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Student Persistence in Engineering Majors: A Description of Engineering Students at Two Universities before and during COVID-19

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A Description of Engineering Students at Two Universities Before and During COVID-19

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Introduction

This work-in-progress study describes persistence rates using institutional data to determine which student demographic groups were more impacted by COVID-19 interruptions. Several have indicated the need for more engineers to address the urgent needs of industry and public safety [1]. Unfortunately, when compared to other majors, students enrolled in engineering majors usually switch to other disciplines more frequently, especially after their first semester in college [2]. This is likely because engineering is frequently seen as difficult and demanding, which could be a reason for the dropout rate near 50% [3]— an alarmingly low persistence rate [4]. Additionally, the engineering persistence rate is highest in the sophomore and junior years as compared to after their first year [10]. Student demographic factors such as gender, financial need status, race/ethnicity, and first-generation student status of students have been identified as being predictive of persistence [5][6]. The low persistence becomes more concerning when a specific student population is considered. Specifically, the persistence of people of color and female students is lower than their White and Asian American counterparts [7] [8]. Also, male students' persistence rate was found to be 20% greater than female students [9].

The recent COVID-19 pandemic has potentially impacted the retention of college students. The pandemic has created unprecedented pressures on the educational system from pre-kindergarten to collegiate levels within the U.S. and the world at large. Two studies [11, 12] revealed that student demographic information was predictive of the worry and stress levels of students during the pandemic. Another recent study found that although many students reported increased stress and decreased motivation due to their individual circumstances surrounding COVID-19—which were quite varied, their intentions to stay in engineering did not change [13]. Out of the desire to maintain student anonymity, however, the results were not broken down by students' backgrounds.

Because of the likelihood that any given student will switch or drop out of engineering early in their college experience, our prior work [14, redacted] has examined the persistence of cohorts of first year to sophomore students prior to and during COVID-19, which was disaggregated by student demographic information due to the larger sample size. Although it was hypothesized that students who were impacted by COVID-19 would attrit at higher rates than the prior cohort, the results were the opposite. Across nearly all groups, the attrition rates during COVID-19 were lower by about half as compared to the attrition between first year and sophomores prior to COVID-19. The authors speculated that the poor job market, transition to pass/fail grades, and the retention efforts focused on the first year to sophomore COVID-19 cohort may have helped to retain more students. Thus, the current study will leverage

institutional data to examine persistence rates prior to and during COVID-19 at a large Hispanic serving institution (HSI) in the Southwest and a Historically Black College or University (HBCU) for sophomore to junior year and junior to senior year. We will also examine persistence prior to and during COVID-19 by gender, financial need, first generation status, and race/ethnicity.

The Current Study

This study examines the impact of COVID-19 on sophomore to junior and junior to senior year engineering students' persistence. We examined persistence across gender, financial need, race/ethnicity, and first-generation status. This quantitative study aims to examine engineering students' persistence rates before the COVID-19 pandemic and during the COVID-19 pandemic over three semesters. The paper extends the authors' previous study on the first year to second-year engineering student persistence prior to and during COVID-19 Interruptions (Authors, 2022). The following research questions will be addressed in this paper:

1. How does the percentage of students not returning to engineering compare prior to and during COVID interruptions?
2. How does the proportion of students of different backgrounds (i.e., biological sex, financial need, first generation status, and race/ethnicity) not returning to engineering compare prior to and during COVID?

Methods

Participants

Participants included engineering students at a large Hispanic serving institution (HSI) and at a Historically Black Colleges and University (HBCU) in the Southwest. The demographic information of the participants is shown in Table 1. There were four cohorts of engineering students at each institution included in this study. To be included in the study, students in each cohort must have been enrolled in both the fall and spring of that cohort. For example, in the 2019 sophomore cohort, students must have been present in fall 2019 and spring 2020 to be included. At the HSI, the first cohort is composed of 2,926 sophomore engineering students (Fall 2018-Spring 2019). The second cohort is composed of 3,205 sophomore engineering students (Fall 2019 - Fall 2022) The third cohort is composed of 2,780 junior engineering students (Fall 2018 – Spring 2019). The fourth cohort is composed of 3,205 junior engineering students (Fall 2019 – Fall 2022). At the HBCU, the first cohort is composed of 300 sophomore engineering students (Fall 2018-Spring 2019). The second cohort is composed of 233 sophomore engineering students (Fall 2019-Fall 2022). The third cohort is composed of 271 junior engineering students (Fall 2018-Fall 2019). The fourth cohort is composed of 288 junior engineering students (Fall 2019-Fall 2022).

Table 1. Demographic information of study participants.

