Making Connections

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English learner students' readiness for academic success: The predictive potential of English language proficiency assessment scores in Arizona and Nevada

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Key findings

Higher English language proficiency levels among English learner students in grades 3 and 6 in Arizona and Nevada were associated with higher passing rates on subsequent English language arts and math content tests. Grade 3 English learner students in Arizona and Nevada could score below the threshold for English language proficiency in 2009/10 and still have a 50 percent or higher probability of subsequently passing the English language arts and math content tests in 2010/11 or 2011/12; however, grade 6 students had to score above the proficiency threshold in order to have a 50 percent probability of subsequently passing the content tests.

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Summary

When is the right moment to transition an English learner student from part-time participation in English language development classes into full-time participation in mainstream English-only classes? English learner students should be moved into full-time mainstream English-only classes when they are sufficiently fluent in English to be able to continue to grow in English fluency and subject matter content knowledge and reach expected minimums on state content tests, generally within two years of the transition. Currently, transition criteria center on meeting the English language proficiency levels that each state sets for reclassification of English learner students as fluent English proficient at each grade level. However, no studies describe the extent to which such criteria work as intended. In other words, how ready are English learner students to achieve minimum subject matter content knowledge levels in English language arts and math at the English proficiency level for reclassification as fluent English proficient and placement in mainstream English-only classes?

This study examined the relationship between the English language proficiency level of English learner students in Arizona and Nevada and the students' subsequent performance on English language arts and math content tests. It followed two cohorts of students over three years, beginning in 2009/10: one cohort in grade 3 (elementary) and one in grade 6 (middle school). This report describes the percentage of English learner students at each proficiency level who passed the English language arts and math content tests in the two years following the English language proficiency assessment (2010/11–2011/12) as well as the probability that an English learner student would subsequently pass the content tests based on his or her English language proficiency assessment scale score.

English learner students at higher proficiency levels had higher passing rates on the academic content tests. For example, in Arizona 58 percent of grade 3 students at the intermediate proficiency level (level 4) in 2009/10 passed the English language arts content test at least once in 2010/11 or 2011/12, compared with 96 percent of grade 3 students at the proficient level (level 5).

Grade 3 English learner students in Arizona and Nevada could score below the threshold for English language proficiency in 2009/10 and still have a 50 percent or higher probability of subsequently passing the English language arts and math content tests in 2010/11 or 2011/12. For example, grade 3 English learner students in Nevada could score 25 scale score points below the reclassification threshold and still have a 50 percent or higher probability of passing the English language arts content test in the subsequent two years. But grade 6 English learner students in Arizona and Nevada needed to score above the threshold for reclassification as fluent English proficient. For example, in Nevada, grade 6 English learner students had to score 46 scale score points above the reclassification threshold to have a 50 percent or higher probability of passing the math content test in the subsequent two years.

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Why this study?

This study examined the relationship between the English language proficiency level of English learner students in Arizona and Nevada and the students' subsequent performance on English language arts and math content tests (see box 1 for definitions of key terms). By determining when an English language proficiency assessment score predicts performance at or above minimum expected levels on content tests in the subsequent two years, this study provides evidence on the extent to which English learner students who are reclassified as fluent English proficient are likely to succeed in mainstream English-only classes. This study also aims to help policymakers, administrators, and teachers better understand

Box 1. Key terms

Content tests. Both Arizona and Nevada administer tests to assess student content knowledge in math and English language arts or reading. During the study period, Arizona administered the Arizona Instrument to Measure Standards for math and English language arts content knowledge, and Nevada administered the Criterion Referenced Test for math and reading content knowledge.

English language proficiency assessment. An assessment used to determine the English language development level of English learner students. During the study period, Arizona administered the Arizona English Language Learner Assessment, and Nevada used LAS Links.

English language proficiency level. A classification of how a student performs on an English language proficiency assessment, based on his or her English language proficiency assessment scale score. Arizona and Nevada distinguish five English language proficiency levels. During the study period, Arizona's five English language proficiency levels, ranging from the lowest scale scores to the highest, were pre-emergent (level 1), emergent (level 2), basic (level 3), intermediate (level 4), and proficient (level 5), and Nevada's were entry (level 1), emerging (level 2), intermediate (level 3), advanced intermediate (level 4), and proficient (level 5). The specific scale scores associated with each English language proficiency level varied by grade level and by state. In 2013/14, after the study period, Nevada adopted the World-class Instructional Design and Assessment's ACCESS as its English language proficiency assessment; the new assessment uses proficiency levels different from the ones described in this study.

English language proficiency assessment scale score. The numerical score indicating how an English learner student performed on an English language proficiency assessment. Arizona's English language proficiency assessment scale scores range from 300 to 900; Nevada's range from 297 to 602 for grade 3 and from 341 to 666 for grade 6.

50 percent threshold scale score. The minimum English language proficiency assessment scale score needed to have a 50 percent or higher probability of passing an English language arts or math content test in the two years following the English language proficiency assessment.

Proficiency threshold. The minimum English language proficiency assessment scale score needed to achieve a certain proficiency level. Proficiency thresholds vary by grade level and by state. For example, for grade 3 students, the proficiency threshold on Arizona's assessment is 664 and the proficiency threshold on Nevada's assessment is 540.

Reclassified fluent English proficient student. A student who has scored proficient on the English language proficiency assessment and qualified for full-time placement in mainstream English-only classes.

the diversity of reclassified English learner students in order to target them for additional support. By knowing which reclassified English learner students have and do not have the English proficiency needed to attain expected academic performance in mainstream English-only classrooms in the subsequent two years, educators may be able to determine how to help those students effectively.

Scoring at the proficient level on an English language proficiency assessment is a core benchmark for English learner students (see box 2 for details on Arizona and Nevada's English language proficiency assessments). Until scoring at the proficient level, English learner students in Arizona must be enrolled in English language development support programs and have limited opportunities to participate in mainstream English-only classes (Rios-Aguilar, Gonzalez-Canche, & Moll, 2010). Arizona schools with a low percentage of English learner students require each student to have an individual language plan that includes English language development support, both in and outside mainstream classes (Rios-Aguilar et al., 2010). Arizona schools with a higher percentage of English learner students place those students in pull-out structured English immersion classrooms, which are separate from mainstream classes for the entire school day (Rios-Aguilar et al., 2010). In Nevada the two largest school districts—Clark County School District and Washoe County School District—were examined,[1] and they offer several English language development programs, including partial pull-out and push-in models.[2] In both Arizona and Nevada English learner students at the proficient level (level 5) are reclassified as fluent English proficient and placed full time in mainstream English-only classes (Rios-Aguilar et al., 2010).

Determining when the English fluency of reclassified English learner students is advanced enough for them to meet expected minimums on state content tests is of increasing interest

Both states monitor students' performance for two years following reclassification (see box 2). Reclassified fluent English proficient students who do not meet the state's academic performance requirements during the monitoring period may have to re-enter an English language development support program. Students who meet the requirements for staying in mainstream English-only classes but who do not pass the state English language arts or math content tests during the monitoring period remain in their English-only mainstream classes, although they may take more than two years to pass the content tests—or may not pass at all (see, for example, de Jong, 2004; Slama, 2012; see also Haas, Huang, & Tran, 2014; Haas, Huang, Tran, & Yu, 2016a, b).

The research consensus is that the level of English fluency needed for reclassification and meaningful participation in mainstream English-only classes is lower than the level of fluency in academic English, the level at which (former) English learner students can consistently pass content tests in English (Bailey, 2006a; Tsang, Katz, & Stack, 2008). Exactly when English learner students transition from reclassification fluency to fluency in academic English is unclear. Thus, determining when the English fluency of reclassified English learner students is advanced enough for them to meet expected minimums on state content tests is of increasing interest (Bailey, 2006b; de Jong, 2004; Slama, 2012).

The limited but growing research on determining when English learner students become fluent in academic English (Bailey, 2006a) provides a foundation for the current analysis. The research literature consistently shows that English learner students' English proficiency levels are highly correlated with concurrent scores on state assessments of reading, writing, and math and with other measures of academic performance (Ardasheva, 2010; Ardasheva, Tretter, & Kinny, 2012; Mahon, 2006; Oakeley & Urrabazo, 2001; Solorzano, 2008; Tsang et al., 2008).

Box 2. Arizona and Nevada criteria for exiting English learner support programs and policies for monitoring students who are reclassified as fluent English proficient

Arizona

In 2009/10, to exit the English language development support program, English learner students had to have an average score of proficient (level 5) on the four subsections (listening, speaking, reading, writing) of Arizona's English language proficiency assessment, the Arizona English Language Learner Assessment.

Once they exited the support program, reclassified English learner students were retested annually on the assessment for two years to monitor proficiency. Students who did not continue to score at the proficient level (level 5) re-entered the support program, subject to parent consent.

Nevada

In 2009/10, to exit the English language development support program, English learner students had to have an average score of proficient (level 5) overall and a score of advanced intermediate (level 4) or higher on all four subsections (listening, speaking, reading, and writing) of Nevada's English language proficiency assessment, LAS Links.

Once they exited the support program, reclassified English learner students' progress was monitored for at least two years based on criteria set by the districts. For example, to be considered academically successful in Clark County, the Nevada district with the largest number of English learner students, reclassified students in grade 9 had to have no grade below a "C" in English or reading, math, science, and social studies. Students who scored below a "C" in any of those subjects were administered the LAS Links to determine their level of English proficiency. Students whose LAS Links score was below proficient would likely re-enter the English language development support program, subject to parent approval.

Source: Arizona Department of Education (2015) and Clark County School District (2011).

