Factors Related to Timely Degree Completion

The study presented here attempts to provide a detailed analysis of six-year graduation rates at Auburn by controlling for students' background characteristics, their academic performance in high school and in their first semester at AU, as well as for financial aid variables, academic load, and certain curriculum information. Data for the study came from records for 11,225 students in Auburn's combined 1999, 2000 and 2001 new freshman cohorts. Table 1 provides descriptive statistics for factors that were hypothesized to be associated with timely graduation. (See Table 5 on page 10 for information on last college of record and college change.)

Table 1. Descriptive statistics for study variables

	Mean	SD
Graduated	0.63	
Still Enrolled	0.04	
Female	0.51	
Ethnicity		
White	0.88	
Black	0.08	
Native American	0.00	
Asian	0.01	
Hispanic	0.01	
Foreign	0.00	
Feeder HS*	0.35	
In-state	0.63	
Lee County	0.04	
Poor Alabama County**	0.02	
High School Academic Performance		
HS GPA	3.31	0.51
ACT or SAT Equivalent	23.45	3.80
College Experience: First Fall		
Fall 1 GPA	2.47	0.96
Grant	0.10	
Loan	0.32	
Scholarship	0.27	
Work study	0.03	
Loan X Scholarship	0.12	
Full-time enrollment	0.99	
Fall 2 Enrolled	0.82	
Fall 3 Enrolled	0.74	
Fall 4 Enrolled	0.69	
Matriculation term (Fall 2001 - reference)		
Fall 1999	0.33	
Fall 2000	0.34	
Sample size	11,225	

*High school with at least 50 graduates matriculating to AU in Fall Terms 1999, 2000, and 2001

*Median HH income in the county is $25,000.00 or less

About 62% (2,276 students) from 1999 cohort, 63% (2,412) from 2000 cohort, and 63% (2,356) from 2001 cohort graduated within six years of their initial enrollment. Since the number of students who were still enrolled after six years of study was small (131 from the 1999 cohort; 126 from the 2000 cohort, and 146 from the 2001 cohort), this group of students was combined with graduates for a subsequent analysis. Here, for simplicity, the terms graduation and persistence are often interchangeably.

The present study begins with gender, ethnicity and four additional binary background characteristics that were hypothesized to have an impact on graduation rates – whether or not a student comes from a feeder high school, whether or not a student comes from Alabama, whether or not a student comes from Lee County, and whether or not a student comes from a poor county in Alabama. For this study, a feeder high school was defined as one with at least 50 graduates matriculating at Auburn University in Fall Terms 1999, 2000, and 2001. A poor Alabama county was defined as one with a median household annual income of $25,000 or less.

As at other SREB peer institutions, women in this study are more likely than men to graduate within six years, while certain minority students are less likely than white students to do so. Female students in Auburn's 1999, 2000, and 2001 cohorts were more likely than male students to graduate by 5%, 4%, and 2% (see Fig 5). Compared to white students, Black students from these cohorts were less likely to graduate by 10%, 13%, and 16% (see Fig 6). (Ethnicity was not reported for 2 students in 1999 cohort, 4 students in 2000 cohort, and 5 students in 2001 cohort. For the purposes of this study these students were coded as white.)

Fig 5 Six-year persistence rates: male and female students

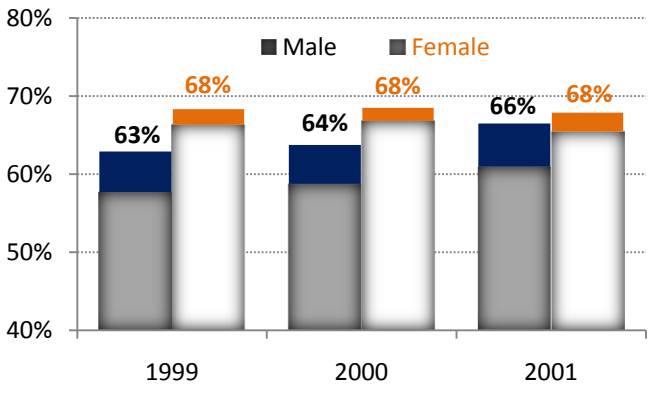
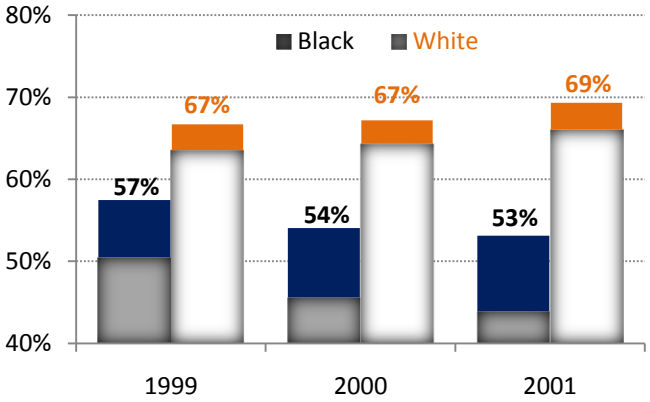


Fig 6 Six-year persistence rates: Black and White students



To background characteristics, this study adds information about grades. Gender and ethnicity differences in persistence can often be accounted for by other characteristics. For example, "the departure of females is, relative to that of males, more determined by social forces than academic ones" (Tinto 1993: 73). AU women have higher average GPAs in high school and in their first semester of college than do men; conversely, at both levels, black students have lower GPAs than white students do (see Table 2).

Table 2. Mean HS GPA and Fall 1 GPA for male, female, Black, and White students

	Mean HS GPA	SD	Mean Fall 1 GPA	SD
Female	3.40	0.48	2.58	0.91
Male	3.22	0.53	2.35	0.99
Black	3.14	0.50	2.06	0.95
White	3.33	0.50	2.51	0.95

In past empirical studies, high school performance has been shown to affect college persistence; and first-term college GPA has been proven to be the most important factor in college persistence and eventual degree attainment (e.g., DesJardins, Ahlburg, and McCall, 1994, 1999). Therefore, it is logical to assume that the differences in graduation rates between males and females are accounted for by these two grade performance factors and will disappear or reverse after controlling for high school and first-term college GPA.

