Making Connections

June 2019

Student and school characteristics associated with academic performance and English language proficiency among English learner students in grades 3–8 in the Cleveland Metropolitan School District

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Key findings

This study, conducted in the Cleveland Metropolitan School District, explored the relationships between student and school characteristics among English learner students and their performance on math, English language arts, and English language proficiency assessments. The key findings include:

- Four school climate domains—academic rigor, safe and respectful climate, peer social-emotional learning, and supportive learning environment—were associated with higher English language speaking proficiency levels.
- Two school climate domains—academic rigor and supportive learning environment—were associated with higher English language arts performance.
- A higher number of students per bilingual paraprofessional was associated with lower math performance.
- A higher number of students per certified teacher of English as a second language was associated with lower English language speaking proficiency levels.

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Summary

The Cleveland Metropolitan School District has seen the number of English learner students in grades K–12 increase in recent years, even as overall enrollment has decreased (U.S. Department of Education, National Center for Education Statistics, 2016). The proportion of students in the district classified as English learner students rose from 5.4 percent in 2011/12 to 8.8 percent in 2016/17. In addition, the English learner student population has grown more diverse in race/ethnicity, country of origin, and native language. This has been driven in part by an influx of resettled refugees speaking a variety of languages. The increasingly diverse English learner student population requires more support from the district to meet broader needs for language, cultural, and educational assistance.

The Cleveland Partnership for English Learner Success is a researcher–practitioner partnership between the Regional Educational Laboratory Midwest and the Cleveland Metropolitan School District's Multilingual Multicultural Education Office and the district's research office. The partnership has prioritized examining the characteristics of English learner students and the schools they attend to identify which characteristics are associated with student academic performance and English language proficiency. The study team conducted this research for the partnership as a step toward improving district and school support for English learner students.

The study described the characteristics of English learner students in grades 3–8 and the schools they attended, as well as the students' performance on statewide math, English language arts, and English language proficiency assessments in 2011/12–2016/17. It then examined the relationships between those characteristics and student academic performance and English language proficiency. The key findings include:

- Four school climate domains—academic rigor, safe and respectful climate, peer social-emotional learning, and supportive learning environment—were associated with higher English language speaking proficiency levels.
- Two school climate domains—academic rigor and supportive learning environment—were associated with higher English language arts performance.
- A higher number of students per bilingual paraprofessional was associated with lower math performance.
- A higher number of students per certified teacher of English as a second language was associated with lower English speaking proficiency levels.

While this study cannot determine whether the relationships are only correlational, the findings are a first step toward identifying action areas that the district can consider for supporting English learner students. The findings also may be relevant for other urban districts with smaller but growing English learner student populations.

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Why this study?

Like many large and midsize districts in the Regional Educational Laboratory (REL) Midwest Region, the Cleveland Metropolitan School District (CMSD) has seen its English learner student population in grades K–12 increase in recent years (U.S. Department of Education, National Center for Education Statistics, 2016).[1] Specifically, from 2011/12 to 2016/17 the number of English learner students in the district rose 27 percent, while overall enrollment decreased 11 percent. Thus, the proportion of English learner students in the district rose from 5.4 percent in 2011/12 to 8.8 percent in 2016/17. Effectively supporting the academic performance and English language development of the growing population of English learner students is a key priority for the district and has served as the basis for the Cleveland Partnership for English Learner Success between REL Midwest and CMSD.

The challenge that CMSD faces extends beyond the increase in English learner students; the composition of the English learner student population is diversifying in terms of race/ethnicity, country of origin, and native language. From 2011/12 to 2016/17 the percentage of non-Spanish-speaking English learner students nearly doubled in the district, from 18 percent to 30 percent. These changes require the district to provide more support to meet broader needs for language, culture, and educational assistance. To help inform its allocation of resources, the district thus sought information on whether diverse student characteristics are associated with academic performance and English language proficiency.

CMSD also has a particular interest in better understanding the characteristics of the schools that English learner students attend (see box 1), the changes in those characteristics over time, and their association with English learner students' academic performance and English language proficiency. Understanding the relationship between school characteristics and English learner student outcomes can help the district identify areas on which to focus. For example, the district has prioritized understanding whether the number of English learner students per certified teacher of English as a second language or per bilingual paraprofessional is associated with student outcomes. Information on school specialist staffing and training background can help guide the conversation about staffing resources and pinpoint areas for future study. (For previous research on school characteristics associated with English learner student outcomes, see appendix A.)

The district also was interested in how the proportion of English learner students at a school is associated with student outcomes. Students entering CMSD who speak a primary language other than English are referred to the district's Multilingual Multicultural Education Office before they are enrolled in a school. The office generally advises families to select a school in which there is a large proportion of other English learner students, because those schools offer more language support and provide students a peer group with some commonalities. While the study findings cannot directly inform school placement decisions, the district sought information on whether the proportion of English learner students at a school merits further investigation as a factor in student outcomes.

Finally, CMSD strongly emphasizes addressing challenges in school climate, which has resulted in the district administering the Conditions for Learning Survey (Osher, Kendziora, & Chinen, 2008) to students since 2008/09. Although school climate is an area of interest for the district, little analysis had been conducted to understand the association of school climate with English learner student outcomes. One goal of the current study is to provide a better understanding of the associations between school climate and English learner students' academic performance and English language proficiency.

Box 1. School options for English learner students in the Cleveland Metropolitan School District

The Cleveland Metropolitan School District has a school-of-choice policy that allows students to attend any school in the district regardless of location or distance from their home. English learner students in grades K–12 in the district can attend either bilingual schools,[1] which provide more intensive support for both student native language and instruction in English, or standard neighborhood nonmultilingual schools, which offer varying levels of support for instruction in English. In addition, students whose families have lived in the United States less than one year are strongly encouraged (but not required) to attend the district's newcomer academy for one to two years. The three types of schools offered by the district are described below.

Bilingual/dual language schools. The district has seven bilingual/dual language schools serving grades K–8. Students can receive primary language instruction for multiple languages besides English and English as a second language in a self-contained classroom, or two-way immersion Spanish–English instruction.

Nonmultilingual schools. The district has 67 nonmultilingual schools serving grades K–8. These schools offer varying levels of English as a second language and sheltered English instruction using the research-based Sheltered Instruction Observation Protocol model. This model calls for integrating English learner students with native English speakers. Certified English as a second language teachers use curricula and methods designed to promote academic content and English language skills. Not all nonmultilingual schools enroll English learner students.

Newcomer academy. The district has one newcomer academy serving English learner students in grades K–12. The academy provides sheltered English instruction using the Sheltered Instruction Observation Protocol model, along with bilingual support designed specifically for students who are new to the country and at the beginning English language proficiency level. Students attend the academy for one to two years and receive the most intensive supports to help them transition to other district schools. Examples of intensive supports include five daily instructional periods of sheltered English instruction and individualized support for refugees and students who have experienced interruptions in schooling. The length of enrollment differs by student and is based on the level of support needed. Students are then encouraged to attend a bilingual school to continue to receive a high level of support.

Note

1. The bilingual curriculum is generally Spanish–English.

Source: All definitions of language support and school types were provided by the Multilingual Multicultural Education Office, http://www.clevelandmetroschools.org/Domain/43; retrieved February 8, 2018.

What the study examined

This study answers three research questions about English learner students in grades 3–8 in CMSD:

1. What were the characteristics of English learner students and the schools they attended between 2011/12 and 2016/17?

2. What were the patterns of performance on statewide math, English language arts, and English language proficiency assessments among English learner students between 2011/12 and 2016/17?

3. Which student and school characteristics were associated with math performance, English language arts performance, and English language proficiency level in 2016/17, after other student and school characteristics are accounted for?

Student and school characteristics were examined separately for each year, enabling the study team to identify patterns of stability and change. To explore associations with academic performance and English language proficiency, the study team used data for the most recent year for which data were available (2016/17) in order to provide information that was most relevant to the current English learner student population and education setting. An overview of the study's sample, measures, and methodology is presented in box 2 (see appendix B for further details).

Box 2. Samples, measures, and methodology

Sample

The sample for research questions 1 and 2 consisted of all English learner students in grades 3–8 in the Cleveland Metropolitan School District from 2011/12 to 2016/17, and the sample for research question 3 consisted of the 2016/17 cohort of English learner students in grades 3–8, the most recent cohort for which data were available. The study focused on grades 3–8 because these are the grade levels that participate in statewide math and English language arts assessments.

The district assesses the English language proficiency of all English learner students each year, so any student who took the English language proficiency assessment in a given year was identified for the study sample as an English learner student, regardless of how he or she scored. Schools were classified as enrolling an English learner student if they enrolled one or more such students in a given school year.

Student outcomes

The study examined student math and English language arts performance on statewide assessments administered each spring. Scores were standardized to the district average in each grade level for each school year, so that each student's score represents his or her performance relative to all students in the district. Ohio used three standardized assessments of math and English language arts during the study period: the Ohio Achievement Assessment in 2012–14, the Partnership for Assessment of Readiness for College and Careers in 2015, and the Ohio State Test in 2016 and 2017.

The study also examined student performance on the state English language proficiency assessment, including overall proficiency levels and proficiency levels on the assessment's four subscales—listening, speaking, reading, and writing. Ohio used two assessments of English language proficiency during the study period: the Ohio Test of English Language Acquisition in 2011/12–2014/15 and the Ohio English Language Proficiency Assessment in 2015/16–2016/17.

Student characteristics

Student characteristics included prior-year English language proficiency levels, native language, race/ethnicity, gender, special education status, gifted status, grade level, and prior-year math and English language arts performance.

(continued)

Box 2. Samples, measures, and methodology *(continued)*

Student native languages were categorized into five categories: Spanish; Arabic; African language (Bassa, Dinka, Ewe, Igbo, Karen, Kinyamulenge, Kirundi, Krahn, Maay Maay, Somali, Swahili, Tigrinya, and Yoruba); Asian language (Burmese, Cambodian, Cantonese, Filipino, Hindi, Indonesian, Mandarin, Nepali, Punjabi, Tagalog, Tamil, Thai, Urdu, and Vietnamese); and European/other language (Albanian, Bosnian, Croatian, English/Creole, French, Romanian, Russian, Turkish, and Ukrainian).

For details on student characteristics, see appendix B.

School characteristics

School characteristics included school type, number and percentage of English learner students, number of languages spoken among English learner students, percentage of English learner students whose native language is Spanish, percentage of English learner students whose native language is Arabic, school specialist staffing (number of English learner students per certified English as a second language teacher and number per bilingual paraprofessional),[1] school climate measures, percentage of English learner students at each English language proficiency level, percentage of all students who met proficiency standards in math and English language arts, school size, percentage of all students in each racial/ethnic category, percentage of all students with special education status, and percentage of all students with gifted status.

School climate was measured by school-level average scale scores for each of the four Conditions for Learning Survey domains—perceptions of academic rigor, safe and respectful climate, peer social-emotional learning, and supportive learning environment—for all years except 2011/12, when the survey used a different scoring method.

For details on school characteristics, see appendix B.

Methodology

To address research questions 1 and 2, the study team calculated student- and school-level averages and percentages for each school year in the analysis. For school characteristics, descriptive statistics are based on all students in the school, regardless of their English learner status; however, only schools that enrolled English learner students are included in the analyses.

To address research question 3, the study team conducted a series of hierarchical linear models with students grouped within schools to estimate the relationship between student and school characteristics and each student outcome. The analyses accounted for the student and school characteristics described earlier and focused on the most recent cohort of students in grades 3–8 enrolled in 2016/17.

Note

1. Bilingual paraprofessionals, also referred to in the district as "bilingual instructional aides," take on several roles, which can include working directly with English learner students, providing support for instructional activities for a primary classroom teacher, and participating in instructional planning.

What the study found

This section details nine notable findings for the three research questions addressed in the study. (For full results, see tables C1–C16 in appendix C. For an overall summary of the findings on the relationships between student and school characteristics and English learner student performance and English language proficiency levels in 2016/17, see table C15.)

