

**Women and ALANA students in STEM disciplines:
Evaluation of student retention and progress towards
STEM degrees**

Irah Modry-Caron
Terra Schehr

January, 2009

Table of Contents

INTRODUCTION.....	1
<i>Methodology.....</i>	<i>1</i>
EXECUTIVE SUMMARY.....	2
DETAILED FINDINGS	3
<i>Student Characteristics.....</i>	<i>3</i>
<i>Student Retention and Progression through STEM Majors.....</i>	<i>5</i>
Science.....	9
Biology.....	12
Chemistry and Physics	15
Speech-Language Pathology/Audiology	18
Technology.....	21
Engineering	24
Math	27
<i>Student Characteristics at Graduation</i>	<i>30</i>
SUMMARY	32

Figures and Tables

FIGURE 1. PROGRESSION IN STEM DISCIPLINES – OVERALL	6
FIGURE 2. PROGRESSION IN STEM DISCIPLINES – BY GENDER	7
FIGURE 3. PROGRESSION IN STEM DISCIPLINES – BY RACE.....	8
FIGURE 4. PROGRESSION IN SCIENCE – OVERALL	9
FIGURE 5. PROGRESSION IN SCIENCE - BY GENDER	10
FIGURE 6. PROGRESSION IN SCIENCE - BY RACE.....	11
FIGURE 7. PROGRESSION IN BIOLOGY - OVERALL	12
FIGURE 8. PROGRESSION IN BIOLOGY - BY GENDER	13
FIGURE 9. PROGRESSION IN BIOLOGY - BY RACE.....	14
FIGURE 10. PROGRESSION IN CHEMISTRY AND PHYSICS – OVERALL	15
FIGURE 11. PROGRESSION IN CHEMISTRY AND PHYSICS - BY GENDER.....	16
FIGURE 12. PROGRESSION IN CHEMISTRY AND PHYSICS - BY RACE.....	17
FIGURE 13. PROGRESSION IN SPEECH-LANGUAGE PATHOLOGY/AUDIOLOGY - OVERALL.....	18
FIGURE 14. PROGRESSION IN SPEECH-LANGUAGE PATHOLOGY/AUDIOLOGY - BY GENDER ..	19
FIGURE 15. PROGRESSION IN SPEECH-LANGUAGE PATHOLOGY/AUDIOLOGY - BY RACE.....	20
FIGURE 16. PROGRESSION IN TECHNOLOGY – OVERALL	21
FIGURE 17. PROGRESSION IN TECHNOLOGY - BY GENDER	22
FIGURE 18. PROGRESSION IN TECHNOLOGY - BY RACE	23
FIGURE 19. PROGRESSION IN ENGINEERING – OVERALL	24
FIGURE 20. PROGRESSION IN ENGINEERING – BY GENDER	25
FIGURE 21. PROGRESSION IN ENGINEERING - BY RACE	26
FIGURE 22. PROGRESSION IN MATH – OVERALL	27
FIGURE 23. PROGRESSION IN MATH - BY GENDER	28
FIGURE 24. PROGRESSION IN MATH - BY RACE	29
 TABLE 1: CROSSWALK BETWEEN STEM MAJORS TO STEM DISCIPLINES	 1
TABLE 2: DESCRIPTIVE STATISTICS OF STUDENTS FROM CLASSES OF 2004 TO 2008.....	4
TABLE 3: DESCRIPTIVE STATISTICS OF GRADUATES FROM CLASSES OF 2004 TO 2008	31

This report prepared by The Office of Institutional Research
Using data from Loyola College's Institutional Information Systems

Women and ALANA students in STEM disciplines: Evaluation of student retention and progress towards STEM degrees

Introduction

In the summer 2008, the Office of Institutional Research conducted a study evaluating Women and ALANA students' retention and progress towards Science, Technology, Engineering, and Mathematics (STEM) degrees. The Classes of 2004 to 2008 were evaluated in terms of their initial educational goals compared to their actual retention, progression, and eventual attainment of bachelor degrees. This report focuses on whether there are significant differences between gender and racial groups across measures of academic performance, retention, and degree attainment.

Methodology

Data for this study were drawn from undergraduate admissions, student, and retention files. A total of 4,970 first-year undergraduate students were included in this study on the basis of their completing an undergraduate degree in academic years 2004 to 2008. This represents the entire population of students in each graduation class was used; no sampling procedures were used in this study.

For each class, from the time of entering Loyola College to completing a degree, the same demographic, academic, retention and progression variables were drawn from institutional data sources. Gender and race information were the primary variables used for comparative purposes. High School GPA and SAT scores are used as a measure of pre-collegiate academic performance. Student retention is derived by using institutional 'hiatus' files to account for students who permanently left the institution. Students' progression to a STEM degree was based on a comparison of incoming students' educational goals and the major that they ultimately completed.

For purposes of subgroup analysis, African-American, Asian/Pacific Islanders, Hispanic/Latinos are grouped together as "ALANA." "Unknown/Other" students are dropped from subgroup analysis. Also, all STEM undergraduate degree programs are grouped into 4 discipline categories, see Table 1.

Table 1: Crosswalk between STEM Majors to STEM Disciplines

Major	STEM Disciplines
Biology	Science
Chemistry	Science
Computer Science	Technology
Electrical Engineering	Engineering
Engineering Science	Engineering
Mathematical Science	Math
Physics	Science
Speech Pathology	Science

Note: Students majoring in STEM-related interdisciplinary studies are included and counted once.

All group differences described in this report are statistically significant at the $p \leq .05$ level, unless otherwise noted.

Executive Summary

- ◆ STEM graduates represent a relatively small proportion of the undergraduate degrees awarded at Loyola. Moreover, nearly half of the students who express interest in a STEM discipline at the point of application do not ultimately complete a degree at Loyola in one of those majors.
- ◆ STEM majors are as popular among women students as they are among men with roughly equal proportions of women and men students intending to major in a STEM disciplines.
 - ◆ Math and Sciences disciplines were more popular among women while Engineering and Technology disciplines were more popular to men.
 - ◆ Just over six out of ten first-year women who intend to major in STEM discipline earned a degree in a STEM discipline. Likewise, just over five out of ten first-year men who intend to major in STEM discipline earned a degree in a STEM discipline.
- ◆ White students, when compared to ALANA students, more frequently express an interest in STEM disciplines.
 - ◆ Similar proportions of ALANA and white students who intended to major in a STEM discipline went on to graduate with a bachelor degree in one of the STEM disciplines.
- ◆ Less than six out of ten students who intended to major in Science disciplines went on to graduate with a Science related degree.
 - ◆ Less than half of all students who intended to major in biology ultimately graduated in this field.
 - ◆ Four out of ten students who intended to major in chemistry or physics went on to graduate with a chemistry or physics major.
 - ◆ Almost eight out of ten students who intended to major in speech-language pathology/audiology ultimately graduated with a speech-language pathology /audiology major.
- ◆ Over one-third of students who intended to major in Technology majors went on to graduate with a technology-related degree.
- ◆ Over four out of ten students who intended to major in Engineering went on to graduate with an engineering degree.
- ◆ Less than a half of all students who intended to major in Math went on to graduate with a math degree.

Detailed Findings

Student Characteristics

As a part of the admissions process, students are asked a number of questions regarding their educational goals and personal characteristics; transcripts and score reports are used to determine academic performance. The demographics of the students entering who entered Loyola in the classes of 2004 to 2008 and those who intended to major in a STEM discipline are shown in Table 2, next page.

Interest in STEM disciplines remained fairly steady fluctuating around 20% in each year although the class of 2008 did have the highest interest in STEM majors compared to the previous four years.

Over the past five years, about the same proportion of first-year women and men students stated an intention to pursue a STEM discipline. Women students tended to prefer the science disciplines (women science N=325, men science N=174), while the men tended to expressed higher interest than women in engineering and technology disciplines (women engineering N=21, men engineering=55; women technology N=20, men technology N=58).

Students with the intention of pursuing a STEM major at the point of application had a higher High School GPAs than the overall first-year student body (HS GPA first-year STEM M=3.52, SD=.37; overall first-year student body M=3.37, SD=0.41). Also, women students had higher High School GPAs than did men. This is true for women who intend to major in a STEM discipline (women HS GPA M=3.60, SD=0.35; men M=3.43, SD=0.38) and for the incoming classes overall (women HS GPA M=3.49, SD=0.37; men M=3.27, SD=0.43).

While a relatively small proportion of the student body, ALANA students were more likely to indicate an interest in STEM majors than were white students (from 2004-2008, 22% of incoming ALANA and 14% of white students were interested in STEM majors).

Table 2: Descriptive Statistics of First-Year Students from Classes of 2004 to 2008

	Overall		STEM Intention		
	Frequency	Percent within Category (col %)	Frequency	Percent of Students (row %)	Percent within Category (col %)
Class Year					
2004	1,034	21%	137	13%	19%
2005	895	18%	126	14%	18%
2006	961	19%	152	16%	21%
2007	973	20%	139	14%	19%
2008	1,107	22%	168	15%	23%
Gender					
Men	2,075	42%	320	15%	44%
Women	2,895	58%	402	14%	56%
Race					
White	4,402	89%	603	14%*	84%
ALANA	469	9%	102	22%*	14%
Unknown	99	2%	17	17%	2%
Intended Major					
Undecided or Non-STEM	4,248	85%			
Engineering	76	2%			
Math	69	1%			
Science	499	10%			
Technology	78	2%			
Academic Qualifications	Mean	Std. Deviation	Mean	Std. Deviation	
Verbal SAT	599.0	83.11	605.0	80.24	
Math SAT	605.0	82.24	624.0	82.58	
Total SAT	1,204.0	149.69	1,230.0	147.80	
G.P.A	3.3*	0.41	3.5*	0.37	

* Indicates statistically significant different between groups

Student Retention and Progression through STEM Majors

In order to chart the progression of students who expressed an interest in pursuing a STEM degree and those students who actually earned a STEM degree, five possible educational pathways were constructed. Each pathway was analyzed by STEM discipline, gender, and race. Students' were assigned to a particular educational pathway based on the comparison of first-year students' intended majors, as documented on their admission application, and graduation major. The five possible educational pathways students can follow as they progress through their undergraduate career at Loyola College are:

1. Intended to major in a STEM discipline and earn a degree in that major;
2. Intended to major in a STEM discipline but earn a degree in a STEM discipline that is different than their first-year intended major;
3. Intended to major in a STEM discipline but earn a degree non-STEM major;
4. Undecided or intended to major in a non-STEM field but earn a degree in STEM major; or,
5. Undecided or intended to major in a non-STEM field and earn a degree in a non-STEM major.

To show this graphically, flow charts were created to show the relationship between first-year students' intentions and their degree completion. The first flow chart depicts the overall number and proportion of students who expressed an interest in a STEM or non-STEM major and the number and proportion of students who progressed through the above mentioned educational pathways. Subsequent flow charts show student flow through these pathways for each STEM discipline and disaggregations by gender and race.

Just over half of all students who intended to major in a STEM discipline went on to graduate with a bachelor degree in one of the STEM disciplines. In addition, 6% of new students who did not indicate interest in STEM disciplines on their application for admission completed a major in one of the STEM areas. See Figure 1.

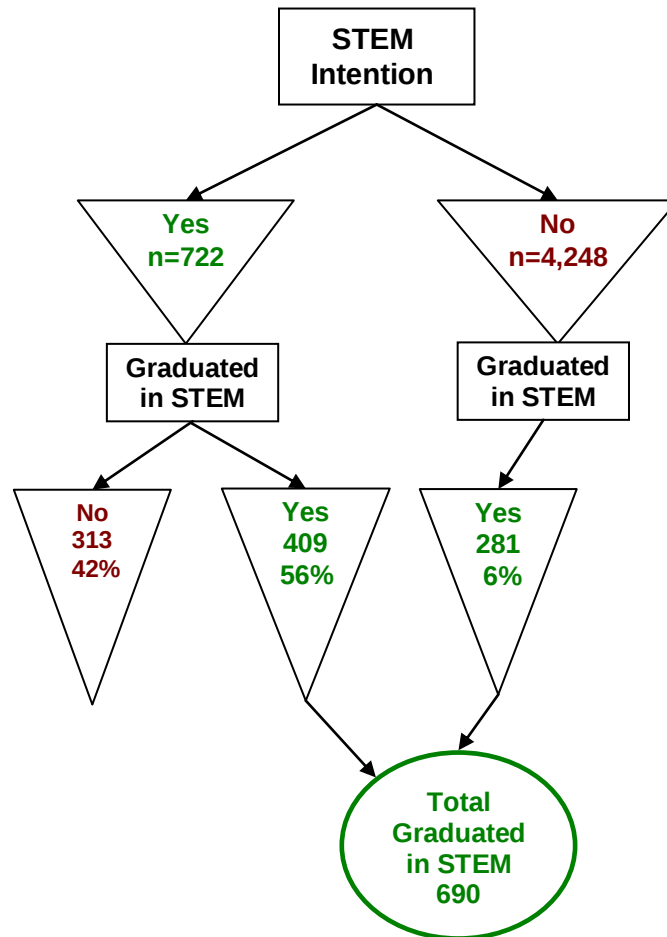


Figure 1. Progression in STEM disciplines – overall

Seventy-two percent of the students who intended to major in a STEM discipline but who did not complete a degree in STEM changed majors; the remaining 28% (88 students) left Loyola before graduating.

Of those students who intended to major in a STEM discipline, students who ultimately completed a degree in STEM had higher SAT scores and High School GPAs than did those who did not (SAT for STEM graduates $M=1251$, $SD=129$; non-STEM completers $M=1201$, $SD=145$; HS GPA for STEM graduates $M=3.58$, $SD=0.35$; non-STEM completers $M=3.46$, $SD=0.38$).

Just over six out of ten first-year women who intend to major in a STEM discipline earned a degree in a STEM major; completion rates for men were lower at 52%. When looking at students who did not express an interest in a STEM major on their application but then went on to complete a degree in STEM, it is interesting to see that proportionally more women (8%) than men (4%) followed this path. See Figure 2.

