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High School Academic Curriculum and the Persistence Path through College

**Persistence and Transfer Behavior of
Undergraduates 3 Years After Entering 4-Year
Institutions**

Executive Summary

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Laura Horn
Lawrence K. Kojaku
MPR Associates, Inc.

C. Dennis Carroll
Project Officer
National Center for Education Statistics

**U.S. Department of Education
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Executive Summary

This report examines the relationship between high school academic curricula and students' persistence path through college, approximately 3 years after first enrolling. The data are drawn from the 1995–96 Beginning Postsecondary Students Survey, a longitudinal study of beginning postsecondary students who first enrolled in a 4-year college in 1995–96. Measures of high school academic preparation are based on academic courses taken in high school as reported by students on their college entrance exam applications.

The high school academic curriculum measure identifies three levels of coursetaking: (1) Core curriculum or below, (2) mid-level, and (3) rigorous. The lowest threshold is based on the core New Basics curriculum first recommended by the National Commission on Excellence in Education in *A Nation at Risk* (1983). Core curriculum includes 4 years of English, 3 years of mathematics, 3 years of science, and 3 years of social studies.¹ The highest threshold, or rigorous curriculum, identified in the current study, includes 4 years of English, 3 years of a foreign language, 3 years of social studies, 4 years of mathematics (including pre-calculus or higher), 3 years of science (including biology, chemistry, physics), and at least one Advanced Placement (AP) course or test taken. Mid-level covers curricula between core and rigorous curricula, but at a minimum must include algebra I, geometry, at least 1 year of a

foreign language, and two science classes from the combination of biology, chemistry, and physics.²

Level of High School Academic Curriculum Completed

The distribution of beginning students enrolled in 4-year institutions across the three levels of course taking is displayed in figure A. Approximately one-third (31 percent) reported completing course work no higher than core curricula, one-half completed mid-level curricula, and the remaining one-fifth (19 percent) completed rigorous curricula.

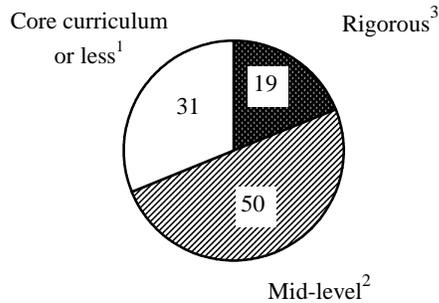
The level of high school academic curriculum completed by beginning 4-year college students was associated with their demographic and socioeconomic characteristics and also with the economic status of the student body in their high schools. Specifically, students from low-income families, students whose parents had no more than a high school education, and students who graduated from high schools in which 25 percent or more of the students were eligible for free or reduced-price lunches were less likely than their more advantaged counterparts to report completing rigorous high school curricula.

Related in part to family income, racial/ethnic group differences also were apparent. Black stu-

¹It also included courses in computer science, but students did not report on such courses on their entrance exam applications.

²The research of Burkam, Lee, and Smerdon (1996) and Adelman (1999) was used extensively in guiding the development of the variable.

Figure A.—Percentage distribution of 1995–96 beginning postsecondary students who enrolled in 4-year institutions, by high school academic curriculum



¹Core curriculum includes 4 years of English, 3 years of social studies, 3 years of mathematics, and 3 years of science.

²Mid-level curriculum exceeds core curriculum, but is less than rigorous. Includes at a minimum 1 year of a foreign language, geometry, algebra I, and 3 years of science including two of the following courses: biology, chemistry, or physics.

³Rigorous curriculum includes 4 years of English, 4 years of mathematics (including precalculus or higher), 3 years of a foreign language, 3 years of social studies, 3 years of science (including biology, chemistry, physics), and at least one advanced placement (AP) class or test taken.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1995–96 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:96/98).

dents were much less likely than either White or Asian/Pacific Islander students to complete rigorous curricula (8 percent versus 20 and 31 percent, respectively) and more likely to complete programs no higher than the core curriculum (42 percent versus 29 and 27 percent). Asian/Pacific Islander students were the most likely to complete rigorous curricula (31 percent). While it appears as though White students were more likely than Hispanic students to complete rigorous curricula (20 percent versus 16 percent) and less likely to complete no higher than core curricula (29 percent versus 34 percent), there was not enough statistical evidence to draw this conclusion.

