ISSUES & ANSWERS

REL 2010–No. 093

REL WEST
Regional Educational Laboratory At WestEd

Patterns of student mobility among English language learner students in Arizona public schools

ies NATIONAL CENTER FOR EDUCATION EVALUATION AND REGIONAL ASSISTANCE
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October 2010

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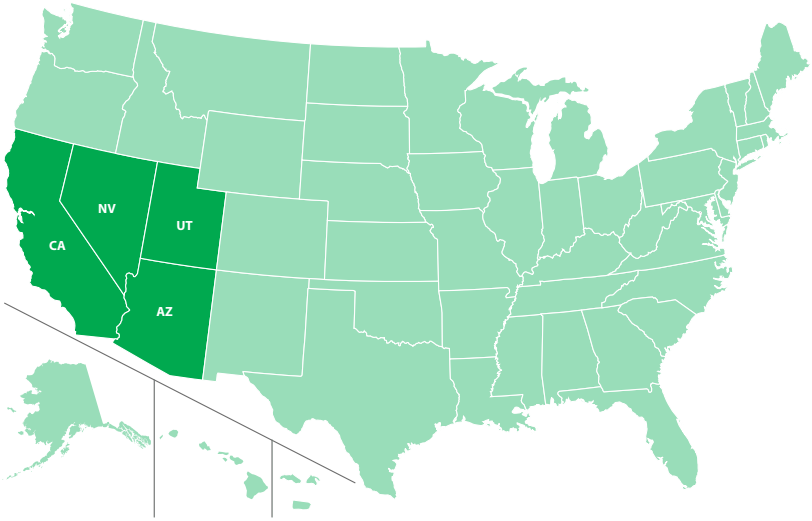

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October 2010

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Summary

REL 2010–No. 093

Patterns of student mobility among English language learner students in Arizona public schools

More than a quarter of Arizona students experienced at least one mobility event in each of the four years examined, and the proportion was higher for English language learner students than for other students. Students were more than twice as likely to transfer to a school in another district than to one in the same district.

High rates of student mobility (nonpromotional change of schools) are associated with lower student achievement (Rumberger and Larson 1998; Engec 2006). While studies have examined mobility among all students, less is known about the mobility rates of English language learner students as a group, an important omission since research has found that mobility increases the time needed to become proficient in English (Mitchell, Destino, and Karam 1997). Arizona's high rates of residential mobility (Berkner and Faber 2003) and high proportion of English language learner students (Hoffman and Sable 2006) make studying student mobility among English language learner students in Arizona especially relevant.

Using data from an Arizona Department of Education dataset that includes all students enrolled at an Arizona public school at any time during 2004/05–2007/08, this study looks at three types of student mobility: students who transferred between public schools in Arizona, students who had breaks in enrollment of at least 19 days, and students (other than kindergarten students) who entered school for the first time during the observation period (2004/05–2007/08). In addition, the study sought to confirm for Arizona public schools findings from other studies of an association between student mobility and other student characteristics such as special education status and race/ethnicity.

This study examined five research questions on student mobility in Arizona public schools:

1. Within a given school year, what proportion of English language learner students and other students are mobile? Did these proportions change over 2004/05–2007/08?

2. Does the proportion of students who are mobile disaggregated by English language learner status vary by education level? Did these proportions change over 2004/05–2007/08?

3. Within a given school year, what proportion of students disaggregated by English language learner status made intradistrict transfers? What proportion made interdistrict transfers?

4. Do intradistrict and interdistrict transfer rates vary by district size? Did these rates change over 2004/05–2007/08?

5. How does the average number of mobility events that students experience over the observation period vary by student characteristics such as English language learner status, eligibility for free or reduced-price lunch, special education status, gender, race/ethnicity, and grade level?

The study finds that more than a quarter of Arizona students experienced at least one mobility event in each of the four years examined. It also found that

- The proportion of students who experienced a mobility event was higher for English language learner students than for other students.

- Mobility rates declined for both groups from 2004/05 to 2007/08, but at a faster pace for English language learner students. By 2007/08, the difference in mobility rates between English language learner students and other students had narrowed from 3.6 percentage points to 0.9 percentage point.

- Students who transferred between schools were more than twice as likely to transfer to a school in another district than to one in the same district.

- Both intradistrict and interdistrict transfer rates varied with the enrollment size of the district: the intradistrict transfer rate increased with district enrollment, and the interdistrict transfer rate decreased with district enrollment.

- Students eligible for free or reduced-price lunch and students in special education programs averaged more mobility events than did their counterparts.

How English language learner students were defined affected whether English language learner students averaged more or fewer mobility events than non–English language learner students. When defined to include all students who were classified at any time as English language learner students (as they were in the study), these students averaged more mobility events than other students did. When defined to include only students who were classified as English language learners during their final enrollment spell (as in the sensitivity analysis), English language learner students averaged fewer mobility events than other students did.

The study, in response to a request by the Arizona Department of Education to examine the magnitude of student mobility throughout the state, especially among English language learner students, begins to fill the information gap on the mobility rate of English language learner students in Arizona. However, several other questions could be usefully examined. Has the difference in mobility rates between English language learner students and other students continued to narrow since 2007/08? What about the timing of school transfers? Do some students in Arizona move more frequently during the school year than during the summer months, for example? Finally, did students transfer to better or worse schools, as measured by academic achievement? Answering these questions could help in understanding whether some transfers (for instance, those in the summer months and those to higher performing schools) are beneficial, while others are disruptive and harmful to students' academic progress.

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More than a quarter of Arizona students experienced at least one mobility event in each of the four years examined, and the proportion was higher for English language learner students than for other students. Students were more than twice as likely to transfer to a school in another district than to one in the same district.

WHY THIS STUDY?

Researchers have noted high rates of student mobility (defined as nonpromotional changes in school; see box 1 and Rumberger 2003) throughout primary and secondary school.[1] Rumberger and Larson (1998) calculate that more than a quarter of all students change schools between grades 8 and 12, excluding promotional transfers. The U.S. General Accounting Office (1994) estimates that 17 percent of students change schools three or more times between grades 1 and 3. Among students from low-income households, that figure rises to 30 percent.

Correlational research shows an association between the number of times a student transfers between schools and the student's academic achievement.[2] Rumberger and Larson (1998), applying a multinomial logistic regression model to data from the National Educational Longitudinal Survey, find that students who make at least one nonpromotional school change between grades 8 and 12 are twice as likely not to complete high school as students who stay in the same school. Engec (2006), using analysis of covariance techniques on a dataset of students in Louisiana, finds that highly mobile students score lower on standardized tests. In a recent study of student mobility in North Carolina, Xu, Hannaway, and D'Souza (2009), using a fixed effects regression model, conclude that nonpromotional moves are associated with lower mathematics performance for Black and Hispanic students. However, while the overall relationship between mobility and academic achievement has been found to be negative, certain instances of student mobility may be beneficial—for example, if a student transfers to a higher performing school or one that is a better match (see, for instance, Hanushek, Kain, and Rivkin 2004; Cullen, Jacob, and Levitt 2005; Holme and Richards 2009).

In addition to the negative association between mobility and student achievement, mobile students must often cope with the disruption of social ties to friends and the community (Coleman 1988;

BOX 1

What is student mobility?

This study considers any of the following three conditions to be a student mobility event:

Transfer event. A student makes a nonpromotional change in schools (thus excluding promotional transfers from elementary to middle school or middle to high school) during any of the four school years 2004/05–2007/08. This definition is commonly used in student mobility research (for example, Rumberger 2003; Hanushek, Kain, and Rivkin 2004; Xu, Hannaway, and D'Souza 2009).

Enrollment break. A student withdraws from one school during the school year and reenrolls at the same school after an absence of at least 19 days (without enrolling at another school in the interim).[1] Research has examined this form of mobility, which is commonly used in calculating student stability, as the percentage of students who remain continuously enrolled in the same school during the school year (see, for example, de la Torre and Gwynne 2009). Fowler-Finn (2001) calculates student stability as the number of students who remain in a school until the end of the year as a percentage of official enrollment on opening day.

Late entry. A student who is not in kindergarten enrolls in an Arizona public school for the first time during any year between 2004/05 and 2007/08. For example, a grade 7 student entering the Arizona public school system for the first time at the beginning of the 2006/07 school year would be considered a late entry. The rationale is that the student must have transferred into the Arizona public school system from out of state, had an enrollment break from the Arizona public school system of at least three years (2003/04–2005/06), or transferred into the Arizona public school system from a nonpublic Arizona school, such as a private school or home school.

Additional details on how the mobility rates are calculated are provided in the appendix.

Note

1. A threshold of 19 days is used to identify enrollment breaks because it meets the Arizona State Legislature's (2009a,b) definition of "excessive absences."

Pribesh and Downey 1999). Mobile students must also grapple with adjusting to a new school environment (Nelson, Simoni, and Adelman 1996). Finally, mobility may be associated with lower student achievement even for stable students within a school, as high student turnover has been found to be negatively associated with orderly teaching and instructional coherence (Smith, Smith, and Bryk 1998).

While previous research has examined mobility among all students, less is known about mobility specifically among English language learner students (defined as students who speak a native language other than English and have been identified as lacking the expected degree of English language proficiency for their grade level[3]).

The authors are aware of three previous correlational studies of mobility among English language learner students. The studies reached slightly different conclusions. The U.S. General Accounting Office (1994), using data from the 1990/91 Department of Education's Prospects Study for a nationally representative sample of 15,000 grade 3 students, finds that children from families whose native language is not English are more likely to be mobile. Similarly, Xu, Hannaway, and D'Souza (2009), examining student mobility in North Carolina, find that English language learner students have higher rates of mobility than do other students. In contrast, Nelson, Simoni, and Adelman (1996), who examine elementary school students in a large, urban, predominantly low-income school district, find that native or proficient English speakers experienced more mobility than did Spanish-speaking students. While this discrepancy in findings may be due to differences in the samples, it suggests that more research is needed.

Understanding mobility among English language learner students is important because of the positive association found between student mobility and how long it takes English language learner students to become proficient in English (Mitchell, Destino, and Karam 1997). The rationale for this finding

appeared more than 30 years ago when Cardenas and Cardenas (1977) conceptualized five incompatibilities between school practices and the education needs of minority children. One incompatibility was between the high rates of mobility among English language learner students and school curricula designed for stable populations. The authors note that "the typical instructional program with built-in continuity and sequence which assumes that the child in the classroom today was here yesterday and will be here tomorrow is incompatible with the mobility characteristic" (p. 8). More recent research finds that English language learner students need a coherent plan of instruction and an integrated set of services that are well targeted to learning academic language and gaining English language proficiency (Parrish et al. 2006).