Understanding when English learner students become fluent in academic English and the predictive value of English language proficiency assessment scores is complicated by changes in academic demands across grade levels as well as uncertainty about variations in testing rigor across states

A subset of studies examines the relationship of English proficiency to the academic performance of reclassified English learner students. Tsang et al. (2008) found that correlations between overall California English Language Development Test scores and Stanford Achievement Test, Ninth Edition, reading and math scores were positive and significant for a combined group of current and reclassified English learner students during 2000/01.[3] Saunders and Marcelletti (2013) found that the percentage of reclassified English learner students who met or exceeded the passing level on the California Standards Test was comparable to that of native English-speaking students in the three grade levels examined, with the percentage of reclassified English learner students slightly lower than that of native English speakers in grades 8 and 10 and higher in grade 5.

Understanding when English learner students become fluent in academic English and the predictive value of English language proficiency assessment scores is further complicated by changes in academic demands across grade levels as well as uncertainty about variations in testing rigor across states. Across grade levels the gap between the English proficiency needed to pass an English language proficiency assessment and the academic literacy needed to pass an English language arts and math academic content test is small in the elementary grades and increases through high school (see, for example, Cummins, 2011; Hakuta, 2011; Krashen, 2002, 2011). Further, states use a variety of English language proficiency assessments and subject matter content tests, so the exact difference in

reclassification English literacy and academic English literacy at each grade level likely varies by state as well. Thus the predictive value of any English language proficiency assessment score will likely vary across grade levels and states as well.[4]

In the studies described, as well as in other studies that the study team located, reclassified English learner students were treated as a homogeneous group, with no distinction by the number of years of participation as a reclassified English learner in mainstream English-only classes. Further, none of the studies examined passing rates on future content tests based on a reclassified student's English language proficiency assessment scores before reclassification. In other words, those studies were not intended to directly respond to the implicit assumption at reclassification: that English learner students have enough English fluency to progress to full academic fluency corresponding to at least the minimum expected academic performance while participating in mainstream English-only classes.

What the study examined

This study examined the relationship between the English language proficiency level of English learner students and their subsequent performance on English language arts and math content tests

This study examined the relationship between the English language proficiency level of English learner students and their subsequent performance on English language arts and math content tests. The analysis also used English language proficiency assessment scale scores (which are more sensitive and have more discriminating power than proficiency level) to determine the probability that students would demonstrate academic success (in terms of passing English language arts and math content tests) in the two years following the proficiency assessment.[5] Specifically, the results were used to identify the threshold score at which a student had a 50 percent or higher probability of passing the content tests at least once in the subsequent two years.[6]

The analysis addressed the following research questions:

1. How do English language proficiency levels relate to passing rates on English language arts and math content tests in the two years following the proficiency assessment?

2. What is the relationship between English language proficiency assessment scale scores and the probability of passing the English language arts and math content tests in the two years following the proficiency assessment?

The study team carried out the analyses with data on a grade 3 cohort and a grade 6 cohort of English learner students in Arizona and Nevada who were followed from the 2009/10 school year through spring of the 2011/12 school year. The initial English language proficiency assessment scale score was for 2009/10, and the English language arts and math content test scores were for 2010/11 and 2011/12. The cohorts included all English learner students enrolled in the respective grade levels in Arizona and all English learner students enrolled in the respective grade levels in Nevada's two largest school districts—Clark County School District and Washoe County School District—which serve about 84 percent of the state's K–12 public school students and 94 percent of the state's total English learner student population.

In both the Arizona and Nevada study samples more than 80 percent of the students were eligible for the federal school lunch program, and at least 64 percent scored at one of the

two highest English language proficiency levels in the first year of the study (see tables A1 and A2 in appendix A for characteristics of the study sample).

First, the study's sample of students were grouped by their 2009/10 English language proficiency levels; then each group's passing rates for the English language arts and math content tests were calculated—that is, the percentage of students at each proficiency level who passed the content tests in the two years following the proficiency assessment. Next, the study team used logistic regression to evaluate the relationship between students' 2009/10 English language proficiency assessment scale scores and students' subsequent rates of passing the content tests (see appendix B for details on the methodology of the report).

Results for research question 1 describe actual student results and group passing rates on English language arts and math content tests by English language proficiency level and grade level. Results for research question 2 describe how well students in each grade level had to score on the English language proficiency assessment to have a 50 percent or higher probability of passing the English language arts and math content tests in the subsequent two years. Comparing the results for English learner students in the grade 3 and grade 6 cohorts permits identification of differences between younger and older English learner students.

In general, English learner students at higher English language proficiency levels had higher passing rates on content tests in the two years following the proficiency assessment

What the study found

This section presents the findings for each research question.

English language proficiency level and passing rates on the content tests

In general, English learner students at higher English language proficiency levels had higher passing rates on content tests in the two years following the proficiency assessment. With two exceptions, English learner students in Arizona and Nevada who started the study at higher English language proficiency levels had higher passing rates on the English language arts and math content tests in the subsequent two years (tables 1 and 2).[7] For example, 12 percent of Arizona English learner students in the grade 3 cohort at the

Table 1. Percentage of Arizona English learner students who passed the content tests at least once in 2010/11 or 2011/12 following the 2009/10 English language proficiency assessment, by cohort, subject, and proficiency level

	Grade 3 cohort		Grade 6 cohort	
Proficiency level	English language arts	Math	English language arts	Math
Pre-emergent	10	20	[a]	[a]
Emergent	3	3	[a]	[a]
Basic	12	9	10	5
Intermediate	58	42	16	7
Proficient	96	86	73	46
Overall	75	62	65	41

Note: Grade 3: pre-emergent (n = 30), emergent (n = 90), basic (n = 3,636), intermediate (n = 19,860), and proficient (n = 26,130); grade 6: pre-emergent ($n \leq 3$), emergent ($n \leq 3$), basic (n = 252), intermediate (n = 2,754), and proficient (n = 19,302).

a. Value is suppressed to reduce the risk of study participants (including districts and schools) being identified.

Source: Authors' analysis of administrative data from the Arizona Department of Education, 2009/10–2011/12.

Table 2. Percentage of Nevada English learner students who passed the content tests at least once in 2010/11 or 2011/12 following the 2009/10 English language proficiency assessment, by cohort, subject, and proficiency level

Proficiency level	Grade 3 cohort		Grade 6 cohort	
	English language arts	Math	English language arts	Math
Entry	4	13	0	0
Emerging	6	26	0	8
Intermediate	29	54	2	21
Advanced intermediate	74	84	15	46
Proficient	94	96	36	69
Overall	59	72	17	43

Note: Grade 3: entry (n = 102), emerging (n = 473), intermediate (n = 1,817), advanced intermediate (n = 3,053), and proficient (n = 1,176); grade 6: entry (n = 30), emerging (n = 196), intermediate (n = 596), advanced intermediate (n = 1,208), and proficient (n = 705).

Source: Authors' analysis of administrative data from Clark County School District and Washoe County School District, 2009/10–2011/12.

Grade 3 English learner students in Arizona and Nevada had higher passing rates on the English language arts and math content tests in the two years following the English language proficiency assessment than did grade 6 English learner students at the same proficiency level

basic proficiency level (level 3) passed the English language arts content test at least once in the subsequent two years, compared with 58 percent at the intermediate level (level 4) and 96 percent at the proficient level (level 5). There were also wide differences in passing rates on the content tests between consecutive proficiency levels. For example, the difference in passing rates between students at the highest level and those at the second highest level ranged from 12 percentage points (Nevada, grade 3, math) to 57 percentage points (Arizona, grade 6, English language arts).

Among Arizona and Nevada English learner students at the same proficiency level, passing rates on the English language arts and math content tests were higher in grade 3 than in grade 6. Grade 3 English learner students in Arizona and Nevada had higher passing rates on the English language arts and math content tests in the two years following the English language proficiency assessment than did grade 6 English learner students at the same proficiency level (see tables 1 and 2). The difference across grades in passing rates on the English language arts content tests ranged from 2 percentage points (Arizona, basic proficiency, level 3) to 59 percentage points (Nevada, advanced intermediate proficiency, level 4). The difference in passing rates on the math content test across grades ranged from 4 percentage points (Arizona, basic proficiency, level 3) to 40 percentage points (Arizona, proficient, level 5).

English language proficiency assessment scale scores and probability of passing the content tests

This section describes the proficiency threshold—the minimum English language proficiency assessment scale scores—for English learner students to have a 50 percent or higher probability of passing the English language arts and math academic content tests in the subsequent two years. The 50 percent threshold was chosen to provide an initial discussion benchmark. Most English learner students reach academic English fluency after they reach English fluency sufficient for reclassification. Because the students whose scores are examined in this study are still English learner students, they likely have additional years of development before they will reach full academic fluency and can be expected to consistently pass academic content tests. English language proficiency assessment scale scores for

other probability levels are presented in figures C1–C4 in appendix C. The expected and actual number of students who passed the content tests using the 50 percent and additional probability thresholds are shown in tables A9–A12 in appendix A.

The study team used two methods to compare the differences across grade levels in English language proficiency scale scores needed to have a 50 percent probability of passing the English language arts or math content tests. One method was to calculate the percentile ranking of the minimum proficiency assessment scale score for a grade level in the distribution of all scale scores in that grade level; the other method was to standardize the different points between the minimum scale scores and the proficiency threshold.

