



Student Success Courses and Educational Outcomes at Virginia Community Colleges

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Abstract

Using data from the Virginia Community College System and building upon prior Florida-based research, this study examines whether student success course enrollment, as well as student and institutional characteristics, has positive associations with shorter term student outcomes, including earning any college credits within the first year and persistence into the second year. The present study finds that students who enrolled in a student success course in the first semester were more likely to earn any college-level credits within the first year and were more likely to persist to the second year. The study also finds that students who were referred to developmental education were more likely to earn any college-level credits within the first year if they enrolled in a student success course in their first term.

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1. Introduction

Community college students face a variety of barriers to degree completion, including the need to earn an income and fulfill family care duties while enrolled as well as low levels of academic preparation. Entering students at these institutions are more likely to need at least one developmental course than their peers at four-year colleges, and they are more likely to need to spend a longer period of time taking such courses (Wirt et al., 2004). Student success at community colleges remains low: Six years after their initial enrollment in the 1995–96 school year, only 45 percent of first-time college students at community colleges had transferred to a four-year institution or earned a certificate or degree (Bailey, Jenkins, & Leinbach, 2006).

In an attempt to help students overcome barriers to success and to improve academic outcomes, community colleges have implemented a variety of student support services, one of which is the student success course. This course, which is usually aimed at students who have no previous college experience, provides them with useful information about the institution, assistance in academic and career planning, techniques to improve study habits, and opportunities to develop personal skills such as basic financial literacy. The goal of the course is to help direct students to the various services offered at the college, facilitate their adjustment to the college environment, and give them the tools they need to be successful at the institution (O’Gara, Karp, & Hughes, 2008).

There is a body of literature that generally indicates an association between participation in a student success course and a range of positive academic outcomes. For example, Schnell and Doetkott (2003) found that students who enrolled in the freshman seminar at a public four-year university persisted in significantly greater numbers than those who had not. Similarly, Boudreau and Kromrey (1994) found a positive relationship between the completion of a freshman orientation course and college persistence, as well as academic performance. A more recent and larger scale study was conducted by the Community College Research Center using data from all 28 Florida community colleges (Zeidenberg, Jenkins, & Calcagno, 2007). This study tracked a cohort of students over 17 terms and compared students who enrolled in a student success

course (known as a Student Life Skills, or SLS, course in Florida) with those who did not. Regression analysis was used to control for student characteristics such as gender, ethnicity, age, English proficiency, and test scores. The study found that students who enrolled in SLS courses were more likely than their non-enrolled peers to be successful over the given time period, as measured by credential completion, persistence in the college, and transfer to a four-year college in the Florida state university system.

However, the Florida study had several shortcomings, particularly in its ability to determine whether students enrolled in an SLS course early in their college careers. In addition, the analysis using the Florida data counted enrollment in a non-academic internship as enrollment in a student success course, since the data did not allow differentiation between academic and non-academic enrollment in SLS courses. These non-academic internships often do not fit the main goal of student success courses, which are meant to provide students with skills specific to improving their academic outcomes.

Using data from the Virginia Community College System, the present study builds and expands upon the Florida study through the use of more detailed information on student success courses (excluding internships) and on the students themselves. The purpose of the study is to determine whether student success course enrollment, as well as student and institutional characteristics, has positive associations with shorter term student outcomes such as credit accumulation within the first year and persistence into the second year. Since any possible effects of student success course enrollment are unlikely to persist over the course of many years, we focus on outcomes that are measureable within a shorter period of time. We are particularly interested in whether early enrollment in a student success course, either within the first semester or within the first 15 enrolled credits, has a strong relationship with these outcomes. In addition, we draw upon the information that we have on student referral to developmental education¹ to determine whether enrolling in a student success course has a positive relationship with outcomes for students who are referred to at least one developmental course. Students who are referred to developmental education are, at most institutions, the most vulnerable group of students in terms of persistence or other positive academic outcomes.

¹ We use the terms “developmental” and “remedial” education interchangeably throughout this paper.

We explore the relationship between developmental referral and student success course enrollment and outcomes for this reason.

