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CollegeBoard

A Comparison of CLEP® and Non-CLEP Students with Respect to Postsecondary Outcomes

By Carol L. Barry

RESEARCH

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Executive Summary

The College-Level Examination Program® (CLEP ®) is an exam program consisting of 33 exams in five subject areas that typically correspond to single-semester courses, but some correspond to full-year or two-year courses. CLEP exams offer students the opportunity to receive college course credit for learning that has already occurred outside of the traditional college classroom. The current research provides a necessary step in understanding the relationship between receiving course credit via exam scores and important postsecondary outcomes by examining whether differences exist between CLEP and non-CLEP students on postsecondary performance outcomes. The study examined data for matched samples of CLEP and non-CLEP students from a large, diverse state in the southeastern United States. Overall, CLEP students graduate sooner, enroll in fewer semesters, graduate with fewer credits, and have GPAs higher than non-CLEP students, when controlling for demographics and prior achievement. Generally, the differences between CLEP and non-CLEP students were more pronounced for students receiving associate degrees than for students receiving bachelor's degrees. CLEP students also tended to perform better than non-CLEP students in subsequent English courses. There were no differences for subsequent math course performance.

Introduction

The College-Level Examination Program (CLEP) is an exam program consisting of 33 exams in five subject areas, each covering material taught in courses that are typically taken by students within the first two years of college. CLEP exams typically correspond to single-semester courses, but some correspond to full-year or two-year courses. Importantly, these exams offer students the opportunity to receive college course credit for learning that has already occurred outside of the traditional college classroom. As such, many, but certainly not all, students who benefit from taking CLEP exams are nontraditional college applicants and military personnel.

In contrast to other exam programs that offer students the opportunity to receive college course credit (e.g., Advanced Placement®, International Baccalaureate), there are relatively few studies that have specifically examined postsecondary outcomes for students who earned credit through a CLEP exam, relative to students who did not. Scammacca and Dodd (2005) compared both short and long-term postsecondary outcomes (e.g., overall GPA, subsequent course performance, number of semesters enrolled, graduation rate) for students who earned credit for CLEP scores and for students who earned credit through course enrollment; in addition, CLEP students were compared to students who earned credit through an AP® Exam. The results of this study indicated that CLEP students did at least as well as the comparison groups on nearly every outcome. However, this study only included students who attended a single postsecondary institution. Additional research is needed that examines these outcomes for other groups of students attending additional postsecondary institutions.

To this end, this study was conducted to determine whether differences exist between CLEP and non-CLEP students on postsecondary performance outcomes. The study used data for matched samples of CLEP and non-CLEP students from a large, diverse state in the southeastern United States. Specifically, the study was conducted to answer two main research questions[1]:

1. When controlling for demographics and prior achievement, are students who pass at least one CLEP exam and students who have not passed a CLEP exam significantly different in terms of time to degree, number of semesters to graduation, overall GPA, and credits to graduation? Do these differences depend upon whether the student obtained an associate degree or a bachelor's degree?

2. When controlling for demographics and prior achievement, do students who pass a CLEP exam related to algebra or English have significantly different subsequent course performance compared to those students who haven't passed the respective CLEP exam?

1. The researcher also examined a third research question to determine whether the observed differences between CLEP and non-CLEP students depended upon whether the students were participants in a prestigious statewide scholarship program. For research question 1, the differences between CLEP and non-CLEP students were the same regardless of participation in the scholarship program. For research question 2, the results were mixed. The difference between CLEP and non-CLEP students on subsequent math GPA did not depend on scholarship participation, but for subsequent English GPA, the difference between CLEP and non-CLEP students was larger for students in the scholarship program. However, the number of students who participated in the scholarship program was very small (i.e., 1.3% to 3.6% of the total samples), and as such, we recommend that these results be treated as preliminary until more students can be used in the analysis.