To have a 50 percent or higher probability of passing the English language arts or math content test in the two years following the English language proficiency assessment, grade 3 English learner students in Arizona and Nevada could score below the proficiency threshold. To have a 50 percent probability of passing the English language arts content test at least once in the two years following the English language proficiency assessment, Arizona grade 3 English learner students needed a scale score of at least 635, which is 29 points (about 0.8 standard deviation) below the proficiency threshold (level 5; figure 1 and table 3), or at about the 22nd percentile of the state's grade 3 score distribution (see table D1 in appendix D). Nevada grade 3 English learner students needed a scale score of at least 515, which is 25 points (about 0.8 standard deviation) below the proficiency threshold (level 5; see figure 1 and table 4), or at about the 37th percentile of the state's grade 3 score distribution (see table D1 in appendix D).

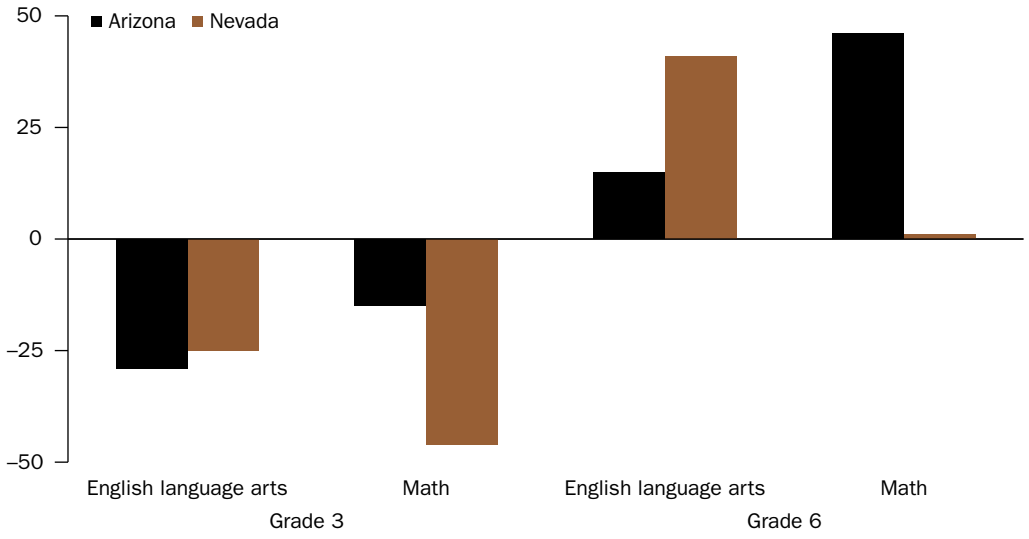
To have a 50 percent probability of passing the English language arts content test at least once in the two years following the English language proficiency assessment, Arizona grade 3 English learner students needed a scale score of at least 635, which is 29 points below the proficiency threshold. Nevada grade 3 English learner students needed a scale score of at least 515, which is 25 points below the proficiency threshold

To have a 50 percent probability of passing the math content test at least once in the two years following the English language proficiency assessment, Arizona grade 3 English learner students needed a scale score of at least 649, which is 15 points (0.4 standard deviation) below the proficiency threshold (level 5; see figure 1 and table 5), or at about the 34th percentile of the state's grade 3 score distribution (see table D1 in appendix D for a list of key scale scores and percentile ranks). Nevada grade 3 English learner students needed a scale score of at least 494, which is 46 points (1.5 standard deviations) below the proficiency threshold (level 5; see figure 1 and table 6), or at about the 16th percentile of the state's grade 3 score distribution (see table D1 in appendix D).

To have a 50 percent or higher probability of passing the English language arts or math content test in the two years following the English language proficiency assessment, grade 6 English learner students in Arizona and Nevada needed a proficiency scale score that exceeded the threshold for reclassification as fluent English proficient. To have a 50 percent or higher probability of passing the English language arts content test, Arizona grade 6 English learner students needed a scale score of at least 692, which is 15 points (0.4 standard deviation) above the proficiency threshold (level 5; see figure 1 and table 3), or at about the 30th percentile of the state's grade 6 score distribution (see table D1 in appendix D for a list of key scale scores and percentile ranks). Nevada grade 6 English learner students needed a scale score of at least 587, which is 41 points (1.3 standard deviations) above the proficiency threshold (level 5; see figure 1 and table 4), or at the 97th percentile of the state's grade 6 score distribution (see table D1 in appendix D).

Figure 1. Grade 3 English learner students in Arizona and Nevada could score below the threshold for English language proficiency in 2009/10 and still have a 50 percent or higher probability of subsequently passing the English language arts and math content tests in 2010/11 or 2011/12, but grade 6 students had to score above the proficiency threshold

Difference between proficiency threshold and English language proficiency assessment scale score needed to have a 50 percent or higher probability of passing the English language arts or math content test in the subsequent two years (points)



Note: Grade 3: Arizona, *n* = 49,746; Nevada, *n* = 6,621. Grade 6: *n* = 22,311; *n* = 2,735.

Source: Authors' analysis of administrative data from Clark County School District, Washoe County School District, and the Arizona Department of Education, 2009/10–2011/12.

Table 3. Arizona minimum 2009/10 English language proficiency assessment scale scores needed to have a 50 percent probability of passing the English language arts content test in 2010/11 or 2011/12, and threshold scale score for intermediate and proficient levels, by cohort

	Grade 3 cohort (*n* = 49,746)		Grade 6 cohort (*n* = 22,311)	
Scale score objective	Scale score	Probability (percent)	Scale score	Probability (percent)
50 percent probability of passing the English language arts test	635	50	692	50
Threshold for intermediate proficiency (level 4)	615	21	630	4
Threshold for proficient (level 5)	664	87	677	32

Source: Authors' analysis of administrative data from the Arizona Department of Education, 2009/10–2011/12.

Table 4. Nevada minimum 2009/10 English language proficiency assessment scale score needed to have a 50 percent probability of passing the English language arts content test in 2010/11 or 2011/12, and threshold scale scores for advanced intermediate and proficient levels, by cohort

Scale score objective	Grade 3 cohort (*n* = 6,621)		Grade 6 cohort (*n* = 2,735)	
	Scale score	Probability (percent)	Scale score	Probability (percent)
50 percent probability to pass the English language arts test	515	50	587	50
Threshold for advanced intermediate proficiency (level 4)	516	51	524	6
Threshold for proficient (level 5)	540	83	546	14

Source: Authors' analysis of administrative data from Clark County School District and Washoe County School District, 2009/10–2011/12.

Table 5. Arizona minimum 2009/10 English language proficiency assessment scale score needed to have a 50 percent probability of passing the math content test in 2010/11 or 2011/12, and threshold scale scores for intermediate and proficient levels, by cohort

Scale score objective	Grade 3 cohort (*n* = 49,752)		Grade 6 cohort (*n* = 22,299)	
	Scale score	Probability (percent)	Scale score	Probability (percent)
50 percent probability to pass the math test	649	50	724	50
Threshold for intermediate proficiency (level 4)	615	15	630	3
Threshold for proficient (level 5)	664	69	677	15

Source: Authors' analysis of administrative data from the Arizona Department of Education, 2009/10–2011/12.

Table 6. Nevada minimum 2009/10 English language proficiency assessment scale score needed to have a 50 percent probability of passing the math content test in 2010/11 or 2011/12, and threshold scale scores for advanced intermediate and proficient levels, by cohort

Scale score objective	Grade 3 cohort (*n* = 6,619)		Grade 6 cohort (*n* = 2,743)	
	Scale score	Probability (percent)	Scale score	Probability (percent)
50 percent probability to pass the math test	494	50	547	50
Threshold for advanced intermediate proficiency (level 4)	516	72	524	32
Threshold for proficient (level 5)	540	88	546	49

Source: Authors' analysis of administrative data from Clark County School District and Washoe County School District, 2009/10–2011/12.

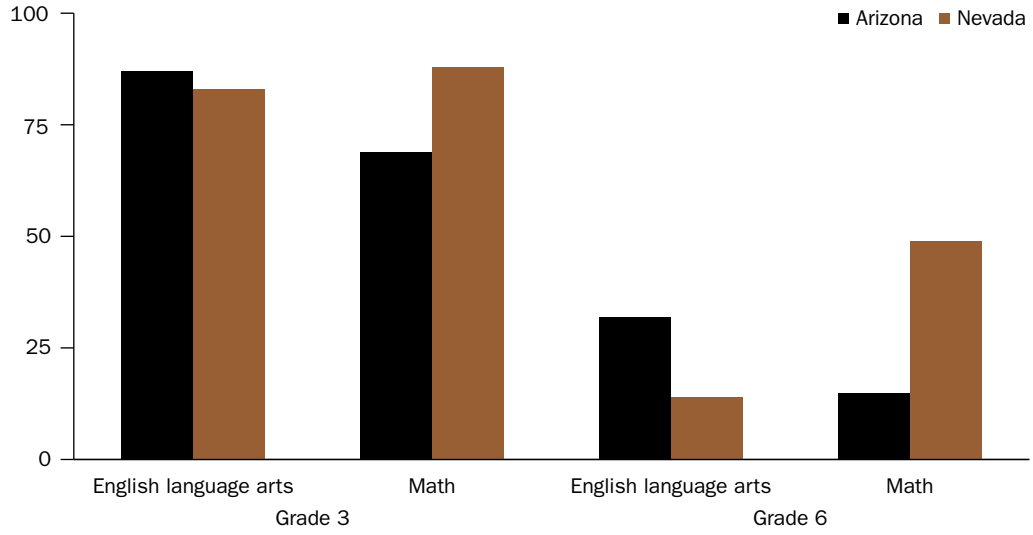
To have 50 percent or higher probability of passing the math content test, Arizona grade 6 English learner students needed a scale score of at least 724, which is 46 points (1.3 standard deviations) above the proficiency threshold (level 5; see figure 1 and table 5), or at about the 70th percentile of the state's grade 6 score distribution (see table D1 in appendix D). Nevada grade 6 English learner students needed a scale score of at least 547, which is 1 point (0.03 standard deviation) above the proficiency threshold (level 5; see figure 1 and table 6), or at about the 63rd percentile of the state's grade 6 score distribution (see table D1 in appendix D).