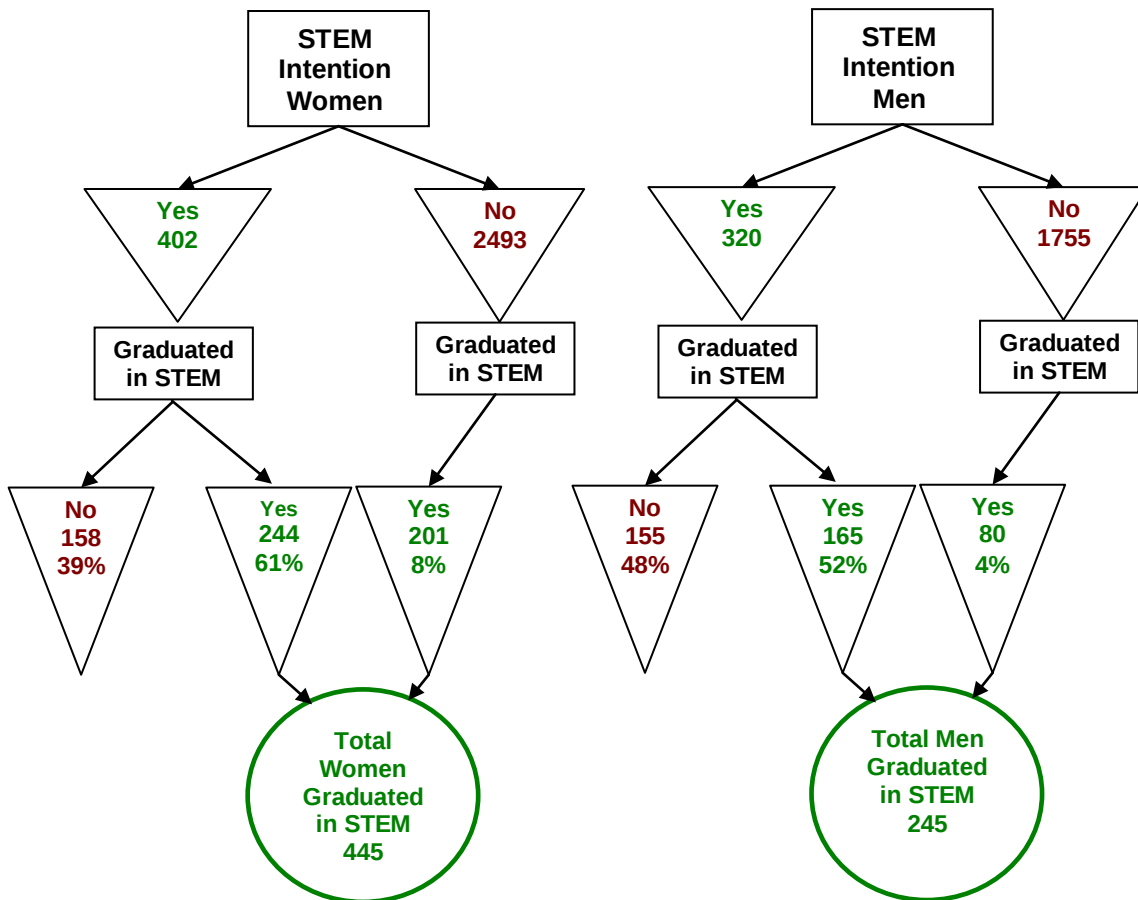


Figure 2. Progression in STEM disciplines – by gender

Seventy-one percent of the women and 73% of the men who intended to major in a STEM discipline but who did not complete a degree in STEM changed majors; the remaining 295 of women (47 students) and 26% of men (41 students) left Loyola before graduating.

Among the women who intended to major in a STEM discipline, those who ultimately completed a degree in a STEM major had higher SAT scores and High School GPAs than did those who did not (SAT for women STEM graduates $M=1241$, $SD=143$; women non-STEM completers $M=1190$, $SD=99$; HS GPA for women STEM graduates $M=3.64$, $SD=0.32$; women non-STEM completers $M=3.52$, $SD=0.37$). Men who intended and completed a STEM major had higher SAT scores than did the men who intended but did not complete a STEM degree but there was no difference in their High School GPA (SAT for men STEM graduates $M=1267$, $SD=104$; men non-STEM completers $M=1212$, $SD=180$).

Nearly six out of ten ALANA and white students who expressed an interest in STEM disciplines went on to complete a degree in a STEM major. In addition, similar proportions of ALANA (5%) and white students (7%) who did not express an intention to major in a STEM discipline ultimately ended up with a degree in STEM. See Figure 3.

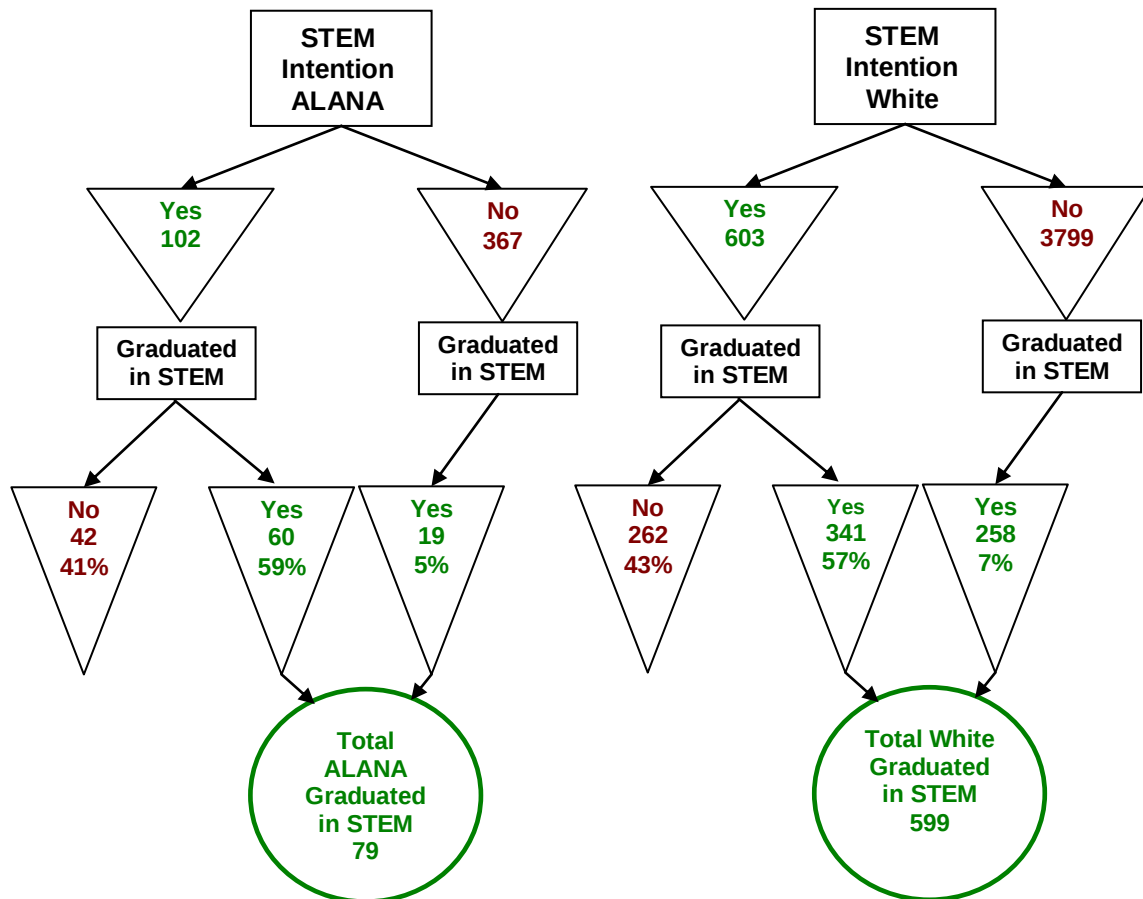


Figure 3. Progression in STEM disciplines – by race

Seventy-three percent of the ALANA and white students who intended to major in a STEM discipline but who did not complete a degree in STEM changed their major; the remaining 26% (11 ALANA students and 68 white students) left Loyola before graduating.

Among the white students who intended to major in a STEM discipline, those who ultimately completed a degree in STEM had Higher SAT scores and High School GPAs than did those who did not (SAT for white STEM graduates $M=1269$, $SD=107$; white non-STEM completers $M=1208$, $SD=149$; HS GPA for white STEM graduates $M=3.6$, $SD=0.33$; white non-STEM completers $M=3.49$, $SD=0.37$).

There were no differences in academic qualifications between ALANA students who completed a STEM degree and those who intended to but did not.

Science

Nearly six out of ten students who intended to major in science disciplines went on to graduate with a science-related degree. Sixty-seven percent of students who intended to major in a science discipline but who did not graduate with a science degree completed a degree in another field at Loyola, the remaining 32% (66 students) left Loyola before graduating. See Figure 4.

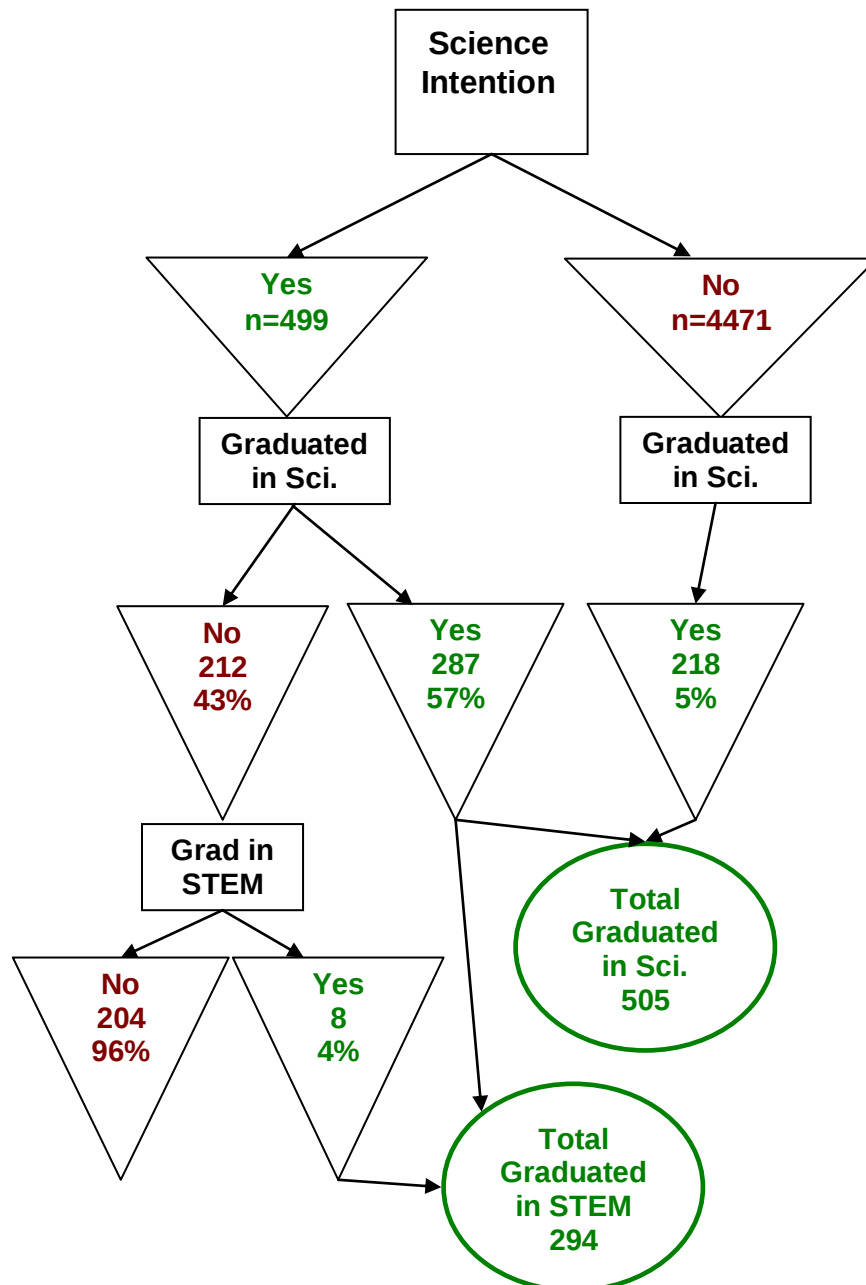


Figure 4. Progression in Science – overall

Among students who intended to major in science, those who ultimately completed a science degree had higher SAT scores than those who did not (SAT for science graduates M=1237, SD=131; non-science completers M=1208, SD=110).

Over half of the women and men that expressed an interest in science earned a bachelors degree in science. Notably, more women than men who did not express an interest in science majors at the point of application ultimately completed a degree in science. Thirty-seven women and twenty-three men who intended to major in the sciences left Loyola before graduating. See Figure 5.