High school academic curriculum also had an obvious association with where students first enrolled in college. As the level of curricula increased, so did students' likelihood of attending selective 4-year colleges or universities.³ For example, 71 percent of students who completed rigorous curricula enrolled in a selective college or university, compared with 40 percent who completed mid-level curricula and 32 percent who completed core curricula or lower.

Postsecondary Persistence 3 Years After Enrolling

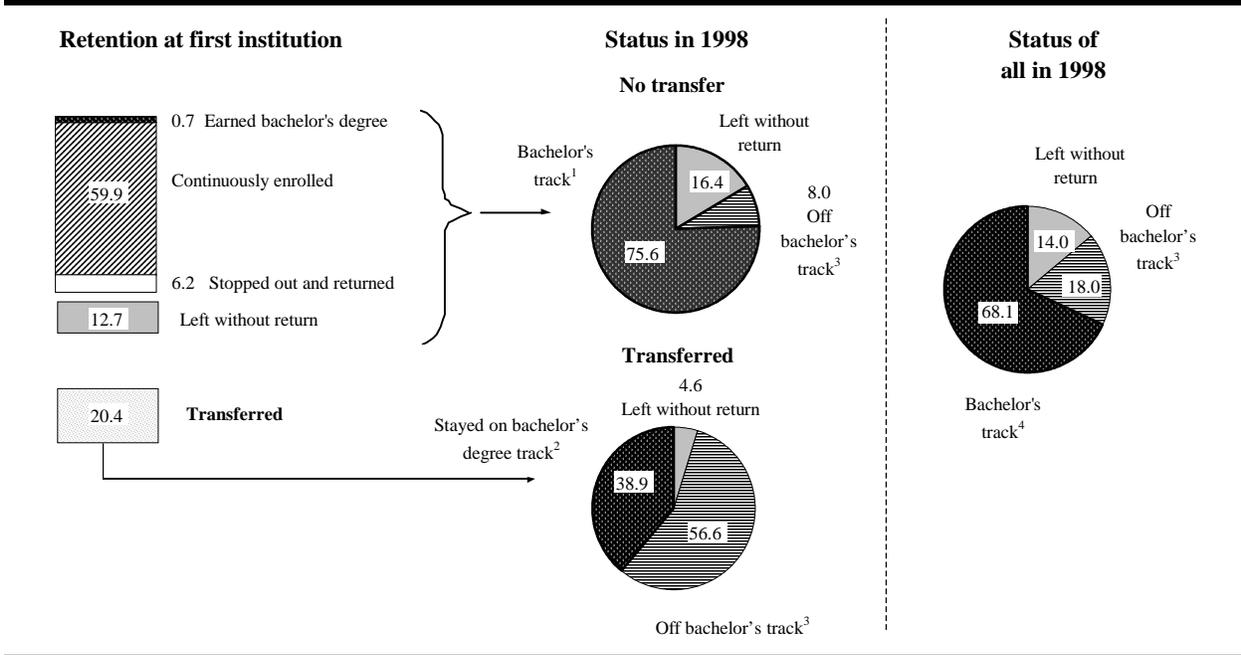
As of 1998, roughly two-thirds of students who had first enrolled in a 4-year college in 1995–96 were still enrolled in the same college (including 6 percent who had left and returned; figure B). One-fifth had transferred to another institution, and 13 percent had left and not returned.

The level of college students' high school curricula was strongly related to their persistence in postsecondary education. This was true both for maintaining enrollment at their initial institution (institutional retention) and, if they transferred, staying on track to a bachelor's degree.⁴ For example, 79 percent of students who had participated in rigorous high school academic curricula were continuously enrolled in their initial institution (including 1 percent who had attained a bachelor's degree; figure C). In contrast, 62 percent and 55 percent, respectively, of those in mid-

³Selectivity was determined by admitted students' entrance exam scores. See appendix A for definition.

⁴The "persistence track" to a bachelor's degree is defined as maintaining uninterrupted enrollment in a 4-year institution toward a bachelor's degree objective. It includes those who transfer between 4-year institutions without a break in enrollment. The persistence track concept was first developed by Carroll (1989) to demonstrate the optimal path to a bachelor's degree and the adverse effects of straying from the path.

Figure B.—Postsecondary persistence path of 1995–96 beginning students who enrolled in 4-year institutions, 3 years after first enrollment (as of 1998)



¹Maintained continuous enrollment in first institution or earned a bachelor's degree.

²Transferred to a 4-year institution with no break in enrollment.

