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ABSTRACT

The data in this report were obtained from the base-year and follow-up surveys of the National Education Longitudinal Study of the Eighth Grade Class of 1988 (NELS:88). NELS:88 began with a sample of 1,052 schools and 24,599 eighth graders. The results of this report apply to students who were eighth-graders in 1988 and graduated from high school in 1992. Results show that not all students who take higher-level math or foreign language courses in high school apply to four-year colleges or universities during their senior year in high school. However, students who do enroll in algebra or foreign language during eighth grade are more likely to pursue a four-year postsecondary education at the end of high school. This is true regardless of the level of math or foreign language attained by these students. For those students who aspire to obtain a postsecondary degree, it is useful for the planning process to commence as early as eighth grade or even before. The results of this study are useful for students who plan to attend college and their parents in determining some of the factors that are associated with their child attaining academic success. Includes graphs and tables depicting study results. (Author/MKA)

NATIONAL CENTER FOR EDUCATION STATISTICS

Statistics in Brief March 1999

Do Gatekeeper Courses Expand Education Options?

Introduction

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Enrollment in advanced level math and foreign language courses while in high school is not always an option for most students. It requires advance planning by both the student and his/her parents. For example, the parents who have high expectations for his/her child's education realize that many advanced level courses require prerequisites. Thus, planning and enrolling in the necessary foundation courses, such as algebra and foreign language during eighth grade, can place a student higher in the math and foreign language pipelines and may eventually lead to decisions, such as applying to college, that are highly related to attending a college.[1] According to the U.S. Department of Education's white paper, Mathematics Equals Opportunity (1997), students who plan to take advanced mathematics courses during high school and begin to study algebra during middle school are at a clear advantage.[2] With this potential advantage in mind, this report examines the relationship between enrollment in algebra or foreign language as an eighth-grader in combination with high school course-taking patterns (math and foreign language) with applying to a 4-year college/university. For this analysis, pipeline intensity (see appendix A) variables were created for math and foreign language.

The data in this report were obtained from the base-year and second follow-up surveys of the National Education Longitudinal Study of the Eighth Grade Class of 1988 (NELS: 88). NELS: 88 began with a sample of 1,052 schools and 24,599 eighth-graders. While in high school, these eighth-grade cohort members were re-surveyed in 1990 and 1992 to determine their educational progress and school, work, and community experiences. Data from the base-year (1988) and second follow-up (1992, with 12,053 students in cohort) surveys were used in this report (see appendix A for technical detail). The results of this report apply to students who were eighth-graders in 1988 and graduated from high school in 1992.

Highlights include:

Enrollment in gatekeeper courses, such as algebra and foreign language in eighth grade helps students reach higher levels in the mathematics and foreign language pipelines. For example:

- Students who enrolled in algebra as eighth-graders were more likely to reach high-level math courses (e.g., algebra 3, trigonometry, or calculus, etc.) in high school than students who did not enroll in algebra as eighth-graders.

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Reaching higher levels in the mathematics and foreign language pipelines, combined with enrollment in eighth-grade algebra or eighth-grade foreign language, provides students with an advantage. For example:

- Students who enrolled in algebra as eighth-graders, and completed a high level math course during high school, were more likely to apply to a four-year college than those eighth-grade students who did not enroll in algebra as eighth-graders, but who also completed a high level math course during high school.

For many students, a college education can be very difficult to obtain. For others, though, the process is easier. They are able to apply, attend, and graduate with a postsecondary degree. Why is the process easier for these students? One explanation may be that these students receive an early start in core subjects, such as math and foreign language. Taking algebra or foreign language in the eighth grade may help contribute to students enrolling in high-level math and foreign language courses during high school, which is associated with applying to a four-year college. In the next two sections, this paper examines the relationships between course-taking behavior in math and foreign language, and applications to college.