Student Demographics		HBCU				HSI			
		Sophomore		Junior		Sophomore		Junior	
		Fall 2018 Cohort	Fall 2019 Cohort	Fall 2018 Cohort	Fall 2019 Cohort	Fall 2018 Cohort	Fall 2019 Cohort	Fall 2018 Cohort	Fall 2019 Cohort
Biological Sex	Female	90 (30%)	66 (28%)	76 (28%)	85 (30%)	595 (20%)	697 (22%)	2155 (78%)	674 (21%)
	Male	210 (70%)	167 (72%)	195 (72%)	203 (70%)	2331 (80%)	2508 (78%)	625 (22%)	2531 (79%)
	Missing	0	0	0	0	0	0	0	0
		300	233	271	288	2926	3205	2780	3205
Ethnicity	White only	4 (1%)	1 (0%)	9 (3%)	5 (2%)	1600 (55%)	1689 (53%)	1533 (55%)	1681 (52%)
	Hispanic	17 (6%)	25 (11%)	28 (10%)	21 (7%)	674 (23%)	746 (22%)	638 (23%)	782 (24%)
	Asian only	3 (1%)	5 (2%)	18 (7%)	9 (3%)	418 (14%)	503 (16%)	327 (12%)	450 (14%)
	International	6 (2%)	4 (2%)	15 (6%)	11 (4%)	54 (2%)	64 (2%)	113 (4%)	86 (3%)
	Black/African American	259 (86%)	194 (83%)	195 (72%)	235 (82%)	75 (3%)	77 (2%)	70 (3%)	79 (2%)
	Multi-Racial	11 (4%)	3 (2%)	5 (2%)	6 (2%)	97 (4%)	117 (4%)	90 (4%)	118 (4%)
	Missing	0	1 (0%)	1 (0%)	1 (0%)	8 (0%)	9 (0%)	9 (0%)	9 (0%)
		300	233	271	288	2926	3205	2780	3205
First Generation	No	226 (75%)	177 (76%)	177 (65%)	208 (72%)	2255 (77%)	2519 (79%)	2031 (73%)	2390 (75%)
	Yes	71 (24%)	51 (22%)	76 (28%)	68 (24%)	580 (20%)	548 (17%)	567 (20%)	664 (21%)
	Missing	3 (1%)	5 (2%)	18 (7%)	12 (4%)	91 (3%)	138 (4%)	182 (7%)	151 (5%)
		300	233	271	288	2926	3205	2780	3205
Financial Status	High	198 (66%)	156 (67%)	182 (67%)	183 (64%)	672 (23%)	717 (22%)	732 (26%)	791 (25%)
	Low	63 (21%)	48 (21%)	37 (14%)	62 (22%)	389 (13%)	409 (13%)	318 (11%)	399 (12%)
	Medium	n/a	n/a	n/a	n/a	254 (9%)	266 (8%)	241 (9%)	254 (8%)
	No Aid application/NoNeed	39 (13%)	29 (12%)	52 (19%)	43 (15%)	1611 (55%)	1813 (57%)	1489 (54%)	1761 (55%)
	Missing	0	0	0	0	0	0	0	0
Total		300	233	271	288	2926	3205	2780	3205

Note: * *The two universities did not report the data in the same way. The HBCU did not use the medium need category.*

Procedures and Measures

We leveraged institutional data for all cohorts of students through an institutional data request from both universities. We obtained substantial data of engineering students at both institutions, including student cohort information as well as demographic information such as biological sex, financial need, first-generational status student race/ethnicity. First, we examined four cohorts of students for three semesters: (a) fall 2018 sophomore students, (b) fall 2019 sophomore students, (c) fall 2018 junior students, and (d) fall 2019 junior students. The sophomore and junior students' persistence was tracked over a period of three semesters— thus the pre-COVID-19 cohorts (i.e., fall 2018 cohorts) did not have their education disrupted over this time frame (fall 2018 to fall 2019) by COVID-19 while the COVID-19 cohorts (i.e., fall 2019 cohorts) did have their education disrupted in spring 2020. Next, due to our large sample, we were able to break down and examine student persistence rate by student demographic groups (i.e., gender, financial need, first generation status, and race/ethnicity).

Plan of Analysis

We used both STATA 17.0 [15] and Microsoft Excel to run all the analyses to answer both research questions. Prior to running the descriptive statistics for each cohort, we merged the institutional datasets across cohorts. Next, we identified the cohorts and partitioned the datasets based on student demographics information. We then examined the proportion of students who persisted within their program by cohorts. Once the attrition rates for each cohort by student demographic variables were obtained, we computed the representation index (*RI*) across cohorts and within student demographics groups by dividing the cumulative attrition rate in a certain exposed group (i.e., percentage of students who attritted from their major within a certain group out of all students who attritted) by the overall percentage of students within the cohort out of the total number of students [16]. Thus, this ratio indicates which groups had higher or lower than expected attrition. A representation index (RI) < 1 indicates that the exposure of engineering students being at risk of attritting from their major is minimal—a reduced risk in the exposed group whereas a representation index > 1 suggests an increased risk of that outcome in the exposed group, and a representation index of 1 indicates equal representation in the attrition and total samples. Thus, values closer to 1 indicate more proportional representation. For example, if first generation students represented 60% of all students who attritted but first-generation students only represent 40% of all students, they are overrepresented in the attrition group (representation index= 1.5 or 60%/40%).

Results

Research question 1

To address research question 1, we examined the proportion of students who persisted by cohort and whether they were interrupted by COVID-19 in the three-semester span (Fall, Spring, Fall). At the HSI, for the 2018 sophomore to junior cohort, 7.52% (Table 1) of students did not return to their engineering major pre-COVID-19 whereas for the 2019 sophomore to junior cohort, 5.05% of students did not return to engineering during COVID-19. The junior to senior 2018 and 2019 cohorts demonstrated a similar pattern, 2.81% (Table 2) of the 2018 junior to senior cohort did not return, and 1.75% (Table 2) of the 2019 junior to senior students did not return. Thus, students were more likely to persist during COVID-19 when compared to the previous year's cohort.