After considering background characteristics and grades, this study examines the impact of certain financial aid variables. The shares of students receiving all types of financial aid are substantially higher among black students and other minority students as compared to white and foreign students (see Table 3). Later, when four models are introduced, it will be shown that controlling for financial aid variables attenuates the effect of ethnicity.

Table 3 Shares of students receiving different types of financial aid by ethnicity

	Grant	Loan	Scholar-ship	Work-study	Loan + Schol.	Loan + Grant	# students
Black	0.47	0.73	0.39	0.15	0.30	0.41	924
American Indian	0.21	0.36	0.43	0.00	0.14	0.17	42
Asian	0.21	0.34	0.21	0.06	0.10	0.14	166
Hispanic	0.19	0.48	0.29	0.07	0.16	0.16	117
Foreign	0.02	0.04	0.05	0.00	0.02	0.02	55
White	0.07	0.28	0.26	0.02	0.10	0.05	9,921

One of the limitations of the study presented here is that it does not control for student socio-economic characteristics, such as parents' educational attainment, family income, and/or an indicator of FAFSA being filed. As a result, the financial aid variables included in the study can show the effect of a student's economic situation rather than the effect of the financial aid itself. Thus, one can assume that a student receiving loan and/or grant has a financial need and, therefore, is less likely to persist.

To test the hypotheses stated above, four logistic regression analyses, or models, were carried out (see Table 4, on page 4). The first model includes only demographic and geographic background variables, including the variable for feeder high schools. The second model adds variables for high school performance to the first model. The third model adds first-semester college GPA to the second model, and the fourth model adds financial aid variables and full- or part-time status in the first semester of enrollment to the third model. Unlike simple cross-tabulation, comparing these four models allows us to analyze differences among the effects of demographic characteristics on graduation rates both before and after control for differences in academic performance and financial aid status.

Table 4. Parameter estimates, standard errors, odds ratios, and goodness-of-fit statistics for models of graduation/persistence

	Model 1 *Background variables only*				***Model 2*** *Background + High School Performance*				***Model 3*** *Background + High School + College GPA*				***Model 4*** *Background + High School + First fall experience*				*Tole-rance*
	B	**S.E.**	**Exp(B)**	**Sig.**	**B**	**S.E.**	**Exp(B)**	**Sig.**	**B**	**S.E.**	**Exp(B)**	**Sig.**	**B**	**S.E.**	**Exp(B)**	**Sig.**	
Intercept	0.60	0.05	1.82	0.00	-3.48	0.18	0.03	0.00	-2.62	0.19	0.07	0.00	-3.18	0.28	0.04	0.00	
Female	0.18	0.04	1.19	0.00	0.01	0.04	1.01	0.88	-0.14	0.05	0.87	0.00	-0.13	0.05	0.87	0.00	0.93
Ethnicity (reference category "White")																	
Black	-0.54	0.07	0.58	0.00	-0.23	0.08	0.79	0.00	-0.19	0.08	0.83	0.02	-0.04	0.09	0.96	0.62	0.79
Native American	0.00	0.33	1.00	0.99	0.00	0.35	1.00	1.00	0.01	0.35	1.01	0.98	0.08	0.36	1.08	0.82	1.00
Asian	-0.42	0.16	0.65	0.01	-0.44	0.17	0.64	0.01	-0.42	0.18	0.66	0.02	-0.33	0.18	0.72	0.06	0.99
Hispanic	-0.54	0.19	0.59	0.00	-0.33	0.20	0.72	0.09	-0.24	0.21	0.79	0.25	-0.19	0.21	0.83	0.37	0.99
Foreign	-0.20	0.28	0.82	0.47	0.40	0.34	1.49	0.23	-0.12	0.32	0.88	0.70	-0.19	0.32	0.82	0.55	0.98
Feeder HS*	0.12	0.05	1.13	0.01	0.34	0.05	1.40	0.00	0.27	0.05	1.31	0.00	0.27	0.05	1.31	0.00	0.75
In-state	0.08	0.05	1.08	0.09	-0.04	0.05	0.96	0.45	0.10	0.05	1.10	0.06	0.09	0.05	1.09	0.11	0.71
Lee County	0.20	0.11	1.22	0.07	0.07	0.11	1.07	0.54	0.03	0.12	1.03	0.79	0.07	0.12	1.08	0.55	0.95
Poor Alabama Cty**	-0.04	0.14	0.96	0.79	-0.11	0.15	0.89	0.44	-0.06	0.16	0.95	0.72	-0.09	0.16	0.91	0.56	0.97
High School Academic Performance																	
HS GPA X HS GPA Reported					1.07	0.05	2.92	0.00	0.55	0.05	1.74	0.00	0.51	0.05	1.67	0.00	0.63
ACT or SAT Equivalent X ACT/SAT Reported					0.03	0.01	1.03	0.00	-0.03	0.01	0.97	0.00	-0.03	0.01	0.97	0.00	0.64
College Experience: first fall																	
Fall 1 GPA									0.89	0.03	2.44	0.00	0.87	0.03	2.40	0.00	0.69
Grant													-0.39	0.08	0.68	0.00	0.73
Loan													-0.30	0.06	0.74	0.00	0.60
Scholarship													0.17	0.08	1.18	0.04	0.46
Work Study													0.27	0.13	1.30	0.04	0.87
Loan X Scholarship													0.26	0.11	1.30	0.02	0.43
Full-time Enrollment													1.00	0.21	2.71	0.00	0.99
Matriculation term (Fall 2001 - reference)																	
Fall 1999	-0.07	0.05	0.93	0.14	0.02	0.05	1.02	0.65	-0.17	0.05	0.85	0.00	-0.15	0.06	0.86	0.01	0.73
Fall 2000	-0.05	0.05	0.95	0.28	-0.03	0.05	0.97	0.50	0.03	0.05	1.03	0.56	0.03	0.05	1.03	0.63	0.74
-2LL[i]		14,223.40				13,423.25				12,314.95				12,216.51			
Chi-square (df)[ii]		116.18 (12)				916.34 (14)				2024.64 (15)				2123.08 (21)			
Nagelkerke R Square[iii]		0.01				0.11				0.23				0.24			
% correctly classified		66.3%				68.2%				73.0%				73.5%			