Enrollment in Algebra and Foreign Language during Eighth Grade

In America's education system, math and foreign language are known as sequential subjects. Usually, a student does not enroll in calculus before he/she completes algebra, geometry, trigonometry, or precalculus; nor does he/she complete French IV with a passing grade, and then enroll in French I. It is typical for students to begin in the lower-level courses before enrolling in the more advanced classes. Due to the sequential nature of the subjects, it is advantageous for students to initiate these course sequences before high school. Course work in algebra and foreign language during eighth-grade enables students to reach higher levels in math and foreign language during high school. Figure 1 presents information about 1988 eighth-grade students who enrolled in an algebra course that met at least once a week. Thirty-seven percent of those 1988 eighth-grade students who enrolled in algebra completed a high-level math course (algebra 3, trigonometry, or calculus, etc.) by 1992 compared to 29 percent of those eighth-grade students who did not attend algebra. This same pattern is true for foreign language. Twenty-five percent of those 1988 eighth-graders who enrolled in a foreign language in eighth grade completed a high level foreign language (completed at least .5 Carnegie unit of 12th-grade language)[3] course by 1992 compared to 10 percent of those eighth-grade students who did not enroll in a foreign language as eighth-graders. Enrolling in foreign language and math courses during eighth grade is only one step towards academic advancement; completing high-level classes in these courses is also an important step.

Applying to College

Generally, completing an application is a required step for admission and subsequent enrollment in a four-year college or university. This section presents data that show that eighth-grade enrollment in algebra or foreign language is associated with postsecondary education even when controlling for high school course-taking. Enrolling in algebra or foreign language during eighth grade, in addition to completing higher levels in math or foreign language, are associated with these measures of academic success. Twelfth-grade students who enrolled in algebra as eighth-graders were more likely to apply to a four-year college at each level of high school math course-taking (72 percent of students completed high-level math, 59 percent of those completing middle-level math, and 53 percent of those finishing low-level math) than their counterparts at each level who did not enroll in algebra in eighth grade (42, 29, and 24 percent, respectively).

As illustrated by figure 2a, algebra in eighth grade is also advantageous when one compares those students who only completed a middle- or low-level math with those who did not take eighth-grade algebra, but completed a high-level math during high school. Twelfth-grade students who enrolled in algebra as eighth-graders and who only completed a middle- or low-level math course during high school were more likely to apply to a four-year college than those eighth-grade students who did not enroll in algebra as eighth-graders, but who completed a high-level math course during high school (59 percent for middle-level math, 53 percent for low-level math and 42 percent for high-level math).

The same patterns are evident with foreign language course-taking. Figure 2b shows that 12th-grade students who enrolled in a foreign language in eighth grade were more likely to apply to a four-year college at each level of high school foreign language course-taking (78 percent of students completing high-level foreign language, 67 percent of those completing middle-level foreign language, and 50 percent of those finishing low-level foreign language) than their counterparts at each level who did not enroll in a foreign language in eighth grade (52 percent, 44 percent, and 32 percent, respectively). Moreover, 67 percent of 12th-grade students who enrolled in a foreign language as eighth-graders and completed a middle level (completed at least .5 Carnegie unit of 10th-grade language) language course during high school applied to a four-year college, compared to 52 percent of those eighth-grade students who did not

enroll in a foreign language as eighth-graders, but who completed a high-level foreign language course during high school (see figure 2b).

This section emphasized the importance of enrolling in eighth-grade algebra or foreign language. It is not only beneficial to reach high levels in math and foreign language during high school, but as represented by the results, it is also important to start taking these courses before high school.

For those students who plan to attend a four-year college, it is important to note that most four-year postsecondary schools require students to meet basic requirements in both math and a foreign language course during high school. The aforementioned results indicated that enrolling in either algebra or foreign language in the eighth-grade is beneficial to students applying to a four-year college, but those students who enrolled in both eighth-grade algebra and foreign language are at a even greater advantage. As shown in table 2, 12th-grade students who enrolled in algebra and a foreign language as eighth-graders were more likely to apply to a four-year college than those students who only enrolled in one or none of the courses during eighth grade (78 percent of students who enrolled in both algebra and a foreign language, 56 percent of students who enrolled in either algebra or foreign language and 29 percent of students who enrolled in neither algebra nor foreign language).

Conclusion. Not all students who take higher-level math or foreign language courses in high school apply to four-year colleges or universities during their senior year in high school. However, students who do enroll in algebra or foreign language during eighth grade are more likely to pursue a four-year postsecondary education at the end of high school. This is true regardless of the level of math or foreign language attained by these students. For any student who aspires to obtain a postsecondary degree, it is useful for the planning process to commence as early as eighth grade or even before. The results of this study are useful for students who plan to attend college and their parents in determining some of the factors that are associated with their child attaining academic success.