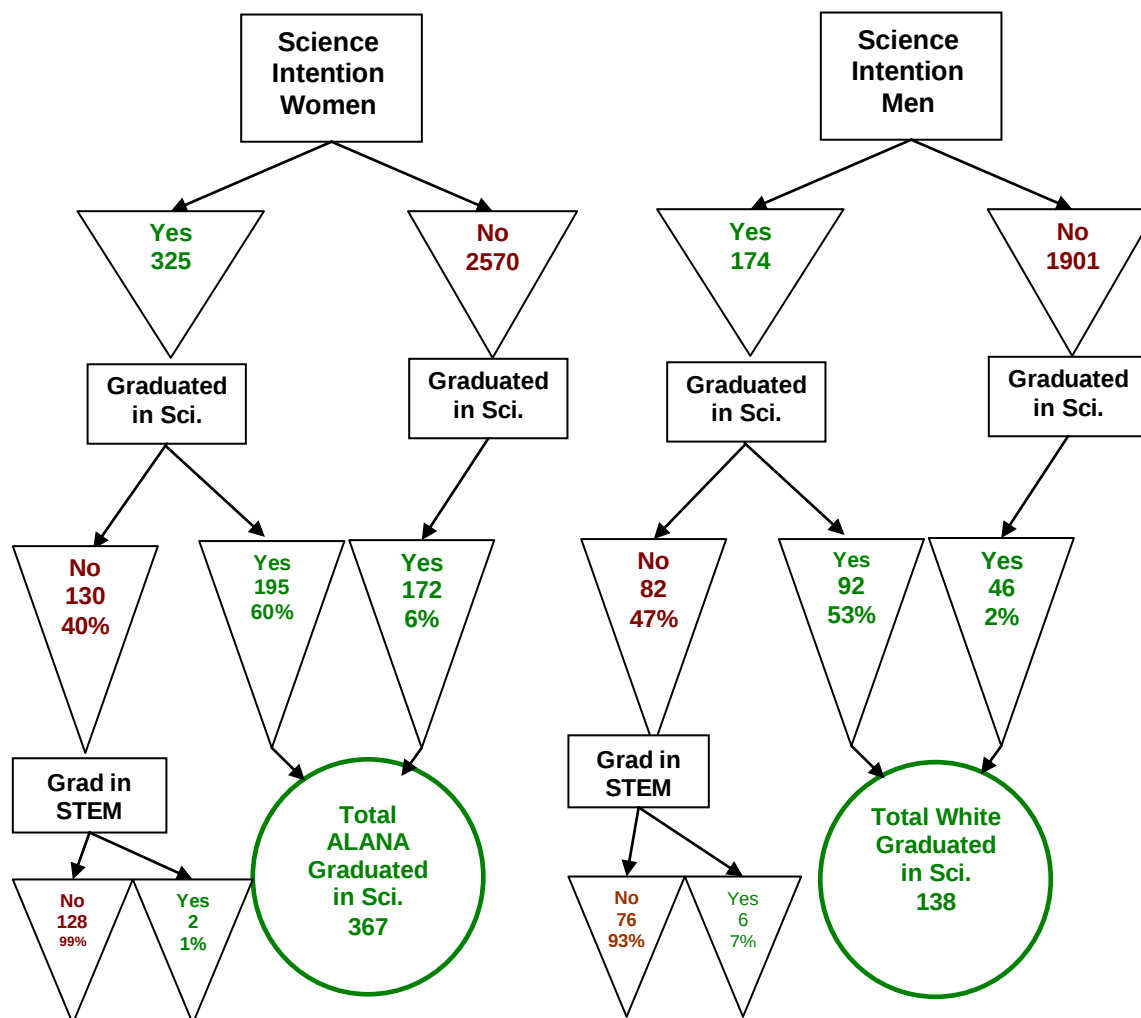


Figure 5. Progression in Science - by gender

Among women who intended to major in a science discipline, those who ultimately completed a science degree had higher SAT scores and High School GPA than did those who did not (SAT for women science graduates M=1227, SD=141; women non-science completers M=1194, SD=98; HS GPA for women science graduates M=3.63, SD=0.31; women non-science completers M=3.52, SD=0.38).

There were no differences in academic qualifications between men who completed a science degree and those who intended to but did not.

Nearly two-thirds of ALANA students who expressed an interest in science earned a bachelors degree in a science field; 57% of white students who intended to major in science completed degrees in that area. Forty-six white students and eleven ALANA students left the College before graduating. See Figure 6.

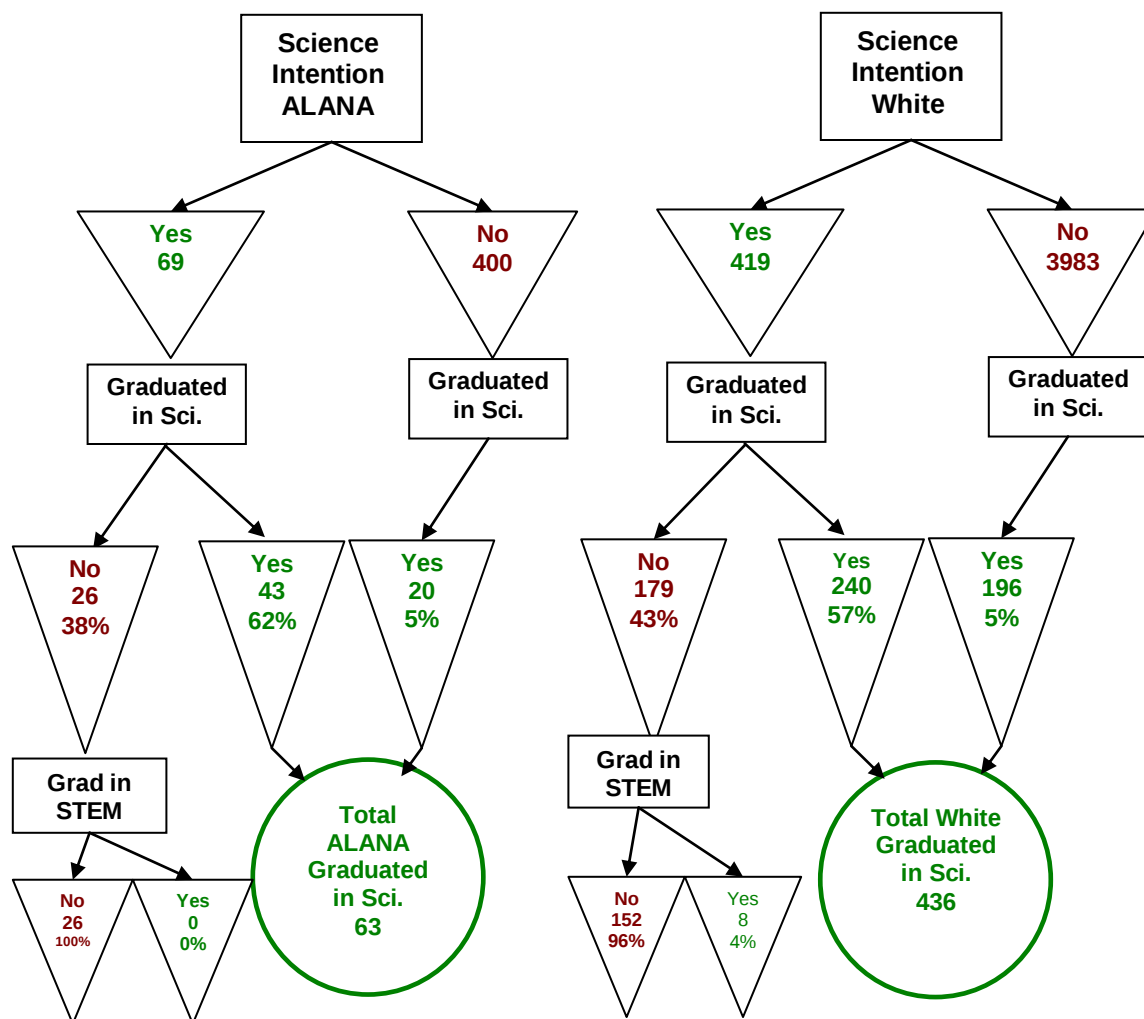


Figure 6. Progression in Science - by race

Among white students who intended to major in a science discipline, those who ultimately completed a science degree had higher SAT scores and High School GPAs than did those who did not (SAT for white science graduates M=1255, SD=104; white science non-completers M=1213, SD=105; HS GPAs for white science graduates M=3.62, SD=0.31; white science non-completers M=3.53, SD=0.36.)

There were no differences in the academic qualifications of ALANA students who did and did not complete science majors.

Biology

Less than half of all students who intended to major in biology ultimately graduated in this field. While the data would indicate that biology does not attract many students who enter Loyola without declaring an interest in the major—only 2% of the incoming classes, over one-third (38%) of the biology graduates in the past five-years were students who did not express an interest in biology on their application. See Figure 7.

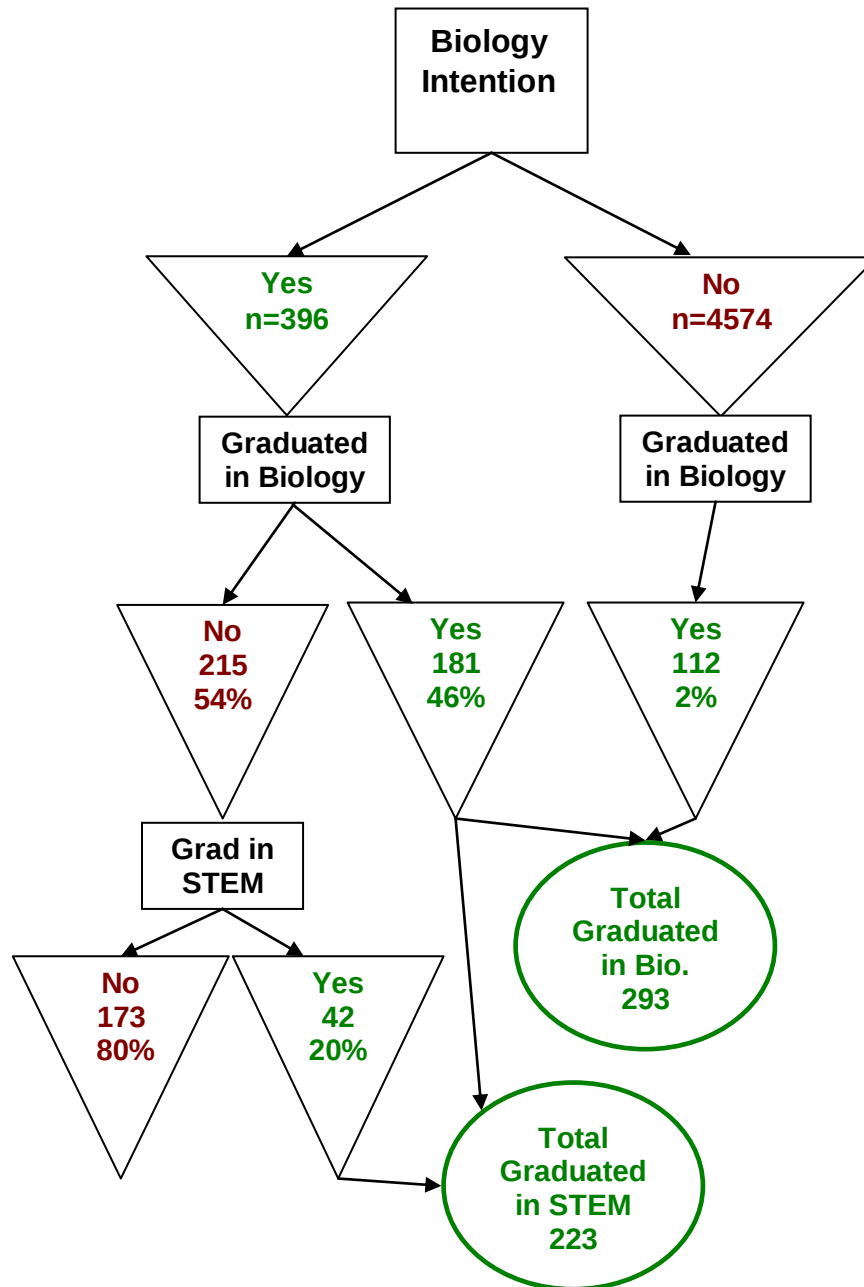


Figure 7. Progression in Biology - overall

There were no differences in academic qualifications between students who completed a biology degree and those who intended to but did not.

Less than half of women and men that expressed an interest in biology earned a degree in biology. See Figure 8.

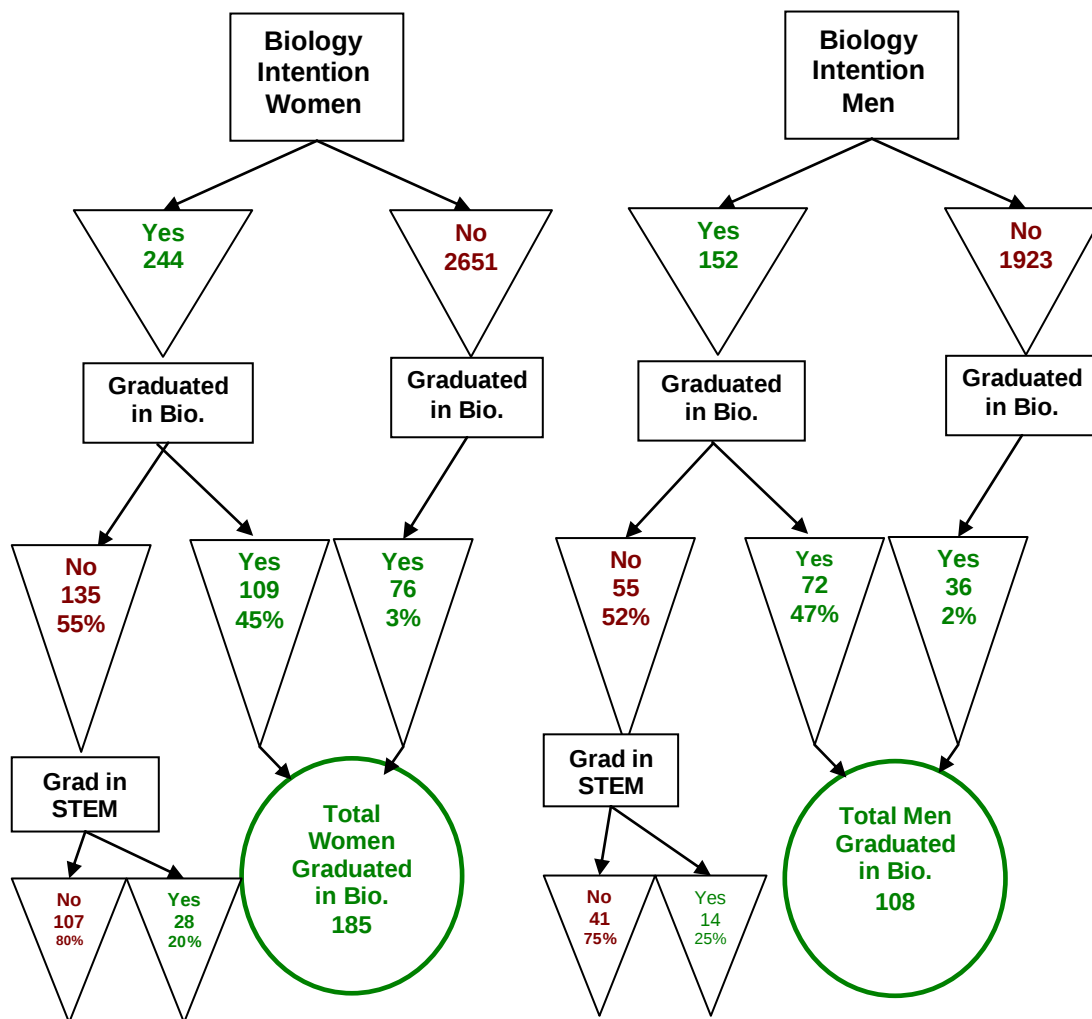


Figure 8. Progression in Biology - by gender

There were no differences in academic qualifications between women and men students who completed a biology degree and those who intended to but did not.