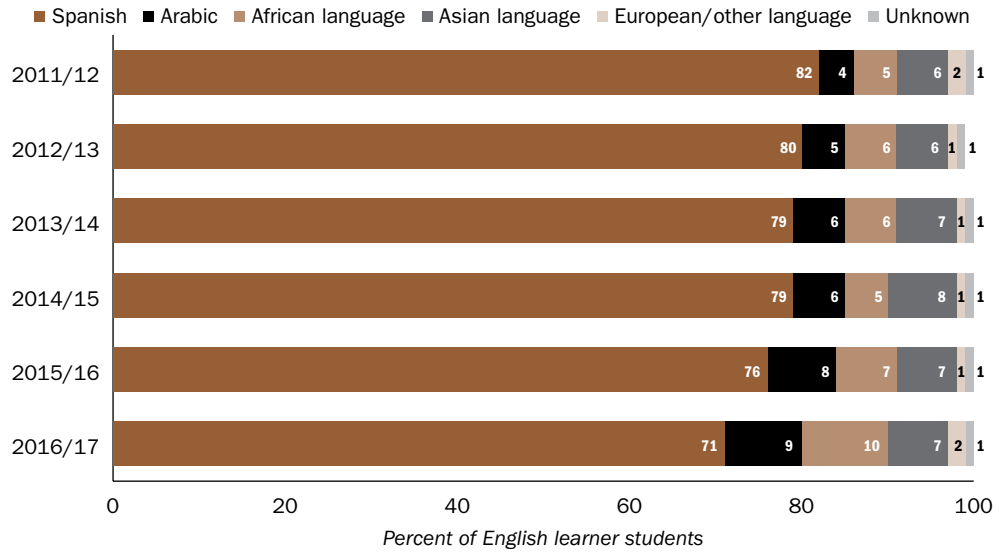
The number of English learner students speaking languages other than Spanish increased

The number of English learner students in grades 3–8 in CMSD increased from 1,266 in 2011/12 to 1,542 in 2016/17, a 22 percent increase. The native languages most common among these students were Spanish, Arabic, African languages, and Asian languages. From 2011/12 to 2016/17 the percentage of English learner students whose native language was Spanish decreased from 82 percent to 71 percent (figure 1; see also table C1 in appendix C). During the same period the percentage whose native language was Arabic more than doubled, from 4 percent to 9 percent, and the percentage whose native language was an African language doubled, from 5 percent to 10 percent.

The percentage of English learner students attending the district's newcomer academy increased, while the percentage of English learner students attending bilingual schools decreased

The percentage of English learner students in grades 3–8 attending the district's newcomer academy more than doubled from 11 percent in 2011/12 to 23 percent in 2016/17 (figure 2). During the same period the percentage attending one of the district's seven bilingual schools decreased from 70 percent to 54 percent. While there were some fluctuations from year to year, the percentage attending a nonmultilingual school remained generally stable. English learner students attended 41–47 K–8 schools each year of the study (see table C2 in appendix C), which represented, on average, 56 percent of the K–8 schools in the district.

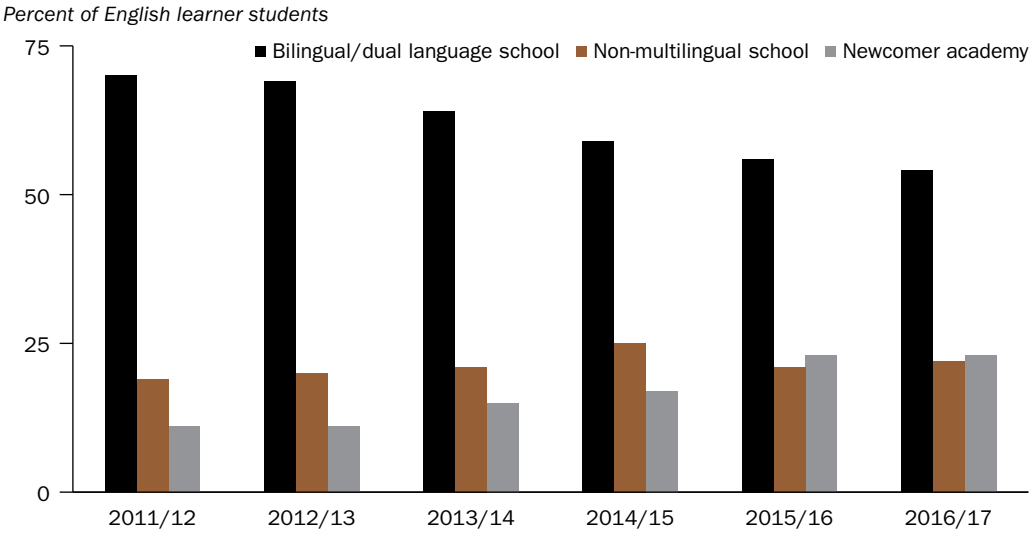
Figure 1. The percentage of English learner students in grades 3–8 who spoke Spanish decreased between 2011/12 and 2016/17, while the percentages who spoke Arabic or African languages increased



Note: See box 2 for the languages included in each category.

Source: Authors' calculations based on data from the Cleveland Metropolitan School District.

Figure 2. The percentage of English learner students in grades 3–8 attending the Cleveland Metropolitan School District's newcomer academy more than doubled from 2011/12 to 2016/17



Note: See box 1 for descriptions of each school type and the number of schools in each category.

Source: Authors' calculations based on data from the Cleveland Metropolitan School District.

English learner students increasingly attended schools with school climate scores higher than the district average

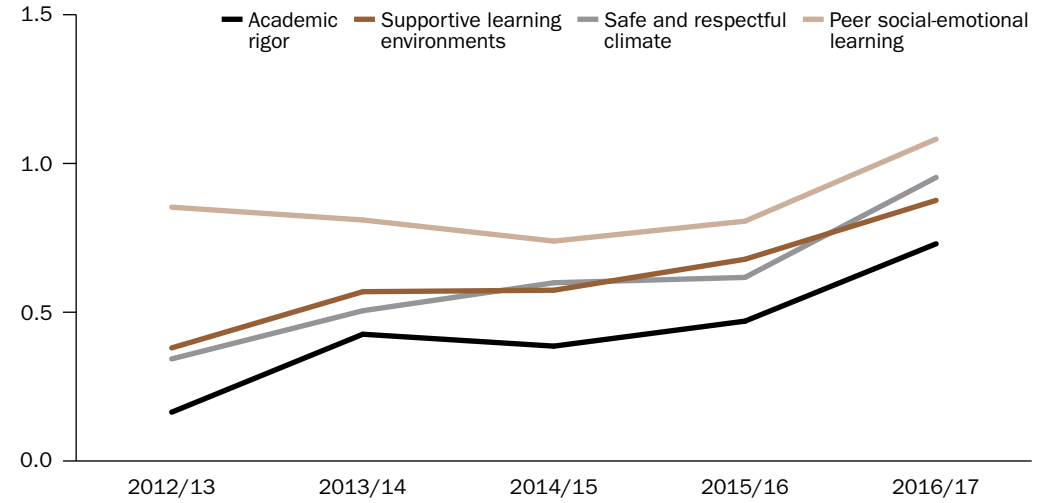
Between 2012/13 and 2016/17 English learner students in grades 3–8 increasingly attended schools that scored above the district average in each of the four domains of the Conditions for Learning Survey: academic rigor, safe and respectful climate, peer social-emotional learning, and supportive learning environment (figure 3; see also table C2 in appendix C). For example, the average English learner student attended a school with an academic rigor score 0.16 standard deviation above the district average in 2012/13 and 0.73 standard deviation above the district average in 2016/17.

This increase occurred at the same time that more students enrolled in the newcomer academy. In every year during 2012/13–2016/17 the newcomer academy had school climate scores at least one standard deviation above the district average on most school climate domains (see table C5 in appendix C). As the proportion of English learner students attending the newcomer academy increased, the average English learner student experienced a more positive school climate.

English learner students' English language arts performance was below the district average, while their math performance was closer to that of other students

English learner students in grades 3–8 performed below the district average on the state assessment in English language arts in 2011/12–2016/17 and on the state assessment in math in 2011/12, 2012/13, 2013/14, and 2016/17 (figure 4; see also table C6 in appendix C). But their math performance was closer to the district average than their English language arts performance was. For both subjects the degree to which English learner students scored below the district average fluctuated. The fluctuations coincided with the changes

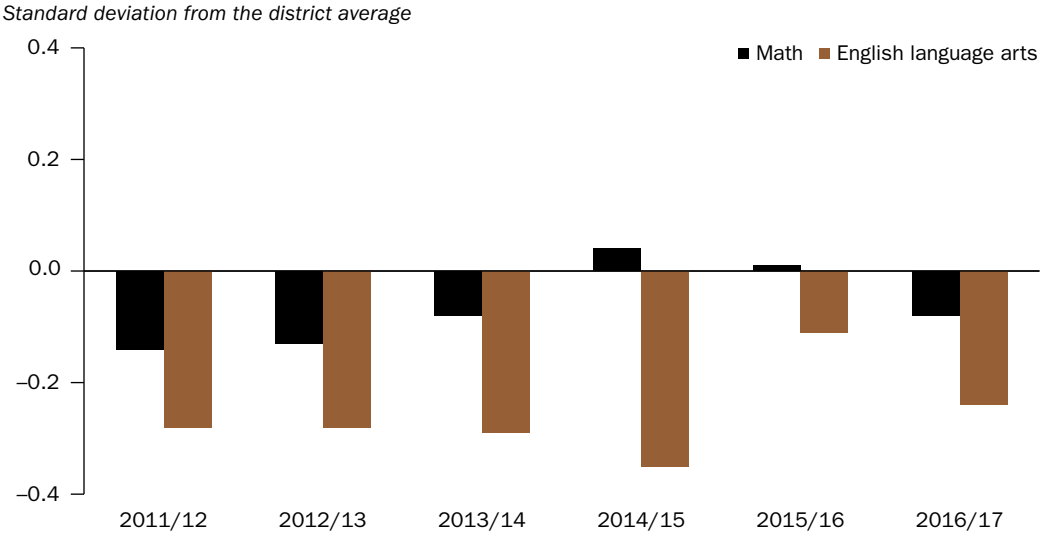
Figure 3. English learner students in grades 3–8 attended schools that scored above the district average on all four domains of school climate from 2012/13 to 2016/17



Note: The figure is based on school-level scores weighted by the number of English learner students per school to depict the average English learner student experience. Each point represents the average school climate score in standard deviations from the district average among English learner students in a domain and year. The study team standardized scores for each domain relative to the distribution of scores for all schools in the district.

Source: Authors' calculations based on data from the Conditions for Learning Survey.

Figure 4. English learner students' performance on state standardized assessments from 2011/12 to 2016/17 were below the district average for English language arts in all six years of the study and for math in four years of the study



Note: The state standardized assessment was the Ohio Achievement Assessment in 2012–14, the Partnership for Assessment of Readiness for College and Careers in 2015, and the Ohio State Test in 2016 and 2017. The study team standardized math and English language arts scores relative to the distribution of scores across all students in the district in each year and grade level.

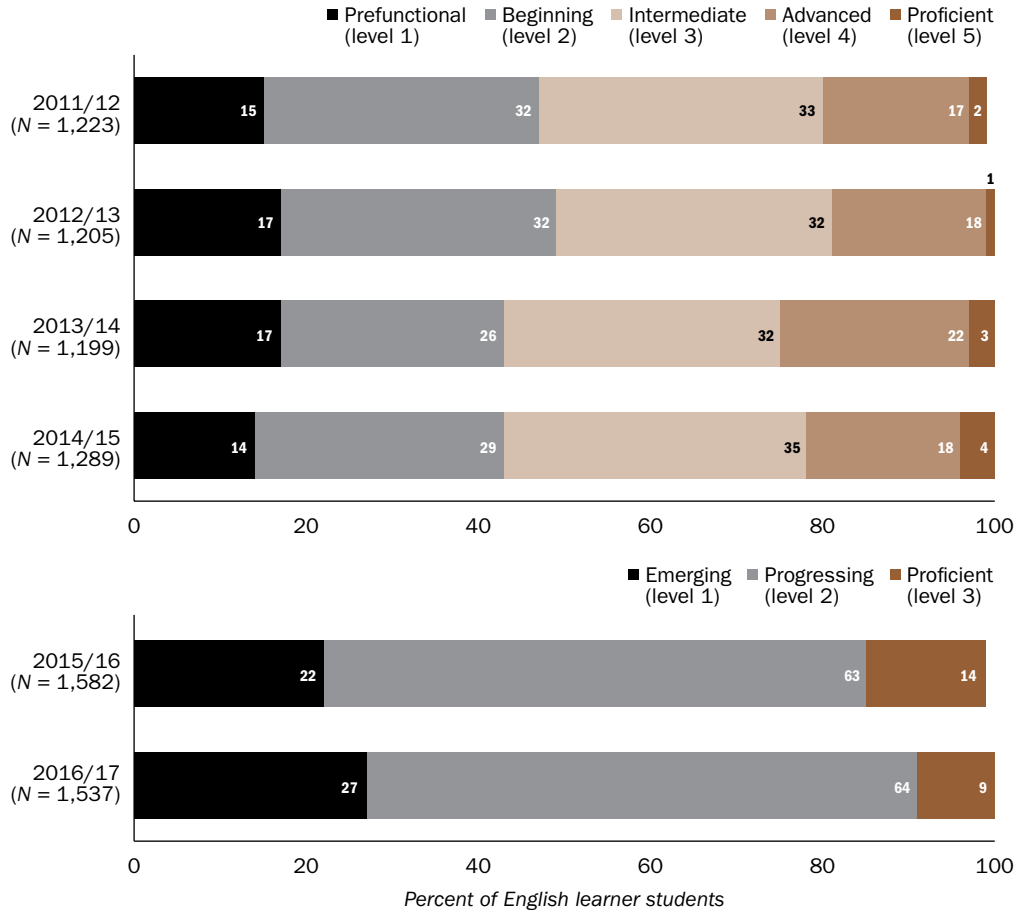
Source: Authors' analyses based on data from the Cleveland Metropolitan School District.

in assessments, but the study did not explore whether the changes explain the observed year-to-year variations (see appendix B for a more detailed discussion of the state standardized assessments used during the study period).

