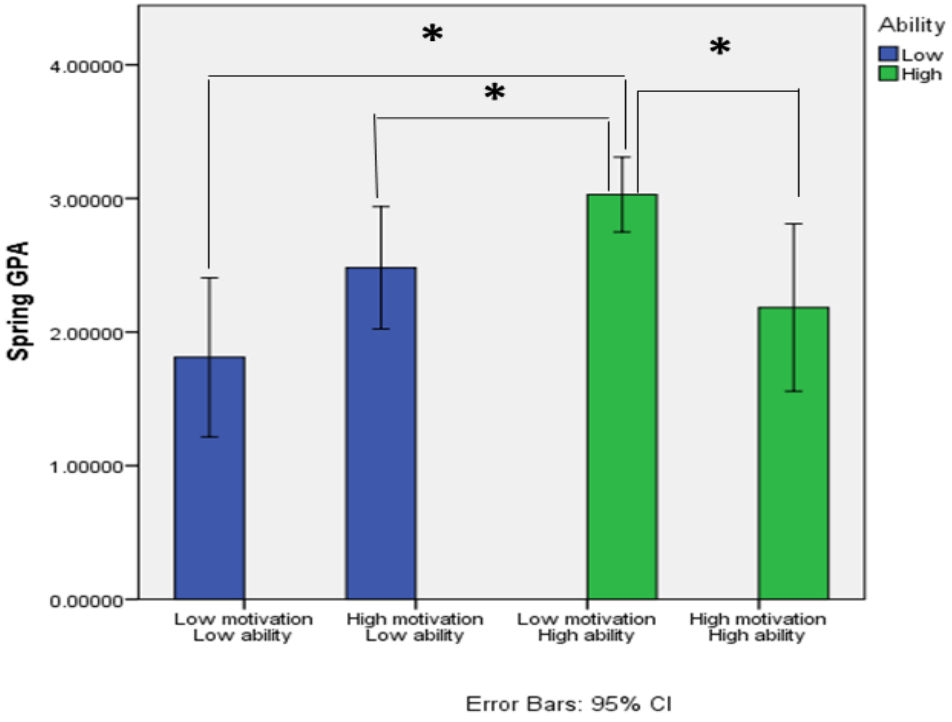



*Figure 3.* Planned Contrast Testing for Motivation and Ability.

Table 10

*GPA Regressed on External Motivation*Ability*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.51 | 0.16 | | 2.42 | 0.18 | | 1.76 | 0.41 | | 2.26 | 1.03 | | -2.42 | 2.63 | |
| White | 0.24 | 0.20 | | 0.42 | 0.25 | | 0.52 | 0.34 | | 0.51 | 0.35 | | 0.55 | 0.38 | |
| Male | -0.41 | 0.21 | * | -0.10 | 0.33 | | 0.13 | 0.42 | | 0.10 | 0.39 | | -0.11 | 0.47 | |
| White*Male | | | | -0.52 | 0.42 | | -0.65 | 0.54 | | -0.56 | 0.52 | | -0.29 | 0.57 | |
| Ability | | | | | | | 0.01 | 0.01 | | 0.02 | 0.02 | | 0.09 | 0.02 | * |
| Motivation | | | | | | | | | | -0.11 | 0.26 | | 1.09 | 0.66 | * |
| Ability*Motivation | | | | | | | | | | | | | -0.03 | 0.01 | * |
| | *N*=114 | | | *N*=114 | | | *N*=77 | | | *N*=74 | | | *N*=74 | | |
| | $R^2$=.04 | | | $R^2$=.06 | | | $R^2$=.07 | | | $R^2$=.05 | | | $R^2$=.10 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

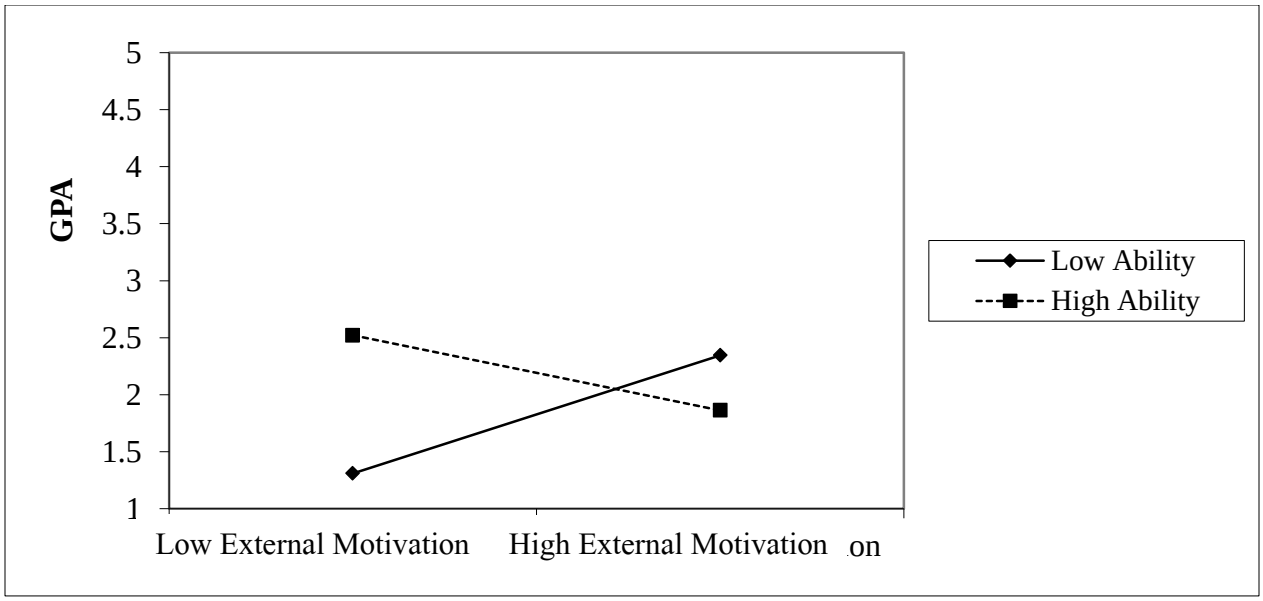



*Figure 4.* Interaction between External Motivation and Ability.

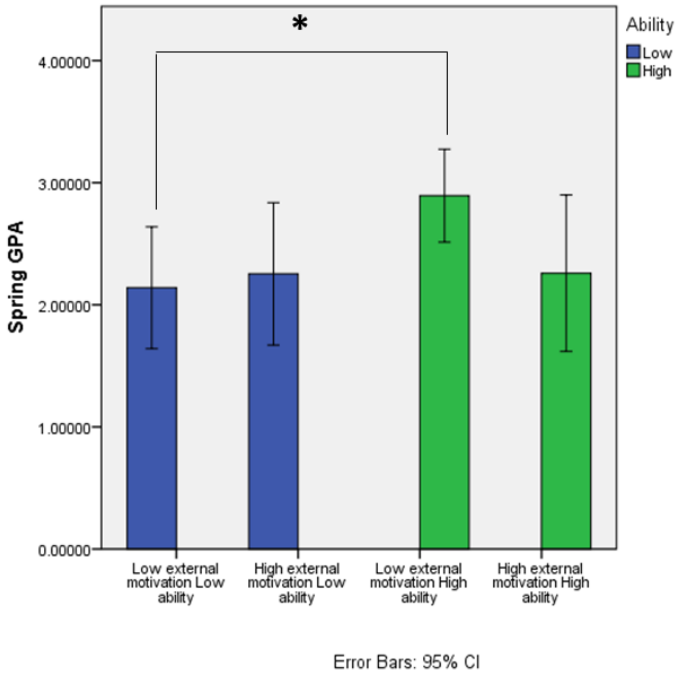



*Figure 5.* Planned Contrast Testing for External Motivation and Ability.

Table 11

*GPA Regressed on Internal Motivation*Ability*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.52 | .16 | | 2.42 | 0.18 | | 1.76 | 0.41 | | 3.44 | .77 | | .47 | 1.78 | |
| White | .24 | .20 | | 0.42 | 0.25 | | 0.52 | 0.34 | | -.10 | .12 | | -.06 | .12 | |
| Male | -0.41 | 0.21 | * | -0.10 | 0.33 | | 0.13 | 0.42 | | -.70 | .69 | | -.66 | .68 | |
| White*Male | | | | -0.52 | 0.42 | | -0.65 | 0.54 | | .22 | .16 | | .20 | .16 | |
| Ability | | | | | | | 0.01 | 0.01 | | -.11 | .12 | | .55 | .38 | |
| Internal Motivation | | | | | | | | | | -.13 | .11 | | .04 | .02 | * |
| Ability*Internal Motivation | | | | | | | | | | | | | -.18 | .01 | *** |
| | *N*=114 | | | *N*=114 | | | *N*=77 | | | *N*=74 | | | *N*=74 | | |
| | $R^2$=.04 | | | $R^2$=.06 | | | $R^2$=.07 | | | $R^2$=.05 | | | $R^2$=.10 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

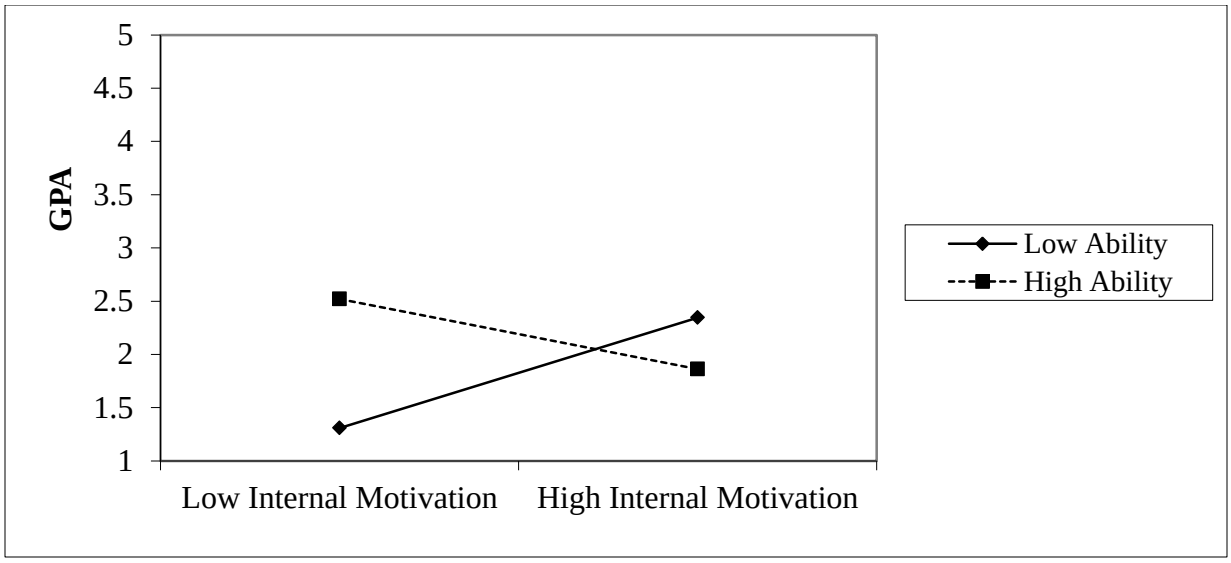



*Figure 6.* Interaction between Internal Motivation and Ability.