Method

Participants

Data for the current study were obtained from a large, diverse state in the southeastern United States. Students' postsecondary transcript data were combined with CLEP exam participation and performance data. A total of 29,595 students were identified as having taken at least one CLEP exam, and of these, 13,256 had obtained a degree from a single postsecondary institution. The specific samples used varied across the three research questions and are described in the following pages. However, for each research question, students were identified as CLEP students (i.e., students who had taken and passed at least one CLEP exam) or non-CLEP students (i.e., students who had either not taken a CLEP exam or who had taken but not passed a CLEP exam).

Research question 1. Of the 13,256 students who took a CLEP exam, 8,124 students passed at least one CLEP exam and graduated from a single postsecondary institution. After having identified these 8,124 CLEP students, a sample of similar non-CLEP students was selected. To this end, a "greedy matching" SAS macro developed by Bergstralh and Kosanke (2003) was used to select a sample of non-CLEP students who were very similar to the CLEP students with regard to a number of control variables that took into account demographics and prior measures of achievement (details follow). This matching technique does not use 1:1 matching, and subsequently, the sample sizes for the two groups may differ from one another. This non-CLEP sample consisted of 8,119 students and was quite similar to the sample of CLEP students (see comparison Table A1 in the appendix).

After having selected the samples of CLEP and non-CLEP students, it was determined that a large number of students had missing data for postsecondary cumulative GPA; there were 664 CLEP students with missing GPA and 401 non-CLEP students with missing GPA. Given the large number of students with a missing GPA value, a multiple imputation procedure was conducted to impute the GPA for these students (Rubin, 1987; SAS Institute Inc., 1999). Finally, only students who received associate (A.A.) or bachelor's (BA) degrees were kept in the data set, yielding a final, effective sample size of 7,889 CLEP students and 7,884 non-CLEP students.

Research question 2. For research question 2, given that the focus was on subsequent course performance rather than outcomes related to graduation, two smaller data sets were created. Because this resulted in smaller total sample sizes for research question 2, some ethnicities (i.e., American Indian/Alaska Native, multiracial) were underrepresented and, for this reason, were excluded from the analyses. For math, CLEP students were limited to students who had taken and passed the College Algebra CLEP exam and who had completed a subsequent math course, yielding a sample size of 721 CLEP students. These students were again matched on the basis of demographics and measures of prior achievement to non-CLEP students, yielding a matched sample of 722 non-CLEP students. For English, CLEP students were limited to students who had taken and passed the English Composition CLEP exam, yielding a sample size of 1,822 CLEP students. These students were again matched on the control variables, yielding a matched sample of 1,826 non-CLEP students. A comparison of the CLEP and matched non-CLEP samples for both math and English are included in Tables A2 and A3 in the appendix).

Measures

A variety of measures were used in the analyses, either as an indicator of group membership, a control variable, or an outcome variable. These measures are described in the following section.

Group membership. The following two group membership variables were used in the analyses.

CLEP status. Each student was identified as either a CLEP student or a non-CLEP student, as described previously, and this variable was used to determine whether CLEP and non-CLEP students differed from one another on the outcomes of interest.

Degree awarded. Students were identified as having either been awarded a bachelor's (BA) degree or an associate (A.A.) degree to evaluate research question 1 separately for these students.

Control variables. The following control variables were used in order to identify a matched sample of non-CLEP students and as control variables to be used in the analyses.

High school GPA. Students' final, cumulative high school grade point average (GPA) was used to control for prior achievement.

Gender. Students' gender was used as both a matching and control variable. Gender was dummy coded, with female students serving as the reference group.

Ethnicity. Students' race/ethnicity was used as both a matching and control variable. Ethnicity was dummy coded, with white students serving as the reference group.

Lunch status. Whether students applied for free/reduced lunch during their last year of high school was used as both a matching and control variable.

Transfer hours. The total number of credit hours that were transferred to the degree program was used as both a matching and control variable.

English as a second language (ESL). Whether English was the students' second language was used as both a matching and control variable. ESL was dummy coded, with students whose first language was English serving as the reference group.

Part-time students. Whether the students were part time was used as both a matching and control variable. Part-time student status was dummy coded, with full-time students serving as the reference group.

Outcome variables. Across the two research questions, a total of 6 outcome variables were examined.