English learner students' overall English language proficiency levels were generally stable

There was little change in the proportion of students in grades 3–8 scoring at each level on the two state English language proficiency assessments used during the study years. During 2011/12–2014/15, 3–5 percent of English learner students received an overall score indicating full proficiency on the assessment used during that period (figure 5). During 2015/16–2016/17, 9–14 percent of students received an overall score indicating full proficiency on the assessment used during that period. The increase in the percentage of students achieving full proficiency in the last two years coincided with the change in assessment, but the study did not explore whether the change in assessment explained the observed increase.

Figure 5. Overall English language proficiency levels among English learner students in grades 3–8 were stable under each state assessment from 2011/12 to 2016/17



Note: The number of overall proficiency levels decreased from five to three between 2014/15 and 2015/16. The English language proficiency assessment administered in 2011/12–2014/15 was the Ohio Test of English Language Acquisition, and the assessment administered in 2015/16 and 2016/17 was the Ohio English Language Proficiency Assessment. See appendix B for a more detailed explanation of both assessments.

Source: Authors' analyses based on data from the Cleveland Metropolitan School District.

Special education status and lower prior-year assessment performance were consistently associated with lower academic performance and English language proficiency level

English learner students with special education status had lower math performance, English language arts performance, and English language proficiency levels than did English learner students without special education status, even after student background and school characteristics were accounted for (table 1; see also tables C11 and C12 in appendix C). Prior-year math performance, prior-year English language arts performance, and prior-year overall English language proficiency level all were positively associated with their corresponding spring 2017 student performance measure. This means that students with higher outcomes in spring 2016 had higher outcomes in spring 2017 and that students with lower outcomes in spring 2016 had lower outcomes in spring 2017.

These findings are consistent with prior research that also found lower academic performance among English learner students with special education status and English learner students with lower prior performance, even after differences in student background characteristics were accounted for (for example, Greenberg Motamedi, 2015; Hass, Huang, Tran, & Yu, 2016; Parker, O'Dwyer, & Irwin, 2014; Thompson, 2017).

English learner students whose native language was Arabic tended to have lower English language proficiency levels, while gifted students and female students tended to have higher proficiency levels

English learner students whose native language was Arabic had lower proficiency levels overall and in listening, reading, and writing than did students whose native language was Spanish (see table 1; see also table C12 in appendix C). Similarly, students whose

Table 1. Student characteristics related to English learner math and English language arts performance and English language proficiency levels, 2016/17

	Ohio State Test		Ohio English Language Proficiency Assessment				
Characteristic	Math	English language arts	Overall	Listening	Speaking	Reading	Writing
Special education status	–	–	–	–	–	–	–
Prior-year assessment score[a]	+	+	+	+	+	+	+
Native language = Arabic[b]	ns	ns	–	–	ns	–	–
Native language = African language[b]	ns	ns	ns	–	ns	ns	ns
Native language = Asian language[b]	ns	ns	ns	ns	ns	ns	ns
Native language = European/other language[b]	ns	ns	+	ns	+	ns	ns
Female	ns	ns	+	ns	+	ns	+
Gifted status	ns	ns	+	ns	ns	ns	ns

ns is not significant at the $p = .05$ level.

+ and brown shading denotes a statistically significant positive relationship.

– and grey shading denotes a statistically significant negative relationship.

a. Associations with prior-year math and English language arts performance do not include grade 3 students because they do not take the assessment in grade 2.

b. Compared with English learner students whose native language is Spanish.

Source: Authors' analyses based on the regressions that account for student and school characteristics (see tables C12 and C13 in appendix C).

native language was an African language had lower listening proficiency levels than did students whose native language was Spanish. Conversely, students whose native language was a European/other language had higher overall and speaking proficiency levels than did students whose native language was Spanish. Despite the differences in English language proficiency by student native language, there were no clear differences in math or English language arts performance by student native language.

Female students had higher overall, speaking, and writing proficiency levels than did male students, and students identified as gifted had higher overall English language proficiency levels than did students not identified as gifted (see table 1; see also table C12 in appendix C). There were no clear differences in math or English language arts by student gender or gifted status.

The percentage of Spanish-speaking English learner students in a school was associated with math performance and with English language overall, listening, and speaking proficiency levels

Three of the school characteristics studied were associated with math performance (table 2; see also table C11 in appendix C). English learner students had higher math performance when they attended a school with a higher proportion of Spanish-speaking English learner students and larger total student enrollment. Students had lower math performance when they attended a school with more English learner students per bilingual paraprofessional.

Two of the school characteristics studied were associated with English language proficiency levels. As with math performance, overall, listening, and speaking proficiency levels were higher among students who attended schools with a higher proportion of Spanish-speaking

Table 2. School characteristics related to English learner math and English language arts performance and English language proficiency levels, 2016/17

	Ohio State Test		Ohio English Language Proficiency Assessment				
Characteristic	Math	English language arts	Overall	Listening	Speaking	Reading	Writing
Number of English learner students per certified English as a second language teacher	ns	ns	ns	ns	–	ns	ns
Number of English learner students per bilingual paraprofessional	–	ns	ns	ns	ns	ns	ns
Percentage of all students who are English learner students	ns	ns	–	–	–	ns	ns
Percentage of English learner students whose native language is Spanish	+	ns	+	+	+	ns	ns
School size = large[a]	+	ns	ns	ns	ns	ns	ns

ns is not significant at the $p = .05$ level.

+ and brown shading denotes a statistically significant positive relationship.

– and grey shading denotes a statistically significant negative relationship.

a. Compared with small or medium schools, as defined in appendix B.

Source: Authors' analyses based on the regressions that account for student and school characteristics (see tables C12 and C13 in appendix C).

English learner students and were lower among students who attended schools with higher proportions of English learner students overall (see table 2; see also table C12 in appendix C). One additional school characteristic studied was associated with speaking proficiency level: English learner students who attended schools with more students per certified English as a second language teacher had lower speaking proficiency levels.

No school characteristics were clearly associated with English language arts performance or English language reading or writing proficiency levels (see table 2; see also tables C11 and C12 in appendix C).

School climate domains were positively associated with English language speaking proficiency level but not with most other student outcomes

All four domains of school climate were positively associated with English language speaking proficiency level (table 3; see also table C14 in appendix C). In addition, English learner students who attended schools with higher student ratings of academic rigor and supportive learning environment had higher English language arts performance. Students who attended schools with higher safe and respectful climate ratings had higher listening proficiency levels. There were no other clear associations between the school climate measures and the other student outcomes.[2]

Implications of the study findings

The study findings provide direction for further investigation into actionable steps for CMSD to support English learner students' academic performance and English language proficiency. While the results speak to these relationships in just one district, educators and policymakers from other geographic areas may consider similar studies to determine whether the relationships are similar in their own contexts.

The study findings suggest the need for additional examination of the role of school climate in student learning. The associations between English language speaking proficiency and student perceptions of school climate could be investigated further to better understand

Table 3. Conditions for Learning Survey measures related to math and English language arts performance and English language proficiency levels of English learner students, 2016/17

	Ohio State Test		Ohio English Language Proficiency Assessment				
Domain	Math	English language arts	Overall	Listening	Speaking	Reading	Writing
Academic rigor	ns	+	ns	ns	+	ns	ns
Safe and respectful climate	ns	ns	ns	+	+	ns	ns
Peer social-emotional learning	ns	ns	ns	ns	+	ns	ns
Supportive learning environment	ns	+	ns	ns	+	ns	ns

ns is not significant at the $p = .05$ level.

+ denotes a statistically significant positive relationship.

Source: Authors' analyses based on the regressions that account for student and school characteristics (see tables C14 and C15 in appendix C).

whether the relationships are causal. For example, it could be useful for the district to examine whether a positive school climate contributes to the ability of English learner students to improve their speaking skills. Schools may also wish to consider whether there are approaches to building a positive school climate that are particularly well suited for supporting English learner students. Further research could focus on working with the district to evaluate school climate interventions that appear to be useful for improving the performance of English learner students.

Relatedly, it would be useful to understand the extent to which the newcomer academy's particularly high ratings for school climate reflect strong practices for building a positive school climate that could be replicated in other schools. The district also may wish to understand whether newcomer academy student supports help explain school climate perceptions and student performance. The district also might benefit from studying English learner school climate ratings over time, as students leave the newcomer academy and acclimate to their new contexts.

Further, these findings contribute to the body of research suggesting that school climate is a promising area of focus for districts and schools. While research on school climate as it pertains specifically to English learner students is limited (O'Conner, De Feyter, Carr, Luo, & Romm, 2017), the findings of this study are similar to those of previous studies in other locations based on general student populations that have found an association between school climate perceptions and student learning and performance (for example, Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Hopson, Schiller, & Lawson, 2014). In CMSD, school climate has been a long-standing district priority (Osher, Poirier, Jarjoura, Haight, & Mitchell, 2014). The current study provides a step toward understanding the association between school climate and English learner student performance and raises new questions, such as why speaking proficiency was most consistently associated with Conditions for Learning Survey measures. Future research could use a more rigorous approach to understand whether districts and schools can improve school climate as a pathway to improving performance for English learner students and all students.

Finally, school staffing characteristics demonstrated some associations with student outcomes, but the findings were not consistent, so these potential relationships require further study. For example, the district may benefit from examining how changes in the number of English learner students per certified English as a second language teacher or bilingual paraprofessional in a school are related to student outcomes. This study found that a higher number of English learner students per bilingual paraprofessional was associated with lower math performance. This finding is similar to that in other research, which has found positive associations between students having access to teachers with bilingual certification and student performance (Loeb, Soland, & Fox, 2014; Ruiz de Castilla, 2018). Additionally, student English language speaking proficiency levels (although not other student outcomes) were higher in schools with fewer students per English as a second language teacher and were lower in schools with no certified English as a second language teachers. This contrasts somewhat with previous research in the Houston Independent School District, which found no clear associations between teacher certification in English as a second language and English learner student performance (Ruiz de Castilla, 2018). Taken together, these results suggest that further research is needed into the number and type of staff that schools employ to support English learner students and their outcomes.

Limitations of the study

This study has five key limitations.

First, the study team would have liked to examine how student and school characteristics were related to student performance over time, but assessment data over multiple years were not available for enough students to allow for a longitudinal approach. In addition, English learner student performance on statewide assessments relative to the district average shifted as the assessments changed, further limiting the ability to conduct a longitudinal study.

Second, the study would be improved with an understanding of how long a student had been in the district and, further, how long a student had been in the United States. For example, it is possible that Spanish-speaking students were more likely to have been in the district longer than students from other language groups. But this information was not available from district records.

Third, while the analysis includes school-level information such as the ratio of students to specialist staff, CMSD does not track student-level records about the specific English learner services that students receive. This limited the study team's ability to understand variation in student services in a school or school type.

Fourth, the study focused on English learner students in a single school district, limiting the generalizability of the study. Although CMSD is likely similar to other urban districts in Ohio and the REL Midwest Region more broadly,[3] the results may not generalize to districts that have larger populations of English learner students than CMSD. This study also focused on students in grades 3–8; therefore, the results also may not be relevant for English learner students in other grade levels.

Fifth, the correlational design for this study cannot determine whether student and school characteristics play a causal role in English learner student outcomes. Findings are described as associations and suggest areas for further investigation, but they do not supplant the need for research with a different design to assess actual impacts.

Appendix A. Review of the literature

U.S. civil rights law, following Lau v. Nichols (1974), mandates that education programs meet both the language and content needs of English learner students. Meeting these needs is often a long-term process. English learner students exhibit lower content proficiency in math and reading at school entry and throughout elementary and high school (Flores, Batalova, & Fix, 2012; Fry, 2007; Reardon & Galindo, 2009; Slama, 2014).

Since 2003 the National Assessment of Educational Progress has documented significant national performance gaps between English learner students and non–English learner students in both math and reading at all age levels tested, with no indication of improvement in English learner student performance in either content area at any grade level through 2013 (U.S. Department of Education, National Center for Education Statistics, n.d.).