Arizona and Nevada grade 3 English learner students at the proficiency threshold had at least an 83 percent probability of passing the English language arts content test and at least a 69 percent probability of passing the math content test in the subsequent two years. The probability was lower among grade 6 English learner students. Arizona and Nevada grade 6 English learner students at the proficiency threshold had at most a 32 percent probability of passing the English language arts content test and at most a 49 percent probability of passing the math content test in the subsequent two years (figure 2; see also tables 3–6).

Arizona and Nevada grade 3 English learner students at the proficiency threshold had at least an 83 percent probability of passing the English language arts content test and at least a 69 percent probability of passing the math content test in the subsequent two years

Figure 2. Grade 3 English learner students in Arizona and Nevada had a 50 percent or higher probability of passing the English language arts and math content tests in 2010/11 or 2011/12 when scoring at the minimum proficiency level for reclassification (level 5) in 2009/10, but grade 6 students had to score higher

Probability of passing the subsequent English language arts or math content test when scoring at the minimum English language proficiency level for reclassification (percent)



Note: Grade 3: Arizona, *n* = 49,746; Nevada, *n* = 6,621. Grade 6: *n* = 22,311; *n* = 2,735.

Source: Authors' analysis of administrative data from Clark County School District, Washoe County School District, and the Arizona Department of Education, 2009/10–2011/12.

Implications of the study findings

Two findings of this study were consistent with the current research, and two extended the current research. All the findings have implications for education practice for teachers and administrators and suggest several areas for further research.

Two of the study's findings were similar for both Arizona and Nevada and were consistent with the research literature. The first is that English learner students at higher English language proficiency levels tended to have higher passing rates on content tests in the two years following the proficiency assessment. That finding is consistent with the research literature that suggests that English proficiency levels are positively correlated with performance on concurrent statewide assessments in reading and math (Ardasheva, 2010; Ardasheva et al., 2012; Mahon, 2006; Oakeley & Urrabazo, 2001; Solorzano, 2008; Tsang et al., 2008).

The finding that English learner students at higher English language proficiency levels tended to have higher passing rates on content tests in the two years following the proficiency assessment is consistent with the research literature that suggests that English proficiency levels are positively correlated with performance on concurrent statewide assessments in reading and math

The second finding is that grade 3 English learner students who scored at English language proficiency level 4 or 5 had a higher probability of passing the content tests in the subsequent two years than did grade 6 students at the same proficiency levels. That finding is consistent with the research literature that shows that older English learner students generally make slower academic progress than do younger English learner students (for example, Cook, Wilmes, Boals, & Santos, 2008; Saunders & Marcelletti, 2013).

Two findings extended the current research literature. First, grade 3 English learner students in both Arizona and Nevada did not have to achieve proficiency to have at least a 50 percent probability of passing the English language arts and math content tests at least once in the subsequent two years. In fact, reaching the proficiency threshold gave them at least a 69 percent probability of passing the content tests at least once in the subsequent two years. Second, among grade 6 English learner students in both Arizona and Nevada, the English language proficiency assessment scale score associated with a 50 percent or higher probability of passing the English language arts and math academic content tests at least once in the subsequent two years was higher than the proficiency threshold, the minimum score needed for reclassification and full-time placement in mainstream English-only classes, by 0.4–1.3 standard deviations (see tables 3–6). No other research seems to have been published that describes this relationship between English language proficiency assessment scores and subsequent content test scores and the differences among students across grade levels.

Implications for practice

For both Arizona and Nevada, grade 3 English learner students were generally successful as measured by one-time content test passing rates, which suggests that education practices during the study period for grade 3 English learner students were mostly effective. For grade 3 English learner students who scored at the reclassification threshold, the probability of passing the English language arts or math content tests at least once within two years ranged from 69 percent to 88 percent. In contrast, grade 6 English learner students were much less successful on these content tests, which suggests that educational practices during the study period for grade 6 English learner students were less effective than those for the grade 3 English learner students. These findings suggest two implications for school practice for middle and high school students.

First, the findings suggest that to meet minimum levels of academic achievement in the transition to mainstream English-only classrooms, middle and high school students need a longer period of English language development support than the grade 6 English learner students in this study received. Among grade 6 English learner students who scored at the reclassification threshold, the probability of passing the academic content tests at least once in the subsequent two years ranged from 14 percent to 49 percent. So even though those grade 6 English learner students had scored high enough to test out of the English language development support program, their performance on subsequent content tests indicates that most continued to struggle with the higher demands of English language arts and math for the next two years. The majority of these grade 6 English learner students who scored at the reclassification threshold will not pass the academic content tests until at least their third attempt, beginning in grade 9.

In determining the duration of support services needed for academic success, the findings appear consistent with the research literature: grade 6 English learner students require a total of at least five to seven years of support and instruction in English before they acquire enough academic English proficiency to perform at expected levels in a mainstream English-only classroom (Hakuta, Butler, & Witt, 2000; Tsang et al., 2008). Further, as these grade 6 students progress into high school, many may continue to struggle to reach full academic fluency and pass the academic content tests. For example, Slama (2012) found that a large number of high school English learner students had spent at least nine years in U.S. schools without reaching full academic fluency, which includes their ability to achieve minimum achievement levels on academic content tests. With a longer period of support, more English learner students at the middle and high school levels may have a better chance of fully transitioning to expected levels of performance in academic content areas (see, for example, Haas, Huang, & Tran, 2014; Haas et al., 2015; Haas, Huang, Tran, & Yu, 2016, a, b).

The findings suggest that to meet minimum levels of academic achievement in the transition to mainstream English-only classrooms, middle and high school students need a longer period of English language development support than the grade 6 English learner students in this study received

Providing longer English language development support for middle and high school students might occur in different ways. For example, a higher reclassification proficiency threshold could be used to ensure that English learner students are ready to perform at expected levels once they transition to English-only classrooms. Or two years after reclassification might be too soon for middle and high school English learner students to perform at or above expected levels of academic performance, at least as measured by standardized content tests, so English learner students who score high enough to be reclassified will likely need ongoing support in the years immediately following reclassification, including in their mainstream English-only content classes.

Second, the findings suggest that middle and high school English learner students may need more support that is more intensive than and possibly different from what they received during the study period, both prior to and after reclassification, before they are ready to perform at expected levels in academic content areas. Middle and high school English language development programs may need to be revised. In addition, specific transitional assistance in mainstream English-only classrooms at the middle and high school level may need to be implemented or revised.

The need for longer, more, or different support for English learner students to achieve full academic English proficiency will likely affect the classroom practices of middle and high school subject matter content teachers. The greater struggles of the grade 6 English

learner students compared with the grade 3 English learner students might be due to the increasing difficulty of the content tests at higher grade levels. As grade level increases, a growing gap seems to develop between the English proficiency level needed to score well on the English language proficiency assessments and the academic literacy needed to pass the English language arts and math content tests. In other words, the level of English proficiency needed for reclassification might be closer to fluency at the everyday English level, which may remain somewhat constant across grade levels, whereas the level of academic English fluency (or academic literacy) required for content mastery in English language arts and math generally increases, possibly even dramatically, at higher grade levels (see, for example, Cummins, 2011; Hakuta, 2011; Krashen, 2002, 2011). As a result, secondary school content teachers may need to develop strategies for integrating academic language and content knowledge development in English-only classrooms to sufficiently support the development of their newly reclassified English learner students (Arizona Department of Education, 2015). With college and career-ready standards across the curriculum focusing more on writing, the need for effective support for reclassified English learner students as part of their subject matter content classes will likely increase as well.

With college and career-ready standards across the curriculum focusing more on writing, the need for effective support for reclassified English learner students as part of their subject matter content classes will likely increase

This study also found that English learner students' passing rates on the English language arts content test differed from those on the math content test, indicating that different support may be needed for different subjects. However, the nature of the difference was not consistent across the two states in this study: in Arizona English learner students' passing rates were higher on the English language arts content test than on the math content test, but in Nevada passing rates were higher on the math content test than on the English language arts content test. That contrast may have several causes, such as different instructional practices (an emphasis on full-day pull-out programs in Arizona and a mix of partial pull-out and push-in programs in Nevada), different state standards, differences in the populations and needs of the English learner students in each state, or differences in the relative difficulty of the states' English language arts and math content tests. The value of further research into the types of support that may be needed for math versus English language arts is discussed in the next section.

Implications for further research

Examining additional grade levels other than grades 3 and 6 may provide information on the generalizability of this study's findings. Extending the research in that manner could provide more reliable insights for policymakers on what additional support might be needed for students at different grade levels (see, for example, Cook, Linquanti, Chinen, & Jung, 2012). In addition, studies on the extent to which these findings are consistent in more testing contexts across similar grade levels would provide information on the generalizability of these findings. For example, in 2013/14, after the current study period, Nevada adopted the World-class Instructional Design and Assessment (WIDA) ACCESS as its English language proficiency assessment. Future research could explore whether the differences in grade 3 and grade 6 probabilities continue in Nevada's new English language proficiency standards and assessment context, as well as the extent to which these probability patterns occur in other states that administer the WIDA ACCESS.