*High school with at least 50 graduates matriculating to AU in falls of 1999, 2000, and 2001

*Median HH income in the county is less than $25,000.00

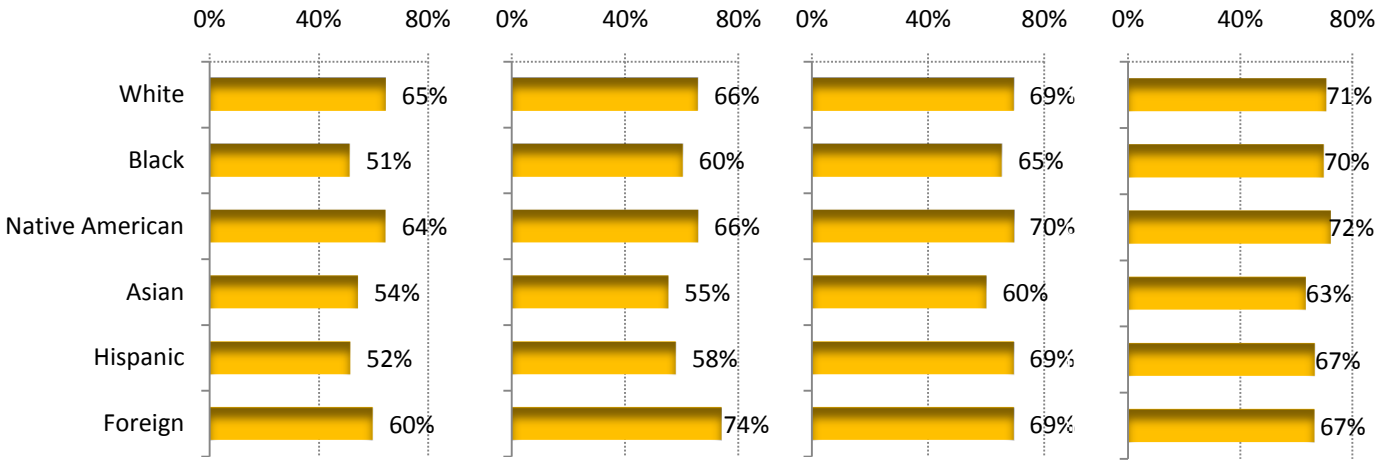
Figure 7, below, illustrates expected probabilities of persistence for male students of different ethnicity groups without control for academic performance (Model 1). Figures 8, 9 and 10 show how those expected probabilities change after controlling for high school academic performance (Model 2, figure 8), for both high school academic performance and first-semester college GPA (Model 3, figure 9), and for both high school and college grades and types of financial aid received (Model 4, figure 10).

Fig 7 (Model 1)
Expected probabilities of out-of-state male student persistence by ethnicity w/o control for high school or college variables

Fig 8 (Model 2)
Expected probabilities of out-of-state male student persistence by ethnicity w/o control for college variables, HS GPA 3.30 and ACT 23

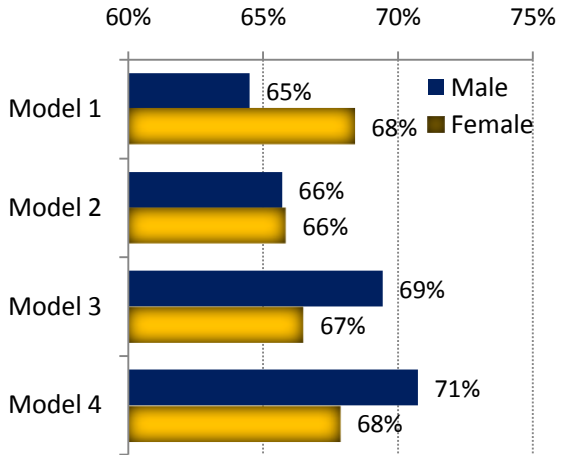
Fig 9 (Model 3)
Expected probabilities of out-of-state male student persistence by ethnicity, HS GPA 3.30, ACT 23, and fall 1 GPA 2.50, no control for financial aid

Fig 10 (Model 4)
Expected probabilities of out-of-state male student persistence by ethnicity, HS GPA 3.30, ACT 23, full-time enrollment and GPA 2.50 in the first term, not receiving financial aid



These figures illustrate that the difference in expected probabilities of six-year persistence between black and white students significantly diminishes (from 14% to 6%) after control for high school variables. This difference becomes even smaller after control for college GPA (from 6% to 4%) and practically disappears and becomes non-significant (see Model 4 in Table 4) after control for financial aid variables.

Fig 11 Expected probabilities of graduation by gender with and w/o control for high school and college variables



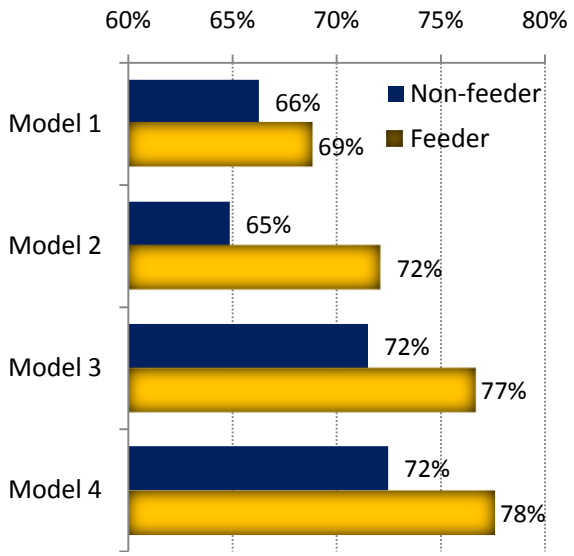
Before controlling for high school and college variables, the expected probability of six-year persistence for a female student is 3% higher than for a male student (see Model 1 in Figure 11).

