Making Connections

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Advanced course enrollment and performance among English learner students in Washington state

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Key findings

This study describes patterns in advanced coursetaking among four groups of high school students in Washington state: current English learner students, monitored English learner students (reclassified as English proficient within the previous two school years), former English learner students (reclassified more than two school years ago), and never–English learner students. The study finds that students' academic preparation accounts for much of the difference in advanced course enrollment and performance:

- Current, monitored, and former English learner students take 0.5–1 fewer advanced courses per school year than never–English learner students do. However, students who are similarly prepared take advanced courses at a similar rate.
- Current, monitored, and former English learner students are 40–50 percent less likely to complete algebra I in middle school than never–English learner students are, and students who pass algebra I in middle school take more than twice as many math courses beyond algebra II as students who pass in grade 9 do.
- The grades that current, monitored, and former English learner students earn in advanced courses are similar to those that never–English learner students earn in those courses after students' prior academic performance is taken into account.
- Schools with the lowest percentages of students who have ever been classified as English learner students offer more advanced courses than other schools do—even after school characteristics, such as average standardized test scores in math and reading, are taken into account.

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Summary

Advanced high school courses (for example, honors, Advanced Placement, and dual-credit courses that offer the opportunity to earn college credits in high school) help prepare students for postsecondary education and careers. Students who take advanced courses are more likely to enroll and persist in college. However, the number and variety of advanced courses offered—and the requirements students must meet to take them—differ greatly across schools and districts.

English learner students face unique obstacles to taking advanced courses. They divide their time between acquiring English proficiency and learning academic content. Additionally, English learner students who move to the United States in middle or high school may have problems transferring credits. This can lead to their retaking courses that they have already completed in their country of origin. Because the English learner student population is growing rapidly, both in Washington state and across the country, it is important to provide every opportunity for these students to graduate from high school ready for college and careers. Ensuring that they are prepared for and have the option to take advanced courses in high school is critical to this effort.

This study describes patterns in advanced coursetaking in high school among four groups of students in Washington state: current English learner students, monitored English learner students (reclassified as English proficient within the previous two school years), former English learner students (reclassified as English proficient three or more years ago), and never–English learner students. The study finds that students' academic preparation accounts for much of the difference in advanced course enrollment and performance between current, monitored, and former English learner students and never–English learner students. Specifically, the results show:

- Current, monitored, and former English learner students take 0.5–1 fewer advanced courses per school year than never–English learner students do. However, students who are similarly prepared take advanced courses at a similar rate.
- Current, monitored, and former English learner students are 40–50 percent less likely to complete algebra I in middle school than never–English learner students are, and students who pass algebra I in middle school take more than twice as many math courses beyond algebra II as students who pass algebra I in grade 9 do.
- The grades that current, monitored, and former English learner students earn in advanced courses are similar to those that never–English learner students earn in those courses after students' prior academic performance is taken into account.
- Schools with the lowest percentages of students who have ever been classified as English learner students offer more advanced courses than other schools do—even after school characteristics, such as average standardized test scores in math and reading, are taken into account.

The study findings may help state, district, and school decisionmakers develop policies or strategies that increase English learner students' enrollment in advanced courses.

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Why this study?

Rigorous coursework in high school is important for postsecondary success. Research suggests that students who participate in advanced coursework tend to be better prepared for college than peers who do not are (Attewell & Domina, 2008; Barnard-Brak, McGaha-Garnett, & Burley, 2011; Long, Conger, & Iatarola, 2012; Roderick & Stoker, 2010). Access to challenging academic content can be important for English learner students, as it may improve both English language acquisition and content mastery (Quinn, Lee, & Valdés, 2012; Roessingh, 2004). However, not all students have access to upper level courses (such as physics, calculus, and honors classes) or to Advanced Placement and dual-credit courses that offer the opportunity to earn college credit in high school. Specifically, the schools that racial/ethnic minority, low-income, and English learner students attend generally offer fewer advanced courses than other schools do (Barnard-Brak et al., 2011; Iatarola, Conger, & Long, 2011). Alternatively, racial/ethnic minority, low-income, and English learner students may not enroll in advanced courses when they are offered (Achieve, 2013).

The study explores possible factors that explain different outcomes for current, monitored, former, and never–English learner students, such as academic readiness for advanced content and the number of advanced courses offered at students' schools

English learner students face multiple obstacles to taking advanced courses. They divide their time between acquiring English proficiency and learning academic content, creating a challenge for them to keep pace with native English-speaking students (Estrada, 2015; Short & Boyson, 2012). Students in English as a Second Language courses in high school are less likely to enroll in college preparatory coursework than are students who are not in such courses (Callahan, Wilkinson, & Muller, 2010; Umansky et al., 2015). Even if English learner students demonstrate academic readiness, their status as English learners may limit their access to accelerated and advanced coursetaking through "tracking" policies and practices at their schools (Umansky, 2015). This is especially relevant for math. Because taking advanced math courses typically requires students to complete a sequence of prerequisite courses (such as algebra I, geometry, and algebra II), students who complete the required course sequence earlier will have more time to take advanced courses. Additional barriers may include high mobility rates and difficulty transferring credits earned elsewhere in the United States or abroad (Martinez-Wenzl, 2014).

Washington state has seen substantial growth in the number of students classified as English learner students. From 2002/03 to 2012/13 the English learner student population increased by about a third, from 70,000 to 94,000 students (U.S. Department of Education, n.d.). In an effort to better serve those students, the Washington Office of Superintendent of Public Instruction collaborated with Regional Educational Laboratory Northwest to examine how current, monitored, and former English learner students' enrollment and performance in advanced courses compared with that of never–English learner students (see box 1 for definitions of key terms used in the report). The study explores possible factors that explain different outcomes for current, monitored, former, and never–English learner students, such as academic readiness for advanced content and the number of advanced courses offered at students' schools. The findings may help Washington state education policymakers align resources to address disparities and launch further inquiry into how to prepare students who are or once were English learner students for postsecondary education and careers.

What the study examined

The study compares advanced course enrollment and performance among four groups: current English learner students, monitored English learner students, former English learner students, and never–English learner students.

The study examines five questions:

1. How many advanced courses do current, monitored, and former English learner students and never–English learner students in Washington state take per school year?

2. How does advanced course enrollment vary among current, monitored, and former English learner students and never–English learner students in Washington state and within schools?

3. In what grade do current, monitored, and former English learner students and never–English learner students pass algebra I, what percentage of students take math courses beyond algebra II, and how many do they take by the end of high school?

4. How do the grades earned in advanced courses compare between current, monitored, and former English learner students and never–English learner students?

5. How does the number of advanced courses offered vary between schools that have a large percentage of students who were ever identified as English learner students and schools with a small percentage of those students?

Descriptive and regression analyses are used to examine outcomes for students attending Washington state high schools between 2009/10 and 2012/13

This study uses descriptive and regression analyses to examine outcomes for students attending Washington state high schools between 2009/10 and 2012/13. The study's data and analysis are summarized in box 2, with details in appendix A.

Box 1. Key terms

Advanced courses. Advanced Placement, International Baccalaureate, honors-level, Cambridge Program, and dual-enrollment courses (those in which students receive both high school and college credit), as well as courses that exceed graduation requirements in math, science, and world languages, such as multivariate calculus and inorganic chemistry. A student was enrolled in an advanced course if that course was present on the student's transcript. If a student withdrew from an advanced course before the first grading period, that student was not considered enrolled in the course. See appendix A for additional details on how advanced courses were identified.

Current English learner students. Students who are currently classified as English learner students and receive English learner services in the current school year.

Former English learner students. Students who were previously classified as English learner students but were reclassified as English proficient more than two school years ago.

(continued)

Box 1. Key terms *(continued)*

Monitored English learner students. Students who were previously classified as English learner students but were reclassified as English proficient within the previous two school years.

Never–English learner students. Students who never qualified for English learner services.

Reclassified as English proficient. Washington state's only criterion for reclassifying students as English proficient is achieving level 4 (transitional) on the state's English proficiency exam, which is given to students who receive English language development services annually to measure their growth in English language knowledge and skills. Unlike other states, such as California, students are not required to meet proficiency on state standardized content tests before being reclassified as English proficient. During the study period students took either the Washington Language Proficiency Test II (2004/05–2011/12) or the Washington English Language Proficiency Assessment (2012/13).

Supplemental courses. Courses that provide students with guided support and tutoring to improve their success within targeted historically difficult courses. Examples include algebra support classes and writing labs.

Transitional courses. Courses designed for students with an individualized education program or for remedial high school education. Examples include reading improvement courses and basic math courses.

Box 2. Data and methods

Data. The Washington Office of Superintendent of Public Instruction provided data on students who were enrolled in Washington state public high schools between 2009/10 and 2012/13. The data included students' school and district enrollment, withdrawal date and reason, gender, race/ethnicity, grade level, English learner status, special education status, standardized test scores in math and reading, and course transcripts.

In addition, U.S. Census data were incorporated into the Washington Office of Superintendent of Public Instruction data to determine "neighborhood" socioeconomic indicators, such as the percentage of people living under the poverty line in a student's zip code. Finally, schools were matched to the National Center for Education Statistics Common Core of Data (U.S. Department of Education, n.d.) to obtain locale codes (for example, city, suburban, town, and rural schools), the percentage of students in the school who qualified for free or reduced-price lunch, and the number of full-time equivalent educators.

The full study sample of students includes 66,175 current English learner students, 14,954 monitored English learner students, 31,357 former English learner students, and 1,008,584 never–English learner students. Research questions 1–4 include data for general education students only, and thus the analysis for those questions excludes approximately 69,000 students who at any time qualified for special education services.

Methods. The study reports descriptive statistics about patterns in advanced course enrollment and performance for current, monitored, and former English learner students and never–English learner students. The analysis features regression models that estimate the difference in advanced course enrollment, advanced course grade point average, and enrollment in and completion of math courses beyond algebra II among those groups. Regression analysis also is used in this study to estimate the difference in the number of advanced courses offered within schools that serve varying proportions of English learner students.

What the study found

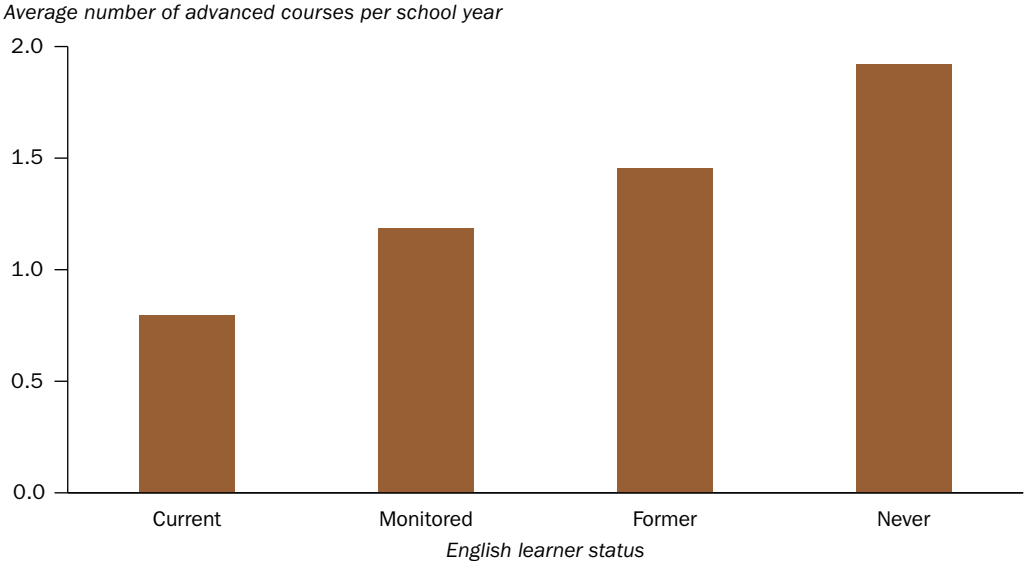
This section presents the key findings on the patterns of advanced course enrollment and performance for current, monitored, and former English learner students and never–English learner students. It also describes how much prior academic performance, as measured by grade point average and standardized test scores in math and reading, accounts for differences among the groups.

Current, monitored, and former English learner students take 0.5–1 fewer advanced courses per school year than never–English learner students do

On average, current English learner students take about one advanced course per school year —half as many as never–English learner students take (figure 1). Former English learner students take 0.5 fewer advanced course per school year than never–English learner students do.