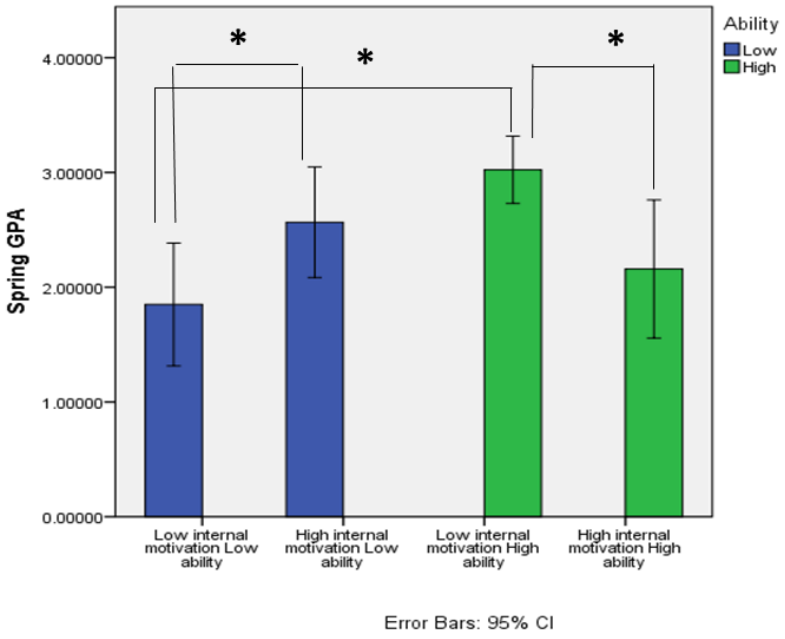



*Figure 7.* Planned Contrasts for Testing Internal Motivation and Ability.

Table 12

*Retention Regressed on Motivation*Ability*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | .95 | .02 | | 0.94 | 0.03 | | 0.10 | 0.06 | | 0.63 | 0.17 | | 1.05 | 0.42 | |
| White | .02 | .03 | | 0.03 | 0.04 | | 0.01 | 0.05 | | 0.00 | 0.05 | | 0.00 | 0.05 | |
| Male | .04 | .03 | | 0.06 | 0.05 | | 0.04 | 0.06 | | 0.04 | 0.06 | | 0.05 | 0.06 | |
| White*Male | | | | -0.03 | 0.07 | | 0.00 | 0.08 | | 0.04 | 0.08 | | 0.03 | 0.08 | |
| Ability | | | | | | | 0.00 | 0.00 | | 0 | 0.00 | | -0.07 | 0.01 | |
| Motivation | | | | | | | | | | 0.08 | 0.03 | ** | -0.02 | 0.09 | |
| Ability*Motivation | | | | | | | | | | | | | 0.00 | 0.00 | |
| | *N*=115 | | | *N*=115 | | | *N*=78 | | | *N*=76 | | | *N*=76 | | |
| | $R^2$=.02 | | | $R^2$=.02 | | | $R^2$=.02 | | | $R^2$=.09 | | | $R^2$=.12 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 13

*Retention Regressed on External Motivation and Ability*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | .97 | .01 | | 0.99 | 0.04 | | 1.01 | 0.06 | | 0.63 | 0.12 | | 1.20 | 0.38 | |
| White | .01 | .03 | | 0.02 | 0.03 | | 0.02 | 0.05 | | 0.02 | 0.04 | | 0.02 | 0.06 | |
| Male | .03 | .03 | | 0.05 | 0.05 | | 0.03 | 0.07 | | 0.03 | 0.07 | | 0.04 | 0.07 | |
| White*Male | | | | -0.03 | 0.06 | | 0.00 | 0.09 | | 0.05 | 0.08 | | 0.01 | 0.09 | |
| Ability | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | -0.02 | 0.02 | |
| Motivation | | | | | | | | | | 0.09 | 0.03 | ** | -0.05 | 0.09 | |
| Ability*Motivation | | | | | | | | | | | | | 0.00 | 0.00 | |
| | *N*=115 | | | *N*=112 | | | *N*=76 | | | *N*=74 | | | *N*=74 | | |
| | $R^2$=.07 | | | $R^2$=.02 | | | $R^2$=.06 | | | $R^2$=.14 | | | $R^2$=.17 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 14

*Retention Regressed on Internal Motivation and Ability*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | .95 | .02 | | 0.94 | 0.03 | | 1.00 | 0.06 | | 0.86 | 0.14 | | 0.89 | 0.37 | |
| White | .02 | .03 | | 0.03 | 0.04 | | 0.01 | 0.05 | | 0.00 | 0.05 | | 0.00 | 0.05 | |
| Male | .04 | .03 | | 0.06 | 0.05 | | 0.04 | 0.06 | | 0.04 | 0.06 | | 0.04 | 0.06 | |
| White*Male | | | | -0.03 | 0.07 | | 0.00 | 0.08 | | 0.02 | 0.08 | | 0.02 | 0.08 | |
| Ability | | | | | | | 0 | 0.00 | | 0 | 0.00 | | -0.00 | 0.01 | |
| Motivation | | | | | | | | | | 0.03 | 0.03 | | 0.02 | 0.08 | |
| Ability*Motivation | | | | | | | | | | | | | 0E+00 | 0.00 | |
| | *N*=115 | | | *N*=115 | | | *N*=78 | | | *N*=76 | | | *N*=76 | | |
| | $R^2$=.08 | | | $R^2$=.02 | | | $R^2$=.02 | | | $R^2$=.04 | | | $R^2$=.04 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 15

*GPA Regressed on Self-regulation*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.54 | 0.30 | | 3.11 | 0.48 | | 3.11 | 0.57 | | 2.95 | 0.90 | | 4.35 | 2.15 | |
| White | 0.01 | 0.06 | | -0.12 | 0.11 | | -0.17 | 0.13 | | -0.10 | 0.12 | | -0.10 | 0.12 | |
| Male | 0.34 | 0.15 | ** | -0.52 | 0.59 | | -0.90 | 0.73 | | -0.56 | 0.71 | | -0.66 | 0.72 | |
| White * Male | | | | 0.20 | 0.13 | | 0.28 | 0.17 | | 0.18 | 0.16 | | 0.20 | 0.17 | |
| Ability | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | -0.02 | 0.03 | |
| Self-regulation | | | | | | | | | | 0.00 | 0.20 | | -0.40 | 0.60 | |
| Ability * Self-regulation | | | | | | | | | | | | | 0.01 | 0.01 | |
| | *N*=114 | | | *N*=114 | | | *N*=77 | | | *N*=73 | | | *N*=73 | | |
| | $R^2$=.04 | | | $R^2$=.06 | | | $R^2$=.07 | | | $R^2$=.04 | | | $R^2$=.05 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 16

*Retention Regressed on Self-Regulation*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.10 | 0.06 | | 1.00 | 0.10 | | 1.01 | 0.11 | | 1.02 | 0.19 | | 0.70 | 0.45 | |
| White | -0.02 | 0.01 | * | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.03 | | 0.00 | 0.03 | |
| Male | -0.04 | 0.03 | | 0.11 | 0.12 | | 0.14 | 0.14 | | 0.14 | 0.15 | | 0.16 | 0.15 | |
| White * Male | | | | -0.03 | 0.03 | | -0.04 | 0.03 | | -0.04 | 0.03 | | -0.05 | 0.03 | |
| Ability | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.01 | |
| Self-regulation | | | | | | | | | | 0.00 | 0.04 | | 0.09 | 0.12 | |
| Ability * Self-regulation | | | | | | | | | | | | | 0.00 | 0.00 | |
| | *N*=117 | | | *N*=117 | | | *N*=79 | | | *N*=75 | | | *N*=75 | | |
| | $R^2$=.04 | | | $R^2$=.06 | | | $R^2$=.07 | | | $R^2$=.07 | | | $R^2$=.08 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 17

*GPA Regressed on Social Support*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.54 | 0.30 | | 3.20 | 0.54 | | 3.11 | 0.57 | | 2.65 | 0.63 | | 2.83 | 1.05 | |
| White | 0.01 | 0.06 | | -0.16 | 0.13 | | -0.17 | 0.13 | | -0.09 | 0.12 | | -0.09 | 0.12 | |
| Male | 0.34 | 0.15 | ** | -0.86 | 0.73 | | -0.90 | 0.73 | | -0.67 | 0.69 | | -0.64 | 0.71 | |
| White * Male | | | | 0.28 | 0.17 | | 0.28 | 0.17 | | 0.20 | 0.16 | | 0.19 | 0.16 | |
| Ability | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.02 | |
| Social support | | | | | | | | | | 0.07 | 0.08 | | 0.02 | 0.24 | |
| Ability*Social support | | | | | | | | | | | | | 0.00 | 0.00 | |
| | *N*=114 | | | *N*=77 | | | *N*=77 | | | *N*=75 | | | *N*=75 | | |
| | $R^2$=.04 | | | $R^2$=.06 | | | $R^2$=.07 | | | $R^2$=.05 | | | $R^2$=.05 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 18