Studies that incorporate other factors—such as the student's status as a first-, second-, or third-generation English learner student in the United States; the length of time a student is in English learner status; and the grade level in which a student is reclassified—may

provide additional information that could help narrow the performance gap between current and former English learner students and native English-speaking students. For example, de Jong (2004) and Slama (2012) found that the students in these additional English learner subgroups, for both current and reclassified English learner students, had different cumulative passing percentages on English language arts and the math content tests. Findings such as these suggest that decisions about placement in English-only classrooms or about providing additional support for students in English-only classrooms might depend on more than just English language proficiency assessment scores, and might include the characteristics of students in additional English learner subgroups that will enable more focused diagnostics.

As noted previously, it could be beneficial to understand how current and former English learner students' needs vary across different content areas and contexts. The finding that grade 3 and grade 6 English learner students in Arizona had higher passing rates on the English language arts content test than on the math content test—which was the opposite of the results in Nevada and different from findings of other research in general—suggests a need to further explore possible explanations. For example, the Arizona results could stem from a greater academic literacy level required by the state's math assessment compared with Nevada's assessment. The Arizona results could also result from less emphasis on math content teaching in the state's English language development program compared with Nevada's program. Differences may also result from the way reclassified fluent English proficient students are supported in their mainstream classes. Mosqueda and Maldonado (2013) point out that educators must provide adequate linguistic support for English learner students to be able to access high-level math skills and reasoning. Deeper comparative research of the assessment content and teaching programs in Arizona and Nevada, or among any group of states with differing practices, can reveal effective types of linguistic support in classroom practices and optimum levels of linguistic complexity in assessments. Such investigations may enable English learner and reclassified fluent English proficient students to more effectively develop and demonstrate content knowledge in various subject areas.

Deeper comparative research of the assessment content and teaching programs in Arizona and Nevada, or among any group of states with differing practices, can reveal effective types of linguistic support in classroom practices and optimum levels of linguistic complexity in assessments

In sum, this study provides evidence that many English learner students may not yet be ready for full academic success within two years of reclassification and placement in mainstream English-only classes. This state of affairs was particularly true for students in grade 6. Further research could provide more detailed information about which subgroups of English learner students are more likely to struggle once they transition to mainstream English-only classes, how the reclassification criteria might be adjusted to minimize those struggles, and what support could improve English learner students' academic performance, especially those in the secondary grades.

Limitations of the study

This study has four limitations. The first concerns the scope of the sample, which excludes mobile students who left or entered Arizona or the two school districts in Nevada during the study period or who had atypical grade level progression, such as grade skipping or retention.[8] As a result, the sample group of English learner students is more stable than the total population of English learner students present in most schools. Thus the overall probability of achieving proficiency could be overestimated for the sample compared with the English learner student population as a whole. In addition, the relationship between

English language proficiency assessment scores and passing rates on content area assessments may differ between this group and the English learner student population as a whole. The study team conducted a separate analysis for Arizona, which provided data for multiple grades per cohort, and found similar results when the analysis included those students who did not have typical grade level progression.

The second limitation concerns differences in the scope of the samples between Arizona and Nevada. For Arizona the indicators for eligibility for special education services and eligibility for the federal school lunch program were available only for 2006/07 and not for 2009/10 (the first year of the study period). To use these indicators in the analyses, students in the Arizona cohort had to be in Arizona public schools for both 2006/07 and 2009/10. The study team expected that most of the English learner students in Arizona public schools for both 2006/07 and 2009/10 were enrolled continuously for at least that four-year period. For English learner students in the Nevada sample, data from 2009/10 were used for both the indicators and the test score data. As a result, the Nevada sample could include English learner students who newly enrolled in 2009/10 as well as those who had been continuously enrolled since at least one year earlier, 2008/09. Because of the differences in the criteria for the Arizona and Nevada samples, the Arizona sample is likely more stable than both the Arizona English learner population as a whole and the Nevada sample. As described above, the greater stability of a sample may result in an overestimation of the overall probability of achieving proficiency. As a result, the Arizona sample may overestimate the overall probability compared with the Nevada sample.

This study provides evidence that many English learner students may not yet be ready for full academic success within two years of reclassification and placement in mainstream English-only classes

The third limitation concerns the English language proficiency assessments core data in Nevada. During the study period Nevada used the LAS Links as its proficiency assessment, but in 2013/14 the state began using WIDA ACCESS for its proficiency assessment. As a result, the findings cannot be directly applied to the current Nevada testing context.[9] However, the study findings, generally consistent across Arizona and Nevada, raise general concerns about whether current transition proficiency thresholds for English learner students are appropriate, and the analysis can serve as an example that can be applied to any testing context.

The fourth limitation concerns the differences in state testing contexts. Given that most states have different combinations of English language proficiency and subject matter academic content tests from the ones examined in this study for Arizona and Nevada, the results may not necessarily generalize to other states.

Appendix A. Supporting data tables

This appendix provides additional data on the characteristics of the study sample in each state (table A1 for Arizona and table A2 for Nevada), the percentage of students who passed the English language arts and math content tests in each state (table A3 for Arizona and A4 for Nevada), the summary of logistic regression analyses of students who passed the English language arts test (table A5 for Arizona and A6 for Nevada) and the math content test (table for A7 for Arizona and A8 for Nevada) in each state based on English language proficiency assessment scale scores, and the predicted number of students at the proficient level who should have passed the English language arts test (table A9 for Arizona and A10 for Nevada) and the math content test (table A11 for Arizona and A12 for Nevada) in each state and the observed passing rates among those students.

For Arizona, data on eligibility for special education services and eligibility for the federal school lunch program were available only in 2006/07; therefore, the study sample for Arizona included students who attended Arizona public schools in 2006/07 and most likely were continuously enrolled in Arizona public schools from 2006/07 through the study period (see table A1). For Nevada, data were available for the first year of the study period (2009/10; see table A2).

Table A1. Characteristics of the Arizona study sample, by cohort and subject, 2009/10

	Grade 3 cohort				Grade 6 cohort			
	English language arts (*n* = 49,746)		Math (*n* = 49,752)		English language arts (*n* = 22,311)		Math (*n* = 22,299)	
Characteristic	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Male	25,371	51.0	25,377	51.0	11,889	53.3	11,886	53.3
Eligible for special education services[a]	3,033	6.1	3,030	6.1	2,955	13.2	2,952	13.2
Eligible for the federal school lunch program[a]	40,428	81.3	40,434	81.3	19,281	86.4	19,269	86.4
Initial proficiency level								
Pre-emergent	30	0.1	30	0.1	[b]	0.0	[b]	0.0
Emergent	90	0.2	90	0.2	[b]	0.0	[b]	0.0
Basic	3,636	7.3	3,636	7.3	252	1.1	252	1.1
Intermediate	19,860	39.9	19,863	39.9	2,754	12.3	2,754	12.4
Proficient	26,130	52.5	26,133	52.5	19,302	86.5	19,290	86.5

a. Data are for 2006/07.

b. Value is suppressed to reduce the risk of study participants (including districts and schools) being identified.

Note: Math sample sizes were slightly larger than English language arts sample sizes for the grade 3 cohort and smaller for the grade 6 cohort, but the percentages are the same across both subjects in both cohorts. Percentages may not sum to 100 because of rounding

Source: Authors' analysis of administrative data from the Arizona Department of Education, 2006/07 and 2009/10.

Table A2. Characteristics of the Nevada study sample, by cohort and subject, 2009/10

	Grade 3 cohort				Grade 6 cohort			
	English language arts (*n* = 6,621)		Math (*n* = 6,619)		English language arts (*n* = 2,735)		Math (*n* = 2,743)	
Characteristic	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Male	3,405	51.4	3,406	51.5	1,487	54.4	1,492	54.4
Ever eligible for special education services	914	13.8	916	13.8	636	23.3	640	23.3
Ever eligible for the federal school lunch program	5,984	90.4	5,983	90.4	2,432	88.9	2,440	89.0
Initial proficiency level								
Entry	102	1.5	102	1.5	30	1.1	30	1.1
Emerging	473	7.1	474	7.2	196	7.2	196	7.2
Intermediate	1,817	27.4	1,818	27.5	596	21.8	602	22.0
Advanced Intermediate	3,053	46.1	3,050	46.1	1,208	44.2	1,212	44.2
Proficient	1,176	17.8	1,175	17.8	705	25.8	703	25.6

Note: Clark County School District and Washoe County School District provided students' eligibility status for special education services and the federal school lunch program in each year of the study period, so the study team was able to count the number of students who were ever eligible for those services. Math sample sizes were slightly smaller than English language arts sample sizes for the grade 3 cohort and larger for the grade 6 cohort, but the percentages are the same across both subjects in both cohorts. Percentages may not sum to 100 because of rounding.

Source: Authors' analysis of administrative data from Clark County School District and Washoe County School District, 2009/10.

Table A3. Percentage of Arizona students who passed the English language arts or math content test in 2010/11 or 2011/12, by cohort and 2009/10 English language proficiency level

	Grade 3 cohort				Grade 6 cohort			
	English language arts		Math		English language arts		Math	
Initial proficiency level	Pass in 2010/11	Pass in 2011/12	Pass in 2010/11	Pass in 2011/12	Pass in 2010/11	Pass in 2011/12	Pass in 2010/11	Pass in 2011/12
Pre-emergent	0	10	20	10	[a]	[a]	[a]	[a]
Emergent	3	3	0	3	[a]	[a]	[a]	[a]
Basic	6	9	6	5	6	5	1	4
Intermediate	42	49	32	31	14	7	5	5
Proficient	89	92	78	76	68	50	39	35
Overall	64	68	54	53	61	44	34	31

a. Value is suppressed to reduce the risk of study participants (including districts and schools) being identified.