The proportion of students who take at least one advanced course in a given school year is lower among current, monitored, and former English learner students than among never–English learner students (figure 2). Twenty-six percent of current English learner students take at least one advanced course, compared with 48 percent of never–English learner students. The percentage of students who take at least one advanced course per school year

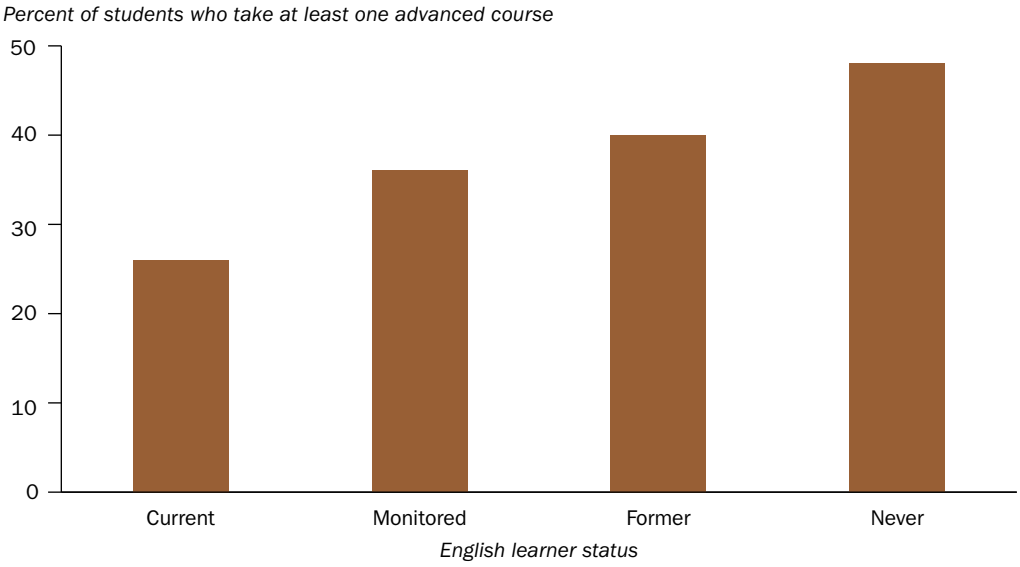
Figure 1. English learner students in Washington state high schools take fewer advanced courses per school year than never–English learner students do, 2009/10–2012/13



Note: Current English learner students are currently classified as English learner students and receive English learner services in the current school year. Monitored English learner students are students who were previously classified as English learner students but were reclassified as English proficient within the previous two school years. Former English learner students are students who were previously classified as English learner students but were reclassified as English proficient more than two school years ago. Never–English learner students are students who never qualified for English learner services. Values are unadjusted and do not account for differences across schools or in students' prior academic performance, such as grade point average and standardized test scores in math and reading.

Source: Authors' analysis based on Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

Figure 2. The proportion of students in Washington state high schools who take at least one advanced course in a given school year is lower among English learner students than among never–English learner students, 2009/10–2012/13



Twenty-six percent of current English learner students take at least one advanced course, compared with 48 percent of never–English learner students

Note: Current English learner students are currently classified as English learner students and receive English learner services in the current school year. Monitored English learner students are students who were previously classified as English learner students but were reclassified as English proficient within the previous two school years. Former English learner students are students who were previously classified as English learner students but were reclassified as English proficient more than two school years ago. Never–English learner students are students who never qualified for English learner services. Values are unadjusted and do not account for differences across schools or in students' prior academic performance, such as grade point average and standardized test scores in math and reading.

Source: Authors' analysis based on Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

is also lower among monitored English learner students (36 percent) and former English learner students (41 percent) than among never–English learner students. Differences in the proportion of students taking an advanced course vary by content area—they are largest in English and math and smallest in world languages and electives, including fine and performing arts (see table B1 in appendix B).

The characteristics of students who take advanced courses differ from those of students who do not. Within groups of current, monitored, and former English learner students and never-English learner students, students who take advanced courses are more likely to be Asian and less likely to be Hispanic than students in the same English learner group who do not take an advanced course. Further, the likelihood of living in a neighborhood with low poverty rates is higher among students who take advanced courses than among students who do not. Students who take advanced courses also have higher grade point averages and standardized test scores in math and reading from the previous school year (see table B2 in appendix B).

When students are similarly prepared to take advanced courses, they take those courses at a similar rate

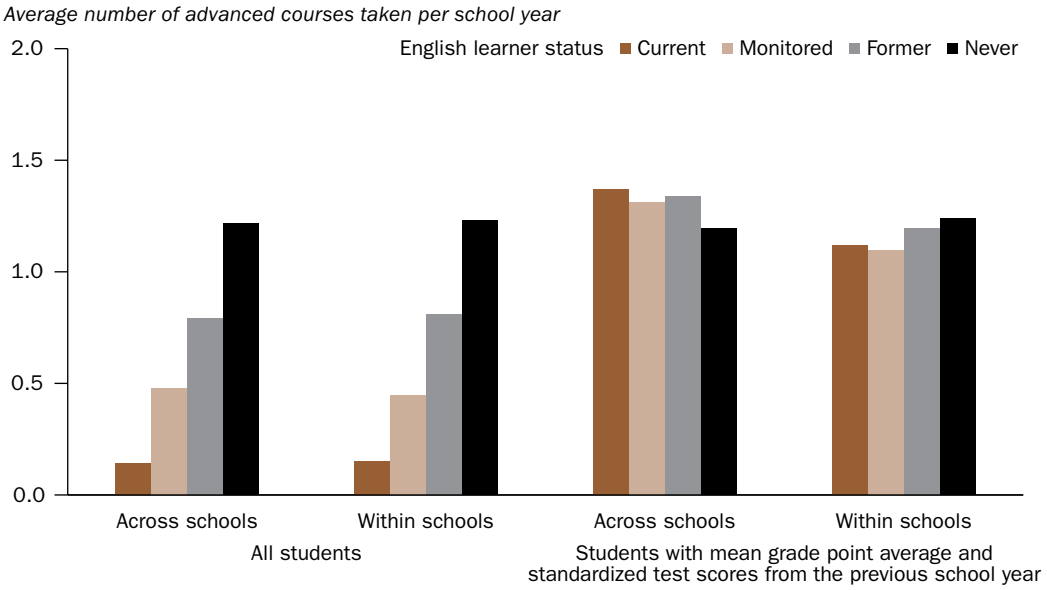
Enrollment in advanced courses depends heavily on students' academic preparation. If academic preparation is not considered, the differences in advanced course enrollment discussed above persist when all students within the same grade level and school year, both

across Washington state and among students who attend the same school, are compared, as shown in the first two sets of bars in figure 3.

When students are more equally prepared for advanced courses, as measured by their grade point average and standardized test scores in math and reading from the previous school year, the gaps close (see the third and fourth sets of bars in figure 3).[1] In fact, across all schools in Washington state, current, monitored, and former English learner students take slightly more advanced courses than never–English learner students with similar prior academic performance do.

Figure 3. Overall, current, monitored, and former English learner students in Washington state high schools take fewer advanced courses per school year than never–English learner students do, but students with the same grade point average and standardized test scores take a similar number of advanced courses, 2009/10–2012/13

When students are more equally prepared for advanced courses the gaps in advanced course enrollment between current, monitored, and former English learner students and never–English learner students close



Note: Current English learner students are currently classified as English learner students and receive English learner services in the current school year. Monitored English learner students are students who were previously classified as English learner students but were reclassified as English proficient within the previous two school years. Former English learner students are students who were previously classified as English learner students but were reclassified as English proficient more than two school years ago. Never–English learner students are students who never qualified for English learner services. The sample is restricted to Washington state high school students from 2010/11 to 2012/13 who had a grade point average from the previous school year (that is, 2009/10–2011/12). Values are calculated based on coefficients from four regression models (see appendix A). The first model, all students—across schools, modeled the number of advanced courses taken per year on students' English learner category (current, monitored, or former, relative to never–English learner students) and interaction terms to control for the school year and students' grade levels. The second model, all students—within schools, adds school fixed effects to the first model. The third model, students with mean grade point average and standardized test scores from the previous school year—across schools, adds controls for grade point average and standardized test scores in math and reading from the previous school year to the first model. The fourth model, students with mean grade point average and standardized test scores in the previous school year—within schools, adds school fixed effects to the third model. Regression-adjusted results shown are based on coefficients for students in grade 9 in 2009/10. Full results are presented in table B3 in appendix B. Standardized test scores in math and reading were standardized across all students in the state in the same grade level who took the same test in the same school year to have a mean of 0 and a standard deviation of 1. For this analysis the sample mean grade point average in the previous school year is 2.54, the sample mean standardized test score in math is 0.16, and the sample mean standardized test score in reading is 0.15.

Source: Authors' analysis based on Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

However, statewide comparisons do not account for differences between schools that English learner students and never–English learner students attend. For example, English learner students are more likely than never–English learner students to attend urban schools, which offer more advanced courses than rural schools do (see table B7 in appendix B). It is thus important to examine how enrollment in advanced courses differs between English learner student groups and never–English learner students at the same school. Among students with similar academic preparation, current, monitored, and former English learner students take slightly fewer advanced courses than never–English learner students at the same school do (see the fourth set of bars in figure 3). Nevertheless, differences in prior academic performance explain most of the differences between English learner student groups and never–English learner students—both within and across Washington state schools.

Higher percentages of current, monitored, and former English learner students than of never–English learner students take supplemental courses, such as algebra support classes or writing labs

The finding that gaps in enrollment in advanced courses disappear after grade point average and standardized test scores from the previous school year are taken into account is consistent with other evidence that students have unequal academic preparation for advanced courses. Specifically, current, monitored, and former English learner students have lower grade point averages and standardized test scores in math and reading, on average, than never–English learner students do (see figures B1, B2, and B3 in appendix B).

In addition, the types of courses English learner students and never–English learner students take show some differences in rigor. Higher percentages of current, monitored, and former English learner students than of never–English learner students take supplemental courses, such as algebra support classes or writing labs (table 1). Current, monitored, and former English learner students also take transitional courses, such as reading improvement and basic math courses, at higher rates than never–English learner students do. This finding holds true for students who have a grade point average or standardized test scores in math that is at or above the averages for never–English learner students who take at least one advanced course (3.0 grade point average, math test scores of 0.5 standard deviation above the mean).[2]

Standardized test scores reveal additional evidence of differences in course rigor. Even when comparing only students who have a grade point average of 3.0 or higher, the average standardized test scores of current, monitored, and former English learner students are still 0.39–0.56 standard deviation lower in math and 0.38–0.96 standard deviation lower in reading than those of never–English learner students (see table 1). Although current, monitored, and former English learner students with a 3.0 grade point average or higher are earning high grades in their courses, they are not demonstrating the same mastery of reading and math on standardized tests that never–English learner students are.

Further, among students with standardized test scores in math that are at least 0.5 standard deviation above the mean (that is, higher than at least 69 percent of other students who took the same test), current, monitored, and former English learner students have lower average standardized test scores in reading than do never–English learner students (see table 1). This coincides with their advanced course enrollment rates, which are 7–18 percentage points lower than those of never–English learner students. However, when high-math-achieving students also have standardized test scores in reading at or above the mean (that is, higher than at least 50 percent of other students who took the same test), the gaps in rates of enrollment in advanced courses between English learner student groups and never–English learner students shrink to 5 percentage points (see table 1).

Table 1. Differences in academic preparation and types of courses taken in grades 9–12 in Washington state, by English learner status, 2009/10–2012/13

Academic characteristic	English learner status			
	Current	Monitored	Former	Never
All students				
Average grade point average	2.12	2.24	2.35	2.57
Average standardized test score in math	–0.55	–0.38	–0.17	0.23
Average standardized test score in reading	–0.88	–0.56	–0.16	0.22
Percentage who take one or more supplemental courses	15	12	10	7
Percentage who take one or more transitional courses	19	13	9	5
Percentage who take one or more advanced courses	26	36	41	48
Students with a grade point average of 3.0 or higher[a]				
Percentage of sample meeting this criterion	24.0	27.3	30.3	41.5
Average grade point average	3.45	3.48	3.48	3.52
Average standardized test score in math	0.14	0.20	0.31	0.70
Average standardized test score in reading	–0.35	–0.17	0.23	0.61
Percentage who take one or more supplemental courses	11	6	5	3
Percentage who take one or more transitional courses	11	6	3	1
Percentage who take one or more advanced courses	42	56	60	66
Students with standardized test scores in math of 0.5 or more standard deviation above the mean[a]				
Percentage of sample meeting this criterion	13.0	15.8	19.6	34.6
Average grade point average	2.99	3.03	3.02	3.12
Average standardized test score in math	1.20	1.19	1.10	1.19
Average standardized test score in reading	–0.12	–0.02	0.32	0.68
Percentage who take one or more supplemental courses	8	5	5	3
Percentage who take one or more transitional courses	8	4	3	1
Percentage who take one or more advanced courses	51	60	62	69
Percentage who take one or more advanced courses among students who also have a standardized test score in reading that is 0 or more standard deviation above the mean	68	68	68	73

Note: Current English learner students are currently classified as English learner students and receive English learner services in the current school year. Monitored English learner students are students who were previously classified as English learner students but were reclassified as English proficient within the previous two school years. Former English learner students are students who were previously classified as English learner students but were reclassified as English proficient more than two school years ago. Never–English learner students are students who never qualified for English learner services. Percentages and averages are unadjusted and do not account for differences across schools or in students' prior academic performance, such as grade point average and standardized test scores. Standardized test scores are standardized for all students who took the test in the same grade level and school year across the state to have a mean of 0 and a standard deviation of 1. Less than 5 percent of current and monitored English learner students scored 0.5 or more standard deviation above the mean on standardized tests in reading, so that analysis is not shown.

a. Never–English learner students who took an advanced course had, on average, a 3.0 grade point average and a standardized test score in math that was 0.5 standard deviation above the mean.