Compared with non–English learner students, English learner students consistently underperform in math and English language arts (Cook, Boals, & Lundberg, 2011; Fry, 2007; Menken, 2008; Reardon & Galindo, 2009; Ruiz-de-Velasco, Fix, & Clewell, 2000; Valencia & Villarreal, 2005) and often are considered at risk because they must learn academic content concurrently to gaining language proficiency (Harper, de Jong, & Platt, 2008; Short & Fitzsimmons, 2007). Research suggests that it can take up to 10 years for newly arriving English learner students to develop English proficiency (Batalova, Fix, & Murray, 2007; Cook, Boals, Wilmes, & Santos, 2008; Hakuta, Butler, & Witt, 2000; Linquanti & George, 2007).

English learner students are a diverse group, and thus it is important that instructional approaches take into account their diverse needs. Olsen (2010) found that 59 percent of English learner students in California secondary schools had been in a U.S. school for more than six years without reaching a sufficient level of English proficiency to be reclassified as fluent. The study also found that few school districts had programs designed for long-term English learner students. Other English learner students are newly arrived students (immigrants or refugees) who may have limited English proficiency and special needs such as health issues as they face challenges at the higher grade levels upon arrival (Short & Boyson, 2012).

Mainstream teachers can lack knowledge related to educating English learner students. More than 30 states have no training requirements for teachers to work with English learner students, and none of the Regional Educational Laboratory Midwest states has such a requirement (Education Commission of the States, 2014).[4] Specific instructional knowledge and skills are required to effectively teach English learner students (Master, Loeb, Whitney, & Wyckoff, 2016), yet general education teachers often lack these skills (Lucas & Grinberg, 2008) and report feeling underprepared to effectively teach English learner students (Cho & McDonnough, 2009). Darling-Hammond, Wei, Andree, Richardson, & Orphanos (2009, p. 6) indicated that "more than two-thirds of teachers nationally had not had even one day of training in supporting the learning of special education or [English learner] students during the previous three years, and only one-third agreed that they had been given the support they needed to teach students with special needs."

Districts and schools may seek to understand how student and school characteristics influence English learner student success, and research has provided some clues. Numerous

studies have documented associations between English learner student performance and student characteristics, including immigrant status, special education designation, race/ethnicity, and poverty status (for example, Glick & Hohmann-Marriott, 2007; Leventhal, Xue, & Brooks-Gunn, 2006; Mulligan, Halle, & Kinukawa, 2012). For instance, higher socioeconomic status has been associated with shorter time to English language proficiency across multiple districts (Hakuta et al., 2000). Other research has found that special education status was significantly associated with lower English proficiency among English language learner students (Parker et al., 2014).

Also, it is particularly important to understand how school characteristics are associated with English learner student outcomes because districts and schools have control over some of these characteristics. School characteristics and the kinds of first-language support that English learner students receive have been found to have significant associations with Hispanic English learner student and native English-speaking student performance gaps (Han, 2012) as well as with English learner students' short- and long-term skill development (Collier, 1992; Umansky & Reardon, 2014).

Several studies have examined the relationship between teacher certification in English as a second language and English learner student performance. In a study based in the Houston Independent School District, student improvement in math and reading performance and English language proficiency was not associated with having a teacher with English as a second language certification (Ruiz de Castilla, 2018). Similarly, Parker et al. (2014) found no relationship between English language proficiency and the percentage of English learner students at a school taught by certified English as a second language teachers. However, López, Scanlan, and Gundrum (2013) analyzed reading performance among Hispanic students on the National Assessment of Educational Progress and found higher performance among students in states with more stringent requirements for earning certification in educating English learner students.

Research also has found generally positive relationships between teacher bilingual certification and student performance (Loeb et al., 2014; Ruiz de Castilla, 2018), although there is a lack of research examining the relationship between bilingual paraprofessionals and student outcomes. The role of bilingual paraprofessionals in English learner student outcomes merits further research, given the potential of paraprofessionals to address common shortages of bilingual certified teachers and to create career pathways for a more diverse teaching force (Amos, 2013).

Appendix B. Study methodology

This study addressed questions posed by the Cleveland Partnership for English Learner Success, a partnership between researchers from the Regional Educational Laboratory Midwest and the Cleveland Metropolitan School District (CMSD). This appendix provides further details on the study's data sources, sample, missing data, sensitivity analysis, measures, variables, and analysis methods.

Data sources

CMSD maintains student administrative records on a yearly basis to supplement the Conditions for Learning Survey data collected by the American Institutes for Research (AIR). AIR and CMSD have an ongoing data-sharing agreement that allows AIR to use administrative data as well as student- and school-level Conditions for Learning Survey data to conduct studies with permission from the district on a case-by-case basis. The study team obtained information from CMSD pertaining to staff full-time equivalency in the district over the six-year study period. School-level data, including student enrollment statistics, were obtained from publicly available, school-level data files on the website of the Ohio Department of Education (2018).

Sample

The sample for the current study included all English learner students in grades 3–8 from 2011/12 to 2016/17 and all schools enrolling those students each year (table B1). Any school enrolling one or more English learner students in grades 3–8 from 2011/12 to 2016/17 was included.

CMSD tests all English learner students each year. Thus, the study team identified students as English learner students by whether they had taken an English language proficiency assessment in a given year. Any student who had a score on either the Ohio Test of English Language Acquisition (in 2011/12–2014/15) or the Ohio English Language Proficiency Assessment (in 2015/16 and 2016/17) was considered an English learner student.

Measures

To answer research question 1 about the characteristics of English learner students and the schools they attended, the study team used the variables shown in table B2.

Table B1. Number of English learner students and schools enrolling English learner students in the Cleveland Metropolitan School District, 2011/12–2016/17

School year	Number of English learner students in grades 3–8	Number of schools enrolling English learner students in grades 3–8
2011/12	1,266	42
2012/13	1,237	42
2013/14	1,215	41
2014/15	1,310	44
2015/16	1,585	47
2016/17	1,542	41

Note: English learner students were identified by whether they took an English language proficiency assessment in a given year.

Source: Authors' calculations based on data from the Cleveland Metropolitan School District.

Table B2. Student- and school-level variables used in analyses

Variable	Description
Student characteristics	
English language proficiency level	Proficiency level in listening to English and speaking, reading, and writing in English as assessed by the Ohio Test of English Language Acquisition (2011/12–2014/15) or the Ohio English Learner Proficiency Assessment (2015/16 and 2016/17).
Native language	Coded as Spanish; Arabic; African language (Bassa, Dinka, Ewe, Igbo, Karen, Kinyamulenge, Kirundi, Krahn, Maay Maay, Somali, Swahili, Tigrinya, and Yoruba); Asian language (Burmese, Cambodian, Cantonese, Filipino, Hindi, Indonesian, Mandarin, Nepali, Punjabi, Tagalog, Tamil, Thai, Urdu, and Vietnamese); or European/other language (Albanian, Bosnian, Croatian, English/Creole, French, Romanian, Russian, Turkish, and Ukrainian).
Race/ethnicity	Coded as Asian, Black, Hispanic, White, or other
Gender	Coded as female or male
Special education status	Whether a student received special education services for a learning disability
Gifted status	Whether a student received gifted and talented services
Grade level	Grade level at the end of the year
Math and English language arts performance	Score on state standardized assessments, standardized using annual districtwide grade-level means and standard deviations
School characteristics	
School type	Coded as bilingual school, nonmultilingual school, or the district's newcomer academy
Number and percentage of English learner students	Raw number and proportion of students in a school who are identified as English learner students
Number of languages spoken among English learner students	Number of unique native languages spoken among English learner students in a school
Percentage of English learner students whose native language is Spanish	Percentage of English learner students in a school who are also identified as Spanish speakers
Percentage of English learner students whose native language is Arabic	Percentage of English learner students in a school who are also identified as Arabic speakers
School specialist staffing	Number of English learner students per certified English as a second language teacher and number of English learner students per bilingual paraprofessional in a school
School climate measures	Based on student responses to the Conditions for Learning Survey, which consists of four domains: academic rigor, safe and respectful climate, peer social-emotional learning, and supportive learning environment
Percentage of English learner students at each English language proficiency level	Percentage of English learner students in a school who tested at each English language proficiency level.
Percentage of all students who met proficiency standards in math and English language arts	Percentage of all students in a school who scored proficient or higher on the state standardized assessment
School size	Coded as small, medium, or large based on the annual distribution of enrollment across the district's K–8 schools
Other school-level descriptors	Percentage of all students in a school in each racial/ethnic category, percentage of all students in a school who have special education status, percentage of all students in a school who have gifted status

Source: Authors' compilation.

Student-level variables

English language proficiency level. All English learner students, when they are onboarded into the district each fall, as well as each spring until they are reclassified (or no longer in need of special language assistance or instruction), are assessed by the district for their English language proficiency in listening, speaking, reading, and writing using a state standardized assessment. In addition to being scored in each of these areas, students are given an overall, composite score that determines their English language proficiency level. The assessment has forms that are used for specific grade-level bands that align with the Ohio English Language Proficiency Standards. Accordingly, there are forms for grades K, 1, 2–3, 4–5, 6–8, and 9–12. The same proficiency levels are used in each grade-level band form of the assessment.

The English language proficiency assessment changed during the study period. In 2011/12–2014/15 students took the Ohio Test of English Language Acquisition, whose overall and subscale scores map to five performance levels: 1—prefunctional, 2—beginning, 3—intermediate, 4—advanced, and 5—full English proficiency skills. In 2015/16 and 2016/17 students took the Ohio English Learner Proficiency Assessment, whose subscale scores map to five performance levels: 1—beginning, 2—early intermediate, 3—intermediate, 4—early advanced, and 5—advanced skills. Based on the performance level for the four subscales, students are then assigned an overall proficiency level of 1—emerging, 2—progressing, or 3—proficient. The performance level cutpoints are as follows (Ohio Department of Education, 2017):

- Emerging means that a student scored any combination of level 1s and 2s on the four subscales.
- Progressing means that a student scored a combination of levels that did not allow the student to be considered proficient or emerging.
- Proficient means that a student scored any combination of level 4s and 5s on the four subscales.

The study team used the grade-level band English language proficiency-level designations.

Native language. CMSD keeps detailed records of the language reported by a student's parents or guardian as the student's primary native language. The records include more than 70 distinct language codes. For ease of reporting, the study team grouped these languages as follows:

- Spanish.
- Arabic.
- African languages: Bassa, Dinka, Ewe, Igbo, Karen, Kinyamulenge, Kirundi, Krahn, Maay Maay, Somali, Swahili, Tigrinya, and Yoruba.
- Asian languages: Burmese, Cambodian, Cantonese, Filipino, Hindi, Indonesian, Mandarin, Nepali, Punjabi, Tagalog, Tamil, Thai, Urdu, and Vietnamese.
- European/other languages: Albanian, Bosnian, Croatian, English/Creole, French, Romanian, Russian, Turkish, and Ukrainian.

Twenty-seven other languages were spoken by CMSD students who were not in the analytical sample. Those languages were not categorized here.

Race/ethnicity. CMSD data also provide information on student race/ethnicity. The study team grouped students into five categories: Asian, Black (includes African American), Hispanic (includes Latino), White, and other (includes Hawaiian or other Pacific Islander, American Indian/Alaska Native, and two or more races/ethnicities).

Gender. The study team constructed student gender as a dichotomous indicator. Female students were designated as 1, and male students were designated as 0.

Special education status. Students who qualify for special education services have their needs designated under nine special education codes.[5] The study team constructed special education status as a dichotomous indicator, whether students qualify for special education services or not.

Gifted status. Students identified as gifted and talented are flagged in district administrative records. The study team constructed gifted status as a dichotomous indicator, whether students were designated as gifted or not.

Grade level. The study team identified students' grade level in a given year by the grade in which they were reported to be at the end of the school year.

Math and English language arts performance. All students in grades 3–8 in CMSD, including English learner students, are required to take the state achievement assessment each spring. The assessment changed during the study period: the Ohio Achievement Assessment was administered in 2012–14, the Partnership for Assessment of Readiness for College and Careers was administered in 2015, and the Ohio State Test was administered in 2016 and 2017. To facilitate examination of patterns over time and across assessments, the study team used annual districtwide, grade-level math and English language arts means and standard deviations to standardize student scores, which allowed examination of how English learner students performed relative to all students in the district each year.[6]

School-level variables

School type. The district offers three schools that differ in the type of language program offered: bilingual schools (seven K–8 schools), nonmultilingual schools (67 K–8 schools), and a newcomer academy (one K–12 school).

Number and percentage of English learner students. The study team constructed variables to capture the proportion of English learner students in the district as well as the proportion of English learner students, the proportion of Spanish-speaking English learner students, and the proportion of Arabic-speaking English learner students in each school included in the analysis for each year of the study.