Source: Authors' analysis of administrative data from the Arizona Department of Education, 2009/10–2011/12.

Table A4. Percentage of Nevada students who passed the English language arts or math content test in 2010/11 or 2011/12, by cohort and 2009/10 English language proficiency level

	Grade 3 cohort				Grade 6 cohort			
	English language arts		Math		English language arts		Math	
Initial proficiency level	Pass in 2010/11	Pass in 2011/12	Pass in 2010/11	Pass in 2011/12	Pass in 2010/11	Pass in 2011/12	Pass in 2010/11	Pass in 2011/12
Entry	2	3	7	8	0	0	0	0
Emerging	2	4	17	19	0	0	3	6
Intermediate	18	22	40	44	2	1	15	13
Advanced intermediate	62	62	70	76	10	10	37	30
Proficient	88	87	90	91	28	23	61	50
Overall	49	50	61	65	12	10	35	29

Source: Authors' analysis of administrative data from Clark County School District and Washoe County School District, 2009/10–2011/12.

Table A5. Summary of logistic regression analyses predicting Arizona students who passed the English language arts content test in 2010/11 or 2011/12 based on 2009/10 English language proficiency assessment scale scores and student demographics, by cohort

Statistic	Intercept	Proficiency assessment scale score	Male	Eligibility for special education services	Eligibility for the federal school lunch program	Likelihood ratio test	Percent concordant
Grade 3 cohort							
Coefficient	–41.9651	0.0661	–0.323	–0.308	–0.0424	<.0001	89.1
Standard error	0.4204	0.00065	0.0275	0.052	0.037	na	na
Huber-White standard error	0.9764	0.0015	0.0494	0.0999	0.0709	na	na
Grade 6 cohort							
Coefficient	–35.4351	0.0512	–0.0015	–0.379	–0.2493	<.0001	83.0
Standard error	0.562	0.0008	0.0347	0.0514	0.0524	na	na
Huber-White standard error	1.3158	0.0019	0.0635	0.0852	0.1014	na	na

na is not applicable.

Source: Authors' analysis of administrative data from the Arizona Department of Education, 2009/10–2011/12.

Table A6. Summary of logistic regression analyses predicting Nevada students who passed the English language arts content test in 2010/11 or 2011/12 based on 2009/10 English language proficiency assessment scale scores and student demographics, by cohort

Statistic	Intercept	Proficiency assessment scale score	Male	Eligibility for special education services	Eligibility for the federal school lunch program	Likelihood ratio test	Percent concordant
Grade 3 cohort							
Coefficient	–33.3957	0.0648	–0.054	–0.613	–0.3744	<.0001	85.6
Standard error	0.9101	0.00175	0.0639	0.1057	0.1129	na	na
Huber-White standard error	1.0758	0.0021	0.0625	0.1082	0.1097	na	na
Grade 6 cohort							
Coefficient	–26.3345	0.0449	–0.199	–1.207	–0.3483	<.0001	81.2
Standard error	1.5542	0.00281	0.1145	0.2502	0.1642	na	na
Huber-White standard error	1.4794	0.0026	0.1083	0.2439	0.1754	na	na

na is not applicable.

Source: Authors' analysis of administrative data from Clark County School District and Washoe County School District, 2009/10–2011/12.

Table A7. Summary of logistic regression analyses predicting Arizona students who passed the math content test in 2010/11 or 2011/12 based on 2009/10 English language proficiency assessment scale scores and student demographics, by cohort

Statistic	Intercept	Proficiency assessment scale score	Male	Eligibility for special education services	Eligibility for the federal school lunch program	Likelihood ratio test	Percent concordant
Grade 3 cohort							
Coefficient	–33.088	0.051	0.2144	0.00398	–0.0871	<.0001	83.7
Standard error	0.3222	0.00049	0.0231	0.0475	0.0302	na	na
Huber-White standard error	0.7923	0.0012	0.0434	0.0898	0.0592	na	na
Grade 6 cohort							
Coefficient	–27.153	0.0375	0.3912	–0.5356	–0.1819	<.0001	78.3
Standard error	0.4512	0.00063	0.0318	0.056	0.0448	na	na
Huber-White standard error	1.1698	0.0016	0.0557	0.0912	0.081	na	na

na is not applicable.

Source: Authors' analysis of administrative data from the Arizona Department of Education, 2009/10–2011/12.

Table A8. Summary of logistic regression analyses predicting Nevada students who passed the math content test in 2010/11 or 2011/12 based on 2009/10 English language proficiency assessment scale scores and student demographics, by cohort

Statistic	Intercept	Proficiency assessment scale score	Male	Eligibility for special education services	Eligibility for the federal school lunch program	Likelihood ratio test	Percent concordant
Grade 3 cohort							
Coefficient	–21.554	0.0436	0.2639	–0.598	–0.221	<.0001	80.8
Standard error	0.745	0.0015	0.0648	0.0907	0.1171	na	na
Huber-White standard error	1.056	0.002	0.0659	0.1023	0.1203	na	na
Grade 6 cohort							
Coefficient	–17.736	0.0324	0.4172	–0.787	–0.389	<.0001	75.8
Standard error	1.0209	0.0019	0.0877	0.1227	0.137	na	na
Huber-White standard error	1.1373	0.0021	0.0834	0.1279	0.1409	na	na

na is not applicable.

Source: Authors' analysis of administrative data from Clark County School District and Washoe County School District, 2009/10–2011/12.

Table A9. Predicted number of Arizona English learner students at the proficient level in 2009/10 who should have passed the English language arts content test in 2010/11 or 2011/12 and observed passing rates among those students, by cohort and probability

Probability (percentage)	Grade 3 cohort		Grade 6 cohort	
	Predicted number passing	Observed passing rate (percent)	Predicted number passing	Observed passing rate (percent)
50	39,522	87	16,134	80
60	36,633	90	14,382	83
70	33,312	92	11,613	87
80	29,265	95	8,280	92
90	22,716	97	4,809	96

Source: Authors' analysis of administrative data from the Arizona Department of Education, 2009/10–2011/12.

Table A10. Predicted number of Nevada English learner students at the proficient level in 2009/10 who should have passed the English language arts content test in 2010/11 or 2011/12 and the observed passing rates among those students, by cohort and probability

	Grade 3 cohort		Grade 6 cohort	
Probability (percentage)	Predicted number passing	Observed passing rate (percent)	Predicted number passing	Observed passing rate (percent)
50	4,224	79	138	54
60	3,695	83	66	62
70	3,062	86	31	74
80	2,275	90	10	80
90	1,159	96	1	100

Source: Authors' analysis of administrative data from Clark County School District and Washoe County School District, 2009/10–2011/12.

Table A11. Predicted number of Arizona English learner students at the proficient level in 2009/10 who should have passed the math content test in 2010/11 or 2011/12 and the observed passing rates among those students, by cohort and probability

	Grade 3 cohort		Grade 6 cohort	
Probability (percentage)	Predicted number passing	Observed passing rate (percent)	Predicted number passing	Observed passing rate (percent)
50	33,546	79	8,034	68
60	29,412	83	5,328	74
70	24,624	87	3,003	80
80	18,105	90	1,827	83
90	9,657	94	552	86

Source: Authors' analysis of administrative data from the Arizona Department of Education, 2009/10–2011/12.

Table A12. Predicted number of Nevada English learner students at the proficient level in 2009/10 who should have passed the math content test in 2010/11 or 2011/12 and the observed passing rates among those students, by cohort and probability

	Grade 3 cohort		Grade 6 cohort	
Probability (percentage)	Predicted number passing	Observed passing rate (percent)	Predicted number passing	Observed passing rate (percent)
50	5,537	81	1,177	65
60	5,037	84	709	71
70	4,386	86	312	77
80	3,307	90	111	84
90	1,568	94	12	100

Source: Authors' analysis of administrative data from Clark County School District and Washoe County School District, 2009/10–2011/12.

Appendix B. Data and methodology

This appendix describes the study's methodology.

Data

This study analyzed three years of student data, for 2009/10–2011/12, for Arizona and for the two largest school districts in Nevada (Clark County School District and Washoe County School District). The Nevada Department of Education does not have the necessary data for all students in the state, but Clark and Washoe County School Districts serve 84 percent of Nevada's K–12 students and 94 percent of its English learner students, so the analysis included the majority of the state's English learner students.

The analytic sample included two cohorts of English learner students: one in grade 3 and one in grade 6 in 2009/10. For each cohort the analytic sample included only students who had the necessary assessment and test results (English language proficiency assessment results for 2009/10 and either English language arts or math content test results for 2010/11 and 2011/12) and other key data elements (gender, eligibility for special education services, and eligibility for the federal school lunch program).

The analysis also excluded students who did not have typical grade progression, such as those who skipped a grade level or were retained. Each cohort was sorted into two groups: one for English language arts analysis and one for math analysis. Thus test scores were analyzed for four groups of students for each state (tables B1 and B2).

Table B1. Number and percentage of Arizona students in each step to obtain the analytic sample, by cohort and subject, 2009/10–2011/12

		Grade 3 cohort				Grade 6 cohort			
		English language arts		Math		English language arts		Math	
Step	Category	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Start point	Total English learner students in 2009/10	57,861	100.0	57,861	100.0	26,676	100.0	26,676	100.0
1	Students were excluded because they were not in the data system for all three years of the study period	6,009	10.4	6,009	10.4	3,276	12.3	3,276	12.3
2	Students were excluded because they had atypical grade progression	468	0.8	468	0.8	207	0.8	207	0.8
3	Students were excluded because they did not have all the test results and other key data elements required for the analysis	1,638	2.8	1,632	2.8	882	3.3	894	3.4
End point	Total English learner students in the analytic sample	49,746	86.0	49,752	86.0	22,311	83.6	22,299	83.6

Source: Authors' analysis of administrative data from the Arizona Department of Education, 2009/10–2011/12.