Source: Authors' analysis based on Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

Current, monitored, and former English learner students are 40–50 percent less likely to complete algebra I in middle school than never–English learner students are, and students who pass algebra I in middle school take more than twice as many math courses beyond algebra II as students who pass algebra I in grade 9 do

The ability to take advanced courses often depends on completion of prerequisite courses. This is especially true in math, in which students generally must pass algebra I, geometry, and algebra II before taking advanced and college-preparatory courses, such as trigonometry, statistics, and calculus. Students who move quickly through the progression can fit

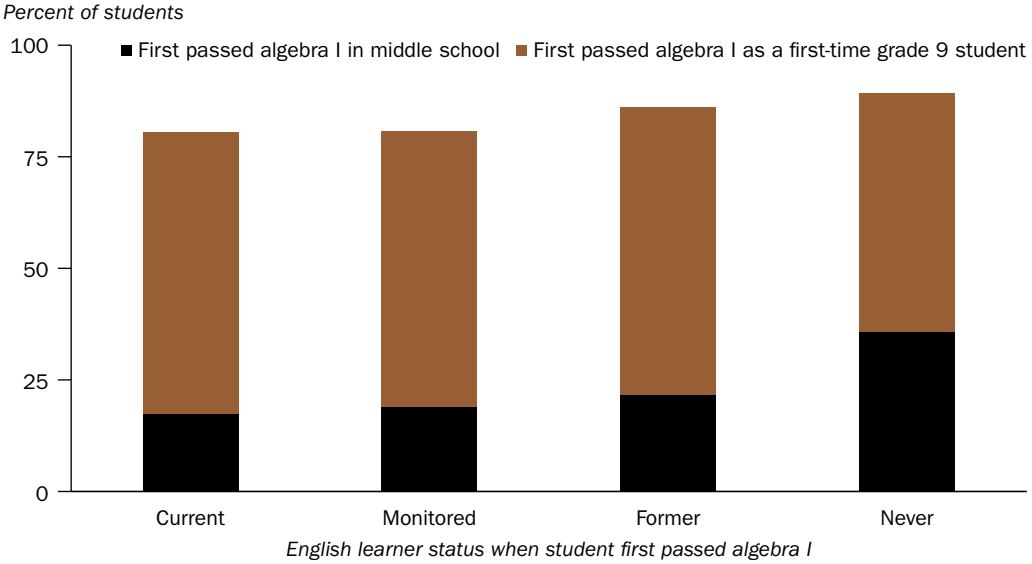
more courses beyond algebra II into their schedule. In Washington state never–English learner students take an average of about 1.5 math courses beyond algebra II, while current, monitored, and former English learner students take an average of 1 math course beyond algebra II. This disparity could be related to when students in each group pass algebra I.

Among Washington state students who attend four years of high school, 80–90 percent pass algebra I in or before grade 9 (figure 4). However, a lower percentage of current, monitored, and former English learner students than of never–English learner students take and pass algebra I in middle school. This means that a lower percentage of English learner students than of never–English learner students could take math courses beyond algebra II by the end of high school.

Further analysis shows that passing algebra I in middle school is important in determining how many math courses beyond algebra II a student takes by the end of high school. Regardless of English learner status, less than 40 percent of students who pass algebra I as a first-time grade 9 student take at least one math course beyond algebra II (figure 5). In contrast, 64 percent of current and monitored English learner students, 70 percent of former English learner students, and 81 percent of never–English learner students who pass algebra I in middle school take at least one math course beyond algebra II.

Among Washington state students who attend four years of high school, 80–90 percent pass algebra I in or before grade 9 (figure 4). However, a lower percentage of current, monitored, and former English learner students than of never–English learner students take and pass algebra I in middle school

Figure 4. A lower percentage of English learner students than of never–English learner students in Washington state high schools pass algebra I in middle school, 2009/10–2012/13

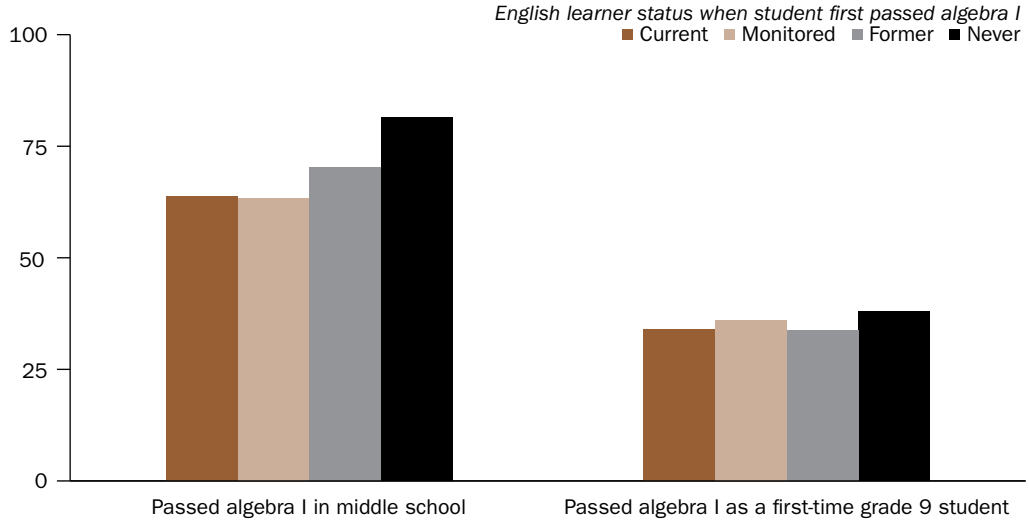


Note: Current English learner students are currently classified as English learner students and receive English learner services in the current school year. Monitored English learner students are students who were previously classified as English learner students but were reclassified as English proficient within the previous two school years. Former English learner students are students who were previously classified as English learner students but were reclassified as English proficient more than two school years ago. Never–English learner students are students who never qualified for English learner services. Sample includes students who began grade 9 in 2009/10 and attended high school for four years. Percentages are unadjusted and do not account for differences across schools or in students' prior academic performance, such as grade point average and standardized test scores.

Source: Authors' analysis based on Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

Figure 5. The percentage of Washington state students who take at least one math course beyond algebra II by the end of high school is higher among students who pass algebra I in middle school than among students who pass as first-time grade 9 students, 2009/10–2012/13

Percent of students who took at least one math course beyond algebra II by the end of high school



Note: Current English learner students are currently classified as English learner students and receive English learner services in the current school year. Monitored English learner students are students who were previously classified as English learner students but were reclassified as English proficient within the previous two school years. Former English learner students are students who were previously classified as English learner students but were reclassified as English proficient more than two school years ago. Never–English learner students are students who never qualified for English learner services. Sample includes students who began grade 9 in 2009/10 and attended high school for four years. Percentages are unadjusted and do not account for differences across schools or in students' prior academic performance, such as grade point average and standardized test scores.

Source: Authors' analysis based on Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

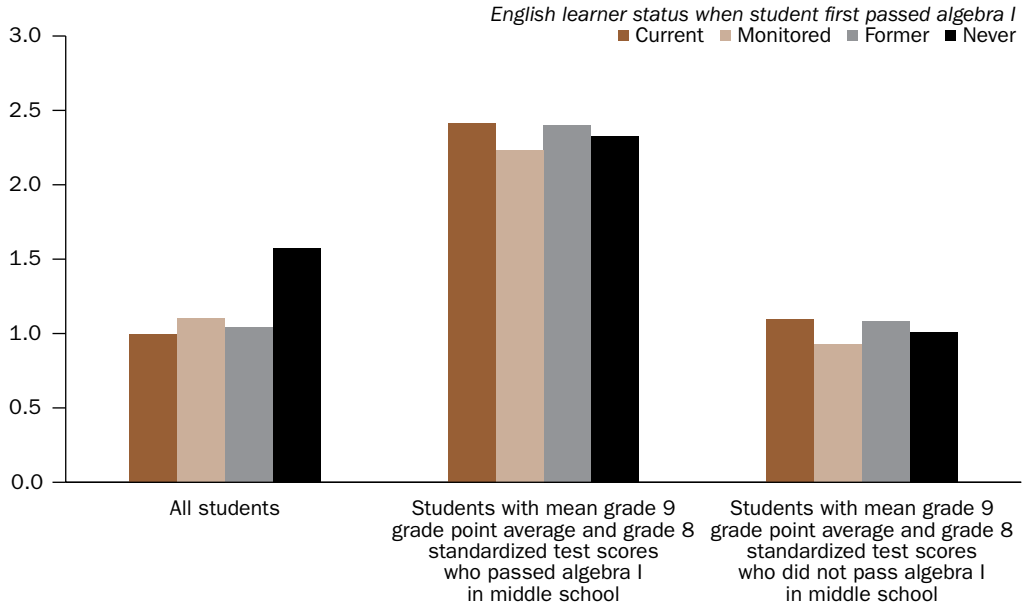
Regardless of English learner status, less than 40 percent of students who pass algebra I as a first-time grade 9 student take at least one math course beyond algebra II

A smaller percentage of current, monitored, and former English learner students who pass algebra I in middle school than of never–English learner students who pass algebra I in middle school take at least one math course beyond algebra II (see figure 5). However, when students have similar prior academic performance, the difference disappears. For example, among students with the mean grade 9 grade point average and grade 8 standardized test scores in math and reading who pass algebra I in middle school, never–English learner students take about 2.3 math courses beyond algebra II by the end of high school, and current, monitored, and former English learner students take 2.2–2.4 math courses beyond algebra II (figure 6).

Although gaps across English learner status groups disappear after grade point average and standardized test scores in math and reading are taken into account, a large gap exists in the number of math courses beyond algebra II taken by the end of high school between students who pass algebra I in middle school and students who pass it as a first-time grade 9 student. Students who pass algebra I in middle school take more than twice as many math courses beyond algebra II as students who pass algebra I as first-time grade 9 students (see figure 6). For all groups of students the gap is larger than one course—the difference that would be expected if students who pass algebra I in middle school are able to take the next course in the progression in grade 9. This large difference underscores the importance

Figure 6. Among students in Washington state high schools who pass algebra I in the same grade, English learner students take about the same number of math courses beyond algebra II as never–English learner students in the same school, when grade 9 grade point average, grade 8 standardized test scores in math and reading, and whether they pass algebra I in middle school are taken into account, 2009/10–2012/13

Number of math courses beyond algebra II taken by the end of high school



A large gap exists in the number of math courses beyond algebra II taken by the end of high school between students who pass algebra I in middle school and students who pass it as a first-time grade 9 student

Note: Current English learner students are currently classified as English learner students and receive English learner services in the current school year. Monitored English learner students are students who were previously classified as English learner students but were reclassified as English proficient within the previous two school years. Former English learner students are students who were previously classified as English learner students but were reclassified as English proficient more than two school years ago. Never–English learner students are students who never qualified for English learner services. Sample includes students who began grade 9 in 2009/10 and attended high school for four years. The mean grade 9 grade point average of the sample is 2.86. Data in the first set of bars (all students) are the unadjusted numbers of math courses beyond algebra II taken by each of the four groups of English learner students. Data in the second and third groups of bars are the number of math courses beyond algebra II students take based on coefficients from a regression analysis that modeled the number of math courses beyond algebra II taken on whether a student passed algebra I in middle school, after grade 9 grade point average and grade 8 standardized test scores in math and reading are controlled for. The regression model also includes interaction effects between English learner status and whether the student passed algebra I by grade 8. Grade 9 grade point average is used because grade 8 course grades are not consistently available in the data. Grade 8 standardized test scores are used because many grade 9 students did not take a standardized test. The regression model is described in detail in appendix A, and full regression results are in table B4 in appendix B.