NOTES

[1] Access to Postsecondary Education for the 1992 High School Graduates. Lutz Berkner, Lisa Chavez. NCES publication #98-105, October 1997.

[2] U.S. Department of Education. (1997). *Math Equals Opportunity.* White paper prepared for the U.S. Secretary of Education, Richard W. Riley.

[3] One Carnegie unit is equivalent to a one hour class that meets 5 days a week for one school year and 12th-grade language is equivalent to the fourth level of a particular language (e.g. French IV).

APPENDIX A: Technical notes for NELS: 88

The NELS: 88 baseline comprised a national probability sample of all regular public and private eighth-grade schools in the 50 states and the District of Columbia in the 1987—88 school year. During the base year data collection, students, parents, teachers, and school administrators were selected to participate in the survey. A total of 24,599 eighth-grade students participated in the base-year survey (93 percent response rate).

The NELS: 88 first follow-up survey was conducted during the spring of 1990. Students, dropouts, teachers, and school administrators participated in the follow-up, with a successful data collection effort for 17,424 individuals in the student survey who had also participated in the base year (approximately 93 percent response rate).

During the second follow-up data collection activities (1992), data were collected from students, dropouts, parents, teachers, school administrators, and extant high school transcripts. For the analysis presented in this report, only the 14,283 students who had participated in the base year, first follow-up, and second follow-up and had transcripts were used. The analysis was further restricted to students who graduated in 1992 (F2RTROUT = 1,2, or 3), thus resulting in a final sample of 12,053.

Sampling errors

The data were weighted using the second follow-up transcript panel weight (F2TRP1WT) to reflect the sampling rates (probability of selection) and adjustments for unit nonresponse. The complex sample design was taken into account when a Taylor series approximation procedure was used to compute the standard errors in this report. The standard error is a measure of variability of a sample estimate due to sampling. It indicates, for a given sample size, how much variance there is in the population of possible estimates of a parameter. If all possible samples were selected under similar conditions, intervals of 1.96 standard errors below to 1.96 standard errors above a particular statistic would include the true population parameter being estimated for about 95 percent of these samples (i.e., 95 percent confidence interval). Comparisons noted in this report are significant at the 0.05 level and were determined using Bonferroni adjusted t-tests.

Development of Mathematics and Foreign Language Pipeline Variables

The University of Michigan developed the pipeline variables used in this report. Using the NELS:88 transcript file, they developed the pipeline variables by measuring students' high school course-taking in

math and foreign language. This report uses the highest course the student completed in high school.

Math

Forty-seven courses (see appendix B—not all courses included on list) were employed from the NAEP-equivalent mathematics classifications to determine which math courses to use for different levels (e.g., non-academic, low academic, middle academic, and advanced academic) of the pipeline. For a student to be classified in a certain level of a pipeline he/she must have *completed, not attempted,* a course in that specific level. First, the math pipeline was divided into four categories: non-academic (basic or general math), low academic (e.g., pre-algebra, two-year algebra 1, informal geometry), middle academic (e.g., algebra or unified mathematics 1, algebra 1, geometry, and algebra 2), and advanced academic (e.g., trigonometry, college algebra, and pre-calculus and calculus). Second, a "no mathematics" category was added to the aforementioned four categories, thus producing a five-level pipeline. Because many students begin their high school math education at level four (middle academic courses), middle academic was further subdivided into middle 1 (two years of math including algebra 1 and geometry, or two years of unified mathematics) and middle 2 (one year of mathematics including algebra 2 or a third year of a unified math program). The advanced courses were divided into three categories: advanced 3 (all calculus courses), advanced 2 (introductory analysis or pre-calculus), and advanced 1 (all other courses labeled as advanced, including various trigonometry, probability, and statistics courses). These divisions resulted in the eight-level math pipeline measure: 1 = no mathematics, 2 = non-academic, 3 = low academic, 4 = middle academic 1, 5 = middle academic 2, 6 = advanced 1, 7 = advanced 2, and 8 = advanced 3. Finally, for the purpose of this report, the pipeline levels were re-categorized into three levels: 1 = low (no mathematics, non-academic, and low academic), 2 = middle (middle academic 1 and middle academic 2), 3 = high (advanced 1, advanced 2, and advanced 3).