*Retention Regressed on Social Support*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.10 | 0.06 | | 1.00 | 0.10 | | 1.01 | 0.00 | | 0.90 | 0.13 | | 1.12 | 0.21 | |
| White | -0.02 | 0.01 | | 0.00 | 0.02 | | 0.00 | 0.19 | | 0.00 | 0.03 | | 0.00 | 0.03 | |
| Male | -0.04 | 0.03 | | 0.11 | 0.12 | | 0.14 | 0.22 | | 0.15 | 0.14 | | 0.18 | 0.14 | |
| White * Male | | | | -0.03 | 0.03 | | -0.04 | 0.10 | | -0.04 | 0.03 | | -0.05 | 0.03 | |
| Ability | | | | | | | 0.00 | 0.55 | | 0.00 | 0.00 | | 0.00 | 0.00 | |
| Social support | | | | | | | | | | 0.03 | 0.02 | | -0.03 | 0.05 | |
| Ability*Social support | | | | | | | | | | | | | 0.00 | 0.00 | |
| $R^2$ | .04 | | | .06 | | | .07 | | | .10 | | | .12 | | |
| Observations | 117 | | | 117 | | | 79 | | | 77 | | | 77 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 19

*GPA Regressed on ISEL*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.54 | 0.30 | | 3.11 | 0.48 | | 3.11 | 0.57 | | 3.04 | 0.77 | | 2.80 | 1.79 | |
| White | 0.01 | 0.06 | | -0.12 | 0.11 | | -0.17 | 0.13 | | -0.11 | 0.13 | | -0.11 | 0.13 | |
| Male | 0.34 | 0.15 | ** | -0.52 | 0.59 | | -0.90 | 0.73 | | -0.54 | 0.73 | | -0.56 | 0.74 | |
| White * Male | | | | 0.20 | 0.13 | | 0.28 | 0.17 | | 0.18 | 0.17 | | 0.18 | 0.17 | |
| Ability | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.01 | 0.03 | |
| ISEL | | | | | | | | | | -0.04 | 0.17 | | 0.03 | 0.50 | |
| Ability*ISEL | | | | | | | | | | | | | 0.00 | 0.01 | |
| $R^2$ | .04 | | | .06 | | | .07 | | | .05 | | | .05 | | |
| Observations | 113 | | | 114 | | | 77 | | | 70 | | | 70 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 20

*Retention Regressed on ISEL*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.12 | 0.07 | | 1.01 | 0.13 | | 1.01 | 0.13 | | 1.08 | 0.18 | | 0.97 | 0.40 | |
| White | -0.03 | 0.02 | * | 0.00 | 0.03 | | 0.00 | 0.03 | | 0.00 | 0.04 | | 0.00 | 0.02 | |
| Male | -0.03 | 0.04 | | 0.13 | 0.14 | | 0.15 | 0.15 | | 0.17 | 0.19 | | 0.15 | 0.15 | |
| White * Male | | | | -0.04 | 0.04 | | -0.03 | 0.04 | | -0.03 | 0.05 | | -0.03 | 0.02 | |
| Ability | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.02 | |
| ISEL | | | | | | | | | | -0.02 | 0.03 | | 0.02 | 0.14 | |
| Ability*ISEL | | | | | | | | | | | | | 0.00 | 0.00 | |
| $R^2$ | .04 | | | .07 | | | .06 | | | .08 | | | .09 | | |
| Observations | 117 | | | 117 | | | 79 | | | 72 | | | 72 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 21

*Retention Regressed on Organizational Identity*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.10 | 0.06 | | 1.00 | 0.10 | | 1.01 | 0.11 | | 0.91 | 0.13 | | 1.08 | 0.21 | |
| White | -0.02 | 0.01 | * | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.03 | | 0.00 | 0.03 | |
| Male | -0.04 | 0.03 | | 0.11 | 0.12 | | 0.14 | 0.14 | | 0.15 | 0.15 | | 0.16 | 0.15 | |
| White * Male | | | | -0.03 | 0.03 | | -0.04 | 0.03 | | -0.05 | 0.03 | | -0.05 | 0.03 | |
| Ability | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.00 | |
| Organizational identity | | | | | | | | | | 0.03 | 0.02 | | -0.02 | 0.06 | |
| Ability*Organizational identity | | | | | | | | | | | | | 0.00 | 0.00 | |
| $R^2$ | .04 | | | .06 | | | .07 | | | .10 | | | .12 | | |
| Observations | 117 | | | 117 | | | 79 | | | 74 | | | 74 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 22

*GPA Regressed on Social Identity*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.54 | 0.30 | | 3.11 | 0.48 | | 3.11 | 0.57 | | 4.33 | 0.98 | | 6.62 | 2.68 | |
| White | 0.01 | 0.06 | | -0.12 | 0.11 | | -0.17 | 0.13 | | -0.09 | 0.12 | | -0.09 | 0.12 | |
| Male | 0.34 | 0.15 | * | -0.52 | 0.59 | | -0.90 | 0.73 | | -0.41 | 0.68 | | -0.42 | 0.68 | |
| White * Male | | | | 0.20 | 0.13 | | 0.28 | 0.17 | | 0.16 | 0.16 | | 0.16 | 0.16 | |
| Ability | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | -0.03 | 0.04 | |
| Social identity | | | | | | | | | | -0.40 | 0.21 | | -1.05 | 0.73 | |
| Ability*Social identity | | | | | | | | | | | | | 0.01 | 0.01 | |
| $R^2$ | .01 | | | .06 | | | .07 | | | .09 | | | .10 | | |
| Observations | 114 | | | 114 | | | 77 | | | 70 | | | 70 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 23

*Retention Regressed on Social Identity*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.10 | 0.06 | | 1.00 | 0.10 | | 1.01 | 0.11 | | 0.91 | 0.22 | | 0.70 | 0.60 | |
| White | -0.02 | 0.01 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.03 | | 0.00 | 0.03 | |
| Male | -0.04 | 0.03 | | 0.11 | 0.12 | | 0.14 | 0.14 | | 0.14 | 0.15 | | 0.14 | 0.15 | |
| White * Male | | | | -0.03 | 0.03 | | -0.04 | 0.03 | | -0.04 | 0.04 | | -0.04 | 0.04 | |
| Ability | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.01 | |
| Social identity | | | | | | | | | | 0.03 | 0.05 | | 0.08 | 0.17 | |
| Ability*Social identity | | | | | | | | | | | | | 0.00 | 0.00 | |
| $R^2$ | .04 | | | .06 | | | .07 | | | .07 | | | .07 | | |
| Observations | 117 | | | 117 | | | 79 | | | 72 | | | 72 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 24

*GPA Regressed on the Interaction between Study Hours and Academic Motivation*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | | Model 6 | | | Model 7 | | | Model 8 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.54 | 0.30 | | 3.11 | 0.48 | | 3.31 | 0.53 | | 3.27 | 0.61 | | 3.63 | 1.09 | | 4.20 | 1.04 | | 1.33 | 2.32 | | 1.48 | 2.23 | |
| White | 0.01 | 0.06 | | -0.12 | 0.11 | | -0.17 | 0.12 | | -0.21 | 0.14 | | -0.16 | 0.14 | | -0.12 | 0.13 | | -0.13 | 0.14 | | -0.12 | 0.14 | |
| Male | 0.34 | 0.15 | * | -0.52 | 0.59 | | -0.90 | 0.65 | | -1.16 | 0.81 | | -1.05 | 0.79 | | -0.74 | 0.71 | | -0.92 | 0.80 | | -0.83 | 0.77 | |
| White*Male | | | | 0.20 | 0.13 | | 0.28 | 0.15 | * | 0.33 | 0.18 | * | 0.29 | 0.18 | | 0.24 | 0.17 | | 0.27 | 0.18 | | 0.26 | 0.18 | |
| Study hours | | | | | | | 0.00 | 0.01 | | 0.00 | 0.01 | | 0.00 | 0.01 | | -0.07 | 0.05 | | 0.00 | 0.09 | | 0.05 | 0.09 | |
| Ability | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | -0.01 | 0.01 | | 0.04 | 0.03 | | 0.03 | 0.03 | |
| Academic motivation | | | | | | | | | | | | | -0.09 | 0.17 | | -0.12 | 0.17 | | 0.43 | 0.49 | | 0.54 | 0.48 | |
| Study hours * Academic motivation | | | | | | | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.02 | | -0.03 | 0.02 | |
| Ability * Academic motivation | | | | | | | | | | | | | | | | | | | -0.01 | 0.01 | | -0.01 | 0.01 | |
| Study hours* Ability*Academic motivation | | | | | | | | | | | | | | | | | | | | | | 0.001 | 0.00 | |
| $R^2$ | .04 | | | .04 | | | .07 | | | .08 | | | .06 | | | .10 | | | .06 | | | .16 | | |
| Observations | 114 | | | 114 | | | 102 | | | 71 | | | 69 | | | 72 | | | 69 | | | 69 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 25