Number of languages spoken among English learner students. The study team constructed this variable to capture the number of different native languages spoken among English learner students at a school. The variable does not include languages spoken by students who are not classified as English learner students in a specific year. At the school level the study team considered the total number of languages spoken in a school rather than the language groups used at the student level. For example, at the school level the study team counted Swahili and Yoruba separately rather than as African languages.

Percentage of English learner students whose native language is Spanish. The study team constructed this variable to capture the proportion of English learner students at a school that were identified as Spanish speakers.

Percentage of English learner students whose native language is Arabic. The study team constructed this variable to capture the proportion of English learner students at a school that were identified as Arabic speakers.

School specialist staffing. The study team constructed the number of English learner students per certified English as a second language teacher and the number of English learner students per bilingual paraprofessional for each school based on staffing data from Multilingual Multicultural Education Office administrative records for all six years.

School climate measures. The study team analyzed student responses to the Conditions for Learning Survey (Osher et al., 2008) for each school. The Conditions for Learning Survey is a psychometrically validated instrument for measuring student connections and conditions for learning at the elementary school (grades 2–4), middle school (grades 5–8), and high school (grades 9–12) levels. The survey is administered in the fall, winter, and spring of each year to all students in grades 2–12 who are not identified as needing alternative accommodations for test taking and assessment (due to, for example, severe cognitive disability). The survey is administered in English and Spanish, and items are read aloud to students in grades 2–4, as well as in a student's native language in any grade when necessary. Response rates for elementary and middle school grades are consistently at or above 90 percent. Since the survey was developed and first administered in Chicago in 2007, it has been administered to or adapted for public school students in several school districts around the country, including CMSD. The survey is designed to assess four core constructs that measure the conditions for learning, or climate, within a school:

1. Academic rigor asks students about the level of challenge and the school's expectations for student academic success (17 items, Cronbach's $\alpha = 0.85$).

2. Safe and respectful climate captures student perceptions of how emotionally and physically safe they feel at school (15 items, $\alpha = 0.89$).

3. Peer social-emotional learning measures the extent to which students feel their peers are able to handle social-emotional challenges (11 items, $\alpha = 0.84$).

4. Supportive learning environment measures the extent to which students feel connected and attached to adults in the school and believe that their teachers care about them and treat them respectfully (14 items, $\alpha = 0.82$).

The Conditions for Learning Survey asked students their perceptions of each of the aforementioned domains in their school environment, and their responses are aggregated to produce school-level measures of school climate for each school. Survey data are available for the five most recent years of the study (2012/13–2016/17).

The study team created school-level measures for all four domains by averaging the elementary and middle grade scores for each school. The study team then created a composite measure of school climate by summing each school's averaged domains. All four domains,

in addition to the composite school climate measure, were standardized to the districtwide distribution in each school year.

Percentage of English learner students at each English language proficiency level. The study team constructed school-level measures related to the percentage of students who tested at each proficiency level on the state's two assessments of English learner proficiency—the Ohio Test of English Language Acquisition in 2011/12–2014/15 and the Ohio English Language Proficiency Assessment in 2015/16 and 2016/17.

Percentage of all students who met proficiency standards in math and English language arts. The state classifies student performance on standardized assessments in math and English language arts into five categories: limited, basic, proficient, accelerated, and advanced. The study team collapsed these categories to construct a dichotomous variable, proficient (proficient, accelerated, or advanced) or not proficient (limited or basic) in each subject. Then, a schoolwide average was created based on the proportion of students in the school who were proficient in each subject.

School size. The study team categorized schools into three groups based on the distribution of total student enrollment for all K–8 schools in the district, determined within each year. The team characterized schools with enrollment under the 25th percentile as small, schools with enrollment in the 25th–75th percentiles as medium, and schools with enrollment over the 75th percentile in enrollment as large. In 2016/17 the 25th percentile was 315 students, and the 75th percentile was 475 students.

Other school-level descriptors. To further describe the school context, other school-level data were examined, including percentage of all students in each racial/ethnic category, percentage of all students with special education status, and percentage of all students with gifted status. These variables were aggregated from student-level administrative records.

Missing data

Rates of missing data in the sample for the descriptive analysis were generally low (4.5 percent or less; table B3). School-level data were missing from the samples for several reasons. Some data were not available at all for a specific year (for example, information on certified English as a second language teachers in 2011/12–2015/16 and mean scores on the Conditions for Learning Survey in 2011/12).

Missing data in the sample for the regression analysis was specific to prior-year (spring 2016) academic performance, which was due primarily to students being new to the district or being in grade 3 and thus not having prior-year math and English language arts assessment information. The study team replaced missing values with zeros and included an indicator variable in all analyses to signal whether prior-year performance was missing. Rates of missing data for student performance on the spring 2017 Ohio State Test math or English language arts assessments are displayed in table B4. Rates of missing data for English language proficiency level on the spring 2017 Ohio English Language Proficiency Assessment are displayed in table B5.

Table B3. Rates of missing student- and school-level data in the analytic samples for descriptive analyses, 2011/12–2016/17

Characteristic	2011/12		2012/13		2013/14		2014/15		2015/16		2016/17	
	Number of valid cases	Percent missing	Number of valid cases	Percent missing	Number of valid cases	Percent missing	Number of valid cases	Percent missing	Number of valid cases	Percent missing	Number of valid cases	Percent missing
Student characteristics												
English language proficiency level												
Overall	1,223	3.4	1,205	2.6	1,199	1.3	1,289	1.6	1,582	0.2	1,537	0.3
Listening	1,258	0.6	1,226	0.9	1,209	0.5	1,299	0.8	1,581	0.3	1,527	1.0
Speaking	1,241	2.0	1,222	1.2	1,209	0.5	1,299	0.8	1,562	1.5	1,516	1.7
Reading	1,257	0.7	1,230	0.6	1,211	0.3	1,306	0.3	1,575	0.6	1,529	0.8
Writing	1,251	1.2	1,223	1.1	1,206	0.7	1,298	0.9	1,569	1.0	1,527	1.0
Native language	1,266	0.0	1,237	0.0	1,215	0.0	1,310	0.0	1,585	0.0	1,542	0.0
Race/ethnicity	1,266	0.0	1,237	0.0	1,215	0.0	1,310	0.0	1,585	0.0	1,542	0.0
Gender	1,266	0.0	1,237	0.0	1,215	0.0	1,310	0.0	1,585	0.0	1,542	0.0
Special education status	1,266	0.0	1,237	0.0	1,215	0.0	1,310	0.0	1,585	0.0	1,542	0.0
Gifted status	1,266	0.0	1,237	0.0	1,215	0.0	1,310	0.0	1,585	0.0	1,542	0.0
Math performance	1,210	4.4	1,183	4.4	1,175	3.3	1,251	4.5	1,549	2.3	1,475	4.4
English language arts performance	1,210	4.4	1,183	4.4	1,174	3.4	1,256	4.1	1,548	2.3	1,481	4.0
School type	1,260	0.5	1,230	0.5	1,211	0.3	1,308	0.2	1,584	0.1	1,542	0.0
School characteristics												
Percentage of students who are English learner students	42	0.0	42	0.0	41	0.0	44	0.0	47	0.0	41	0.0
Percentage of English learner students whose native language is Spanish	42	0.0	42	0.0	41	0.0	44	0.0	47	0.0	41	0.0
Percentage of English learner students whose native language is Arabic	42	0.0	42	0.0	41	0.0	44	0.0	47	0.0	41	0.0
Number of English learner students per certified English as a second language teacher	0	100.0	0	100.0	0	100.0	0	100.0	0	100.0	41	0.0
Number of English learner students per bilingual paraprofessional	42	0.0	42	0.0	41	0.0	44	0.0	47	0.0	41	0.0
Conditions for Learning Survey scores	0	100.0	42	0.0	41	0.0	44	0.0	47	0.0	41	0.0
Percentage of English learner students at each English language proficiency level	42	0.0	42	0.0	41	0.0	44	0.0	47	0.0	41	0.0
Percentage of all students who met math proficiency standards	0	100.0	41	2.4	40	2.4	44	0.0	46	2.1	41	0.0

(continued)

Table B3. Rates of missing student- and school-level data in the analytic samples for descriptive analyses, 2011/12–2016/17 *(continued)*

Characteristic	2011/12		2012/13		2013/14		2014/15		2015/16		2016/17	
	Number of valid cases	Percent missing	Number of valid cases	Percent missing	Number of valid cases	Percent missing	Number of valid cases	Percent missing	Number of valid cases	Percent missing	Number of valid cases	Percent missing
Percentage of all students who met English language arts proficiency standards	42	0.0	42	0.0	41	0.0	44	0.0	47	0.0	41	0.0
School size	42	0.0	42	0.0	41	0.0	44	0.0	47	0.0	41	0.0
Percentage of all students in each racial/ethnic category	42	0.0	42	0.0	41	0.0	44	0.0	47	0.0	41	0.0
Percentage of all students with special education status	42	0.0	42	0.0	41	0.0	44	0.0	47	0.0	41	0.0
Percentage of all students with gifted status	42	0.0	42	0.0	41	0.0	44	0.0	47	0.0	41	0.0

Source: Authors' analyses.

Table B4. Rates of missing student- and school-level data in the analytic samples for student performance regression analyses, 2016/17

Characteristic	Math		English language arts	
	Number of valid cases	Percent missing	Number of valid cases	Percent missing
Student characteristics				
Prior-year overall English language proficiency level	1,126	23.7	1,128	23.8
Native language	1,475	0.0	1,481	0.0
Gender	1,475	0.0	1,481	0.0
Special education status	1,475	0.0	1,481	0.0
Gifted status	1,475	0.0	1,481	0.0
Prior-year math performance	937	36.5	na	na
Prior-year English language arts performance	na	na	938	36.7
School characteristics				
Percentage of all students who are English learner students	1,475	0.0	1,481	0.0
Percentage of English learner students whose native language is Spanish	1,475	0.0	1,481	0.0
Number of English learner students per certified English as a second language teacher	1,475	0.0	1,481	0.0
Number of English learner students per bilingual paraprofessional	1,475	0.0	1,481	0.0
Measure of school climate (standardized)	1,475	0.0	1,481	0.0
Percentage of all students who met math proficiency standards	1,475	0.0	1,481	0.0
Percentage of all students who met English language arts proficiency standards	1,475	0.0	1,481	0.0
School size	1,475	0.0	1,481	0.0
Percentage of all students with special education status	1,475	0.0	1,481	0.0

na is not applicable because the characteristic was not included in the regression analysis for the indicated student outcome.

Source: Authors' analyses.

Table B5. Rates of missing student- and school-level data in the analytic samples for English language proficiency regression analyses, 2016/17

Characteristic	Overall		Listening		Speaking		Reading		Writing	
	Number of valid cases	Percent missing	Number of valid cases	Percent missing	Number of valid cases	Percent missing	Number of valid cases	Percent missing	Number of valid cases	Percent missing
Student characteristics										
Prior-year overall English language proficiency	1,159	24.6	1,154	24.4	1,147	24.3	1,154	24.5	1,154	24.4
Prior-year English language proficiency listening level	1,159	24.6	1,154	24.4	1,147	24.3	1,154	24.5	1,154	24.4
Prior-year English language proficiency speaking level	1,143	25.6	1,139	25.4	1,133	25.3	1,140	25.4	1,140	25.3
Prior-year English language proficiency reading level	1,154	24.9	1,150	24.7	1,143	24.6	1,151	24.7	1,151	24.6
Prior-year English language proficiency writing level	1,152	25.1	1,148	24.8	1,142	24.7	1,149	24.9	1,148	24.8
Native language	1,537	0.0	1,527	0.0	1,516	0.0	1,529	0.0	1,527	0.0
Gender	1,537	0.0	1,527	0.0	1,516	0.0	1,529	0.0	1,527	0.0
Special education status	1,537	0.0	1,527	0.0	1,516	0.0	1,529	0.0	1,527	0.0
Gifted status	1,537	0.0	1,527	0.0	1,516	0.0	1,529	0.0	1,527	0.0
Prior-year math performance	958	37.5	1,154	24.4	1,147	24.3	956	37.5	956	37.4
School characteristics										
Percentage of all students who are English learner students	1,537	0.0	1,527	0.0	1,516	0.0	1,529	0.0	1,527	0.0
Percentage of English learner students whose native language is Spanish	1,537	0.0	1,527	0.0	1,516	0.0	1,529	0.0	1,527	0.0
Number of English learner students per certified English as a second language teacher	1,537	0.0	1,527	0.0	1,516	0.0	1,529	0.0	1,527	0.0
Number of English learner students per bilingual paraprofessional	1,537	0.0	1,527	0.0	1,516	0.0	1,529	0.0	1,527	0.0
Measure of school climate (standardized)	1,537	0.0	1,527	0.0	1,516	0.0	1,529	0.0	1,527	0.0
Percentage of all students who met math proficiency standards	1,537	0.0	1,527	0.0	1,516	0.0	1,529	0.0	1,527	0.0
Percentage of all students who met English language arts proficiency standards	1,537	0.0	1,527	0.0	1,516	0.0	1,529	0.0	1,527	0.0
School size	1,537	0.0	1,527	0.0	1,516	0.0	1,529	0.0	1,527	0.0
Percentage of all students with special education status	1,537	0.0	1,527	0.0	1,516	0.0	1,529	0.0	1,527	0.0

Source: Authors' analyses.