Over half of ALANA students but fewer than half of white students who expressed an interest in biology earned a degree in biology—this difference is directional only, not statistically significant. See Figure 9.

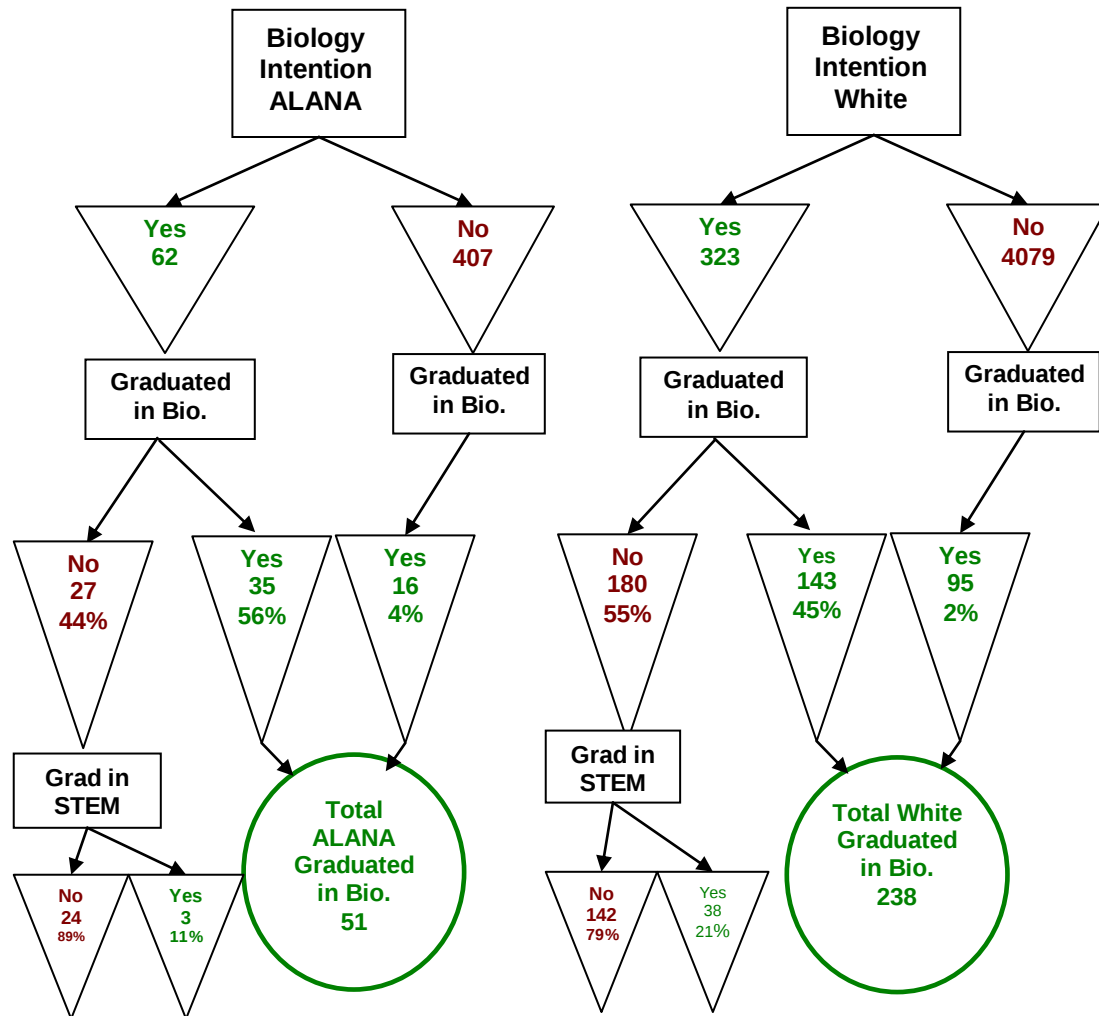


Figure 9. Progression in Biology - by race

Among white students who intended to major in biology, those who ultimately completed a biology degree had higher SAT scores than those who did not (SAT for white biology graduates $M=1261$, $SD=100$; white biology non-completers $M=1217$, $SD=101$).

There were no differences in academic qualifications ALANA students who completed a biology degree and those who intended to but did not.

Chemistry and Physics

Four out of ten students who intended to major in chemistry or physics went on to graduate with a chemistry or physics degree. Interestingly, 71% of the chemistry or physics majors in the past five years were students who did not express an interest in those disciplines on their application. See Figure 10.

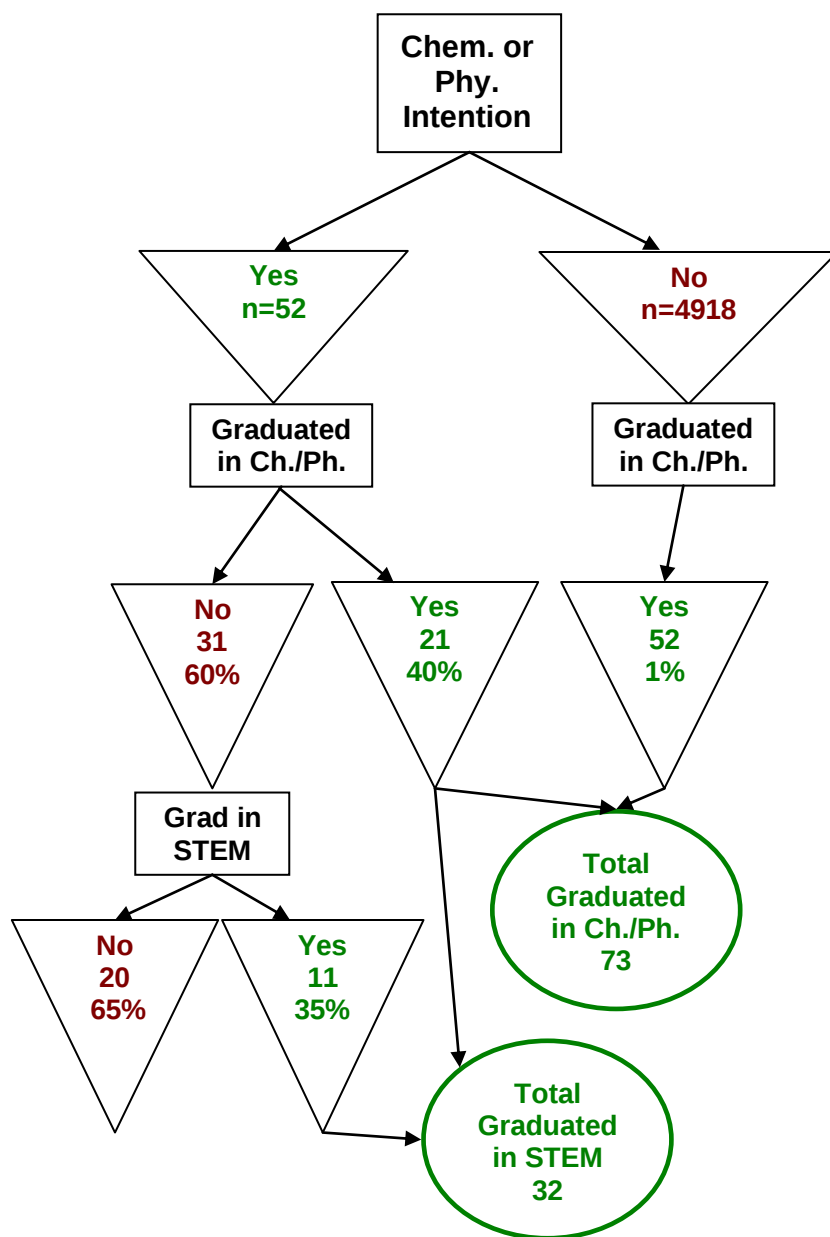


Figure 10. Progression in Chemistry and Physics – overall

Among students who intended to major in chemistry or physics, those who completed chemistry or physics degrees had higher SAT scores than those who did not (SAT scores for chemistry and physics graduates M=1274, SD=101; chemistry and physics non-completers M=1202, SD=112).

Over one-third of men and women who expressed an interest in chemistry or physics on their application completed a degree in these majors. See Figure 11.

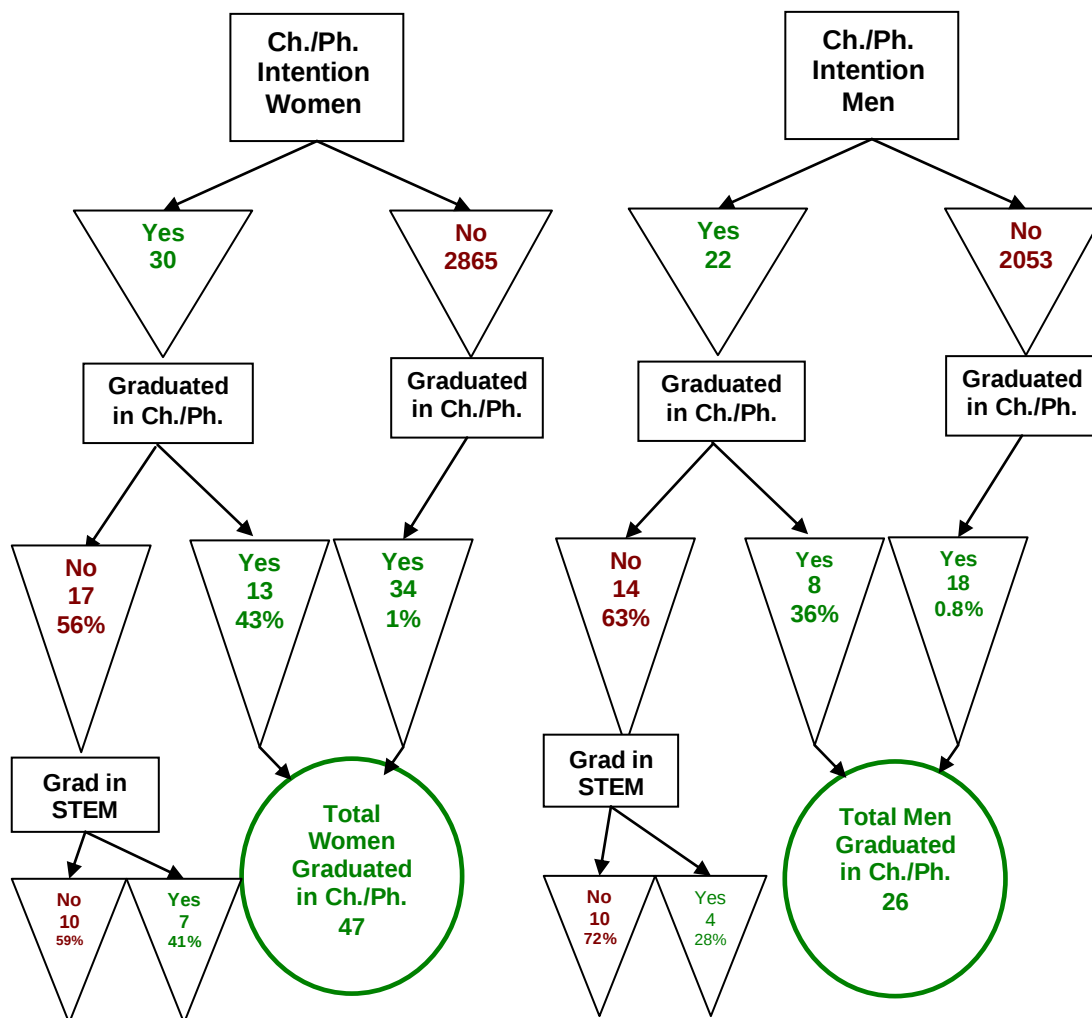


Figure 11. Progression in Chemistry and Physics - by gender

Among women students who intended to major in chemistry/physics, those who completed a chemistry/physics degree had higher SAT scores and High School GPAs than those who did not (SAT for women chemistry/physics graduates $M=1269$, $SD=109$; women chemistry/physics non-completers $M=1180$, $SD=60$; HS GPAs for women chemistry/physics graduates $M=3.79$, $SD=0.23$; women chemistry/physics non-completers $M=3.56$, $SD=0.27$).

There were no differences in academic qualifications among men who completed a chemistry/physics degree and those who intended to but did not.

Although small in number, two-thirds of ALANA students who indicated interest in chemistry or physics ultimately completed a degree in one of those fields while proportionally fewer of the white students (36%) who were initially interested in chemistry/physics completed a degree in those fields. See Figure 12.