³Stopped out (break of more than 4 months) and/or enrolled in a less-than-4-year institution.

⁴Maintained continuous enrollment in any 4-year institution.

NOTE: Details may not sum to 100 due to rounding.

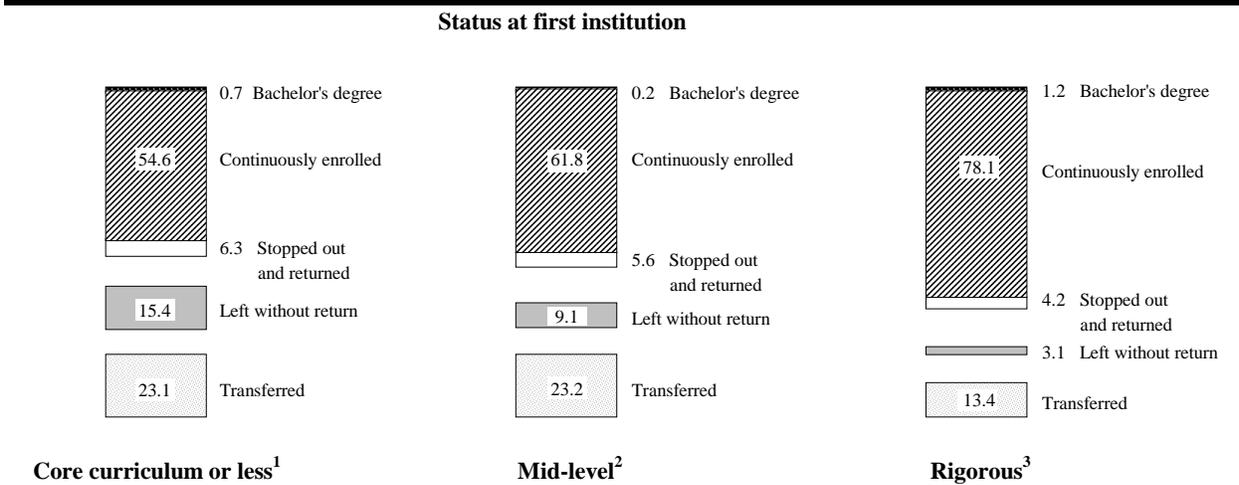
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1995–96 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:96/98).

level curricula or core curricula or lower were continuously enrolled in their initial institution. Students in rigorous curricula also were less likely to transfer from their first institution (13 percent) than those who participated in less than rigorous curricula, whether in mid-level or core or lower curricula (23 percent of both groups transferred).

The difference between levels of academic curricula was especially notable with respect to staying on track to a bachelor's degree (i.e., continuous enrollment in any 4-year institution). As the level of academic curricula increased, so

did the proportion of undergraduates who stayed on track (figure D). As of 1998, the vast majority (87 percent) of those who had participated in rigorous high school academic curricula were still on track to a bachelor's degree, compared with 71 percent of those in mid-level curricula, and 62 percent of those who completed core curricula or lower. Correspondingly, the proportion of those who had left postsecondary education and did not return declined with each successive level of academic curriculum (from 17 percent to 10 percent to 4 percent).

Figure C.—Percentage distribution of 1995–96 beginning students’ 1998 enrollment status in their first institution for those who began in a 4-year institution, by high school academic curriculum