Sensitivity analyses

The study team conducted several analyses to examine whether the findings were meaningfully affected if the variables and samples in the regression model were changed. This included re-running analyses on distinct samples based on prior-year English learner proficiency level, running analyses in which school staffing variables were replaced with indicators for school type, re-running analyses and excluding students who lacked prior-year assessment data (instead of using mean imputation), and testing the analyses using 2016 performance as the outcome. In all cases the main findings were consistent, or the sample sizes in the test analyses were too small to draw definitive conclusions.

Analysis methods

The analysis employed a combination of descriptive and correlational methods.

Research question 1 used means and percentages to describe the characteristics of the English learner student population and the schools they attended by year, using the variables described in the measures section above. For the student-level description, each year-based sample was defined by selecting all students who were identified as English learner students and enrolled in grades 3–8 for each year. For the school-level description, each year-based sample included all the schools that the sample of English learner students attended in that year.

The analysis for research question 2 also used means and percentages to describe the patterns in academic outcomes among English learner students in grades 3–8 in the six cross-sectional samples. State math and English language arts assessment scores were standardized using the annual districtwide, grade-level means and standard deviations.

To answer research question 3 on the extent to which student and school characteristics are associated with English learner student outcomes, the study team developed a series of regression models to estimate the association between student performance in 2016/17 and student and school characteristics. The regression analyses focused on the most recent school year in the sample (2016/17), and the sample was restricted to students with outcome data (math and English language arts performance and English language proficiency level) for 2016/17. Missing values of covariates (see tables B3 and B4) were replaced with a value of zero, and a dichotomous flag was created as a missing indicator for each covariate with missing data in the analysis.

The core model was specified as follows:

$$Y_{ij} = \alpha_i + \mathbf{X}_i + \mathbf{W}_j + r_j + \varepsilon_{ij}$$

where Y_{ij} is the outcome for student i in school j, $\mathbf{X}_i$ is a vector that captures student characteristics, $\mathbf{W}_j$ is a vector that captures school characteristics, r_j is a school-level random-error term, and ε_{ij} is an individual random-error term. All models were estimated as two-level, hierarchical linear models to account for the nesting of students within schools. State math and English language arts assessment scores were standardized using annual districtwide, grade-level means and standard deviations; thus, coefficients can be interpreted in standard deviation units.

The study team explored using ordinal logistic estimation for English language proficiency assessment outcomes given that these had discrete, ordered integer values; the patterns of significance and direction of the estimated relationships were the same as when linear models were used; thus, the results from the linear models are presented for ease of interpretation. Sensitivity analyses were conducted to examine the results using complete cases only, and no substantive differences were found.

Appendix C. Additional results

This appendix details full results of the findings from the three research questions addressed in the study.

Table C1. Summary characteristics of English learner students in grades 3–8 in the Cleveland Metropolitan School District, 2011/12–2016/17

Characteristic	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Number of English learner students	1,266	1,237	1,215	1,310	1,585	1,542
Percentage of all students who are English learner students	6	7	7	8	9	9
Percentage of students by native language						
Spanish	82	80	79	79	76	71
Arabic	4	5	6	6	8	9
African language[a]	5	6	6	5	7	10
Asian language[b]	6	6	7	8	7	7
European/other language[c]	2	1	1	1	1	2
Other or unknown	1	1	1	1	1	1
Percentage of students by race/ethnicity						
Asian	6	6	7	8	7	7
Black	3	4	4	5	8	11
Hispanic	82	80	79	79	76	71
White	5	5	6	6	8	10
Other	4	4	3	2	1	1
Percentage of students who are female	47	48	47	46	46	46
Percentage of students with special education status	16	15	16	18	18	17
Percentage of students with gifted status	2	1	1	2	3	3
Percentage of students in each school type						
Bilingual school	70	69	64	59	56	54
Nonmultilingual school	19	20	21	25	21	22
Newcomer academy	11	11	15	17	23	23

a. Includes Bassa, Dinka, Ewe, Igbo, Karen, Kinyamulenge, Kirundi, Krahn, Maay Maay, Somali, Swahili, Tigrinya, and Yoruba.

b. Includes Burmese, Cambodian, Cantonese, Filipino, Hindi, Indonesian, Mandarin, Nepali, Punjabi, Tagalog, Tamil, Thai, Urdu, and Vietnamese.

c. Includes Albanian, Bosnian, Croatian, English/Creole, French, Romanian, Russian, Turkish, and Ukrainian.

Source: Authors' calculations based on data from the Cleveland Metropolitan School District.

Table C2. Summary characteristics of schools attended by English learner students in grades 3–8 in the Cleveland Metropolitan School District, 2011/12–2016/17

Characteristic	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Total number of schools with English learner students	42	42	41	44	47	41
Average percentage of all students who are English learner students	10	10	10	10	10	10
Average number of languages spoken among English learner students	2.8	3.0	3.2	3.1	3.4	3.8
Average percentage of English learner students by language spoken						
Spanish	73	68	68	70	65	69
Arabic	4	9	10	9	10	7
School specialist staffing						
Average number of English learner students per certified English as a second language teacher[a]	na	na	na	na	na	26
Average number of English learner students per bilingual paraprofessional[b]	59	61	69	52	53	54
Average school climate domain measures[c] (standard deviation)						
Academic rigor	na	0.1	0.1	0.2	0.1	0.1
Safe and respectful climate	na	0.4	0.4	0.3	0.3	0.3
Peer social-emotional learning	na	0.4	0.3	0.3	0.3	0.2
Supportive learning environment	na	0.4	0.3	0.3	0.2	0.2
Average percentage of English learner students at each English language proficiency level[d]						
Ohio Test of English Language Acquisition						
1—prefunctional	11	11	15	10	na	na
2—beginning	26	33	28	30	na	na
3—intermediate	38	29	31	30	na	na
4—advanced	18	19	21	22	na	na
5—proficient	4	2	3	5	na	na
Ohio English Language Proficiency Exam						
1—emerging	na	na	na	na	13	19
2—progressing	na	na	na	na	71	69
3—proficient	na	na	na	na	13	11
Average percentage of all students who met proficiency standards						
Math	49	48	50	34	26	32
English language arts	60	60	58	47	21	29
Percentage of schools in each school size category[e]						
Small	14	14	20	25	28	15
Medium	38	50	37	36	38	51
Large	48	36	44	39	34	34
Average percentage of all students by race/ethnicity						
Asian	1	1	2	1	1	1
Black	49	48	48	51	54	50
Hispanic	22	22	22	21	19	21
White	24	24	24	23	21	23
Other	11	10	10	11	11	12

(continued)

Table C2. Summary characteristics of schools attended by English learner students in grades 3–8 in the Cleveland Metropolitan School District, 2011/12–2016/17
(continued)

Characteristic	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Average percentage of all students with special education status	13	14	16	18	19	18
Average percentage of all students with gifted status	5	5	5	5	6	7

na is not applicable.

a. Data on certified English as a second language teachers were not available prior to 2016/17. The average number of English learner students per certified English as a second language teacher was calculated only for schools that had at least one certified English as a second language teacher (n = 16).

b. The average number of English learner students per bilingual paraprofessional was calculated only for schools that had at least one bilingual paraprofessional (n = 31 for 2011/12, n = 33 for 2012/13, n = 33 for 2013/14, n = 42 for 2014/15, n = 33 for 2015/16, n = 32 for 2016/17).

c. School climate data were not available for 2011/12. School climate scores were measured by aggregate school-level scale scores on the Conditions for Learning Survey and were standardized to the district average.

d. The number of overall English language proficiency levels decreased from five to three between 2014/15 and 2015/16, when the assessment changed.

e. School size was based on the annual districtwide distribution of school enrollment. Small schools had an enrollment below the 25th percentile of the distribution in a given school year, medium schools had an enrollment in the 25th–75th percentiles, and large schools had an enrollment above the 75th percentile.

Source: Authors' calculations based on data from the Cleveland Metropolitan School District.

Table C3. Summary characteristics of nonmultilingual schools attended by English learner students in grades 3–8 in the Cleveland Metropolitan School District, 2011/12–2016/17

Characteristic	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Total number of nonmultilingual schools that have at least one English learner student	32	33	32	35	38	33
Average percentage of all students who are English learner students	2	3	3	3	3	4
Percentage of nonmultilingual schools by size of English learner student population						
0–5 percent English learner students	91	94	81	63	71	67
5–10 percent English learner students	9	6	19	37	29	33
More than 10 percent English learner students	0	0	0	0	0	0
Average number of languages spoken among English learner students	2.1	2.2	2.6	2.4	2.6	2.9
Average percentage of English learner students by language spoken						
Spanish	72	65	64	66	62	67
Arabic	4	10	11	10	10	7
School specialist staffing						
Average number of English learner students per certified English as a second language teacher[a]	na	na	na	na	na	23
Average number of English learner students per bilingual paraprofessional[b]	66	71	80	56	55	49
Average school climate domain measures[c] (standard deviation)						
Academic rigor	na	0.0	0.0	0.1	0.1	0.0
Safe and respectful climate	na	0.4	0.3	0.2	0.3	0.2
Peer social-emotional learning	na	0.2	0.2	0.2	0.2	0.1
Supportive learning environment	na	0.3	0.3	0.2	0.2	0.1
Average percentage of English learner students at each English language proficiency level[d]						
Ohio Test of English Language Acquisition						
1—prefunctional	11	10	16	10	na	na
2—beginning	24	33	28	30	na	na
3—intermediate	41	28	30	30	na	na
4—advanced	19	19	20	23	na	na
5—proficient	3	2	2	4	na	na
Ohio English Language Proficiency Exam						
1—emerging	na	na	na	na	13	19
2—progressing	na	na	na	na	71	68
3—proficient	na	na	na	na	13	12
Average percentage of all students who met proficiency standards						
Math	50	49	50	34	27	32
English language arts	62	62	60	49	22	30

(continued)

Table C3. Summary characteristics of nonmultilingual schools attended by English learner students in grades 3–8 in the Cleveland Metropolitan School District, 2011/12–2016/17 *(continued)*

Characteristic	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Percentage of schools in each school size category[e]						
Small	19	18	22	29	29	15
Medium	38	48	38	34	39	55
Large	44	33	41	37	32	30
Average percentage of all students by race/ethnicity						
Asian	1	1	1	1	1	1
Black	54	55	55	57	61	57
Hispanic	14	14	14	14	12	13
White	26	26	26	24	22	25
Other race/ethnicity	12	11	11	12	11	12
Average percentage of all students with special education status	13	14	17	18	19	19
Average percentage of all students with gifted status	5	5	5	5	6	7

na is not applicable.

a. Staffing data on certified English as a second language teachers were not available prior to 2016/17. The average number of English learner students per certified English as a second language teacher was calculated only for schools that had at least one certified English as a second language teacher (n = 8).

b. The number of English learner students per bilingual paraprofessional was calculated only for schools that had at least one bilingual paraprofessional (n = 23 for 2011/12, n = 25 for 2012/13, n = 25 for 2013/14, n = 34 for 2014/15, n = 25 for 2015/16, n = 24 for 2016/17).

c. School climate data were not available for 2011/12. School climate scores were measured by aggregate school-level scale scores on the Conditions for Learning Survey and were standardized to the district average.

d. The number of overall English language proficiency levels decreased from five to three between 2014/15 and 2015/16, when the assessment changed.

e. School size was based on the annual districtwide distribution of school enrollment. Small schools had an enrollment below the 25th percentile of the distribution in a given school year, medium schools had an enrollment in the 25th–75th percentiles, and large schools had an enrollment above the 75th percentile.

Source: Authors' calculations based on data from the Cleveland Metropolitan School District.