Time to degree. Time to degree indicates the total number of semesters before the students were awarded a degree (3 semesters equal a year) at the institution where they were awarded the degree. Note that even if the students did not register for a course during a particular semester, the count still includes that semester.

Number of semesters. Number of semesters indicates the total number of semesters the students were enrolled in at the institution where they were awarded a degree. If the students did not enroll during a particular semester, then that semester was not included in the calculations.

GPA. GPA indicates the students' final cumulative GPA when graduating from an institution.

Number of credits. Number of credits indicates the sum of all credits awarded while attending the institution from which the students graduated; classes for which the students' received passing grades contributed to the total number of credits.

Math course GPA. Math course GPA is the average GPA for subsequent math classes after a required course credit that could have been obtained by passing the College Algebra CLEP exam.

English course GPA. English course GPA is the average GPA for subsequent English classes after a required course credit that could have been obtained by passing the English Composition CLEP exam.

Results

For all analyses, hierarchical linear modeling (HLM) was used to analyze the data. HLM was chosen for two reasons; the first was to address the nested nature of the data. In this data, students were nested within postsecondary institutions, and it is possible that students who attended and attained degrees from the same postsecondary institution were more similar to one another than to students from other postsecondary institutions. Nesting can result in dependencies among cases in the data, which may violate the assumption of independent cases that underlies traditional regression analyses. HLM allows one to treat postsecondary institution as a random effect, thereby appropriately adjusting for these dependencies and correctly estimating standard errors. Second, HLM allows for the inclusion of the control variables into the regression analysis. Although these control variables were used to match a sample of non-CLEP students to the sample of CLEP students, these same variables were included in the analysis to account for variability in the dependent variables, thereby increasing the power of the analysis. We should note, however, that the coefficients of most interest were those for CLEP versus non-CLEP students, as these indicated whether these students differed significantly on the outcomes of interest. Finally, given the large number of statistical tests conducted, a Bonferroni adjustment was applied to control for Type I Error, and an adjusted alpha of $\alpha = 0.01$ was used to evaluate statistical significance. Results for both of the research questions are presented and discussed in the following sections.

Research Question 1

First, descriptive statistics (i.e., means and standard deviations) for each of the four outcome variables are presented for CLEP students versus non-CLEP students (Table 1).

Table 1.

Summary Statistics for Research Question 1 — Dependent Variables

	CLEP		Non-CLEP	
	Mean	Standard Deviation	Mean	Standard Deviation
Time to Degree (in semesters)	10.85	4.09	11.66	4.66
Number of Semesters	9.50	3.02	9.88	3.45
GPA	3.13	0.63	3.00	0.65
Number of Credits	83.77	28.51	84.27	30.03

As discussed previously, research question 1 evaluated the extent to which CLEP and non-CLEP students differed on the outcome variables of time to degree, number of semesters, GPA, and number of credits obtained. The results of the HLM model evaluating these differences for the overall group (i.e., for A.A. and B.A. students combined) are presented in Table 2. Examination of these parameters indicates that after controlling for the other variables in the model, CLEP students graduate nearly one semester earlier (β = -0.91, p-value < 0.01), enroll in fewer semesters (β = -0.61, p-value < 0.01), graduate with approximately 1.5 fewer credits (β = -1.46, p-value < 0.01), and have GPAs approximately 0.15 points higher than non-CLEP students (β = 0.15, p-value < 0.01), when controlling for demographics and prior achievement.

Table 2.

Model Parameters for Research Question 1 — Aggregate

	Time to Degree	Number of Semesters	GPA	Number of Credits
Intercept	13.44*	10.46*	3.03*	97.44*
CLEP	-0.91*	-0.61*	0.15*	-1.46*
HGPA	-0.06	-0.01	-0.01	0.19
Associate Degree	-3.90*	-2.54*	-0.08*	-34.98*
Male	-0.04	-0.03	-0.02	0.06
Asian/Pacific Islander	0.05	-0.07	0.04	-0.78
Black	-0.19	-0.08	0.00	-0.26
Hispanic	0.09	-0.03	0.02	0.54
American Indian/Alaska Native	-0.42	-0.11	0.02	-1.09
Multiracial	0.91	0.57	-0.07	1.28
Lunch Status	0.11	0.03	-0.02	0.49
Transfer Hours	-0.25*	-0.24	0.01*	-2.10*
ESL	-0.09	-0.16*	-0.01	-1.30
Part-Time Student	2.75*	1.30	-0.06*	-3.36*

Note: * indicates $p < 0.01$.