*Retention Regressed on the Interaction between Study Hours and Academic Motivation*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | | Model 6 | | | Model 7 | | | Model 8 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.10 | 0.06 | | 1.00 | 0.10 | | 0.98 | 0.10 | | 0.98 | 0.11 | | 0.60 | 0.19 | | 0.66 | 0.20 | | 0.59 | 0.21 | | 0.56 | 0.23 | |
| White | -0.02 | 0.01 | | 0.00 | 0.02 | | 0.01 | 0.02 | | 0.02 | 0.03 | | 0.30 | 0.05 | | 0.70 | .07 | | 0.80 | 0.08 | | 0.90 | 0.10 | |
| Male | -0.04 | 0.15 | * | -0.52 | 0.59 | | -0.90 | 0.65 | | -1.16 | 0.81 | | -1.05 | 0.79 | | -0.74 | 0.71 | | -0.92 | 0.80 | | -0.83 | 0.77 | |
| White*Male | | | | 0.20 | 0.13 | | 0.28 | 0.15 | * | 0.33 | 0.18 | * | 0.29 | 0.18 | | 0.24 | 0.17 | | 0.27 | 0.18 | | 0.26 | 0.18 | |
| Study hours | | | | | | | 0.00 | 0.01 | | 0.00 | 0.01 | | 0.00 | 0.01 | | -0.07 | 0.05 | | 0.00 | 0.09 | | 0.05 | 0.09 | |
| Ability | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | -0.01 | 0.01 | | 0.04 | 0.03 | | 0.03 | 0.03 | |
| Academic motivation | | | | | | | | | | | | | -0.09 | 0.17 | | -0.12 | 0.17 | | 0.43 | 0.49 | | 0.54 | 0.48 | |
| Study hours * Academic motivation | | | | | | | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.02 | | -0.03 | 0.02 | |
| Ability * Academic motivation | | | | | | | | | | | | | | | | | | | -0.01 | 0.01 | | -0.01 | 0.01 | |
| Study hours* Ability*Academic motivation | | | | | | | | | | | | | | | | | | | | | | 0.004 | 0.00 | * |
| $R^2$ | .04 | | | .04 | | | .07 | | | .08 | | | .06 | | | .10 | | | .06 | | | .16 | | |
| Observations | 114 | | | 114 | | | 102 | | | 71 | | | 69 | | | 72 | | | 69 | | | 69 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 26

*GPA Regressed on the Interaction between Study Hours and Academic Motivation (External)*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | | Model 6 | | | Model 7 | | | Model 8 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.54 | 0.30 | | 3.11 | 0.48 | | 3.31 | 0.53 | | 3.27 | 0.61 | | 3.63 | 1.09 | | 4.20 | 1.04 | | 1.33 | 2.32 | | 1.48 | 2.23 | |
| White | 0.01 | 0.06 | | -0.12 | 0.11 | | -0.17 | 0.12 | | -0.21 | 0.14 | | -0.16 | 0.14 | | -0.12 | 0.13 | | -0.13 | 0.14 | | -0.12 | 0.14 | |
| Male | 0.34 | 0.15 | * | -0.52 | 0.59 | | -0.90 | 0.65 | | -1.16 | 0.81 | | -1.05 | 0.79 | | -0.74 | 0.71 | | -0.92 | 0.80 | | -0.83 | 0.77 | |
| White*Male | | | | 0.20 | 0.13 | | 0.28 | 0.15 | * | 0.33 | 0.18 | * | 0.29 | 0.18 | | 0.24 | 0.17 | | 0.27 | 0.18 | | 0.26 | 0.18 | |
| Study hours | | | | | | | 0.00 | 0.01 | | 0.00 | 0.01 | | 0.00 | 0.01 | | -0.07 | 0.05 | | 0.00 | 0.09 | | 0.05 | 0.09 | |
| Ability | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | -0.01 | 0.01 | | 0.04 | 0.03 | | 0.03 | 0.03 | |
| Academic motivation | | | | | | | | | | | | | -0.09 | 0.17 | | -0.12 | 0.17 | | 0.43 | 0.49 | | 0.54 | 0.48 | |
| Study hours * Academic motivation | | | | | | | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.02 | | -0.03 | 0.02 | |
| Ability * Academic motivation | | | | | | | | | | | | | | | | | | | -0.01 | 0.01 | | -0.01 | 0.01 | |
| Study hours* Ability*Academic motivation | | | | | | | | | | | | | | | | | | | | | | 0.007 | 0.00 | * |
| $R^2$ | .04 | | | .04 | | | .07 | | | .08 | | | .06 | | | .10 | | | .06 | | | .16 | | |
| Observations | 114 | | | 114 | | | 102 | | | 71 | | | 69 | | | 72 | | | 69 | | | 69 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 27

*Retention Regressed on the Interaction between Study Hours and Academic Motivation (External)*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | | Model 6 | | | Model 7 | | | Model 8 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.10 | 0.06 | | 1.05 | 0.10 | | 0.95 | 0.08 | | 1.00 | 0.12 | | 0.87 | 0.17 | | 0.84 | 0.23 | | 0.95 | 0.45 | | 0.99 | 0.45 | |
| White | -0.03 | 0.01 | | 0.00 | 0.02 | | 0.00 | 0.03 | | 0.00 | 0.03 | | 0.00 | 0.02 | | 0.00 | 0.03 | | 0.00 | 0.03 | | 0.00 | 0.03 | |
| Male | -0.04 | 0.02 | | 0.11 | 0.14 | | 0.10 | 0.18 | | 0.16 | 0.19 | | 0.15 | 0.13 | | 0.16 | 0.16 | | 0.12 | 0.16 | | 0.15 | 0.18 | |
| White*Male | | | | -0.03 | 0.03 | | -0.02 | 0.02 | | -0.04 | 0.07 | | -0.07 | 0.03 | | -0.04 | 0.02 | | -0.06 | 0.04 | | -0.03 | 0.03 | |
| Study hours | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.01 | | 0.01 | 0.01 | | 0.00 | 0.02 | |
| Ability | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.02 | | 0.00 | 0.01 | |
| Academic motivation. (external) | | | | | | | | | | | | | 0.02 | 0.03 | | 0.05 | 0.05 | | 0.01 | 0.08 | | 0.02 | 0.08 | |
| Study hours * Academic motivation (external) | | | | | | | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.00 | |
| Ability * Academic motivation. (internal) | | | | | | | | | | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | |
| Study hours* Ability*Academic motivation. (external) | | | | | | | | | | | | | | | | | | | | | | 0.00 | 0.00 | |
| $R^2$ | .04 | | | .06 | | | .04 | | | .07 | | | .09 | | | .10 | | | .10 | | | .10 | | |
| Observations | 117 | | | 117 | | | 104 | | | 73 | | | 71 | | | 71 | | | 71 | | | 71 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 28

*GPA Regressed on the Interaction between Study Hours and Academic Motivation (Internal)*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | | Model 6 | | | Model 7 | | | Model 8 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.54 | 0.30 | | 3.11 | 0.48 | | 3.31 | 0.53 | | 3.27 | 0.61 | | 3.74 | 0.85 | | 0.65 | 1.91 | | 0.70 | 0.44 | | 1.94 | 1.95 | |
| White | 0.01 | 0.06 | | -0.12 | 0.11 | | -0.17 | 0.12 | | -0.21 | 0.14 | | -0.13 | 0.13 | | -0.09 | 0.13 | | 0.00 | 0.03 | | -0.09 | 0.13 | |
| Male | 0.34 | 0.15 | | -0.52 | 0.59 | | -0.90 | 0.65 | | -1.16 | 0.81 | | -0.97 | 0.76 | | -0.90 | 0.75 | | 0.13 | 0.15 | | -0.72 | 0.74 | |
| White*Male | | | | 0.20 | 0.13 | | 0.28 | 0.15 | | 0.33 | 0.18 | | 0.28 | 0.17 | | 0.26 | 0.17 | | -0.04 | 0.03 | | 0.22 | 0.17 | |
| Study hours | | | | | | | 0.00 | 0.01 | | 0.00 | 0.01 | | 0.00 | 0.01 | | 0.00 | 0.01 | | 0.03 | 0.02 | | -0.05 | 0.05 | |
| Ability | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.05 | 0.03 | | 0.00 | 0.01 | | 0.03 | 0.03 | |
| Academic motivation. (internal) | | | | | | | | | | | | | -0.13 | 0.14 | | 0.56 | 0.41 | | 0.06 | 0.09 | | 0.41 | 0.41 | |
| Study hours * Academic motivation (external) | | | | | | | | | | | | | | | | -0.01 | 0.01 | | -0.01 | 0.01 | | -0.01 | 0.01 | |
| Ability * Academic motivation. (internal) | | | | | | | | | | | | | | | | | | | 0.00 | 0.00 | | -0.01 | 0.01 | |
| Study hours* Ability*Academic motivation. (internal) | | | | | | | | | | | | | | | | | | | | | | 0.006 | 0.00 | * |
| $R^2$ | .04 | | | .06 | | | .07 | | | .08 | | | .06 | | | .11 | | | .11 | | | .13 | | |
| Observations | 114 | | | 114 | | | 102 | | | 71 | | | 69 | | | 69 | | | 69 | | | 74 | | |

*Note.* ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note.* *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 29

*Retention Regressed on the Interaction between Study Hours and Academic Motivation (Internal)*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | | Model 6 | | | Model 7 | | | Model 8 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.10 | 0.06 | | 1.00 | 0.10 | | 0.99 | 0.09 | | 1.00 | 0.12 | | 0.84 | 0.18 | | 0.80 | 0.23 | | 0.94 | 0.42 | | 0.98 | 0.44 | |
| White | -0.02 | 0.01 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.03 | | 0.00 | 0.03 | | 0.00 | 0.03 | | 0.00 | 0.03 | | 0.00 | 0.03 | |
| Male | -0.04 | 0.03 | | 0.11 | 0.12 | | 0.07 | 0.11 | | 0.14 | 0.16 | | 0.14 | 0.16 | | 0.14 | 0.16 | | 0.13 | 0.16 | | 0.14 | 0.16 | |
| White*Male | | | | -0.03 | 0.03 | | -0.02 | 0.03 | | -0.04 | 0.04 | | -0.05 | 0.04 | | -0.04 | 0.04 | | -0.04 | 0.04 | | -0.04 | 0.04 | |
| Study hours | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.01 | | 0.01 | 0.01 | | 0.00 | 0.01 | |
| Ability | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.01 | | 0.00 | 0.01 | |
| Academic motivation. (internal) | | | | | | | | | | | | | 0.04 | 0.03 | | 0.04 | 0.05 | | 0.01 | 0.09 | | 0.01 | 0.09 | |
| Study hours * Academic motivation (external) | | | | | | | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.00 | |
| Ability * Academic motivation. (internal) | | | | | | | | | | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | |
| Study hours* Ability*Academic motivation. (internal) | | | | | | | | | | | | | | | | | | | | | | 0.00 | 0.00 | |
| $R^2$ | .04 | | | .06 | | | .04 | | | .07 | | | .09 | | | .10 | | | .10 | | | .10 | | |
| Observations | 117 | | | 117 | | | 104 | | | 73 | | | 71 | | | 71 | | | 71 | | | 71 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 30