After controlling for high school variables, however, this difference disappears (see Model 2 in Figure 11). The expected probabilities shown are for a white out-of-state student with a high school GPA of 3.30 and ACT score of 23.

After controlling for both high school and college variables the expected probability of persistence becomes higher for male students (see model 3 and 4 in figure 11). The expected probabilities shown are for a white out-of-state student with a high school GPA of 3.30, an ACT score of 23, full-time enrollment and GPA 2.50 in the first semester, and no financial aid.

The effect of coming from a feeder high school (see Appendix 1 for the list of feeder high schools) remains significant across all four models. According to Model 1 in Table 4, the odds of six-year persistence for students coming from feeder schools are 1.13 times the odds of persistence of students coming from other schools. As more controls are introduced, this positive odds ratio increases. Thus, according to Models 2, 3, and 4 in Table 4 the odds of six-year persistence for students coming from feeder schools are 1.40 times, 1.31 times and 1.31 times the odds of persistence of students coming from other high schools.

Fig 12 Expected probabilities of persistence for non-feeder and feeder high schools with and w/o control for high school and college variables



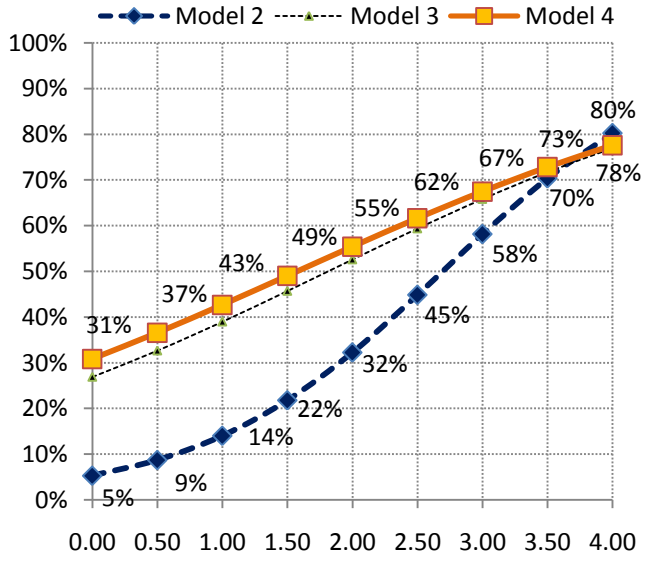
Before controlling for high school and college variables, the expected probability of persistence for an in-state white student from a feeder school is 3% higher than that of an in-state student from a non-feeder school (see Model 1 in figure 12).

After controlling for high school variables, this difference becomes 7% (see Model 2 in figure 12). The expected probabilities in the graph are for a White in-state male student with high school GPA 3.30 and ACT score of 23.

After control for both high school and initial college GPAs, the expected probability of six-year persistence is 5% higher for students from feeder schools (see Model 3 in figure 12). The expected probabilities for Model 3 in the graph are for a white in-state male student with high school GPA 3.30, ACT score of 23, and fall 1 GPA 2.50. Similar probabilities were found after control for financial aid variables and first semester enrollment status in Model 4.

The effects of being from Alabama (in-state), Lee County, and poor Alabama counties are not significant at the 5% alpha level.

Fig 13 Expected probabilities of persistence by high school GPA with and w/o control for college variables



The effects of high school variables in Model 2 are attenuated by control for college variables in Model 3 and Model 4 (see Table 4). Figure 13 shows the expected probabilities of six-year persistence for a white, out-of-state, male student with ACT Composite score of 23. The college GPA in Model 3 and Model 4 of Fig 13 is constrained to 2.50. Financial aid in Model 4 is constrained to zero.

The graph in Fig 13 demonstrates the attenuation of the effect of the high school GPA in Model 2 after the control for college GPA in Model 3 and Model 4. For example, the change from 2.00 to 3.00 in high school GPA in Model 2 leads to a 26% difference in the expected probability of persistence. The change from 2.00 to 3.00 in high school GPA for students with fall 1 GPA of 2.50 in Model 4 leads to only a 12% difference in the expected probability of persistence.

As expected, first-semester college GPA is the most important factor in the persistence probability in Model 3 and Model 4. A one-point increase in first-semester GPA increases the odds of six-year graduation by 2.44 in Model 3 and by 2.40 in Model 4. Figure 13 illustrates the effect of first-term college GPA on the probability of persistence of out-of-state white student with high school GPA of 3.30 and ACT Composite score of 23 who does not receive financial aid. (Since the differences between expected probabilities based on Model 3 and 4 are small, only probabilities based on Model 4 are considered here.) As Figure 14 shows, a change from 2.00 to 3.00 in college GPA leads to an 18% difference in the expected probability of six-year persistence, from 61% to 79%.

Fig 14 Expected probabilities of six-year persistence by first semester GPA (Model 4, Table 4)