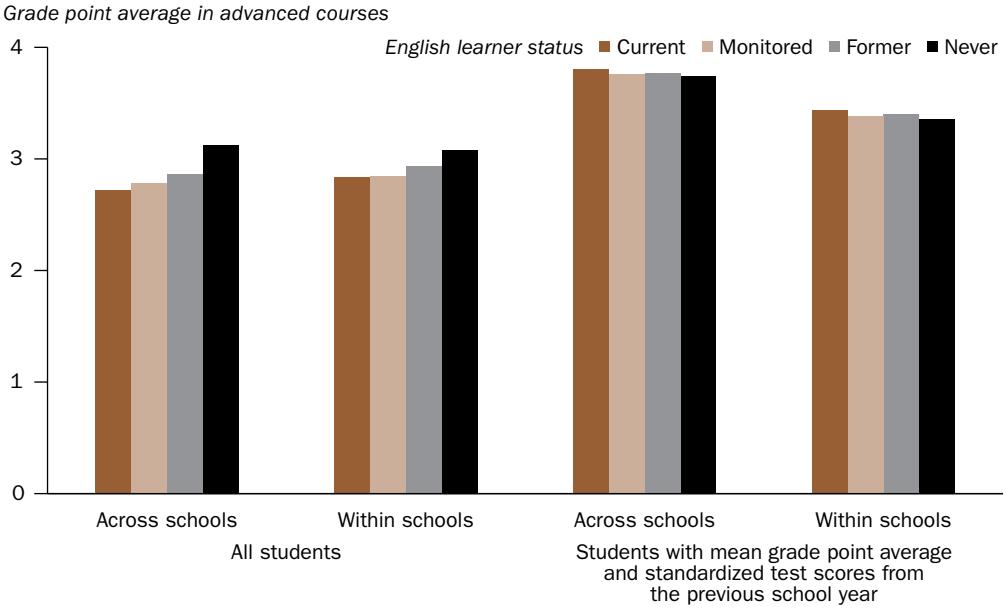
Source: Authors' analysis based on Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

of the finding that never–English learner students are 40–50 percent more likely to pass algebra I in middle school (see figure 4).

The grades that current, monitored, and former English learner students earn in advanced courses are similar to those that never–English learner students earn in those courses after students' prior academic performance is taken into account

Current, monitored, and former English learner students earn slightly lower grades in advanced courses, on average, than never–English learner students earn (figure 7).

Figure 7. The grades that current, monitored, and former English learner students in Washington state high schools earn in advanced courses are roughly the same as or better than those that never–English learner students who have the same grade point average and standardized test scores in the previous school year earn in those courses, 2009/10–2012/13



Note: Current English learner students are currently classified as English learner students and receive English learner services in the current school year. Monitored English learner students are students who were previously classified as English learner students but were reclassified as English proficient within the previous two school years. Former English learner students are students who were previously classified as English learner students but were reclassified as English proficient more than two school years ago. Never–English learner students are students who never qualified for English learner services. The sample is restricted to Washington state high school students from 2010/11 to 2012/13 who had a grade point average from the previous school year (that is, 2009/10–2011/12), who had Washington state standardized test scores in math and reading from the previous school year, and who took at least one advanced course. These results are based on four regression models. The first measures the average grade point average in advanced courses and controls for students' English learner status and grade level interacted with the school year. The second adds school fixed effects to the first model and clusters standard errors at the school level. The third adds students' grade point average and standardized math and reading test scores in the previous school year to the first model. The fourth adds school fixed effects to the third model and clusters standard errors at the school level. Regression adjusted results shown are based on coefficients for students in grade 9 in 2009/10. All four regression models are described in appendix A, and full results are available in table B5 in appendix B.

Source: Authors' analysis based on Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

Students who have similar academic preparation—as measured by grade point average or standardized test scores—earn similar grades in the advanced courses they take, regardless of their English learner status or the school they attend

However, grading policies vary across schools—some schools experience grade inflation, and others experience grade deflation (see, for example, Zhang & Sanchez, 2013). When students who attend the same school are compared, the difference in grade point average in advanced courses between current, monitored, and former English learner students and never–English learner students shrinks slightly. The largest gap—between current English learner students and never–English learner students—shrinks from 0.40 to 0.24 when school differences are taken into account.

Among students who have the same grade point average and standardized test scores in math and reading in the previous school year, current, monitored, and former English learner students earn grades in advanced courses that are similar to or better than, on

average, those that never–English learner students earn. This is true both across and within schools. In other words, students who have similar academic preparation—as measured by grade point average or standardized test scores—earn similar grades in the advanced courses they take, regardless of their English learner status or the school they attend. For students who attend the same school, the differences between current and former English learner students and never–English learner students are statistically significant (see table B5 in appendix B).

Schools with the lowest percentages of students who have ever been classified as English learner students offer more advanced courses than other schools do—even after school characteristics, such as average standardized test scores in math and reading, are taken into account

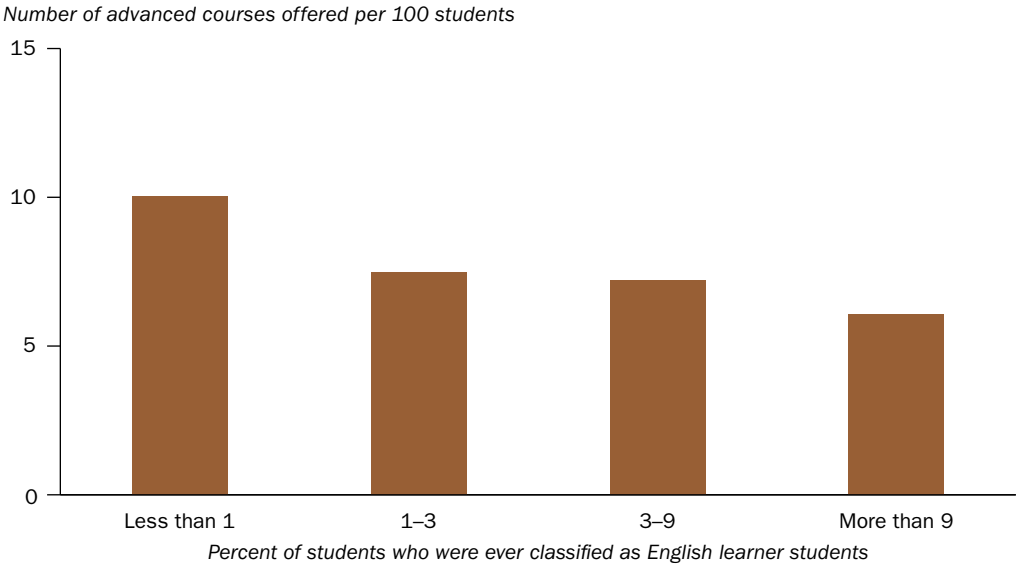
Students who have never been English learner students have less access to advanced courses when they attend schools that serve higher percentages of English learner students

Students' enrollment in advanced courses depends partially on the availability of those courses in their schools. In turn, the number of advanced courses that schools offer is related to their characteristics, such as size, location, the district to which they belong, and the academic ability of their students. Even after many school characteristics are taken into account, schools with the lowest percentages of students who have ever been classified as English learner students offer more advanced courses than schools with higher percentages of students who have ever been classified as English learner students (figure 8). For example, when schools were divided into four quartiles based on the percentage of their students who were ever English learner students, schools in the lowest quartile had less than 1 percent English learner students. Those schools offered 10 advanced courses in a single school year for every 100 students attending the school, on average. In contrast, students who have ever been classified as English learner students accounted for more than 9 percent of students in schools in the highest quartile (22 percent, on average). Those schools offered an average of six advanced courses in a single school year for every 100 students.

The evidence that schools with lower percentages of English learner students provide more advanced courses is consistent with previous research (Barnard-Brak et al., 2011; Iatarola, Conger, & Long, 2011). However, given that there are large differences between English learner students and never–English learner students within schools, course availability may not be an important driver of differences between these groups. Nevertheless, this disparity affects all students—students who have never been English learner students have less access to advanced courses when they attend schools that serve higher percentages of English learner students.

Across the range of possible values some students from each English learner status group have the same grade point average and standardized test scores from the previous school year that never–English learner students do (see figures B1–B3 in appendix B). This makes comparisons among groups of students with similar prior academic performance possible. However, many more never–English learners than current, monitored, and former English learner students have a grade point average above 3.0 and standardized test scores more than 0.5 standard deviation above the mean. This is consistent with other evidence that schools at which less than 1 percent of students have ever been classified as English learner students had mean standardized test scores that were 0.16 standard deviation higher in math and 0.14 standard deviation higher in reading than schools at which more than 9 percent of students have ever been classified as English learner students did (see table B7 in appendix B).

Figure 8. Washington state high schools with the lowest percentages of current, monitored, and former English learner students offer more advanced courses per school year, 2009/10–2012/13



Note: Current English learner students are currently classified as English learner students and receive English learner services in the current school year. Monitored English learner students are students who were previously classified as English learner students but were reclassified as English proficient within the previous two school years. Former English learner students are students who were previously classified as English learner students but were reclassified as English proficient more than two school years ago. Never–English learner students are students who never qualified for English learner services. The difference in the number of advanced courses per 100 students offered in schools is based on a regression model that controls for the following school-level characteristics: National Center for Education Statistics locale code (city, suburb, distant/fringe, remote), the percentage of students qualifying for free or reduced-price lunch, average standardized test scores in math and reading, percentage of students who are special education students, school size (number of students), student–teacher ratio (students enrolled/total school full-time equivalency teachers), percentage of students in each racial/ethnic group, and fixed effects for school district. The regression model is described in equation A11 in appendix A, and full results are presented in table B6 in appendix B.

Source: Authors' analysis based on Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

The percentage of students at schools with test scores that are more than 0.5 standard deviation above the mean is not dramatically different between schools with the lowest concentration of English learner students and schools with the highest concentration

But the percentage of students at schools with test scores that are more than 0.5 standard deviation above the mean is not dramatically different between schools with the lowest concentration of English learner students and schools with the highest concentration of English learner students—a 3 percentage point difference in math and a 2 percentage point difference in reading (see table B7 in appendix B). However, although all groups of schools have similar percentages of students with high standardized test scores in math and reading (18–27 percent, depending on the subject), a small fraction of those students have ever been classified as English learner students. On average, less than 1 percent of students with standardized test scores in math or reading or both that are more than 0.5 standard deviation above the mean have ever been classified as English learner students.

Implications of the study findings

This study finds that students' academic preparation accounts for much of the difference in advanced course enrollment and performance between current, monitored, and former English learner students and never–English learner students. Schools, districts, and state

agencies could consider several takeaways from this study to improve access to advanced courses for English learner students.

More research is needed to understand why high-achieving current, monitored, and former English learner students are less likely to take advanced courses than never–English learner students are. The grades that current, monitored, and former English learner students earned in advanced courses were comparable to those of never–English learner students with the same grade point average or standardized test scores in the previous school year (see figure 7). However, among students with a high grade point average or standardized test score in math, the percentage of students who take one or more advanced courses is much higher among never–English learner students than among current, monitored, and former English learner students (see table 1). Knowing why some high-achieving students do not take advanced courses could help school and district leaders understand the reasons for the discrepancy and develop plans for increasing high-performing English learner students' enrollment in advanced courses.

Knowing why some high-achieving current, monitored, and former English learner students do not take advanced courses could help school and district leaders develop plans for increasing these students' enrollment in advanced courses

A variety of factors could contribute to the evidence that high-achieving students who have ever been English learner students take fewer advanced courses than never–English learner students.

First, English learner students with high grade point averages and standardized test scores in math may not experience the same academic rigor in their middle and high school courses to prepare them for mastering advanced material, as their lower standardized test scores in reading and higher participation in supplementary and transitional courses suggest. Lower standardized test scores in reading also could indicate that a limited command of academic English hinders English learner students from pursuing courses that require advanced reading and writing skills. In that case, schools could consider providing English language supports in advanced classes to students who are otherwise qualified to take such courses. Those supports could include helping teachers of advanced courses learn strategies for working with English learner students or having an English as a Second Language or bilingual teacher coordinate with advanced course teachers to provide English support in and outside class.

Second, this finding could reflect policies that restrict access to advanced courses based on English proficiency or standardized test scores. Districts and schools that have such policies could empower some students to take advanced courses by using multiple measures to determine readiness on a case-by-case basis. They may also want to review policies and practices for communicating what students must do to enroll in advanced courses to students and families in schools with higher percentages of English learner students.