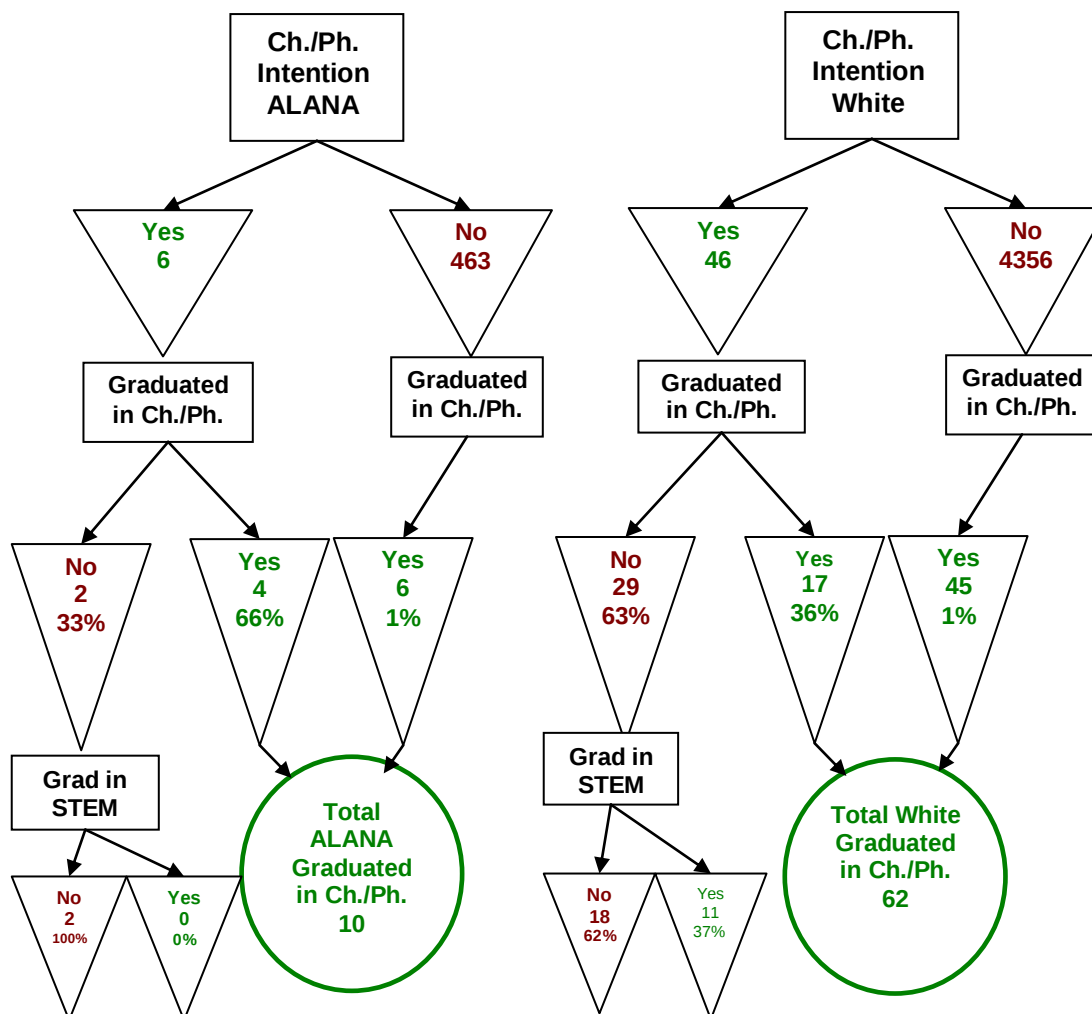
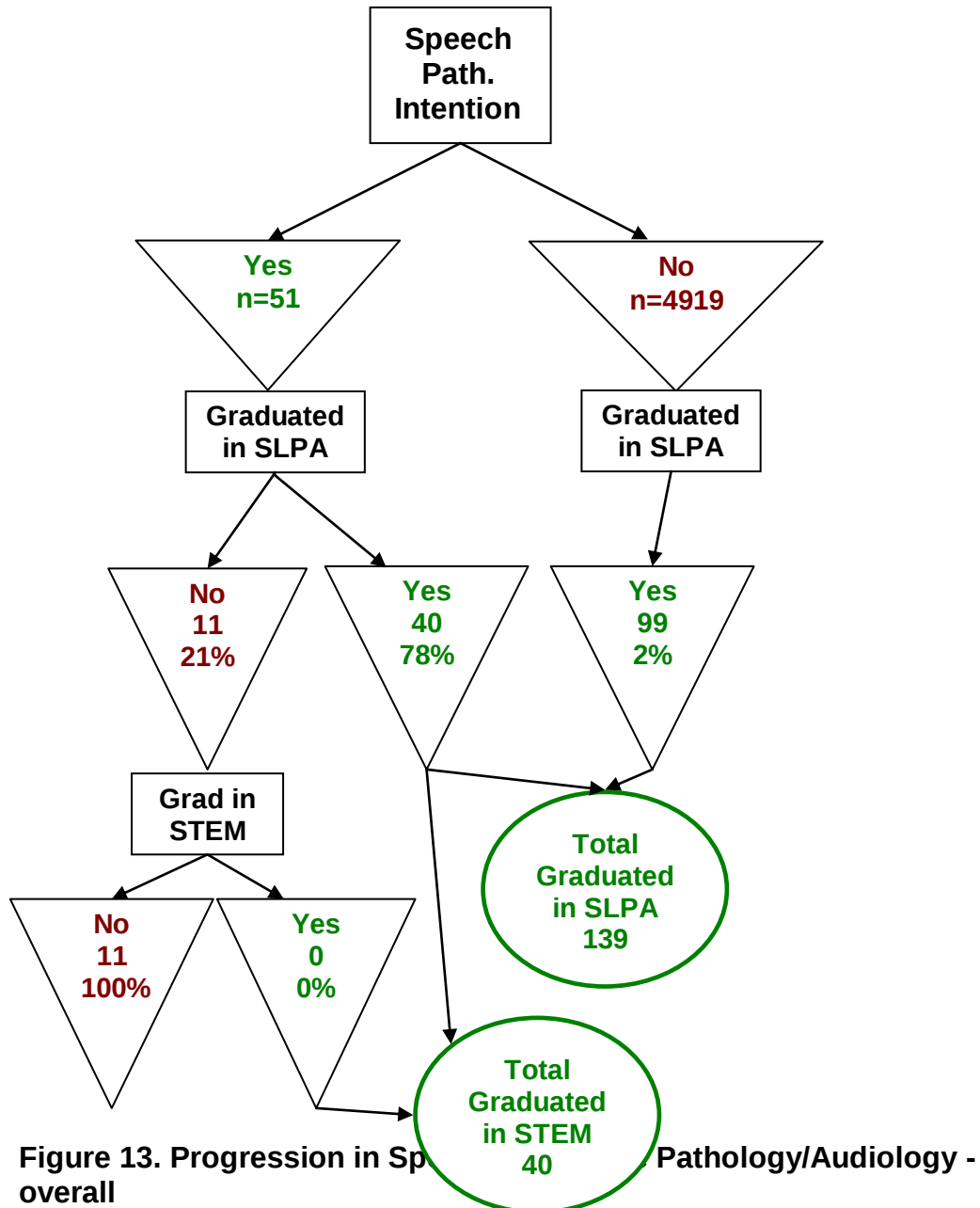


Figure 12. Progression in Chemistry and Physics - by race

There were no differences in academic qualifications within groups of ALANA and white students who expressed an interest in chemistry or physics majors and completed or did not complete degrees in those fields.

Speech-Language Pathology/Audiology

Almost eight out of ten students who intended to major in speech-language pathology/audiology (SLPA) ultimately graduate with a SLPA major. Notably, 71% of the SLPA majors in the past five years were students who did not express an interest in that major on their application. In addition, all of the students who expressed interest in SLPA on their admission application but who did not earn a SLPA degree transferred out of STEM-related degree programs completely or left the institution. See Figure 13.



Among students who intended to major in SLPA, those who completed a SLPA degree had higher High School GPAs than those who did not (HS GPA scores for SLPA students M=3.54, SD=0.33; SLPA non-completers M=2.92, SD=0.62).

All of the students who expressed interest in SLPA upon admission were women. A total of four men in the past five years graduated with a degree in SLPA and none of them indicated that field as an area of interest on the application.

Nearly eight out ten women that expressed an interest in SLPA earned a degree in SLPA. See Figure 14.

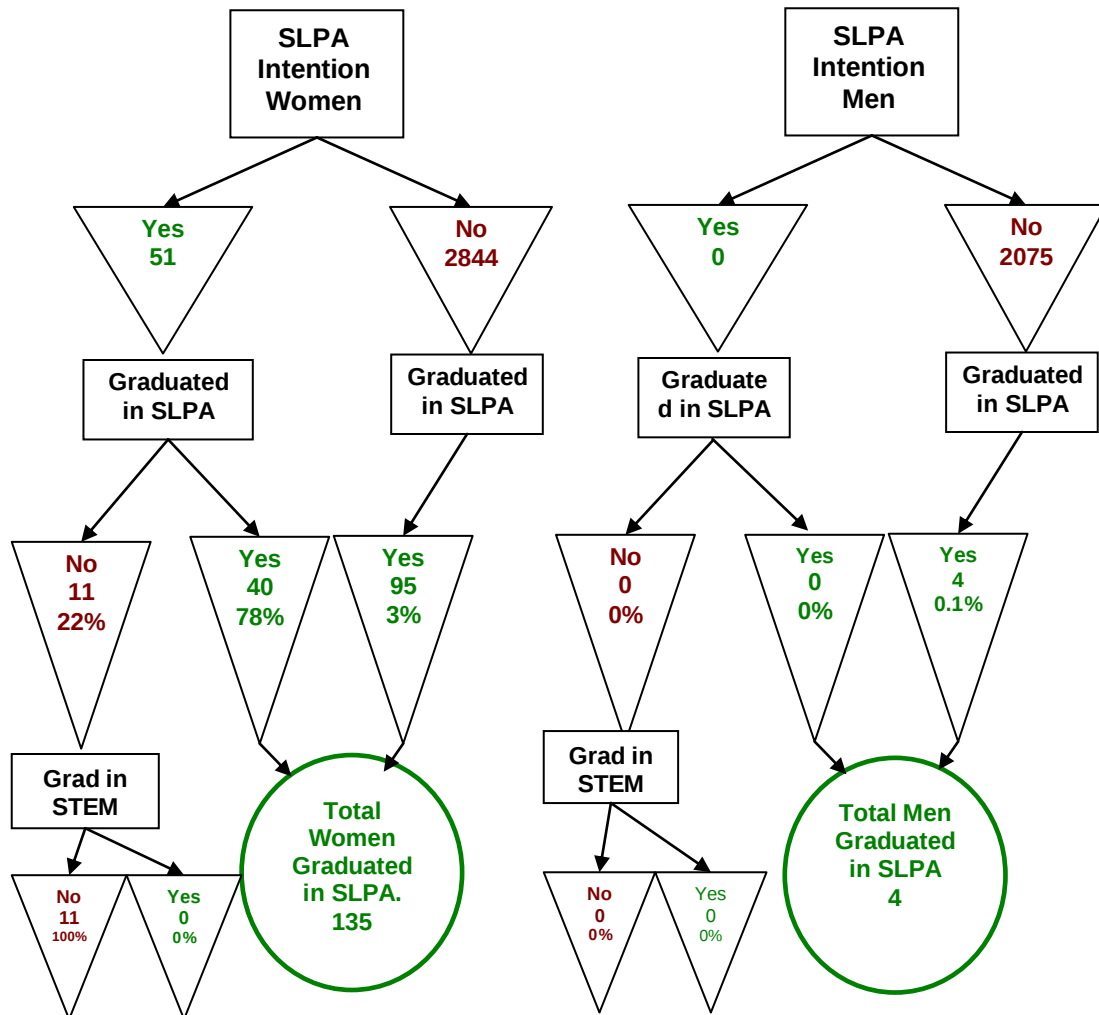


Figure 14. Progression in Speech-Language Pathology/Audiology - by gender

Women who intended to major in SLPA and completed a SLPA degree had higher high School GPAs than women who did not. (HS GPAs for women SLPA graduates $M=3.54$, $SD=0.33$; women SLPA non-completers $M=2.92$, $SD=0.62$.)

Most of the white students (78%) and the one ALANA student who expressed an interest in SLPA ultimately graduated in SLPA. See Figure 15.

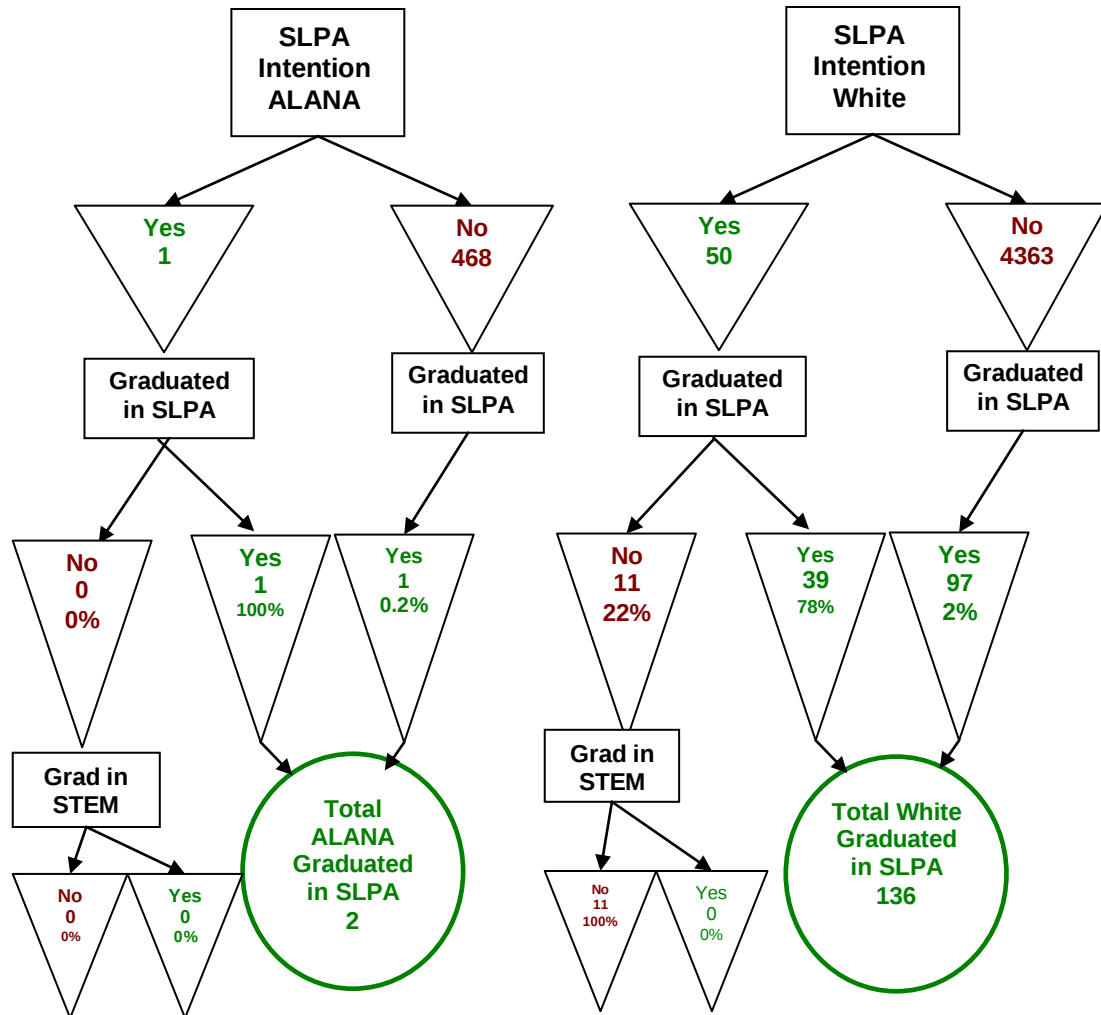


Figure 15. Progression in Speech-Language Pathology/Audiology - by race

There were no differences in academic qualifications within groups of ALANA and white students who expressed an interest in SPLA and completed or did not complete degrees in that field.