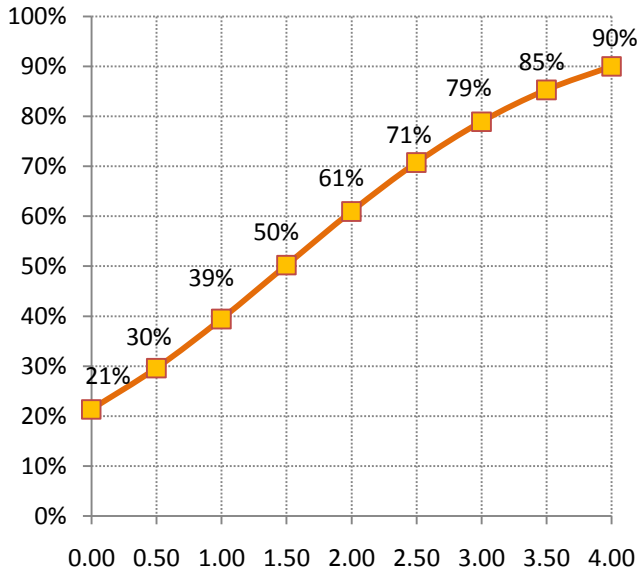
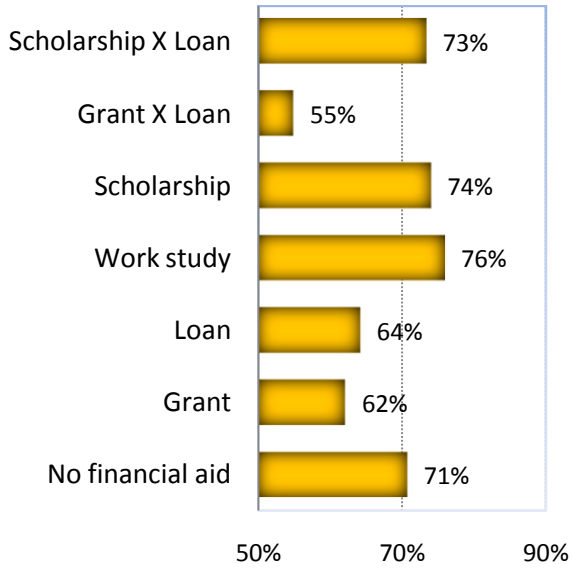


Fig 15 Expected probability of persistence/graduation for a white student from out-of-state with high school GPA 3.30, ACT 23, and full-time enrollment and GPA 2.50 in the first semester depending upon the type of financial aid paid (Model 4)



As indicated earlier, in the absence of other economic status variables, financial aid variables can show the effect of a student's economic situation rather than the effect of the financial aid itself. Therefore, it is not surprising that the expected probabilities for students receiving loans and grants are 7% and 9% lower than the expected probabilities for students who do not receive financial aid. A combination of grant and loan leads to a 16% decrease in expected probability of six-year persistence.

Students receiving financial aid for work-study have 5% higher probability of persisting than students who do not receive financial aid.

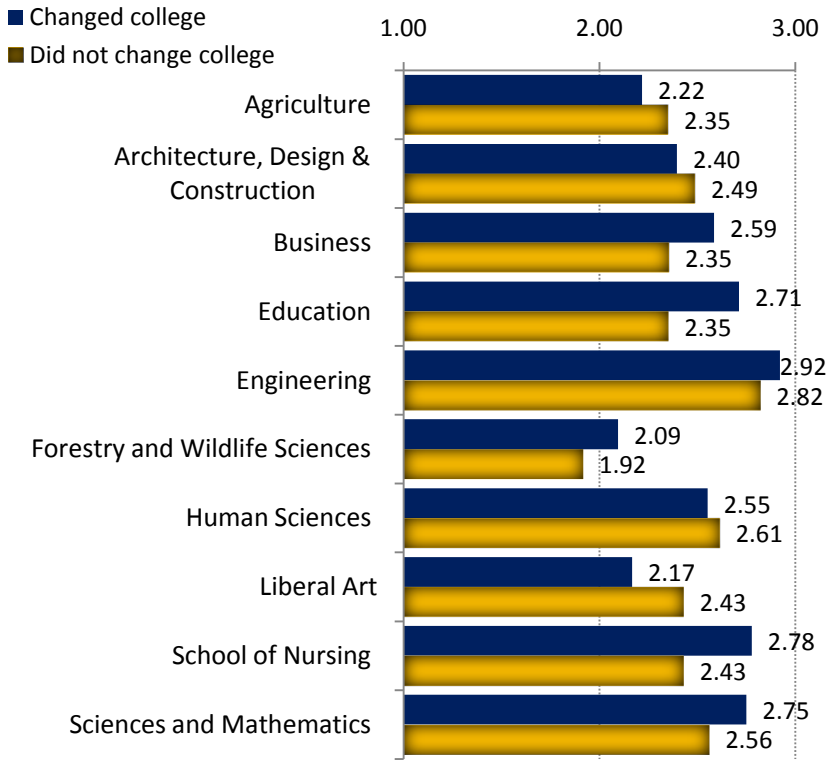
Students receiving both scholarship and loan aid have 2% higher probability of persisting, indicating that receiving a scholarship significantly attenuates the negative effect of a loan.

Timely Degree Completion and the Last College of Record

It is logical to assume that changing college would have a negative effect on a timely degree completion since different degree programs may impose different requirements. However, as shown in Table 5 (page 9), overall graduation rates actually tend to be higher for students in this study who changed college. The six-year persistence rate for those who did not change college is 61.5%, while that rate for those who changed college is 74.8%. The most obvious explanation of these surprising rates is the fact that students who changed their major could have had a longer time in college to do so. And the descriptive statistics in Table 5 align well with this explanation. The percent of students who were enrolled at Auburn for at least one year is substantially higher among those who changed their college (90.8%) than among those who did not (76.9%). Therefore, one can assume that a positive effect of a college change would disappear after controlling for retention for several years simply because those students who stayed longer had more time to change their colleges.

The magnitude of college changing behavior varies by college, with the lowest college migration to Engineering and the highest college migration to Education (see Table 5). Only 8.3% of students (100 out of 1,198) whose last college of record was Engineering changed their college. For the College of Education, that percentage was almost six times higher: 49.1% of students (414 out of 844) whose last college of record was Education changed their college. The second highest migration rate was to the School of Nursing (45%, 140 out of 308). The second lowest migration was found to Science and Mathematics (16.3%, 139 out of 854).

Fig 16 Average Fall 1 GPA by last college of record



The difference in Fall 1 GPA between those who changed college and those who did not was highest for students whose last college of record was Liberal Arts. Those who stayed within this college had, on average, a Fall 1 GPA 0.26 higher than those who came from another college. The difference in Fall 1 GPA between those who changed college and those who did not was lowest for students whose last colleges of record were Education or Nursing. Those who stayed within these colleges had, on average, Fall 1 GPAs 0.35 and 0.36 points lower than those who came from another college.

