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Research demonstrates student mobility, or students transferring schools, significantly affects student academic outcomes, making it a critical concern for policymakers and practitioners. Within-school-year transfers, in particular, often reflect sudden, unexpected circumstances. However, research on the prevalence, risk factors, and patterns of student mobility remains limited. This study leveraged an ecological framework to identify student, school, and neighborhood characteristics linked to within-year school transfers and to examine whether these patterns differ across urban and suburban/rural contexts. Using regression modeling with Missouri state data spanning nine years, we examined who and where students moved. The results reveal both expected and novel patterns, such as higher transfer rates among students with unstable housing, special education needs, and in high-suspension schools, with implications for policy, practice, and future research.

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Who Transfers and Where do They Go?

Identifying Risk Factors Across Student, School, and Neighborhood Characteristics

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Abstract

Research demonstrates *student mobility*, or students transferring schools, significantly affects student academic outcomes, making it a critical concern for policymakers and practitioners. Within-school-year transfers, in particular, often reflect sudden, unexpected circumstances. However, research on the prevalence, risk factors, and patterns of student mobility remains limited. This paper is the first of four research papers out of a local research practice partnership, examining within-year mobility in St. Louis. Leveraging an ecological framework, we identify student, school, and neighborhood characteristics linked to within-year school transfers and to examine whether these patterns differ across urban and suburban/rural contexts. Using regression modeling with Missouri state data spanning nine years, we examined *who* and *where* students moved. The results reveal both expected and novel patterns, such as higher transfer rates among students with unstable housing, special education needs, and in high-suspension schools, with implications for policy, practice, and future research.

Keywords: Student mobility, within-year school transfers, educational outcomes

Who Transfers and Where do They Go?

Identifying Risk Factors Across Student, School, and Neighborhood Characteristics

Long-term collaborations between researchers and educators or research practice partnerships (RPPs) can be an effective way to address large problems of policy and practice, and facilitate educational improvement (Donovan, 2013; Farrell & Penuel, 2023). In the summer of 2020 our team of public and charter school leaders, university deans, and researchers in the St. Louis area came together to form the Saint Louis School Research-Practice Collaborative (SRPC), an independent RPP, dedicated to addressing challenges facing local school districts. Through a collaborative process, practitioners in the SRPC identified *student mobility*, or the transfer of students from one school to another (Rumberger, 2003; Welsh, 2017) as a shared problem of practice among districts. Educators described the immense difficulty of meeting state requirements while continuously adjusting curriculum and instructional practices throughout the school year to support a shifting student population.

Student mobility is a widespread challenge facing schools in the U.S. with the majority of students experiencing at least one non-promotional move before high school (Rumberger, 2015). Given declining birth rates, the "hollowing out" of urban cores—particularly in regions that have experienced high rates of job loss (e.g., due to suburbanization and automation), and an increase in students not attending traditional public schools, student mobility will likely continue to be a pressing issue. Indeed, these factors have coalesced in St. Louis to create what some have described as "hypermobility" (Metzger et al., 2018) with publicly available data showing average mobility rates as high as 38% across the city. Student mobility can also be described as a "neutral" problem, meaning that because students—especially those who are low-income—move for all sorts of reasons, schools can be seen as not contributing to the core problem. This

perspective, however, can be problematic: the less institutions see themselves contributing to a problem, the less they may be willing to help solve it.

One of the first challenges of the project was getting data to help understand student mobility. Student mobility—by definition—is a multi-school and multi-district phenomenon. Not only are there multiple charter schools in St. Louis, but also, high rates of mobility between the St. Louis City and St. Louis county. While it is possible to gather data from multiple districts, data cleaning and merging issues would likely lead to inefficiencies that could delay the project. Thus, we decided to work with individual data from Missouri's Department of Elementary and Secondary Education (DESE). In 2022 the SRPC research team requested a large data set from DESE including student-level enrollment, core demographic data, performance data, and discipline data from any student that attended a school within St. Louis City and the surrounding five countries (St. Louis County, St. Charles County, Franklin County, and Jefferson County) from the 2007-2008 school year through the 2021-2022 school year. Student-level data was then merged with publicly available school-level enrollment, assessment, and discipline data from DESE. Finally, these data were merged with neighborhood-level data (by school zip code) from the American Community Survey (ACS) 5-year estimates (2009-2021). ACS survey data includes a wide variety of measures across economic, housing, and other social characteristics.

In consultation with our school partners we decided that it would be best to explore some of the fundamental questions of student mobility: where students move, when they move, why they move, and what are some of the outcomes associated with moving. While it is true that there is already research that addresses some of these questions (Welsh, 2017), there was a sense among school partners that these phenomena were operating uniquely in St. Louis. Moreover, these research questions involve aspects of a student's school experience, which is essential in

understanding how schools not only may be contributing to the problem of student mobility, but also be key partners in the solution. Considering some of the unique dynamics in St. Louis, we focused our analyses on the phenomena that school partners noted as the biggest hurdle to effective teaching and learning: within-year mobility. Given our large and diverse geographic footprint, we also examined differences across St. Louis City and the surrounding counties, which allowed us to contrast this phenomena between an urban area and more suburban and rural areas.

As each of these questions can speak to different aspects of student mobility, and subsequently, different audiences, we decided to break these up into a series of papers. In the current paper, the introduction to the series, we use correctional regression methods to examine what student, school, and neighborhood characteristics are associated with transferring during the school year in general, as well as specific types of transfers (within-district, between-district, private/home transfers, and transfers out of the state/country). In paper two, we used panel regression and survival methods to examine how student achievement predicts mobility over time for 3rd-8th graders (Wallace et al., 2025a). Relatedly, in paper three, we focused on high school students to examine how discipline predicts mobility overtime in high school (Wallace et al., 2025b). Lastly, in paper four, we used random-effect panel regression methods to examine the influence of student mobility on achievement over time and the ways in which the destination school context can moderate these influences (Cohen et al., 2025).

We followed an iterative and collaborative research approach in which researchers developed extensive data quality checks, presented findings periodically to school partners and other stakeholder, had internal peer reviews, and made frequent revisions. We hope that these papers not only help St. Louis families, schools, and neighborhoods pinpoint problems

associated with student mobility and develop creative solutions, but also that other researchers and schools will be able to apply learnings from our project to their own school contexts.

Gaps in the Literature and Study Objectives

Student mobility is an important concern for policy-makers and practitioners, given its demonstrated influence on student academic outcomes (Cordes, et al., 2019; Goldhaber, et al., 2022; Metzger, et al., 2018; Schwartz et al., 2017; Voight, et al., 2020). For this reason, it is important to gain an accurate understanding of this phenomenon—in terms of its manifestation, prevalence, and risk factors—as they can guide intervention strategies. However, there are substantial gaps in our understanding of student mobility.