However, there have been few empirical studies of mobility among English language learner students and none that focus specifically on Arizona. A study of mobility among English language learner students in Arizona is especially timely because of Arizona's high rate of residential mobility and high proportion of English language learner students. Arizona has the third highest residential mobility rate in the country, at 55.7 percent (Berkner and Faber 2003), and the fourth highest proportion of English language learner students, at 17.1 percent (Hoffman and Sable 2006).

Request for study

Given this background, the Arizona Department of Education approached Regional Educational Laboratory West to conduct a study of the magnitude of student mobility in Arizona, with a focus on English language learner students. The department was also interested in understanding patterns of student mobility, such as the proportion of students who transfer within the same district (intradistrict transfer) and the proportion who transfer between districts (interdistrict transfers),[4] and whether such transfer rates vary by district size.

Because student mobility in Arizona is likely to be related to other characteristics as well as English language learner status, this study examines mobility by such characteristics as eligibility for free or reduced-price lunch (an indicator of low-income status), special education status, and race/ethnicity. For instance, correlational research has found associations between student mobility and low-income status (de la Torre and Gwynne 2009; U.S. General Accounting Office 1994), mobility and special education status (Alexander, Entwisle, and Dauber 1996), and mobility and race/ethnicity (de la Torre and Gwynne 2009). The current study seeks to find whether the results of research for other states and time periods hold in Arizona.

Understanding mobility among English language learner students is important because of the positive association found between student mobility and how long it takes English language learner students to become proficient in English

Finally, student mobility rates may be changing. For instance, de la Torre and Gwynne (2009) find a decline in student mobility rates overall and in intradistrict transfer rates for both elementary and high school students in Chicago from 1995 to 2007. Xu, Hannaway, and D'Souza (2009) find that the gap in mobility rates between English language learner students and other students narrowed between 1997 and 2000. Since mobility patterns may be changing in Arizona as well, this study examines trends over four years (2004/05–2007/08). Policymakers may be better equipped to make key decisions if they have information on patterns in mobility over time (for example, whether the mobility rate is rising among a subgroup of students or whether the gap between two groups of students is narrowing) rather than just on mobility at one point in time.

Research questions

This study addresses five research questions on student mobility in Arizona public schools:

1. Within a given school year, what proportion of English language learner students and

other students are mobile? Did these proportions change over 2004/05–2007/08?

2. Does the proportion of students who are mobile disaggregated by English language learner status vary by education level? Did these proportions change over 2004/05–2007/08?

3. Within a given school year, what proportion of students disaggregated by English language learner status made intradistrict transfers? What proportion made interdistrict transfers?

4. Do intradistrict and interdistrict transfer rates vary by district size? Did these rates change over 2004/05–2007/08?

5. How does the average number of mobility events that students experience over the observation period vary by student characteristics such as English language learner status, eligibility for free or reduced-price lunch, special education status, gender, race/ethnicity, and grade level?

Box 2 describes the data used in the study.

BOX 2

Data used in the study

The dataset. The Arizona Department of Education assigns a unique student identification number to each student in its traditional public, alternative, and charter schools.[1] Thus, students can be tracked as they move into and out of schools in the state.[2] School and district personnel collect and input the enrollment data and are required to report them to the Arizona Department of Education at least once every 20 school days.

The dataset, which covers school years 2003/04–2007/08, provides the enrollment information on the school and district the student entered, date of enrollment, school and district the student left, and date of withdrawal. The dataset also contains student information (for the enrollment spell period) on English language learner status, eligibility for free or reduced-price lunch, special education status, gender, race/ethnicity, and grade level. Every student who enrolled in an Arizona school at any time during the observation period has a record in the dataset; unless otherwise noted, the total student population analyzed for each question was 1,528,348.

Because the dataset is structured at the enrollment spell level, each student commonly has multiple observations, with each observation reporting information for that enrollment spell. For instance, a student might be an English language learner for the 2004/05 enrollment spell but then be reclassified the following year and no longer be an English language learner student for the 2005/06 enrollment spell. Because the Arizona Department of Education is interested in learning about all English language learner students, regardless of when or how long they were so classified, this report considers a student to be an English language learner (or, analogously, a special education student or a student eligible for free or reduced-price lunch) if the student was classified as such at any time during the period covered by the dataset (2003/04–2007/08). Results of a sensitivity analysis using a second definition—with students considered English language learners if they were identified as such during their final enrollment spell—are reported in the appendix.

Although the dataset spans school years 2003/04–2007/08, the analysis in this report examines only the period 2004/05–2007/08 due to the left-censoring of data at 2003/04 (see below). While the data are also right-censored at 2007/08, the impact of this right-censoring is attenuated. Late entries are not affected. Intradistrict and interdistrict transfers are not affected in instances where a student finished the 2007/08 school year and transferred the following summer, since summer transfers are counted in the following school year (see the appendix). The one instance when a transfer event or an enrollment break would not be identified due to right-censoring of data is if a student left one school more than 19 days before the end of the 2007/08 school year and then entered the same school or a different school in the 2008/09 school year. Such events should be counted as mobility events in the 2007/08 school year. However, in the prior three years

(CONTINUED)

BOX 2 (CONTINUED)

Data used in the study

(2004/05–2006/07), such instances accounted for only 1.1 percent of the mobility rate. In other words, assuming that the same proportion of students returned in 2008/09 as in prior years, the 2007/08 mobility rate would increase by 1.1 percent. For this reason, the 2007/08 school year is included in the analysis.

Dataset strengths. Because the Arizona Department of Education dataset includes all students ever enrolled in an Arizona public school or charter school during the four-year observation period, mobility could be examined across all nonprivate schools in the state. Each enrollment spell has a school entry and a school exit date, so observation of a student's complete school enrollment history in Arizona is possible.

Dataset limitations. Some limitations of the dataset affect what conclusions can be drawn. First, the data do not track students after they leave the Arizona public school system (whether to transfer to a school in another state or country or to a private school or home school). As a result, the findings of this analysis concern Arizona public school mobility only.

Second, the dataset contains information on students only for 2003/04–2007/08. Thus, if a student was classified as an English language learner in 2002/03 but not in any of the years 2003/04–2007/08, that student would not be considered an English language learner in this report. The appendix analyzes how the results change when the definition of English language learner student is based only on the student's last enrollment spell.

Third, the dataset is left-censored at 2003/04, the first year observed in the dataset. As a result, late entries, intradistrict transfers, and interdistrict transfers that occurred at the start of the 2003/04 school year cannot be identified because the dataset does not include the 2002/03 school year. The analysis does not attempt to identify mobility events in the 2003/04 school year but instead uses the 2003/04 school year to identify and locate students and calculate mobility events for the 2004/05 school year.

Notes

1. This includes enrollments at schools that serve special populations of students (such as students who have dropped out of traditional high schools) and career and technical education high schools. Less than 0.7 percent of the enrollment spells were at career and technical education schools.
2. Student names are not included in the dataset, and student identification numbers were rehashed by the Arizona Department of Education.

WHAT WE LEARNED

The population used for this study includes more than 1.5 million K–12 Arizona public school students from more than 600 districts during 2004/05–2007/08.[5] The characteristics of these students are reported in table 1. At some point during the observation period, approximately 23 percent of the students were identified as English language learner students, 57 percent were eligible for free or reduced-price lunch, and 14 percent received special education services. Approximately 51 percent of the students were boys. The largest proportion of students were White (45.2 percent), followed by Hispanic (40.2 percent); Black (5.9 percent), American Indian (5.8 percent), and Asian (2.8 percent) students made up much smaller proportions.[6]

The study found that more than a quarter of Arizona students experienced at least one mobility event in each of the four years examined, and the proportion was higher for English language learner students than for other students. However, mobility rates declined over the four years for both groups, with the rate falling faster among English language learner students. As a result, the difference in mobility rates between English language learner students and other students shrank from 3.6 percentage points in 2004/05 to 0.9 percentage point in 2007/08. Mobility rates were lower among middle school students and higher among elementary and high school students.

TABLE 1
Characteristics of Arizona public school students, 2004/05–2007/08

Characteristic	Number	Percent
English language learner status		
English language learner student	356,092	23.3
Non–English language learner student	1,172,256	76.7
Low-income status		
Eligible for free or reduced-price lunch	866,965	56.7
Not eligible for free or reduced-price lunch	661,383	43.3
Special education status		
Special education student	214,662	14.0
Non–special education student	1,313,686	86.0
Gender		
Female	743,784	48.7
Male	784,564	51.3
Race/ethnicity		
American Indian	89,353	5.8
Asian	42,927	2.8
Black	90,817	5.9
Hispanic	613,956	40.2
White	691,295	45.2

Source: Authors' analysis of enrollment data obtained by special request from the Arizona Department of Education.

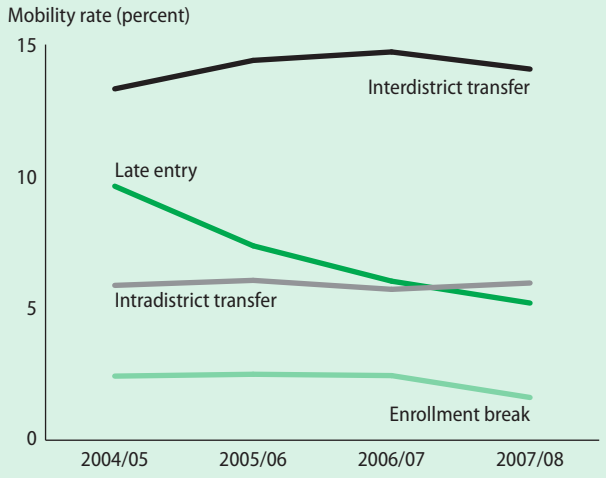
Unlike previous studies that had found that students transferred mainly to other schools in their districts (de la Torre and Gwynne 2009; Kerbow 1996; Offenberg 2004), this study found that Arizona students (both English language learner students and other students) were twice as likely to transfer across districts as within districts. Both intradistrict and interdistrict transfer rates varied by district enrollment size. The larger the district the more likely students were to transfer within a district and the less likely they were to transfer across districts.

Examining the relationship between student mobility and student characteristics confirmed previous research that mobility was higher among low-income students than among other students (Alexander, Entwisle, and Dauber 1996; U.S. General Accounting Office 1994; Kerbow 1996; Nelson, Simoni, and Adelman 1996; Rumberger et al. 1999; Temple and Reynolds 1999) and among special education students than among other students.

Figure 1 illustrates the student mobility rates disaggregated by the four types of student mobility for each year. Because of the declining trend in late entry students, students were more likely to experience a late entry than an intradistrict transfer from 2004/05–2006/07, but this pattern was reversed in 2007/08. In the final year of observation, students were most likely to experience an interdistrict transfer, with the next most common being an intradistrict transfer, followed by a late entry, and finally an enrollment break.