2. Virginia Community College System Data

The original dataset consists of 23,267 student-unit records from the Virginia Community College System (VCCS). These records include all community college students enrolled in the system for the first time at their institutions in the summer or fall of 2004.² This includes part-time students and those students who may have earned some credits at another institution. The dataset contains information on student demographics, institutions attended, developmental placement scores and referrals, transcript data on courses taken and grades received, and information on educational outcomes (including certificates and associate degrees earned, as well as transfers to four-year institutions).

For this analysis, we are also able to identify which students enrolled in at least one course that would be in line with our definition of a student success course—a course that orients students toward college, providing them with study skills, information on the institution, and general advising. Three courses in the VCCS meet these criteria: College Success Skills (STD/SDV 100), Orientation to: *Specify Discipline* (STD/SDV 101, or, “Discipline-Specific Orientation”), and College Survival Skills (STD/SDV 108). Out of a total of 14,807 students who enrolled in at least one student success course, 11,658 students enrolled in College Success Skills, 1,713 students enrolled in Discipline-Specific Orientation, and 1,219 students enrolled in College Survival Skills.

According to the VCCS course catalog, College Success Skills is required for graduation in all associate degree programs and also in some certificate programs. The course “assists students in transition to college” and provides an overview of the college’s policies and offerings. Discipline-Specific Orientation offers students information on services offered at the college in addition to study skills and applies this to the student’s discipline where applicable. Lastly, College Survival Skills “provides an orientation to the college” and offers activities focusing on self-discovery and the

² These include all program-placed students (i.e., those in either a transfer-oriented or occupational-oriented track). Students who attended for personal development or work-related training were excluded from the sample.

development of coping skills, such as listening and interpersonal relations. Unlike the other two courses, this course is recommended for students enrolled in developmental education courses. Both College Success Skills and Discipline-Specific Orientation are one-credit courses. Only 6 percent of all College Survival Skills course enrollments in the 2004 cohort were two- or three-credit courses.

Coordinators from the VCCS have indicated that either Discipline-Specific Orientation or College Survival Skills may be used in lieu of College Success Skills for the graduation requirement. Due to the fact that any of these three courses can be used toward degree completion, for purposes of analysis we define student success enrollment as enrollment in any one of these courses.

Many of the students who enrolled in at least one student success course also enrolled in some level of developmental education (in Virginia, there are two levels of developmental reading and three levels of developmental math). Of the 14,807 students who enrolled in a student success course, approximately 62 percent (N = 9,157) enrolled in a developmental education course at some point during their college careers.

3. Descriptive Analysis and Definitions

Although enrollment in a student success course is required by the VCCS to graduate with an associate degree, we find that 88 percent of all students who earned an associate degree within four years enrolled in one of these courses, and that 68 percent of these students enrolled in College Success Skills. The respective percentages for those who earned a certificate are 59 percent and 42 percent. This suggests that while these student success courses are supposed to be a requirement for all associate degree holders, there are still some students who manage to graduate with a degree having never taken one of these courses.

We first compare the outcomes of students who enrolled in at least one student success course versus those who did not enroll in any of these courses. Based on findings from Zeidenberg, Jenkins, and Calcagno (2007), we predict that students who enroll in student success courses are more likely to succeed than similar students who do not enroll

in them, as measured by rates of credits earned (both total³ and college-level) and persistence into the second year. Instead of focusing on longer term student outcomes (e.g., certificate or associate degree attainment), we instead use short-term outcomes for our regression analysis. We assume that enrollment in student success courses should have a greater impact on outcomes within the first year (and on persistence into the second year) relative to award attainment, which is usually measured within three or more years to allow adequate time for students to finish a program. Also, we do not focus on graduation outcomes because we observe that the student success enrollment requirement is not enforced. These are the reasons why we choose to focus primarily on the timing of student success course-taking and shorter-term outcomes.

We measure student success enrollment in two ways—within the first 15 credits of each student’s total attempted credits, and within each student’s first semester⁴ at the institution. Most students who enroll in a student success course do so early on in their college careers. We find that two thirds of the cohort enrolled in a student success course either within their first 15 credits or within their first semester. We capture enrollment in these short-term measures to ensure that students who enroll in student success courses late in their college careers due to some institutional requirement are not identified as enrollees in our analysis. In addition, we want to make sure that student success enrollment occurs before our one-year credit and second-year persistence outcomes.⁵

The descriptive statistics of our control variables and outcomes are shown in Table 1, separated by whether or not the student ever enrolled in a student success course.