Next, we examined the persistence rates at the HBCU. Notably, 12% of sophomore students did not return to their major pre-COVID-19 interruptions and 6.44% left their majors during COVID-19 interruptions, respectively (Table 9). That said, the attrition rate for sophomore engineering students during COVID-19 interruptions was lower than that prior to COVID-19. Similarly, COVID-19 interruptions did not interfere with junior engineering students' decisions to return to their majors—about 8.12% of junior students did not return prior to COVID-19 compared to only 6.25% of junior students who left their majors during COVID-19 interruptions at this HBCU (Table 10).

Research question 2

To address our second research question, we examined the percentage of students who persisted within their engineering major pre- and during COVID-19 interruptions by student backgrounds (i.e., biological sex, financial need, first generation status, and race/ethnicity) then we computed the representation index for each group and compared the representation index between groups at both institutions. The results suggest that at the HSI, the risk of female students leaving their major during COVID-19 interruptions was higher compared to their male counterparts for both cohorts (Figure 1), whereas sophomore male students were more at risk during COVID-19 interruptions at the HBCU compared to their female counterparts (Figure 2).
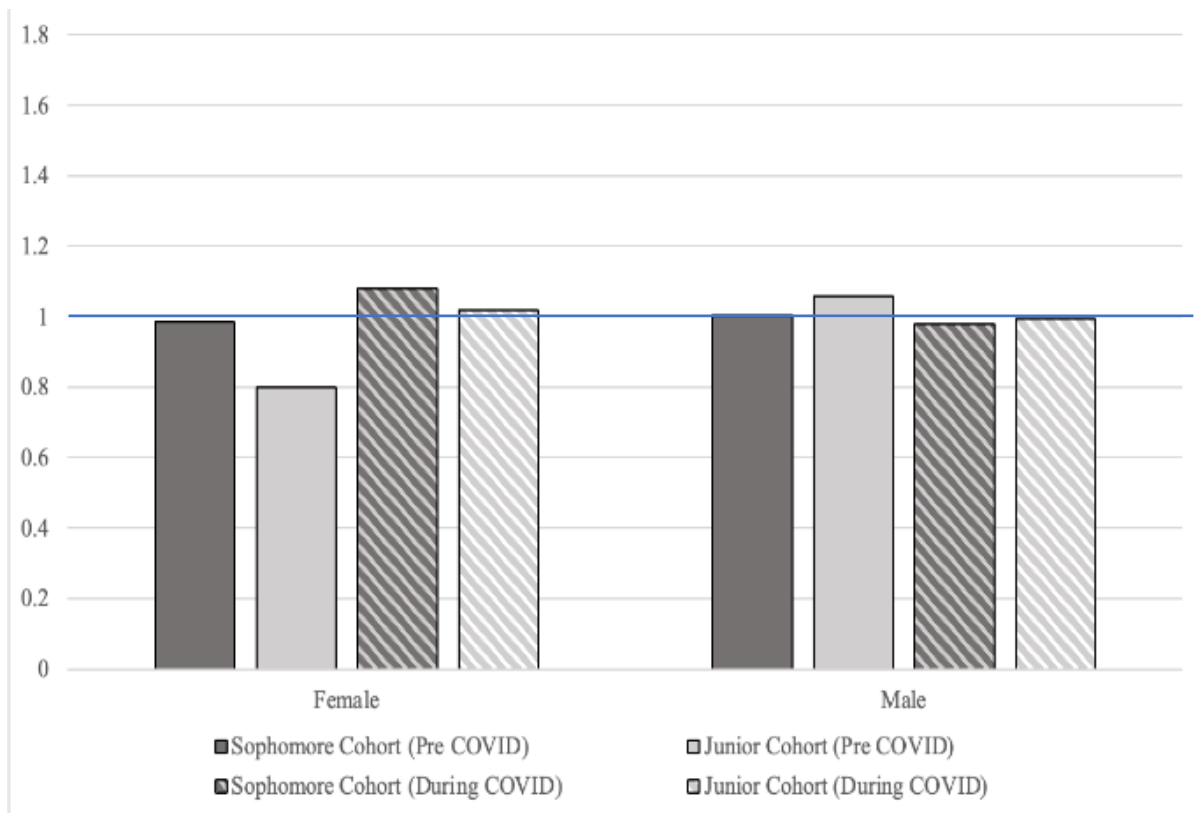