First, prior research tends to group between- and within-school-year transfers into one category: unstructured moves (de la Torre & Gwynn, 2009). As within-school-year transfers may reflect circumstances that require a sudden, unexpected move—as opposed to between-school-year transfers that may reflect a planned process—it is possible that these populations differ across both observed and unobserved characteristics, which limits our ability to understand the populations most prone to within-school year disruptions. Second, prior research often does not distinguish among the types of transfers (e.g., within-district, between-district, etc.) (Goldhaber, et al., 2022), which limits the ability of school leaders and policy-makers to understand the reasons that students transfer. For example, students that transfer within districts may cause districts to consider more uniform curriculum and instructional strategies, as opposed to students that transfer between districts. Third, prior research tends to focus on student risk factors without considering school and neighborhood factors (Metzger, et al., 2018), which limits our understanding of important social and environmental factors related to mobility. Finally, prior research tends to view student mobility as an urban phenomenon (Metzger, et al., 2018), which

limits our ability to understand these dynamics in suburban and rural contexts, which can also experience high rates of student mobility.

As the first study in this paper series, we explored within-year-transfers in the city of Saint Louis and the nearby counties of St. Louis County, St. Charles County, Franklin County, and Jefferson County from 2008 to 2022, which provides an opportunity to explore mobility in urban, suburban, and rural contexts. In particular, we consider the prevalence of within-year transfers across unique manifestations of the phenomena, including within-district transfers, between-district transfers, private/home-school transfers, and transfers out of the state/country. Finally, to understand students' social and environmental contexts, we apply an ecological systems framework to our analysis (Bronfenbrenner, 1979), considering both school and neighborhood characteristics associated with mobility. In doing so, we ask the following research questions:

1. **Who moves**: What student, school, and neighborhood characteristics are associated with transferring during the school year?
    a. Do these relationships differ across urban and suburban/rural contexts?
2. **Where do students move**: What student, school, and neighborhood characteristics are associated with the types of transfers during the school year?
    a. Do these relationships differ across urban and suburban/rural contexts?

Background

This section outlines background literature related to our study. It should be noted that some of the research summarized in this paper is also presented in other papers in our series on student mobility in St. Louis (Cohen et al., 2025; Jabbari et al., 2025; Wallace et al., 2025a; 2025b). Research on student mobility tends to focus on either school mobility (i.e., transfers) or

residential mobility, although these focus areas are not mutually exclusive—instances of residential mobility studies can include instances of school mobility. Starting with student mobility, research has found that students who change schools are more likely to be at-risk for low academic performance and less likely to graduate high school (Goldhaber, et al., 2022; Schwartz et al., 2017). Specifically, students with more instances of *unstructured mobility*, or mobility outside of structural changes such as grade advancements (e.g., going from a middle school to a high school), are associated with lower performance on third and tenth grade assessments as well as lower high school graduation rates (Goldhaber, et al., 2022; Schwartz et al., 2017). These correlations provide descriptive evidence for the negative influence of mobility on student academic outcomes. Further supporting these negative influences, Reynolds and colleagues (2009) found that three or more unstructured moves between kindergarten and high school were associated with significant declines in reading and math performances, as well as increased rates of dropping out, when compared to similar students who did not experience an unstructured move. Mobility has also been associated with increased rates of punishment. For example, Engec (2006) used data from almost 800,000 K-12 public school students in Louisiana during the 1998-1999 school year, finding that student mobility, especially within-school-year mobility, significantly correlated with suspension occurrences.

Hanushek and colleagues (2004) lend nuance to the discussion on school mobility and its impact on academic achievement. Examining 4^{th} – 7^{th} grade math performance across 3,000 Texas public schools between 1994 and 1997, the authors found that some moves resulted in increased school quality. Specifically, moves to a new district within the same region often resulted in increased school quality. However, the authors found that moving to a new school in the same district did not increase school quality. Moreover, the authors found that students who

did not move were also harmed by the disruption of school mobility *and* that these harms were disproportionately experienced by low-income and minoritized students who often attend schools with higher rates of mobility.

More recently, Min (2022) examined the impact of within- and between-year school mobility using data from 34,299 students in the 2011-2012 and 2012-2013 school years across 202 elementary and middle schools in a large urban school district. Min found that within-school-year mobility was associated with decreased academic achievement when compared to between-school-year mobility. Min also found that while the effects of within-year mobility varied across racial groups, between-year mobility did not. Notably, Asian students, despite higher levels of reading and math achievement, were more negatively impacted by within-year school mobility compared to other groups. At the same time, Black students experienced the highest mobility rates across both types.

Moving on to studies that consider both school and residential mobility, Voight and colleagues (2020) used hierarchical linear modeling in an urban school district in the southeastern United States, finding that academic performance decreased for students who changed residences and schools during the school year when compared to students who maintained their same residence and attended the same school. Adding further nuance to this phenomenon, Cordes, Schwartz and Stiefel (2019) used fixed effects and an instrumental variable design with students in New York City and found that short-distance moves (<1 mile) were associated with improved academic performance, while long-distance moves (≥1 mile) were associated with decreased academic performance. Importantly, only 39% of students who experienced a short-distance move switched schools, compared to 61% of students who experienced a long-distance move. As such, most students who experienced a short-distance

move did not experience academic disruption, while most students who experienced a long-distance move did. Additionally, students who moved a short distance were more likely to be White, Asian, or Hispanic, while students who moved a long distance were more likely to be immigrants, have limited English proficiency, and speak a language other than English at home.

Additional research has examined some of the risk factors associated with mobility. Rumberger (2003) examined data from 133,489 students from the National Assessment of Education Progress, finding substantial variation in student mobility across race and ethnicity, with Black and Hispanic American fourth-graders having higher rates of school mobility relative to their White and Asian American counterparts. Rumberger also found that 4th-grade students from low socioeconomic status (SES) backgrounds were more likely to change schools when compared to students from middle- and high-SES backgrounds. Rumberger reported higher rates of mobility in urban, predominantly minority, school districts, while also highlighting the importance of family structure, noting that students from single-parent families are more likely to move schools. Similar to the research that has examined the relationship between student mobility and academic outcomes, Rumberger highlighted the deleterious effects of student mobility on academic performance, demonstrating decreased reading proficiency with each additional school move.

Maroulis and his colleagues (2019) provide additional insights into the motivation behind school mobility in their study of school mobility in New Orleans. The authors investigated what they describe as ‘push’ and ‘pull’ factors, or those which cause students to leave a school or those which draw a student in, respectively (p. 345). Their findings revealed that school achievement serves as both a ‘push’ and a ‘pull’ factor, with low-achieving schools pushing students out and high-achieving schools drawing students in; notably, their findings reveal that

the desire to leave a low-performing school is higher than the desire to move to a high-achieving school. Relatedly, the authors found that low-achieving students are more likely to be pushed out of their low-achieving schools, often without the benefit of moving to a high-achieving school.

Finally, Welsh (2017) conducted a literature review examining 73 studies published between 1994 and 2014, finding that switching schools, overall, has a negative influence on academic achievement. However, like much of the research discussed so far, Welsh notes that transferring to a higher-quality school can have a positive influence on academic achievement. Welsh also notes that the inability of previous research to separate the impact of mobility from the inciting reason for that mobility makes it likely that the two are conflated in much of the literature. Heeding Welsh's call for a more nuanced understanding of student mobility to inform educational policy, we consider risk factors across multiple contexts and types of mobility.