³ These include college-level, developmental education, noncredit vocational, and other credits.

⁴ The first semester includes the summer and fall terms of 2004. For the majority of this analysis, we will use enrollment in the first semester as our primary measure of student success enrollment.

⁵ One may argue that even in the first semester, those who *intend* to graduate with a degree will be more likely to take the course, and it may be the intent to graduate that is important to persistence, rather than the taking of the course. However, when we consider only the subset of students who enrolled in student success courses, only 19 percent of those who enrolled in one in the first semester received an associate degree, compared with 23 percent of those who enrolled in one after their first semester.

Table 1
Descriptive Statistics

	All Students	Students Who Enrolled in a Student Success Course	Students Who Did Not Enroll in a Student Success Course
<i>Enrolled in student success</i>	62%	100%	0%
<i>Enrolled in student success within the first 15 credits</i>	42%	67%	0%
<i>Enrolled in student success within the first semester</i>	41%	66%	0%
<i>Enrolled in a developmental course</i>	54%	62%	41%
<i>Referred to a developmental course</i>	58%	64%	49%
<i>Enrolled in student success within the first semester and referred to a developmental course</i>	26%	42%	0%
<i>Outcome: Earned any credits in the first year</i>	86%	92%	77%
<i>Outcome: Earned any college credits in the first year</i>	80%	88%	67%
<i>Outcome: Persisted into the second year</i>	52%	65%	31%
Female	57%	60%	53%
African American	22%	21%	23%
American Indian	1%	1%	1%
Asian	6%	6%	7%
Hispanic	6%	5%	7%
23 years of age or older	25%	19%	36%
Some Pell Grant received	31%	35%	24%
ESL	4%	3%	6%
Academic intent	59%	62%	53%
College Success Skills (100)	49%	79%	0%
Discipline-Specific Orientation (101)	7%	12%	0%
College Survival Skills (108)	5%	8%	0%
Institution—urban	37%	38%	34%
Institution—rural	27%	30%	23%
Institution—suburb	36%	32%	42%
Institution—instructional expenditure per student above median (\$3,020)	65%	62%	70%
Institution—instructional expenditure per student below median (\$3,020)	35%	38%	30%

As shown in Table 1, both students who did and did not enroll in a student success course were fairly similar in terms of ethnic background. However, students who enrolled in at least one student success course in their college careers were younger, more likely to receive Pell Grant aid, more likely to have been referred to and to have enrolled

in a remedial course, and more likely to have academic intent.⁶ A smaller percentage of student success enrollees were either referred to or enrolled in a developmental course. Only about two thirds of the student success enrollees who were referred to a developmental course actually enrolled in a student success course within their first semester; the rest enrolled in a student success course at another point in time. Students who enrolled in a student success course were also more likely to have earned credits (both total and college-level) in their first year; the difference in percentages between the two groups is greater when we observe college-level credit attainment. The gap between enrollees and non-enrollees is even more noticeable when we consider student persistence into the fall term of their second year.

We hypothesize that our findings will be consistent with previous research on student success courses, in that the students who enrolled in these courses early in their college careers will be found to be more likely to earn credits in their first year and persist into the second year than their counterparts who did not enroll in them. We show this descriptively by separating those students who enrolled in a student success course within their first 15 credits from those who did not. We then tabulate our three outcomes by each group in Figure 1.

A larger percentage of students who enrolled in a student success course *within their first 15 enrolled credits* earned credits in their first year and persisted into the second year, relative to students who did not. This difference between the two groups is larger when we measure college-credit attainment in the first year and persistence into the second year. In Figure 2, we measure the same differences between students who enrolled in a student success course *within their first semester* versus those who did not.

We observe that the percentage differences in Figure 2 are very similar to those found in Figure 1. This indicates that the characteristics and outcomes of those students who enrolled in a student success course within their first 15 credits are similar to those who enrolled in a student success course within the first semester.

⁶ Students with academic intent are those who intend to transfer to a four-year institution upon their arrival at the institution.