The analyses were conducted a second time, this time separately for students receiving an associate degree (A.A.) and for students receiving a bachelor's degree (B.A.). Parameters for the model conducted on A.A. students and B.A. students are reported in Tables 3 and 4, respectively. When considering A.A. students only, CLEP students graduated sooner (β = -1.34, p-value < 0.01), enrolled in nearly one less semester (β = -0.84, p-value < 0.01), graduated with approximately 3.5 fewer credits (β = -3.51, p-value < 0.01), and had GPAs approximately 0.13 points higher than non-CLEP students (βc= 0.13, p-value < 0.01) when controlling for demographics and prior achievement. When considering B.A. students only, CLEP students took approximately a half semester less to graduate (β = -0.62, p-value < 0.01), enrolled in approximately a half semester less (β = -0.46, p-value < 0.01), and had GPAs approximately 0.16 points higher than non-CLEP students (β = 0.16, p-value < 0.01). There were no significant differences between CLEP and non-CLEP students in the number of credits received.

When comparing the results for A.A. students to those for B.A. students, the differences between CLEP and non-CLEP students on time to degree, number of semesters enrolled, and number of credits obtained are more pronounced for A.A. students than for B.A. students. However, the difference between CLEP and non-CLEP students on GPA appears to be quite similar for both groups. These variations can be easily seen when examining graphical representations of the differences between CLEP and non-CLEP students (Figures 1 through 4).

Table 3

Model Parameters for Research Question 1 — A.A. Degrees

	Time to Degree (in semesters)	Number of Semesters	GPA	Number of Credits
Intercept	9.84*	7.81*	3.02*	62.83*
CLEP	-1.34*	-0.84*	0.13*	-3.51*
HGPA	-0.13	-0.01	-0.02	0.61
Male	-0.11	-0.07	-0.01	-0.42
Asian/Pacific Islander	0.04	-0.02	-0.02	-0.47
Black	-0.08*	0.05	-0.02	1.05
Hispanic	0.38	0.02	0.01	1.22
American Indian/Alaska Native	-0.71	-0.83	0.07	-3.08
Multiracial	1.15	0.75	-0.08	3.48
Lunch Status	0.08	0.01	-0.03	-0.14
Transfer Hours	-0.16*	-0.09	0.01*	-1.27*
ESL	-0.38	-0.30	0.00	-1.92
Part-Time Student	3.10*	1.56*	-0.05	-1.55*

Note: * indicates p < 0.01.

Table 4.

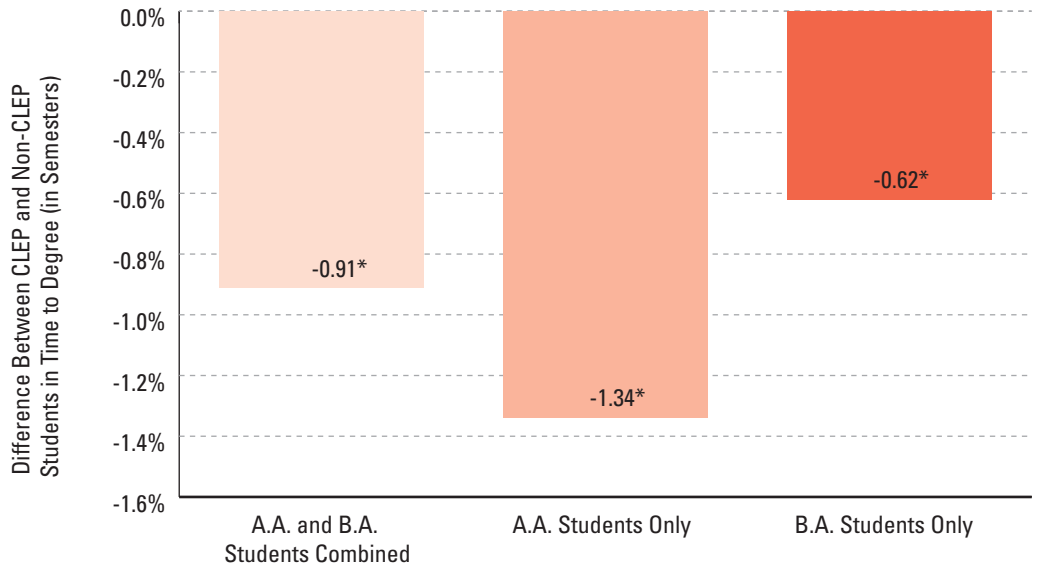
Model Parameters for Research Question 1 — B.A. Degrees