Table C4. Summary characteristics of bilingual schools attended by English learner students in grades 3–8 in the Cleveland Metropolitan School District, 2011/12–2016/17

Characteristic	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Total number of bilingual schools that have at least one English learner student	7	7	7	7	7	7
Average percentage of all students who are English learner students	35	35	33	33	36	33
Percentage of bilingual schools by size of English learner student population						
Less than 10 percent English learner students	0	0	0	0	0	0
10–25 percent English learner students	29	14	43	43	29	43
25–40 percent English learner students	29	43	29	29	14	29
More than 40 percent English learner students	43	43	29	29	57	29
Average number of languages spoken among English learner students	4.1	5.3	5.0	4.9	4.6	5.4
Average percentage of English learner students by language spoken						
Spanish	86	83	84	83	82	83
Arabic	5	6	8	8	8	7
School specialist staffing						
Average number of English learner students per certified English as a second language teacher[a]	na	na	na	na	na	28
Average number of English learner students per bilingual paraprofessional[b]	43	39	36	38	43	70
Average school climate domain measures[c] (standard deviation)						
Academic rigor	na	0.4	0.4	0.4	0.4	0.5
Safe and respectful climate	na	0.3	0.4	0.4	0.4	0.6
Peer social-emotional learning	na	0.8	0.7	0.5	0.6	0.6
Supportive learning environment	na	0.4	0.6	0.5	0.6	0.6
Average percentage of English learner students at each English language proficiency level[d]						
Ohio Test of English Language Acquisition						
1—prefunctional	10	10	8	10	na	na
2—beginning	33	29	26	31	na	na
3—intermediate	33	35	37	34	na	na
4—advanced	20	22	24	19	na	na
5—proficient	4	3	5	5	na	na
Ohio English Language Proficiency Exam						
1—emerging	na	na	na	na	8	12
2—progressing	na	na	na	na	75	78
3—proficient	na	na	na	na	17	10
Average percentage of all students who met proficiency standards						
Math	46	48	52	39	30	36
English language arts	56	57	56	48	21	28

(continued)

Table C4. Summary characteristics of bilingual schools attended by English learner students in grades 3–8 in the Cleveland Metropolitan School District, 2011/12–2016/17 *(continued)*

Characteristic	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Percentage of schools in each school size category[e]						
Small	0	0	0	0	14	14
Medium	29	43	43	57	43	43
Large	71	57	57	43	43	43
Average percentage of all students by race/ethnicity						
Asian	1	2	2	2	2	2
Black	24	24	24	24	24	23
Hispanic	56	56	56	55	55	55
White	15	15	15	15	16	17
Other	7	7	7	8	8	10
Average percentage of all students with special education status	13	13	15	17	17	16
Average percentage of all students with gifted status	3	2	2	3	3	6

na is not applicable.

a. Data on certified English as a second language teachers were not available prior to 2016/17. The average number of English learner students per certified English as a second language teacher was calculated only for schools that had at least one certified English as a second language teacher (n = 7).

b. The number of English learner students per bilingual paraprofessional was calculated only for schools that had at least one bilingual paraprofessional (n = 7 for all years).

c. School climate data were not available for 2011/12. School climate scores were measured by aggregate school-level scale scores on the Conditions for Learning Survey and were standardized to the district average.

d. The number of overall English language proficiency levels decreased from five to three between 2014/15 and 2015/16, when the assessment changed.

e. School size was based on the annual districtwide distribution of school enrollment. Small schools had an enrollment below the 25th percentile of the distribution in a given school year, medium schools had an enrollment in the 25th–75th percentiles, and large schools had an enrollment above the 75th percentile.

Source: Authors' calculations based on data from the Cleveland Metropolitan School District.

Table C5. Summary characteristics of the newcomer academy attended by English learner students in grades 3–8 in Cleveland Metropolitan School District, 2011/12–2016/17

Characteristic	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Total number of schools with newcomer programs	1	1	1	1	1	1
Percentage of all students who are English learner students	83	78	78	74	85	80
Number of languages spoken among English learner students	18	12	14	17	22	21
Percentage of English learner students by language spoken						
Spanish	54	60	61	61	58	46
Arabic	13	8	10	13	14	18
School specialist staffing						
Number of English learner students per certified English as a second language teacher[a]	na	na	na	na	na	41
Number of English learner students per bilingual paraprofessional[b]	41	33	59	52	76	63
Average school climate domain measures[c] (standard deviation)						
Academic rigor	na	0.6	2.2	0.6	0.5	1.5
Safe and respectful climate	na	1.2	1.2	1.4	1.2	2.0
Peer social-emotional learning	na	2.6	2.1	1.8	1.6	2.5
Supportive learning environment	na	1.1	1.8	1.2	1.0	1.6
Percentage of English learner students at each English language proficiency level[d]						
Ohio Test of English Language Acquisition						
1—prefunctional	34	51	46	37	na	na
2—beginning	36	32	38	33	na	na
3—intermediate	18	14	15	21	na	na
4—advanced	3	3	1	8	na	na
5—proficient	0	0	0	2	na	na
Ohio English Language Proficiency Exam						
1—emerging	na	na	na	na	65	70
2—progressing	na	na	na	na	34	30
3—proficient	na	na	na	na	1	< 1
Percentage of all students who met proficiency standards						
Math	17	9	15	15	6	1
English language arts	10	3	6	5	1	< 1
School enrollment	399	425	520	712	949	1,064
School size category[e]	Medium	Medium	Large	Large	Large	Large
Percentage of all students by race/ethnicity						
Asian	20	22	23	18	12	9
Black	9	8	8	8	15	25
Hispanic	59	62	57	55	56	41
White	12	9	13	19	17	24
Other	7	4	3	4	4	3
Percentage of all students with special education status	2	1	3	6	6	4
Percentage of all students with gifted status	0	0	0	0	0	0

(continued)

Table C5. Summary characteristics of the newcomer academy attended by English learner students in grades 3–8 in Cleveland Metropolitan School District, 2011/12–2016/17 *(continued)*

na is not applicable.

a. Data on certified English as a second language teachers were not available prior to 2016/17.

c. School climate data were not available for 2011/12. School climate scores were measured by aggregate school-level scale scores on the Conditions for Learning Survey and were standardized to the district average.

d. The number of overall English language proficiency levels decreased from five to three between 2014/15 and 2015/16, when the assessment changed.

e. School size was based on the annual districtwide distribution of school enrollments. Small schools had an enrollment below the 25th percentile of the distribution in a given school year, medium schools had an enrollment in the 25th–75th percentiles, and large schools had an enrollment above the 75th percentile.

Source: Authors' calculations based on data from the Cleveland Metropolitan School District.

Table C6. Average scores on the state standardized math and English language arts assessments among English learner students in grades 3–8 in the Cleveland Metropolitan School District, 2011/12–2016/17

	Math		English language arts	
School year	Mean	Standard deviation	Mean	Standard deviation
2011/12	–0.14	0.96	–0.28	0.96
2012/13	–0.13	0.93	–0.28	0.96
2013/14	–0.08	0.97	–0.29	0.97
2014/15	0.04	0.92	–0.35	0.90
2015/16	0.01	0.84	–0.11	0.84
2016/17	–0.08	0.91	–0.24	0.87

Note: The study team standardized math and English language arts scores relative to the distribution of scores across all students in the district in each year and grade level.

Source: Authors' analyses based on data from the Cleveland Metropolitan School District.

Table C7. Percentage of English learner students in grades 3–8 in the Cleveland Metropolitan School District scoring at each level on the listening domain subscale of the English language proficiency assessment, 2011/12–2016/17

Proficiency level	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
1—prefunctional	8	10	9	9	15	17
2—beginning	13	12	11	12	11	11
3—intermediate	23	26	26	24	23	26
4—advanced	19	20	20	21	29	27
5—proficient	37	33	35	35	23	19

Note: The English language proficiency assessment administered in 2011/12–2014/15 was the Ohio Test of English Language Acquisition, and the assessment administered in 2015/16 and 2016/17 was the Ohio English Language Proficiency Assessment.

Source: Authors' analyses based on data from the Cleveland Metropolitan School District.

Table C8. Percentage of English learner students in grades 3–8 in the Cleveland Metropolitan School District scoring at each level on the speaking subscale of the English language proficiency assessment, 2011/12–2016/17

Proficiency level	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
1—prefunctional	3	5	4	4	24	28
2—beginning	6	4	4	6	15	17
3—intermediate	15	11	11	11	24	25
4—advanced	31	28	24	22	18	16
5—proficient	45	52	57	57	17	14

Note: The English language proficiency assessment administered in 2011/12–2014/15 was the Ohio Test of English Language Acquisition, and the assessment administered in 2015/16 and 2016/17 was the Ohio English Language Proficiency Assessment.

Source: Authors' analyses based on data from the Cleveland Metropolitan School District.

Table C9. Percentage of English learner students in grades 3–8 in the Cleveland Metropolitan School District scoring at each level on the reading subscale of the English language proficiency assessment, 2011/12–2016/17

Proficiency level	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
1—prefunctional	14	18	15	13	32	36
2—beginning	32	33	24	34	17	19
3—intermediate	17	17	23	20	29	29
4—advanced	28	21	24	22	11	9
5—proficient	10	11	13	11	10	6

Note: The English language proficiency assessment administered in 2011/12–2014/15 was the Ohio Test of English Language Acquisition, and the assessment administered in 2015/16 and 2016/17 was the Ohio English Language Proficiency Assessment.

Source: Authors' analyses based on data from the Cleveland Metropolitan School District.

Table C10. Percentage of English learner students in grades 3–8 in the Cleveland Metropolitan School District scoring at each level on the writing subscale of the English language proficiency assessment, 2011/12–2016/17

Proficiency level	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
1—prefunctional	20	20	22	17	24	31
2—beginning	34	28	26	29	15	15
3—intermediate	26	32	24	24	40	39
4—advanced	15	19	24	19	11	9
5—proficient	5	1	4	11	10	6

Note: The English language proficiency assessment administered in 2011/12–2014/15 was the Ohio Test of English Language Acquisition, and the assessment administered in 2015/16 and 2016/17 was the Ohio English Language Proficiency Assessment.

Source: Authors' analyses based on data from the Cleveland Metropolitan School District.

Table C11. State standardized assessment scores in math and English language arts regressed on student and school characteristics, 2016/17

Characteristic	Math		English language arts	
	Beta	Standard error	Beta	Standard error
Student characteristics				
Prior-year overall English language proficiency level = 1—emerging	–0.154**	0.053	–0.275***	0.054
Prior-year overall English language proficiency level = 3—proficient	–0.017	0.141	0.124	0.149
No prior-year overall English language proficiency level	–0.362***	0.062	–0.523***	0.063
Native language = Arabic[a]	–0.036	0.066	0.028	0.068
Native language = African language[a,b]	–0.108	0.060	0.027	0.061
Native language = Asian language[a,c]	0.058	0.070	0.113	0.071
Native language = European/other language[a,d]	0.105	0.102	0.098	0.105
Female	0.020	0.033	0.023	0.033
Special education status	–0.353***	0.047	–0.393***	0.048
Gifted status	0.114	0.095	0.168	0.098
Prior-year math performance	0.731***	0.026	na	na
No prior-year math performance	0.081	0.049	na	na
Prior-year English language arts performance	na	na	0.571***	0.027
No prior-year English language arts performance	na	na	0.066	0.050
School characteristics				
Percentage of all students who are English learner students	0.0629	0.290	–0.577	0.443
Percentage of English learner students whose native language is Spanish	0.515***	0.111	0.278	0.172
Number of English learner students per certified English as a second language teacher	–0.002	0.003	–0.004	0.004
No English as a second language teachers	–0.0377	0.117	–0.237	0.186
Number of English learner students per bilingual paraprofessional	–0.002***	0.000	0.000	0.001
No bilingual paraprofessionals	–0.107	0.123	–0.061	0.171
Measure of school climate (standardized)	–0.0364	0.049	0.088	0.072
Percentage of all students who met math proficiency standards	0.782	0.476	–0.121	0.731
Percentage of all students who met English language arts proficiency standards	–0.052	0.577	0.281	0.870
School size = small	–0.313**	0.096	–0.005	0.131
School size = medium	–0.123*	0.055	–0.036	0.091
Percentage of all students with special education status	–0.806	0.481	–1.309	0.810

* Significant at $p = .05$; ** significant at $p = .01$; *** significant at $p = .001$.

na is not applicable because prior-year academic performance was used only for outcomes in the same subject (that is, prior-year math performance was used only in the regression in which math performance was the outcome, and prior-year English language arts performance was used only in the regression in which English language arts performance was the outcome).

Note: The study team standardized math and English language arts scores relative to the distribution of scores across all students in the district within each year and grade level.

a. Compared with English learner students whose native language is Spanish.

b. Includes Bassa, Dinka, Ewe, Igbo, Karen, Kinyamulenge, Kirundi, Krahn, Maay Maay, Somali, Swahili, Tigrinya, and Yoruba.

c. Includes Burmese, Cambodian, Cantonese, Filipino, Hindi, Indonesian, Mandarin, Nepali, Punjabi, Tagalog, Tamil, Thai, Urdu, and Vietnamese.

d. Includes Albanian, Bosnian, Croatian, English/Creole, French, Romanian, Russian, Turkish, and Ukrainian.