Figure 1
Short-Term Outcomes for Students Who Enrolled in Student Success Within the First 15 Credits

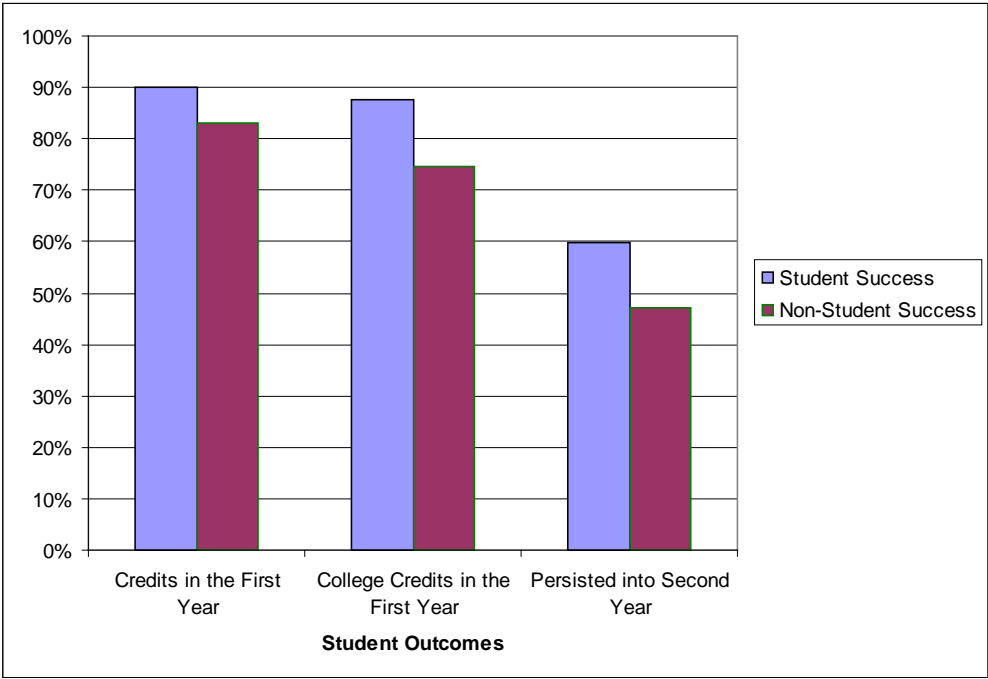
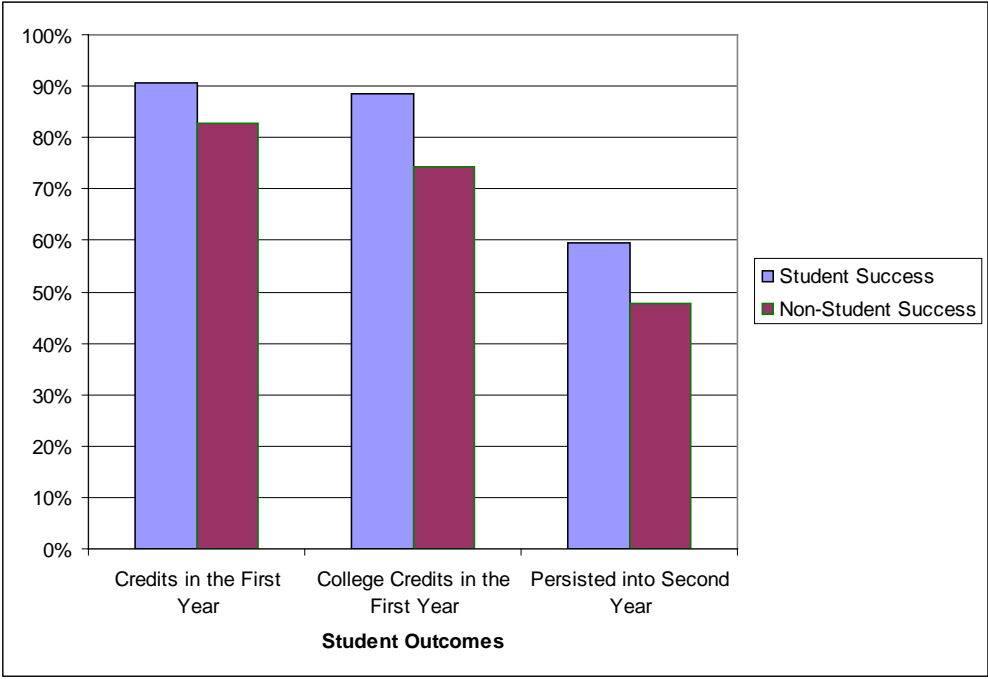