Technology

Over one-third of students who intended to major in technology disciplines went on to graduate with a technology-related degree. Seventy-three percent of students who expressed an interest in technology majors but who did not complete a technology-related degree did complete a non-STEM degree at Loyola; the remaining 26% (11 students) left Loyola before graduating. See Figure 16.

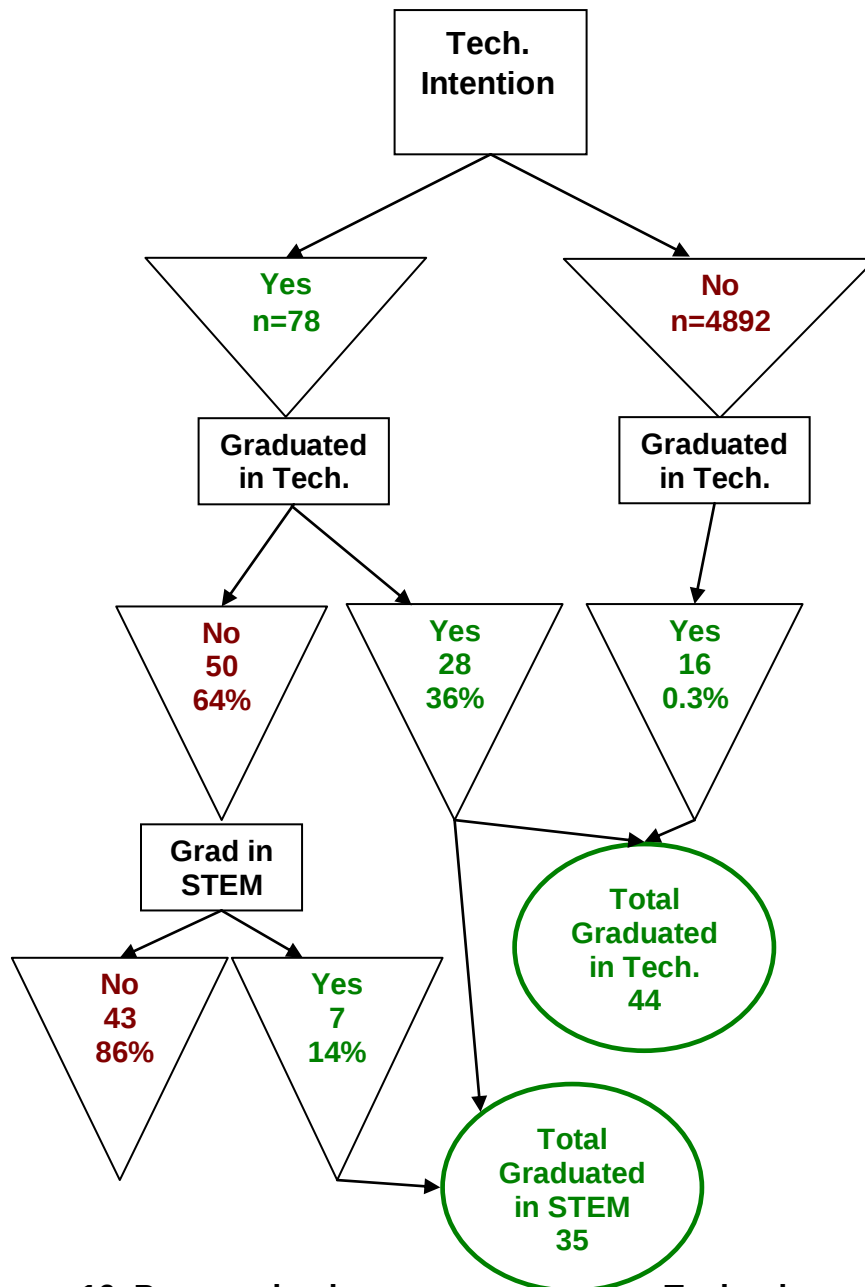


Figure 16. Progression in

Technology – overall

There were no differences in academic qualifications between students who completed a technology degree and those who intended to but did not.

Approximately one-third of all men and women who intended to major in technology went on to graduate with a technology degree. Three women and eight men left Loyola before graduating. See Figure 17.

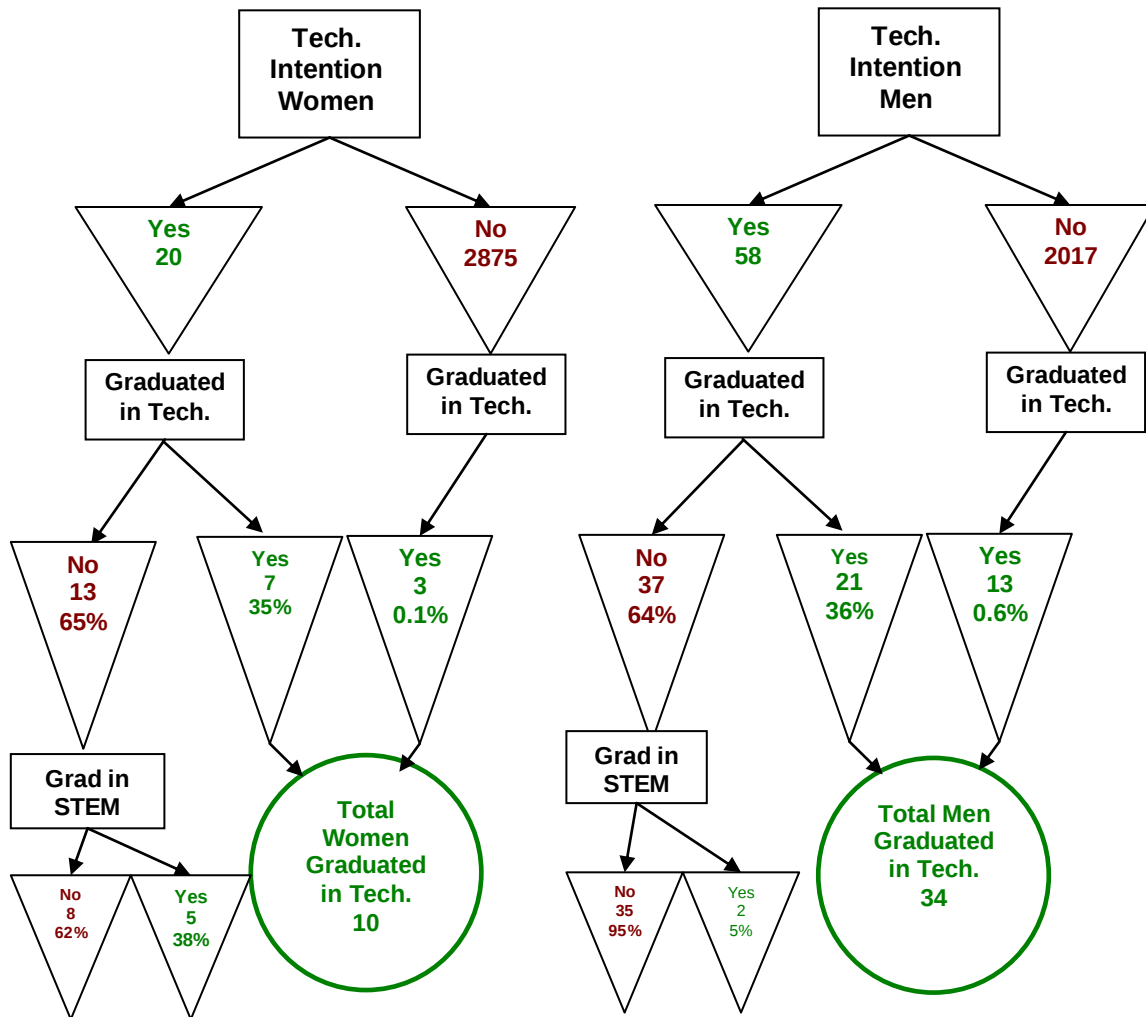


Figure 17. Progression in Technology - by gender

There were no differences in academic qualifications between students who completed a technology degree and those who intended to but did not.

Just over one-third of ALANA and white students who intended to major in a technology major ultimately earned a technology degree. Eight white students and one ALANA student left Loyola before graduating. See Figure 18.

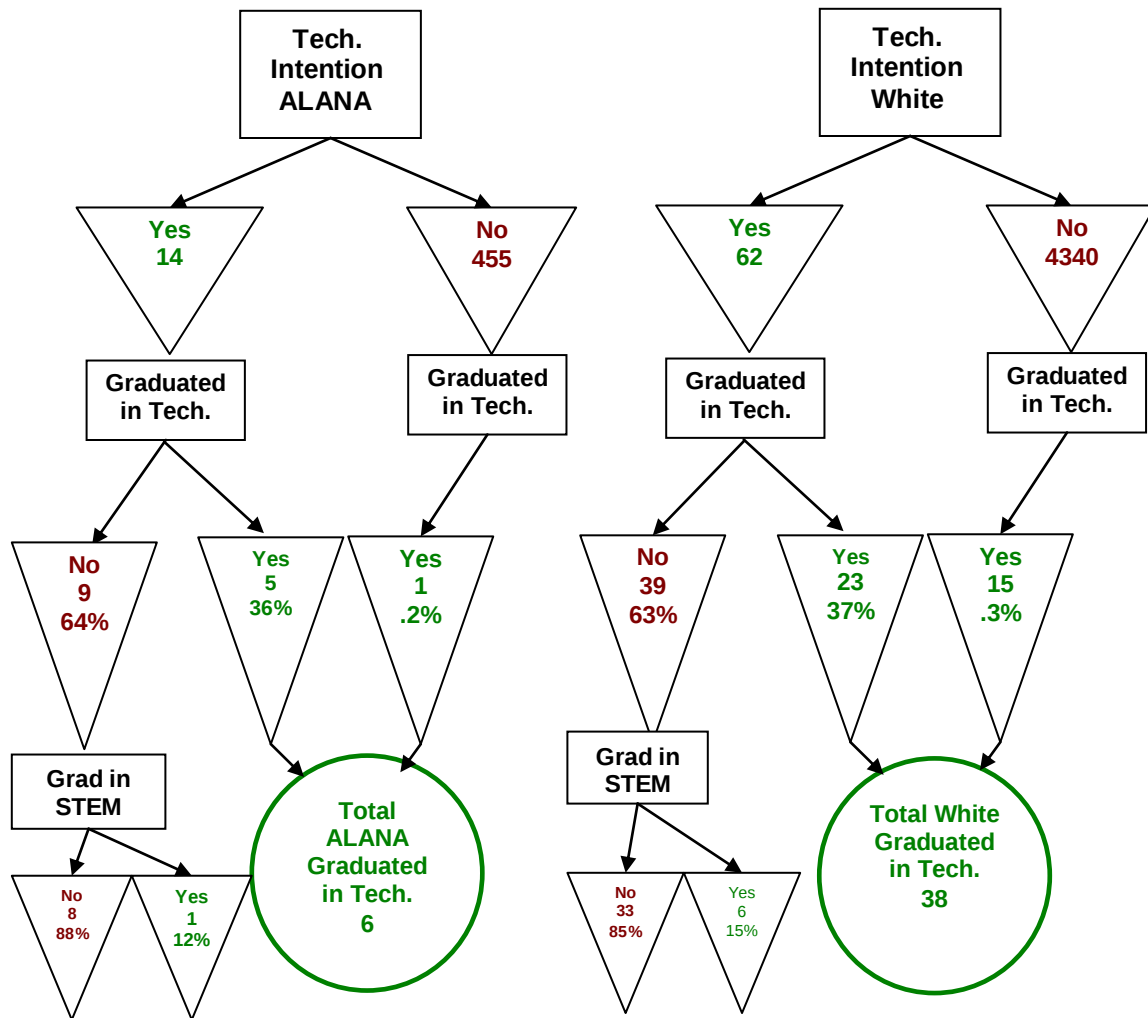


Figure 18. Progression in Technology - by race

There were no differences in academic qualifications between students who completed a technology degree and those who intended to but who did not.

Engineering

Over four out of ten students who intended to major in engineering went on to graduate with an engineering degree. Notably, almost half (46%) of students who graduated with a degree in engineering in the past five years did not express interest in that major on their application. Eighty percent of the students who intended to major in engineering, but did not graduate with an engineering degree, left the STEM disciplines altogether; seven students left Loyola before graduating. See

Figure 19.

