Study Abroad and Graduation Outcomes

Recent research (e.g. NSSE, High Impact Practices (HIP) research, GLOSSARI from University of Georgia System, and CASSIE) indicates study abroad participation could be a high impact practice that improves educational achievement for all groups. Further, an internal 2017 exploratory study by Institutional Research, Planning & Effectiveness suggest graduation rates might be higher for students with study abroad experiences compared to students without study abroad experiences. This report is a follow-up to the 2017 study with this iteration utilizing inverse propensity weighting. Further, this study explores how these associations may vary by student characteristics.

Key Findings

Five-year and six-year graduation rates are higher for students with study abroad experiences compared to students without study abroad experiences; however, there was no difference in four-year graduation rate by study abroad participation. Further, racially minoritized, Pell grant recipient, and first generation study abroad students had significantly higher six-year graduation rates compared to students who did not study abroad. Although results showed study abroad participation had a positive association with five-year and six year graduation rates, results indicated SA students who earned a degree did so on average .08 years slower than non-SA graduates. First generation students and Pell recipient graduates who studied abroad also took longer to receive their degree than non-SA first generation and Pell recipient graduates, but the differences were again slight (.09-.12 years slower). Racially minoritized graduates who studied abroad did not significantly differ in their time to degree from racially minoritized graduates who did not study abroad. This, in conjunction with the finding that racially minoritized students who studied abroad had the largest increase in graduation rates compared to non-SA racially minoritized students, suggests study abroad may have a disproportionate positive association for racially minoritized students.

Methodology

This study focused on two main research questions. First, is study abroad participation positively associated with a four-year, five-year, or six-year graduation rates and, if so, how does that relationship vary by student characteristic (racially minoritized, Pell recipient, and first generation status)? Second, do study abroad participants take longer to complete their degrees compared to non-study abroad participants and, if so, how does that relationship vary by student characteristic (racially minoritized status, Pell recipient, first generation status)?

Population

The population includes all first-time, full-time students in the Fall 2010-2014 cohorts who persisted to their third fall term. Table 1 displays the headcount of students by study abroad status and cohort.

Table 1. Term Headcount by Study Abroad Participation

Population	Hdct	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014
SA	2,111	146	373	524	515	553
Non-SA	14,360	3,033	2,949	2,863	2,806	2,709

[1]Includes all first-time, full-time undergraduates

In order to ensure that the control group had the opportunity to do study abroad, only students who persist to their third fall were included since study abroad experiences roughly occur around students' second or third years. Students were categorized into one of two groups: study abroad (SA) or non-study abroad (Non-SA). SA students were identified by the Office of International Programs Education Abroad as participating in the program in 2013 or later.

This study only examined students who participated in study abroad in 2013 or later; therefore, the fall 2010 and fall 2011 SA cohorts were smaller than the Fall 2012-2014 cohorts since study abroad students in the earlier cohorts assumedly participated in study abroad prior to 2013 (see Table 1).

Inverse Propensity Weighting

Inverse propensity weighting (IPW) is a type of propensity score analysis that weights individuals based on a set of characteristics that predict membership in the treatment (in this case, SA) versus the control group (non-SA) in order to more accurately estimate the treatment effect. As participation in SA cannot be randomly assigned, IPW simulates random assignment and essentially creates comparable groups across selected characteristics. The first step in IPW is to create a propensity model, which is a binary logistic regression model that predicts treatment (SA v. non-SA) controlling for pre-treatment covariates (e.g., gender, first generation status, racially minoritized status, STEM major, etc.). The resulting predicted values are used to calculate ATT weights (average treatment effect on the treated) for students in the control group (non-SA)[1]; students in the treatment (SA) are given a weight of 1. The calculated ATT weights were examined to ensure none were exceptionally large (generally not larger than 10) and trimmed accordingly. Once weighted, SA and non-SA groups should have a similar representation of characteristics known to impact student success; characteristics that were significantly different prior to weighting should be non-significant after the IPW procedure. IPW serves as a data preparation step prior to using other analytical methods, such as logistic or linear regression.

Analytical Approach to Evaluating Graduation Outcomes

As noted above, graduation rates are assessed using IPW followed by regression modeling. Propensity model weighting characteristics include gender, CCHE index, residency, Pell recipient status, first generation status, racially minoritized status, and STEM major. Means of these characteristics before and after weighting can be found in Appendix A: Table A-1. Characteristics that did not differ significantly between SA and non-SA sections prior to weighting were not included in the propensity model. The relationship between graduation success and SA participation are then examined using weighted logistic regression, controlling again for the aforementioned characteristics (a "doubly robust" approach). Differences in four, five, and six-year graduation rates are compared using weighted logistic regression modeling, while average years to graduation use weighted least squares regression, controlling again for matching characteristics.