Figure 2
Short-Term Outcomes for Students Who Enrolled in Student Success Within the First Semester



Consistent with previous research, we expect to find positive apparent effects on outcomes when students enroll in a student success course early in college, and we expect to find negative apparent effects on outcomes when students are referred to a developmental course. However, for those students who may have taken a student success course early and were recommended to take a developmental course, we expect to find less negative or marginally positive associations between student success enrollment and outcomes. As students referred to developmental education are at a greater risk of not obtaining credits or persisting into the second year, these students may be the most positively affected by enrolling in a student success course early in their college careers.

4. Empirical Specifications and Results

Using our full sample of students in the 2004 cohort, we develop logit regression models with our three short-term outcomes, using marginal effects coefficients. We hypothesize that success in community colleges is dependent upon student demographics and institutional characteristics. As gender, race and ethnicity, and age are commonly identified as predictors of postsecondary outcomes (Choy, 2002; Pascarella & Terenzini, 2005), the student demographics we use include gender, race, age, Pell Grant received, and ESL enrollment. Institutional characteristics include type of college location (i.e., urban, rural, or suburban) and a dummy variable measuring above-median instructional expenditure per student. We also include dummy variables that indicate whether a student was ever enrolled in a student success course and whether a student was ever enrolled in a developmental education course, as well an interaction term for these two variables. In addition, we add controls to indicate whether a student was a full-time student or had ever enrolled in dual enrollment.⁷ Robust standard errors are clustered by each institution.

In the first regression, the variable of interest is enrollment in student success within the first 15 enrolled credits. Using the full sample of students, the variable equals

⁷ Dual enrollment allows high school students to enroll concurrently in local community college courses. These agreements expose students to college at an early age and are often targeted toward students who may be at risk of not enrolling in postsecondary education.

1 if a student enrolled in a student success course in the first 15 credits, and 0 if not. The results are presented in Table 2.

Table 2
Regressions with Student Success Enrollment in the First 15 Enrolled Credits

	Any Credits Within First Year	Any College Credits Within First Year	Persist to the Second Year
<i>Student success within the first 15 credits</i>	0.055*** [0.004]	0.096*** [0.007]	0.099*** [0.012]
Female	0.032*** [0.004]	0.028*** [0.007]	0.040*** [0.009]
Black	-0.037*** [0.009]	-0.078*** [0.009]	-0.077*** [0.012]
American Indian	-0.033 [0.050]	-0.054 [0.039]	-0.032 [0.042]
Asian	0.013** [0.006]	0.020*** [0.008]	0.057*** [0.013]
Hispanic	0.003 [0.007]	-0.014** [0.007]	0.011 [0.025]
23 years of age or older	0.060*** [0.005]	0.067*** [0.005]	0.009 [0.024]
Some Pell Grant received	-0.009 [0.012]	-0.013 [0.013]	-0.060*** [0.015]
ESL	0.063*** [0.003]	-0.350*** [0.008]	0.100*** [0.005]
Ever full-time	0.152*** [0.007]	0.192*** [0.011]	0.339*** [0.010]
Ever dual enrollee	0.060*** [0.007]	0.094*** [0.007]	0.048*** [0.016]
Transfer (academic intent)	0.002 [0.007]	-0.004 [0.010]	0.028*** [0.007]
Institution—urban	0.029*** [0.011]	0.026*** [0.010]	-0.016 [0.018]
Institution—rural	0.009 [0.010]	0.013 [0.011]	-0.045*** [0.015]
Institution—instructional expenditure above median (\$3,020)	0.014 [0.012]	0.031*** [0.012]	0.015 [0.018]
Observations	23,267	23,267	23,267
Pseudo R-squared	0.079	0.108	0.094

Note. Robust standard errors in brackets, clustered by institution.