*GPA Regressed on the Interaction between Job Hours and Academic Motivation*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | | Model 6 | | | Model 7 | | | Model 8 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.54 | 0.30 | | 3.11 | 0.48 | | 3.12 | 0.51 | | 3.14 | 0.61 | | 3.75 | 1.02 | | -.26 | 2.26 | | 1.15 | 0.45 | | -1.91 | 2.42 | |
| White | 0.01 | 0.06 | | -0.12 | 0.11 | | -0.11 | 0.11 | | -0.19 | 0.14 | | -0.13 | 0.13 | | -.07 | 0.13 | | 0.00 | 0.03 | | -0.10 | 0.13 | |
| Male | 0.34 | 0.15 | * | -0.52 | 0.59 | | -0.56 | 0.62 | | -1.16 | 0.78 | | -1.00 | 0.74 | | -.61 | 0.71 | | 0.13 | 0.14 | | -0.81 | 0.71 | |
| White*Male | | | | 0.20 | 0.13 | | 0.19 | 0.14 | | 0.33 | 0.18 | | 0.28 | 0.17 | | .21 | 0.16 | | -0.05 | 0.03 | | 0.25 | 0.17 | |
| Job Hours | | | | | | | 0.00 | 0.01 | | 0.00 | 0.01 | | -0.01 | 0.01 | | -.002 | 0.01 | | 0.00 | 0.00 | | 0.10 | 0.05 | |
| Ability | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | .06 | 0.03 | | -0.01 | 0.01 | | 0.06 | 0.03 | |
| Academic motivation | | | | | | | | | | | | | -0.15 | 0.17 | | .74 | 0.49 | | -0.05 | 0.10 | | 1.15 | 0.52 | |
| Job Hours * Academic motivation | | | | | | | | | | | | | | | | -.01 | 0.00 | | 0.00 | 0.00 | | -0.03 | 0.01 | |
| Ability * Academic motivation | | | | | | | | | | | | | | | | | | | -0.01 | 0.01 | | -0.01 | 0.01 | |
| Job Hours* Ability*Academic motivation | | | | | | | | | | | | | | | | | | | | | | 0.00 | 0.00 | |
| $R^2$ | .04 | | | .06 | | | .05 | | | .09 | | | .09 | | | .11 | | | .18 | | | .19 | | |
| Observations | 114 | | | 114 | | | 106 | | | 72 | | | 72 | | | 72 | | | 74 | | | 70 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 31

*Retention Regressed on the Interaction between Job Hours and Academic Motivation*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | | Model 6 | | | Model 7 | | | Model 8 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.10 | 0.06 | | 1.00 | 0.10 | | 0.97 | 0.10 | | 0.99 | 0.12 | | 0.60 | 0.20 | | 0.41 | 0.29 | | 0.81 | 0.51 | | 0.82 | 0.52 | |
| White | -0.02 | 0.01 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.03 | | 0.01 | 0.03 | | 0.01 | 0.03 | | 0.00 | 0.03 | | 0.00 | 0.03 | |
| Male | -0.04 | 0.03 | | 0.11 | 0.12 | | 0.11 | 0.13 | | 0.14 | 0.15 | | 0.16 | 0.15 | | 0.16 | 0.15 | | 0.14 | 0.15 | | 0.14 | 0.15 | |
| White*Male | | | | -0.03 | 0.03 | | -0.03 | 0.03 | | -0.04 | 0.03 | | -0.05 | 0.03 | | -0.05 | 0.03 | | -0.05 | 0.03 | | -0.05 | 0.04 | |
| Job Hours | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.01 | 0.01 | | 0.01 | 0.01 | | 0.01 | 0.01 | |
| Ability | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.00 | | -0.01 | 0.01 | | -0.01 | 0.01 | |
| Academic motivation | | | | | | | | | | | | | 0.08 | 0.03 | | 0.12 | 0.06 | | 0.03 | 0.11 | | 0.04 | 0.11 | |
| Job Hours * Academic motivation | | | | | | | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.00 | |
| Ability * Academic motivation | | | | | | | | | | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | |
| Job Hours* Ability*Academic motivation | | | | | | | | | | | | | | | | | | | | | | 0.00 | 0.00 | |
| $R^2$ | 00 | | | 0.06 | | | 0.09 | | | 0.09 | | | 0.16 | | | 0.17 | | | 0.19 | | | 0.18 | | |
| Observations | 117 | | | 117 | | | 109 | | | 74 | | | 72 | | | 72 | | | 74 | | | 72 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 32

*GPA Regressed on the Interaction between Job Hours and Academic Motivation (External)*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | | Model 6 | | | Model 7 | | | Model 8 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.61 | 0.40 | | 3.15 | 0.50 | | 3.33 | 0.55 | | 3.30 | 0.65 | | 3.67 | 1.10 | | 4.25 | 1.04 | | 1.36 | 2.33 | | 1.48 | 2.25 | |
| White | 0.01 | 0.08 | | -0.14 | 0.14 | | -0.19 | 0.14 | | -0.25 | 0.12 | | -0.18 | 0.15 | | -0.13 | 0.13 | | -0.14 | 0.18 | | -0.14 | 0.14 | |
| Male | 0.36 | 0.17 | | -0.55 | 0.60 | | -0.95 | 0.67 | | -1.18 | 0.84 | | -1.05 | 0.80 | | -0.76 | 0.73 | | -0.95 | 0.83 | | -0.86 | 0.78 | |
| White*Male | | | | 0.19 | 0.15 | | 0.31 | 0.20 | | 0.37 | 0.19 | | 0.30 | 0.18 | | 0.23 | 0.19 | | 0.28 | 0.15 | | 0.26 | 0.20 | |
| Job hours | | | | | | | 0.00 | 0.01 | | 0.00 | 0.02 | | 0.00 | 0.01 | | -0.03 | 0.06 | | 0.00 | 0.08 | | 0.06 | 0.09 | |
| Ability | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | -0.01 | 0.01 | | 0.04 | 0.04 | | 0.03 | 0.05 | |
| Academic motivation | | | | | | | | | | | | | -0.09 | 0.19 | | -0.15 | 0.14 | | 0.41 | 0.49 | | 0.54 | 0.47 | |
| Job hours * Academic motivation | | | | | | | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.01 | | -0.03 | 0.04 | |
| Ability * Academic motivation | | | | | | | | | | | | | | | | | | | -0.02 | 0.01 | | -0.01 | 0.01 | |
| Job hours* Ability*Academic motivation | | | | | | | | | | | | | | | | | | | | | | 0.00 | 0.00 | |
| $R^2$ | .04 | | | .04 | | | .07 | | | .08 | | | .06 | | | .10 | | | .06 | | | .16 | | |
| Observations | 114 | | | 114 | | | 102 | | | 71 | | | 69 | | | 72 | | | 69 | | | 69 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 33

*Retention Regressed on the Interaction between Job Hours and Academic Motivation (External)*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | | Model 6 | | | Model 7 | | | Model 8 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.54 | 0.30 | | 3.11 | 0.48 | | 3.12 | 0.51 | | 3.14 | 0.61 | | 3.29 | 1.02 | | 0.19 | 0.27 | | -1.45 | 2.57 | | 0.75 | 0.51 | |
| White | 0.01 | 0.06 | | -0.12 | 0.11 | | -0.11 | 0.11 | | -0.19 | 0.14 | | -0.12 | 0.14 | | 0.01 | 0.03 | | -0.12 | 0.14 | | 0.00 | 0.03 | |
| Male | 0.34 | 0.15 | | -0.52 | 0.59 | | -0.56 | 0.62 | | -1.16 | 0.78 | | -0.98 | 0.74 | | 0.13 | 0.15 | | -0.99 | 0.76 | | 0.09 | 0.15 | |
| White*Male | | | | 0.20 | 0.13 | | 0.19 | 0.14 | | 0.33 | 0.18 | | 0.26 | 0.17 | | -0.04 | 0.03 | | 0.28 | 0.18 | | -0.04 | 0.04 | |
| Job Hours | | | | | | | 0.00 | 0.01 | | 0.00 | 0.01 | | -0.01 | 0.01 | | 0.02 | 0.01 | | 0.06 | 0.05 | | 0.02 | 0.01 | |
| Ability | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.05 | 0.03 | | -0.01 | 0.01 | |
| Academic motivation. (external) | | | | | | | | | | | | | -0.05 | 0.16 | | 0.17 | 0.06 | | 1.03 | 0.56 | | 0.06 | 0.11 | |
| Job Hours * Academic motivation (external) | | | | | | | | | | | | | | | | 0.00 | 0.00 | | -0.02 | 0.01 | | 0.00 | 0.00 | |
| Ability * Academic motivation. (external) | | | | | | | | | | | | | | | | | | | -0.01 | 0.01 | | 0.00 | 0.00 | |
| Job Hours* Ability*Academic motivation. (external) | | | | | | | | | | | | | | | | | | | | | | 0.00 | 0.00 | |
| $R^2$ | .04 | | | .06 | | | .05 | | | .09 | | | .07 | | | .24 | | | .13 | | | .26 | | |
| Observations | 114 | | | 114 | | | 106 | | | 72 | | | 70 | | | 72 | | | 70 | | | 72 | | |

*Note.* ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note.* *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 34