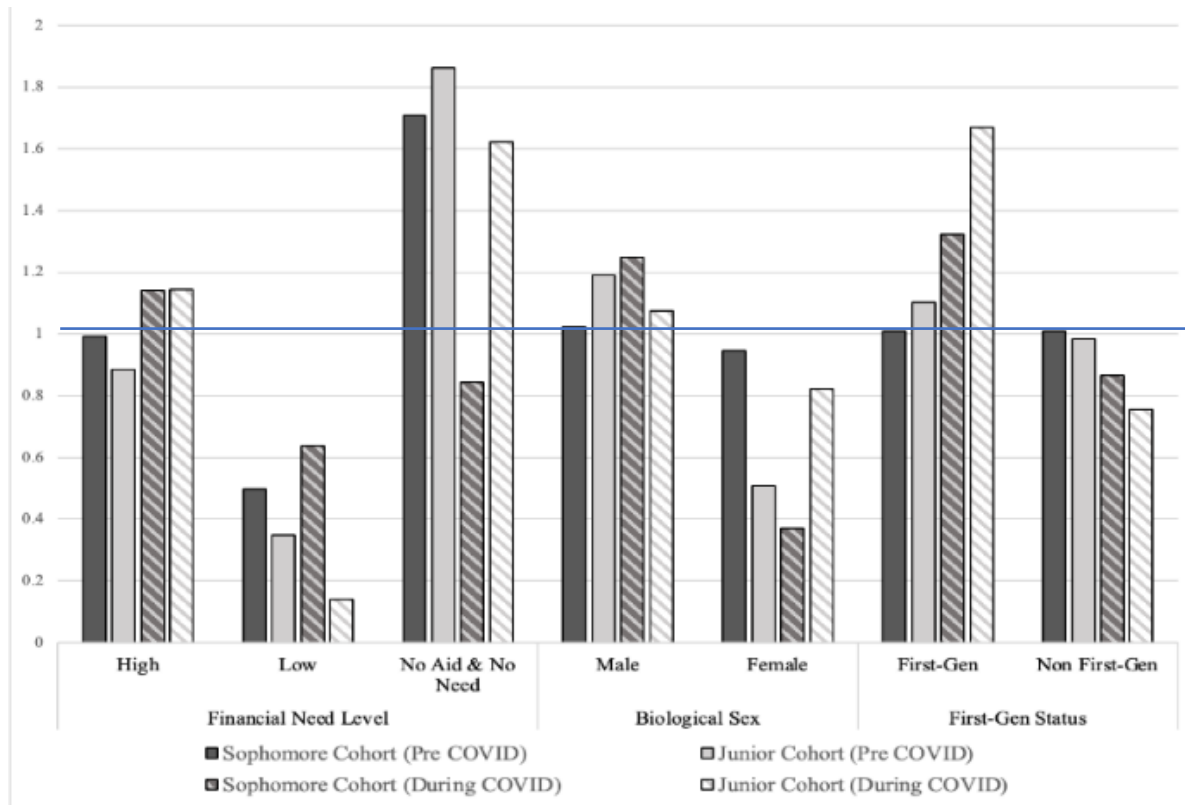**Figure 1.** HSI Representation Index by Student Biological Sex

Figure 2. HBCU Representation Index by Cohorts and Student Background Representation Index by cohorts and student background