Conceptual Framework

Capturing Classroom Disruptions

This study emerged from a research-practice-partnership, which began by school leaders and teachers identifying a key problem area: disruptions to the teaching and learning environment spurred by the constant shuffling of students in and out of school, often occurring between schools in the same neighborhood and district. Within-school-year mobility can be a particularly difficult event for teachers attempting to maintain continuity in their curricula and classroom culture, as well as for students who must adjust to changing curricula and learning environments (de la Torre & Gwynn, 2009). We therefore operationalize mobility as an instance of transferring between schools *during* the school year, rather than *over* the summer. Moreover, as we focus on disruptions to the learning environment, we do not focus on students who

experience residential mobility[1]. Furthermore, to best capture the transfer from one school to another, we do not include students who left school permanently for other reasons, including students who drop out of school, stop out of school, or pass away. However, we do consider a range of mobility types that can better inform policy-makers and practitioners, including within-district transfers, between-district transfers, private/home-school transfers, and transfers out of the state/country.

Risk Factors across Contexts

Given that mobility can be influenced by family, school, and neighborhood factors, we employ an ecological framework for identifying risk factors. Based on ecological systems theory (Bronfenbrenner, 1979), ecological frameworks in educational research recognize that students are nested within unique family, school, and neighborhood contexts, and that these contexts can interact to produce particular social phenomena, such as student mobility. In particular, we consider student and family characteristics, like race/ethnicity, gender, grade, and special education status, as well as socioeconomic status and housing status. We also consider the educational environment in which each student is situated, which includes school size, as well as academic achievement and punishment. Finally, we consider neighborhood characteristics, including educational attainment levels and homeownership rates.

Data, Methods, and Results

Data and Sample

Student- and school-level data for our empirical analysis comes from the Missouri Department of Elementary and Secondary Education (DESE). The student-level enrollment and core demographic data were collected from the 2007-2008 school year through the 2021-2022

[1] While it is possible that students who move schools also move homes, we are unable to capture residential mobility in our study.

school year for this and our other papers examining student mobility in the region. The student-level sample in the datasets includes complete records for *any* student from kindergarten through 12th grade who attended a public school (including a public charter school) in one of the five St. Louis area counties throughout the study period: St. Louis City, St. Louis County, and three surrounding counties: St. Charles County, Franklin County, and Jefferson County. Student-level data was then merged with publicly available school-level assessment and discipline data from the DESE. To capture school-level measures that were not prone to COVID-19 disruptions, we leveraged school-level data from the 2018-2019 school year. The school assessment file included average scores in state-level ELA and math assessments, while the school discipline file included average incidents in student discipline. Finally, these data were merged with neighborhood-level data (by school zip code) from the American Community Survey (ACS) 5-year estimates (2009-2021). ACS survey data includes a wide variety of measures across economic, housing, and other social characteristics.

Based on our focus on unstructured moves to other schools occurring within the school year, a small proportion of observations were removed through listwise deletion. Specifically, we removed pre-kindergarten records, summer school records, records in which entry dates are the same as the exit dates ("no shows"), records in which the exit code is stop-out, drop-out, or deceased,[2] and records that we were not able to match with school-level (e.g., for students that attended a school that was closed in 2018-2019) or neighborhood-level datasets (e.g., for students that attended a virtual school). A visual depiction of our missing data can be found in

[2] Stop-out codes are designated for students that formally drop out. We also observed records in which students exit and enter the same school without transferring to another school in between (i.e. same-school transfers). Same-school transfers appear to represent informal mechanisms that some schools use for a variety of cases, which can include parents informing schools that they intend to transfer, but not actually leaving, as well as students temporarily not showing up for an extended and undefined period of time. As a transfer, by definition, means going to another school, we choose to include same-school transfers in the total analyses, but we do not designate these records as transfers.

Appendix A. The final analytical sample includes 4,522,936 student-level records (471,749 for St. Louis City County and 3,808,597 for four counties) across 15 school years.[3] While our five-county analysis allows us to understand student mobility across an entire metropolitan region, we also include a subsample analysis of one county—St. Louis City—to explore mobility dynamics within a central city.

Measures

Dependent Variables

For the first analysis, we constructed a dichotomous outcome variable by dividing students' exit status into two categories (0 = remain or graduate in the school; and 1 = transfer to another school). In the second analysis, we constructed a multinomial outcome variable by dividing students' exit status into five categories (0 = remain in the school; 1 = transfer to another school within the same district; 2 = transfer to another school outside of the same districts; 3 = transfer to a private school or a home-schooling option; and 4 = transfer to a school in another state or country).[4]

Independent Variables

[3] Here, it is important to note that students can have multiple records in a given year, as records are based on student-school-year dimensions. For example, if a student attends two schools in a given year, the student will have two separate records—one transfer and one non-transfer record. In practice, a record-level analysis tends to slightly underestimate the number of students who transfer when students transfer one time, but slightly overestimate the number of students who transfer when students transfer three or more times. For example, if there are two students and Student A transfers once and Student B transfers zero times, then there will be a total of three student records: Student A will have two records—one transfer and one non-transfer record—and Student B will have one non-transfer record. 50% of the students will transfer, but only 33% of the records will be transfer records. Alternatively, if Student A transfers three times and Student B transfers zero times, then there will be a total of five student records: Student A will have four records—three transfer records and one non-transfer record—and Student B will have one non-transfer record. 50% of the students will transfer, but 60% of the records will be transfer records. As a result of these variations, we include a robustness check on our transfer operationalization, found in Appendix B.

[4] As exit codes are input by district officials, it is possible that our results are prone to some measurement error; while data quality checks can be used to determine if where students transfer to matches the exit code destination, these checks can only occur for students transferring to public schools in the same state. Future research is needed to better understand measurement error in moves to private schools, as well as moves out of the state.

Our main analyses involve examining the associations between student-, school-, and neighborhood-level demographic characteristics and unstructured transfers occurring during the school year and examining the types of unstructured transfers occurring during the school year. Student-level characteristics include: school year, grade level (ranging from kindergarten through 12th grade)[5], race/ethnicity (White, Black, Hispanic, Asian, and others), gender (female and male), lunch status (free, reduced-price, and regular-price), disability status (student with and without an Individualized Education Plan; IEP), English Language Learner status (ELL and non-ELL), housing status (not homeless, sheltered, unsheltered, doubled-up, and staying in a hotel/motel), and residency status (resident in the attending school district and not a resident in the attending school district). Additionally, school-level characteristics include the numbers of enrolled students, percentages of free/reduced lunch students, percentages of race/ethnicity groups (White, Black, and Hispanic), in-school suspension rates, and proficiency rates in state-level math and English Language Arts (ELA) assessments. Finally, neighborhood-level characteristics include median household income, percentages of individuals from various racial/ethnic groups (White, Black, and Hispanic), percentages of educational attainment levels (less than some college vs. some college or higher), and percentages of homeownership within each zip code for year 2021.