	Time to Degree (in semesters)	Number of Semesters	GPA	Number of Credits
Intercept	12.84*	11.35*	2.84*	98.30*
CLEP	-0.62*	-0.46*	0.16*	-0.09
HGPA	-0.01	-0.02	-0.01	-0.09
Male	0.02	0.01	-0.02	0.44
Asian/Pacific Islander	0.03	-0.12	0.08	-1.22
Black	-0.28	-0.18*	0.01	-1.28
Hispanic	-0.14	-0.08	0.03	-0.15
American Indian/Alaska Native	-0.23	0.43	-0.04	0.04
Multiracial	0.73	0.42	-0.06	-0.53
Lunch Status	0.16	0.05	-0.01	1.06
Transfer Hours	-0.26*	-0.25*	0.01*	-2.17*
ESL	0.10	-0.08	-0.02	-0.93
Part-Time Student	1.65*	0.41*	-0.1	-9.83*

Note: * indicates $p < 0.01$.

Figure 1.

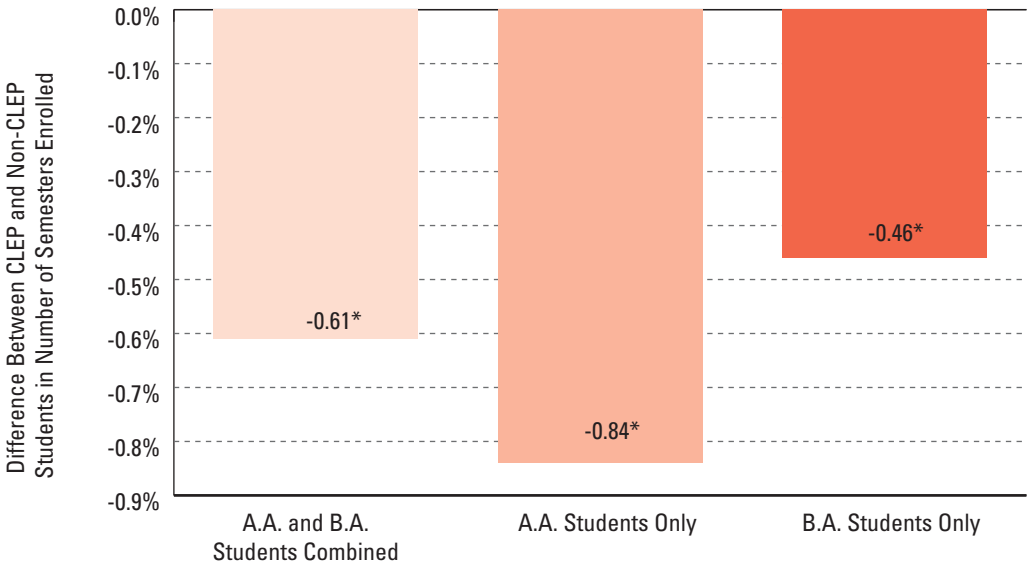
Difference in time to degree (in semesters) for CLEP and non-CLEP students.



Note: 3 semesters = 1 year.
*Indicates that CLEP students graduate in significantly less time.

Figure 2.