Similarly, during COVID-19 interruptions, junior students who needed low and medium financial assistance at the HSI (Figure 3), as well as junior and sophomore students who needed high financial assistance at the HBCU (Figure 2) were more at risk of leaving their major. Even though students who needed high financial assistance at the HSI were equally at risk of leaving their major, COVID-19 interruption did not affect their attrition rates (Figure 3). The same trends were observed among first-generation sophomore and junior students at HSI (Figure 4).
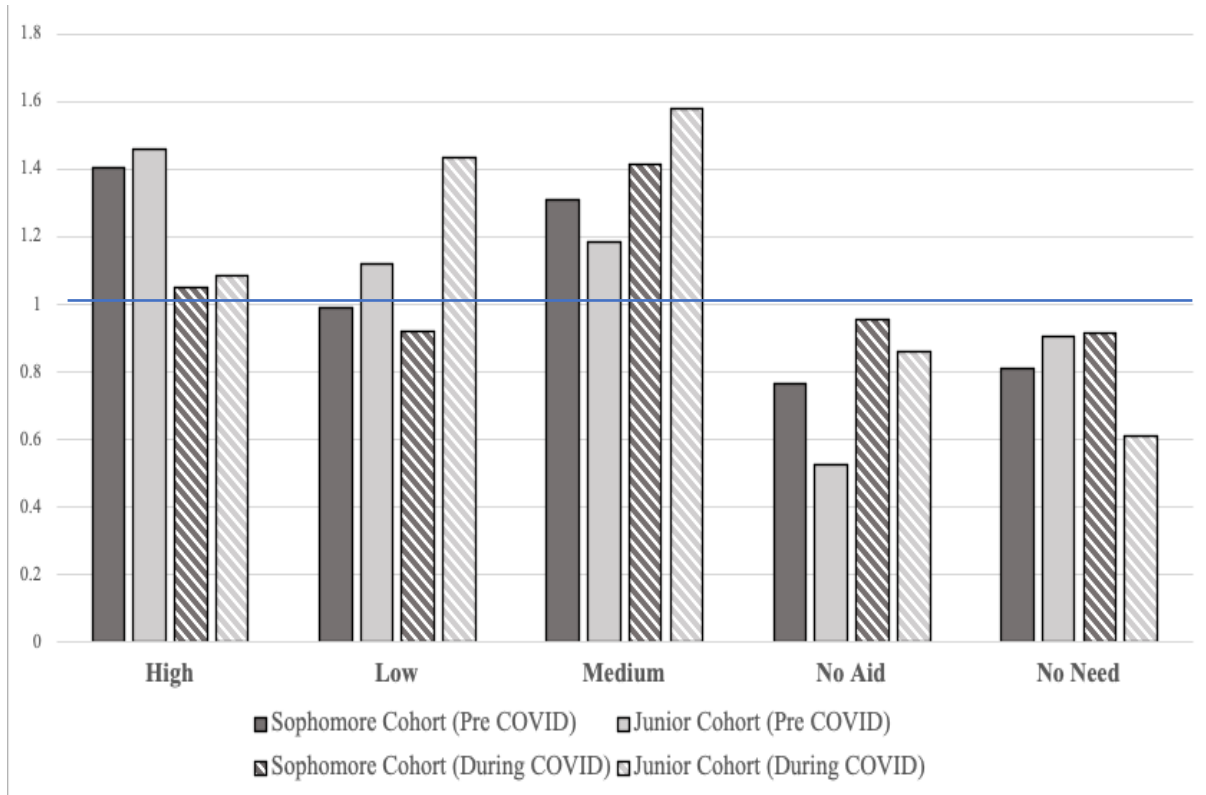
Figure 3. HSI Representation Index by Student Financial Need Status
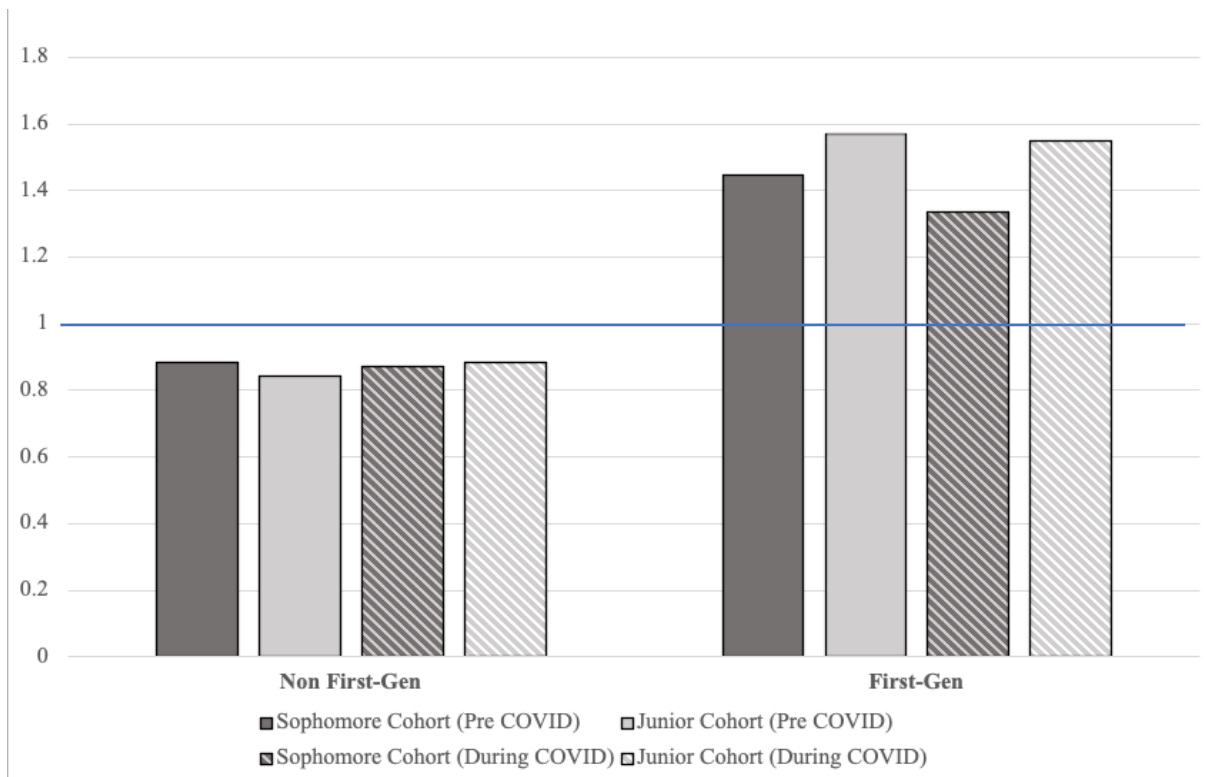
Figure 4. HSI Representation Index by Student First-Generation Status

Of note, at the same institution, Hispanic students were equally at risk of leaving their majors, but COVID-19 did not interfere with their decisions to leave their majors (Figure 5)
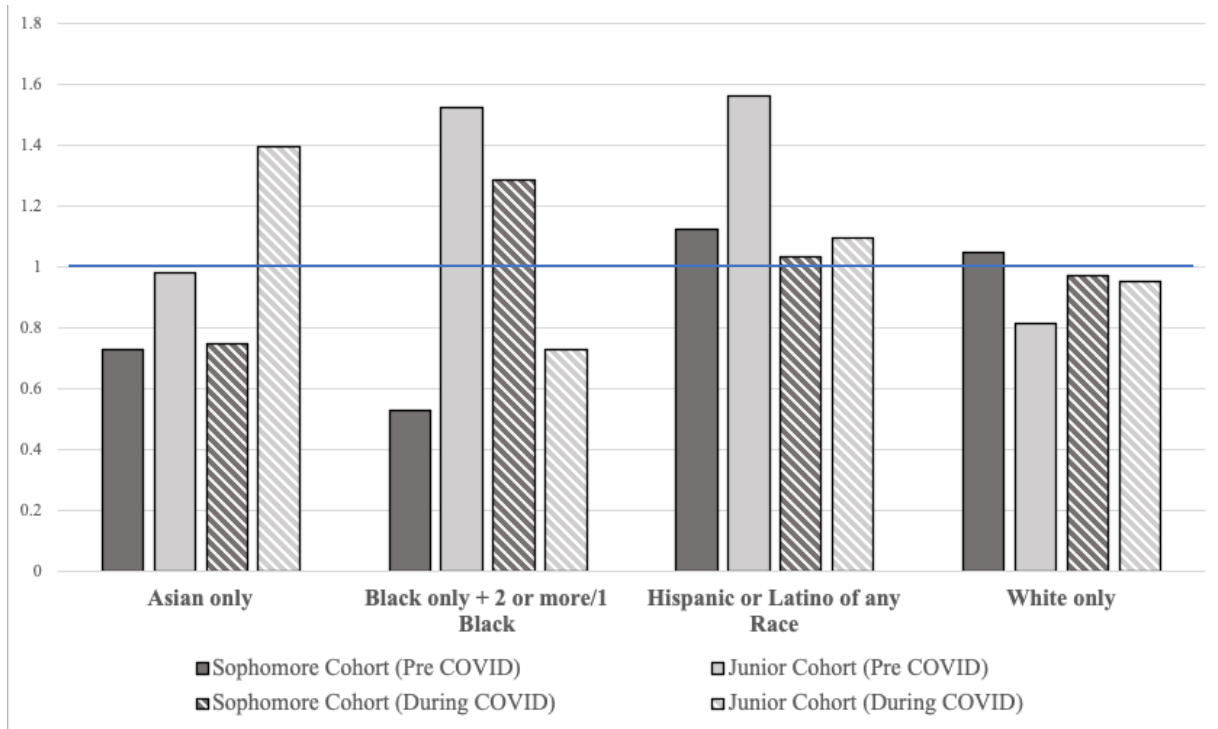