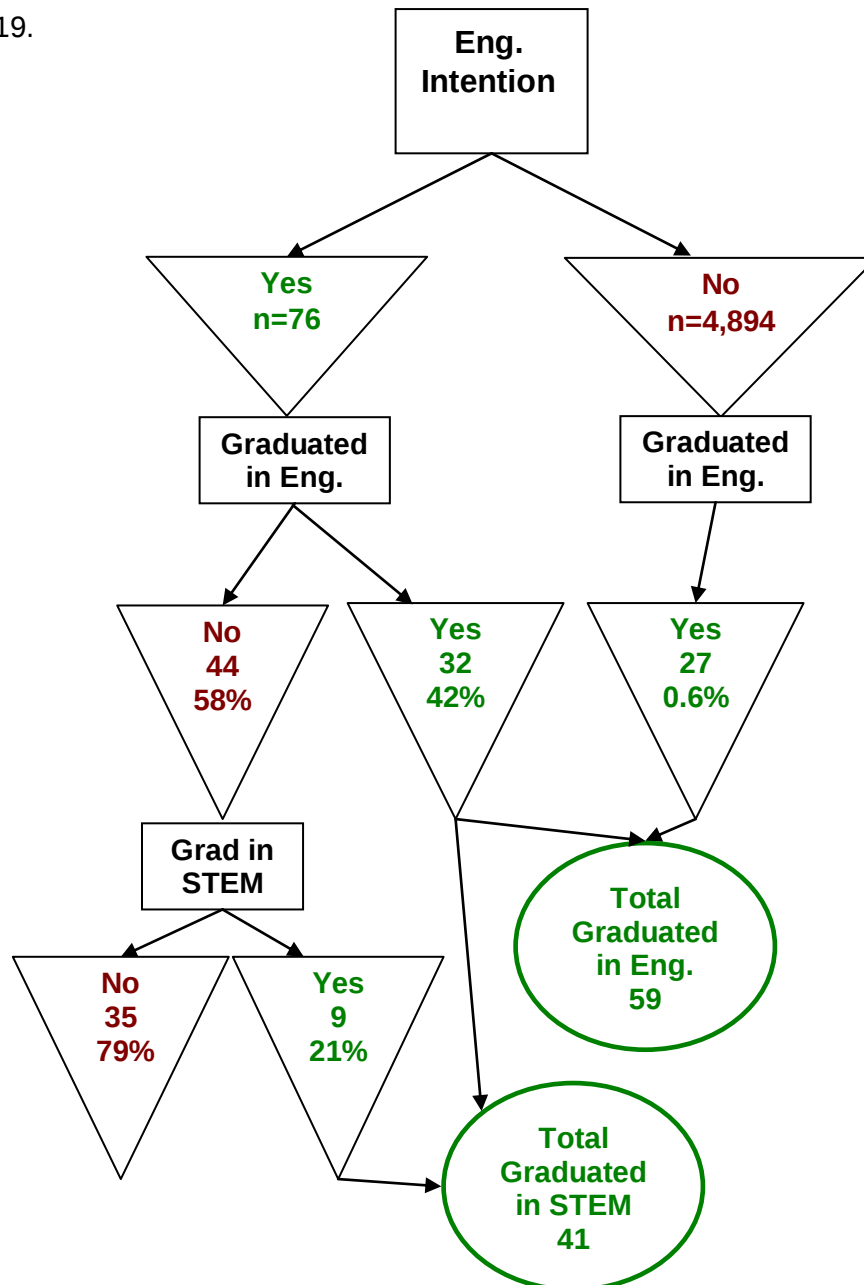


Figure 19. Progression in Engineering – overall

Of those students who intended to major in engineering, students who ultimately completed a degree in engineering had higher SAT scores than those who did not (SAT

for engineering graduates $M=1246$, $SD=95$; engineering non-completers $M=1183$, $SD=136$).

One out of three women and nearly half of the men that expressed an interest in engineering earned a degree in engineering. While there is a higher degree completion rate for men than women who expressed interest in engineering, the difference is not statistically significant. Seven of the men who intended to major in engineering but did not complete a degree in that field left Loyola before graduating. See Figure 20.

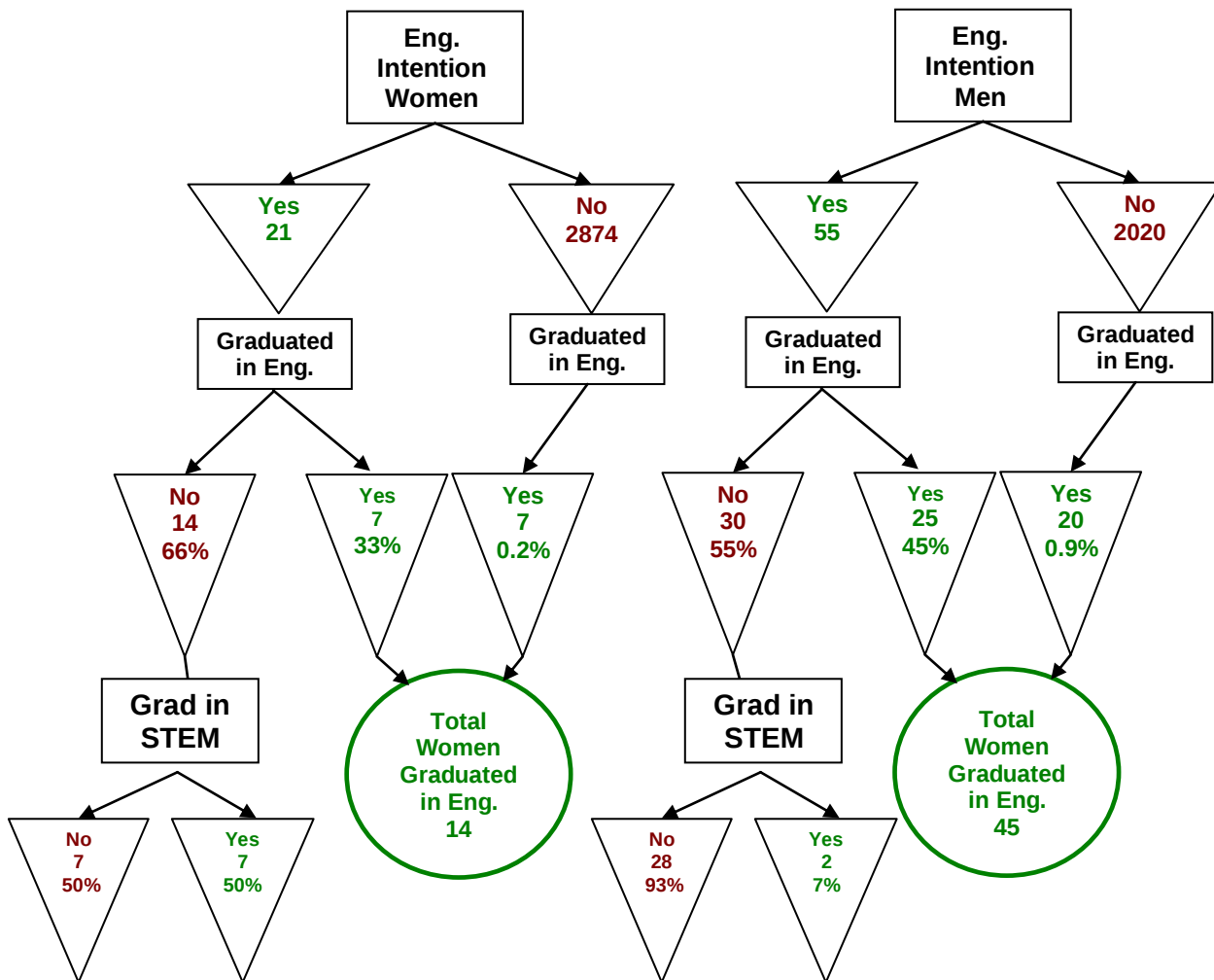


Figure 20. Progression in Engineering – by gender

There were no differences in academic qualifications between students who completed a technology degree and those who intended to but did not.

Just over one-third of ALANA students who expressed an interest in engineering earned a degree in that field. A slightly higher proportion of white students who expressed interest in engineering completed a degree in that field—because of the small number of ALANA students interested in engineering, statistical comparisons have not been conducted. Five white students and two ALANA students left Loyola before graduating. See Figure 21.

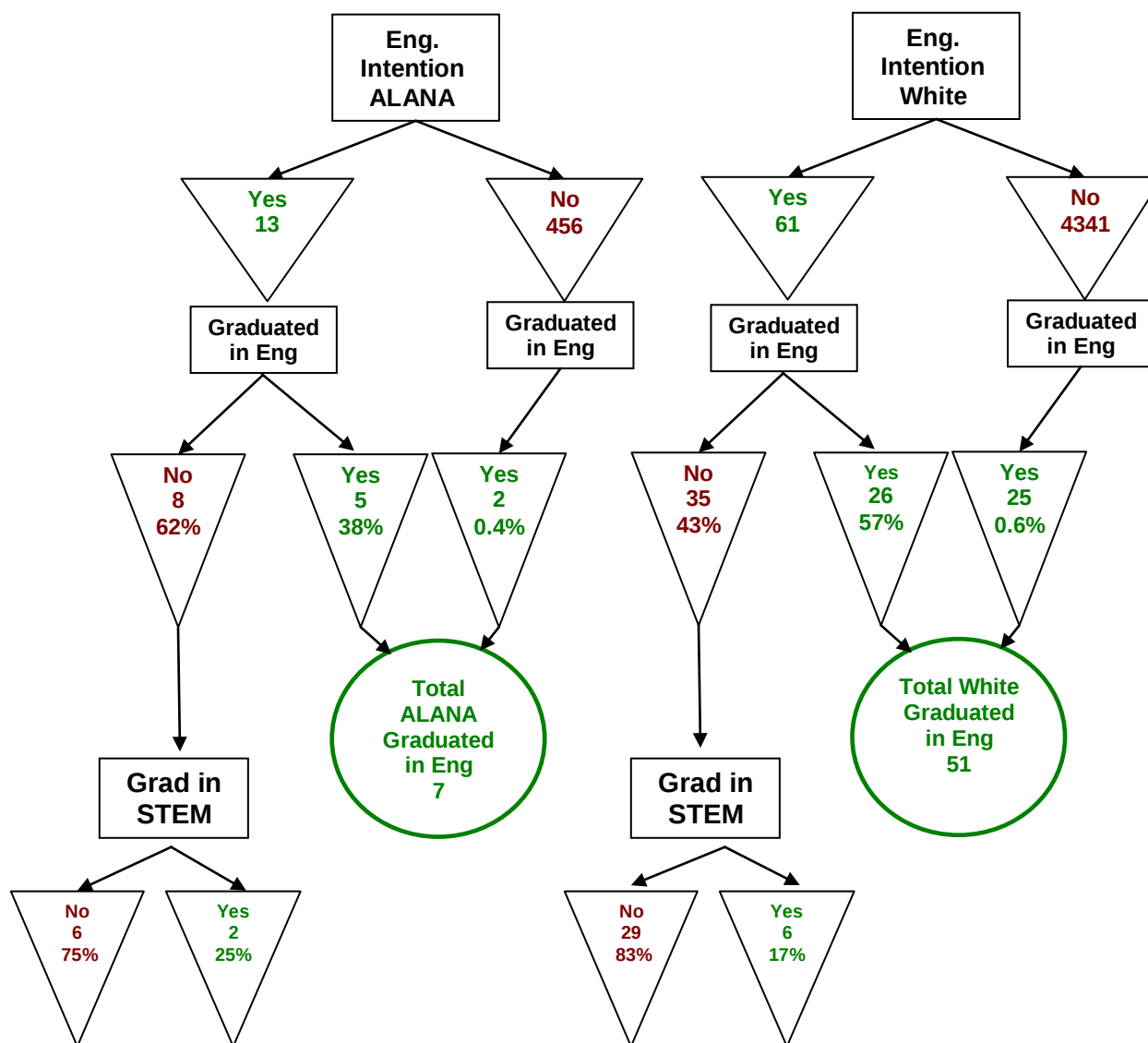


Figure 21. Progression in Engineering - by race

Among the white students who intended to major in engineering, those who ultimately completed an engineering degree had higher SAT scores than did those who did not (SAT for white engineering graduates $M=1268$, $SD=85$; white engineering non-completers $M=1197$, $SD=143$).

There were no differences in academic qualifications between ALANA students who completed an engineering degree and those who intended to but did not.

Math

Less than a half of all students who intended to major in math went on to graduate with a Math degree. In addition, over half (63%) of the math graduates in the past five years did not express an interest in that major at the point of application. The majority (68%) of students who intended to major in Math changed their major; ten students who were interested in math at the point of admission left Loyola before graduating. See Figure 22.

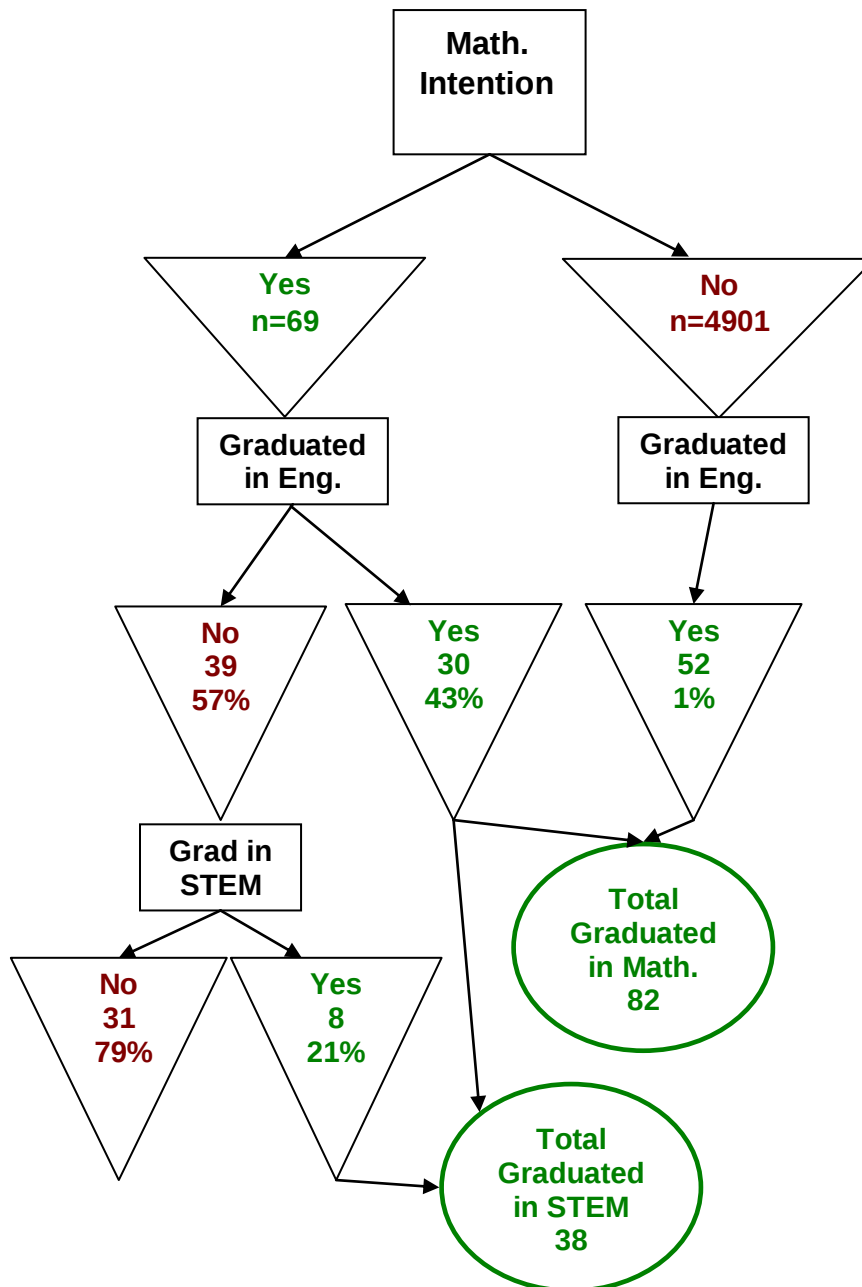


Figure 22. Progression in Math – overall

Among students who intended to major in math, those who ultimately completed a math degree had higher SAT and High School GPAs than those who did not (SAT for math graduates $M=1335, SD=88$; non-math completers $M=1161, SD=301$. HS GPA for math graduates $M=3.72, SD=0.27$; non-math completers $M=3.37, SD=0.36$).