Higher six-year persistence rates were found at the college of Human Sciences (78.2%), Engineering (72.9%), and Business (72.2%). Higher differences in persistence between those who changed and did not change colleges were found at the colleges of Education (22.3%) and Business (20.0%). Smaller differences in persistence between those who changed and did not change colleges were found at the colleges of Engineering (1.2%), Liberal Arts (8.1%) and Nursing (12.4%).

Table 5 Persistence and academic performance by last college of record. A Comparison of students who changed their college with those who remained within their original college

	Changed college					Did not change college					Total				
	Six-year persistence rate	One-year retention rate	Fall 1 GPA	SD	#	Six-year persistence rate	One-year retention rate	Fall 1 GPA	SD	#	Six-year persistence rate	One-year retention rate	Fall 1 GPA	SD	#
Agriculture	74.4%	91.5%	2.22	0.94	117	59.8%	70.1%	2.35	1.09	254	64.4%	76.8%	2.31	1.05	371
Architecture, Design & Construction	80.5%	89.4%	2.40	0.82	123	64.0%	78.8%	2.49	0.97	378	68.1%	81.4%	2.46	0.93	501
Business	84.5%	94.9%	2.59	0.76	1,122	64.5%	80.3%	2.35	0.96	1,773	72.2%	86.0%	2.44	0.89	2,895
Education	80.4%	94.4%	2.71	0.74	414	58.1%	73.3%	2.35	0.98	430	69.1%	83.6%	2.53	0.89	844
Engineering	74.0%	87.0%	2.92	0.90	100	72.8%	82.2%	2.82	0.99	1,098	72.9%	82.6%	2.83	0.98	1,198
Forestry and Wildlife Sciences	65.7%	77.1%	2.09	0.89	35	50.0%	60.3%	1.92	1.06	68	55.3%	66.0%	1.98	1.01	103
Human Sciences	85.7%	94.4%	2.55	0.73	357	69.1%	81.8%	2.61	0.88	291	78.2%	88.7%	2.58	0.80	648
Liberal Arts	66.4%	87.3%	2.17	0.89	1,524	58.3%	75.2%	2.43	0.97	1,979	61.8%	80.4%	2.31	0.95	3,503
School of Nursing	49.3%	87.9%	2.78	0.78	140	36.9%	62.5%	2.43	1.00	168	42.5%	74.0%	2.59	0.92	308
Sciences and Mathematics	67.6%	86.3%	2.75	0.96	139	51.0%	71.7%	2.56	1.15	715	53.7%	74.1%	2.59	1.13	854
Total	**74.8%**	**90.8%**	**2.44**	**0.86**	**4,071**	**61.5%**	**76.9%**	**2.48**	**1.01**	**7,154**	**66.3%**	**82.0%**	**2.47**	**0.96**	**11,225**

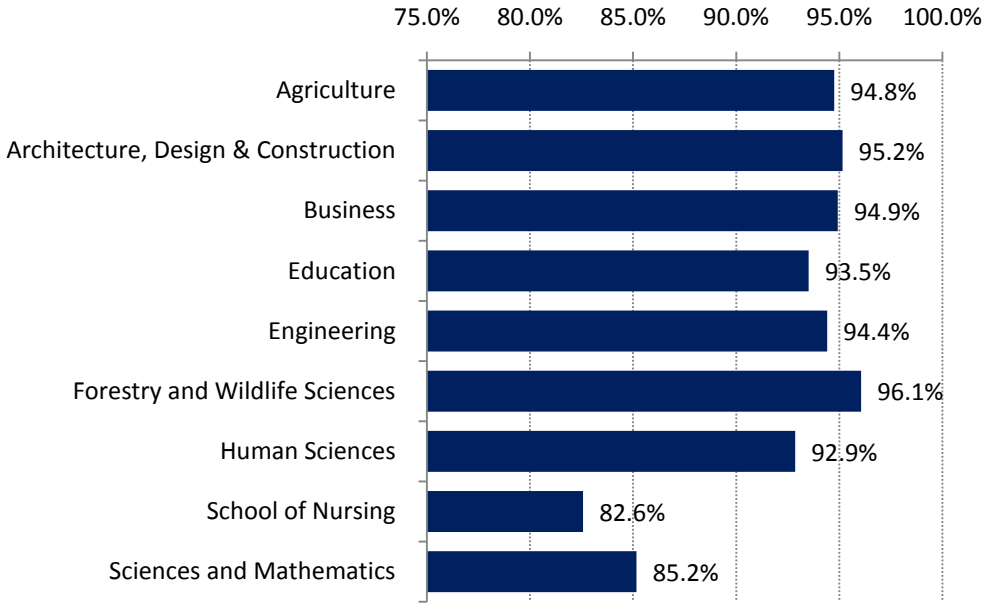
Table 6. Parameter estimates, standard errors, odds ratios, and goodness-of-fit statistics for models of graduation/persistence