*GPA Regressed on the Interaction between Job Hours and Academic Motivation (Internal)*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | | Model 6 | | | Model 7 | | | Model 8 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.54 | 0.30 | | 3.11 | 0.48 | | 3.12 | 0.51 | | 3.14 | 0.61 | | 3.64 | 0.82 | | 1.67 | 1.07 | | -0.36 | 1.98 | | -0.33 | 2.01 | |
| White | 0.01 | 0.06 | | -0.12 | 0.11 | | -0.11 | 0.11 | | -0.19 | 0.14 | | -0.11 | 0.13 | | -0.07 | 0.12 | | -0.05 | 0.13 | | -0.05 | 0.13 | |
| Male | 0.34 | 0.15 | | -0.52 | 0.59 | | -0.56 | 0.62 | | -1.16 | 0.78 | | -0.95 | 0.73 | | -0.59 | 0.71 | | -0.52 | 0.71 | | -0.53 | 0.72 | |
| White*Male | | | | 0.20 | 0.13 | | 0.19 | 0.14 | | 0.33 | 0.18 | | 0.27 | 0.17 | | 0.19 | 0.16 | | 0.18 | 0.16 | | 0.18 | 0.17 | |
| Job Hours | | | | | | | 0.00 | 0.01 | | 0.00 | 0.01 | | -0.01 | 0.01 | | 0.08 | 0.03 | | 0.08 | 0.03 | | 0.08 | 0.03 | |
| Ability | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.03 | 0.02 | | 0.03 | 0.02 | |
| Academic motivation. (internal) | | | | | | | | | | | | | -0.14 | 0.13 | | 0.27 | 0.20 | | 0.73 | 0.42 | | 0.73 | 0.42 | |
| Job Hours * Academic motivation (external) | | | | | | | | | | | | | | | | -0.02 | 0.01 | | -0.02 | 0.01 | | -0.02 | 0.01 | * |
| Ability * Academic motivation. (internal) | | | | | | | | | | | | | | | | | | | -0.01 | 0.01 | | -0.01 | 0.01 | |
| Job Hours* Ability*Academic motivation. (internal) | | | | | | | | | | | | | | | | | | | | | | 0.00 | 0.00 | |
| $R^2$ | .04 | | | .06 | | | .05 | | | .09 | | | .08 | | | .18 | | | .20 | | | .20 | | |
| Observations | 114 | | | 114 | | | 106 | | | 72 | | | 70 | | | 70 | | | 70 | | | 70 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 35

*Retention Regressed on the Interaction between Job Hours and Academic Motivation (Internal)*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | | Model 6 | | | Model 7 | | | Model 8 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.15 | 0.05 | | 1.06 | 0.11 | | 0.99 | 0.09 | | 1.00 | 0.12 | | 0.88 | 0.17 | | 0.87 | 0.24 | | 0.95 | 0.45 | | 0.96 | 0.47 | |
| White | -0.04 | 0.02 | | 0.00 | 0.03 | | 0.00 | 0.03 | | 0.00 | 0.04 | | 0.00 | 0.01 | | 0.00 | 0.03 | | 0.00 | 0.03 | | 0.00 | 0.03 | |
| Male | -0.05 | 0.01 | | 0.12 | 0.16 | | 0.11 | 0.19 | | 0.14 | 0.20 | | 0.15 | 0.14 | | 0.15 | 0.17 | | 0.12 | 0.16 | | 0.13 | 0.18 | |
| White*Male | | | | -0.04 | 0.05 | | -0.03 | 0.03 | | -0.03 | 0.05 | | -0.08 | 0.03 | | -0.04 | 0.02 | | -0.06 | 0.04 | | -0.02 | 0.03 | |
| Job hours | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.01 | | 0.01 | 0.01 | | 0.00 | 0.02 | |
| Ability | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.02 | | 0.00 | 0.01 | |
| Academic motivation. (internal) | | | | | | | | | | | | | 0.01 | 0.02 | | 0.06 | 0.06 | | 0.01 | 0.08 | | 0.02 | 0.09 | |
| Job hours * Academic motivation (internal) | | | | | | | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.00 | |
| Ability * Academic motivation. (internal) | | | | | | | | | | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | |
| Job hours* Ability*Academic motivation. (internal) | | | | | | | | | | | | | | | | | | | | | | 0.00 | 0.00 | |
| $R^2$ | .04 | | | .06 | | | .04 | | | .07 | | | .09 | | | .10 | | | .10 | | | .10 | | |
| Observations | 117 | | | 117 | | | 104 | | | 73 | | | 71 | | | 71 | | | 71 | | | 71 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 36

GPA Regressed on the Interaction between GRIT and Self-Regulation

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.65 | 0.30 | | 3.15 | 0.50 | | 2.99 | 0.69 | | 2.68 | 0.69 | | 1.42 | 1.73 | |
| White | 0.01 | 0.07 | | -0.10 | 0.13 | | -0.09 | 0.12 | | -0.08 | 0.14 | | -0.08 | 0.12 | |
| Male | 0.34 | 0.16 | | -0.56 | 0.61 | | -0.33 | 0.61 | | -0.30 | 0.63 | | -0.29 | 0.57 | |
| White * Male | | | | 0.25 | 0.15 | | 0.14 | 0.16 | | 0.14 | 0.14 | | 0.14 | 0.12 | |
| GRIT | | | | | | | 0.01 | 0.12 | | -0.05 | 0.15 | | 0.37 | 0.53 | |
| Social support | | | | | | | | | | 0.13 | 0.08 | | 0.43 | 0.40 | |
| GRIT*Social support | | | | | | | | | | | | | -0.10 | 0.15 | |
| $R^2$ | .05 | | | .06 | | | .05 | | | .06 | | | .08 | | |
| Observations | 114 | | | 114 | | | 108 | | | 107 | | | 107 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 37

*Retention Regressed on the Interaction between GRIT and Self-Regulation*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.10 | 0.06 | | 1.00 | 0.10 | | 1.06 | 0.14 | | 1.22 | 0.18 | | 1.53 | 0.71 | |
| White | -0.02 | 0.01 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.02 | |
| Male | -0.04 | 0.03 | | 0.11 | 0.12 | | 0.12 | 0.12 | | 0.12 | 0.13 | | 0.11 | 0.13 | |
| White * Male | | | | -0.03 | 0.03 | | -0.04 | 0.03 | | -0.04 | 0.03 | | -0.04 | 0.03 | |
| GRIT | | | | | | | -0.02 | 0.03 | | -0.02 | 0.03 | | -0.11 | 0.21 | |
| Self-regulation | | | | | | | | | | -0.04 | 0.03 | | -0.13 | 0.20 | |
| GRIT*Self-regulation | | | | | | | | | | | | | 0.03 | 0.06 | |
| $R^2$ | .04 | | | .06 | | | .07 | | | .09 | | | .09 | | |
| Observations | 117 | | | 117 | | | 110 | | | 106 | | | 106 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 38

*GPA Regressed on the Interaction between GRIT and Social Support*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.54 | 0.30 | | 3.11 | 0.48 | | 2.95 | 0.65 | | 2.63 | 0.67 | | 1.40 | 1.71 | |
| White | 0.01 | 0.06 | | -0.12 | 0.11 | | -0.08 | 0.11 | | -0.07 | 0.11 | | -0.07 | 0.11 | |
| Male | 0.34 | 0.15 | | -0.52 | 0.59 | | -0.31 | 0.59 | | -0.29 | 0.59 | | -0.28 | 0.59 | |
| White * Male | | | | 0.20 | 0.13 | | 0.13 | 0.13 | | 0.13 | 0.13 | | 0.13 | 0.13 | |
| GRIT | | | | | | | 0.02 | 0.13 | | -0.03 | 0.13 | | 0.34 | 0.50 | |
| Social support | | | | | | | | | | 0.11 | 0.07 | | 0.41 | 0.39 | |
| GRIT*Social support | | | | | | | | | | | | | -0.09 | 0.12 | |
| $R^2$ | .04 | | | .06 | | | .07 | | | .08 | | | .12 | | |
| Observations | 117 | | | 117 | | | 110 | | | 110 | | | 110 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 39

*Retention Regressed on the Interaction between GRIT and Social Support*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.10 | 0.06 | | 1.00 | 0.10 | | 1.06 | 0.14 | | 1.00 | 0.14 | | 1.67 | 0.35 | |
| White | -0.02 | 0.01 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.02 | |
| Male | -0.04 | 0.03 | | 0.11 | 0.12 | | 0.12 | 0.12 | | 0.13 | 0.12 | | 0.12 | 0.12 | |
| White * Male | | | | -0.03 | 0.03 | | -0.04 | 0.03 | | -0.04 | 0.03 | | -0.04 | 0.03 | |
| GRIT | | | | | | | -0.02 | 0.03 | | -0.03 | 0.03 | | -0.23 | 0.10 | |
| Social support | | | | | | | | | | 0.02 | 0.02 | | -0.14 | 0.08 | |
| GRIT*Social support | | | | | | | | | | | | | 0.05 | 0.02 | |
| $R^2$ | .04 | | | .06 | | | .07 | | | .08 | | | .12 | | |
| Observations | 117 | | | 117 | | | 110 | | | 110 | | | 110 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 40

*GPA Regressed on the Interaction between GRIT and ISEL*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.54 | 0.30 | | 3.11 | 0.48 | | 2.95 | 0.65 | | 3.14 | 0.75 | | 5.32 | 3.27 | |
| White | 0.01 | 0.06 | | -0.12 | 0.11 | | -0.08 | 0.11 | | -0.07 | 0.11 | | -0.07 | 0.11 | |
| Male | 0.34 | 0.15 | | -0.52 | 0.59 | | -0.31 | 0.59 | | -0.17 | 0.61 | | -0.19 | 0.61 | |
| White * Male | | | | 0.20 | 0.13 | | 0.13 | 0.13 | | 0.11 | 0.14 | | 0.12 | 0.14 | |
| GRIT | | | | | | | 0.02 | 0.13 | | 0.09 | 0.14 | | -0.56 | 0.96 | |
| ISEL | | | | | | | | | | -0.14 | 0.14 | | -0.70 | 0.84 | |
| GRIT*ISEL | | | | | | | | | | | | | 0.17 | 0.25 | |
| $R^2$ | .04 | | | .06 | | | .04 | | | .06 | | | .06 | | |
| Observations | 114 | | | 114 | | | 107 | | | 101 | | | 101 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 41

*Retention Regressed on the Interaction between GRIT and ISEL*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.10 | 0.06 | | 1.00 | 0.10 | | 1.06 | 0.14 | | 1.08 | 0.17 | | 0.72 | 0.73 | |
| White | -0.02 | 0.01 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.02 | |
| Male | -0.04 | 0.03 | | 0.11 | 0.12 | | 0.12 | 0.12 | | 0.14 | 0.13 | | 0.14 | 0.14 | |
| White * Male | | | | -0.03 | 0.03 | | -0.04 | 0.03 | | -0.04 | 0.03 | | -0.04 | 0.03 | |
| GRIT | | | | | | | -0.02 | 0.03 | | -0.02 | 0.03 | | 0.09 | 0.21 | |
| ISEL | | | | | | | | | | -0.01 | 0.03 | | 0.09 | 0.19 | |
| GRIT*ISEL | | | | | | | | | | | | | -0.03 | 0.05 | |
| $R^2$ | .04 | | | .06 | | | .07 | | | .07 | | | .07 | | |
| Observations | 117 | | | 117 | | | 110 | | | 104 | | | 104 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 42