Table B2. Number and percentage of Nevada students in each step to obtain the analytic sample, by cohort and subject, 2009/10–2011/12

		Grade 3 cohort				Grade 6 cohort			
		English language arts		Math		English language arts		Math	
Step	Category	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Start point	Total English learner students in 2009/10	7,461	100.0	7,461	100.0	3,166	100.0	3,166	100.0
1	Students were excluded because they were not in the data system for all three years of the study period	649	8.7	649	8.7	229	7.2	229	7.2
2	Students were excluded because they had atypical grade progression	75	1.0	75	1.0	127	4.0	127	4.0
3	Students were excluded because they did not have all the test results and other key data elements required for the analysis	116	1.6	118	1.6	75	2.4	67	2.1
End point	Total English learner students in the analytic sample	6,621	88.7	6,619	88.7	2,735	86.4	2,743	86.6

Source: Authors' analysis of administrative data from Clark County School District and Washoe County School District, 2009/10–2011/12.

Methods

The study was conducted using descriptive analysis and logistic regression.

To address research question 1, for each grade-level cohort the study team showed a distribution (that is, number and percentage) of English learner students by initial English language proficiency level. The study team then calculated the percentage of those students who passed each content test in either 2010/11 or 2011/12 (see table 1 in the main body of the report). For example, to calculate the percentage of English learner students who were at proficiency level 5 in grade 3 in 2009/10 and who subsequently passed the English language arts content test in either 2010/11 or 2011/12, the number of students at proficiency level 5 in grade 3 who passed the English language arts content test in either of those two years was divided by the total number of English learner students at proficiency level 5 in grade 3 in 2009/10. See tables A3 and A4 in appendix A for the percentages in each state.

To address research question 2, the study team used the following logistic regression equation:

$$\Pr(Proficiency_j = 1) = \text{logit}^{-1}(\beta_0 + \beta_1 X_j + \beta_2 Male_j + \beta_3 IEP_j + \beta_4 FRL_j + \varepsilon_j).$$

The probability of an outcome coded as 1 (passing a content test) for student j is a nonlinear function of student j's English language proficiency assessment scale score (X_j), gender ($Male_j$), eligibility for special education services (IEP_j), and eligibility for the federal school lunch program (FRL_j) in the first year of the study period. *Male*, *IEP*, and *FRL* are dummy-coded variables. To make the results easier to interpret, each demographic variable was centered to its grand mean (that is, the average proportion of each demographic in the analytic sample). For instance, if 55 percent of the students in the analytic sample were male, then the centered values for male students would be 0.45, and the centered values for female students would be –0.55. So the estimates of β_0 and β_1 were calculated for the

average English learner student. The parameters β_0 and β_1 are estimated from the data that were presented as odds ratios; they indicate how the average English learner student's probability of passing the content tests in the subsequent two years changes with a one-unit change in the proficiency assessment scale score. The logit function was used because the dependent variable is binary. This model is described more fully by Rabe-Hesketh and Skrondal (2012).

That approach enabled the study team to calculate the probability of passing a content test associated with any English language proficiency assessment scale score for the average English learner student in the sample. For example, the probability of passing a content test was calculated for students who had proficiency assessment scale scores that qualified them for reclassification as fluent English proficient (level 5). The probability of those students passing content tests was then compared with the probability for students whose proficiency assessment scale scores were one level lower (level 4) and so on. The study team also calculated the proficiency assessment scale score that gives a student a 50 percent probability or better of passing a content test.

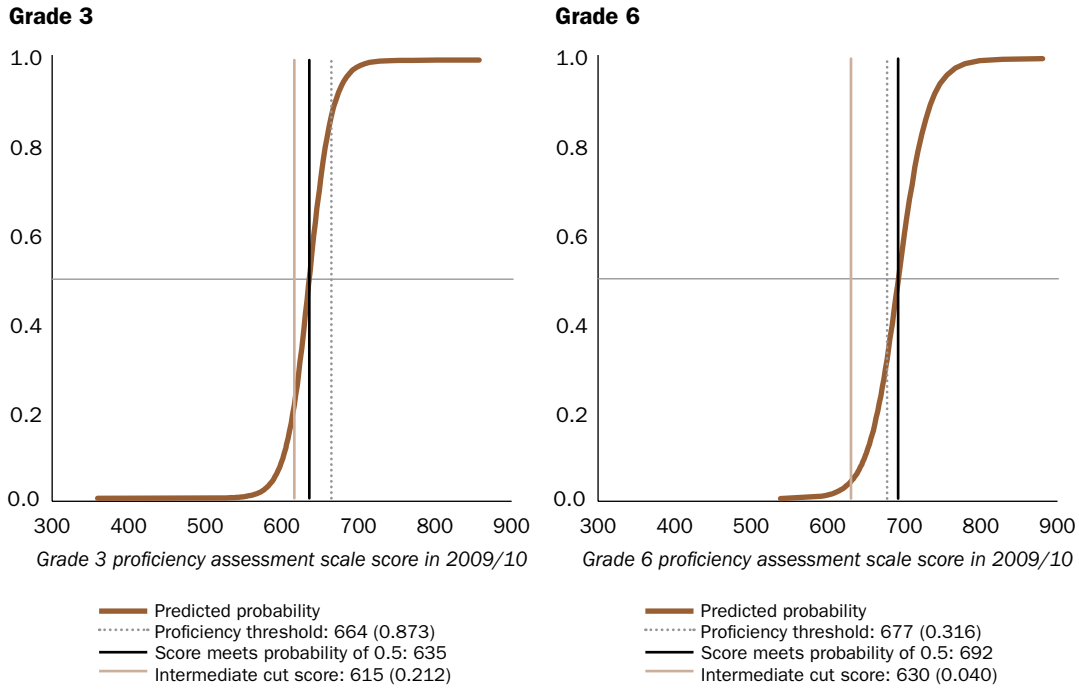
The summary of logistic regression analyses is presented in tables A5–A8 in appendix A. The logistic regression parameters can be used to build the function that provides the estimated probability of passing a content test associated with any given English language proficiency assessment scale score. The likelihood ratio test assesses whether a model with proficiency assessment scale scores and covariates is superior to a model with the intercept only. The percent concordant, which can range from 0 to 100, provides information about the accuracy of the predictions using the model. Both the estimates and the standard errors for the logistic regression parameters are included, as well as the statistical significance for the intercept, weight, and likelihood ratio test.

To assess how accurately initial English language proficiency assessment scores predict English language arts content proficiency, for example, the study team used various probability cutoffs between 0.5 and 1.0 for predicting success to examine how changing the threshold for predicting students' passing the content test affects the precision of the model (see tables A9–A12 in appendix A).

Appendix C. Passing rate probability figures

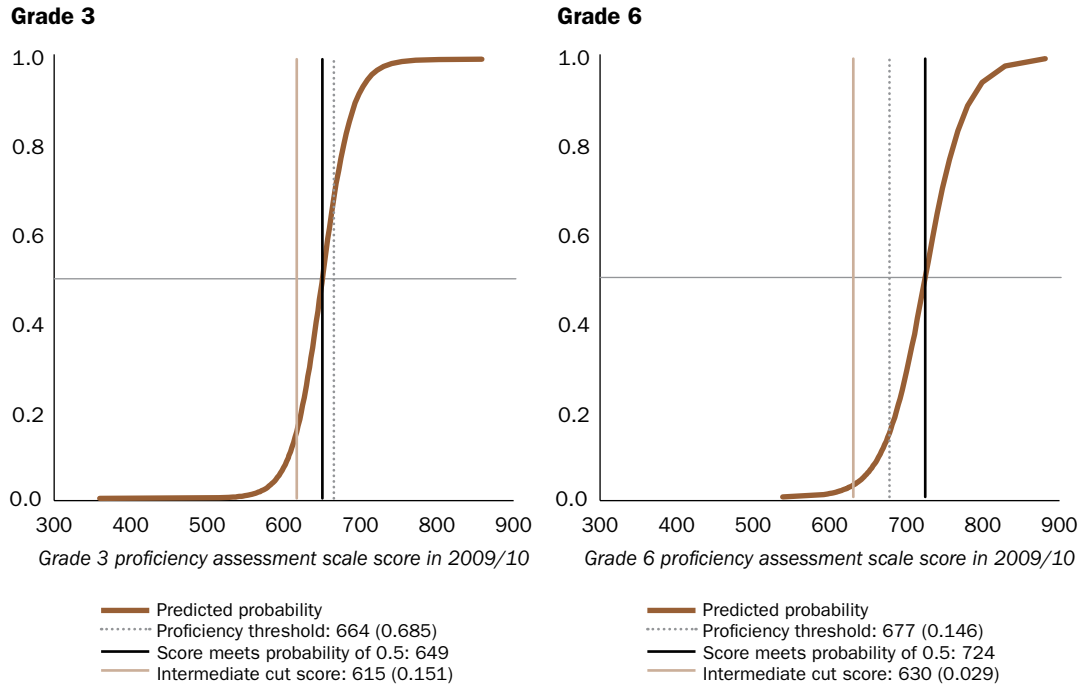
This appendix provides the predicted probability curves for Arizona and Nevada students passing the subsequent English language arts and math content tests based on English language proficiency assessment scale score.