The proportion of students who experienced a late entry dropped from approximately 10 percent in 2004/05 to 5 percent in 2007/08. The proportion of students who experienced an enrollment break remained stable at 1.6–2.5 percent, and the

FIGURE 1
Student mobility rates in Arizona public schools by mobility event type, 2004/05–2007/08



Note: The percentages of students who experienced each type of mobility event do not sum to the total percentage of students who experienced a mobility event, since some students are counted in multiple categories. In any given year, a student may experience multiple types of mobility events.

Source: Authors' analysis of enrollment data obtained by special request from the Arizona Department of Education.

proportion who experienced an intradistrict transfer remained at 5.7–6.1 percent. Students transferred to a school in a different district more than twice as often as to a school in the same district (see appendix for more detail).

Within a given school year and over 2004/05–2007/08, what proportion of Arizona English language learner students and other students are mobile?

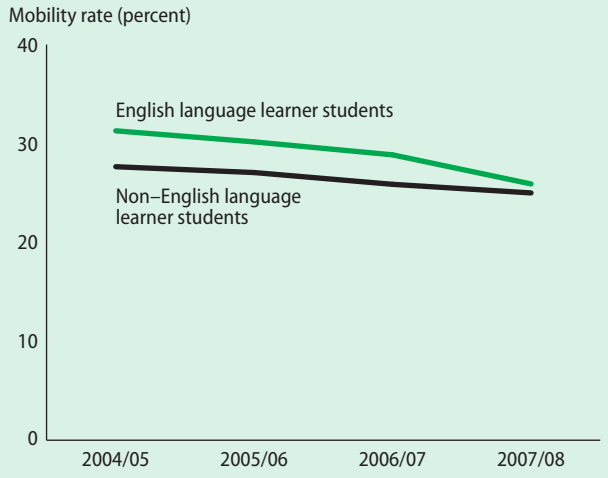
More than a quarter of all students experienced at least one mobility event in each of the four school years (figure 2). Mobility rates were higher for English language learner students than for other students in all four years. But while mobility rates declined for both groups over 2004/05–2007/08, they declined more rapidly for English language learner students (down 5.4 percentage points, from 31.3 percent to 25.9 percent) than for other students (down 2.7 percentage points, from 27.7 percent to 25.0 percent). As a result, the mobility rate gap between English language learner students and other students shrank from 3.6 percentage points in 2004/05 to 0.9 percentage points in 2007/08. (For additional details on how the mobility rate was calculated for each research question, see the appendix.)

Does the proportion of Arizona students who are mobile vary by education level, and did the proportions change over 2004/05–2007/08?

By education level, the highest mobility rate was for English language learner students in high school, which ranged from 34.9 percent in 2004/05 to 28.4 percent in 2007/08 (figure 3). Non–English language learner students in middle school were the least mobile, with a mobility rate over the four years of 26.1–24.1 percent. English language learner students had a higher mobility rate than did other students at all education levels except for elementary schools in 2007/08, when the mobility rate of non–English language learner students was 0.5 percentage points higher than that of English language learner students.

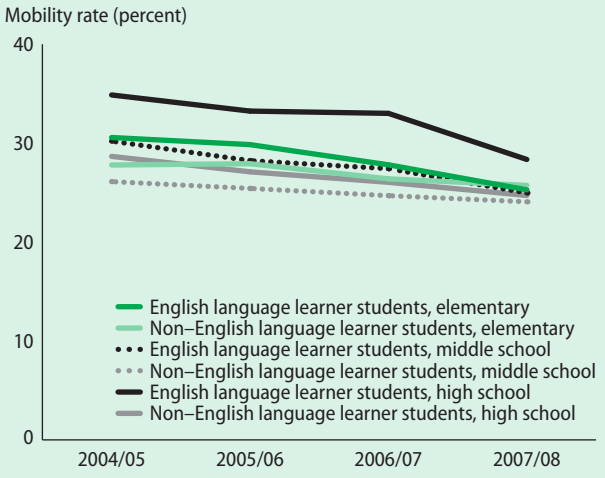
By education level, the difference in mobility rate between English language learner students and other students is largest in high school. For instance, in 2007/08 the difference between the two groups at the high school level was 3.6 percentage

FIGURE 2
Student mobility rates in Arizona public schools by English language learner status, 2004/05–2007/08



Source: Authors' analysis of enrollment data obtained by special request from the Arizona Department of Education.

FIGURE 3
Student mobility rates in Arizona public schools by English language learner status and education level, 2004/05–2007/08



Source: Authors' analysis of enrollment data obtained by special request from the Arizona Department of Education.

points; the difference was less than 1 percentage point at the elementary and middle school levels.

Within a given school year, what proportion of Arizona students transferred within or between districts?

For each observed school year, a higher proportion of English language learner students than of non–English language learner students transferred within districts (figure 4). The intradistrict transfer rate over the four years ranged from 6.8 percent to 7.4 percent for English language learner students and from 5.4 percent to 5.7 percent for other students.

While the results in figure 4 also show that in each year a higher proportion of English language learner students than of other students transferred between districts, this finding is not robust to the sensitivity analysis reported in the appendix (see figure A7). As a result, this finding should be interpreted with caution. Finally, when both intradistrict and interdistrict transfer rates are taken into account (not shown in figure 4), 41.3 percent of English language learner students transferred schools over the four-year period compared with 36.0 percent of other students.

The finding that students are more likely to transfer between rather than within districts in Arizona differs from the findings of studies in other settings. For instance, de la Torre and Gwynne (2009) and Kerbow (1996), who examine student mobility in the Chicago Public School system, find that intradistrict transfers are more common than interdistrict transfers.[7] Offenberg (2004) examines students in the Philadelphia school district and also finds intradistrict transfers to be more common. By comparison, this study finds that from 2005/06 to 2007/08 the interdistrict transfer rate in Arizona was more than twice as high as the intradistrict transfer rate for both English language learner students and other students. In other words, when a student in Arizona transfers to a different school, the new school is twice as likely to be in a different district as in the same district.

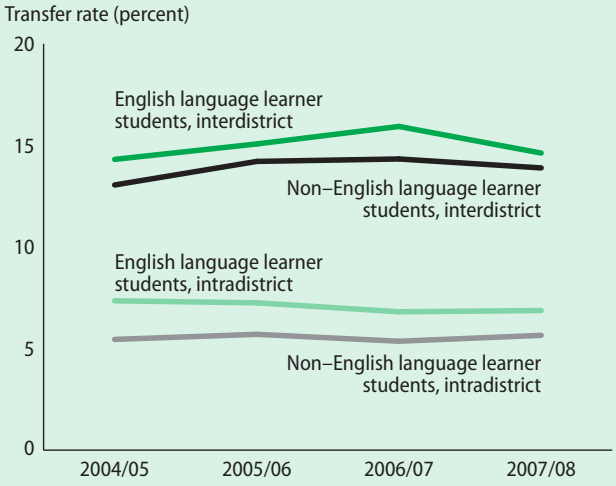
One possible reason for the difference in findings between the current study and previous research is that the current study examines mobility across an entire state, whereas the previous research examined mobility in large urban school districts. Considering student mobility across an entire state allows researchers to track more transfers to other districts. Another possible reason for the higher interdistrict transfer rate is that Arizona contains several districts composed of a single charter school. For additional analysis of interdistrict transfers in a purposively selected sample of five districts in Arizona, see the appendix.

Do intradistrict and interdistrict transfer rates for all students vary by district size in Arizona, and did the rates change during 2004/05–2007/08?

School districts in Arizona were grouped into quintiles based on student enrollment, from lowest enrollment (quintile 1) to highest (quintile 5).[8] Both intradistrict and interdistrict transfer rates varied systematically by enrollment quintile.[9] With the exception of 2007/08,[10] intradistrict transfer rates increased monotonically with enrollment quintile: quintile 1 had the lowest

FIGURE 4

Intradistrict and interdistrict transfer rates in Arizona public schools by English language learner status, 2004/05–2007/08



Source: Authors' analysis of enrollment data obtained by special request from the Arizona Department of Education.

intradistrict transfer rate, quintile 2 had the next lowest, and so on up through quintile 5 (figure 5). In contrast, with the exception of 2006/07,[11] interdistrict transfer rates decreased monotonically with enrollment quintile (figure 6).

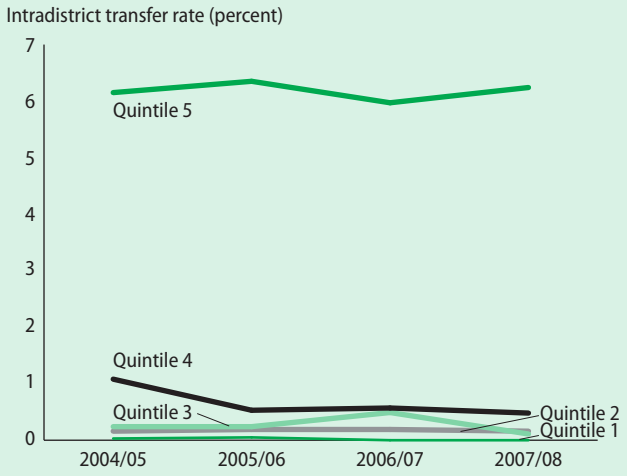
As figures 5 and 6 show, intradistrict and interdistrict transfer rates in the largest enrollment quintile tend to be separated from the other quintiles. For intradistrict transfer rates, quintile 5 remained at approximately 6 percent over the four years, while the other four quintiles all had intradistrict transfer rates of 0–1 percent. Similarly, for interdistrict transfer rates, quintile 5 remained at 15–20 percent over the four years, while quintiles 1–4 had rates of 33–45 percent.

Correlations between district enrollment size (not grouped by quintiles) and intradistrict and interdistrict transfer rates reveal a similar story.[12] The correlation between district size and the intradistrict transfer rate varied from 0.42 to 0.51 during 2004/05–2007/08, meaning that the intradistrict transfer rate rose as district enrollment increased. The correlation between district size and the interdistrict transfer rate varied from −0.24 to −0.25 during 2004/05–2007/08, meaning that the interdistrict transfer rate fell as district enrollment rose.

These findings, while similar to those of previous research, also differ from them somewhat. A report by the Arizona Department of Education (1992) found that most intradistrict transfers took place in large districts. While the current study examines the proportion (not the number) of students in a district who transferred within districts, it confirms the general findings of the Arizona Department of Education study of a positive relationship between intradistrict transfers and enrollment size.

A study for Wisconsin found that a district's number of interdistrict transfers received had a statistically significant positive relationship with the log of district enrollment (Welsch, Statz, and Skidmore 2010). This difference from the findings of the current report can be attributed to how mobility is measured. Welsch, Statz, and Skidmore examine the number of interdistrict transfers into a district, whereas the current report examines the proportion of students in the district who made interdistrict transfers into or out of the district.