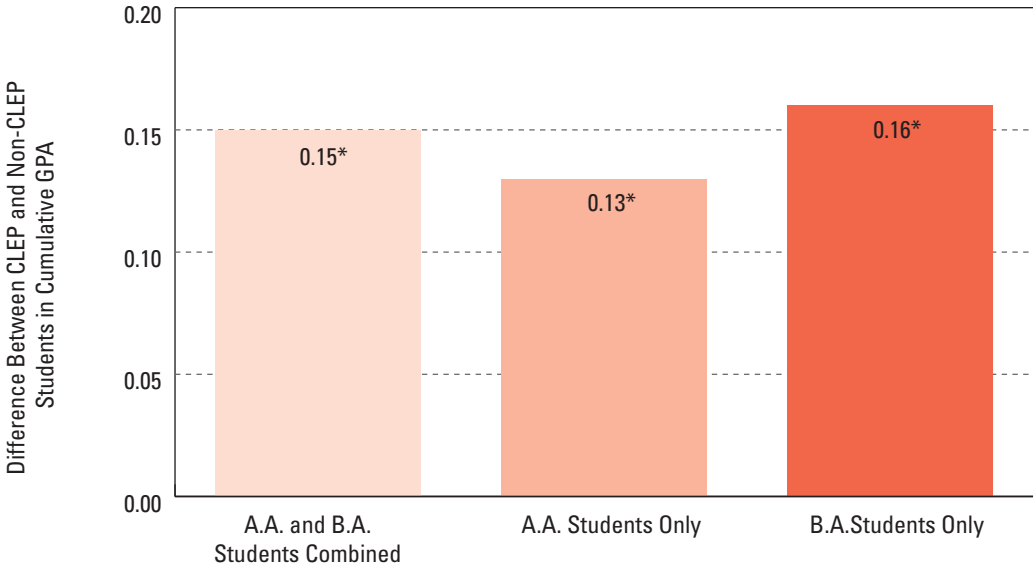
Difference in number of semesters enrolled for CLEP and non-CLEP students.



Note: 3 semesters = 1 year.
*Indicates that CLEP students enroll in significantly fewer semesters.

Figure 3.

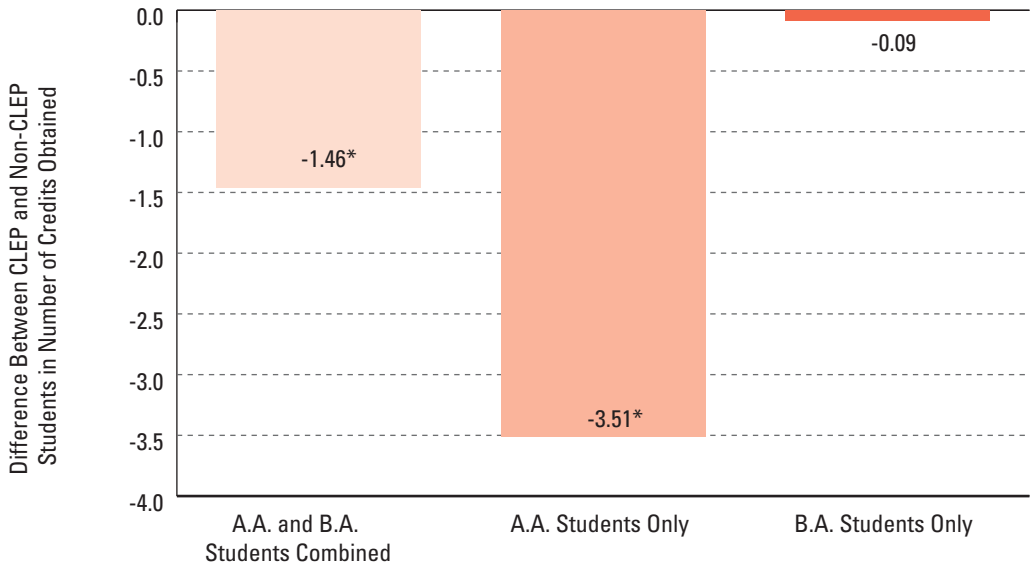
Difference in cumulative GPA for CLEP and non-CLEP students.