Figure C1. Predicted probability of Arizona students passing the English language arts content test at least once in 2010/11 or 2011/12 following the 2009/10 English language proficiency assessment, by cohort



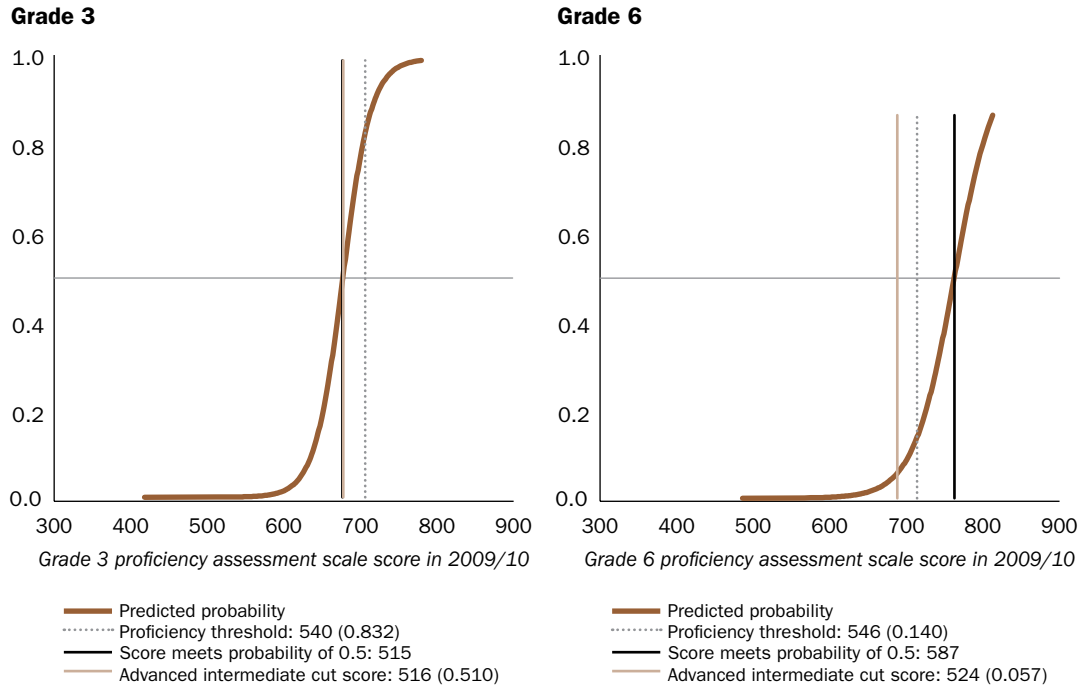
Source: Authors' analysis of administrative data from the Arizona Department of Education, 2009/10–2011/12

Figure C2. Predicted probability of Arizona students passing the math content test at least once in 2010/11 or 2011/12 following the 2009/10 English language proficiency assessment, by cohort



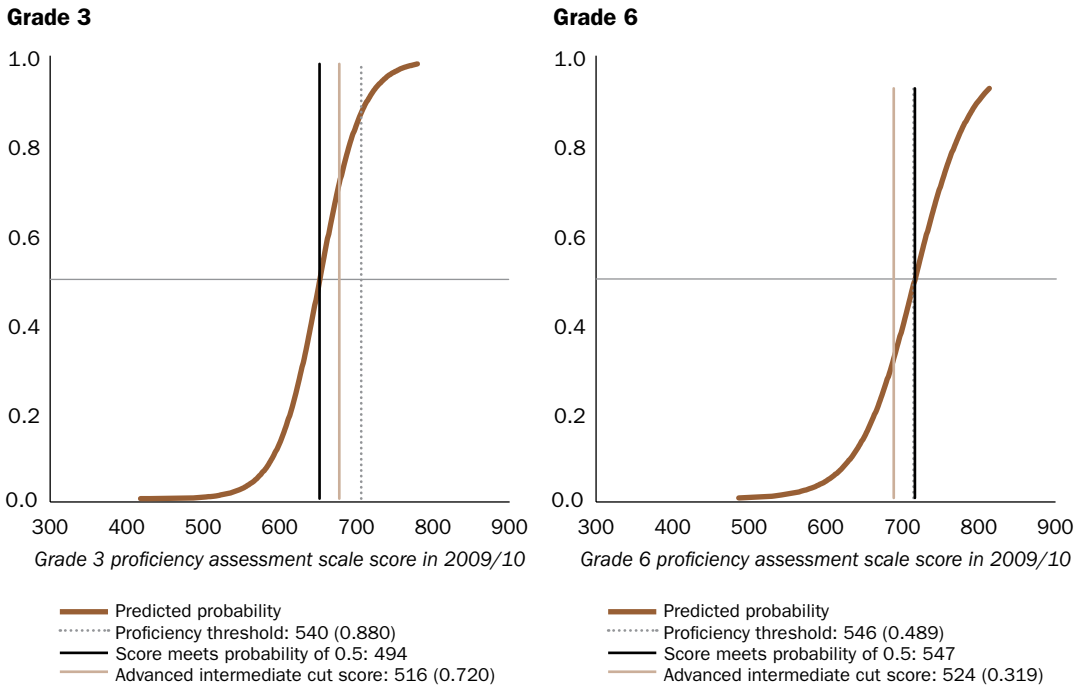
Source: Authors' analysis of administrative data from the Arizona Department of Education, 2009/10–2011/12

Figure C3. Predicted probability of Nevada students passing the English language arts content tests at least once in 2010/11 or 2011/12 following the English language proficiency assessment, by cohort



Source: Authors' analysis of administrative data from Clark County School District and Washoe County School District, 2009/10–2011/12

Figure C4. Predicted probability of Nevada students passing the math content test at least once in 2010/11 or 2011/12 following the 2009/10 English language proficiency assessment, by cohort



Source: Authors' analysis of administrative data from Clark County School District and Washoe County School District, 2009/10–2011/12

Appendix D. Distribution of English language proficiency assessment scale scores

This appendix provides the distribution of English language proficiency assessment scale scores by grade level and state.

Table D1. Distribution of English language proficiency assessment scale scores, by state and grade level, 2009/10

	Arizona		Nevada	
Statistic	Grade 3	Grade 6	Grade 3	Grade 6
Number of English learner students	57,861	26,676	6,775	2,936
Mean	662	709	522	534
Standard deviation	35.9	35.7	30.7	32.2
Maximum	858	882	602	629
99th percentile	740	799	577	599
95th percentile	721	767	564	580
90th percentile	708	756	556	571
75th percentile	684	728	542	556
50th percentile	664	710	525	538
25th percentile	638	689	505	517
10th percentile	617	667	484	492
5th percentile	604	652	468	476
1st percentile	577	622	427	441
Minimum	357	400	297	354

Source: Authors' analysis of administrative data from Clark County School District, Washoe County School District, and the Arizona Department of Education, 2009/10–2011/12.

Notes

1. Nevada has 17 school districts but no statewide student longitudinal data system. The two school districts in the study were able to provide the student administrative data needed for this study. See http://www.nevadareportcard.com/di/ for data on total enrollment in the study districts and the state and Nevada Department of Education (2012) for data on English learner enrollment in the study districts and the state.
2. Pull-out programs allow English learner students to spend part to most of the day in mainstream classrooms. Push-in programs allow English learner students to remain in their classrooms, and the English language development teacher goes into the classroom to work with those students for the mandated time.
3. The Stanford Achievement Test, now in its 10th edition, assesses content achievement in reading and math, among other content areas (Pearson, 2015). According to the California Department of Education website, the SAT-9 was last used by California in 2002 (California Department of Education, 2015).
4. The study team could not find any studies on the predictive validity of the Arizona English Language Learner Assessment or Nevada's LAS Links with regard to subsequent academic content tests.
5. The analysis also controlled for three student-level characteristics (gender, eligibility for special education services, and eligibility for the federal school lunch program). Race/ethnicity was not controlled for because more than 90 percent of English learner students in both states were Hispanic. For Arizona the indicators for these characteristics are for the 2006/07 school year and not 2009/10 (the first year of the study period). See the limitations of the study section for a discussion of the influence of this difference on the study findings.
6. A 50 percent probability is a typical level used in research focused on the outcome of a binary event (one that has only two possible outcomes, such as passing or not passing a test). Thresholds were also calculated for a 60, 70, 80, and 90 percent probability of passing the tests (see tables A9–A12 in appendix A).
7. The exceptions were Arizona grade 3 English learner students at the pre-emergent level, who scored higher on both content tests than students at the emergent level, and Nevada grade 6 English learner students at the entry level, who scored the same on the math content test as students at the emerging level. These exceptions may be due to the very small samples of students at each of those proficiency levels (see tables A1 and A2 in appendix A).
8. For Arizona the indicators for eligibility for special education services and eligibility for the federal school lunch program were available only in 2006/07; therefore, the sample for Arizona included only students with data for 2006/07 and 2009/10 (the first year of the study).
9. The study team could not locate any alignment or other studies that compared student results on LAS Links to those of World-class Instructional Design and Assessment (WIDA) ACCESS, the English language proficiency assessment currently being administered by Nevada. Nor could the study team find any validity testing results for LAS Links in general or for validity in predicting scores on state content tests (see also National Research Council, 2011, which states that the authors could not locate any validity studies, including in the most recent technical manual). The most recent ACCESS validity testing results are available in the Annual Technical Report for 2013–14 (Center for Applied Linguistics, 2015). The report provides evidence of the validity of the ACCESS proficiency level classifications as defined in the WIDA

English language development standards. Apparently no studies have been conducted of the validity of WIDA classifications for predicting specific state content tests, including those used in Nevada.

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