Analytic Approach

Regression Modeling

For our main results, we utilized both logistic regression (for dichotomous outcomes) and multinomial logistic regression (for multinomial outcomes). Because our data are longitudinal with students being observed across multiple years, we clustered standard errors at the individual

[5] As we focus on within-school-year moves, natural (or "structural") moves are not designated in the data.

level, which can limit the influence of interclass correlations (i.e., unobservable effects within individuals)[6]. For our examination of whether or not students transfer, we apply the following logistic regression models:

$$Ln\left(\frac{P}{1}-P\right)=\beta_0+\beta_1 student-level\ covariates_i+\varepsilon_i \quad (1)$$

$$Ln\left(\frac{P}{1}-P\right)=\beta_0+\beta_2 school-level\ covariates_i+\varepsilon_i \quad (2)$$

$$Ln\left(\frac{P}{1}-P\right)=\beta_0+\beta_3 neighborhood-level\ covariates_i+\varepsilon_i \quad (3)$$

$$Ln\left(\frac{P}{1}-P\right)=\beta_0+\beta_1 student-level\ covariates_i+\beta_2 school-level\ covariates_i+\varepsilon_i \quad (4)$$

$$Ln\left(\frac{P}{1}-P\right)=\beta_0+\beta_1 student-level\ covariates_i+\beta_3 neighborhood-level\ covariates_i+\varepsilon_i \quad (5)$$

$$Ln\left(\frac{P}{1}-P\right)=\beta_0+\beta_1 student-level\ covariates_i+\beta_2 school-level\ covariates_i+\beta_3 neighborhood-level\ covariates_i+\varepsilon_i \quad (6)$$

where β_0 captures the intercept, β_1 captures the effect of student-level variables on the likelihood that a student transferred to a different school within the school year, β_2 captures the effect of school-level variables, β_3 captures the effect of neighborhood-level variables, and ε_i is an error term clustered at the student level. To understand potential mediating or confounding effects, we modeled student, school, and neighborhood variables individually and simultaneously. Equation (1) includes only student-level variables; equation (2) includes only school-level variables; equation (3) includes only neighborhood-level variables; equation (4) student- and school-level variables; equation (5) includes student- and neighborhood-level variables; and equation (6)

[6] While clustering standard errors helps arrive at more precise standard errors, it does not fully account for repeated outcomes, which would entail alternative model specifications (e.g., fixed effects models, etc.)

includes student-, school-, and neighborhood-level variables. To aid interpretation, our results are reported in odds ratios.

For our examination of the types of student transfers, we apply the following multinomial logistic regression models:

$$Ln\left(\frac{P\,(Y_1=T)}{P\,(Y_1=R)}\right) = \beta_0 + \beta_1 student - level\ covariates_i + \varepsilon_i \quad (7)$$

$$Ln\left(\frac{P\,(Y_1=T)}{P\,(Y_1=R)}\right) = \beta_0 + \beta_1 student - level\ covariates_i + \beta_2 school - level\ covariates_i + \varepsilon_i \quad (8)$$

$$Ln\left(\frac{P\,(Y_1=T)}{P\,(Y_1=R)}\right) = \beta_0 + \beta_1 student - level\ covariates_i + \beta_2 school - level\ covariates_i + \beta_3 neighborhood - level\ covariates_i + \varepsilon_i \quad (9)$$

where *P*() represents the logistic probability function for each transfer type, *R* is the reference category, remaining at one's school, and *T* is each of the four student transfer types. Equation (7) includes only student-level variables, equation (8) includes student- and school-level variables, and equation (9) includes student-, school-, and neighborhood-level variables. Because we compare the likelihood of each type of student transfer to remaining at one's school, we use the relative risk ratio for the interpretation of the coefficients[7].

Results

In this section, we provide results for our main analysis of all St. Louis area counties. Sub-sample analyses can be found in Appendix 3.

Sample Description

[7] The RRR is equivalent, but not identical, to the odds ratio in a nonlinear regression model with binary outcomes (e.g., logistic or probit regression). Distinctively, RRRs compare the risk (or chance) of an event in one group versus the risk in the reference group, whereas odds ratios compare the odds of an event occurring in one group compared with another.

Table 1 presents descriptive statistics for the entire sample. On average, over 91% of the records belonged to students that remained in their respective schools, and roughly 9% of the records belonged to students who transferred to another school. For gender, 51% of records belonged to males and 49% belonged to females. For race/ethnicity, about 62% belonged to white students, 28% belonged to Black students, and about 4% belonged to Hispanic students. Roughly 56% of records belonged to students who did not qualify for free or reduced-price lunch, 40% of records belonged to students who qualified for free lunch, and 4% of records belonged to students who qualified for reduced-price lunch. About 16% of the records belonged to students who qualified for special education services, and 14% of the records belonged to students who were designated as English language learners (ELL). About 97% of the records belonged to students who were not homeless about 3% belonged to students who were doubled-up, and the remaining (less than 1%) belonged to students who were sheltered, unsheltered, or living in a hotel/motel. About 98% of the records belonged to students who resided in their school's catchment area. Additionally, in terms of school-level characteristics, we included many of the same variables included at the student-level, such as lunch status, race/ethnicity, special education status, and ELL status. We also included the number of enrolled students, in-school suspension, and proficiency rates in the state assessments for ELA and math. The average number of students was 782, the suspension rate was about 10.2%, and the proficiency rate in ELA (mean = 52.5; SD=20.0) was slightly higher than the proficiency rate in math (mean = 44.8; SD=20.9). Lastly, at the neighborhood-level, the median household income in 2021 was $76,967; the percent of those who have some college or higher degree was 68% (SD=13%), and the percent of homeownership was 71% (SD=16%).

Table 2 presents descriptive statistics for each transfer type for the five St. Louis-area counties. In 2022, 93.51% of the records belonged to students who did not transfer; 6.49% of the records belonged to students who transferred. Specifically, 0.76% of records belonged to students who transferred within the same district, 3.48% of the records belonged to students who transferred to another district, 1.01% of records belonged to students who transferred to a home or private school, and 1.23% of students transferred to another state or country.

Who Transfers?

Table 3 examines the association between student transfers and student-level (Model 1), school-level (Model 2), and neighborhood-level characteristics (Model 3), as well as student- and school-level characteristics (Model 4), student- and neighborhood-level characteristics (Model 5), and student-, school-, and neighborhood level characteristics (Model 6). Across all outcomes, almost all of the student-level variables, including school year, grade level, race/ethnicity, housing status, residency status, ELL status, and special education status, were significantly associated with student transfers. Starting with time-related variables in Model 6, when compared to records from 2008, records from all other study years were significantly associated with a moderate decrease in the odds of being a transfer record. Additionally, when compared to kindergarten students, records from 1st through 8th graders were significantly associated with a slight decrease in the odds of being a transfer record while records from 9th – 12th graders were significantly associated with a slight increase in the odds of being a transfer record. For all other variables, we use a coefficient plot to visualize the odds of being associated with a transfer record. Beginning with student-level variables (Figure 1), records from male students (OR=1.05***)—when compared to female students, records from Black (OR=1.46***), Hispanic (OR=1.29***), Asian students (OR=1.65***), and others racial/ethnic students

(OR=1.39***)—when compared to white students, records from students who qualify for free lunch (OR=1.80***)—when compared to non-reduced lunch, records from sheltered (OR=2.84***), unsheltered (OR=2.45***), and doubled-up students (OR=1.64***), as well as students in hotels/motels (OR=2.76***)—when compared to not homeless students, and records from special education students (OR=1.14***), were significantly associated with increased odds of being a transfer record. Conversely, records from reduced-price lunch students (OR=0.95***), ELL students (OR=0.90***), and students not residing in their current school (OR=0.77***) were significantly associated with decreased odds of being a transfer record.