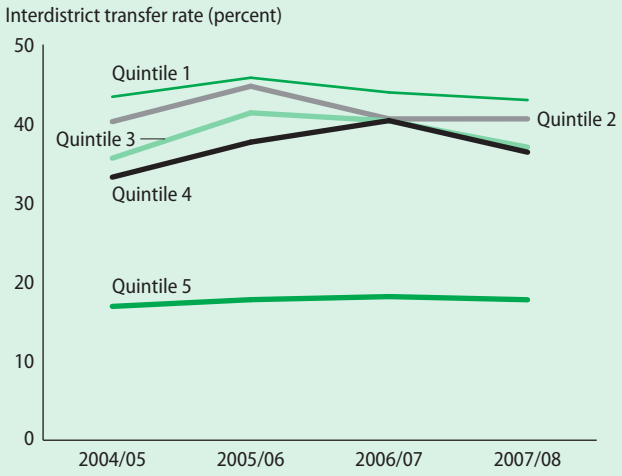
FIGURE 5
Intradistrict transfer rates in Arizona public schools by enrollment quintile, 2004/05–2007/08



Note: Quintile 1 has the lowest enrollment, and quintile 5 the highest.

Source: Authors' analysis of enrollment data obtained by special request from the Arizona Department of Education.

FIGURE 6
Interdistrict transfer rates in Arizona public schools by enrollment quintile, 2004/05–2007/08



Note: Quintile 1 has the lowest enrollment, and quintile 5 the highest.

Source: Authors' analysis of enrollment data obtained by special request from the Arizona Department of Education.

How does the average number of student mobility events during 2004/05–2007/08 vary by student characteristics?

In contrast to the previous research questions on the proportion of students that experienced at least one mobility event in each school year, this question examines the average number of mobility events that students experienced during the four-year period. (See the appendix for details on calculating the average number of mobility events experienced by a student.)

Students eligible for free or reduced-price lunch averaged almost twice as many mobility events (1.13) as students who were not eligible (0.61). Students who received special education services averaged more mobility events (1.09) than students who did not (0.88; table 2). Black students were the most mobile, averaging 1.31 mobility events, while White students were the least mobile, averaging 0.78 mobility events. Although English language learner students averaged more mobility events (0.99) than did other students (0.88), this finding is not robust to alternative specifications of the English language learner classification.

When students are classified as English language learners based solely on their classification during their final enrollment spell, non–English language learner students averaged more mobility events than English language learner students did (see table A3 in the appendix). This discrepancy with the findings of the main analysis is due to students who were "reclassified" from English language learner status to non–English language learner status over the period. These reclassified students experienced more mobility events, on average, than did students never classified as English language learners and students classified as English language learner students on their last enrollment spell.

Students eligible for free or reduced-price lunch averaged almost twice as many mobility events as students who were not eligible. Students who received special education services averaged more mobility events than students who did not

The average number of mobility events experienced by grade level were calculated for students when they were in a particular grade. Mobility events for a specific grade (such as for grade 3 students) are calculated by dividing the number of mobility events experienced by grade 3 students over the four-year period by the number of unique grade 3 students enrolled over the period. As a result, the means and standard deviations for each grade level are smaller than those for the other characteristics, since student are usually in one grade level for only one year. In addition, the maximum figure for each grade level is the greatest number of mobility events experienced by a single student when that student was in a particular grade. For grade 3 students, for example, the largest number of mobility events experienced by a student in that grade was seven.

Grade 1 students averaged the greatest number of mobility events (0.44), and kindergarten students the least (0.17; see table 2). As a whole, middle school students (grades 6–8) averaged fewer mobility events than did elementary school students and high school students. More specifically, when the mean number of mobility events among grades are averaged within each education level (elementary, middle, and high school), middle school students have the lowest average.

IMPLICATIONS AND NEXT STEPS

Previous correlational research on student mobility called attention to its negative relationship with academic, social, and behavioral outcomes. But little research has focused on understanding mobility specifically among English language learner students. Recent studies suggest that English language learner students would improve their English language proficiency and benefit academically from a coherent plan of instruction that integrates needed services (see, for example, Parrish et al. 2006). Highly mobile English language learner students are unlikely to have coherent instruction plans. Thus, a goal of this study was to compare the mobility rate of English language learner students with that of other students in Arizona

TABLE 2

Descriptive statistics of mobility events for Arizona public school students by student characteristic, 2004/05–2007/08

Characteristic	Mean	Standard deviation	Maximum	Percentage of students with 0 mobility events	1 mobility event	2 mobility events	3+ mobility events
All students	0.91	1.19	19	46.6	32.3	12.2	9.0
English language learner status							
English language learner student	0.99	1.23	19	43.2	32.8	13.7	10.3
Non–English language learner student	0.88	1.17	17	47.6	32.1	11.7	8.6
Low-income status							
Eligible for free or reduced-price lunch	1.13	1.35	19	40.0	31.7	15.0	13.3
Not eligible for free or reduced-price lunch	0.61	0.84	11	55.2	33.1	8.4	3.3
Special education status							
Special education student	1.09	1.35	19	42.4	30.5	14.4	12.7
Non–special education student	0.88	1.15	17	47.3	32.6	11.8	8.4
Gender							
Female	0.89	1.17	16	47.2	32.1	12.0	8.7
Male	0.92	1.2	19	45.9	32.5	12.3	9.3
Race/ethnicity							
American Indian	1.04	1.27	16	41.3	33.5	13.5	11.7
Asian	0.79	0.93	13	44.5	39.3	11.2	5.0
Black	1.31	1.41	15	31.4	36.6	16.6	15.4
Hispanic	0.98	1.24	19	44.3	32.4	13.0	10.3
White	0.78	1.08	17	51.4	31.0	10.7	6.9
Grade							
Kindergarten	0.17	0.47	8	86.3	11.3	1.9	0.5
Grade 1	0.44	0.67	10	64.3	29.5	4.9	1.2
Grade 2	0.38	0.63	9	69.0	25.7	4.3	1.0
Grade 3	0.36	0.61	7	70.1	25.0	4.1	0.9
Grade 4	0.34	0.6	8	71.4	24.0	3.8	0.8
Grade 5	0.33	0.59	10	72.2	23.4	3.7	0.7
Grade 6	0.31	0.58	7	73.7	22.2	3.4	0.7
Grade 7	0.31	0.6	8	74.5	21.0	3.6	0.9
Grade 8	0.32	0.61	9	74.1	21.2	3.8	0.9
Grade 9	0.33	0.63	8	73.6	21.3	4.0	1.2
Grade 10	0.39	0.69	9	70.6	22.2	5.6	1.7
Grade 11	0.38	0.68	9	70.9	22.1	5.6	1.5
Grade 12	0.38	0.72	11	72.4	20.3	5.3	2.0

Note: The minimum number of mobility events for all subgroups of students is zero.

Source: Authors' analysis of enrollment data obtained by special request from the Arizona Department of Education.

Understanding the timing of moves—whether certain students move more frequently during certain times of the year—could help in budgeting and resource planning and help educators develop consistent, well targeted instructional programs for English language learner students

public schools as well as to study how other student characteristics were related to mobility. State and local education leaders and policymakers can use the findings to better understand student mobility and to develop strategies for smoother transitions and delivery of services.

However, as some questions are answered, more arise. For example, this report finds that the difference in mobility rates between English language learner students and other students narrowed over the four-year period from 3.6 percentage points in 2004/05 to 0.9 percentage point in 2007/08. More recent data (2008/09 and 2009/10) could show whether this trend has continued.

While this study compared the mobility rates of English language learner students and non–English language learner students, it did not investigate the timing. Understanding the timing of the moves—whether certain groups of students in Arizona move more frequently during certain times of the year—could help school administrators in budgeting and resource planning and help educators develop and implement consistent, well targeted instructional programs for English language learner students. With such information, school personnel could plan for student transfers with the goal of reducing any disruptive impact of transitions on students' academic and social development.

In addition, while this study reported on the proportions of Arizona students who transferred within and across districts, it did not examine whether students transferred to better or worse performing schools. Other research has found evidence of a stratified structure of student mobility, with movement driven by factors such as achievement level, racial composition, and economic resources (Kerbow 1996). Future research in Arizona could explore, for instance, whether English language learner students or whether higher achieving students are more likely than other students to transfer to a higher performing school.

Of particular interest to policymakers, educators, and parents is the relationship between student mobility and achievement. Correlational research has shown that student mobility is associated with lower student achievement (Engec 2006; U.S. General Accounting Office 1994; Rumberger and Larson 1998; Xu, Hannaway, and D'Souza 2009). Therefore, additional research might help explain the relationship between the mobility rates of English language learner students and their progress on statewide assessments of English proficiency. Such information would help state policymakers and school officials as they consider service delivery options that meet the language needs of English language learner students.

Finally, more qualitative research on why students move could give policymakers a fuller understanding of mobility. While this study calculated the proportion of English language learner students who transferred to others schools throughout Arizona, it did not investigate students' reasons for moving. Gaining a fuller understanding of why students transfer could help state leaders and educators make informed policy decisions about how to lower the student mobility rate. Interventions to address family-initiated moves due to the lack of affordable housing would be vastly different from interventions to address moves that are school-initiated due to disciplinary problems. Without understanding the rationale behind the school transfer, targeting appropriate interventions could be difficult.

APPENDIX
DETAILS ON THE MOBILITY CALCULATION, EXPLORATORY ANALYSIS, AND SENSITIVITY ANALYSIS

This appendix provides additional information on how student mobility was calculated in this study. It also presents the results of an exploratory analysis of interdistrict transfers in five large Arizona school districts, which involved detailed geographic coding. Finally, it provides the results of the sensitivity analysis.

Calculating student mobility

Previous literature on student mobility. Previous studies of student mobility have calculated it in different ways. Ligon and Paredes (1992) found up to 33 mobility formulas in use throughout the country. The wide range of mobility calculations often reflects data availability. As described in Kerbow (1996, p. 149), "the most commonly used calculation of mobility rates includes both the number of students who leave a school and the number who enroll after the beginning of the year. These numbers are summed and then divided by the total number of students attending the school in order to convert mobility to a percentage of enrollment." This method of calculating student mobility is commonly used when the data do not track students over time.

Using datasets that track students over time, recent research has calculated student mobility more precisely. Studies first identify the mobile students, defining mobility as nonpromotional school to school transfers, and then divide the number of mobile students by the total number of students enrolled at the school, district, or state level. For instance, Xu, Hannaway, and D'Souza (2009) define mobility as students who made a nonpromotional school change from the previous year (so that students are considered mobile in the year they entered the new school) and divide the number of mobile students by the total number of students in the state. De la Torre and Gwynne (2009) separate mobility into "in-mobility" (the proportion of students who transferred into a school in a given year) and "out-mobility" (the proportion who transferred out).