	Model 5: Last college of record				*Model 6: Last college + Fall 2 Enr.*				*Model 6: Last college + Fall 3 Enr.*				*Model 6: Last college + Fall 4 Enr.*				*Tole-*
	B	**S.E.**	**Exp(B)**	**Sig.**	**B**	**S.E.**	**Exp(B)**	**Sig.**	**B**	**S.E.**	**Exp(B)**	**Sig.**	**B**	**S.E.**	**Exp(B)**	**Sig.**	*rance*
Intercept	-3.88	0.29	0.02	0.00	-5.38	0.34	0.00	0.00	-5.62	0.41	0.00	0.00	-5.93	0.48	0.00	0.00	
Female	0.01	0.05	1.01	0.88	0.04	0.06	1.04	0.53	0.07	0.07	1.07	0.30	0.24	0.08	1.27	0.00	0.77
Ethnicity (reference category "White")																	
Black	0.02	0.09	1.02	0.80	-0.18	0.10	0.84	0.08	-0.30	0.12	0.74	0.01	-0.17	0.14	0.84	0.24	0.77
Native American	0.09	0.37	1.10	0.80	0.19	0.45	1.20	0.68	-0.26	0.48	0.77	0.58	-0.49	0.53	0.61	0.36	0.99
Asian	-0.35	0.18	0.70	0.05	-0.39	0.20	0.68	0.05	-0.55	0.23	0.58	0.02	-0.35	0.28	0.70	0.21	0.99
Hispanic	-0.20	0.22	0.82	0.35	-0.15	0.25	0.86	0.55	-0.05	0.31	0.95	0.86	-0.18	0.37	0.84	0.63	0.99
Foreign	-0.20	0.33	0.82	0.55	-0.57	0.35	0.56	0.10	-0.59	0.40	0.55	0.14	-0.14	0.49	0.87	0.78	0.98
Feeder HS*	0.26	0.06	1.29	0.00	0.21	0.06	1.24	0.00	0.11	0.07	1.12	0.14	-0.03	0.09	0.97	0.75	0.75
In-state	0.09	0.06	1.09	0.12	-0.02	0.06	0.98	0.74	-0.11	0.08	0.89	0.13	-0.19	0.09	0.83	0.04	0.71
Lee County	0.12	0.12	1.13	0.34	0.31	0.15	1.37	0.03	0.35	0.17	1.42	0.04	0.26	0.19	1.30	0.18	0.95
Poor Alabama Cty**	-0.08	0.16	0.92	0.62	-0.08	0.18	0.92	0.65	-0.25	0.21	0.78	0.22	-0.57	0.23	0.57	0.01	0.97
High School Academic Performance																	
HS GPA	0.54	0.05	1.71	0.00	0.51	0.06	1.66	0.00	0.46	0.07	1.59	0.00	0.43	0.09	1.54	0.00	0.62
ACT or SAT Equivalent	-0.03	0.01	0.97	0.00	-0.02	0.01	0.98	0.01	-0.02	0.01	0.99	0.15	-0.01	0.01	0.99	0.37	0.62
College Experience: First Fall																	
Fall 1 GPA	0.91	0.03	2.49	0.00	0.69	0.03	1.99	0.00	0.59	0.04	1.80	0.00	0.54	0.05	1.72	0.00	0.61
Grant	-0.33	0.08	0.72	0.00	-0.26	0.09	0.77	0.01	-0.24	0.11	0.78	0.03	-0.15	0.14	0.86	0.26	0.73
Loan	-0.31	0.06	0.74	0.00	-0.28	0.07	0.76	0.00	-0.17	0.08	0.84	0.03	-0.10	0.10	0.91	0.31	0.59
Scholarship	0.20	0.08	1.22	0.02	0.13	0.09	1.14	0.14	0.16	0.11	1.18	0.14	0.25	0.13	1.28	0.05	0.46
Work Study	0.20	0.13	1.22	0.13	0.21	0.15	1.24	0.16	0.32	0.18	1.38	0.08	0.21	0.22	1.24	0.33	0.87
Loan X Scholarship	0.24	0.11	1.27	0.04	0.27	0.13	1.31	0.03	0.15	0.15	1.16	0.33	0.02	0.18	1.02	0.93	0.43
Full-time Enrollment	0.96	0.21	2.62	0.00	0.54	0.24	1.72	0.02	-0.07	0.30	0.93	0.82	-0.06	0.35	0.94	0.85	0.98
Enrolled in Fall 2					2.98	0.08	19.63	0.00	1.35	0.10	3.85	0.00	0.89	0.12	2.43	0.00	0.56
Enrolled in Fall 3									3.49	0.08	32.92	0.00	1.81	0.10	6.13	0.00	0.35
Enrolled in Fall 4													3.41	0.09	30.38	0.00	0.39
Last College of Record College (reference college: Liberal Art)																	
Agriculture	0.12	0.13	1.13	0.35	0.25	0.15	1.28	0.11	0.16	0.19	1.18	0.38	0.24	0.22	1.27	0.27	0.91
Architecture, Design & Cons	0.33	0.12	1.40	0.00	0.33	0.13	1.39	0.01	0.34	0.16	1.40	0.03	0.32	0.19	1.38	0.09	0.90
Business	0.47	0.06	1.60	0.00	0.39	0.07	1.47	0.00	0.34	0.08	1.41	0.00	0.27	0.10	1.32	0.00	0.70
Education	0.00	0.09	1.00	0.96	0.02	0.11	1.02	0.83	0.10	0.13	1.11	0.43	0.01	0.15	1.02	0.92	0.85
Engineering	0.32	0.10	1.37	0.00	0.39	0.11	1.48	0.00	0.34	0.13	1.40	0.01	0.17	0.16	1.19	0.26	0.71
Forestry and Wildlife Scien	0.05	0.23	1.05	0.84	0.37	0.28	1.44	0.19	0.51	0.34	1.67	0.13	0.54	0.39	1.72	0.17	0.97
Human Sciences	0.44	0.11	1.56	0.00	0.44	0.13	1.55	0.00	0.31	0.15	1.37	0.03	-0.09	0.17	0.92	0.61	0.86
School of Nursing	-1.16	0.18	0.31	0.00	-1.07	0.21	0.34	0.00	-0.86	0.26	0.42	0.00	-1.10	0.23	0.33	0.00	0.92
Sciences and Mathematics	-0.61	0.09	0.55	0.00	-0.54	0.10	0.59	0.00	-0.50	0.13	0.61	0.00	-0.91	0.16	0.40	0.00	0.72
College change	0.79	0.05	2.21	0.00	0.47	0.06	1.59	0.00	0.24	0.07	1.27	0.00					
Engineering X change	-0.83	0.27	0.44	0.00	-0.61	0.31	0.54	0.05									
Nursing X change	-0.60	0.26	0.55	0.02	-0.64	0.28	0.52	0.02	-1.00	0.34	0.37	0.00					
Sciences and Mathematics X College change													0.73	0.34	2.07	0.03	0.84
Matriculation term (Fall 2001 - reference)																	
Fall 1999	-0.16	0.06	0.86	0.01	-0.02	0.06	0.98	0.77	-0.01	0.08	0.99	0.89	0.02	0.09	1.02	0.86	0.73
Fall 2000	0.03	0.06	1.03	0.65	0.09	0.06	1.09	0.16	0.08	0.08	1.09	0.28	0.03	0.09	1.03	0.73	0.74
-2LL		11,900.59				9,736.46				7,258.73				5,427.48			
Chi-square (df)		2,438.99 (30)				4,603.12 (34)				7,080.85 (34)				8,912.10 (34)			
Nagelkerke R Square		0.27				.47				0.65				0.76			
% correctly classified		75.2%				82.1%				88.4%				92.0%			