Moving on to school-level variables, one-unit increases in the number of enrolled students (OR=0.98***), the percent of Black students (OR=0.99***), the percent of ELL and special education students (OR=0.99***), in-school suspension rates (OR=0.99***), and ELA and Math (OR=0.99***) proficiency rates (OR=0.99***) were all significantly associated with decreased odds of transferring to another school, while one-unit increases in the percentage of free/reduced-price lunch students (OR=1.003***) and Hispanic students (OR=1.004***) were significantly associated with increased odds of transferring to another school. Considering neighborhood-level variables, a one-unit increase in the percent of Black residents (OR=1.05*) was significantly associated with increased odds of transferring to another school, while a one-unit increase in median income (OR=0.99***) and the percent of Hispanic residents (OR=0.54***) was significantly associated with decreased odds of transferring to another school.

Where do Students Transfer?

Table 4 presents the associations between transfer types and student-, school-, and neighborhood-level variables for all five counties. Similarly, we use a coefficient plot to

visualize the relative risk ratios of predictors in our multinomial regression model (Figure 2). We start by describing the chances of transferring *within one's district*. Beginning with student-level characteristics, records of male students (RRR=1.11***), Asian students (RRR=1.23***), Black students (RRR=2.08***), Hispanic students (RRR=1.35***), students of other races and ethnicities (RRR=1.40***), free lunch students (RRR=2.10***) reduced-price lunch students (RRR=1.23***), sheltered students (RRR=2.92***), unsheltered students (RRR=2.52***), doubled-up students (RRR=2.84***), students living in hotels/motels (RRR=2.67***), and special education students (RRR=1.48***) were significantly associated with increased chances of transferring within one's district relative to remaining in one's school. Conversely, records of ELL students (RRR=0.85***) and non-resident students (RRR=0.81***) were significantly associated with decreased chances of transferring within one's school relative to remaining in one's school. Moving on to school-level characteristics, increased percentages of ELL/special education students (RRR=1.01***) and increased math proficiency rates (RRR=1.01***), were significantly associated with increased chances of transferring within one's school, while the number of enrolled students (RRR=0.92***), the percent of free/reduced-price lunch students (RRR=0.99*), the percent of Black students (RRR=0.99***), the percent of Hispanic students (RRR=0.98*), the in-school suspension rates (RRR=0.88***), and the ELA proficiency rate (RRR=0.96***) were significantly associated with decreased chances of transferring within one's district. Considering neighborhood-level characteristics, the percents of Black residents (RRR=1.66***), Hispanic residents (RRR=142.8***), and those who had some college or higher degrees (RRR=1.31***) were significantly associated with increased chances of transferring to another school in the same district, while the percent of homeownership (RRR=0.49***) was significantly associated with decreased chances of transferring within one's district.

Next, we consider chances of transferring *to other districts in Missouri*. Beginning with student-level characteristics, records of male students (RRR=1.05**), Black students (RRR=1.42***), Hispanic (RRR=1.06***), students of other races and ethnicities (RRR=1.38***), free lunch students (RRR=2.08***), sheltered students (RRR=2.69***), unsheltered students (RRR=2.30***), doubled-up students (RRR=1.56***), students living in hotels/motels (RRR=2.77***), and special education students (RRR=1.10***) were significantly associated with increased chances of transferring to another district. Further, records of ELL students (RRR=0.81***), and non-resident students (RRR=0.91***) were significantly associated with increased chances of transferring to another district. Moving on to school-level characteristics, increases in the percent of free/reduced lunch students (1.01***), the percent of Hispanic students (RRR=1.02***), and suspension rates (RRR=1.04***) were significantly associated with increased chances of transferring to another district, while increases in the number of enrolled students (RRR=0.97***), the percent of Black students (RRR=0.98***), the percent of ELL/special education students (RRR=0.98***), proficiency rates in ELA (RRR=0.99***) and math (RRR=0.99***) were significantly associated with decreased chances of transferring to another district. Considering neighborhood-level characteristics, increases in the percent of those who had some college or higher degrees (RRR=1.12*), and the percent of homeownership (RRR=1.39***) were significantly associated with increased chances of transferring to another district, while increases in median household income (RRR=0.99***), the percent of Black residents (RRR=0.89***), and the percent of Hispanic residents (RRR=0.89***) were significantly associated with decreased chances of transferring to another district.

Additionally, we consider chances of *transferring to a home or private school in Missouri.* Beginning with student-level characteristics, records of male students (RRR=1.06**), free lunch students (RRR=1.23***), sheltered students (RRR=2.67***), unsheltered students (RRR=1.77*), doubled-up students (RRR=1.11**), students living in hotels/motels (RRR=1.82***), and special education students (RRR=1.49***) were significantly associated with increased chances of transferring to a home or private school. Conversely, records of Asian students (RRR=0.76***), Black students (RRR=0.93***), Hispanic students (RRR=0.90**), reduced-price lunch students (RRR=0.78***), ELL (RRR=0.92***), and non-resident student (RRR=0.64***) were significantly associated with decreased chances of transferring to a home or private school. Moving on to school-level characteristics, increases in the percent of Hispanic students (RRR=1.02***) and proficiency rates in ELA (RRR=1.002***) were significantly associated with increased chances of transferring to a home or private school, while the number of enrolled students (RRR=0.95***), the percent of Black students (RRR=0.99***), and the rate of in-school suspensions (RRR=0.89***) were significantly associated with decreased chances of transferring to a home or private school. Considering neighborhood-level characteristics, an increase in the percent of those who had some college and higher degrees (RRR=1.25*) was significantly associated with increased chances of transferring to a home or private school, while median household income (RRR=0.99***) and the percent of Hispanic residents (RRR=0.01***) were significantly associated with decreased chances of transferring to a home or private school.