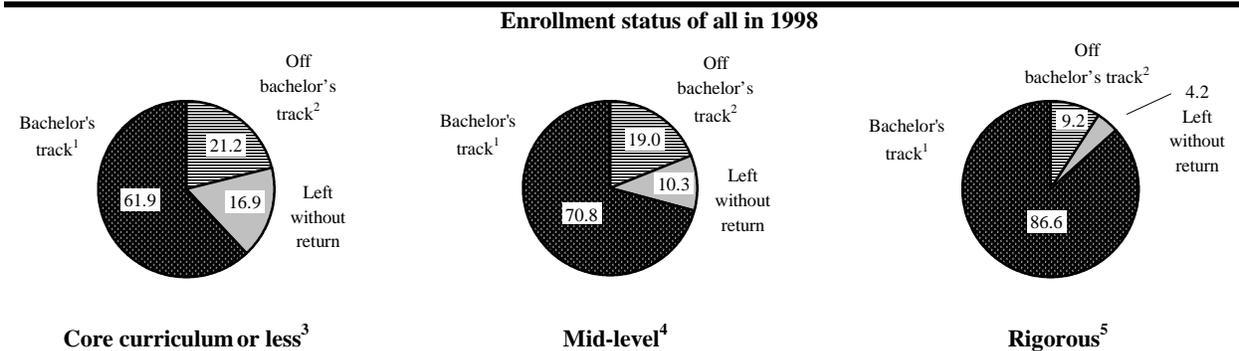


¹Core curriculum includes 4 years of English, 3 years of social studies, 3 years of mathematics, and 3 years of science.
²Mid-level curriculum exceeds core curriculum, but is less than rigorous. Includes at a minimum 1 year of a foreign language, geometry, algebra I, and 3 years of science including two of the following courses: biology, chemistry, or physics.
³Rigorous curriculum includes 4 years of English, 4 years of mathematics (including precalculus or higher), 3 years of a foreign language, 3 years of social studies, 3 years of science (including biology, chemistry, physics), and at least one advanced placement (AP) class or test taken.

NOTE: Details may not sum to 100 due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1995–96 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:96/98).

Figure D.—Enrollment status in 1998 of 1995–96 beginning students who first enrolled in 4-year institutions, by high school academic curriculum



¹Continuously enrolled in any 4-year institution.
²Stopped out (break of 4 or more months) and/or enrolled in a less-than-4-year institution.
³Core curriculum includes 4 years of English, 3 years of social studies, 3 years of mathematics, and 3 years of science.
⁴Mid-level curriculum exceeds core curriculum, but is less than rigorous. Includes at a minimum 1 year of a foreign language, geometry, algebra I, and 3 years of science including two of the following courses: biology, chemistry, or physics.
⁵Rigorous curriculum includes 4 years of English, 4 years of mathematics (including precalculus or higher), 3 years of a foreign language, 3 years of social studies, 3 years of science (including biology, chemistry, physics), and at least one advanced placement (AP) class or test taken.

NOTE: Details may not sum to 100 due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1995–96 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:96/98).

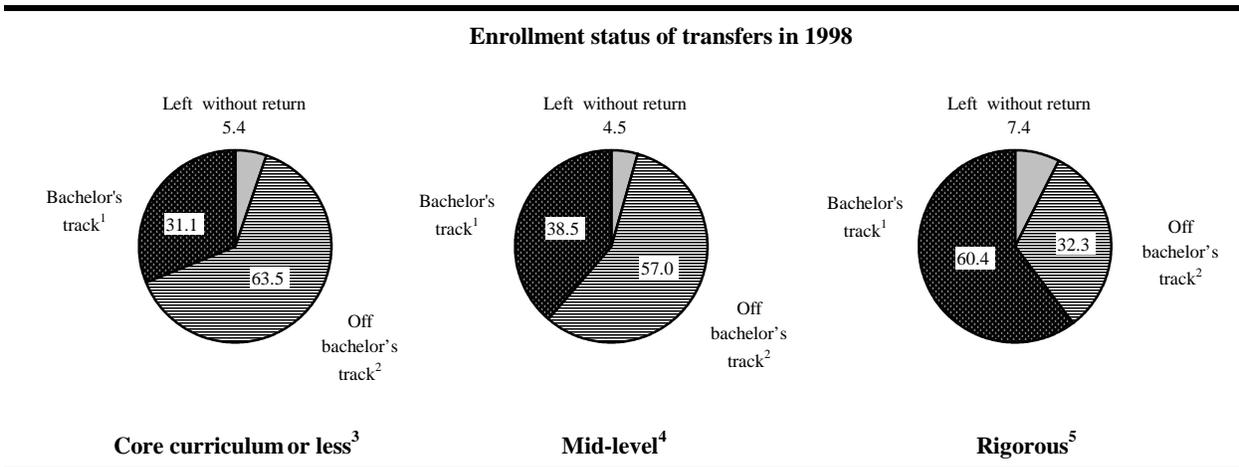
Patterns of Transfer

The rate of transfer for those who completed no higher than a core curriculum in high school was the same as for those who completed mid-level curricula. Roughly one-quarter of these students had transferred from their first institution, while just 13 percent in rigorous high school curricula had done so. However, as shown in Figure E, among students who transferred, as their level of academic curricula increased, so did the likelihood of staying on track to a bachelor's degree (i.e., they transferred to another 4-year institution without a break in enrollment). For those who had completed core curricula or lower, 31 percent of transfers stayed on the bachelor's degree track, as

did 39 percent of transfers who had completed mid-level curricula and 60 percent of those who had completed rigorous high school curricula.