*Indicates that CLEP students have significantly higher GPAs.

Figure 4.

Difference in number of credits obtained for CLEP and non-CLEP students.



Note: 3 semesters = 1 year.
*Indicates that CLEP students graduate with significantly fewer credits.

Research Question 2

Research question 2 was concerned with whether students who pass a CLEP exam related to algebra or English have significantly different subsequent course performance compared to non-CLEP students (i.e., students who either did not take the respective CLEP exam or who took but did not pass the respective CLEP exam). For this reason, this analysis used the two smaller samples detailed earlier in the Method section. Descriptive statistics (i.e., means and standard deviations) for subsequent math GPA and subsequent English GPA are presented for CLEP students versus non-CLEP students in Table 5.

Table 5.

Summary Statistics for Research Question 2 — Dependent Variables

	CLEP		Non-CLEP	
	Mean	Standard Deviation	Mean	Standard Deviation
Subsequent Math GPA	2.35	1.27	2.32	1.28
Subsequent English GPA	2.99	1.23	2.81	1.27

The results of the HLM models evaluating research question 2 for both algebra and English are presented in Table 6. Again, the main coefficients of interest are those for CLEP versus non-CLEP students, as these indicate whether CLEP and non-CLEP students differ significantly on these outcomes. When examining performance in subsequent math courses, there was no significant difference between CLEP and non-CLEP students on subsequent math GPA, when controlling for demographics and prior achievement. However, when examining performance in subsequent English courses, CLEP students had subsequent English GPAs that were approximately 0.18 points higher than non-CLEP students, when controlling for demographics and prior achievement.

Table 6.

Model Parameters for Research Question 2

	Subsequent Math GPA	Subsequent English GPA
Intercept	-0.99*	0.62*
CLEP	0.01	0.18*
HGPA	1.00*	0.66*
Male	-0.09	-0.17*
Asian/Pacific Islander	0.26	0.23*
Black	-0.06	0.04
Hispanic	-0.03	0.17*
Lunch Status	-0.04	-0.13
ESL	0.02	0.01

Note: * indicates that $p < 0.01$.

Discussion

The current study helps address a gap in the literature examining postsecondary outcomes for students who earned college course credit through exam scores relative to students who did not. Although there are numerous studies of this type for programs such as Advanced Placement, relatively little research examines this question for students who obtained course credit by taking and passing CLEP exams. As the number of students who seek to obtain college credit before enrolling in college increases, so does the need for this type of research. This study addressed this question for students from a large, diverse state in the southeastern United States.

In general, when examining the results of this study, it does appear that there were clear differences between CLEP and non-CLEP students with respect to general performance. Specifically, CLEP students graduated in less time, enrolled in fewer semesters, maintained a higher GPA, and graduated with fewer credits when compared to a matched sample of students who did not pass the CLEP exam. Further, these differences were more pronounced for students receiving A.A. degrees than for students receiving B.A. degrees. These results were obtained after controlling for a number of factors that are related to the students' prior ability, demographic characteristics, and socioeconomic status.

The results of research question 2 suggest that CLEP students are not at a disadvantage when attending subsequent courses. Specifically, the performance of CLEP students in subsequent math courses was indistinguishable from the performance of non-CLEP students who attended the prerequisite course. When considering subsequent English performance, the results differed slightly. CLEP students had significantly higher performance in subsequent English courses when compared to non-CLEP students. Taken together, when examining performance in subsequent courses, CLEP students appeared to perform as well as or better than non-CLEP students who took the prerequisite course.

Several limitations associated with this study should be noted. First, our sample was taken from a single, albeit diverse, state within the United States. Future studies should use additional, more representative samples to determine whether findings generalize to all students. Second, the analyses presented here focused only on two areas — math and English — and specifically on students who received credit for the College Algebra or the English Composition exam. There are many other exams, both within math and English and within other content areas, that could be the focus of future studies. Finally, this study only identified CLEP students on the basis of whether they took and passed at least one CLEP exam. It may be of interest to see if a relationship also exists between how many CLEP exams were taken and passed and postsecondary outcomes. It may be that the results observed in this study are more pronounced for students who take and pass more CLEP exams. Despite its limitations, however, this study provides a necessary step in understanding the relationship between receiving course credit via exam scores and these important postsecondary outcomes. We encourage researchers to continue examining these relationships, with a specific focus on CLEP.