* significant at 10%; ** significant at 5%; *** significant at 1%

The results indicate that there is a consistently positive association between student success course enrollment among female students and all three student outcomes. There is a consistently negative association between Black students and outcomes, and a slight positive association between Asian students and outcomes. There is also a positive association between older students and credit attainment. As expected, there is a positive and statistically significant association between full-time students and all three outcomes. There is a similar but less positive association between dual enrollees and these outcomes.

Being enrolled in a student success course has a positive and statistically significant association with all three of our outcomes. Students who enrolled in a student success course within their first 15 credits were 10 percentage points more likely to earn college-level credits in the first year compared with their non-enrollee counterparts, and they were 10 percentage points more likely to persist to the next year. These results are statistically significant at the 1 percent level.

In the next analysis, we use student success enrollment within the first semester as our variable of interest, using the same controls. If the descriptive statistics are any indication, the coefficients on this variable should not vary substantially from the ones found in the last regression. The results are presented in Table 3.

Students who enrolled in a student success course within their first semester were slightly less likely to achieve these three outcomes compared with those who enrolled in a student success course within their first 15 credits. However, the differences are small, and all coefficients on the variable of interest are still statistically significant at the 1 percent level. The largest difference is seen when we use persistence into the second year as our outcome; students who enrolled in a student success course within their first semester were six percentage points more likely to persist, but students who enrolled in a student success course in the first 15 credits were 10 percentage points more likely to persist. This difference may be attributed to the fact that students who took a student success course within the first 15 credits may have taken the course well after their first semester, particularly if they were enrolled part time.

In the interest of brevity, we use student success enrollment in the first semester as our main indicator of enrollment in the upcoming regressions. The two variables are

similar enough (descriptively, as well as when we use them in separate regressions) for the purpose of outcome associations.

Table 3
Regressions with Student Success Enrollment in the First Semester

	Any Credits Within First Year	Any College Credits Within First Year	Persist to the Second Year
<i>Student success within first semester</i>	0.051*** [0.005]	0.095*** [0.008]	0.063*** [0.010]
Female	0.033*** [0.004]	0.029*** [0.007]	0.042*** [0.009]
Black	-0.036*** [0.009]	-0.076*** [0.010]	-0.075*** [0.012]
American Indian	-0.033 [0.051]	-0.054 [0.043]	-0.034 [0.041]
Asian	0.013** [0.006]	0.020*** [0.008]	0.056*** [0.014]
Hispanic	0.004 [0.007]	-0.013* [0.007]	0.012 [0.025]
23 years of age or older	0.060*** [0.005]	0.066*** [0.005]	0.004 [0.024]
Some Pell Grant received	-0.008 [0.012]	-0.013 [0.013]	-0.057*** [0.015]
ESL	0.062*** [0.003]	-0.351*** [0.009]	0.091*** [0.005]
Ever full-time	0.150*** [0.007]	0.187*** [0.010]	0.340*** [0.010]
Ever dual enrollee	0.053*** [0.007]	0.082*** [0.008]	0.027 [0.017]
Transfer (academic intent)	0.002 [0.007]	-0.004 [0.009]	0.028*** [0.007]
Institution—urban	0.029*** [0.011]	0.026*** [0.009]	-0.014 [0.017]
Institution—rural	0.009 [0.010]	0.012 [0.011]	-0.042*** [0.015]
Institution—instructional expenditure above median (\$3,020)	0.014 [0.012]	0.031*** [0.012]	0.012 [0.018]
Observations	23,267	23,267	23,267
Pseudo R-squared	0.077	0.107	0.090

5. Student Success Outcomes and Math Developmental Referral Levels

In the next series of analyses, we consider different samples of students according to their level of developmental math referral. In the state of Virginia, students are referred to one of three levels of developmental math if they are deemed underprepared for college-level work. As there are only two levels of developmental reading in the state, we use math referral levels as a means of creating more distinct levels of developmental education. We hypothesize that the students who were referred to the highest levels of developmental math will outperform their counterparts who were referred to the lowest levels, if both groups enrolled in a student success course.