Identifying mobility events. The current study defined mobility events as any of the following three conditions (excluding promotional school transfers):

- *Transfer event.* A student in one Arizona public school is later observed entering a different Arizona public school at any time from 2004/05 to 2007/08.
- *Enrollment break event.* A student leaves an Arizona school for at least 19 days, with no school enrollment during the 19 days, and then reenrolls in the same school.
- *Late entry.* A nonkindergarten student's first enrollment spell in an Arizona public school occurs during any of the years from 2004/05 to 2007/08.

Calculating the student mobility rate. The student mobility rate in time period *t* was calculated as follows:

$$\frac{\textit{Number of students who experienced at least one mobility event in time period } t}{\textit{Number of unique individual students enrolled in time period } t}$$

The denominator is the number of unique students enrolled rather than student enrollment count on a specific date (such as October 1) for two reasons: to calculate mobility among all students in the state or district rather than only among students who are officially enrolled on an arbitrary date and to avoid having a mobility rate greater than 100 percent, which could happen if the numerator included students who are excluded from the denominator (mobile students who were not enrolled as of the specific date).

Calculating student mobility rates by year. The first four research questions require calculating the mobility rate for each year from 2004/05 to 2007/08.

A transfer completed within a single school year is counted as one mobility event in that year. However, a mobility event can occur over multiple school years. For instance, a student leaving School A on February 4, 2005, and entering School B on October 25, 2005, is considered a mobility event (specifically, a transfer). For research questions that involve calculating the mobility rate by year, this mobility event would be counted in both 2004/05 and 2005/06. (In the Arizona dataset 2.01 percent of mobility events spanned more than one school year.) The rationale for including this as a mobility event in both years is that the transfer affected the student (and the classroom) in the 2004/05 school year, when the student left in the middle of the year, and in 2005/06, when the student entered a new school after the school year had begun. Transfers occurring over the summer are counted only in the second school year.[13] For instance, if the student finished the 2004/05 school year in School A and then entered School B on August 20, 2005 (the beginning of the school year), the transfer event would be counted only in the 2005/06 school year. The rationale is that the student completed the 2004/05 school year at School A, so the transfer did not affect his or her education during that school year. However, it could have affected the student's education in the following year, when the student enrolled in the new school.

For enrollment breaks, the mobility event is counted in each year in which the enrollment break occurred. If the mobility event occurred over two years, it is counted in both years. For instance, if a student left School A on March 15, 2005, and reentered School A on November 15, 2005 (with no enrollment in between), the enrollment break is counted in both school years. As a concrete example, the formula for calculating the mobility rate by year is specified for 2006/07:

Mobility rate for 2006/07 =

$$\frac{\textit{Number of students experiencing at least one mobility event in 2006/07}}{\textit{Number of unique students enrolled at any time during 2006/07}}$$

Calculating the student mobility rate in research question 1. The following formula was used to calculate the mobility rate for research question 1 on what proportion of Arizona English language learner students and other students are mobile within a given school year and during 2004/05–2007/08. As a concrete example, the following formula applies specifically to non–English language learner students during the 2006/07 school year but relates to both subgroups of students and for each school year.

Non–English language learner student mobility rate in 2006/07 =

$$\frac{\textit{Number of non–English language learner students who experienced at least one mobility event in 2006/07}}{\textit{Number of unique non–English language learner students enrolled in 2006/07}}$$

Calculating the student mobility rate in research question 2. A similar formula was used to calculate student mobility for research question 2 on whether the proportion of Arizona students who are mobile varies by education level and whether the proportions changed during 2004/05–2007/08. The only difference is that subpopulations (English language learner students and non–English language learner students) are disaggregated by education level. As a concrete example, the following formula applies specifically to high school non–English language learner students during the 2006/07 school year:

High school non–English language learner student mobility rate in 2006/07 =

$$\frac{\textit{Number of high school non–English language learner students who experienced at least one mobility event in 2006/07}}{\textit{Number of unique high school non–English language learner students enrolled in 2006/07}}$$

Calculating the intradistrict and interdistrict transfer rates in research question 3. Research question 3

examined the proportion of Arizona students who transferred within or between districts in a given school year. Transfer events were identified in the dataset and classified by the year or years in which they occurred; then intradistrict and interdistrict transfer rates were calculated. As a concrete example, the following formula pertains to the interdistrict transfer rate for English language learner students during the 2007/08 school year:

English language learner student interdistrict transfer rate in 2007/08 =

$$\frac{\textit{Number of English language learner students who experienced at least one interdistrict transfer event in 2007/08}}{\textit{Number of unique English language learner students enrolled in 2007/08 in Arizona}}$$

Calculating the intradistrict and interdistrict transfer rates in research question 4. The denominator for the transfer rate for question 3 is calculated at the state level, so it includes all students enrolled in Arizona. The denominator for question 4 is calculated at the district level, so it includes all students enrolled in a given district. It looks at whether intradistrict and interdistrict transfer rates for all students vary by district size and whether the rates changed during 2004/05–2007/08.

For the intradistrict transfer rate, all intradistrict transfers are first identified and classified based on the year in which they occurred. For instance, if a student exits School A in District 1 on March 15, 2005, and then enters School B in District 1 on May 1, 2005, this movement is categorized as one intradistrict transfer occurring in District 1 during the 2004/05 school year. If a student exits School A in District 1 on March 15, 2005, and then enters School B in District 1 on September 1, 2006, this movement is categorized as one intradistrict transfer occurring in District 1 during the 2004/05 school year and one intradistrict transfer occurring in District 1 during the 2005/06 school year.

For the interdistrict transfer rate, all interdistrict transfers are first identified and classified based on the year and district in which they occurred. Because interdistrict transfers involve two school districts, these transfers are counted in both districts. For instance, if a student exits School A in District 1 on March 15, 2005 and then enters School B in District 2 on May 1, 2005, the student is considered to have experienced an interdistrict transfer in both District 1 and District 2 during the 2004/05 school year. And since the student was enrolled in both school districts during the 2004/05 school year, he or she will also be included in the denominator for both districts. For concreteness, the interdistrict transfer rate for District 1 in 2004/05 is calculated as follows:

Interdistrict transfer rate for District 1 in 2004/05 =

$$\frac{\textit{Number of students in District 1 who experienced at least one interdistrict transfer event in 2004/05}}{\textit{Number of unique students enrolled in District 1 in 2004/05}}$$

Calculating the average number of mobility events in research question 5. The first four research questions examine whether a student was mobile in any given year: students were considered mobile whether they experienced one mobility event or five in a given year. Since multiple mobility events could affect a student differently than a single mobility event, research question 5 looks at whether the average number of student mobility events during 2004/05–2007/08 varies by student characteristics (English language learner status, eligibility for free or reduced-price lunch, special education status, gender, race/ethnicity, and grade level). It differentiates students who make one move from students who make multiple moves by calculating the average number of mobility events for each student over 2004/05–2007/08. Each mobility event (transfer, enrollment break, and late entry) is counted, and the events are totaled. (For this research question, a transfer event occurring over two years is counted just once.)[14] The total number of mobility events is then divided by the

number of unique individual students enrolled at any time during the four-year period to calculate the average number of mobility events. As a concrete example, the following formula is specified for English language learner students:

Average number of mobility events experienced by English language learner students during 2004/05–2007/08 =

$$\frac{\textit{Total number of mobility events among all English language learner students during 2004/05–2007/08}}{\textit{Total number of unique English language learner students observed during 2004/05–2007/08}}$$

Identifying the first and last days of the school year for each school. To identify students with enrollment breaks of at least 19 days, it was necessary to identify the first and last days of the school year. These dates were not in the dataset and were not available from the Arizona Department of Education,[15] so the dates were inferred from the data. To infer the first day of school for a given school in a given year, the first date that each student entered the school in July, August, or September was tabulated. Then the modal start date for the school in July, August, or September was identified and compared with the earliest start date at the school. In 99 percent of the schools across the four years, the two dates (earliest start date observed and modal start date among all students) were the same. In the 1 percent of cases where the dates differed, the modal start date was used if it was in August or if it was fewer than 19 days after the earliest start date; otherwise, the earliest start date was used as the first day of school.

To infer the last day of school for a given school in a given year, the last exit date for each school in May or June was identified.[16] Then, the last exit date in the school's district was identified across 2004/05–2007/08.[17] The last exit date for the district was used for all schools in that district if it was later than May 25; if the last date was May 25 or earlier, May 25 was used as the last day of school.

Promotional school changes. In this study, promotional school changes refer to student transfers to another school when the current school does not offer the next grade to which a student is being promoted. These are typically grades 5 and 8, but they can also be grades 3 and 6 in the case of schools whose grade spans are K–3 or K–6. Promotional school changes are not considered mobility events. These changes are identified in the dataset based on school enrollment in each year. For instance, in ascertaining whether grade 5 students at School A in 2005/06 who transferred to grade 6 at School B in 2006/07 would be considered promotional transfers, the grade 6 enrollment of School A in 2006/07 was identified. If there were no grade 6 students in School A in 2006/07, all the transferring grade 5 students would be counted as promotional transfers (and excluded from the mobility count). In this example, some of the grade 5 students may have transferred to a different school for grade 6 than was typical for other grade 5 students from School A. However, this analysis does not judge whether a promotional transfer was "typical." All promotional transfers are excluded from the mobility calculation. Enrollment of each grade within each school was checked for every school year because some schools change their grade spans over time.

Dual enrollment. In some cases, students may be enrolled simultaneously at more than one school; for instance, a student may take most classes at one high school but also take a course at a different high school.[18] Dual enrollment may take one of three forms:

- *Partial overlap* between two schools. (A student was enrolled at School A from August 20, 2006, through March 24, 2007, and at School B from February 2, 2007, through June 30, 2007, with overlap during February and March.)

- Enrollment at one school falls *completely within* the enrollment spell at another school. (A student was enrolled at School A from August 15, 2005, through June 30, 2006, and at

School B from January 4, 2006, through May 20, 2006, a period that falls completely within the enrollment spell at School A.)

- An *exact match.* (A student was enrolled at School A from August 15, 2005, through June 30, 2006, and at School B from August 15, 2005, through June 30, 2006.)[19]

All instances of dual enrollment in the dataset would register as a transfer event. However, counting dual enrollments that involve "completely within" or "exact matches" as transfer events artificially inflates the transfer count since the student is not actually transferring between schools.