Third, schools may want to investigate whether the types of advanced courses they offer limit English learner students' ability to participate in them. For example, if the majority of advanced courses offered are in English language arts and social studies, the school may want to add advanced course options in science, world languages, and fine and performing arts—courses in which gaps in the percentages of students enrolled across English learner status groups are smaller (see table B1 in appendix B) and success may depend less heavily on advanced academic English language ability. Finally, schools could examine whether courses designed to help English learner students master English are scheduled at the same

time as advanced courses that they are likely eligible to take or at the same time as the prerequisites for those courses.

English learner students may need different preparation and support to pass algebra I in middle school. A key finding is that a smaller percentage of English learner students pass algebra I in middle school, limiting their opportunities to take high school math courses beyond algebra II. Because this study did not assess the availability of algebra I in middle school, state and district leaders could begin further investigations by exploring how opportunities to take algebra I are distributed across schools. After doing so, they could consider examining how districts and schools assess English learner students' academic readiness for algebra I, as well as what instructional and linguistic supports are provided for English learner students taking algebra I. Leaders in Washington state can use the data from this study to identify schools that have been successful in getting English learner students to pass algebra I in middle school, learn about the practices and policies that have contributed to that success, and share that knowledge with other schools in the state.

To better understand how to improve academic outcomes for English learner students, policymakers and education leaders could investigate the policies and practices of schools that serve many English learner students but do not have gaps in advanced course enrollment between current, monitored, and former English learner students and never–English learner students

Efforts to improve academic preparation for advanced coursework for English learner students require additional study to determine effective practices. Grade point average and standardized test scores from the previous school year account for most of the differences between English learner students and never–English learner students in advanced course enrollment and performance in this study. Many studies evaluate bilingual education, English immersion, separate English as a Second Language courses, and other interventions and instructional strategies. However, that body of research has not resulted in a consensus on the best way to help English learner students keep pace with never–English learner students in academic content acquisition and mastery. More research is needed to better understand how to improve academic outcomes for English learner students. Washington state policymakers and education leaders could begin by investigating the policies and practices of schools that serve many English learner students but do not have gaps in advanced course enrollment between current, monitored, and former English learner students and never–English learner students. In particular, they could focus on how those districts prepare English learner students for advanced coursework by raising their English proficiency and academic performance throughout their K–12 education.

Expanding access to advanced courses in schools that serve many students who have ever been classified as English learner students may reduce disparities in advanced course offerings among all students. Schools that serve the lowest percentages of current, monitored, and former English learner students consistently offer more advanced courses than other schools do—even after average student characteristics within schools, including students' average standardized test scores in math and reading, are taken into account. This finding might be of interest for reducing disparities among all students—including never–English learner students—in schools with high percentages of English learner students compared with schools with low percentages of English learner students. Follow-up research could also investigate and report on the policies and practices for equitable advanced course offerings within and across school districts, as well as evaluate how current state and regional programs designed to increase opportunities for advanced coursetaking —such as the Rural Alliance for College Success—serve English learner students.

Limitations of the study

This study has three main limitations.

First, some former English learner students may be coded as never–English learner students if they were reclassified before 2004/05, the earliest year in the dataset. However, students who have been proficient in English for many years are more likely to be similar to never–English learner students than to current or monitored English learner students in their level of English proficiency.

Second, despite the finding that grade point average and state standardized test scores in the previous school year explain the difference in advanced coursetaking between English learner students and never–English learner students, schools across the state may serve English learner students differently. Disparate instructional models and support could result in different academic growth for English learner students. Information about how schools serve English learner students was unavailable for this study. Further, all high schools in Washington state have their own set of requirements for entry into advanced courses, which they do not report to the Washington Office of Superintendent of Public Instruction. Thus, even though a school may offer a course, not all students may qualify to take it. Related to this issue, middle school course grades were not consistently available in the data, and many grade 9 students did not take a standardized test. Therefore, it was necessary to use grade point average in grade 9 and standardized test scores in grade 8 to control for prior academic performance in the analysis of the number of math courses beyond algebra I students take by the end of high school.

Many factors that are not included in the data contribute to taking advanced courses, including student plans and motivations, academic rigor in the primary grades, family support, and school policies, such as academic tracking or English proficiency requirements for mainstream and advanced courses

Third, many factors that are not included in the data contribute to taking advanced courses, including student plans and motivations, academic rigor in the primary grades, family support, and school policies, such as academic tracking or English proficiency requirements for mainstream and advanced courses. Further research is needed to determine the root causes of differences in academic performance and advanced coursetaking between English learner students and never–English learner students.

Appendix A. Data and methodology

This appendix provides additional details about the data and methods used in the study.

Data

Student data by research question. Research questions 1–4 include data for general education students only. For that reason, the analysis excludes approximately 69,000 students who at any time qualified for special education services. Additional details about the study's student-level sample size and restrictions are presented in table A1.

Research question 5 includes school-level results for 547 individual high schools. Results are measured each school year, resulting in 1,903 unique school-by-school year observations. An individual school could be included up to four times (one for each year between 2009/10 and 2012/13). Some schools were included fewer times because they were not open for one or more of the years. Certain schools are excluded from the sample: alternative high schools, schools with missing values for one or more of the variables included in the regression analysis, and schools offering unusually high numbers of advanced courses as a result of several students taking unique dual-enrollment courses at postsecondary institutions.

Identifying students enrolled in advanced courses. A student was enrolled in an advanced course if that course was present on the student's transcript. If a student withdrew from an advanced course before the first grading period, that student was not considered enrolled in the course.

Table A1. Sample for research questions 1–4

Research question	Sample	English learner status group	Number of students
1	Full study sample of students in grades 9–12 who attended Washington state public high schools between 2009/10 and 2012/13, excluding special education students	Current	66,175
		Monitored	14,954
		Former	31,357
		Never	1,008,584
2, 4	Students who have course transcript records in the previous school year and standardized test scores in math and reading within the previous two school years	Current	56,275
		Monitored	13,961
		Former	30,918
		Never	936,061
3	Students who began grade 9 in 2010, attended high school in Washington state for four consecutive years, and passed algebra I or a higher level math course during middle school or grade 9	Current	2,094
		Monitored	558
		Former	591
		Never	40,493

Note: Current English learner students are currently classified as English learner students and receive English learner services in the current school year. Monitored English learner students are students who were previously classified as English learner students but were reclassified as English proficient within the previous two school years. Former English learner students are students who were previously classified as English learner students but were reclassified as English proficient more than two school years ago. Never–English learner students are students who never qualified for English learner services. Students are counted once per school year. Analysis is conducted during the school year for research questions 1, 2, and 4, and English learner status is measured each school year. Therefore, students may be counted as current English learner students in 2010 and as monitored English learner students in 2011 if they were reclassified as English proficient in 2011.

Source: Authors' analysis based on Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

Advanced courses were identified through the following procedures. First, the Washington Office of Superintendent of Public Instruction provided indicators of advanced course types for each course (table A2). Second, the study team identified courses that exceed graduation requirements in math, science, and world languages; those courses are considered advanced (table A3). Advanced options for English language arts and social studies courses are all coded as advanced because they are all courses that fall under one of the designation codes in table A2. Washington state requires two credits of science. Students may decide to take an advanced science course to meet one or both of the required credits. That course counts as an advanced course, although it also meets the standard graduation requirement. For example, honors biology is counted as an advanced course.

Methodology

The study employed descriptive statistics and regression analysis to address the research questions. Descriptive statistics, such as counts and percentages, summarize differences in advanced course enrollment (for example, the results presented in response to research question 1). Regression analysis expanded on descriptive findings by assessing the association of variables with the outcome of interest—such as number of advanced courses taken, number of math courses beyond algebra II taken, or average grade point average

Table A2. Advanced course designation codes in high schools in Washington state

Code	Description
A – Advanced Placement	The Advanced Placement program allows students to take college-level courses while still in high school and to earn college credit by taking Advanced Placement exams.
C – College in the High School	The College in the High School program allows students in grades 11 and 12 to enroll concurrently in high school and college and earn both high school and college credit. These courses are offered within the high school and taught by high school teachers who have been trained and approved in the program by the sponsoring college.
H – Honors	Honors courses are determined by the district or school.
I – International Baccalaureate	The International Baccalaureate program offers high-quality programs of international education to a worldwide community of schools.
K – Cambridge Program	The University of Cambridge offers an international, pre-university curriculum and examination system that emphasizes the value of a broad and balanced education for academically able students.
R – Running Start	Offered to students in grades 11 and 12, Running Start courses are taught at institutions of higher education. Students earn both high school and college credit with a passing grade.

Source: Washington Office of Superintendent of Public Instruction, 2014.

Table A3. Graduation requirements for high schools in Washington state and examples of courses that exceed those requirements, 2012–16

Subject	Required courses	Examples of advanced courses
Math	Algebra I, geometry, and algebra II or integrated math I, II, and III	Calculus, precalculus, probability and statistics, trigonometry
Science	Biology	Genetics, microbiology, organic chemistry, physics, scientific research and design
World languages	None, but two years required for college admission	World languages courses higher than level 2 (for example, Chinese literature, French III)

Source: Washington State Board of Education, 2013.

in advanced courses—while controlling for other factors, such as students' grade point average and standardized test scores from the previous school year. When test scores or grade point average were missing, the values were imputed using values from two years prior. Regression analysis was used to produce results for research questions 2–4.

Some analyses use a type of regression model called a fixed effects model, which accounts for clustering of students within schools by including fixed effects for schools. A fixed effect for a school is simply a variable coded 1 if a student attended the school and 0 otherwise. Models without fixed effects produce estimates that combine what is happening both within and between schools and do not account for the unobserved differences between schools.

A specific set of analyses were used to address each research question, which are described below.

Research question 1. The study reports descriptive statistics, including the average number of advanced courses that students from each group took within a school year and the percentage of students from each group who took at least one advanced course. Further, the characteristics of students who enrolled in advanced courses are compared with those of students who did not enroll in an advanced course.

Research question 2. The study reports the variation in advanced course enrollment explained by students' prior academic performance based on regression models. In all regressions the dependent variable is the number of advanced courses taken within a school year. Equations A1, A2, A3, and A4 correspond to figure 3 in the main text. Equation A1 estimates the number of advanced courses taken overall for students from each English learner student group compared with never–English learner students. Equation A2 adds school fixed effects to equation A1 to obtain within-school estimates:

$$\begin{aligned} \textit{Advanced courses taken}_i = {} & \beta_0 + \beta_1 \textit{CurrentEL}_i + \beta_2 \textit{MonitoredEL}_i + \beta_3 \textit{FormerEL}_i + \\ & \beta_4 \textit{School Year}_i + \beta_5 \textit{Grade Level}_i + \beta_6 (\textit{Grade X Year})_i + \varepsilon_i \end{aligned} \quad \text{(A1)}$$

$$\begin{aligned} \textit{Advanced courses taken}_i = {} & \beta_0 + \beta_1 \textit{CurrentEL}_i + \beta_2 \textit{MonitoredEL}_i + \beta_3 \textit{FormerEL}_i + \\ & \beta_4 \textit{School Year}_i + \beta_5 \textit{Grade Level}_i + \beta_6 (\textit{Grade X Year})_i + \Sigma_{j=1}^{1902} \beta_{7-1902} \textit{School}_j + \varepsilon_i \end{aligned} \quad \text{(A2)}$$

where *Advanced courses taken* is the number of advanced courses student *i* in school *j* took by the end of high school; *CurrentEL* is a binary indicator for whether student *i* is a current English learner student, *MonitoredEL* is a binary indicator for whether student *i* is a monitored English learner student, *FormerEL* is a binary indicator for whether student *i* is a former English learner student (the referent category is never–English learner students); *School Year* is a set of binary variables for each school year between 2010/11 and 2012/13 (2009/10 is the referent category); *Grade Level* is a set of binary variables for each grade level between grade 10 and grade 12 (grade 9 is the referent category); *Grade X Year* is a set of interaction terms for student *i*'s grade level multiplied by the school year; *School* is a set of fixed effects for each school *j* in the state; and ε is an error term.