Using the same controls and dependent variables as those used in Table 2, we carry out the original analysis using only those students who were referred to the lowest level of developmental math. The findings are presented in Table 4. We observe that for those students who were referred to the lowest level of developmental math, taking a student success course is still positively associated with the likelihood of earning credits. There is no evidence that enrolling in a student success course in the first semester has a statistically significant relationship with persistence into the second year.

In Table 5, we see the results of the same analysis using those students who were referred to the middle level of developmental math. We find that for those students who were referred to the middle level of developmental math, there is a positive and statistically significant association between student success enrollment and credit attainment. Among those who were referred to this level, students were more than six percentage points more likely to earn any credits if they enrolled in student success within their first semester. Unlike those students who were referred to the lowest level of developmental math, these students were more than three percentage points more likely to persist into the second year if they enrolled in a student success course in the first semester.

Table 4
Students Referred to the Lowest Level of Developmental Math

	Any Credits Within First Year	Any College Credits Within First Year	Persist to the Second Year
<i>Student success within first semester</i>	0.059*** [0.009]	0.158*** [0.017]	0.014 [0.022]
Female	0.071*** [0.010]	0.081*** [0.019]	0.095*** [0.018]
Black	-0.008 [0.018]	-0.034 [0.026]	-0.035*** [0.013]
American Indian	-0.088 [0.069]	-0.161** [0.067]	0.129 [0.083]
Asian	0.056** [0.026]	0.065 [0.045]	-0.041 [0.035]
Hispanic	0.013 [0.018]	0.001 [0.021]	-0.059* [0.034]
23 years of age or older	0.063*** [0.017]	0.063** [0.027]	0.039 [0.024]
Some Pell Grant received	-0.035** [0.014]	-0.020 [0.018]	-0.119*** [0.028]
ESL	0.106*** [0.025]	-0.335*** [0.040]	0.212*** [0.048]
Ever full-time	0.148*** [0.014]	0.196*** [0.022]	0.307*** [0.013]
Ever dual enrollee	0.083*** [0.022]	0.105*** [0.027]	0.019 [0.046]
Transfer (academic intent)	-0.002 [0.010]	-0.014 [0.020]	0.028 [0.018]
Institution—urban	0.051*** [0.017]	0.062*** [0.020]	0.028** [0.012]
Institution—rural	0.020 [0.019]	0.041** [0.019]	-0.021 [0.023]
Institution—instructional expenditure above median (\$3,020)	0.017 [0.012]	0.058*** [0.022]	0.018 [0.018]
Observations	2,698	2,698	2,698
Pseudo R-squared	0.065	0.090	0.077

Table 5
Students Referred to the Middle Level of Developmental Math

	Any Credits Within First Year	Any College Credits Within First Year	Persist to the Second Year
<i>Student success within first semester</i>	0.064*** [0.008]	0.115*** [0.009]	0.033** [0.016]
Female	0.059*** [0.008]	0.059*** [0.012]	0.061*** [0.011]
Black	-0.046*** [0.014]	-0.095*** [0.016]	-0.101*** [0.022]
American Indian	-0.007 [0.098]	0.022 [0.116]	-0.029 [0.106]
Asian	0.039*** [0.011]	-0.017 [0.016]	0.037 [0.040]
Hispanic	-0.005 [0.018]	-0.020 [0.027]	-0.007 [0.036]
23 years of age or older	0.079*** [0.011]	0.089*** [0.012]	0.052*** [0.014]
Some Pell Grant received	-0.019 [0.017]	-0.018 [0.016]	-0.080*** [0.013]
ESL	0.078*** [0.010]	-0.269*** [0.052]	0.137*** [0.011]
Ever full-time	0.150*** [0.013]	0.201*** [0.016]	0.317*** [0.014]
Ever dual enrollee	0.047*** [0.015]	0.070*** [0.016]	0.060*** [0.019]
Transfer (academic intent)	0.006 [0.009]	-0.004 [0.010]	0.018** [0.008]
Institution—urban	0.038** [0.018]	0.058*** [0.014]	0.006 [0.026]
Institution—rural	-0.000 [0.019]	0.019 [0.016]	-0.043*** [0.016]
Institution—instructional expenditure above median (\$3,020)	0.036** [0.018]	0.055*** [0.018]	0.020 [0.027]
Observations	6,731	6,731	6,731
Pseudo R-squared	0.075	0.097	0.075

Table 6 lists the results of those students who were referred to the highest level of developmental math.