Limitations

A major limitation to this analysis is that the vast majority of the population graduates. Students who persist long enough to study abroad are typically in their second or third year and, therefore, will have higher graduation rates. In addition, examining graduation outcomes utilizes older cohorts and, consequently, study abroad experiences that may have taken place several years ago. Current study abroad experiences may vary quite a bit and, further, a student's type of study abroad experience varies considerably program to program, which is not accounted for in the analysis.

[1] The ATT weights were calculated using the formula: predicted probability / (1 – predicted probability).

Student Characteristics by Study Abroad Participation

Table 2 displays the headcount and demographics of students that have participated in SA since Fall 2013 compared to non-SA students (Fall 2010-2014 cohorts).

Table 2. Student Characteristics by Study Abroad Participation

Population	Hdct	Female (%)	Avg. CDHE Index	Pell Recipient (%)	STEM Major (%)	Resident (%)	Racially Minoritized (%)	First Generation (%)
SA	2,111	72.1%	116.96	21.2%	30.0%	72.5%	20.4%	19.6%
Non-SA	14,360	52.9%	115.69	20.7%	37.0%	77.8%	18.0%	22.7%

[1]Includes all first-time, full-time undergraduates in the fall 2010, 2011, 2012, 2013, and 2014 cohorts.

In comparison to non-SA students, SA students have a much larger representation of females (+19.2 PP) and a significantly higher average CDHE index 1.27 index points). However, SA students had lower proportions of STEM majors (-7.0 PP) and Colorado residents (-5.03) than non-SA group. The groups were comparable within a three percentage points for first generation (+ 3.1 PP), Pell recipient (+.5 PP), and racially-minoritized (+2.4 PP) students (see Table 1).

Graduation Success Outcomes by Study Abroad Participation

This section describes graduation success outcomes, which include four-year, five-year, and six-year graduation rates and average number of years to graduation.

Graduation Rates

Graduation rates in this study will be higher than the CSU's overall rates since all students in the study persisted to their third fall. Table 3 displays SA and non-SA headcounts and unweighted graduation rates, as well as predicted graduation rates using IPW and binary logistic regression (graduate or not graduate as the outcome). All models assume male, non-Pell, continuing generation, non-racially minoritized, non-resident status, non-STEM and an average CDHE index. Positive percentage point (PP) differences indicate SA students graduated at higher rates than non-SA students. See Appendix A: Tables A3-A5 for complete model results.

Table 3. SA and Non-SA Graduation Rates by Unweighted and Weighted Samples

		Unweighted Model			Weighted Model[1]	
Graduation Rate	Group	n	Graduation Rate (%)	PP Difference	Predicted Graduation Rate (%)	Predicted PP Difference
Six Year (FA10-FA12)	SA	1,043	95.4%	8.0*	95.4%	8.0*
	Non-SA	8,833	87.4%		87.5%	
Five Year (FA10-FA13)	SA	1,558	91.0%	7.9*	91.9%	7.3*
	Non-SA	11,638	83.1%		84.6%	
Four Year (FA10-FA14)	SA	2,111	58.7%	2.0	59.8%	2.0
	Non-SA	14,347	56.7%		57.8%	

*$p < .05$

[1]Predicted values based on IPW-weighted logistic regression models, controlling for residency, STEM major, racially-minoritized status, Pell recipient, first generation, CDHE index, and gender.

Based on weighted values, SA students are significantly more likely to graduate in five and six years compared to non-SA students by 8.0 and 7.3 percentage points respectively; however, they were not significantly more likely to graduate in four years. After matching and controlling for the aforementioned characteristics, predicted graduation rates were comparable to the unweighted model. SA students were still significantly more likely to graduate at a five-year and six-year rate compared to non-SA students, but there were no significant differences for the four-year graduation rate. Further, the PP differences were also comparable. See Appendix B: Figure 1 for a graph of the graduation rates by study abroad participation for four-year, five-year, and six-year rates.

Table 4 displays SA and non-SA headcounts and unweighted graduation rates, as well as predicted graduation rates using IPW and binary logistic regression (graduate or not graduate as the outcome) for students who have traditionally been underserved by higher education (first generation, racially minoritized, Pell recipients students)[2]. Positive percentage point (PP) differences indicate SA students of that characteristic graduated at higher rates than non-SA students with that characteristic. See Appendix A: Tables A6-A8 for complete model results.