*GPA Regressed on the Interaction between GRIT and Organizational Identity*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.54 | 0.30 | | 3.11 | 0.48 | | 2.95 | 0.65 | | 3.01 | 0.69 | | 3.59 | 1.84 | |
| White | 0.01 | 0.06 | | -0.12 | 0.11 | | -0.08 | 0.11 | | -0.08 | 0.11 | | -0.08 | 0.11 | |
| Male | 0.34 | 0.15 | | -0.52 | 0.59 | | -0.31 | 0.59 | | -0.26 | 0.60 | | -0.27 | 0.60 | |
| White * Male | | | | 0.20 | 0.13 | | 0.13 | 0.13 | | 0.12 | 0.13 | | 0.12 | 0.14 | |
| GRIT | | | | | | | 0.02 | 0.13 | | 0.01 | 0.14 | | -0.17 | 0.54 | |
| Organizational identity | | | | | | | | | | -0.01 | 0.09 | | -0.17 | 0.50 | |
| GRIT*Organizational identity | | | | | | | | | | | | | 0.05 | 0.15 | |
| $R^2$ | .04 | | | .06 | | | .04 | | | .04 | | | .04 | | |
| Observations | 114 | | | 114 | | | 107 | | | 104 | | | 104 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 43

*Retention Regressed on the Interaction between GRIT and Organizational Identity*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.10 | 0.06 | | 1.00 | 0.10 | | 1.06 | 0.14 | | 1.01 | 0.15 | | 1.21 | 0.39 | |
| White | -0.02 | 0.01 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.02 | |
| Male | -0.04 | 0.03 | | 0.11 | 0.12 | | 0.12 | 0.12 | | 0.13 | 0.13 | | 0.13 | 0.13 | |
| White * Male | | | | -0.03 | 0.03 | | -0.04 | 0.03 | | -0.04 | 0.03 | | -0.04 | 0.03 | |
| GRIT | | | | | | | -0.02 | 0.03 | | -0.03 | 0.03 | | -0.09 | 0.11 | |
| Organizational identity | | | | | | | | | | 0.03 | 0.02 | | -0.03 | 0.11 | |
| GRIT*Organizational identity | | | | | | | | | | | | | 0.02 | 0.03 | |
| $R^2$ | .04 | | | .06 | | | .07 | | | .08 | | | .09 | | |
| Observations | 117 | | | 117 | | | 110 | | | 107 | | | 107 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 44

*GPA Regressed on the Interaction between GRIT and Social Identity*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.54 | 0.30 | | 3.11 | 0.48 | | 2.95 | 0.65 | | 3.76 | 0.89 | | -1.30 | 4.14 | |
| White | 0.01 | 0.06 | | -0.12 | 0.11 | | -0.08 | 0.11 | | -0.08 | 0.11 | | -0.08 | 0.11 | |
| Male | 0.34 | 0.15 | | -0.52 | 0.59 | | -0.31 | 0.59 | | -0.15 | 0.60 | | -0.10 | 0.60 | |
| White * Male | | | | 0.20 | 0.13 | | 0.13 | 0.13 | | 0.11 | 0.14 | | 0.10 | 0.14 | |
| GRIT | | | | | | | 0.02 | 0.13 | | 0.05 | 0.14 | | 1.62 | 1.26 | |
| Social identity | | | | | | | | | | -0.26 | 0.18 | | 1.06 | 1.07 | |
| GRIT*Social identity | | | | | | | | | | | | | -0.41 | 0.33 | |
| $R^2$ | .04 | | | .06 | | | .04 | | | .06 | | | .07 | | |
| Observations | 114 | | | 114 | | | 107 | | | 100 | | | 100 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 45

*Retention Regressed on the Interaction between GRIT and Social Identity*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.10 | 0.06 | | 1.00 | 0.10 | | 1.06 | 0.14 | | 0.99 | 0.20 | | 1.23 | 0.93 | |
| White | -0.02 | 0.01 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.02 | |
| Male | -0.04 | 0.03 | | 0.11 | 0.12 | | 0.12 | 0.12 | | 0.14 | 0.13 | | 0.13 | 0.13 | |
| White * Male | | | | -0.03 | 0.03 | | -0.04 | 0.03 | | -0.04 | 0.03 | | -0.04 | 0.03 | |
| GRIT | | | | | | | -0.02 | 0.03 | | -0.03 | 0.03 | | -0.10 | 0.28 | |
| Social identity | | | | | | | | | | 0.02 | 0.04 | | -0.04 | 0.24 | |
| GRIT*Social identity | | | | | | | | | | | | | 0.02 | 0.07 | |
| $R^2$ | .04 | | | .06 | | | .07 | | | .07 | | | .07 | | |
| Observations | 117 | | | 117 | | | 110 | | | 103 | | | 103 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 46

*GPA Regressed on the Interaction between Efficacy and Self-Regulation*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.54 | 0.30 | | 3.11 | 0.48 | | 2.64 | 0.66 | | 2.75 | 0.77 | | 5.87 | 2.32 | |
| White | 0.01 | 0.06 | | -0.12 | 0.11 | | -0.07 | 0.10 | | -0.06 | 0.10 | | -0.07 | 0.10 | |
| Male | 0.34 | 0.15 | | -0.52 | 0.59 | | -0.41 | 0.57 | | -0.21 | 0.57 | | -0.22 | 0.57 | |
| White * Male | | | | 0.20 | 0.13 | | 0.15 | 0.13 | | 0.10 | 0.13 | | 0.10 | 0.13 | |
| Efficacy | | | | | | | 0.08 | 0.11 | | 0.03 | 0.12 | | -0.70 | 0.52 | |
| Self-regulation | | | | | | | | | | 0.03 | 0.15 | | -0.94 | 0.70 | |
| Efficacy*Self-regulation | | | | | | | | | | | | | 0.23 | 0.16 | |
| $R^2$ | .04 | | | .06 | | | .04 | | | .03 | | | .05 | | |
| Observations | 114 | | | 114 | | | 111 | | | 107 | | | 107 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 47

*Retention Regressed on the Interaction between Efficacy and Self-Regulation*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.10 | 0.06 | | 1.00 | 0.10 | | 0.98 | 0.14 | | 1.11 | 0.17 | | 1.69 | 0.50 | |
| White | -0.02 | 0.01 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.02 | |
| Male | -0.04 | 0.03 | | 0.11 | 0.12 | | 0.11 | 0.12 | | 0.10 | 0.12 | | 0.09 | 0.12 | |
| White * Male | | | | -0.03 | 0.03 | | -0.03 | 0.03 | | -0.03 | 0.03 | | -0.03 | 0.03 | |
| Efficacy | | | | | | | 0.00 | 0.02 | | 0.01 | 0.03 | | -0.12 | 0.11 | |
| Self-regulation | | | | | | | | | | -0.05 | 0.03 | | -0.23 | 0.15 | |
| Efficacy*Self-regulation | | | | | | | | | | | | | 0.04 | 0.03 | |
| $R^2$ | .04 | | | .06 | | | .06 | | | .08 | | | .09 | | |
| Observations | 117 | | | 117 | | | 114 | | | 110 | | | 110 | | |

*Note.* ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note.* *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 48

*GPA Regressed on the Interaction between Efficacy and Social Support*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.54 | 0.30 | | 3.11 | 0.48 | | 2.63 | 0.66 | | 2.51 | 0.67 | | 2.83 | 1.19 | |
| White | 0.01 | 0.06 | | -0.12 | 0.11 | | -0.07 | 0.10 | | -0.07 | 0.10 | | -0.07 | 0.11 | |
| Male | 0.34 | 0.15 | | -0.52 | 0.59 | | -0.41 | 0.57 | | -0.39 | 0.57 | | -0.40 | 0.57 | |
| White * Male | | | | 0.20 | 0.13 | | 0.15 | 0.13 | | 0.14 | 0.13 | | 0.15 | 0.13 | |
| Efficacy | | | | | | | 0.08 | 0.11 | | 0.02 | 0.12 | | -0.06 | 0.28 | |
| Social support | | | | | | | | | | 0.09 | 0.08 | | 0.00 | 0.29 | |
| Efficacy*Social support | | | | | | | | | | | | | 0.02 | 0.07 | |
| $R^2$ | .04 | | | .06 | | | .04 | | | .05 | | | .05 | | |
| Observations | 114 | | | 114 | | | 111 | | | 111 | | | 111 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 49

*Retention Regressed on the Interaction between Efficacy and Social Support*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.10 | 0.06 | | 1.00 | 0.10 | | 0.98 | 0.14 | | 0.96 | 0.14 | | 1.10 | 0.25 | |
| White | -0.02 | 0.01 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.02 | |
| Male | -0.04 | 0.03 | | 0.11 | 0.12 | | 0.11 | 0.12 | | 0.11 | 0.12 | | 0.10 | 0.12 | |
| White * Male | | | | -0.03 | 0.03 | | -0.03 | 0.03 | | -0.03 | 0.03 | | -0.03 | 0.03 | |
| Efficacy | | | | | | | 0.00 | 0.02 | | -0.01 | 0.03 | | -0.05 | 0.06 | |
| Social support | | | | | | | | | | 0.02 | 0.02 | | -0.02 | 0.06 | |
| Efficacy*Social support | | | | | | | | | | | | | 0.01 | 0.02 | |
| $R^2$ | .04 | | | .06 | | | .06 | | | .07 | | | .08 | | |
| Observations | 117 | | | 117 | | | 117 | | | 114 | | | 114 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 50