Finally, we consider chances of *transferring to a school in another state or country.* Beginning with student-level characteristics, records of Asian students (RRR=3.48***), Black students (RRR=1.59***), Hispanic students (RRR=2.34***), students from other races and

ethnicities (RRR=1.75***), free lunch students (RRR=1.34***), sheltered students (RRR=3.11***), unsheltered students (RRR=3.48***), doubled-up students (RRR=1.95***), students living in hotels/motels (RRR=3.49***), and ELL students (RRR=1.26***) were significantly associated with increased chances of transferring to a school in another state or country. Conversely, records of reduced-price lunch students (RRR=0.95*), non-resident students (RRR=0.47***), and special education students (RRR=0.83***) were significantly associated with decreased chances of transferring to a school in another state/country. Moving on to school-level characteristics, increases in the percent of Black students (RRR=1.01***), the percent of ELL/special education students (RRR=1.02***), proficiency rates in ELA (RRR=1.002*) and math (RRR=1.01***) were significantly associated with increased chances of transferring to a school in another state/country, while the number of enrolled students (RRR=0.99***), the percent of free/reduced-price lunch students (RRR=0.99***), and the rate of in-school suspensions (RRR=0.99**) were significantly associated with decreased chances of transferring to a school in another state/country. Considering neighborhood-level characteristics, increases in the percent of Hispanic residents (RRR=3.83***), the percent of those who had some college or higher degrees (RRR=1.58***), and the percent of homeownership (RRR=1.35***) were significantly associated with increased chances of transferring to a school in another state or country, while median household income (RRR=0.99***) was significantly associated with decreased chances of transferring to a school in another state or country.

Discussion

Given the deleterious effects of student mobility on academic outcomes, recent research has begun to examine risk factors associated with mobility. These risk factors can then be used to inform a variety of prevention and recovery strategies. However, research tends to focus on

student-level risk factors, which can limit our ability to understand school and neighborhood risk factors. Moreover, research tends to consider mobility as a unified construct, which can limit our ability to understand the nuances of mobility (e.g., understanding where students are transferring to). Together, these gaps limit our ability to comprehensively understand the risk factors associated with mobility, ultimately limiting our ability to inform prevention and recovery strategies. Furthermore, without fully understanding these risk factors, inferential work may continue to conflate the consequences of mobility with its causes.

In the first study of its kind, we combined over 4 million individual student transfer records over fifteen years with comprehensive school and neighborhood characteristics across five large counties. We focused on within-school-year transfers, which allowed us to better identify disruptions to the teaching and learning environment. Leveraging an ecological framework, we contributed to the literature by including risk factors across student, school, and neighborhood contexts. Additionally, we explored heterogeneity within the types of transfers, which allowed us to better understand where students are transferring to. Finally, we examined student mobility in a large geographic region, exploring the variation across urban and suburban locations.

Our findings provide a nuanced understanding of risk factors, while also highlighting novel and yet—at times—unsurprising inequalities. For example, we were unsurprised to find higher likelihoods of transferring for students with unstable housing, as well as for students who qualified for free and reduced-price lunch. However, a closer look reveals novel inequalities: Black students were more likely to transfer within districts but less likely to transfer to a private school. Furthermore, we observed that students who qualified for special education services were also more likely to transfer.

At the school level, while we were unsurprised to find that increased educational performance was associated with decreased odds of transferring, we were somewhat surprised to see that higher suspension rates were also associated with decreased odds of transferring overall. Nevertheless, a closer look reveals that higher suspension rates were also associated with increased odds of transferring to another district, which may imply instances of students being "pushed out" of the district. Furthermore, at the neighborhood level, we were surprised to observe higher likelihoods of transfer records for students attending schools in St. Louis City zip codes with higher rates of homeownership and educational attainment. This finding may suggest that within-school-year transfers are not only a product of family hardships (e.g., housing instability) but potentially dissatisfaction with local schools. Indeed, when looking at where students transfer, we saw that higher rates of homeownership were associated with increased odds of transferring to a private school.

There are several implications for research, policy, and practice. First, concerning research, we noticed stark contrasts when comparing our frequencies to previous research. Our records indicate far fewer instances of transfers than what schools, states, and similar research have demonstrated. For example, in a recent study, Goldhaber et al. (2022) found that 39% of students experienced a non-structural move in Missouri from grades 3 to 12. Thus, we were surprised to see that, overall, only 6.5% of our records in 2022 indicated students who transferred. While the comparison to Goldhaber et al.'s (2022) findings is limited in that we focus only on within-school-year transfers and Goldhaber and his colleagues include both within-school-year and between-school-year transfers, the size of the discrepancy suggests the need for a more nuanced definition of mobility—one that parses out both within- and between-school-year transfers. While within- and between-school-year transfers share some conceptual

similarities, these transfers can have distinct implications for classroom interactions and subsequent prevention and recovery strategies.

Our research also demonstrates the need for more standardized methods for calculating mobility. As we analyzed the numbers, we noticed that states used different calculations for student mobility when providing school estimates, often including students who transfer in, as well as out, summer school transfers, and students who enrolled in multiple schools (Medler et al., 2024). In addition to differences in calculations, reporting also appears to be inconsistent, with some schools and districts appearing to include students who are chronically absent as experiencing mobility. The lack of clarity and consistency across student mobility research makes it difficult to craft appropriate policies and interventions.

Concerning policy and practice, our findings highlight ways in which schools and districts can work intentionally to not only mitigate instances of transfers but also to support students who do transfer. By identifying risk factors across contexts, policies and practices can be developed for and deployed to student groups, schools, and neighborhoods most at risk for experiencing transfers. For example, the extremely high rates of transfers among students who are in shelters can be used to design interventions, while higher rates of transfers in high school can be used to deploy interventions in particular schools. Moreover, given the substantial number of between- and within-district transfers in St. Louis City—4.5% of records were between-district transfers and 2.2% of records were within-district transfers in 2022—policy-makers and practitioners should consider collaborative interventions. For instance, schools may consider developing mechanisms to share relevant academic information for students that transfer and adopting common curricular and instructional elements. In addition to schools, local

governments should also consider interventions to smooth the process of transfer students, such as public transportation solutions for all students.

Finally, this study is not without limitations. First, concerning internal validity, we cannot infer causality from the relationships we present. Rather, we presented descriptive evidence demonstrating associational relationships across student, school, and neighborhood factors to present a series of risk factors. Future research should consider alternative models to examine associated risks for transfers, such as multi-level models and survival analyses. Moreover, the way transfer codes were utilized in our data may differ from school-to-school, introducing measurement errors into the findings. While our robustness check largely confirms our overall transfer occurrences, qualitative research with school practitioners and leaders may shed further light on how transfer codes are entered and how this impacts interpretation. Last, concerning external validity, while we presented data from over 4.5 million students over 15 years, these dynamics may not be representative of students in other parts of the state or country. Future research should consider exploring these dynamics across multiple states.