Equations A3 and A4 add three variables to equations A1 and A2: students' grade point average and standardized test scores in math and reading from the previous school year:

$$\textit{Advanced courses taken}_i = \beta_0 + \beta_1 \textit{CurrentEL}_i + \beta_2 \textit{MonitoredEL}_i + \beta_3 \textit{FormerEL}_i + \beta_4 \textit{School Year}_i + \beta_5 \textit{Grade Level}_i + \beta_6 (\textit{Grade X Year})_i + \beta_7 \textit{Previous Year GPA}_i + \beta_8 \textit{Previous Year Math Test Score}_i + \beta_9 \textit{Previous Year Reading Test Score}_i + \varepsilon_i \quad \text{(A3)}$$

$$\textit{Advanced courses taken}_i = \beta_0 + \beta_1 \textit{CurrentEL}_i + \beta_2 \textit{MonitoredEL}_i + \beta_3 \textit{FormerEL}_i + \beta_4 \textit{School Year}_i + \beta_5 \textit{Grade Level}_i + \beta_6 (\textit{Grade X Year})_i + \beta_7 \textit{Previous Year GPA}_i + \beta_8 \textit{Previous Year Math Test Score}_i + \beta_9 \textit{Previous Year Reading Test Score}_i + \Sigma_{j=1}^{1902} \beta_{10-1902} \textit{School}_j + \varepsilon_i \quad \text{(A4)}$$

where *Previous Year GPA* is student *i*'s grade point average in the previous school year; *Previous Year Math Test Score* is student *i*'s standardized test score in math from the previous school year, standardized with a mean of 0 and a standard deviation of 1 within test, grade level, and school year; *Previous Year Reading Test Score* is student *i*'s standardized test score in math from the previous school year, standardized with a mean of 0 and a standard deviation of 1 within test, grade level, and school year; and ε is an error term.

The regression-adjusted results that are presented are derived from the coefficients of the regression models. For example, the result for current English learner students is based on the following formula: *regression_constant + CurrentEL_coefficient + sample_mean_GPA * GPA_coefficient + sample_mean_mathtest*mathtest_coefficient + sample_mean_readingtest * readingtest_coefficient.*

Finally, averages and percentages were used to describe academic performance and types of courses taken for each English learner student group and for never–English learner students.

Research question 3. The study reports the percentage of current, monitored, and former English learner students and never–English learner students who passed algebra I in middle school and those who passed it as a first-time grade 9 student. Next, the study uses regression models in which the dependent variable is the number of math courses taken beyond algebra II (equations A5 and A6). Results are derived from the coefficients of the regression model, as in research question 2. Another set of regression models (equations A7–A10) added school fixed effects to produce the within-school results (see table B4 in appendix B).

$$\textit{Math courses taken beyond algebra II}_i = \beta_0 + \beta_1 \textit{CurrentEL}_i + \beta_2 \textit{MonitoredEL}_i + \beta_3 \textit{FormerEL}_i + \beta_4 \textit{Passed algebra 1 by grade 8}_i + \beta_5 \textit{CurrentEL} \times \textit{Passed algebra I by grade 8}_i + \beta_6 \textit{MonitoredEL} \times \textit{Passed algebra I by grade 8}_i + \beta_7 \textit{FormerEL} \times \textit{Passed algebra I by grade 8}_i + \beta_8 \textit{Grade9GPA}_i + \beta_9 \textit{Grade 8 Math Test Score}_i + \beta_{10} \text{Grade 8 reading test score}_i + \varepsilon_i \quad \text{(A5)}$$

$$\textit{Math courses taken beyond algebra II}_i = \beta_0 + \beta_1 \textit{CurrentEL}_i + \beta_2 \textit{MonitoredEL}_i + \beta_3 \textit{FormerEL}_i + \beta_4 \textit{Passed algebra 1 by grade8}_i + \beta_5 \textit{CurrentEL} \times \textit{Passed algebra I by grade 8}_i + \beta_6 \textit{MonitoredEL} \times \textit{Passed algebra I by grade 8}_i + \beta_7 \textit{FormerEL} \times \textit{Passed algebra I by grade 8}_i + \beta_8 \textit{Grade 9 GPA}_i + \beta_9 \textit{Grade 8 Math Test Score}_i + \beta_{10} \textit{Grade 8 Reading Test Score}_i + \beta_{11} \textit{Passed Algebra 1 by Grade 8}_i + \Sigma_{j=1}^{1902} \beta_{12-1902} \textit{School}_j + \varepsilon_i \quad \text{(A6)}$$

where *Math courses taken beyond algebra II* is the number of courses student *i* in school *j* took beyond algebra II by the end of the fourth year of high school; *CurrentEL* × *Passed algebra I by grade 8* is an interaction term between the binary indicator for whether student *i* is a current English learner and the binary indicator for whether student *i* passed algebra by grade 8; *MonitoredEL* × *Passed algebra I by grade 8* is an interaction term between the binary indicator for whether student *i* is a monitored English learner and the binary indicator for whether student *i* passed algebra by grade 8; *FormerEL* × *Passed algebra I by grade 8* is an interaction term between the binary indicator for whether student *i* is a former English learner and the binary indicator for whether student *i* passed algebra by grade 8; *Grade 9 GPA* represents student *i*'s grade point average in grade 9; *Grade 8 Math Test Score* is student *i*'s standardized test score in math from the previous school year, standardized with a mean of 0 and a standard deviation of 1 within test, grade level, and school year; *Grade 8 Reading Test Score* is student *i*'s standardized test score in math from the previous school year, standardized with a mean of 0 and a standard deviation of 1 within test, grade level, and school year; and ε is an error term. In equations A5 and A6, analysis is conducted at the student level, and standard errors are clustered at the school level.

Research question 4. The grades that current, monitored, and former English learner students and never–English learner students earn in advanced courses are compared using four regression models, shown in equations A7–A10. The dependent variable is the average grade point average earned in advanced courses. Equation A7 includes binary variables for each English learner student group (current, monitored, and former) and indicators for each grade level and school year interaction. The other equations add school fixed effects, grade point average in the previous school year, or standardized math and reading test scores in the previous school year. As in the analysis conducted for research questions 2 and 3, the results displayed are based on the coefficients the regression models yielded.

$$\textit{GPA in advanced courses}_i = \beta_0 + \beta_1 \textit{CurrentEL}_i + \beta_2 \textit{MonitoredEL}_i + \beta_3 \textit{FormerEL}_i + \beta_4 \textit{School Year}_i + \beta_5 \textit{Grade Level}_i + \beta_6 (\textit{Grade} \times \textit{Year})_i + \varepsilon_i \quad \text{(A7)}$$

$$\textit{GPA in advanced courses}_i = \beta_0 + \beta_1 \textit{CurrentEL}_i + \beta_2 \textit{MonitoredEL}_i + \beta_3 \textit{FormerEL}_i + \beta_4 \textit{School Year}_i + \beta_5 \textit{Grade Level}_i + \beta_6 (\textit{Grade} \times \textit{Year})_i + \Sigma_{j=1}^{1902} \beta_{7-1902} \textit{School}_j + \varepsilon_i \quad \text{(A8)}$$

$$\textit{GPA in advanced courses}_i = \beta_0 + \beta_1 \textit{CurrentEL}_i + \beta_2 \textit{MonitoredEL}_i + \beta_3 \textit{FormerEL}_i + \beta_4 \textit{School Year}_i + \beta_5 \textit{Grade Level}_i + \beta_6 (\textit{Grade} \times \textit{Year})_i + \beta_7 \textit{Previous Year GPA}_i + \beta_8 \textit{Previous Year Reading Score}_i + \beta_9 \textit{Previous Year Math Score}_i + \varepsilon_i \quad \text{(A9)}$$

$$GPA\ in\ advanced\ courses_i = \beta_0 + \beta_1 CurrentEL_i + \beta_2 MonitoredEL_i + \beta_3 FormerEL_i + \beta_4 School\ Year_i + \beta_5 Grade\ Level_i + \beta_6 (Grade \times Year)_i + \beta_7 Previous\ Year\ GPA_i + \beta_8 Previous\ Year\ Reading\ Score_i + \beta_9 Previous\ Year\ Math\ Score_i + \Sigma_{j=1}^{1902} \beta_{10-1902} School_j + \varepsilon_i \quad \text{(A10)}$$

where *GPA in advanced courses* represents the average grade point average earned in all advanced courses taken by student *i* in school *j*. In equations A7–A10, analysis is conducted at the student level, and standard errors are clustered at the school level.

Research question 5. The analysis for this research question includes three stages. First, schools were grouped into four quartiles based on the percentage of students attending the school who were ever identified as English learner students.

Second, the number of advanced courses offered per 100 students was calculated. For example, a school with 1,000 students that offers 80 advanced courses would have 8 courses per 100 students. This measure takes school size into account when comparing schools. Third, a school district fixed effect model was used to estimate the number of advanced courses offered across schools of varying English learner student compositions, where the dependent variable is the number of advanced courses offered per 100 students, and independent variables include the indicators for each of the four groups of schools and school characteristics, such as the percentage of students attending the school who qualify for free or reduced-price lunch. Equation A11 describes the regression model:

$$Advanced\ courses\ per\ 100\ students_j = \beta_0 + \beta_1 ELPercentQuartile_j + \beta_2 AverageMathTestScores_j + \beta_3 AverageReadingTestScores_j + \beta_4 PercentSpecialEducation_j + \beta_5 PercentFRPL_j + \beta_6 Locale_j + \beta_7 EnrollmentSize_j + \beta_8 StudentTeacherRatio_j + \beta_9 PercentRaceEthnicity_j + \Sigma_{k=1}^{894} \beta_{10-894} District_k + \varepsilon_j \quad \text{(A11)}$$

where *Advanced courses per 100 students* is the number of advanced courses offered in school *j* in district *k; ELPercentQuartile* is a set of indicators for each quartile in which schools are divided evenly into four quartiles based on the percentage of students in school *j* who were ever English learner students (the quartile with the lowest percentage is the referent category); *AverageMathTestScores* is the mean standardized test score in math in school *j*, standardized to have a mean of 0 and a standard deviation of 1 within grade level and school year; *AverageReadingTestScores* is the mean state standardized reading test score in school *j*, standardized to have a mean of 0 and a standard deviation of 1 within grade level and school year; *PercentSpecialEducation* is the percentage of students who qualified for special education services in school *j; PercentFRPL* is the percentage of students qualifying for free or reduced-price lunch in school *j*; *Locale* represents the National Center for Education Statistics locale code of school *j* (suburban, distant/fringe, and remote schools relative to city schools); *PercentRaceEthnicity* is a set of indicators for the percentage of students of each racial/ethnic category in school *j* (in other words, the percentage of students who were Asian, Black, Hispanic, American Indian, Native Hawaiian or Pacific Islander, and two or more races/ethnicities, relative to the percentage of students who were White); *District* is a set of fixed effects for each district in the state; and *εj* is an error term. In equation A11, analysis is conducted at the school level, and standard errors are clustered at the district level to control for unobserved differences between districts. The regression output for school characteristics is displayed in table B6 in appendix B.

Appendix B. Supplemental results

This appendix displays additional results relevant to the interpretation of the study's findings.

Table B1. Percentage of students in Washington state high schools who took one or more advanced courses in a given school year, by English learner status and content area, 2009/10–2012/13

Advanced course content area	English learner status			
	Current	Monitored	Former	Never
English	10	15	20	26
Math	13	18	17	26
Science	4	7	8	10
Social studies	6	10	14	17
World languages	8	11	14	15
Electives[a]	2	2	3	4
Any content area	26	36	41	48

Note: Current English learner students are currently classified as English learner students and receive English learner services in the current school year. Monitored English learner students are students who were previously classified as English learner students but were reclassified as English proficient within the previous two school years. Former English learner students are students who were previously classified as English learner students but were reclassified as English proficient more than two school years ago. Never–English learner students are students who never qualified for English learner services. Percentages are unadjusted and do not account for differences across schools or in students' prior academic performance, such as grade point average and standardized test scores.

a. Includes business, career and technical education, fine and performing arts, health and physical education, and theology.

Source: Authors' analysis based on Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

Table B2. Characteristics of students in Washington state high schools who took one or more advanced courses in a given school year, by English learner status, compared with students who did not take any advanced courses, 2009/10–2012/13

	English learner status							
	Current (*n* = 66,175)		Monitored (*n* = 14,954)		Former (*n* = 31,357)		Never (*n* = 1,008,584)	
	Took at least one advanced course during the school year							
Characteristic	Yes	No	Yes	No	Yes	No	Yes	No
Percentage who took an advanced course	26	74	36	64	41	59	48	52
Percentage of students by race/ethnicity								
Asian	33	18	37	12	28	11	10	4
Black	6	8	5	4	4	3	4	5
Hispanic	47	60	43	68	51	68	9	13
White	12	11	13	13	14	14	71	71
Other	2	3	2	4	3	4	6	7
Percentage of students who are male	49	55	50	55	46	52	45	53
Percentage of people living under poverty line in students' neighborhoods	16	18	15	18	16	18	12	13
Median household income in students' neighborhoods ($)	58,000	53,500	61,000	53,200	58,100	53,200	67,000	60,800
Average grade point average in the previous school year	2.72	1.94	2.84	1.92	2.82	1.96	3.09	2.11
Average standardized test score in math in the previous school year[a]	–0.10	–0.81	0.05	–0.61	0.11	–0.43	0.58	–0.14
Average standardized test score in reading in the previous school year[a]	–0.43	–1.14	–0.30	–0.67	–0.05	–0.34	0.53	–0.07
Average number of credits taken during school year	7	6	7	6	7	6	7	6

Note: Current English learner students are currently classified as English learner students and receive English learner services in the current school year. Monitored English learner students are students who were previously classified as English learner students but were reclassified as English proficient within the previous two school years. Former English learner students are students who were previously classified as English learner students but were reclassified as English proficient more than two school years ago. Never–English learner students are students who never qualified for English learner services.

a. Standardized within test, school year, and grade level across all students in the state to have a mean of 0 and a standard deviation of 1.