*GPA Regressed on the Interaction between Efficacy and ISEL*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.54 | 0.30 | | 3.11 | 0.48 | | 2.63 | 0.66 | | 2.89 | 0.74 | | 1.25 | 3.42 | |
| White | 0.01 | 0.06 | | -0.12 | 0.11 | | -0.07 | 0.10 | | -0.06 | 0.11 | | -0.05 | 0.11 | |
| Male | 0.34 | 0.15 | | -0.52 | 0.59 | | -0.41 | 0.57 | | -0.22 | 0.58 | | -0.18 | 0.59 | |
| White * Male | | | | 0.20 | 0.13 | | 0.15 | 0.13 | | 0.12 | 0.13 | | 0.11 | 0.13 | |
| Efficacy | | | | | | | 0.08 | 0.11 | | 0.14 | 0.11 | | 0.53 | 0.80 | |
| ISEL | | | | | | | | | | -0.16 | 0.13 | | 0.27 | 0.90 | |
| Efficacy*ISEL | | | | | | | | | | | | | -0.10 | 0.21 | |
| $R^2$ | .04 | | | .06 | | | .04 | | | .06 | | | .07 | | |
| Observations | 114 | | | 116 | | | 111 | | | 105 | | | 105 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 51

*Retention Regressed on the Interaction between Efficacy and ISEL*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.097 | .058 | | 1.000 | .095 | | .984 | .140 | | 1.009 | .165 | | 1.282 | .758 | |
| White | -.023 | .012 | | -9.853E-16 | .022 | | .000 | .022 | | .001 | .024 | | .000 | .024 | |
| Male | -.037 | .030 | | .108 | .117 | | .108 | .120 | | .121 | .129 | | .114 | .131 | |
| White * Male | | | | -.033 | .026 | | -.033 | .027 | | -.036 | .029 | | -.035 | .029 | |
| Efficacy | | | | | | | .004 | .023 | | .007 | .025 | | -.058 | .177 | |
| ISEL | | | | | | | | | | -.012 | .030 | | -.084 | .199 | |
| Efficacy*ISEL | | | | | | | | | | | | | .018 | .047 | |
| $R^2$ | .04 | | | .06 | | | .06 | | | .06 | | | .07 | | |
| Observations | 117 | | | 117 | | | 114 | | | 108 | | | 108 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 52

*GPA Regressed on the Interaction between Efficacy and Organizational Identity*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.54 | 0.30 | | 3.11 | 0.48 | | 2.63 | 0.66 | | 2.72 | 0.69 | | 1.86 | 2.45 | |
| White | 0.01 | 0.06 | | -0.12 | 0.11 | | -0.07 | 0.10 | | -0.07 | 0.11 | | -0.08 | 0.11 | |
| Male | 0.34 | 0.15 | | -0.52 | 0.59 | | -0.41 | 0.57 | | -0.36 | 0.58 | | -0.37 | 0.58 | |
| White * Male | | | | 0.20 | 0.13 | | 0.15 | 0.13 | | 0.14 | 0.13 | | 0.14 | 0.13 | |
| Efficacy | | | | | | | 0.08 | 0.11 | | 0.07 | 0.12 | | 0.28 | 0.58 | |
| Organizational identity | | | | | | | | | | -0.01 | 0.09 | | 0.24 | 0.70 | |
| Efficacy*Organizational identity | | | | | | | | | | | | | -0.06 | 0.16 | |
| $R^2$ | .04 | | | .06 | | | .04 | | | .04 | | | .04 | | |
| Observations | 114 | | | 114 | | | 111 | | | 108 | | | 108 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 53

*Retention Regressed on the Interaction between Efficacy and Organizational Identity*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.10 | 0.06 | | 1.00 | 0.10 | | 0.98 | 0.14 | | 0.94 | 0.15 | | 0.77 | 0.52 | |
| White | -0.02 | 0.01 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.02 | |
| Male | -0.04 | 0.03 | | 0.11 | 0.12 | | 0.11 | 0.12 | | 0.11 | 0.12 | | 0.11 | 0.12 | |
| White * Male | | | | -0.03 | 0.03 | | -0.03 | 0.03 | | -0.04 | 0.03 | | -0.04 | 0.03 | |
| Efficacy | | | | | | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.04 | 0.12 | |
| Organizational identity | | | | | | | | | | 0.02 | 0.02 | | 0.08 | 0.15 | |
| Efficacy*Organizational identity | | | | | | | | | | | | | -0.01 | 0.03 | |
| $R^2$ | .04 | | | .06 | | | .06 | | | .07 | | | .08 | | |
| Observations | 117 | | | 117 | | | 114 | | | 111 | | | 111 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 54

*GPA Regressed on the Interaction between Efficacy and Social Identity*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 2.54 | 0.30 | | 0.00 | 3.11 | | 0.00 | 2.63 | | 0.00 | 3.58 | | -0.25 | 3.74 | |
| White | 0.01 | 0.06 | | 0.89 | -0.12 | | 0.26 | -0.07 | | 0.49 | -0.08 | | -0.07 | 0.10 | |
| Male | 0.34 | 0.15 | | 0.03 | -0.52 | | 0.38 | -0.41 | | 0.47 | -0.27 | | -0.21 | 0.57 | |
| White * Male | | | | | 0.20 | | 0.14 | 0.15 | | 0.24 | 0.14 | | 0.13 | 0.13 | |
| Efficacy | | | | | | | | 0.08 | | 0.46 | 0.19 | | 1.14 | 0.92 | |
| Social identity | | | | | | | | | | | -0.39 | | 0.60 | 0.96 | |
| Efficacy*Social identity | | | | | | | | | | | | | -0.25 | 0.24 | |
| $R^2$ | .04 | | | | .06 | | | .04 | | | .08 | | .09 | | |
| Observations | 114 | | | | 114 | | | 111 | | | 104 | | 104 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 55

*Retention Regressed on the Interaction between Efficacy and Social Identity*

| Measures | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | | Model 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| Intercept | 1.10 | 0.06 | | 1.00 | 0.10 | | 0.98 | 0.14 | | 0.93 | 0.19 | | 1.14 | 0.85 | |
| White | -0.02 | 0.01 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.02 | | 0.00 | 0.02 | |
| Male | -0.04 | 0.03 | | 0.11 | 0.12 | | 0.11 | 0.12 | | 0.11 | 0.13 | | 0.11 | 0.13 | |
| White * Male | | | | -0.03 | 0.03 | | -0.03 | 0.03 | | -0.04 | 0.03 | | -0.04 | 0.03 | |
| Efficacy | | | | | | | 0.00 | 0.02 | | 0.00 | 0.03 | | -0.06 | 0.21 | |
| Social identity | | | | | | | | | | 0.02 | 0.04 | | -0.03 | 0.22 | |
| Efficacy*Social identity | | | | | | | | | | | | | 0.01 | 0.05 | |
| $R^2$ | .04 | | | .06 | | | .06 | | | .06 | | | .06 | | |
| Observations | 117 | | | 117 | | | 114 | | | 107 | | | 107 | | |

*Note*. ** Coefficient is significant at the .01 level (2-tailed), *Coefficient is significant at the .05 level (2-tailed).
*Note*. *** $p < .01$, ** $p < .05$, * $p < 0.1$.

Table 56

*Overview of Paper 3 Results*

| Variable | | Hypothesis | Hypothesis Confirmed | Notes |
|---|---|---|---|---|
| Motivation | H1 | Students with high levels of motivation will have higher GPAs than students with low levels of motivation | ✓ | |
| Motivation | H2 | Students with high levels of motivation will have higher retention than students with low levels of motivation | ✓ | |
| Ability x Motivation | H3 | The strength of the positive relationship between ability and GPA will be stronger when motivation is high than when it is low | ✓ | |
| Ability x Motivation | H4 | The strength of the positive relationship between ability and retention will be stronger when motivation is high than when it is low | × | |
| External Motivation | H5 | Students with high levels of external motivation will have higher retention rates than students with low levels of external motivation | ✓ | |
| Internal Motivation | H6 | Students with high levels of internal motivation will have higher retention rates than students with low levels of external motivation | × | |
| External Motivation | H7 | Students with high levels of external motivation will have higher GPAs than students with low levels of external motivation | ✓ | 1) Marginally significant |
| 1) Internal Motivation | H8 | Students with high levels of internal motivation will have higher GPAs than students with low levels of external motivation | ✓ | |

| | | | |
|---|---|---|---|
| Self-Regulation | H9 | Students with high levels of self-regulation will have higher GPAs than students with low levels of self-regulation | × |
| Self-Regulation | H10 | Students with high levels of self-regulation will have higher retention than students with low levels of self-regulation | × |
| ISEL and Social Support | H11 | Students with high levels of interpersonal support and perceived social support will have higher GPAs than students with low levels of interpersonal support | × |
| ISEL and Social Support | H12 | Students with high levels of interpersonal support and perceived social support will have higher retention than students with low levels of interpersonal support | × |
| Organizational Identity | H13 | Students with high levels of organizational identity will have higher GPAs than students with low levels of organizational identity | × |
| Organizational Identity | H14 | Students with high levels of organizational identity will have higher retention than students with low levels of organizational identity | × |
| College Student Social Identity | H15 | Students with high levels of college student social identity will have higher GPAs than students with low levels of social identity | × |
| College Student Social Identity | H16 | Students with high levels of college student social identity will have higher retention than students with low levels of social identity | × |
| Self-Efficacy | H17 | The strength of the positive relationship between the psychological variables and GPA will be stronger when self-efficacy is high than when it is low | × |
| Self-Efficacy | H18 | The strength of the positive relationship between the psychological variables and retention will be stronger when self-efficacy is high than when it is low | × |

| | | | |
|---|---|---|---|
| Grit | H19 | The strength of the positive relationship between the psychological variables and GPA will be stronger when grit is high than when it is low | × |
| Grit | H20 | The strength of the positive relationship between the psychological variables and retention will be stronger when grit is high than when it is low | × |
| Ability x Hours Studied x Motivation | N/A | GPA | ✓ |
| Ability x Hours Studied x Motivation | N/A | Retention | ✓ |
| Ability x Hours Studied x External Motivation | N/A | GPA | ✓ |
| Ability x Hours Studied x External Motivation | N/A | Retention | × |
| Ability x Hours Studied x Internal Motivation | N/A | GPA | ✓ |
| Ability x Hours Studied x Internal Motivation | N/A | Retention | ✓ |