Over half of women that expressed an interest in math earned a degree in math. In contrast, only one out of three men who expressed an interest on their applications completed a degree in that field. Seven women and three men who expressed an interest in math left Loyola before graduating. See Figure 23.

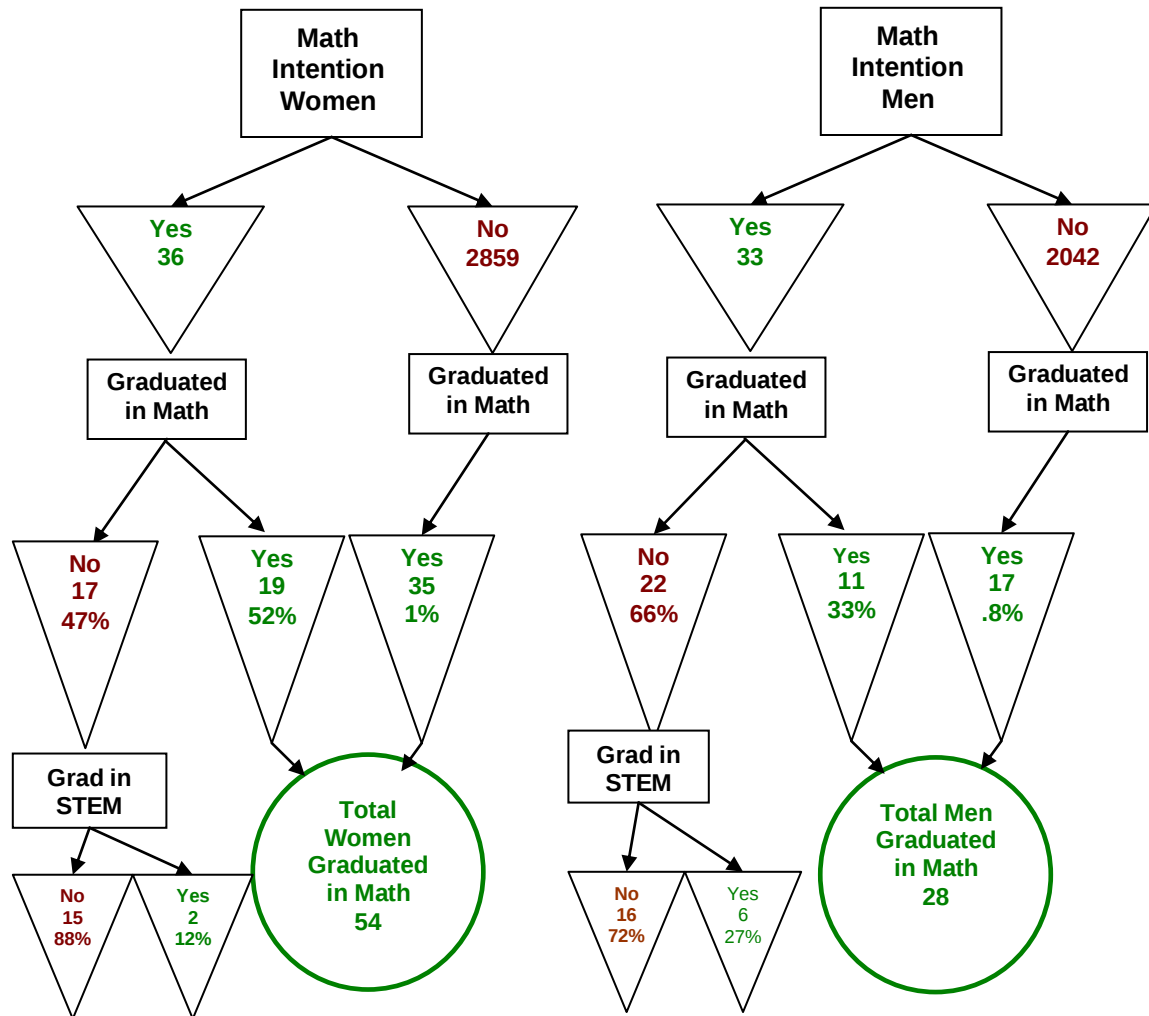


Figure 23. Progression in Math - by gender

Among women who intended to major in math, those who completed a math degree had higher SAT scores and High School GPAs than those who did not (SAT scores for women math graduates $M=1328$, $SD=96$; women non-math completers $M=1196$, $SD=77$; HS GPAs for women math graduates $M=3.82$, $SD=0.18$; women non-completers $M=3.37$, $SD=0.32$). Among men who intended to major in math, those who completed a math degree had higher SAT scores than those who did not (SAT for men math graduates $M=3.57$, $SD=0.33$; math non-completers $M=3.37$, $SD=0.35$).

One-third of ALANA students who expressed an interest in math earned a degree in math while less than half of the white students who were interested in math went on to complete a math degree—because of the small number of ALANA students interested in math, statistical comparisons have not been conducted. Math draws relatively few ALANA students who do not enter the University pre-disposed to that major; on the other hand, nearly two-thirds (65%) of white math graduates in the past five years did not express an interest in math at the point of application. Nine white students and one ALANA students left Loyola before graduation. See Figure 24.

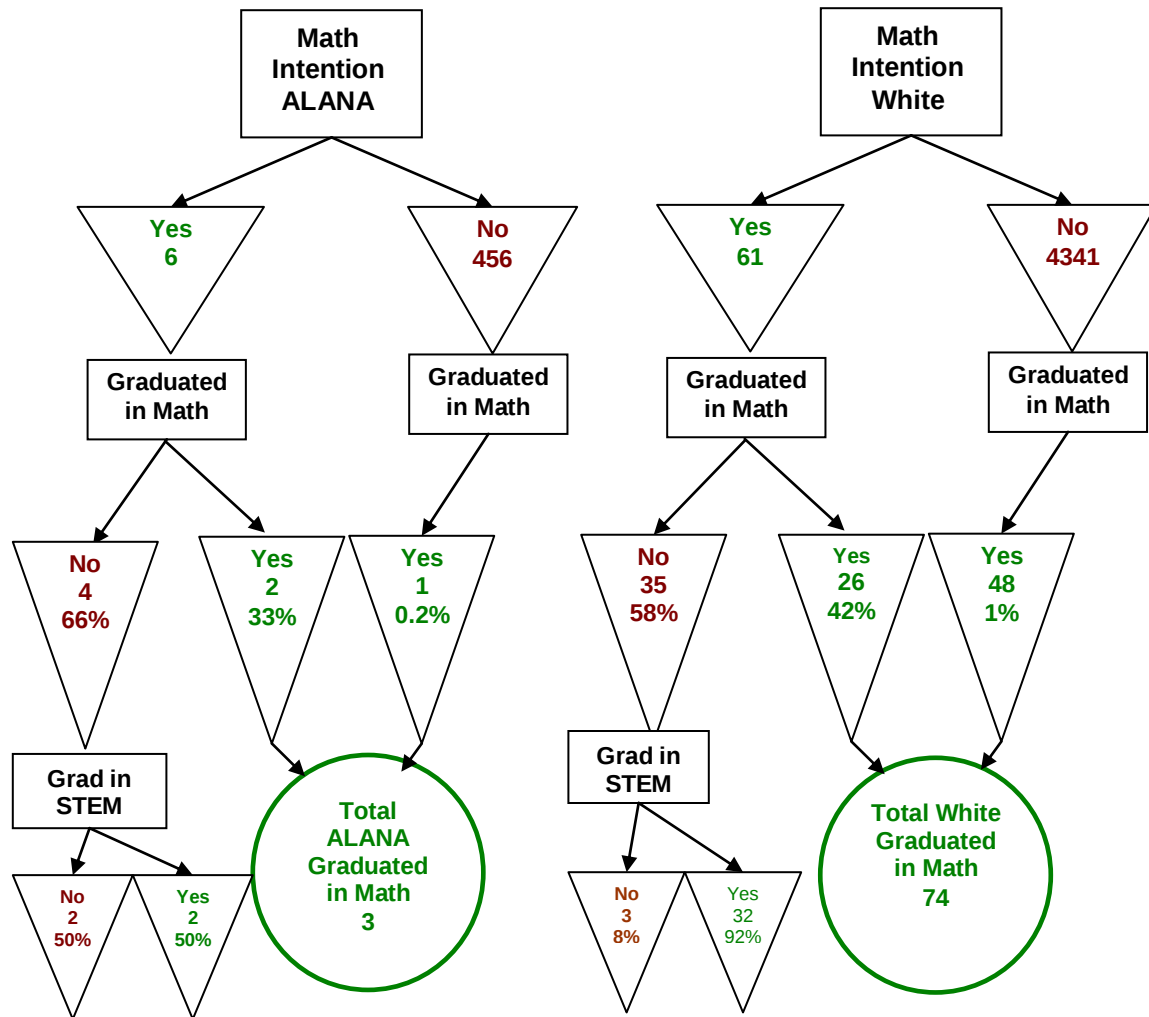


Figure 24. Progression in Math - by race

Among white students who intended to major in math, those who ultimately complete a math degree had higher SAT and High School GPAs than did those who did not (SAT for white math graduates $M=1340$, $SD=87$; white math non-completers $M=1157$, $SD=310$; HS GPAs white math graduates $M=3.71$, $SD=0.28$; white math non-completers $M=3.36$, $SD=0.36$).

There were no differences in academic qualifications between ALANA students who completed a math degree and those who intended to but did not.

Student Characteristics at Graduation

Among the classes of 2004 to 2008, 4,062 undergraduate students earned degrees from Loyola College; 690 (17%) of these degrees were in STEM disciplines. Consistent with the demographics of the general student population, women and white students earned the greatest number of STEM degrees over these academic years. Among STEM degree earners, the majority of degrees (73%) were awarded in the science disciplines. STEM graduates had higher cumulative GPAs than students who graduated from Loyola in non-STEM disciplines. Also, first-year students who were interested in a STEM major at the time of application had a higher graduation rate (83%) than the overall student body (82%)—however, the differences in graduation rates are not statistically significant. Furthermore, students who completed a major in the STEM disciplines had higher graduation GPAs than their classmates (Graduation GPA for STEM graduates $M=3.33$, $SD=0.41$; all completers $M=3.24$, $SD=0.41$). See Table 3, next page.

Table 3: Descriptive Statistics of Graduates from Classes of 2004 to 2008

	Overall		STEM Graduates		
	Frequency	Percent within Category (col %)	Frequency	Percent within Students (row %)	Percent within Category (col %)
Class Year					
2004	802	20%	116	14%	17%
2005	766	19%	132	17%	19%
2006	815	20%	141	17%	20%
2007	793	20%	140	18%	20%
2008	886	22%	161	18%	23%
Gender					
Men	1,684	41%	245	15%	36%
Women	2,378	59%	445	19%	64%
Race					
White	3,597	89%	599	17%	87%
ALANA	390	10%	79	20%	11%
Unknown	75	2%	12	16%	2%
Degrees					
Non-STEM	3,372	83%			
Engineering	59	1%			
Math	82	2%			
Science	505	12%			
Technology	44	1%			
Academic Performance	Mean	Std. Deviation	Mean	Std. Deviation	
Graduation G.P.A*	3.24	0.41	3.33	0.41	

Summary

Enrollment in the STEM disciplines constitutes a relatively small portion of undergraduate enrollment at Loyola College but the students in those majors are some of the most academically well qualified. Despite national debates about a chilly climate for women and persons of color in the STEM disciplines, similar proportions of women and men who enter Loyola and proportionally more of the ALANA students, compared to white students, express interest in STEM majors.

At Loyola, women tend to do better in the STEM disciplines than do men. More women who intend to major in the STEM discipline earn degrees in those areas and more women who do not initially express interest in STEM majors ultimately go onto a degree in a STEM field.

Overall, ALANA students progress toward STEM degrees relative to their interest in those fields is similar to the progress of white students. Two exceptions may be engineering and mathematics where the proportion of ALANA students with interest who ultimately complete a degree in those fields is quite a bit lower than the degree completion for their white counterparts. It should be noted, however, that because of the small number of ALANA students in these groups, these differences should be interpreted as directionally but not statistically significant.

With both women and ALANA students there is no evidence that the students who intended to major in a STEM discipline but went on to graduate with a degree in a non-STEM field are better qualified students; that is, we are not losing our best women or ALANA students to chilly climate issues in the STEM disciplines.

It should be noted this evaluation does not aim to be exhaustive in covering all possible educational pathways in which the students progress from admission to graduation. Still, these data can be useful in establishing a baseline for monitoring student progress in STEM disciplines.