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Table 1

Results of descriptive statistics with binary outcomes (remained and transferred)

	Five counties						St. Louis City						Four counties					
	Remained		Transfer		Total (4,522,936)		Remained		Transfer		Total (471,749)		Remained		Transfer		Total (3,808,597)	
	%/Mean	SD	%/Mean	SD	N/Mean	%/SD	%/Mean	SD	%/Mean	SD	N/Mean	%/SD	%/Mean	SD	%/Mean	SD	N/Mean	%/SD
Student level variables																		
School year																		
2008	91.3%		8.7%		296567	6.6%	81.4%		18.6%		28946	6.1%	93.3%		6.7%		256111	6.7%
2009	91.7%		8.3%		296269	6.6%	87.6%		12.4%		27160	5.8%	93.0%		7.0%		256152	6.7%
2010	91.9%		8.1%		299838	6.6%	86.7%		13.3%		29406	6.2%	93.4%		6.6%		255860	6.7%
2011	91.5%		8.5%		301847	6.7%	85.6%		14.4%		30409	6.5%	93.2%		6.8%		255429	6.7%
2012	91.3%		8.7%		303020	6.7%	86.1%		13.9%		30324	6.4%	93.0%		7.0%		255734	6.7%
2013	91.1%		8.9%		307807	6.8%	84.4%		15.6%		33520	7.1%	93.0%		7.0%		256631	6.7%
2014	91.3%		8.7%		307699	6.8%	87.2%		12.8%		32670	6.9%	92.9%		7.1%		256681	6.7%
2015	91.4%		8.6%		307976	6.8%	87.2%		12.8%		33006	7.0%	93.0%		7.0%		256380	6.7%
2016	91.6%		8.4%		307580	6.8%	88.3%		11.7%		32702	6.9%	93.1%		6.9%		256247	6.7%
2017	91.8%		8.2%		305770	6.8%	88.8%		11.2%		32169	6.8%	93.2%		6.8%		255184	6.7%
2018	91.9%		8.1%		304852	6.7%	88.0%		12.0%		32879	7.0%	93.4%		6.6%		254203	6.7%
2019	92.3%		7.7%		302500	6.7%	87.3%		12.7%		33112	7.0%	93.9%		6.1%		252323	6.6%
2020	93.4%		6.6%		299808	6.6%	89.5%		10.5%		32810	7.0%	94.6%		5.4%		251303	6.6%
2021	93.4%		6.6%		291541	6.5%	93.3%		6.7%		31315	6.6%	94.2%		5.8%		245381	6.4%
2022	93.5%		6.5%		289862	6.4%	90.4%		9.6%		31321	6.6%	94.5%		5.5%		244978	6.4%
Grade level																		
Kindergarten	90.3%		9.7%		345840	7.7%	87.4%		12.6%		46602	9.9%	92.0%		8.0%		281285	7.4%
1st grade	90.6%		9.4%		351043	7.8%	87.3%		12.7%		45702	9.7%	92.2%		7.8%		286764	7.5%
2nd grade	91.1%		8.9%		351624	7.8%	87.7%		12.3%		42855	9.1%	92.6%		7.4%		288227	7.6%
3rd grade	91.6%		8.4%		351091	7.8%	88.4%		11.6%		40335	8.6%	93.0%		7.0%		289114	7.6%
4th grade	91.9%		8.1%		349687	7.7%	88.0%		12.0%		38727	8.2%	93.3%		6.7%		289261	7.6%
5th grade	92.2%		7.8%		345925	7.7%	88.4%		11.6%		37022	7.9%	93.6%		6.4%		287463	7.6%
6th grade	92.7%		7.3%		336377	7.4%	88.1%		11.9%		32669	6.9%	94.1%		5.9%		282007	7.4%
7th grade	93.1%		6.9%		343679	7.6%	89.2%		10.8%		30781	6.5%	94.3%		5.7%		293086	7.7%
8th grade	92.5%		7.5%		343153	7.6%	88.3%		11.7%		29594	6.3%	93.9%		6.1%		294135	7.7%

9th grade	91.5%		8.5%		370477	8.2%	82.7%		17.3%		38404	8.1%	93.6%		6.4%		312969	8.2%
10th grade	91.9%		8.1%		355727	7.9%	85.7%		14.3%		32090	6.8%	93.5%		6.5%		306619	8.1%
11th grade	92.8%		7.2%		339660	7.5%	86.9%		13.1%		27928	5.9%	94.1%		5.9%		298582	7.8%
12th grade	93.5%		6.5%		338653	7.5%	90.0%		10.0%		29040	6.2%	94.1%		5.9%		299085	7.9%
Race/Ethnicity																		
Asian	92.5%		7.5%		141215	3.1%	91.1%		8.9%		11073	2.4%	92.7%		7.3%		128425	3.4%
Black	88.2%		11.8%		1280559	28.3%	86.7%		13.3%		357781	75.8%	89.5%		10.5%		888293	23.3%
Hispanic	91.4%		8.6%		167666	3.7%	91.2%		8.8%		23454	5.0%	92.1%		7.9%		137828	3.6%
White	93.7%		6.3%		2807603	62.1%	89.4%		10.6%		73620	15.6%	94.9%		5.1%		2544118	66.8%
Others	91.0%		9.0%		125893	2.8%	90.9%		9.1%		5821	1.2%	92.4%		7.6%		109933	2.9%
Gender																		
Female	92.2%		7.8%		2203022	48.7%	88.3%		11.7%		232804	49.4%	93.6%		6.4%		1854066	48.7%
Male	91.8%		8.2%		2319914	51.3%	86.7%		13.3%		238945	50.7%	93.3%		6.7%		1954531	51.3%
Lunch status																		
Unreduced lunch	95.0%		5.0%		2509915	55.5%	81.4%		18.6%		62390	13.2%	95.6%		4.4%		2379107	62.5%
Free lunch	87.6%		12.4%		1810989	40.0%	88.3%		11.7%		397834	84.3%	89.1%		10.9%		1251390	32.9%
Reduced lunch	94.0%		6.0%		202032	4.5%	93.0%		7.0%		11525	2.4%	94.5%		5.5%		178100	4.7%
IEP																		
No	92.3%		7.7%		3806975	was	87.8%		12.2%		402561	85.3%	93.7%		6.3%		3212382	84.4%
Yes	90.4%		9.6%		715961	15.8%	85.5%		14.5%		69188	14.7%	92.1%		7.9%		596215	15.7%
ELL status																		
Not ELL	91.9%		8.1%		3888030	86.0%	87.0%		13.0%		404232	85.7%	93.4%		6.6%		3271935	85.9%
ELL	92.2%		7.8%		634906	14.0%	90.6%		9.4%		67517	14.3%	93.3%		6.7%		536662	14.1%
Homeless status																		
Not Homeless	92.4%		7.6%		4371335	96.7%	88.2%		11.8%		421096	89.3%	93.7%		6.3%		3720098	97.7%
Shelters	70.5%		29.5%		11136	0.3%	78.0%		22.0%		5476	1.2%	69.4%		30.6%		4112	0.1%
Unsheltered	75.4%		24.6%		1521	0.0%	79.2%		20.8%		395	0.1%	75.9%		24.1%		913	0.0%
Doubled Up	81.5%		18.5%		129861	2.9%	81.8%		18.2%		43125	9.1%	83.1%		16.9%		76996	2.0%
Hotel/Motel	74.5%		25.5%		9083	0.2%	81.8%		18.2%		1657	0.4%	74.6%		25.4%		6478	0.2%
Residency status																		
Resident in the attending school	92.0%		8.0%		4426286	97.9%	87.5%		12.5%		469632	99.6%	93.4%		6.6%		3715421	97.6%
Others	92.2%		7.8%		96650	2.1%	84.9%		15.1%		2117	0.5%	92.5%		7.5%		93176	2.5%
School level variables																		
Avg. number of enrolled students	792.88	516.4	655.15	443.33	781.82	512.29	395.62	205.88	358.50	192.14	390.98	204.58	849.80	522.50	745.68	454.50	842.95	518.94
Avg. percent - African-American	26.91	33.90	36.79	38.41	27.70	34.39	74.99	27.32	79.84	24.89	75.60	27.08	22.46	30.60	32.83	36.25	23.14	31.11
Avg. percent - Hispanic	4.51	4.51	4.54	5.15	4.51	4.57	5.84	8.37	4.97	7.25	5.73	8.25	4.36	3.71	4.43	4.29	4.37	3.76