Table 4. SA and Non-SA Six-Year Graduation Rates (FA10-FA12 cohorts) by Student Characteristic for Unweighted and Weighted Samples

		Unweighted Model			Weighted Model[1]	
Graduation Rate	Group	n	Graduation Rate (%)	PP Difference	Predicted Graduation Rate (%)	Predicted PP Difference
First Generation	SA	414	88.3%	9.8*	85.0%	11.4*
	Non-SA	3,262	78.5%		73.6%	
Racially Minoritized	SA	430	90.5%	14.3*	91.5%	13.6*
	Non-SA	2,582	76.1%		77.9%	
Pell Recipient	SA	447	81.8%	10.1*	91.9%	10.2*
	Non-SA	2,979	91.6%		81.7%	

*p< .05

[1]Predicted values based on IPW-weighted logistic regression models. All models control for residency, STEM major, CDHE index, gender, and , when appropriate, racially-minoritized status, Pell recipient, and first generation.

Based on weighted values, SA first generation, racially minoritized, and Pell Recipient students are significantly more likely to graduate in six years compared to non-SA students with the same characteristic. Specifically, after controlling for student characteristics, SA FG students are predicted to be 2.03 times more likely, SA racially minoritized students to be 3.07 times more likely, and SA Pell recipient students to be 2.54 times more likely to graduate in six years compared to non-SA students of the respective characteristic. Racially minoritized students who studied abroad had the largest increase in their graduation rate, 13.6 PP higher than non-SA racially minoritized students, while first generation and Pell recipient study abroad students had a 11.4 and 10.2 PP advantage respectively compared to first generation and Pell recipient non-study abroad students.

[2] The model examining first generation students assumes male, non-Pell, non-racially minoritized, non-resident status, non-STEM and an average CDHE index. The model examining racially minoritized students assumes male, non-Pell, continuing generation, non-resident status, non-STEM and an average CDHE index. Lastly, the model examining Pell recipients assumes male, continuing generation, non-racially minoritized, non-resident status, non-STEM and an average CDHE index.

After matching and controlling for the aforementioned characteristics, significant findings of the predicted graduation rates were comparable to the unweighted model. However, the weighted model for first generation students indicate a larger PP difference (11.4) compared to the non-weighted model (9.8), while the racially minoritized weighted model showed a slightly lower PP difference (13.6) compared to the racially minoritized unweighted model (14.3). The PP differences were within .1 of one another for the Pell Recipient models. See Appendix B: Figure 2 for a graph showing six-year graduation rates by study abroad experience and student characteristics.

There is a 10 PP gap between the average six-year graduation rate between study abroad and non-study abroad students. Although the rates were below the overall six-year graduation rate of study abroad students (95.4%, see Table 3), the gaps between first generation, racially minoritized, and Pell recipients who studied abroad were all the same or smaller when compared to their respective comparison group who did not study abroad. Racially minoritized students who studied abroad made substantial progress to closing the six-year graduation gap by having a graduation rate only 3.9 PP below the SA six-year graduation rate. Comparatively, racially minoritized students who did not study abroad had a graduation gap of 7.5 PP below the non-SA six-year graduation rate. First generation students who studied abroad also had a smaller six-year graduation rate gap and were 10.4 PP lower than the SA six-year graduation rate, while non-SA first generation students were 11.8 PP lower than the non-SA six-year graduation rate. Pell recipients were more comparable with a 3.5 (SA) and 3.7 (non-SA) PP difference.

Average Years to Graduation

Looking at just those students in the study who have earned a degree (FA10-FA12 cohorts), Table 5 displays SA and non-SA unweighted average years to graduation, as well as predicted average years to graduation using IPW and weighted least squares regression[3]. The weighted model comparing SA and non-SA assumes male, non-Pell, continuing generation, non-racially minoritized, non-resident status, non-STEM and an average CDHE index. The model examining first generation students assumes male, non-Pell, non-racially minoritized, non-resident status, non-STEM and an average CDHE index. The model examining racially minoritized students assumes male, non-Pell, continuing generation, non-resident status, non-STEM and an average CDHE index. Lastly, the model examining Pell recipients assumes male, continuing generation, non-racially minoritized, non-resident status, non-STEM and an average CDHE index. Positive percentage point (PP) differences indicate SA students of that characteristic took longer to graduate than non-SA students with that characteristic. See Appendix A: Tables A9-A12 for complete model results.