Foreign Language

Although the NELS:88 transcript file includes data for 30 different languages taken by students, many courses had no enrollment or fewer than ten students. As a result, only four languages were used for the pipeline: Spanish, French, Latin and German. The pipeline measures are on a 0-5 scale in increments of .5, indicating the highest level completed:

0.0 = attempted but "no progress"
0.5 = completed .5 Carnegie units of 9th-grade language instruction
1.0 = completed 1 Carnegie unit of 9th-grade language instruction
1.5 = completed .5 Carnegie units of 10th-grade language instruction
2.0 = completed 1 Carnegie unit of 10th-grade language instruction
...
5.0 = completed 1 Carnegie unit of Advanced Placement language instruction

The level assigned to each student depended on how far a student progressed in any language (this report only uses the highest level language completed). If a student completed one Carnegie unit of 10th-grade French, he/she received a score of 2. However, if a student completed 1 Carnegie unit of 10th-grade French and 1 Carnegie unit of 11th-grade German, he/she received a score of 3, because German was the highest level completed. For the purpose of this study the foreign language pipeline was re-categorized to low, middle, and high (low = 0-1, middle = 1.5-3, and high = 3.5-5).

Variables Used

From NELS: 88

F2TRP1WT –Transcript panel weight, grades 8—12
F2RACE1—Composite race
F2RTROUT – Transcript-indicated outcome
BYS67C – Attend algebra at least once a week (eighth-grade)
BYS67BE – Attend a foreign language at least once a week (eighth-grade)
F2S60A—Student has applied to how many schools
F2S61—Type of school student most likely to attend
MTHPIPE8 – Math pipeline (8), highest level completed
LA_PIPE1 – Language pipeline: How far in first language (language student advanced furthest in)

Created Variables

Student applied to college:

FOURCOLL:

An applied to college variable was created by using F2S60A (has student applied to college) and F2S61 (Type of school student most likely to attend). The new variable indicated a 1 if the student applied to a college or university and thought he/she will most likely attend a four-year college/university. A zero was given to all others.

Highest math and foreign language course completed:

NEWMATH8—NEWLANG:

The following three variables were created by using the University of Michigan pipeline variables. The

math and foreign language pipelines were separated into three categories, low, middle and high: math—low (1,2 or 3), middle (4 or 5), and high (6,7, or 8); and foreign language –low (0 or 1.0), middle (1.5, 2.0. 2.5, or 3.0), high (3.5, 4.0, 4.5 or 5.0).

Students who enrolled in a math & foreign language, only one of the courses or neither during eighth grade

MATHLANG8

This variable was created by using the BYS67C (Attend algebra at least once a week in 8th grade) and BYS67BE (Attend foreign language at least once a week in 8th grade). The categories of the variable are: 1 = 8th grade algebra and 8th grade language, 2 = 8th grade algebra and no 8th grade language or 8th grade language and no 8th grade algebra, 3 = no 8th algebra or 8th grade language.

APPENDIX B

Grouping for Pipeline Measure: Highest Math Level Completed During High School

Low Math
No math, general 1-2, basic 1-3, consumer, technical, vocational, review, pre-algebra, algebra 1, informal geometry

Middle Math
Algebra 1, geometry plane, geometry plane-solid, unified 1, unified 2, other, pure

High Math
Algebra 3, algebra-trig., algebra-analytical geometry, trig., trig-solid geometry, analytical geometry, linear algebra, probability, probability-statistics, statistics, independent study, introduction to analysis, advanced placement calculus, calculus-analytical geometry, calculus

Grouping for Pipeline Measure: Highest Foreign Language Level Completed During High School

Low Foreign Language
Attempted but no progress
Completed up to 1 Carnegie unit of 9th-grade language instruction

Middle Foreign Language
Completed at least .5 Carnegie unit of 10th-grade language instruction and up to 1 Carnegie unit of 11th-grade language instruction

High Foreign Language
Completed at least .5 Carnegie unit of 12th-grade language and 1 Carnegie unit of Advanced Placement language instruction