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Appendix

Table A1.

Descriptive Statistics for Research Question 1 Matched CLEP and Non-CLEP Samples — Counts (Percentage)

	CLEP (Total *N* = 8,124)		Non-CLEP (Total *N* = 8,119)	
	Count	Percentage	Count	Percentage
Degree Awarded				
A.A.	3,371	41.5%	3,366	41.5%
B.A.	4,518	55.6%	4,518	55.7%
A.A.S.	17	0.1%	17	0.1%
AHD	6	< 0.1%	6	< 0.1%
AP	1	< 0.1%	1	< 0.1%
AS	106	1.3%	107	1.3%
ASC	28	0.3%	28	< 0.1%
ADT	19	< 0.1%	19	< 0.1%
GED	2	< 0.1%	2	< 0.1%
MAS	9	< 0.1%	8	< 0.1%
PHA	2	< 0.1%	2	< 0.1%
VC	45	0.6%	45	0.6%
Gender				
Female	4,257	52.4%	4,289	52.8%
Male	3,867	47.6%	3,830	47.2%
Race/Ethnicity				
Asian/Pacific Islander	220	2.7%	222	2.7%
Black	1,806	22.2%	1,794	22.1%
Hispanic	1,346	16.6%	1,275	15.7%
American Indian/Alaska Native	19	0.2%	21	0.3%
Multiracial	41	0.5%	47	0.6%
White	4,692	57.9%	4,760	58.6%
Lunch Status				
No Lunch	6,561	80.8%	6,559	80.8%
Free/Reduced-Price Lunch	1,563	19.2%	1,560	19.2%
Transfer Hours				
Number of Transferred Hours — Mean (*SD*)	1.19	2.27	1.19	2.27
English as a Second Language				
English as First Language	7,190	88.5%	7,187	88.5%
English as a Second Language	934	11.5%	932	11.5%
Part-Time Student				
Full Time	6,680	82.2%	6,675	82.2%
Part Time	1,444	17.8%	1,444	17.8%

Table A2.

Descriptive Statistics for Research Question 2 Matched CLEP and Non-CLEP Samples, Math — Counts (Percentage)

	CLEP (Total *N* = 721)		Non-CLEP (Total *N* = 722)	
	Count	Percentage	Count	Percentage
English as a Second Language				
English as First Language	690	95.7%	691	95.7%
English as a Second Language	31	4.3%	31	4.3%
Race/Ethnicity				
Asian/Pacific Islander	40	5.6%	31	4.3%
Black	42	5.8%	74	10.3%
Hispanic	72	10.0%	69	9.6%
White	567	78.6%	548	75.9%
Gender				
Female	422	58.5%	424	58.7%
Male	299	41.5%	298	41.3%
Lunch Status				
No Lunch	680	94.3%	681	94.3%
Free/Reduced-Price Lunch	41	5.7%	41	5.7%

Table A3.

Descriptive Statistics for Research Question 2 Matched CLEP and Non-CLEP Samples, English — Counts (Percentage)

	CLEP (Total *N* = 1,822)		Non-CLEP (Total *N* = 1,826)	
	Count	Percentage	Count	Percentage
English as a Second Language				
English as First Language	1,687	92.6%	1,690	90.9%
English as a Second Language	135	7.4%	136	7.5%
Race/Ethnicity				
Asian/Pacific Islander	85	4.7%	77	4.2%
Black	147	8.1%	173	9.5%
Hispanic	221	12.1%	217	11.8%
White	1,369	75.1%	1,359	74.4%
Gender				
Female	1,015	55.7%	1,017	55.7%
Male	807	44.3%	809	44.3%
Lunch Status				
No Lunch	1,642	90.1%	1,648	90.2%
Free/Reduced-Price Lunch	180	9.9%	178	9.8%

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