[3] The weighted model comparing SA and non-SA assumes male, non-Pell, continuing generation, non-racially minoritized, non-resident status, non-STEM and an average CDHE index. The model examining first generation students assumes male, non-Pell, non-racially minoritized, non-resident status, non-STEM and an average CDHE index. The model examining racially minoritized students assumes male, non-Pell, continuing generation, non-resident status, non-STEM and an average CDHE index. Lastly, the model examining Pell recipients assumes male, continuing generation, non-racially minoritized, non-resident status, non-STEM and an average CDHE index.

Table 5. SA and Non-SA Average Years to Graduation by Student Characteristic for Unweighted and Weighted Samples

		Unweighted Model			Weighted Model[1]	
Graduation Rate	Group	n	Avg. Years to Graduate	Difference	Predicted Avg. Years to Graduate	Predicted Difference
All	SA	1,002	4.51	.07*	4.48	.08*
	Non-SA	7,764	4.44		4.40	
First Generation	SA	196	4.65	.12*	4.67	.12*
	Non-SA	1,703	4.53		4.55	
Racially Minoritized	SA	174	4.57	.06	4.53	.06
	Non-SA	1,263	4.51		4.47	
Pell Recipient	SA	226	4.65	.10*	4.59	.09*
	Non-SA	1,598	4.56		4.50	

*p< .05

[1]Predicted values based on IPW-weighted logistic regression models. All models control for residency, STEM major, CDHE index, gender, and when appropriate, racially-minoritized status, Pell recipient, and first generation.

Based on weighted values, SA students who have earned a degree take significantly longer to graduate on average (4.48 years) than non-SA graduates (4.40 years); however, the predicted difference is only .08 years longer. First generation and Pell recipient students who studies abroad also graduated in significantly more time compared to non-SA first generation and Pell recipient students. However, there was not a significant difference in the average years to graduation for racially minoritized students. After matching and controlling for the aforementioned characteristics, significant findings of the predicted average years to graduation were comparable to the unweighted model. See Appendix B: Figure 3 to graphically see the average years to graduation by student characteristics.

Non-SA graduates took .08 years longer to earn their degree than non-SA graduates. This was slightly lower for SA racially minoritized students (+ .06 years), but slightly higher for SA Pell recipients (+ .09 years) and highest for SA first generation graduates (+.12 years) when compared to their respective non-SA comparison group. Overall, first generation, racially minoritized, and Pell recipient graduates all took longer than average to receive their degree regardless of their respective SA participation.

When comparing whether these gaps were larger for the SA and non-SA population, the results varied. First generation non-SA students took .15 years longer on average to graduate compared to all non-SA graduates, while SA first generation graduates had a larger gap and took .19 years longer on average compared to all SA graduates. Pell recipient students had comparable number of years longer to graduate compared to the average regardless of study abroad participation (Non-SA=+.10; SA= .11 years). SA racially minoritized graduates were the only group that had a smaller gap than non-SA. SA racially minoritized students took .05 years longer compared to all SA graduates, while non-SA racially minoritized graduates took .07 years longer compared to non-SA graduates.

Conclusions

This study was conducted to explore the relationship with study abroad participation and graduation outcomes to understand whether participating in study abroad significantly hinders graduation rates or time to graduation. This study found students who persisted to their third year had significantly higher five-year and six-year graduation rates compared to non-SA students who persisted to their third year. Four-year graduation rates did not significantly differ by study abroad participation. On the other hand, among those students who received a degree, non-SA students received their degree just a little faster, .08 years, than SA students. Results also showed study abroad participation had a significantly positive association with six-year graduation rates among first generation, Pell recipient, and particularly racially minoritized students. However, similar to the overall findings, first generation and Pell recipient SA students who received a degree took significantly longer to do so than non-SA first generation and Pell recipient students, but again the difference was not substantial. SA racially minoritized students were the only SA group who did not take significantly longer to receive their degree when compared to non-SA racially minoritized students. This finding, along with the smallest six-year graduation gap, suggests study abroad participation may have disproportionately positive impact on racially minoritized students. Overall, this study showed study abroad participation did not hinder graduation rates, and even positively impacted five-year and six-year graduation rates. Furthermore, although SA graduates who received a degree took longer to do so than non-SA graduates, the difference was minor.