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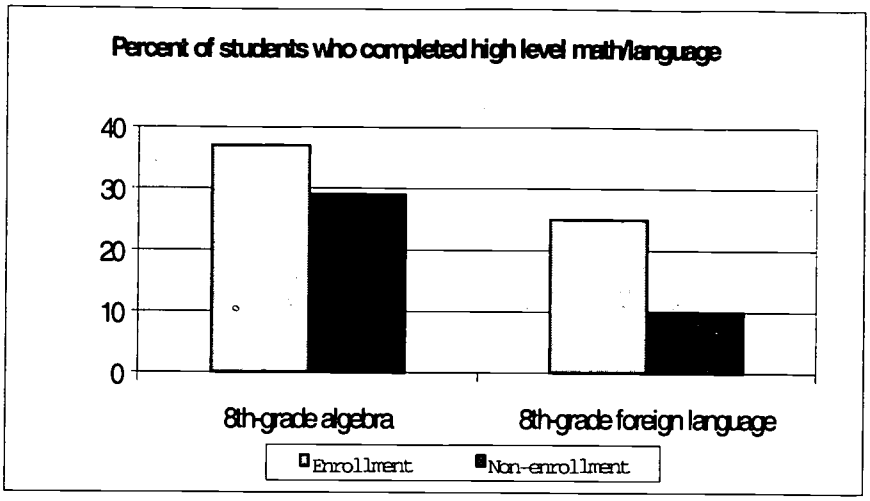
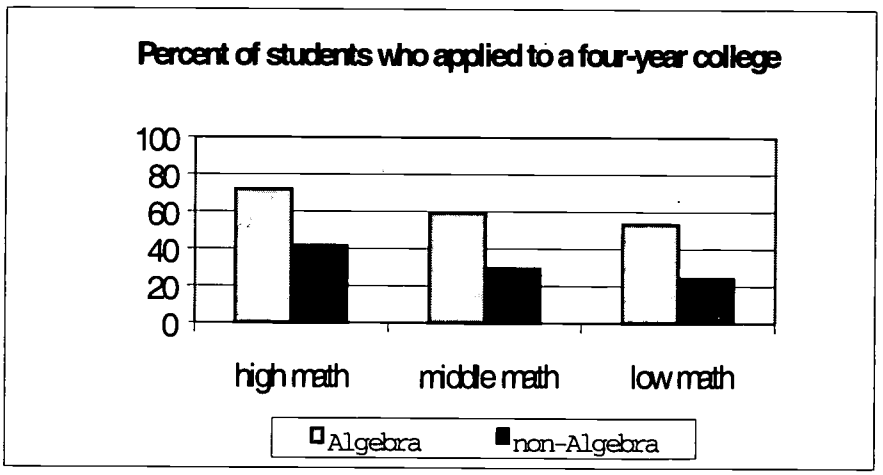
Figure 1.—Percentage of 1992 high school graduates who completed high level* mathematics and foreign language courses, by enrollment status in algebra and/or foreign language as eighth-graders



*High level math refers to trigonometry, algebra 3, statistics, calculus, probability and/or analytical geometry. High level foreign language indicates that the student completed at least .5 Carnegie unit of 12th-grade language.

SOURCE: National Education Longitudinal Study of 1988 (NELS: 88).

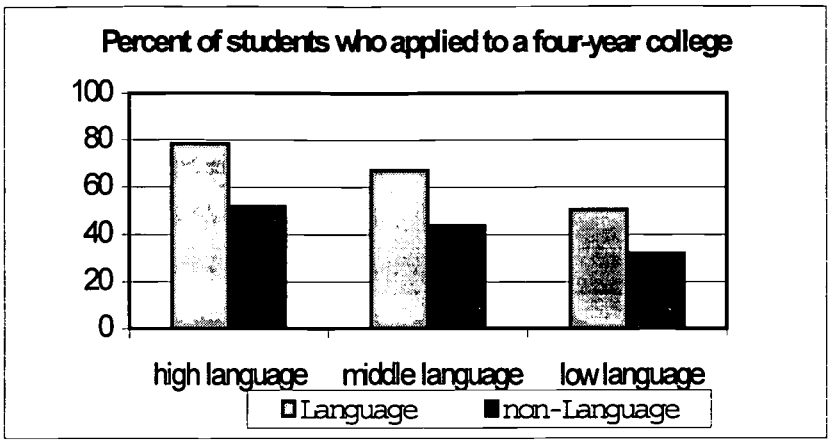
Figure 2a.—Percentage of 1992 high school graduates who applied to a four-year college, by enrollment in eighth-grade algebra and highest level* of high school math completed



*High level math refers to trigonometry, algebra 3, statistics, calculus, probability, and analytical geometry.
Middle level math refers to algebra 1 and geometry.
Low level math refers to pre-algebra and informal geometry.