The new models shown in Table 6 include last colleges of record (with Liberal Arts as a reference college) and certain information on college-change behaviors. Information on college changes was included using Forward LR Method,[iv] i.e., a college-change indicator and interactions of college change and last colleges of record were included in the model. Of these, only effects leading to a significant improvement of model fit (college change, Engineering + college change, Nursing College change, see Model 5 in Table 6) remained in the model.

After controlling for high school and college academic performance in Model 5 of Table 6, higher odds of persistence are associated with Human Sciences, Business, Architecture, and Engineering. For example, the odds of persistence for students with Human Sciences as their last college of record are 1.56 times the odds of persistence for students with Liberal Arts as their last college of record, while those for students with Business as their last college of record are 1.60 times the odds of persistence for students with Liberal Arts as their last college. Consistent with descriptive analysis above, the lowest odds of persistence were found in the College of Nursing. Students with Nursing as their last college of record have odds of persistence only 0.31 times those of students with Liberal Arts as their last college of record.

As anticipated, inclusion of indicators for persistence to the second year (Model 6 of Table 6), to the third year (Model 7 of Table 6), and to the fourth year (Model 8 of Table 6) removes the apparent positive effect of changing colleges. The indicator of college change is not included in Model 8 of Table 6, as it did not lead to a significant improvement of model fit. Figure 17 presents expected probabilities of six-year persistence based on Model 8 of Table 6. These probabilities are high since they were calculated for a student enrolled in Fall 2, Fall 3, and Fall 4. As Figure 17 shows, controlling for other characteristics renders insubstantial the differences among colleges, with the exception of the School of Nursing and the College of Sciences and Mathematics. (At that, one should also account for a significant interaction effect of College of Science and Mathematics and college change that would attenuate some of this difference.)



An overview of models presented here demonstrates that college variables (i.e., first-term college GPA and one-year persistence) are the best predictors of six-year persistence. Thus, including first-term college GPA in Model 3 of Table 4 increases the percentage of correctly classified cases by about 5. Including one-year persistence in

Model 6 of table 6 increases the percentage of correctly classified cases by 7%. These findings emphasize the importance of the first year in college and imply the importance of efforts to improve performance in the first year and retention to the second year.

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Appendix 1. Feeder high schools and number of students from these schools in 1999, 2000, and 2001 fall cohorts.

School	#	*School*	#
Hoover High School	350	Prattville High School	88
Auburn High School	233	Northview High School	87
Vestavia Hills High School	208	Huntsville High School	83
Virgil I Grissom High School	190	Opelika High School	82
Mountain Brook High School	168	Oak Mountain High School	81
McGill-Toolen Catholic HS	149	Chelsea High School	77
Pelham High School	134	Enterprise High School	71
John Carroll Catholic HS	116	Clay-Chalkville High School	70
Shades Valley High School	114	Fairhope High School	69
Hewitt-Trussville High School	111	John T Morgan Academy	69
Saint Pauls Episcopal School	108	Murphy High School	63
George Walton Comprehensive HS, ***GA***	108	Roswell High School, ***GA***	61
Briarwood Christian HS	102	Lassiter High School, ***GA***	60
Trinity Presbyterian School	99	Daphne High School	60
Homewood High School	98	Decatur High School	58
Saint James School	95	Chattahoochee High School, ***GA***	57
Bob Jones High School	93	Booker T Washington Magnet HS	57
Robert E Lee High School	92	Alan C Pope High School, ***GA***	55
Jefferson Davis High School	89		

Endnotes

[i] The -2LL statistic is the likelihood ratio. It is also called goodness of fit, deviance chi-square, scaled deviance, deviation chi-square, DM, or L-square. It reflects the significance of the unexplained variance in the dependent. The likelihood ratio is a function of log likelihood. "Likelihood" is a probability, specifically the probability that the observed values of the dependent may be predicted from the observed values of the independents. Like any probability, the likelihood varies from 0 to 1. The log likelihood (LL) is its log and varies from 0 to minus infinity (it is negative because the log of any number less than 1 is negative). Because -2LL has approximately a chi-square distribution, -2LL can be used for assessing the significance of logistic regression, analogous to the use of the sum of squared errors in OLS regression. As the model becomes better, -2LL will decrease in magnitude.

[ii] Chi-square tests if the model with the predictors is significantly different from the model with only the intercept. It may be interpreted as a test of the capability of all predictors in the model jointly to predict the response (dependent) variable. A finding of significance leads to a conclusion that there is adequate fit of the data to the model, meaning that at least one of the predictors is significantly related to the response variable.

[iii] Cox and Snell's R- Square is an attempt to imitate the interpretation of multiple R-Square based on the log likelihood of the final model vs. log likelihood for the baseline model, but its maximum can be (and usually is) less than 1.0, making it difficult to interpret. Nagelkerke's R- Square is a modification of the Cox and Snell coefficient to assure that it can vary from 0 to 1. That is, Nagelkerke's R- Square divides Cox and Snell's R-Square by its maximum in order to achieve a measure that ranges from 0 to 1.

[iv] The forward method implies that predictors are entered in the model based on a certain criterion or a score statistic and checking, at each step, whether some of the earlier included variables should be removed. Forward LR Method implies that a predictor is included in the model if its inclusion leads to a significant increase in likelihood ratio, and, therefore, improves a model's fit.