Appendix A

Table A-1. SA and Non-SA Student Demographics, Unweighted and with Inverse Propensity Weighting (IPW)

	Unweighted			With IPW		
	SA (N=2,111)	Non-SA(N=14,360)	Sig.	SA(N=2,111)	Non-SA (N=14,360)	Sig.
Gender (SE)	.72 (0.01)	.53 (0.00)	.000	.72 (0.01)	.72 (0.01)	.802
Residency (SE)	.72 (.01)	.78 (.00)	.000	.72(.01)	.72 (.01)	.876
Pell Recipient (SE)	.21 (0.01)	.21 (0.00)	.650	-	-	-
CDHE index (SE)	116.96 (0.26)	115.69 (0.10)	.000	116.96 (.26)	117.00 (.26)	.912
First Generation (SE)	0.20 (0.01)	0.23 (0.00)	.001	.20 (0.01)	0.19 (0.01	.821
STEM Major (SE)	0.30 (0.01)	0.37 (0.00)	.000	0.30 (0.01)	0.30 (0.01)	.822
Racially Minoritized (SE)	0.20 (0.01)	0.18 (0.00)	.001	0.20 (0.01)	0.21 (0.01)	.914

Table A-3. Weighted Logistic Regression Model Predicting Six-Year Graduation Rate

	B	SE	t	df	Sig.	Odds Ratio (95% CI)
(Constant)	-2.02	0.48	-4.24	9678	0.000	
Study Abroad	1.10	0.15	7.14	9678	0.000	3.01 (2.22-4.07)
Gender	0.46	0.10	4.76	9678	0.000	1.59 (1.31-1.92)
CDHE Index	0.03	0.00	7.93	9678	0.000	1.04 (1.03-1.04)
Racially Minoritized	-0.30	0.11	-2.77	9678	0.006	0.74 (.60-.91)
Pell Recipient	-0.16	0.12	-1.34	9678	0.179	0.86 (.68-1.07)
First Generation	-0.43	0.12	-3.69	9678	0.000	0.65 (.52-.82)
Resident	0.10	0.12	0.85	9678	0.395	1.10 (.88-1.39)
STEM Major	-0.27	0.12	-2.29	9678	0.022	0.76 (.61-.96)

Weighted N=2340
Pseudo R^2=0.091

Table A-4. Weighted Logistic Regression Model Predicting Five-Year Graduation Rate

	B	SE	t	df	Sig.	Odds Ratio (95% CI)
(Constant)	-2.44	0.39	-6.326	12939	0.000	
Study Abroad	0.73	0.10	7.556	12939	0.000	2.07 (1.71-2.50
Gender	0.53	0.08	6.789	12939	0.000	1.70 (1.46-1.98)
CDHE Index	0.04	0.00	10.344	12939	0.000	1.04 (1.03-1.04)
Racially Minoritized	-0.27	0.09	-2.928	12939	0.003	.77 (.64-.92)
Pell Recipient	-0.27	0.09	-2.902	12939	0.004	.77 (.64-.92)
First Generation	-0.34	0.10	-3.620	12939	0.000	.71 (.59-.85)
Resident	-0.01	0.09	-0.103	12939	0.918	.99 (.83-1.18)
STEM Major	-0.47	0.09	-5.041	12939	0.000	.62 (.52-.75)

Weighted N=3251
Pseudo R^2=0.087

Table A-5. Weighted Logistic Regression Model Predicting Four-Year Graduation Rate

	B	SE	t	df	Sig.	Odds Ratio (95% CI)
(Constant)	-3.48	0.28	-12.31	16129	0.000	
Study Abroad	0.08	0.05	1.64	16129	0.101	1.09 (.98-1.20)
Gender	0.74	0.05	13.76	16129	0.000	2.11 (1.89-2.34)
CDHE Index	0.03	0.00	13.61	16129	0.000	.84 (.74-.95)
Racially Minoritized	-0.17	0.06	-2.67	16129	0.008	.72 (.63-.81)
Pell Recipient	-0.33	0.07	-5.08	16129	0.000	.72 (.63-.81)
First Generation	-0.09	0.07	-1.33	16129	0.183	.91 (.80-1.04)
Resident	-0.10	0.06	-1.67	16129	0.094	.91 (.81-1.02)
STEM Major	-0.67	0.06	-11.27	16129	0.000	.51 (.45-.57)

Weighted N=4194
Pseudo R^2=1.01

Table A-6. Weighted Logistic Regression Model Predicting Six-Year Graduation Rate for First Generation Students