Figure 5. HSI Representation Index by Student Race/Ethnicity

Discussion & Implications

This work-in-progress study was intended to describe who attritted pre-COVID-19 interruptions in comparison to a cohort with COVID-19 interruptions. The planned full study will examine these patterns using inferential statistics (e.g., multiple logistic regression) to examine whether these patterns are more likely due to random variability or were more systematic in nature. In sum, the results mostly replicate our prior findings [14] that dropout rates were higher pre-COVID-19 as compared to during COVID-19. The trends observed have some elements that are encouraging and others that are discouraging. One of the positive notes is that, overall, a larger proportion of students returned to engineering during COVID-19 than prior to COVID-19 interruptions. There are many coalescing factors that may have resulted in greater persistence during COVID-19: (a) intentionally efforts and flexibility employed by faculty and universities, (b) a bleak job market during summer 2020, (c) governmental financial support provided directly to students, and (d) pass/fail grading in college-level courses. Also, some studies have indicated specific elements of virtual learning (e.g., recorded lectures, virtual office hours) may have been helpful additions to the learning environment [13].

Further, across most demographic categories, this trend of increased persistence during COVID-19 was demonstrated. For example, students with the highest financial need prior to COVID-19 at the HSI had much lower persistence in engineering than similar students with high financial need during the COVID-19 interruptions. However, not all groups experienced an increased retention rate. Mostly noticeable, the first-generation students at the HBCU experienced a decrease in retention rates. Perhaps, the social capital that these students bring may

not have been fully recognized and leveraged, which may have resulted in a decreased ability to navigate the *ins* and *outs* of college that COVID-19 likely exacerbated. Social capital theory may be a helpful framework to further explore the experiences of the students at the HBCU that were also first-generation [17, 18]. Future researchers may also want to consider other comorbid concerns, such as increased mental health risks and marginalization of certain groups of students, when examining student persistence during COVID-19.

As with all studies, this study has limitations. Because we leveraged institutional data, we were unable to connect individual student experiences and psychosocial variables with attrition rates. This study only examined the immediate impact of COVID-19 on student persistence. Future studies should also focus on the longer-term impact of COVID persistence rates.

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Table 1. *Total students for the Sophomore cohort by race/ethnicity from Fall 2018-Fall 2019 and from Fall 2019-Fall 2022 with their attrition rates at the HSI*

	Sophomore cohort Fall 2018 Start		Sophomore cohort Fall 2019 Start	
	Total	Did not return to Engineering	Total	Did not return to Engineering
2 or more/excluding Black and Hispanic	90 (3.08%)	6 (2.73%)	106 (3.31%)	6 (3.70%)
Asian only	418 (14.29%)	23 (10.45%)	503 (15.69%)	19 (11.73%)
Hispanic or Latino of any Race	674 (23.03%)	57 (25.91%)	746 (23.28%)	39 (24.07%)
White only	1,600 (54.68%)	126 (57.27%)	1,689 (52.70%)	86 (53.08%)
International	54 (1.85%)	4 (1.82%)	64 (2.00%)	5 (3.09%)
Black only + 2 or more/1 Black	75 (2.56%)	3 (1.36%)	77 (2.40%)	5 (3.09%)
American Indian/ Native Hawaiian/Unknown	15 (0.51%)	1 (0.46%)	20 (0.62%)	2 (1.24%)
TOTAL	2,926	220 (7.52%)	3,205	162 (5.05%)

Table 2. *Total students for the Junior cohort by race/ethnicity from Fall 2018 – Fall 2019 and from Fall 2019 - Fall 2022 with their attrition rates <u>at the HSI</u>*

	Junior cohort Fall 2018 Start		Junior cohort Fall 2019 Start	
	Total	Did not return to Engineering	Total	Did not return to Engineering
Asian only	327 (11.76%)	9 (11.54%)	450 (14.04%)	11 (19.63%)
Hispanic or Latino of any Race	638 (22.95%)	28 (35.90%)	782 (24.40%)	15 (26.79%)
White only	1,533 (55.14%)	35 (44.87%)	1,681 (52.45%)	28 (50.00%)
Black only + 2 or more/1 Black	70 (2.52%)	3 (3.85%)	79 (2.46%)	1 (1.79%)
International	113 (4.06%)	2 (2.56%)	86 (2.68%)	1 (1.79%)
2 or more/excluding Black and Hispanic	82 (2.95%)	0 (0%)	111 (3.46%)	0 (0%)
American Indian/ Native Hawaiian/Unknown	17 (0.62%)	1 (1.28%)	16 (0.51%)	0 (0%)
TOTAL	2,780	78 (2.81%)	3,205	56 (1.75%)