Consider a "completely within" dual enrollment. A student was enrolled at School A (without any breaks in enrollment) during the 2004/05, 2005/06, and 2006/07 school years and at School B from November 15, 2005, through April 30, 2006, during the 2005/06 school year. Since each row in the dataset represents an enrollment spell at a particular school for a given school year,[20] row 1 would be the 2004/05 enrollment spell at School A, row 2 would be the 2005/06 enrollment spell at School A, row 3 would be the enrollment spell at School B from November 15, 2005, through April 30, 2006, and row 4 would be the 2006/07 enrollment spell at School A. The changes in schools from rows 2 to 3 and rows 3 to 4 would signal a transfer event between schools for each pair of rows. However, because the student was continuously enrolled at School A for the entire three-year period (while concurrently taking courses at School B for part of one year), the authors of this report believe that this dual enrollment should not be considered a transfer event. To address this issue, all enrollment spells that fall completely within another enrollment spell were deleted from the dataset, so these instances were no longer considered to be transfer events.

Now consider a scenario for an "exact match." Assume that a student was enrolled at School A (without breaks in enrollment) during the 2004/05, 2005/06, and 2006/07 school years and also at School B for the entire 2005/06 school year. As in the "completely within" case, if both enrollment spells are included in the dataset, a transfer event would be registered since the student was enrolled at School A during the 2004/05 school year, Schools A and B during 2005/06, and School A during 2006/07. Again, however, because the student was continuously enrolled at School A for the entire three-year period (while being concurrently enrolled at School B for the 2005/06 school year), the authors of this report believe that this dual enrollment should not be considered a transfer event.

To address this issue, the authors deleted the enrollment spell of the school in which the student had spent less time over the entire period under observation. More specifically, the total number of days that a student was enrolled at each school was summed over the five-year observation period (the extra fifth year was included since it represents additional information on the students). The enrollment spell for the school in which the student spent fewer days over the period was then deleted, keeping the data for the school to which the student was more attached. In the example above, the School B enrollment spell in 2005/06 was deleted. This process eliminated 65.5 percent of the exact matches in the dataset. For a student who had spent an equal number of days in both schools over the five-year period, the enrollment spell associated with a technical education school was then deleted. Many students, in addition to taking courses at their regular high school, take career and technical education courses at schools offering only these types of courses. This deletion eliminated 34.4 percent of the rest of the exact matches. For the remaining 0.1 percent of exact matches, one of the spells involved in the exact match was randomly deleted.

The third case of dual enrollment, "partial overlap," also registers a transfer event. However, because both enrollment spells contain portions of time with no dual enrollment, both were kept in the dataset. For example, a student may

have been enrolled at School A from August 20, 2006, through March 24, 2007, and at School B from February 2, 2007, through June 30, 2007. A transfer event occurs during the 2006/07 school year since both enrollment spells cover some periods that do not involve dual enrollment. Deleting either enrollment spell would cause this transfer to be uncounted.

Students who exit the Arizona public school system. The mobility calculations in this report do not include instances when students permanently leave the Arizona public school system. These students are included in the analysis, but their final exit from the Arizona public school system is not counted as a mobility event. A permanent leave is defined as occurring when a student exits an Arizona school and does not reenroll in another Arizona school during the observation period; it is identified in the dataset as the student's final enrollment spell.[21] Permanent leaves are excluded from the mobility calculation to avoid counting dropout events as mobility events. For instance, a grade 10 student leaving the system in the 2004/05 school year is not counted as a mobility event. While a student could be transferring out of state rather than dropping out of school, the data do not provide conclusive evidence to determine this.

Although instances of students permanently leaving the Arizona public school system are not included in the mobility calculation, these instances were examined to assess their frequency and to understand the types of students who experienced these events.

The rate at which students left the Arizona public school system rose from 6 percent in 2004/05 to 8 percent in 2006/07 (figure A1). However, many of these students had already experienced mobility events in the same year before they permanently left the Arizona public school system. As a result, adding the leave events to the mobility calculation would increase the overall mobility rate by less than 8 percent in 2006/07. In particular, for each of the three years, it would increase the overall mobility rate by less than 2 percent.

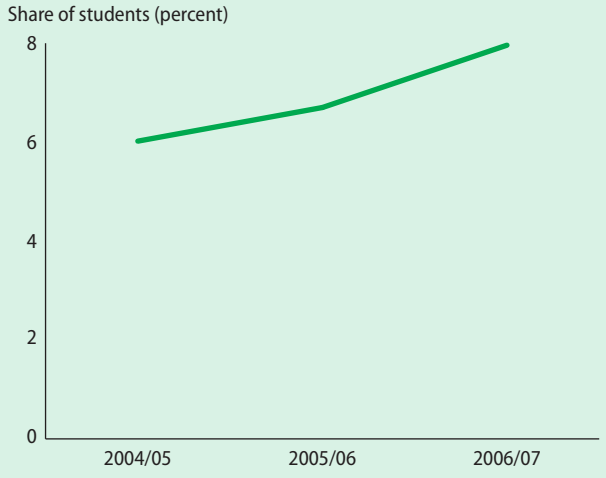
Differences in the rate of leaving by student characteristics are small (table A1). For instance, the difference is 0.1 percentage point between English language learner students and other students and 0.4 percentage point between students eligible for free or reduced-price lunches and those who are not. Overall, 14.6 percent of the students observed from 2004/05–2006/07 were identified as leavers.

Exploratory analysis

Interdistrict transfers in a purposively selected sample of districts. Prior research has found that student mobility tends to occur within localized geographic boundaries. For instance, Kerbow (1996) finds that the median distance that students move between schools is 2.4 miles. Thus, the finding for research question 3 that students are twice as likely to transfer between districts as within districts might be somewhat surprising if one assumes that interdistrict transfers involve greater distances between schools.

FIGURE A1

Percentage of students who left the Arizona public school system, 2004/05–2006/07



Note: Total student population for this analysis is 1,382,643 rather than 1,528,348 because students who were enrolled only in 2007/08 are excluded. This figure does not report the percentage of leavers in 2007/08; since the dataset does not contain information for 2008/09, all students in 2007/08 would have been counted as leavers in that year.

Source: Authors' analysis of enrollment data obtained by special request from the Arizona Department of Education.

TABLE A1
Students who left the Arizona public school system by student characteristic, 2004/05–2006/07

Characteristic	Total students	Number of leavers	Percentage
English language learner status			
English language learner student	356,092	51,577	14.5
Non–English language learner student	1,172,256	171,721	14.6
Low-income status			
Eligible for free or reduced-price lunch	866,965	128,262	14.8
Not eligible for free or reduced-price lunch	661,383	95,036	14.4
Special education status			
Special education student	214,662	28,885	13.5
Non–special education student	1,313,686	194,413	14.8
Gender			
Female	743,784	106,131	14.3
Male	784,564	117,167	14.9
Race/ethnicity			
American Indian	89,353	15,913	17.8
Asian	42,927	5,929	13.8
Black	90,817	15,529	17.1
Hispanic	613,956	88,606	14.4
White	691,295	97,321	14.1

Source: Authors' analysis of enrollment data obtained by special request from the Arizona Department of Education.

This exploratory analysis considers the geographic distances associated with interdistrict transfers. Specifically, it looks at how many interdistrict transfers involved transferring to or from neighboring districts and how many involved transferring to or from districts that shared a common geographic area. School districts can share the same geographic area when, for example, a charter school district is located within the physical boundary of a larger school district.[22]

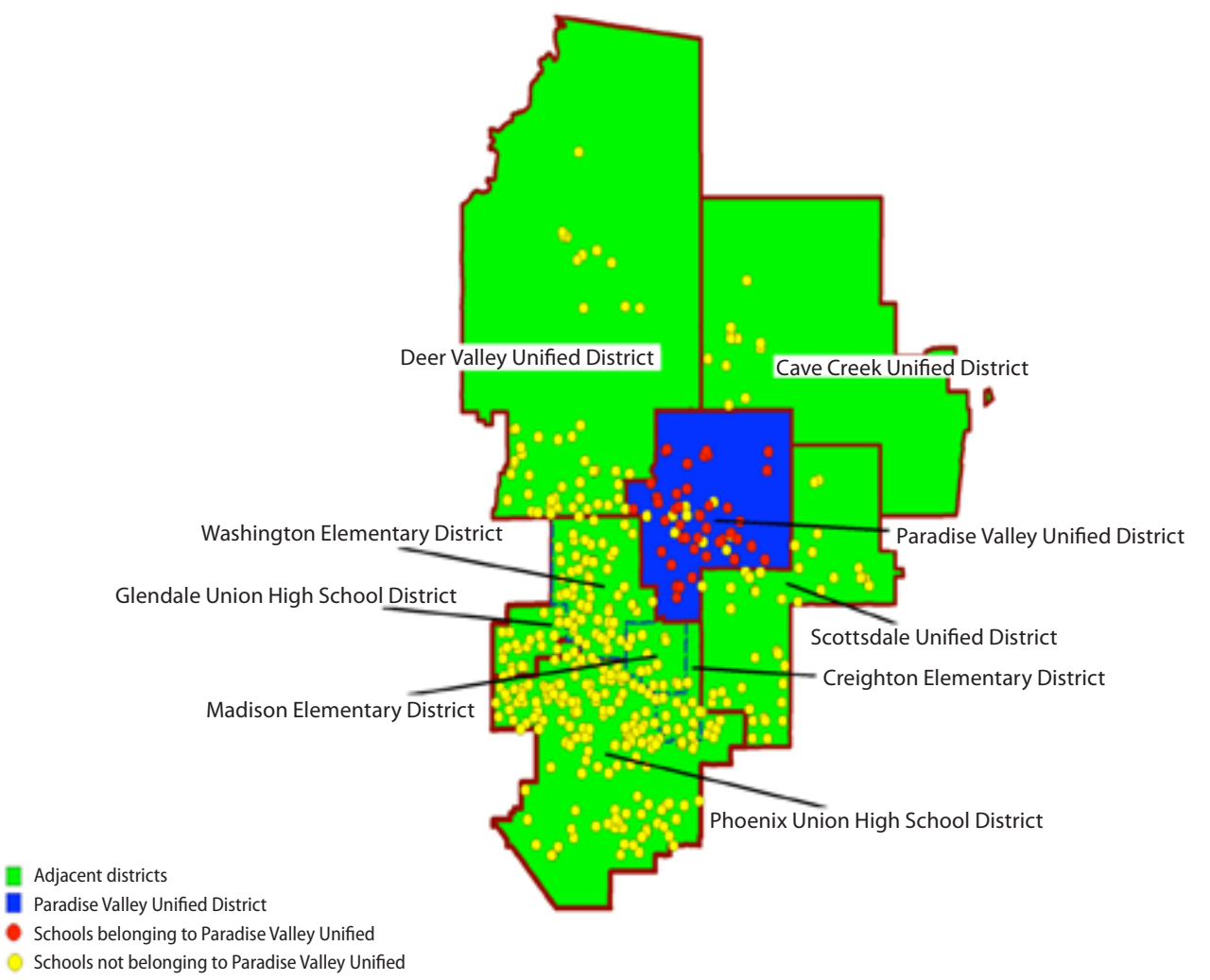
Because of the detailed geographic coding involved, only five Arizona school districts were selected for in-depth analysis. The five were among the seven largest districts in the state based on enrollment size as of 2007/08: Mesa Unified (1, largest), Peoria Unified (3), Gilbert Unified (4), Deer Valley Unified (5), and Paradise Valley Unified (7). These five districts were chosen because they are all in the Phoenix metropolitan area.[23]

In all five districts, more than half the interdistrict transfers occurred between two adjacent districts or between two overlapping districts. For instance, of the interdistrict transfers that occurred for a given district during 2004/05–2007/08, 88.9 percent were between an adjacent district or an overlapping district for Peoria Unified, 66.4 percent for Mesa Unified, 60.5 percent for Gilbert Unified, 68.8 percent for Deer Valley Unified, and 65.9 percent for Paradise Valley Unified. Interdistrict transfers between overlapping districts ranged from 8.1 percent in Paradise Valley Unified to 18.5 percent in Mesa Unified, with values of 9.8 percent for Gilbert Unified, 11.2 percent for Peoria Unified, and 13.7 percent for Deer Valley Unified.