	B	SE	t	df	Sig.	Odds Ratio (95% CI)
(Constant)	-3.43	1.01	-3.41	2142	0.000	
Study Abroad	0.71	0.26	2.72	2142	0.007	2.03 (1.22-3.38)
Gender	0.63	0.20	3.15	2142	0.002	1.88 (1.27-2.80)
CDHE Index	0.04	0.01	4.37	2142	0.000	1.04 (1.02-1.06)
Racially Minoritized	-0.29	0.20	-1.45	2142	0.148	0.75 (.51-1.11)
Pell Recipient	-0.03	0.19	-0.17	2142	0.866	0.97 (.66-1.41)
Resident	0.46	0.27	1.72	2142	0.085	1.58 (.94-2.67)
STEM Major	-0.10	0.23	-0.43	2142	0.670	0.91 (.58-1.42)

Weighted N=463
Pseudo R^2=.091

Table A-7. Weighted Logistic Regression Model Predicting Six-Year Graduation Rate for Racially Minoritized Students

	B	SE	t	df	Sig.	Odds Ratio (95% CI)
(Constant)	-4.69	1.09	-4.31	1714	0.000	
Study Abroad	1.12	0.29	3.84	1714	0.000	3.07 (1.73-5.46)
Gender	0.64	0.19	3.36	1714	0.001	1.91 (1.31-2.78)
CDHE Index	0.05	0.01	5.63	1714	0.000	1.05 (1.03-1.07)
Pell Recipient	-0.02	0.20	-0.12	1714	0.907	0.98 (.66-1.46)
First Generation	0.19	-2.19	1714	0.028	0.19	0.66 (.45-.96)
Resident	0.29	0.23	1.29	1714	0.198	1.34 (.86-2.10)
STEM Major	-0.30	0.21	-1.42	1714	0.156	0.74 (.48-1.12)

Weighted N=445
Pseudo R^2=.133

Table A-8. Weighted Logistic Regression Model Predicting Six-Year Graduation Rate for Pell Recipient Students

	B	SE	t	df	Sig.	Odds Ratio (95% CI)
(Constant)	-2.53	0.99	-2.56	2083	0.011	
Study Abroad	0.93	0.27	3.50	2083	0.000	2.54 (1.51-4.29)
Gender	0.46	0.20	2.34	2083	0.019	1.58 (1.08-2.32)
CDHE Index	0.04	0.01	4.22	2083	0.000	1.04 (1.02-1.05)
Racially Minoritized	-0.21	0.20	-1.04	2083	0.298	0.81 (.55-1.2)
First Generation	-0.32	0.19	-1.66	2083	0.096	0.73 (.50-1.06)
Resident	0.25	0.29	0.85	2083	0.397	1.28 (.72-2.29)
STEM Major	-0.11	0.23	-0.47	2083	0.641	0.90 (.58-1.40)

Weighted N= 512
Pseudo R^2= .083

Table A-9. Weighted Least Squares Regression Model Predicting Average Years to Graduation

		95% CI					
	B	Lower	Upper	SE	Beta	t	Sig.
(Constant)	5.38	5.10	5.66	0.14			
Study Abroad	0.07	0.01	0.14	0.03	0.05	2.14	0.03
Gender	-0.22	-0.28	-0.16	0.03	-0.15	-7.24	0.00
CDHE Index	-0.01	-0.01	-0.01	0.00	-0.17	-7.52	0.00
Racially Minoritized	0.03	-0.04	0.10	0.04	0.02	0.75	0.45
Pell Recipient	0.07	0.01	0.14	0.03	0.05	2.11	0.04
First Generation	0.05	-0.02	0.12	0.04	0.03	1.39	0.16
Resident	0.07	0.01	0.13	0.03	0.05	2.15	0.03
STEM Major	0.20	0.14	0.26	0.03	0.14	6.42	0.00

N=2,161
F(8, 2147)=22.98*
Adjusted R^2=.075

Table A-10. Weighted Least Squares Regression Model Predicting Average Years to Graduation for First Generation Students

		95% CI					
	B	Lower	Upper	SE	Beta	t	Sig.
(Constant)	5.63	4.91	6.35	0.37			
Study Abroad	0.11	-0.02	0.24	0.07	0.08	1.72	0.087
Gender	-0.30	-0.46	-0.15	0.08	-0.18	-3.80	0.000
CDHE Index	-0.01	-0.02	0.00	0.00	-0.16	-3.11	0.002
Racially Minoritized	0.04	-0.10	0.18	0.07	0.03	0.53	0.594
Pell Recipient	-0.01	-0.20	0.18	0.10	0.00	-0.10	0.922
Resident	0.07	-0.06	0.21	0.07	0.05	1.05	0.296
STEM Major	0.16	0.00	0.32	0.08	0.10	2.01	0.045