Table 3

Total students for the Sophomore cohort by financial status from Fall 2018-Fall 2019 and from Fall 2019-Fall 2022 with their attrition rates <u>at the HSI</u>

	Sophomore cohort Fall 2018 Start		Sophomore cohort Fall 2019 Start	
	Total	Did not return to Engineering	Total	Did not return to Engineering
High	672 (22.97%)	71 (32.27%)	717 (22.37%)	38 (23.46%)
Low	389 (13.29%)	29 (13.18%)	409 (12.76%)	19 (11.73%)
Medium	254 (8.68%)	25 (11.36%)	266 (8.30%)	19 (11.73%)
No Aid Application	988 (33.77%)	57 (25.91%)	1,076 (33.57%)	52 (32.10%)
No Need	623 (21.29%)	38 (17.27%)	737 (23.00%)	34 (20.99%)
TOTAL	2,926	220 (7.52%)	3,205	162 (5.05%)

Table 4

Total students for the Junior cohort by financial status from Fall 2018-Fall 2019 and from Fall 2019-Fall 2022 with their attrition rates <u>at the HSI</u>

	Junior cohort Fall 2018 Start		Junior cohort Fall 2019 Start	
	Total	Did not return to Engineering	Total	Did not return to Engineering
High	732 (26.33%)	30 (38.46%)	791 (24.68%)	15 (26.79%)
Low	318 (11.44%)	10 (12.82%)	399 (12.45%)	10 (17.86%)
Medium	241 (8.67%)	8 (10.26%)	254 (7.93%)	7 (12.50%)
No Aid Application	1,095 (39.39%)	20 (20.64%)	1,199 (37.41%)	18 (32.14%)
No Need	394 (14.17%)	10 (12.82%)	562 (17.54%)	6 (10.71%)
TOTAL	2,780	78 (2.81%)	3205	56 (1.75%)

Table 5

Total students for the Sophomore cohort by gender from Fall 2018-Fall 2019 and from Fall 2019-Fall 2022 with their attrition rates <u>at the HSI</u>

	Sophomore cohort Fall 2018 Start		Sophomore cohort Fall 2019 Start	
	Total	Did not return to Engineering	Total	Did not return to Engineering
Female	595 (20.33%)	44 (20.00%)	697 (21.75%)	38 (23.46%)
Male	2,331 (79.67%)	176 (80.00%)	2,508 (78.25%)	124 (76.54%)
TOTAL	2,926	220 (7.52%)	3,205	162 (5.05%)

Table 6

Total students for the Junior cohort by gender from Fall 2018-Fall 2019 and from Fall 2019-Fall 2022 with their attrition rates <u>at the HSI</u>

	Junior cohort Fall 2018 Start		Junior cohort Fall 2019 Start	
	Total	Did not return to Engineering	Total	Did not return to Engineering
Female	625 (22.48%)	14 (17.95%)	674 (21.03%)	12 (21.43%)
Male	2,155 (77.52%)	64 (82.05%)	2,531 (78.97%)	44 (78.57%)
TOTAL	2,780	78 (2.81%)	3,205	56 (1.75%)

Table 7

Total students for the Sophomore cohort by first-generation status from Fall 2018-Fall 2019 and from Fall 2019-Fall 2022 with their attrition rates <u>at the HSI</u>

	Sophomore cohort Fall 2018 Start		*Sophomore* cohort Fall 2019 Start	
	Total	Did not return to Engineering	Total	Did not return to Engineering
Missing	91 (3.11%)	7 (3.18%)	138 (4.31%)	14 (8.64%)
No	2,255 (77.07%)	150 (68.18%)	2,519 (78.60%)	111 (68.52%)
Yes	580 (19.82%)	63 (28.64%)	548 (17.10%)	37 (22.84%)
TOTAL	2,926	220 (7.52%)	3,205	162 (5.05%)

Table 8

Total students for the Junior cohort by first-generation status from Fall 2018-Fall 2019 and from Fall 2019-Fall 2022 with their attrition rates <u>at the HSI</u>

	Junior cohort Fall 2018 Start		*Junior* cohort Fall 2019 Start	
	Total	Did not return to Engineering	Total	Did not return to Engineering
Missing	182 (6.55%)	5 (6.41%)	151 (4.71%)	1 (1.79%)
No	2,031 (73.06%)	48 (61.54%)	2,390 (74.57%)	37 (66.07%)
Yes	567 (20.40%)	25 (32.05%)	664 (20.72%)	18 (32.14%)
TOTAL	2,780	78 (2.81%)	3,205	56 (1.75%)

Table 9. *Total students for the Sophomore cohort by race/ethnicity from Fall 2018-Fall 2019 and from Fall 2019-Fall 2020 with their attrition rates at the HBCU*

	Sophomore cohort Fall 2018 Start		Sophomore cohort Fall 2019 Start	
	Total	Did not return to Engineering	Total	Did not return to Engineering
African American	259 (86.33%)	32 (88.89%)	194 (83.26%)	10 (66.67%)
Hispanic	17 (5.67%)	2 (5.56%)	25 (10.73%)	3 (20.00%)
Asian	3 (1.00%)	0%	5 (2.15%)	1 (6.67%)
White	*	*	*	*
International	*	*	*	*
Multi-Racial	*	*	*	*
Indian/Alaskan	*	*	*	*
Race Unknown	*	*	*	*
Total	300	36 (12.00%)	233	<u>15 (6.44%)</u>

Note. * indicates fewer than 10 students. Redacted to maintain anonymity.