These differences were clearly evident when examining the destination of transfers. Staying on track to a bachelor's degree implies staying enrolled in a 4-year institution, so all transfers who stayed on track transferred to 4-year institutions. However, there were also differences across high school academic curricula with respect to the selectivity of the 4-year institutions where students transferred (table A). Among all transfers who completed rigorous high school curricula, 40 percent transferred to selective institutions, compared with just 21 percent of their counterparts who completed mid-level curricula and 17 percent who

Figure E.—For 1995–96 beginning students who transferred from a 4-year institution, percentage distribution of enrollment status in 1998 with respect to earning a bachelor's degree, by high school academic curriculum



¹Continuously enrolled in any 4-year institution.

²Stopped out (break of 4 or more months) and/or enrolled in a less-than-4-year institution.

³Core curriculum includes 4 years of English, 3 years of social studies, 3 years of mathematics, and 3 years of science.

⁴Mid-level curriculum exceeds core curriculum, but is less than rigorous. Includes at a minimum 1 year of a foreign language, geometry, algebra I, and 3 years of science including two of the following courses: biology, chemistry, or physics.

⁵Rigorous curriculum includes 4 years of English, 4 years of mathematics (including precalculus or higher), 3 years of a foreign language, 3 years of social studies, 3 years of science (including biology, chemistry, physics), and at least one advanced placement (AP) class or test taken.

NOTE: Details may not sum to 100 due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1995–96 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:96/98).

Table A.—Among 1995–96 beginning students who transferred from a 4-year institution, percentage distribution according to their transfer institution, by high school academic curriculum and selectivity of first institution

	Transfer destination		
	4-year institution		Less-than-4-year or for-profit 4-year
	Selective ¹	Less-selective ²	
All transfers from 4-year institutions			
Total	21.3	39.5	39.3
High school academic curriculum			
Core curriculum or less ³	17.4	36.9	45.7
Mid-level ⁴	20.9	39.0	40.1
Rigorous ⁵	40.4	38.9	20.8
Began in selective institution			
Total	34.1	30.0	35.9
Core curriculum or less ³	21.5	31.4	47.1
Mid-level ⁴	32.8	27.6	39.6
Rigorous ⁵	48.5	32.4	19.1
Began in less-selective institution			
Total	14.7	44.3	41.0
Core curriculum or less ³	16.2	38.4	45.4
Mid-level ⁴	13.3	46.2	40.5
Rigorous ⁵	25.0	50.9	24.0

¹Selective institutions are public and private not-for-profit institutions in which students' average SAT scores exceeded 1000 or Carnegie classifications in which a majority of students were enrolled in very selective institutions.

²Less-selective institutions are all others not identified in the selective groups.

³Core curriculum includes 4 years of English, 3 years of social studies, 3 years of mathematics, and 3 years of science.

⁴Mid-level curriculum exceeds core curriculum, but is less than rigorous. Includes at a minimum 1 year of a foreign language, geometry, algebra I, and 3 years of science including two of the following courses: biology, chemistry, or physics.

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NOTE: Details may not sum to 100 due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1995–96 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:96/98).

completed core curricula or lower. Correspondingly, transfers who completed rigorous curricula were much less likely to transfer either to a less-than-4-year or a for-profit institution (21 percent) than their counterparts in mid-level (40 percent) or core curricula or lower (46 percent).

Examining the selectivity of students' first institution with their second, the likelihood of making a lateral transfer from selective to selective institution was much higher for those completing rigorous high school curricula (49 percent) than for those completing either mid-level curricula (33

percent) or no higher than core curricula (22 percent). Similarly, the likelihood of transferring from a selective institution to a less-than-4-year or for-profit institution was much lower for those completing rigorous curricula (19 percent) than for their counterparts completing mid-level curricula (40 percent) or no higher than core curricula (47 percent).

While the patterns of transfer appear to be similar among those who began in less-selective institutions (i.e., those completing rigorous high school curricula more likely than those in less rigorous curricula to transfer to selective institutions or to transfer laterally, and less likely to transfer to less-than-4-year or for-profit institutions), there is not enough statistical evidence to draw this conclusion.

Transfers left postsecondary education at similar rates no matter what their high school academic curricula. As shown in figure E, 5 to 7 percent of transfers left postsecondary education altogether as of 1998.