N=408
F(7, 400)= 5.03*
Adjusted R^2=.065

Table A-11. Weighted Least Squares Regression Model Predicting Average Years to Graduation for Racially Minoritized Students

		95% CI					
	B	Lower	Upper	SE	Beta	t	Sig.
(Constant)	6.11	5.41	6.80	0.36			
Study Abroad	0.06	-0.07	0.18	0.07	0.04	0.84	0.404
Gender	-0.31	-0.46	-0.16	0.08	-0.19	-4.01	0.000
CDHE Index	-0.01	-0.02	-0.01	0.00	-0.25	-4.87	0.000
First Generation	-0.01	-0.15	0.14	0.07	-0.01	-0.11	0.911
Resident	0.08	-0.09	0.24	0.08	0.05	0.91	0.364
Pell Recipient	0.13	-0.01	0.28	0.07	0.10	1.79	0.075
STEM Major	0.27	0.12	0.42	0.08	0.17	3.47	0.001

N=393
F(7, 385)= 8.318*
Adjusted R^2=.116

Table A-12. Weighted Least Squares Regression Model Predicting Average Years to Graduation for Pell Recipient Students

		95% CI					
	B	Lower	Upper	SE	Beta	t	Sig.
(Constant)	5.67	5.01	6.33	0.34			
Study Abroad	0.10	-0.02	0.21	0.06	0.07	1.60	0.110
Gender	-0.27	-0.41	-0.13	0.07	-0.17	-3.79	0.000
CDHE Index	-0.01	-0.02	0.00	0.00	-0.18	-3.76	0.000
Racially Minoritized	0.03	-0.10	0.15	0.06	0.02	0.44	0.659
First Generation	0.04	-0.15	0.23	0.10	0.02	0.46	0.646
Resident	0.09	-0.04	0.22	0.07	0.07	1.39	0.164
STEM Major	0.14	0.00	0.29	0.08	0.09	1.93	0.055

N=458
F(7, 450)= 6.147*
Adjusted R^2=.073

Appendix B

Figure 1. Graduation rates by study abroad experience after weighting the data and controlling for student characteristics