Table 10. *Total students for the Junior cohort by race/ethnicity from Fall 2018-Fall 2019 and from Fall 2019-Fall 2020 with their attrition rates at the HBCU*

	Junior cohort Fall 2018 Start		Junior cohort Fall 2019 Start	
	Total	Did not return to Engineering	Total	Did not return to Engineering
African American	195 (71.96%)	18 (81.82%)	235 (81.60%)	15 (83.33%)
Hispanic	28 (10.33%)	1 (4.55%)	21 (7.29%)	1 (5.56%)
Asian	18 (6.64%)	1 (4.55%)	9 (3.13%)	1 (5.56%)
White	*	*	*	*
International	15 (5.54%)	0%	11 (3.82%)	0
Multi-Racial	*	*	*	*
Indian/Alaskan	*	*	*	*
Nat Hawaiian/Pacific Isl	*	*	*	*
Race Unknown	*	*	*	*
Total	271	22 (8.12%)	288	18 (6.25%)

Note. * indicates fewer than 10 students. Redacted to maintain anonymity.

Table 11

Total students for the Sophomore cohort by financial status from Fall 2018-Fall 2019 and from Fall 2019-Fall 2020 with their attrition rates at the HBCU

	Sophomore cohort Fall 2018 Start		Sophomore cohort Fall 2019 Start	
	Total	Did not return to Engineering	Total	Did not return to Engineering
High Need	198 (66.00%)	23 (63.89%)	156 (66.95%)	11 (73.33%)
Low Need	63 (21.00%)	5 (13.89%)	48 (20.60%)	2 (13.33%)
No Aid and /No Need	39 (13.00%)	8 (22.22%)	29 (12.45%)	2 (13.33%)
Total	300	36 (12%)	233	15 (6.44%)

Table 12

Total students for the Junior cohort by financial status from Fall 2018-Fall 2019 and from Fall 2019-Fall 2020 with their attrition rates at the HBCU

	Junior cohort Fall 2018 Start		Junior cohort Fall 2019 Start	
	Total	Did not return to Engineering	Total	Did not return to Engineering
High Need	182 (67.16%)	14 (63.64%)	183 (63.54%)	14 (77.78%)
Low Need	37 (13.65)	1 (4.55%)	62 (21.53%)	0%
No Aid and No Need	52 (19.19%)	7 (31.82%)	43 (14.93%)	4 (22.22%)
Total	271	22 (8.12%)	288	18 (6.25%)

Table 13

Total students for the Sophomore cohort by gender from Fall 2018-Fall 2019 and from Fall 2019-Fall 2020 with their attrition rates at the HBCU

	Sophomore cohort Fall 2018 Start		Sophomore cohort Fall 2019 Start	
	Total	Did not return to Engineering	Total	Did not return to Engineering
Female	90 (30.00%)	12 (33.33%)	66 (28.33%)	2 (13.33%)
Male	210 (70.00%)	48 (66.67%)	167 (71.67)	13 (86.67%)
Total	300	36 (12.00%)	233	15 (6.44%)

Table 14

Total students for the Junior cohort by gender from Fall 2018-Fall 2019 and from Fall 2019-Fall 2020 with their attrition rates at the HBCU

	Junior cohort Fall 2018 Start		Junior cohort Fall 2019 Start	
	Total	Did not return to Engineering	Total	Did not return to Engineering
Female	76 (28.04%)	5 (22.73%)	85 (29.51%)	4 (22.22%)
Male	195 (71.96%)	15 (77.27%)	203 (70.49)	14 (77.78%)
Total	271	22 (8.12%)	288	18 (6.25%)

Table 15

Total students for the Sophomore cohort by first-generation status from Fall 2018-Fall 2019 and from Fall 2019-Fall 2020 with their attrition rates at the HBCU

	Sophomore cohort Fall 2018 Start		*Sophomore* cohort Fall 2019 Start	
	Total	Did not return to Engineering	Total	Did not return to Engineering
Not Reported	3 (1.00%)	0	5 (2.15%)	1 (6.67%)
No	226 (75.33%)	29 (80.56%)	177 (75.97%)	9 (60.00%)
Yes	71 (23.67%)	7 (19.44%)	51 (21.89)	5 (33.33%)
Total	300	36 (12.00%)	233	15 (6.44%)

Table 16

Total students for the Junior cohort by first-generation status from Fall 2018-Fall 2019 and from Fall 2019-Fall 2020 with their attrition rates at the HBCU

	Junior cohort Fall 2018 Start		Junior cohort Fall 2019 Start	
	Total	Did not return to Engineering	Total	Did not return to Engineering
Not Reported	18 (6.64%)	1 (4.55%)	12 (4.17%)	1 (5.56%)
No	177 (65.31%)	14 (63.64%)	208 (72.22%)	10 (55.56%)
Yes	76 (28.04%)	7 (31.82%)	68 (23.61%)	7 (38.89%)
Total	271	22 (8.12%)	288	18 (6.25%)