SOURCE: National Education Longitudinal Study of 1988 (NELS: 88).

Figure 2b. —Percentage of 1992 high school graduates who applied to a four-year college, by enrollment in eighth grade foreign language and highest level* of high school foreign language completed



*High level foreign language indicates student completed at least .5 Carnegie unit of 12th –grade language.
Middle level foreign language indicates student completed at least .5 Carnegie unit of 10th-grade language.
Low level foreign language indicates less than .5 Carnegie unit of 10th –grade language.

SOURCE: National Education Longitudinal Study of 1988 (NELS: 88).

Table 1.—Percentage of 1992 high school graduates at each level[1] on the math and foreign language pipelines, by selected characteristics

	Math			Foreign Language		
	low	middle	high	low	middle	high
Total	22.6	46.1	31.3	27.9	58.4	13.7
Gender						
Male	24.4	44.6	31.0	32.0	56.5	11.4
Female	20.9	47.6	31.6	24.2	60.0	15.8
Race/ethnicity						
Asian	11.7	39.5	48.9	12.6	61.4	26.0
Hispanic	28.6	49.2	22.2	35.0	51.4	13.8
Black, non-Hispanic	32.2	48.1	19.8	38.6	55.9	5.6
White, non-Hispanic	20.2	45.5	34.3	26.0	59.4	14.5
Socioeconomic status[2]						
Low	44.2	45.2	10.6	48.5	43.9	7.6
Middle	20.9	50.9	28.2	30.4	59.7	10.0
High	6.8	37.5	55.7	14.2	63.3	22.6
Enrolled in algebra as 8th-grader						
Yes	18.8	43.9	37.3	31.8	61.6	6.7
No	23.7	47.2	29.1	39.1	50.6	10.4
Enrolled in a language as 8th-grader						
Yes	22.7	50.8	26.5	18.6	56.2	25.2
No	23.4	60.1	16.6	30.6	59.8	9.6
Males who enrolled in algebra as 8th-grader						
Yes	11.3	41.7	47.1	20.0	62.8	17.2
No	14.7	50.0	35.3	30.0	60.7	9.4
Males who enrolled in a language as 8th-grader						
Yes	8.5	40.4	51.2	17.0	57.6	25.5
No	14.9	49.2	35.9	29.6	62.5	7.9
Females who enrolled in algebra as 8th-grader						
Yes	8.1	46.6	45.3	15.8	62.0	22.1
No	11.0	51.7	37.3	21.3	64.2	14.5
Females who enrolled in a language as 8th-grader						
Yes	8.1	42.4	49.5	10.4	59.5	30.2
No	10.6	53.4	36.0	22.1	65.4	12.6

[1]High level's are: math (trigonometry, algebra 3, calculus, statistics, probability, etc.), foreign language (completed at least .5 Carnegie unit of 12th-grade language). Middle level's are: math (algebra 1 or geometry), foreign language (completed at least .5 Carnegie unit of 10th-grade language).

[2]SES (F2SES1Q)— low (quartile 1), middle (quartiles 2 & 3), high (quartile 4).

SOURCE: National Education Longitudinal Study of 1988 (NELS: 88).

Table 1.—Percentage of 1992 high school graduates at each level[1] on the math and foreign language pipelines, by selected characteristics—continued

	Math			Foreign Language		
	low	middle	high	low	middle	high
Low level SES[2] students who enrolled in algebra as 8th-graders						
Yes	11.3	41.7	47.1	20.0	62.8	17.2
No	14.7	50.0	35.3	30.0	60.7	9.4
Middle level SES students who enrolled in algebra as 8th-graders						
Yes	11.2	49.5	39.3	20.3	67.0	12.7
No	12.3	55.4	32.3	28.3	62.2	9.4
High level SES students who enrolled in algebra as 8th-graders						
Yes	2.3	30.7	67.0	9.9	59.4	30.8
No	5.5	38.2	56.3	14.7	67.2	18.1
Low level SES students who enrolled in a language as 8th-graders						
Yes	8.5	40.4	51.1	17.0	57.6	25.5
No	14.9	49.2	35.9	29.6	62.5	7.9
Middle level SES students who enrolled in a language as 8th-graders						
Yes	10.3	53.4	36.3	18.4	64.7	17.0
No	12.4	53.2	34.4	27.3	63.8	9.0
High level SES students who enrolled in a language as 8th-graders						
Yes	2.8	25.1	72.1	6.0	54.0	40.0
No	4.9	41.8	53.3	16.0	69.5	14.5