Source: Authors' analyses based on data from the Cleveland Metropolitan School District.

Table C12. English language proficiency levels, overall and by subscale, regressed on student- and school-level variables, 2016/17

Characteristic	Overall		Listening		Speaking		Reading		Writing	
	Beta	Standard error	Beta	Standard error	Beta	Standard error	Beta	Standard error	Beta	Standard error
Student characteristics										
Prior-year overall English language proficiency level	0.375***	0.033	na	na	na	na	na	na	na	na
No prior-year overall English language proficiency level	0.262***	0.066	na	na	na	na	na	na	na	na
Prior-year English language listening proficiency level	na	na	0.406***	0.025	na	na	na	na	na	na
No prior-year English language listening proficiency level	na	na	0.085	0.108	na	na	na	na	na	na
Prior-year English language speaking proficiency level	na	na	na	na	0.407***	0.026	na	na	na	na
No prior-year English language speaking proficiency level	na	na	na	na	0.088	0.101	na	na	na	na
Prior-year English language reading proficiency level	na	na	na	na	na	na	0.582***	0.026	na	na
No prior-year English language reading proficiency level	na	na	na	na	na	na	0.699***	0.090	na	na
Prior-year English language writing proficiency level	na	na	na	na	na	na	na	na	0.564***	0.026
No prior-year English language writing proficiency level	na	na	na	na	na	na	na	na	0.734***	0.088
Native language = Arabic[a]	−0.099*	0.043	−0.299***	0.090	−0.094	0.101	−0.208*	0.083	−0.191*	0.079
Native language = African language[a,b]	−0.073	0.039	−0.209*	0.083	−0.011	0.094	−0.104	0.077	−0.054	0.073
Native language = Asian language[a,c]	−0.033	0.046	−0.160	0.097	−0.012	0.110	−0.044	0.090	−0.145	0.086
Native language = European/other language[a,d]	0.150*	0.064	0.212	0.135	0.316*	0.152	0.050	0.126	0.207	0.121
Female	0.048*	0.022	0.089	0.045	0.153**	0.051	0.063	0.042	0.107**	0.040
Special education status	−0.216***	0.031	−0.501***	0.065	−0.530***	0.074	−0.478***	0.062	−0.396***	0.059
Gifted status	0.146*	0.063	0.154	0.134	0.074	0.149	0.227	0.125	0.205	0.118
Prior-year math performance	0.113***	0.018	0.250***	0.042	0.249***	0.046	0.153***	0.037	0.196***	0.035
No prior-year math performance	0.108***	0.033	0.375***	0.069	0.295***	0.076	0.039	0.063	−0.048	0.060
School characteristics										
Percentage of all students who are English learner students	−0.626*	0.248	−1.796***	0.501	−2.335***	0.577	−1.066	0.561	−0.722	0.468
Percentage of English learner students whose native language is Spanish	0.189*	0.093	0.373*	0.189	0.656**	0.219	0.293	0.213	0.211	0.177
Number of English learner students per certified English as a second language teacher	−0.003	0.002	−0.004	0.005	−0.013*	0.005	−0.009	0.005	−0.004	0.004
No certified English as a second language teachers	−0.191	0.102	−0.375	0.206	−0.624**	0.237	−0.333	0.231	−0.224	0.192
Number of English learner students per bilingual paraprofessional	−0.001	0.000	−0.001	0.001	0.000	0.001	−0.001	0.001	−0.001	0.001
No bilingual paraprofessionals	−0.176	0.097	−0.344	0.199	−0.190	0.228	−0.246	0.213	−0.204	0.183

(continued)

Table C12. English language proficiency levels, overall and by subscale, regressed on student- and school-level variables, 2016/17
(continued)

Characteristic	Overall		Listening		Speaking		Reading		Writing	
	Beta	Standard error	Beta	Standard error	Beta	Standard error	Beta	Standard error	Beta	Standard error
Measure of school climate (standardized)	0.041	0.041	0.183*	0.082	0.305**	0.096	0.088	0.091	0.031	0.077
Percentage of all students who met math proficiency standards	–0.618	0.404	–2.313**	0.820	–3.147***	0.947	–1.212	0.919	–1.301	0.764
Percentage of all students who met English language arts proficiency standards	0.455	0.482	2.096*	0.980	2.717*	1.130	1.160	1.094	1.656	0.911
School size = small	–0.007	0.074	–0.019	0.151	–0.133	0.175	0.096	0.166	0.073	0.142
School size = medium	–0.002	0.049	–0.005	0.100	–0.215	0.115	–0.098	0.114	–0.060	0.094
Percentage of all students with special education status	0.587	0.451	1.382	0.911	0.811	1.052	0.079	1.032	1.615	0.855

* Significant at $p = .05$; ** significant at $p = .01$; *** significant at $p = .001$.

na is not applicable because prior-year performance was used only for the corresponding 2016/17 outcome (that is, prior-year overall English language proficiency level was used only in the regression in which overall proficiency level was the outcome, prior-year English language listening proficiency level was used only in the regression in which listening proficiency level was the outcome), and so on.

a. Compared with English learner students whose native language is Spanish.

b. Includes Bassa, Dinka, Ewe, Igbo, Karen, Kinyamulenge, Kirundi, Krahn, Maay Maay, Somali, Swahili, Tigrinya, and Yoruba.

c. Includes Burmese, Cambodian, Chinese, Cantonese, Filipino, Hindi, Indonesian, Mandarin, Nepali, Punjabi, Tagalog, Tamil, Thai, Urdu, and Vietnamese.

d. Includes Albanian, Bosnian, Croatian, English/Creole, French, Romanian, Russian, Turkish, and Ukrainian.

Source: Authors' analyses based on data from the Cleveland Metropolitan School District.

Table C13. State standardized assessment scores in math and English language arts regressed on school climate variables, 2016/17

School climate domain	Math		English language arts	
	Beta	Standard error	Beta	Standard error
Academic rigor	0.073	0.050	0.165**	0.061
Safe and respectful climate	–0.064	0.043	0.055	0.070
Peer social-emotional learning	–0.082	0.045	0	0.067
Supportive learning environment	0.055	0.056	0.147*	0.072

* Significant at $p = .05$; ** significant at $p = .01$.

Note: Each estimate represents a separate regression model. Each model controls for student native language, gender, special education status, gifted status, and prior-year math or English language arts performance, in addition to percentage of English learner students, percentage of English learner students whose native language is Spanish, number of English learner students per certified English as a second language teacher, number of English learner students per bilingual paraprofessional, percentage of students who met proficiency standards in math and English language arts in the prior year, and school size. The study team standardized math and English language arts scores relative to the distribution of scores across all students in the district within each year and grade level.

Source: Authors' analyses based on data from the Cleveland Metropolitan School District.

Table C14. English language proficiency levels, overall and by subscale, regressed on school climate variables, 2016/17

School climate domain	Overall		Listening		Speaking		Reading		Writing	
	Beta	Standard error	Beta	Standard error	Beta	Standard error	Beta	Standard error	Beta	Standard error
Academic rigor	0.011	0.04	0.101	0.083	0.207*	0.098	0.036	0.087	0.024	0.074
Safe and respectful climate	0.064	0.036	0.201**	0.074	0.305***	0.087	0.128	0.086	0.072	0.068
Peer social-emotional learning	0.033	0.039	0.145	0.079	0.253**	0.095	0.047	0.089	–0.016	0.075
Supportive learning environment	0.017	0.043	0.144	0.093	0.245*	0.11	0.081	0.094	0.202	0.082

* Significant at $p = .05$; ** significant at $p = .01$; *** significant at $p = .001$.

Note: Each estimate represents a separate regression model. Each model also controls for student native language, gender, special education status, gifted status, and prior-year math or English language arts performance, in addition to percentage of English learner students, percentage of English learner students whose native language is Spanish, number of English learner students per certified English as a second language teacher, number of English learner students per bilingual paraprofessional, percentage of students who met proficiency standards in math and English language arts in the prior year, and school size.

Source: Authors' analyses based on data from the Cleveland Metropolitan School District.

Table C15. Summary of student and school characteristics related to English learner student math and English language arts performance and English language proficiency levels, 2016/17

Characteristic	Ohio State Test		Ohio English Language Proficiency Assessment				
	Math	English language arts	Overall	Listening	Speaking	Reading	Writing
Student characteristics							
Prior-year English language proficiency level	+	+	+	+	+	+	+
No prior-year English language proficiency level	–	–	+	ns	ns	+	+
Native language = Arabic[a]	ns	ns	–	–	ns	–	–
Native language = African language[a,b]	ns	ns	ns	–	ns	ns	ns
Native language = Asian language[a,c]	ns	ns	ns	ns	ns	ns	ns
Native language = European/other language[a,d]	ns	ns	+	ns	+	ns	ns
Female	ns	ns	+	ns	+	ns	+
Special education status	–	–	–	–	–	–	–
Gifted status	ns	ns	+	ns	ns	ns	ns
Prior-year math performance	+	na	+	+	+	+	+
No prior-year math performance	ns	na	+	+	+	ns	ns
Prior-year English language arts performance	na	+	na	na	na	na	na
No prior-year English language arts performance	na	ns	na	na	na	na	na
School characteristics							
Percentage of all students who are English learner students	ns	ns	–	–	–	ns	ns
Percentage of English learner students whose native language is Spanish	+	ns	+	+	+	ns	ns
Number of English learner students per certified English as a second language teacher	ns	ns	Ns	ns	–	ns	ns
No certified English as a second language teachers	ns	ns	ns	ns	–	ns	ns
Number of English learner students per bilingual paraprofessional	–	ns	ns	ns	ns	ns	ns
No bilingual paraprofessionals	ns	ns	ns	ns	ns	ns	ns
Measure of overall school climate (standardized)	ns	ns	ns	+	+	ns	ns
Academic rigor	ns	+	ns	ns	+	ns	ns
Safe and respectful climate	ns	ns	ns	+	+	ns	ns
Peer social-emotional learning	ns	ns	ns	ns	+	ns	ns
Supportive learning environment	ns	+	ns	ns	+	ns	ns
Percentage of all students who met math proficiency standards	ns	ns	ns	–	–	ns	ns
Percentage of all students who met English language arts proficiency standards	ns	ns	ns	+	+	ns	ns

(continued)

Table C15. Summary of student and school characteristics related to English learner student math and English language arts performance and English language proficiency levels, 2016/17 *(continued)*

Characteristic	Ohio State Test		Ohio English Language Proficiency Assessment				
	Math	English language arts	Overall	Listening	Speaking	Reading	Writing
School size = small	–	ns	ns	ns	ns	ns	ns
School size = medium	–	ns	ns	ns	ns	ns	ns
Percentage of all students with special education status	ns	ns	ns	ns	ns	ns	ns

na is not applicable.

ns is not significant at the $p = .05$ level.

+ denotes a statistically significant positive relationship

– denotes a statistically significant negative relationship

a. Compared with English learner students whose native language is Spanish.

b. Includes Bassa, Dinka, Ewe, Igbo, Karen, Kinyamulenge, Kirundi, Krahn, Maay Maay, Somali, Swahili, Tigrinya, and Yoruba.

c. Includes Burmese, Cambodian, Cantonese, Filipino, Hindi, Indonesian, Mandarin, Nepali, Punjabi, Tagalog, Tamil, Thai, Urdu, and Vietnamese.

d. Includes Albanian, Bosnian, Croatian, English/Creole, French, Romanian, Russian, Turkish, and Ukrainian.

Source: Authors' analyses based on data from the Cleveland Metropolitan School District.

Notes

1. Across districts in REL Midwest states (Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio, and Wisconsin), the English learner student population increased 23 percent from 2010/11 to 2014/15, from 431,302 students to 532,042 students (U.S. Department of Education, National Center for Education Statistics, 2016).
2. The four scales of the Conditions for Learning Survey were highly correlated. The study team included the scales one at a time in separate regression models to avoid multicollinearity.
3. The proportion of all students in CMSD who are English learner students (5–10 percent) is comparable to that in the other largest school districts in the state, including Akron and Cincinnati, where English learner students account for 5 percent of the student population (U.S. Department of Education, National Center for Education Statistics, 2016). It also is similar to the proportion of English learner students in many other larger urban districts in the REL Midwest Region, such as Anoka-Hennepin, Minnesota (6 percent), and Fort Wayne, Indiana (9 percent; U.S. Department of Education, National Center for Education Statistics, 2016).
4. The one exception is that Indiana licensing requirements include a course in teaching English as a new language.
5. These special education codes are cross-categorical, cross-categorical self-contained, emotional disturbance, hearing handicap, low incidence, medically fragile, speech language impairment, special education prekindergarten, and visual impairment.
6. The study team originally planned to standardize scores to the state means, but state means and standard deviations were not available for all years.

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