Map A1 shows the interdistrict transfers between adjacent and overlapping districts for Paradise Valley Unified. Red dots represent schools in Paradise Valley Unified District, and yellow dots represent schools in other districts. The yellow

MAP A1

Interdistrict transfers for Paradise Valley Unified District, Arizona, 2004/05–2007/08



Note: Student population in Paradise Valley Unified District is 57,547.

Source: Authors' analysis of enrollment data obtained by special request from the Arizona Department of Education.

dots within the border of Paradise Valley Unified show the options available for students to transfer to schools that are within the geographic borders of Paradise Valley Unified but not part of the district. Overall, students transferred into or out of 46 Paradise Valley schools and 496 schools in adjacent or overlapping districts. These 496 non–Paradise Valley schools account for about two-thirds of all interdistrict transfers associated with Paradise Valley. Transfer distances (distances between a red and a yellow dot) are generally less than 20 miles, suggesting that the interdistrict transfers involved travel within a localized area.

Proportion of students who experience mobility events by student characteristics. Research question 5 examined the average number of mobility events experienced by different types of students. Because the average number of mobility events can be influenced by a small number of students who experience many mobility events, an additional analysis was conducted of the proportion of students who experienced at least one mobility event based on various student characteristics. This analysis explored the four types of mobility based on various student characteristics (English language learner status, income status, and race/ethnicity).[24]

English language learner students were more likely (7.2 percent) than were other students (4.9 percent) to experience enrollment breaks, intradistrict transfers (16.7 percent and 13.0 percent), and interdistrict transfers (30.7 percent and 27.8 percent; figure A2). Non–English language learner students were more likely to experience a late entry than were English language learner students (20.3 percent and 19.0 percent).

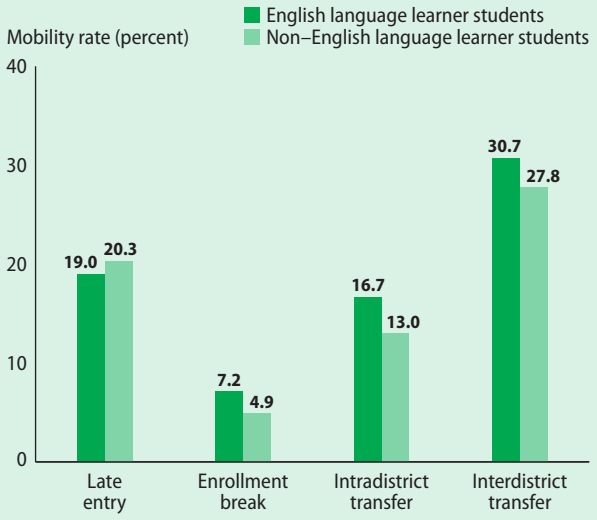
Students eligible for free or reduced-price lunch were more likely than other students to experience an enrollment break, an intradistrict transfer, and an interdistrict transfer (figure A3). The interdistrict transfer rate for students eligible for free or reduced-price lunch (35.9 percent) is almost twice that of other students (18.7 percent). However, students eligible for free or reduced-price lunch were less likely to experience a late entry than were other students.

Comparing figures A2 and A3 illustrates that the gap in mobility rates is larger between students eligible for free or reduced-price lunch and those who are not than it is between English language learner students and non–English language learner students. For intradistrict transfers, 8.2 percentage points separate students eligible for free or reduced-price lunch and those who are not, while 3.6 percentage points separate English language learner students and other students. This difference shows the stronger relationship between mobility and students eligible for free and reduced-price lunch (correlation of 0.15) than between mobility and English language learner students (correlation of 0.04).

Mobility types vary by ethnicity (figure A4). For instance, American Indian students have the highest rates of enrollment breaks, and White students have the lowest. Black students are the most likely to experience an intradistrict transfer, while American Indian students are the least likely. Asian students have the highest rate of late entry, and White students have the lowest. While students overall are more likely to experience an intradistrict transfer than an enrollment break, American Indian students are more likely

FIGURE A2

Cumulative mobility rates of Arizona public school students by English language learner status and mobility type, 2004/05–2007/08

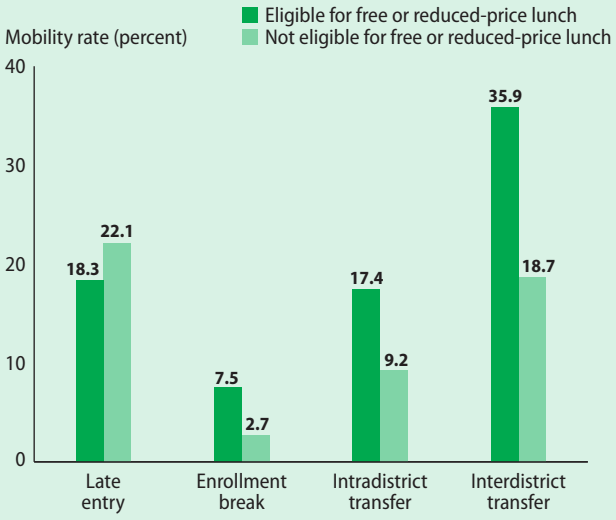


Note: The mobility rate is the proportion of students who experienced at least one type of mobility event over the period.

Source: Authors' analysis of enrollment data obtained by special request from the Arizona Department of Education.

FIGURE A3

Cumulative mobility rates of Arizona public school students by income status and mobility type, 2004/05–2007/08

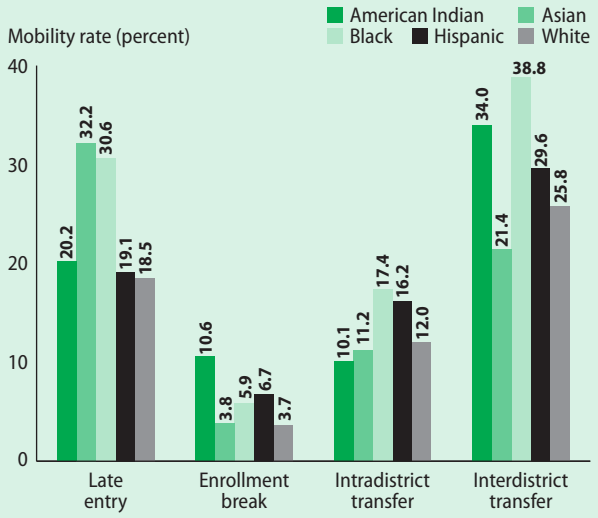


Note: The mobility rate is the proportion of students who experienced at least one type of mobility event over the period.

Source: Authors' analysis of enrollment data obtained by special request from the Arizona Department of Education.

FIGURE A4

Cumulative mobility rates of Arizona public school students by race/ethnicity and mobility type, 2004/05–2007/08



Note: The mobility rate is the proportion of students who experienced at least one type of mobility event over the period.

Source: Authors' analysis of enrollment data obtained by special request from the Arizona Department of Education.

to experience an enrollment break (10.6 percent) than an intradistrict transfer (10.1 percent). Thus, American Indian students are more likely to experience gaps in enrollment within a school than to transfer within the same district, while students of other ethnicities are more likely to have the reverse experience.

Sensitivity analysis

To assess the robustness of the definition of English language learner status used in the main analysis (any student classified as such at any time during 2003/04–2007/08), a second definition was examined: any student classified as an English language learner during the student's last enrollment spell. A chi-square test of independence rejected the hypothesis that the two definitions are independent at the 1 percent level, implying that the two definitions are not independent. Nevertheless, this section reports on the results using this second definition (table A2). This section also reports on the results obtained when students eligible for free or reduced-price lunch and special education students were defined as such based on their last enrollment spell.

Based on students' status at their last enrollment spell, 13.9 percent of students in the dataset were English language learner students, 38.9 percent were eligible for free or reduced-price lunch, and 9.6 percent were special education students. Under the definition used in the main analysis, 23.3 percent of the students were English language learners, 56.7 percent were eligible for free or reduced-price lunch, and 14.0 percent were special education students.

Overall, for research question 1, the pattern of decreasing mobility rates holds for both English

TABLE A2

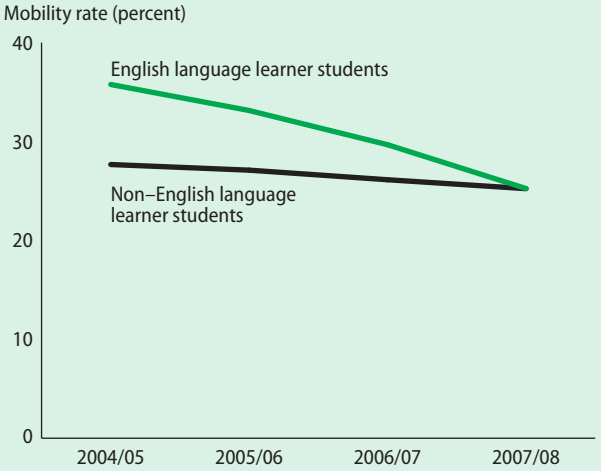
Characteristics of Arizona public school students based on their last enrollment spell, 2004/05–2007/08

Characteristic (as of last enrollment spell)	Number	Percentage
English language learner status		
English language learner student	212,242	13.9
Non–English language learner student	1,316,106	86.1
Low-income status		
Eligible for free or reduced-price lunch	595,284	38.9
Not eligible for free or reduced-price lunch	933,064	61.1
Special education status		
Special education student	146,676	9.6
Non–special education student	1,381,672	90.4

Source: Authors' analysis of enrollment data obtained by special request from the Arizona Department of Education.