Table 6
Students Referred to the Highest Level of Developmental Math

	Any Credits Within First Year	Any College Credits Within First Year	Persist to the Second Year
<i>Student success within first semester</i>	0.044*** [0.013]	0.078*** [0.013]	0.069*** [0.019]
Female	0.026*** [0.009]	0.032*** [0.008]	-0.008 [0.013]
Black	-0.020 [0.021]	-0.038* [0.020]	-0.006 [0.013]
American Indian	-0.024 [0.054]	-0.037 [0.061]	0.146 [0.097]
Asian	-0.029*** [0.008]	-0.012 [0.008]	0.112*** [0.009]
Hispanic	0.008 [0.008]	-0.012 [0.012]	0.065* [0.037]
23 years of age or older	0.062*** [0.010]	0.061*** [0.012]	0.037 [0.046]
Some Pell Grant received	0.035*** [0.014]	0.037*** [0.014]	-0.019 [0.038]
ESL	0.075*** [0.011]	-0.195*** [0.020]	0.131*** [0.036]
Ever full-time	0.193*** [0.020]	0.223*** [0.029]	0.314*** [0.021]
Ever dual enrollee	0.023 [0.021]	0.040 [0.027]	0.019 [0.036]
Transfer (academic intent)	0.014 [0.009]	0.010 [0.010]	0.047*** [0.013]
Institution—urban	0.005 [0.022]	-0.001 [0.019]	-0.063*** [0.021]
Institution—rural	-0.003 [0.022]	-0.003 [0.020]	-0.060*** [0.023]
Institution—instructional expenditure above median (\$3,020)	0.028 [0.027]	0.034 [0.022]	0.078*** [0.026]
Observations	2,700	2,700	2,700
Pseudo R-squared	0.084	0.088	0.077

We find that students who were referred to the highest level of developmental math were more likely to earn any credits and any college-level credits in the first year if they enrolled in a student success course in the first semester. However, these coefficients are smaller than the ones we observed for the lowest and middle levels. This gives some

indication that student success courses may not be as effective in having students obtain credits, and especially college-level credits, among those referred to the highest levels of developmental math compared with those referred to the lowest levels. These results also indicate that students referred to the highest level of developmental math were seven percentage points more likely to persist into the second year if they enrolled in a student success course in the first semester. This suggests that developmental students who are closest to being college-ready are more likely to benefit from student success courses when persistence is the considered outcome, compared with their lower level developmental counterparts.

6. Concluding Remarks

Many students arrive at community colleges with a host of problems, including inadequate knowledge about how to navigate college as well as poor academic skills. Community colleges offer developmental courses, tutoring, and other academic supports to help students overcome skills deficiencies and succeed in their institutions. Student success courses have been devised as an additional method to help students succeed. In this paper, we have built upon existing studies of these courses and the students who take them with a quantitative analysis in order to determine how strongly student success course enrollment is associated with common student success outcomes. This study indicates that there are clear positive associations between enrolling in a student success course in the first semester and the short-term outcomes of credit attainment and second-year persistence.

Since these courses are mainly targeted at students who are considered academically underprepared, we also examined students who were referred to some form of developmental coursework. In order to determine whether, among students who were referred to different developmental levels, there are positive associations between student success enrollment and short-term outcomes, we divided these referred students according to their math developmental referrals. We find that there is evidence that students who were referred to even the lowest levels of developmental math were more likely to earn credits (and in particular, college-level credits) within the first year if they

enrolled in a student success course in their first term. Relative to students who were referred to the same level of developmental coursework but did not take a student success course early in their college careers, the students who did so were more likely to earn credits and, in the cases of higher level of developmental math students, persist into their second year.

In concert with the growing popularity of student success courses, we have carried out this study to shed light on the relationship between these courses and important short-term student outcomes. We have also explored the relationship between student success courses and developmental education. Detailed analyses such as this one may provide a better understanding of the possible effects of student success courses and may be helpful in making data-informed policy decisions on a statewide level.

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