Controlling for Related Variables

In addition to high school academic curricula, many other variables can influence postsecondary education outcomes. Therefore, it is necessary to use multivariate analysis techniques to disentangle the net influence of related variables on the outcome of interest.

In this study, covariance adjustment techniques based on simple linear regression models were used to analyze two persistence outcomes: (1) continuous enrollment at the initial institution, and (2) staying on track to a bachelor's degree. Independent variables reflected students' academic experience in high school (academic curricula and college entrance exam scores), demographic char-

acteristics (gender, race/ethnicity, age), socioeconomic characteristics (income and parents' education), and the economic status of their high schools (the proportion of students eligible for free or reduced-price lunches). Other variables reflected students' experiences in their first year in college, including the type of postsecondary institution, full- or part-time attendance, and work status. In addition, because previous research has shown first-year grade-point average (GPA) to be a strong predictor of success in college (e.g., Pascarella and Terenzini 1991), both analyses were run twice, once without GPA, and once including GPA as an independent variable.

High School Academic Curricula

The results indicated a strong association between high school academic curricula and both measures of persistence. Students who participated in rigorous high school curricula were at a distinct advantage over those who completed no higher than core curricula (the comparison group). In addition, there was some evidence that completing mid-level curricula also was associated with higher rates of staying on track to a bachelor's degree when compared to those completing programs no higher than core curricula. However, the difference did not reach statistical significance after adjusting for the design effect of the dependent variable.⁵

SAT Scores and Other Variables

In both persistence analyses, prior to including first-year college GPA as an independent variable, SAT composite test score levels and high school academic curriculum levels were significantly associated with the outcome. However, once GPA

⁵After adjusting for the design effect, the *t*-value of the coefficient was 1.90. See appendix B for a description of methods and adjustment for design effect.

was taken into account, high school academic curriculum remained a significant predictor of persistence (specifically, completing a rigorous versus core or lower curriculum), but the association between levels of SAT scores and persistence disappeared. In other words, once all related variables were taken into consideration including college GPA, entrance exam scores were no longer associated with the likelihood of persisting, either with respect to institutional retention or staying on track to a bachelor's degree.

Other variables were also significantly associated with both measures of persistence after holding related variables consistent. For example, students whose parents did not attend college were less likely to persist than those whose parents were college-educated.⁶ In addition, students who started college attending part time and/or working full time were less likely to persist than their counterparts, as were those who first enrolled in less-selective 4-year institutions compared with those in selective institutions.

Conclusions

The findings of this study demonstrated a consistent advantage experienced by students who completed rigorous high school curricula, and to a lesser extent by those completing mid-level curricula, over their peers completing core curricula or lower.

However, the level of high school curricula students reported completing also was related to their family background characteristics and indicators of socioeconomic status, including family income, parents' education, race/ethnicity, and the

economic status of their high school's student body. All of these factors relate to whether or not students have the opportunities to participate in and complete rigorous curricula. Moreover, students' success in staying in college was also related to where they first enrolled and how well they did in their first year. Yet, even when all these factors were taken into consideration, the advantage of completing a rigorous high school academic curriculum remained.

The same was not observed for levels of SAT scores. Similar to the findings for curriculum levels, SAT scores were related to persistence when first-year college GPA was not included in the regression. However, after GPA was added, high school curriculum remained a significant factor, but SAT scores did not. These findings are consistent with recent research based on high school transcripts for a cohort of 1980 high school sophomores (Adelman 1999); this study demonstrated that high school curriculum was a stronger predictor of bachelor's degree attainment than standardized test scores or other measures of high school academic performance.

Perhaps most notable in the current study, is the apparent benefit of a strong high school academic curriculum for transfer students. Students who transfer from their initial 4-year college may do so because they are struggling either academically or socially, and attempting to find a better fit in another institution. One-fifth of 1995–96 beginning undergraduates enrolled in 4-year colleges had transferred from their first institution by 1998. For these students in particular, as their level of high school academic curriculum increased, so did their likelihood of staying on track to a bachelor's degree (by transferring to another 4-year institution without a break in enrollment).

⁶A recent NCES report provides a detailed analysis of the experiences of "first-generation" college students—those whose parents did not attend college (Warburton, Bugarin, and Nuñez 2001).

Taken together, the results suggest that completing a rigorous academic curriculum in high school may help students overcome socioeconomic disadvantages such as low family income and parents with no college experience, as well as helping those who get a poor start in college (whether academic or social) and decide to transfer.