FIGURE A5

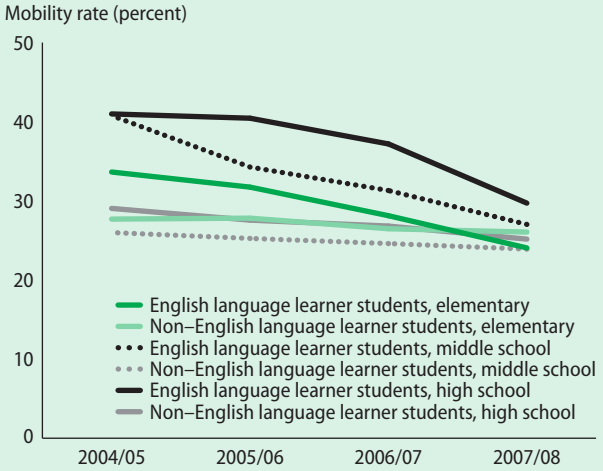
Question 1 sensitivity analysis: mobility rates for English language learner students in Arizona public schools by English language learner status as of last enrollment spell, 2004/05–2007/08



Source: Authors' analysis of enrollment data obtained by special request from the Arizona Department of Education.

FIGURE A6

Question 2 sensitivity analysis: mobility rates by English language learner status and education level for Arizona public schools based on status as of last enrollment spell, 2004/05–2007/08



Source: Authors' analysis of enrollment data obtained by special request from the Arizona Department of Education.

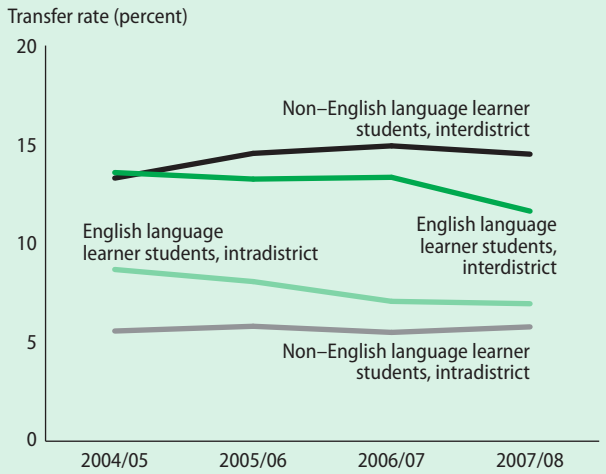
language learner students and non–English language learner students (figure A5). Compared with the original definition, mobility rates are higher for English language learner students over the years 2004/05–2006/07 but lower for 2007/08. In 2007/08 the mobility rate for English language learner students was 0.01 percent higher than for non–English language learner students.

The sensitivity analysis for question 2 finds that high school English language learner students continue to have the highest rates of mobility throughout the period, and middle school non–English language learner students the lowest rates (figure A6), as in the original analysis. While the ranking over the four-year period changes for the other four categories, this does not change the findings for this question because the main reported findings do not include these rankings. The other findings from the sensitivity analysis are the same as those of the main analysis.

The sensitivity analysis results for question 3 differ from the results of the main analysis in that the interdistrict transfer rate is lower for English

FIGURE A7

Question 3 sensitivity analysis: intradistrict and interdistrict transfer rates for Arizona public school students based on English language learner status as of last enrollment spell, 2004/05–2007/08



Source: Authors' analysis of enrollment data obtained by special request from the Arizona Department of Education.

language learner students than for non–English language learner students over 2005/06–2007/08 (figure A7), whereas it was higher in the main analysis during that time period. In both analyses English language learner students have higher

rates of intradistrict transfers than do non–English language learner students.

A sensitivity analysis was not conducted for question 4 since the English language learner student definition was not employed for this question.

The sensitivity analysis for question 5 found average mobility events of 0.88 for English language learner students and 0.91 for other students (table A3). The main analysis, by contrast, found more mobility events on average for English language learner students than for non–English language learner students. The difference arises because of the students who were classified as English language learners at some point during the observation period but who were not classified as such in their final enrollment spell. In other words, they were reclassified from English language learner student to non–English language learner student at some point between 2004/05 and 2007/08. There are 143,850 of these reclassified students, or 40 percent of all of the students who were ever classified as English language learners. These reclassified students had a higher average number of mobility events (1.16) than did students who were classified as English language learners based on their last enrollment spell (0.88; see table A3) and students who were never classified as English language learners (0.88; see table 2). As a result, when the reclassified students are categorized as English language learners in the main analysis, English language learner students have more mobility events on average than do other students. But when these reclassified students are considered to be non–English language learner students in the sensitivity analysis, the non–English language learner students experience more mobility events on average than do the English language learner students.

Consistent with the main findings, students eligible for free or reduced-price lunch during their last enrollment spell and students in special education programs during their last enrollment spell averaged more mobility events than did their counterparts.

TABLE A3

Question 5 sensitivity analysis: descriptive statistics of mobility events for Arizona public school students by student characteristics during last enrollment spell, 2004/05–2007/08

				Percentage of students with			
Characteristic	Mean	Standard deviation	Maximum	0 mobility events	1 mobility event	2 mobility events	3+ mobility events
English language learner status							
English language learner student	0.878	1.089	13	44.5	35.8	12.2	7.5
Non–English language learner student	0.910	1.200	19	46.9	31.7	12.2	9.2
Low-income status							
Eligible for free or reduced-price lunch	1.007	1.256	17	42.9	33.0	13.4	10.7
Not eligible for free or reduced-price lunch	0.841	1.133	19	48.9	31.8	11.4	7.9
Special education status							
Special education student	0.971	1.249	19	44.9	31.8	13.0	10.3
Non–special education student	0.899	1.178	17	46.7	32.3	12.1	8.9

Note: The minimum number of mobility events for all subgroups of students is zero.

Source: Authors' analysis of enrollment data obtained by special request from the Arizona Department of Education.

NOTES

1. This definition excludes the promotional transfers that occur between elementary, middle, and high school. The current study expands on the Rumberger (2003) definition by including students with breaks in enrollment of at least 19 days within a single school.

2. Correlational research uses statistical techniques to control for confounding factors that may affect the relationship between two variables—in this case student mobility and academic achievement. For obtaining unbiased causal estimates, correlational studies are less convincing than randomized controlled trials or good quasi-experimental designs because they may not fully account for confounding factors. Correlational studies may find an association between mobility and lower student achievement, but whether mobility caused the lower student achievement is uncertain.

3. This study identifies English language learner students using an English language learner status variable that identifies students whose primary or home language is not English and who do not exhibit a level of proficiency in academic English appropriate for their grade level. Arizona designates as English language learner students those who achieve below the level of "proficient" on the Arizona English Language Learner Assessment.

4. Arizona has an interdistrict open enrollment policy that allows students to attend schools outside their home district (Arizona State Legislature 2009c).

5. Because this study examined the entire population of public K–12 students in Arizona, tests of statistical significance were not conducted when comparing differences across population means or time periods.

6. Unless otherwise noted, Black includes African American, Hispanic includes Latino, Asian includes Native Hawaiian or Other Pacific Islander, and American Indian includes Alaska Native.

7. Student transfers from an unidentified district into the Chicago Public School system and vice versa are considered interdistrict transfers in these studies.

8. Quintiles were set in each of the four school years, so that if enrollment fluctuated, a district could move between quintiles. If quintiles had been set based solely on enrollment data for one year (such as 2005/06), districts that did not exist in the other years would have had to be excluded from the analysis. For instance, 50 districts that existed in 2004/05–2006/07 did not exist in 2007/08.

9. Intradistrict and interdistrict transfer rates for individual districts, not reported here, are available from the authors.

10. The exception in 2007/08 occurred because quintile 3 had an approximately 0.05 percentage point lower intradistrict transfer rate than did quintile 2 in this year.

11. The exception in 2006/07 occurred because quintile 4 had an approximately 0.03 percentage point higher interdistrict transfer rate than did quintile 3 in this year.

12. In these calculations, the sample size is the universe of school districts in the state for each given year, which ranges from 560 to 610. District size is the student enrollment measured for each year.

13. "Summer" is defined as starting 19 days before the end of the school year. (For a description of how the last day of school is identified, refer to the section "Identifying the first and last days of the school year for each school" in this appendix.) For example, if a student left School A three days before the last day of school in 2005/06 and entered School B

anytime in the 2006/07 school year, this transfer event would be counted only in the 2006/07 school year. The rationale is that leaving three days before the end of the 2005/06 school year is unlikely to materially affect the student's education (or that of the rest of the classroom) in 2005/06. The threshold of 19 days is used for consistency with how enrollment breaks are identified in this report.

14. This differs from practice for the previous research questions, which examined mobility rates for each year and counted a mobility event in both years if a transfer began in one year and finished in the next.

15. School start and end dates are typically determined and recorded at the district level rather than at the state level. And while the first and last days of the school year are usually the same for all schools within a district, they sometimes vary.

16. In the Arizona Department of Education dataset, the exit date for students whose enrollment spell at a school lasted through the end of the school year was marked with a ".". Students who exited during the school year had a date associated with the exit date. When tabulating the exit dates, dates that were marked with a "." were excluded.

17. The rationale for looking at exit dates across years is that the exit dates observed in the dataset must fall before the last day of school, since an enrollment spell would not have an exit date if it ended on the last day of school (it would instead have a "."). To identify the latest possible exit date, all years during the four-year period were considered.

18. High school students make up almost all (97.4 percent) dual enrollment cases.

19. About 10.8 percent of enrollment spells in the dataset were involved in one of these three types of dual enrollment. More specifically, 0.3 percent of all enrollment spells were involved in "partial overlap," 4.8 percent were involved in a "completely within" dual enrollment, and 5.7 percent were involved in an "exact match."

20. The dataset is sorted according to three criteria, in the following order: student hash identification number, start date of each enrollment spell, and exit date of each enrollment spell.

21. Grade 12 students are not included as leavers since these students could be graduating early rather than leaving the school system. For instance, if a grade 12 student exited on March 14, it is possible that the student had completed all necessary coursework to graduate by that time. The dataset does not indicate whether the students have graduated.

22. Measuring the distance between the two schools for every transfer was beyond the scope of this report. However, the authors plan to conduct such an analysis in future work.

23. Although only 5 of the more than 600 districts in Arizona were selected for this exploratory analysis, these five districts make up approximately 20 percent of the state's total student enrollment.

24. Special education status, gender, and grade level are not reported in the additional analysis, but the results are similar to those presented in table 2 and are available from the authors. To keep the reporting simple, results of the additional analysis are cumulative for the four-year period. Results do not change when broken out by year.

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