Source: Authors' analysis based on Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

Table B3. Number of advanced courses that current, monitored, and former English learner students in Washington state high schools take per school year relative to never–English learner students, within and across schools and with and without controls for prior academic performance, 2009/10–2012/13

Characteristic	Model 1 Across schools, without controls for prior academic performance	Model 2 Within schools, without controls for prior academic performance	Model 3 Across schools, with controls for prior academic performance	Model 4 Within schools, with controls for prior academic performance
English learner status, compared with never–English learner students				
Current English learner students	–1.072*** (0.064)	–1.076*** (0.083)	0.175*** (0.040)	–0.122** (0.041)
Monitored English learner students	–0.736*** (0.081)	–0.782*** (0.058)	0.113 (0.060)	–0.144*** (0.038)
Former English learner students	–0.422*** (0.082)	–0.419*** (0.036)	0.143* (0.065)	–0.047 (0.035)
Prior academic performance characteristics				
Grade point average in the previous school year	na	na	0.592*** (0.025)	0.562*** (0.022)
Standardized test score in math in the previous school year	na	na	0.635*** (0.036)	0.513*** (0.021)
Standardized test score in reading in the previous school year	na	na	0.397*** (0.018)	0.387*** (0.015)
School year, relative to 2009/10				
2010/11	–0.006 (0.066)	–0.057*** (0.004)	0.065 (0.067)	0.002 (0.041)
2011/12	–0.026 (0.077)	–0.082*** (0.005)	0.063 (0.076)	0.004 (0.058)
2012/13	–0.002 (0.079)	–0.094*** (0.005)	0.037 (0.079)	–0.022 (0.063)
Grade level, relative to grade 9				
10	0.566*** (0.085)	0.531*** (0.010)	0.594*** (0.084)	0.563*** (0.065)
11	1.073*** (0.109)	1.100*** (0.010)	0.881*** (0.101)	0.909*** (0.093)
12	1.006*** (0.111)	0.949*** (0.012)	0.788*** (0.106)	0.756*** (0.101)
Grade level by school year fixed effects, relative to grade 9 and 2009/10				
2010/11 grade 10	0.156* (0.064)	0.154*** (0.003)	–0.025 (0.066)	–0.003 (0.043)
2011/12 grade 10	0.154* (0.064)	0.190*** (0.009)	0.006 (0.067)	0.047 (0.057)
2012/13 grade 10	0.161* (0.078)	0.201*** (0.004)	0.001 (0.080)	0.027 (0.067)
2010/11 grade 11	0.189* (0.079)	0.222*** (0.006)	0.188* (0.076)	0.215*** (0.058)
2011/12 grade 11	0.376*** (0.084)	0.405*** (0.009)	0.393*** (0.082)	0.410*** (0.080)
2012/13 grade 11	0.340** (0.104)	0.398*** (0.004)	0.406*** (0.104)	0.420*** (0.096)
2010/11 grade 12	–0.009 (0.076)	0.197*** (0.010)	–0.073 (0.075)	0.073 (0.056)

(continued)

Table B3. Number of advanced courses that current, monitored, and former English learner students in Washington state high schools take per school year relative to never–English learner students, within and across schools and with and without controls for prior academic performance, 2009/10–2012/13 *(continued)*

Characteristic	Model 1 Across schools, without controls for prior academic performance	Model 2 Within schools, without controls for prior academic performance	Model 3 Across schools, with controls for prior academic performance	Model 4 Within schools, with controls for prior academic performance
2011/12 grade 12	0.190 (0.099)	0.420*** (0.015)	0.073 (0.099)	0.237* (0.100)
2012/13 grade 12	0.291* (0.127)	0.524*** (0.012)	0.286* (0.126)	0.403** (0.122)
School fixed effects	No	Yes	No	Yes
Constant	1.215*** (0.093)	1.228*** (0.008)	–0.492*** (0.086)	–0.347*** (0.08)
Observations	1,050,554	1,050,554	1,050,554	1,050,554
Adjusted *R*-squared	0.045	0.282	0.265	0.428
Sample characteristics				
Sample mean grade point average in the previous school year				2.57
Sample mean standardized test score in math in the previous school year				0.17
Sample mean standardized test score in reading in the previous school year				0.15

* is significant at $p < .05$; ** is significant at $p < .01$; *** is significant at $p < .001$.

na is not applicable.

Note: Current English learner students are currently classified as English learner students and receive English learner services in the current school year. Monitored English learner students are students who were previously classified as English learner students but were reclassified as English proficient within the previous two school years. Former English learner students are students who were previously classified as English learner students but were reclassified as English proficient more than two school years ago. Never–English learner students are students who never qualified for English learner services. The sample is restricted to Washington state high school students from 2010/11 to 2012/13 who had a grade point average from the previous school year (that is, 2009/10–2011/12) and standardized test scores in math and reading from the previous high school year. Values reported are coefficient estimates from fixed effects linear regression models. Numbers in parentheses are robust standard errors clustered by school. Because of space limitations, coefficient estimates on school fixed effects are not included.

Source: Authors' analysis based on Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

Table B4. Number of math courses beyond algebra II that current, monitored, and former English learner students in Washington state high schools take relative to never–English learner students in the same school, controlling for grade 9 grade point average and whether the student passed algebra I in middle school, 2009/10–2012/13

Variable	Model 1 Controls for grade 9 grade point average and passed algebra I in middle school		Model 2 Controls for grade 8 math and reading test scores and passed algebra I in middle school		Model 3 Controls for grade 9 grade point average, grade 8 math and reading test scores, and passed algebra I in middle school	
English learner status, compared with never–English learner students						
Current English learner students	0.062	0.033	0.474***	0.388***	0.348***	0.257***
	(0.050)	(0.033)	(0.062)	(0.037)	(0.053)	(0.034)
Monitored English learner students	0.163*	0.168**	0.268***	0.269***	0.291***	0.259***
	(0.080)	(0.055)	(0.078)	(0.053)	(0.077)	(0.052)
Former English learner students	–0.073	–0.015	0.021	0.070	0.026	0.050
	(0.061)	(0.045)	(0.062)	(0.045)	(0.059)	(0.043)
English learner status interacted with passing algebra I by grade 8, compared with never–English learner students who did not pass algebra I in grade 8						
Current English learner students X Passing algebra I by grade 8	–0.180	–0.187*	–0.306*	–0.291**	–0.171	–0.169
	(0.120)	(0.092)	(0.127)	(0.096)	(0.119)	(0.091)
Monitored English learner students X Passing algebra I by grade 8	–0.390*	–0.395***	–0.344	–0.363*	–0.320	–0.344**
	(0.170)	(0.133)	(0.184)	(0.151)	(0.165)	(0.131)
Former English learner students X Passing algebra I by grade 8	–0.047	–0.0008	–0.081	–0.029	–0.002	0.021
	(0.166)	(0.159)	(0.172)	(0.160)	(0.164)	(0.151)
Previous academic performance characteristics						
Grade 9 grade point average	0.805***	0.727***	na	na	0.630***	0.588***
	(0.027)	(0.022)			(0.021)	(0.018)
Grade 8 standardized test score in math	na	na	0.644***	0.563***	0.418***	0.383***
			(0.032)	(0.026)	(0.029)	(0.023)
Grade 8 standardized test score in reading	na	na	0.166***	0.139***	0.024	0.013
			(0.018)	(0.010)	(0.017)	(0.009)
Passed algebra I in middle school	1.457***	1.549***	1.369***	1.459***	1.238***	1.317***
	(0.072)	(0.047)	(0.083)	(0.056)	(0.077)	(0.051)
School fixed effects	No	Yes	No	Yes	No	Yes
Constant	–1.328***	–1.139***	0.840***	0.828***	–0.841***	–0.737***
	(0.055)	(0.064)	(0.042)	(0.020)	(0.053)	(0.056)
Observations	40,493	40,493	40,493	40,493	40,493	40,493
Adjusted *R*-squared	0.422	0.543	0.383	0.512	0.448	0.563

* is significant at $p < .05$; ** is significant at $p < .01$; *** is significant at $p < .001$.

na is not applicable.

Note: Current English learner students are currently classified as English learner students and receive English learner services in the current school year. Monitored English learner students are students who were previously classified as English learner students but were reclassified as English proficient within the previous two school years. Former English learner students are students who were previously classified as English learner students but were reclassified as English proficient more than two school years ago. Never–English learner students are students who never qualified for English learner services. The sample is restricted to Washington state high school students who started grade 9 in 2009/10 and attended high school in Washington state for four years. Values reported are coefficient estimates from fixed effects linear regression models. Numbers in parentheses are robust standard errors clustered by school. Because of space limitations, coefficient estimates on school fixed effects are not included.

Source: Authors' analysis based on Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

Table B5. Average grade point average in advanced courses for current, monitored, and former English learner students relative to never–English learner students across and within Washington state high schools, with and without controls for prior academic performance, 2009/10–2012/13

Variable	Model 1 Across schools, without controls for prior academic performance	Model 2 Within schools, without controls for prior academic performance	Model 3 Across schools, with controls for prior academic performance	Model 4 Within schools, with controls for prior academic performance
English learner status, compared with never–English learner students				
Current English learner students	–0.403*** (0.021)	–0.247*** (0.018)	0.060 (0.028)	0.083** (0.025)
Monitored English learner students	–0.346*** (0.045)	–0.24*** (0.042)	0.019 (0.021)	0.025 (0.02)
Former English learner students	–0.267*** (0.012)	–0.148*** (0.013)	0.030 (0.017)	0.049** (0.013)
Prior academic performance characteristics				
Grade point average in the previous school year	na	na	0.628*** (0.108)	0.692*** (0.077)
Standardized test score in math in the previous school year	na	na	0.160*** (0.033)	0.133*** (0.021)
Standardized test score in reading in the previous school year	na	na	0.138*** (0.026)	0.121*** (0.018)
School year, relative to 2010/11				
2011/12	0.051*** (0.0004)	0.047*** (0.007)	–0.213*** (0.043)	–0.005 (0.007)
2012/13	–0.035*** (0.0005)	–0.004 (0.010)	–0.418*** (0.064)	–0.145*** (0.022)
Grade level, relative to grade 9				
10	–0.254*** (0.0001)	–0.218*** (0.018)	–0.999*** (0.140)	–0.608*** (0.056)
11	–0.391*** (0.00009)	–0.356*** (0.018)	–1.079*** (0.121)	–0.676*** (0.042)
12	–0.460*** (0.0001)	–0.430*** (0.019)	–1.103*** (0.110)	–0.698*** (0.033)
Grade level by school year fixed effects, relative to grade 9 and 2010/11				
2011/12 grade 10	–0.083*** (0.0002)	–0.072*** (0.006)	0.209*** (0.036)	0.0003 (0.004)
2012/13 grade 10	–0.011*** (0.0002)	–0.038** (0.009)	0.385*** (0.060)	0.114*** (0.019)
2011/12 grade 11	–0.078*** (0.0002)	–0.078*** (0.006)	0.216*** (0.037)	0.0008 (0.005)
2012/13 grade 11	–0.015*** (0.0002)	–0.043*** (0.009)	0.436*** (0.057)	0.156*** (0.018)
2011/12 grade 12	–0.092*** (0.0003)	–0.082*** (0.007)	0.165** (0.044)	–0.041*** (0.007)
2012/13 grade 12	–0.027*** (0.0004)	–0.050*** (0.009)	0.39*** (0.060)	0.116*** (0.018)

(continued)

Table B5. Average grade point average in advanced courses for current, monitored, and former English learner students relative to never–English learner students across and within Washington state high schools, with and without controls for prior academic performance, 2009/10–2012/13 *(continued)*

Variable	Model 1 Across schools, without controls for prior academic performance	Model 2 Within schools, without controls for prior academic performance	Model 3 Across schools, with controls for prior academic performance	Model 4 Within schools, with controls for prior academic performance
School fixed effects	No	Yes	No	Yes
Constant	3.127***	3.083***	1.698***	1.139***
	(0.001)	(0.017)	(0.178)	(0.173)
Observations	333,209	333,209	333,209	333,209
Adjusted *R*-squared	0.021	0.111	0.398	0.449

** is significant at $p < .01$; *** is significant at $p < .001$.

na is not applicable.