[1]High level's are: math (trigonometry, algebra 3, calculus, statistics, probability, etc.), foreign language (completed at least .5 Carnegie unit of 12th-grade language). Middle level's are: math (algebra 1 or geometry), foreign language (completed at least .5 Carnegie unit of 10th-grade language).

[2]SES (F2SES1Q)— low (quartile 1), middle (quartiles 2 & 3), high (quartile 4).

SOURCE: National Education Longitudinal Study of 1988 (NELS: 88).

Table 1A.—Standard errors for 1992 high school graduates at each level[1] on the math and foreign language pipelines, by selected characteristics

	Math			Foreign Language		
	low	middle	high	low	middle	high
Total	0.86	0.95	0.97	1.10	1.14	0.91
Gender						
Male	1.21	1.38	1.38	1.79	1.78	1.42
Female	0.99	1.18	1.10	1.08	1.30	1.07
Race/ethnicity						
Asian	1.92	3.35	3.69	1.73	3.36	3.18
Hispanic	2.36	2.52	2.58	2.83	3.33	3.31
Black, non-Hispanic	2.62	2.67	2.34	3.73	3.72	1.40
White, non-Hispanic	0.97	1.12	1.17	1.26	1.33	1.09
Socioeconomic status[2]						
Low	2.00	1.87	0.91	2.22	2.08	1.41
Middle	0.85	1.15	1.05	1.39	1.44	0.82
High	1.41	2.01	2.12	1.54	2.06	1.91
Enrolled in algebra as 8th-grader						
Yes	1.05	1.58	1.69	3.08	3.32	1.47
No	1.18	1.22	1.14	3.27	3.25	2.53
Enrolled in language as 8th-grader						
Yes	3.52	3.65	3.18	1.53	2.32	2.38
No	1.60	2.17	1.55	1.35	1.39	0.83
Males who enrolled in algebra as 8th-graders						
Yes	1.36	2.93	3.06	2.24	3.46	3.63
No	1.65	2.05	1.96	2.60	2.49	0.98
Males who enrolled in a language as 8th-graders						
Yes	1.17	4.13	4.23	2.40	4.34	4.67
No	1.36	1.74	1.67	2.28	2.23	.76
Females who enrolled in algebra as 8th-graders						
Yes	.79	1.77	1.82	1.19	2.10	1.87
No	.84	1.54	1.52	1.33	1.59	1.18
Females who enrolled in a language as 8th-graders						
Yes	1.42	2.09	2.13	1.09	2.25	2.24
No	.74	1.52	1.44	1.21	1.57	1.18

[1]High level's are: math (trigonometry, algebra 3, calculus, statistics, probability, etc.), foreign language (completed at least .5 Carnegie unit of 12th-grade language). Middle level's are: math (algebra 1 or geometry), foreign language (completed at .5 Carnegie unit of 10th-grade language).
[2]SES (F2SES1Q)—low (quartile 1), middle (quartiles 2 & 3), high (quartile 4).

SOURCE: National Education Longitudinal Study of 1988 (NELS: 88).

Table 1A.—Standard errors for 1992 high school graduates at each level[1] on the math and foreign language pipelines, by selected characteristics—continued

	Math			Foreign Language		
	low	middle	high	low	middle	high
Low level SES[2] students who enrolled in algebra as 8th-graders						
Yes	1.36	2.93	3.06	2.24	3.46	3.63
No	1.65	2.05	1.96	2.60	2.49	.99
Middle level SES students who enrolled in algebra as 8th-graders						
Yes	1.29	2.48	2.33	1.87	2.48	1.87
No	.83	1.62	1.52	1.96	1.95	.87
High level SES students who enrolled in algebra as 8th-graders						
Yes	.60	2.68	2.82	1.65	3.11	3.51
No	2.77	2.78	2.99	2.95	2.79	1.61
Low level SES students who enrolled in language as 8th-graders						
Yes	1.16	4.13	4.23	2.39	4.34	4.67
No	1.36	1.74	1.67	2.27	2.23	.76
Middle level SES students who enrolled in language as 8th-graders						
Yes	1.25	3.27	2.94	2.08	3.25	2.21
No	.82	1.48	1.42	1.65	1.65	.99
High level SES students who enrolled in language as 8th-graders						
Yes	1.36	2.51	2.82	1.42	3.66	3.97
No	2.19	2.86	2.82	2.45	2.57	1.35