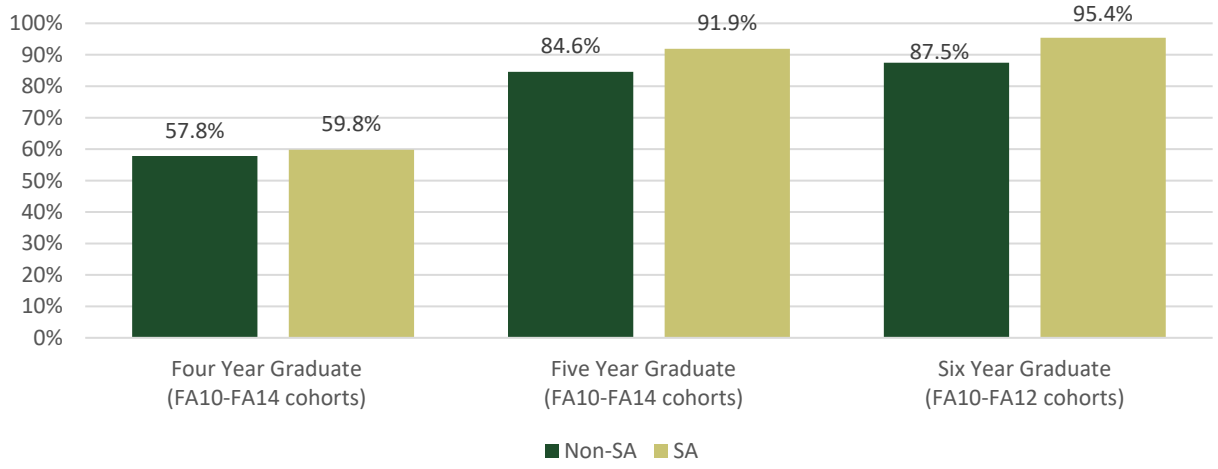
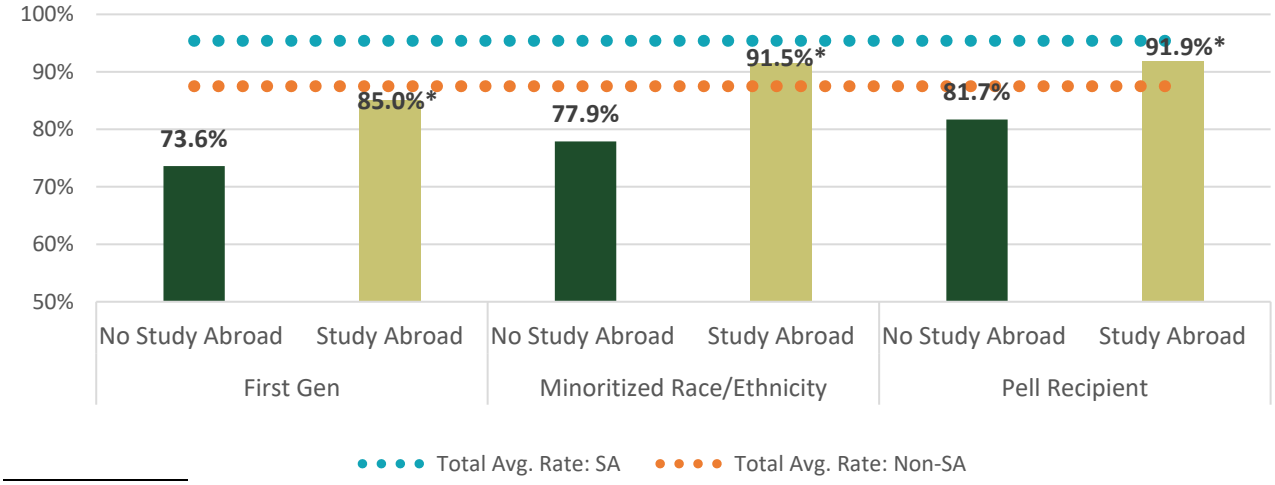
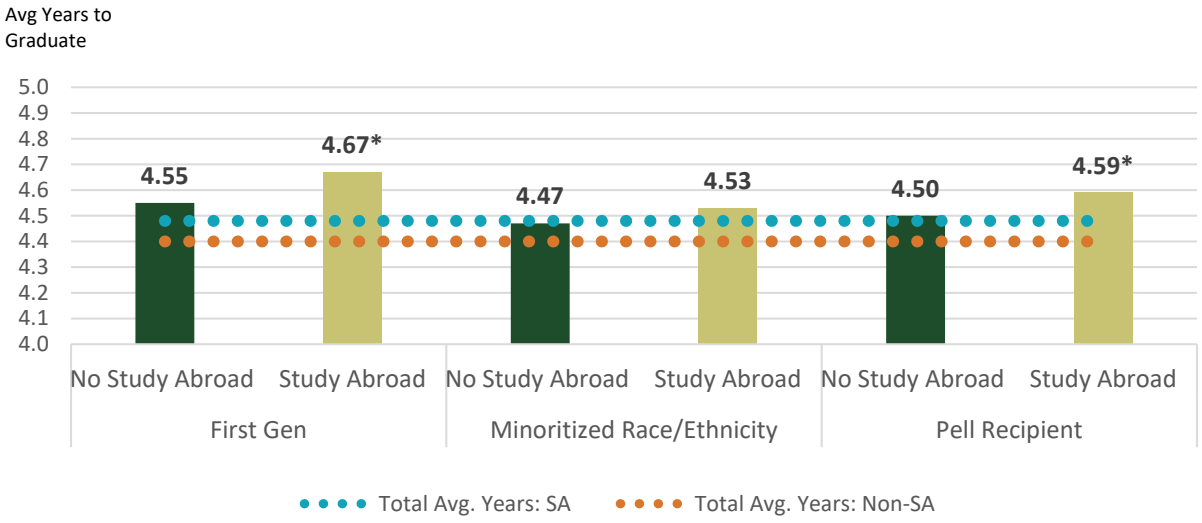


Figure 2. Six-year graduation rate by student characteristics after weighting the data and controlling for student characteristics (FA10-FA12 cohorts)



*p< .05; Predicted values based on IPW-weighted logistic regression models, controlling for residency, STEM major, CDHE index, gender, and , when appropriate, racially-minoritized status, Pell recipient, and first generation.

Figure 3. Average years to graduation by student characteristics after weighting the data and controlling for student characteristics (FA10-FA12 cohorts)



*p< .05; Predicted values based on IPW-weighted logistic regression models, controlling for residency, STEM major, CDHE index, gender, and , when appropriate, racially-minoritized status, Pell recipient, and first generation.