Note: Current English learner students are currently classified as English learner students and receive English learner services in the current school year. Monitored English learner students are students who were previously classified as English learner students but were reclassified as English proficient within the previous two school years. Former English learner students are students who were previously classified as English learner students but were reclassified as English proficient more than two school years ago. Never–English learner students are students who never qualified for English learner services. The sample is restricted to Washington state high school students from 2010/11–2012/13 who have a grade point average from the previous school year (that is, 2009/10–2011/12), have Washington state standardized test scores in math and reading from a previous high school year, and who took at least one advanced course. Values reported are coefficient estimates from fixed effects linear regression models. Numbers in parentheses are robust standard errors clustered by school. Because of space limitations, coefficient estimates on school fixed effects are not included.

Source: Authors' analysis based on Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

Table B6. Number of unique advanced courses offered per 100 students at high schools in Washington state, by school characteristic, 2009/10–2012/13

School characteristic	Advanced courses offered per 100 students
Percentage ever–English learner student quartile (relative to schools with less than 1 percent ever–English learner students)	
Second quartile (1–3 percent)	–2.561 (1.372)
Third quartile (3–9 percent)	–2.827* (1.38)
Fourth quartile (More than 9 percent)	–3.965* (1.541)
School composition characteristics	
Average standardized test score in math	1.488 (0.925)
Average standardized test score in reading	1.042 (0.767)
Percentage of students qualifying for special education services	–4.733 (2.991)
Percentage of students eligible for free or reduced-price lunch	1.345 (1.975)
Location, according to National Center for Education Statistics locale codes, relative to city schools	
Suburban schools	–0.477 (0.966)
Distant/fringe/remote schools	–0.491 (1.42)
Number of students in the school	–0.0004 (0.0006)
Student–teacher ratio (student enrollment/school full-time equivalent)	–0.012 (0.007)
Racial/ethnic composition (relative to percentage of students identifying as White)	
Percentage of students identifying as Asian	4.090 (7.845)
Percentage of students identifying as Black	7.740 (6.388)
Percentage of students identifying as Hispanic	3.883 (4.152)
Percentage of students identifying as American Indian	3.193 (2.902)
Percentage of students identifying as Native Hawaiian/Pacific Islander	–30.046 (28.584)
Percentage of students identifying as two or more races	–5.666 (6.082)
Constant	10.036*** (1.539)
Observations	1,903
Adjusted *R*-squared	0.623

* is significant at $p < .05$; *** is significant at $p < .001$.

Note: The sample includes high schools in Washington state from 2009/10–2012/13. Values reported are coefficient estimates from fixed-effects linear regression models. Numbers in parentheses are robust standard errors clustered by school district. Because of space limitations, coefficient estimates on fixed effects for the school district are not included.

Source: Authors' analysis of Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

Table B7. Characteristics of high schools in Washington state by English learner student concentration, 2009/10–2012/13

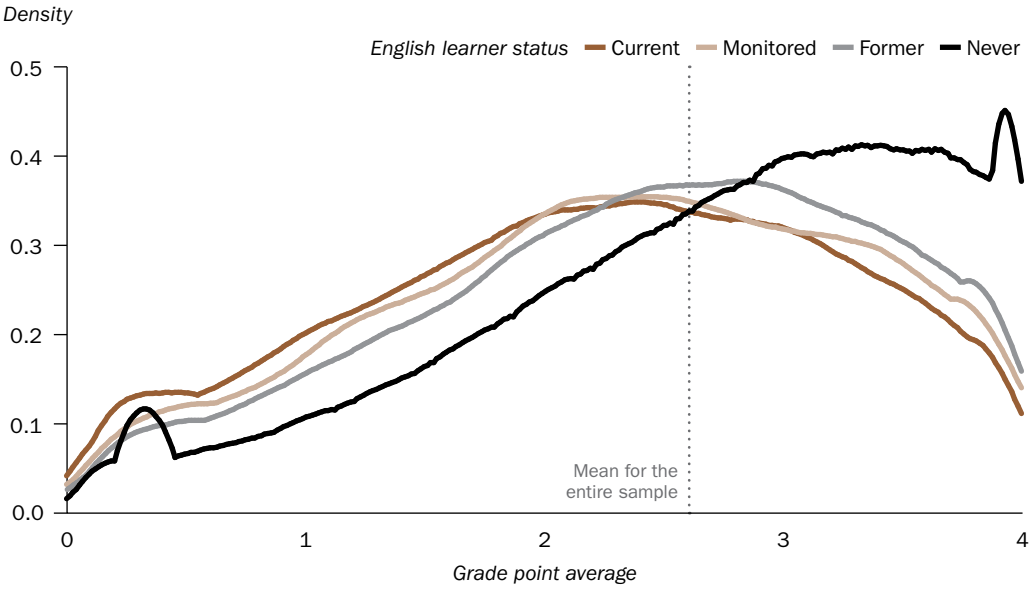
School characteristic	English learner student concentration at the school level			
	Less than 1 percent (*n* = 337)	1–3 percent (*n* = 407)	3–9 percent (*n* = 566)	More than 9 percent (*n* = 593)
Percentage of schools by location, according to National Center for Education Statistics locale code				
City	10	20	22	33
Suburb	18	35	46	27
Distant/fringe	40	38	20	29
Remote	33	6	11	11
Average percentage of students qualifying for free or reduced-price lunch	42	38	38	58
Average percentage of students who were ever English learner students	0.3	2	5	22
Average number of students	238	661	732	823
Average number of students per full-time equivalent educator	16	26	24	22
Average grade point average	2.36	2.29	2.36	2.29
Average standardized test score in math[a]	–0.03	–0.02	–0.04	–0.19
Average standardized test score in reading[a]	–0.05	–0.02	–0.01	–0.19
Percentage of students with standardized test scores in math of at least 0.5 standard deviation above the mean				
All students	22	24	27	19
Students who have never been classified as English learner students	22	24	26	17
Students who have ever been classified as English learner students	0	0	1	2
Percentage of students with reading scores of at least 0.5 standard deviation above the mean				
All students	20	22	23	18
Students who have never been classified as English learner students	20	22	23	16
Students who have ever been classified as English learner students	0	0	0	2
Percentage of students in the school by race/ethnicity				
Black	2	3	4	7
Hispanic	2	7	11	31
Asian	5	4	6	7
White	84	77	73	47
American Indian	4	4	2	4
Native Hawaiian/Pacific Islander	0	1	1	1
Two or more races/ethnicities	2	4	4	3

Note: The sample comprises schools that are included in the analysis for figure 8 in the main text.

a. Standardized to have a mean of 0 and a standard deviation of 1 for all students taking the test in Washington state within each grade level and school year.

Source: Authors' analysis of Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

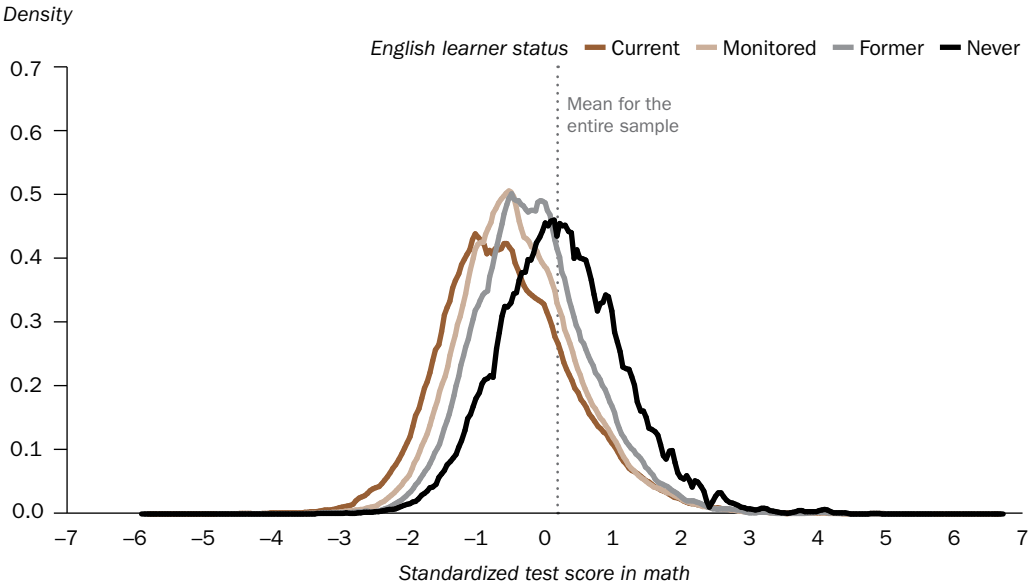
Figure B1. Distribution of grade point average in a single school year among current, monitored, and former English learner students and never–English learner students in Washington state high schools, 2009/10–2012/13



Note: Current English learner students are currently classified as English learner students and receive English learner services in the current school year. Monitored English learner students are students who were previously classified as English learner students but were reclassified as English proficient within the previous two school years. Former English learner students are students who were previously classified as English learner students but were reclassified as English proficient more than two school years ago. Never–English learner students are students who never qualified for English learner services.

Source: Authors' analysis based on Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

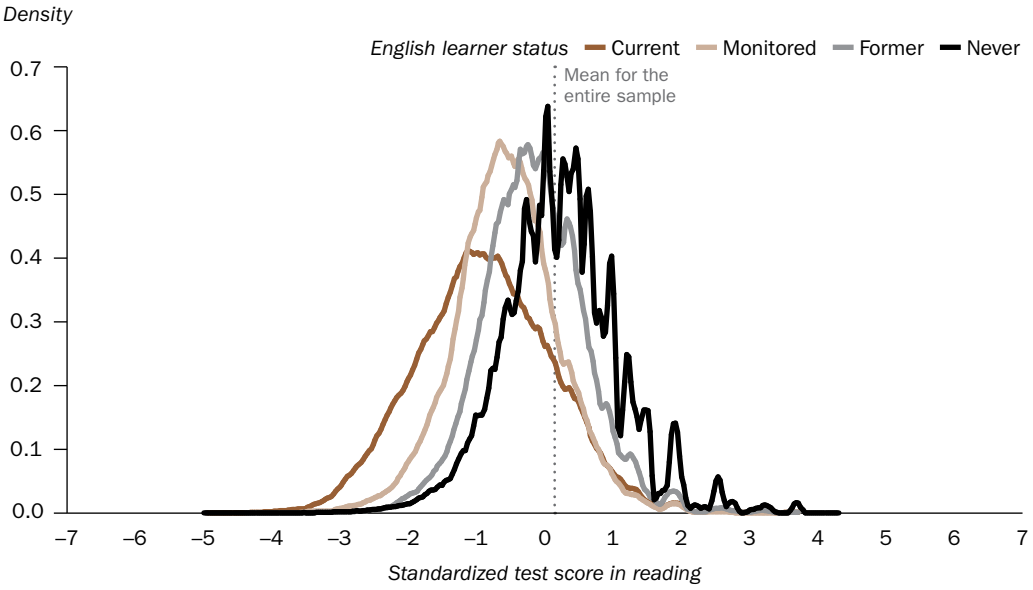
Figure B2. Distribution of standardized test scores in math among current, monitored, and former English learner students and never–English learner students in Washington state high schools, 2009/10–2012/13



Note: Current English learner students are currently classified as English learner students and receive English learner services in the current school year. Monitored English learner students are students who were previously classified as English learner students but were reclassified as English proficient within the previous two school years. Former English learner students are students who were previously classified as English learner students but were reclassified as English proficient more than two school years ago. Never–English learner students are students who never qualified for English learner services.

Source: Authors' analysis based on Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

Figure B3. Distribution of standardized test scores in reading among current, monitored, and former English learner students and never–English learner students in Washington state high schools, 2009/10–2012/13



Note: Current English learner students are currently classified as English learner students and receive English learner services in the current school year. Monitored English learner students are students who were previously classified as English learner students but were reclassified as English proficient within the previous two school years. Former English learner students are students who were previously classified as English learner students but were reclassified as English proficient more than two school years ago. Never–English learner students are students who never qualified for English learner services.

Source: Authors' analysis based on Washington Office of Superintendent of Public Instruction data for 2009/10–2012/13.

Notes

1. This finding and the following ones that correspond to figure 3 are derived from regression analysis. The specific models are described in the figure note and in equations A1–A4 in appendix A.
2. Less than 5 percent of current and monitored English learner students had reading test scores at or above the mean of never–English learner students enrolled in advanced courses. Therefore, that analysis is not discussed.

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