[1]High level's are: math (trigonometry, algebra 3, calculus, statistics, probability, etc.), foreign language (completed at least .5 Carnegie unit of 12th-grade language). Middle level's are: math (algebra 1 or geometry), foreign language (completed at least .5 Carnegie unit of 10th-grade language).

[2]SES (F2SES1Q)—low (quartile 1), middle (quartile 2 & 3), high (quartile 4).

SOURCE: National Education Longitudinal Study of 1988 (NELS: 88).

Table 2.—Percentage of 1992 high school graduates who applied to a four-year college, by levels reached on the math and foreign language pipelines and enrollment in eighth grade foreign language or algebra

	Applied to 4-year College	
	No	Yes
Enrolled in 8th-grade algebra		
Math[1]		
Low	46.6	53.4
Middle	40.7	59.3
High	27.9	72.1
Did not enroll in 8th-grade algebra		
Math		
Low	75.7	24.3
Middle	70.7	29.3
High	58.4	41.6
Enrolled in 8th-grade language		
Foreign Language[2]		
Low	49.6	50.4
Middle	32.8	67.2
High	21.5	78.5
Did not enroll in 8th-grade language		
Foreign Language		
Low	68.1	31.9
Middle	56.3	43.7
High	48.1	51.9
Enrolled in 8th-grade language & algebra	22.0	78.0
Enrolled in 8th-grade alg. but not lang. OR Enrolled in 8th-grade lang. but not alg.	44.3	55.7
Did not in enroll 8th-grade language or alg.	70.6	29.4

[1]Math level's are: high (algebra 3, trigonometry, analytical geometry, probability, statistics, introduction to analysis, and calculus).
middle (algebra 1 and geometry).
low (pre-algebra and informal geometry).

[2]Foreign language level's are: high (completed at least .5 Carnegie unit of 12th-grade language) middle (completed at least .5 Carnegie unit of 10th-grade language).
low (less than .5 Carnegie unit of 10th –grade language).

SOURCE: National Education Longitudinal Study of 1988 (NELS: 88).

Table 2A.—Standard errors for 1992 high school graduates who applied to a four-year college, by levels reached on the math and foreign language pipelines and enrollment in eighth grade foreign language or algebra

	Applied to 4-year College	
	No	Yes
Enrolled in 8th-grade algebra		
Math[1]		
Low	4.09	4.09
Middle	2.36	2.36
High	2.16	2.16
Did not enroll in 8th-grade algebra		
Math		
Low	2.50	2.50
Middle	1.46	1.46
High	1.93	1.93
Enrolled in 8th-grade language		
Foreign Language[2]		
Low	4.17	4.17
Middle	2.44	2.44
High	3.37	3.37
Did not enroll in 8th-grade language		
Foreign Language		
Low	2.09	2.09
Middle	1.58	1.58
High	2.94	2.94
Enrolled in 8th-grade language & algebra	2.31	2.31
Enrolled in 8th-grade alg. but not lang. OR Enrolled in 8th-grade lang. but not alg.	1.37	1.37
Did not enroll in 8th-grade language nor alg.	1.19	1.19

[1] math level's are: high (algebra 3, trigonometry, analytical geometry, probability, statistics, introduction to analysis, and calculus). middle (algebra 1, geometry--plane, geometry—plane-solid, unified 1, unified 2). low (no math, general 1, general 2, basic 1, 2, 3, consumer, technical, vocational, pre-algebra, algebra 1 p1. , p2, & informal geometry).

[2] foreign language level's are: high (completed at least .5 Carnegie unit of 12th-grade language and 1 Carnegie unit of Advanced Placement language) middle (completed at least .5 Carnegie unit of 10th-grade language and up to 1 Carnegie unit of 11th-grade language) low (less than .5 Carnegie unit of 10th-grade language).

SOURCE: National Education Longitudinal Study of 1988 (NELS: 88).

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