Avg. percent - White	61.00	32.57	51.94	36.26	60.27	32.97	15.15	20.54	11.76	17.77	14.72	20.25	65.07	29.75	55.08	34.15	64.41	30.17
Avg. percent - Free/Reduced lunch	44.22	33.03	58.69	33.53	45.38	33.30	94.20	16.71	96.18	13.54	94.45	16.36	37.74	29.64	49.45	32.69	38.51	29.99
Avg. percent - ELL/Special Ed.	3.87	6.79	4.41	8.47	3.91	6.94	9.82	14.52	10.41	15.85	9.90	14.69	3.29	4.84	3.47	5.25	3.30	4.87
Avg. in-school suspension rate	10.03	90.30	11.48	103.15	10.15	91.40	11.16	83.09	7.78	69.59	10.73	81.53	10.00	92.89	12.79	117.42	10.21	94.71
Avg. ELA proficiency rate	53.24	19.66	44.44	21.43	52.53	19.96	25.63	21.51	18.75	16.25	24.77	21.04	56.65	17.04	49.46	19.60	56.18	17.31
Avg. Math proficiency rate	45.54	20.57	36.68	22.32	44.83	20.86	20.18	20.20	14.26	15.50	19.44	19.77	48.77	18.75	41.23	21.92	48.27	19.06
Neighborhood level variables																		
Avg. median household income*	77867.50	28905.17	66657.75	26386.00	76967.37	28872.20	46466.70	15759.66	43474.99	15197.37	46092.49	15721.60	82512.32	27953.61	74524.81	26518.30	81986.82	27931.74
Avg. percent - White	72.00	26.16	64.61	30.95	71.41	26.65	39.15	27.41	33.36	26.93	38.42	27.42	74.92	23.64	67.19	29.04	74.42	24.11
Avg. percent - African American	17.82	27.06	26.00	32.30	18.48	27.61	51.10	31.71	57.61	31.62	51.91	31.78	14.70	24.25	23.02	30.33	15.25	24.78
Avg. percent - Hispanic	2.96	2.00	2.93	2.53	2.96	2.05	3.59	2.28	3.44	2.50	3.57	2.31	2.88	1.84	2.73	2.15	2.87	1.86
Avg. percent - Some college or higher	67.89	13.25	63.27	13.93	67.52	13.36	62.89	14.91	59.31	14.50	62.44	14.91	69.36	12.40	66.73	12.70	69.19	12.44
Avg. percent - Homeownership	71.31	15.88	65.86	17.19	70.87	16.06	40.96	14.91	40.72	14.14	40.93	14.81	74.73	12.11	70.86	13.44	74.48	12.24

* Median household income is based on 2021 Inflation Adjusted Dollars.

Table 2

Results of descriptive statistics with polynomial outcomes, five counties

	Five counties											
	Remained		Transfer within district		Transfer outside district		Transfer - Home/Private school		Transfer - Another state/country		Total (4,522,936)	
	%/Mean	SD	%/Mean	SD	%/Mean	SD	%/Mean	SD	%/Mean	SD	N/Mean	%/SD
Student level variables												
School year												
2008	91.32%		0.54%		6.50%		0.53%		1.12%		296567	6.56%
2009	91.68%		1.24%		4.87%		0.59%		1.62%		296269	6.55%
2010	91.90%		1.24%		4.96%		0.61%		1.29%		299838	6.63%
2011	91.48%		1.41%		5.16%		0.63%		1.32%		301847	6.67%
2012	91.35%		1.44%		5.14%		0.70%		1.37%		303020	6.70%
2013	91.15%		1.28%		5.46%		0.75%		1.37%		307807	6.81%
2014	91.30%		1.23%		5.33%		0.77%		1.38%		307699	6.80%
2015	91.43%		1.28%		5.16%		0.73%		1.40%		307976	6.81%
2016	91.62%		1.27%		4.93%		0.78%		1.39%		307580	6.80%
2017	91.84%		1.19%		4.72%		0.90%		1.35%		305770	6.76%
2018	91.93%		1.10%		4.56%		1.02%		1.39%		304852	6.74%
2019	92.33%		0.98%		4.34%		0.85%		1.50%		302500	6.69%
2020	93.43%		0.80%		3.70%		0.94%		1.13%		299808	6.63%
2021	93.44%		0.67%		3.47%		1.22%		1.20%		291541	6.45%
2022	93.51%		0.76%		3.48%		1.01%		1.23%		289862	6.41%
Grade level												
Kindergarten	90.35%		1.45%		5.67%		0.78%		1.75%		345840	7.65%
1st grade	90.63%		1.44%		5.55%		0.62%		1.76%		351043	7.76%
2nd grade	91.10%		1.38%		5.26%		0.63%		1.65%		351624	7.77%
3rd grade	91.59%		1.39%		4.89%		0.63%		1.50%		351091	7.76%
4th grade	91.87%		1.36%		4.66%		0.64%		1.47%		349687	7.73%
5th grade	92.22%		1.19%		4.46%		0.73%		1.40%		345925	7.65%
6th grade	92.72%		0.93%		4.34%		0.73%		1.29%		336377	7.44%
7th grade	93.05%		0.81%		4.22%		0.72%		1.20%		343679	7.60%

8th grade	92.51%	0.85%	4.39%	1.07%	1.18%	343153	7.59%
9th grade	91.51%	1.09%	5.13%	1.08%	1.19%	370477	8.19%
10th grade	91.94%	0.91%	4.92%	1.07%	1.16%	355727	7.86%
11th grade	92.81%	0.79%	4.29%	0.99%	1.12%	339660	7.51%
12th grade	93.47%	0.66%	4.44%	0.71%	0.72%	338653	7.49%
Race/Ethnicity							
Asian	92.53%	0.57%	2.23%	0.58%	4.10%	141215	3.12%
Black	88.25%	2.62%	6.98%	0.56%	1.59%	1280559	28.31%
Hispanic	91.40%	0.95%	4.14%	0.77%	2.76%	167666	3.71%
White	93.72%	0.46%	3.93%	0.91%	0.98%	2807603	62.07%
Others	90.99%	0.78%	5.43%	0.99%	1.80%	125893	2.78%
Gender							
Female	92.20%	1.01%	4.68%	0.76%	1.35%	2203022	48.71%
Male	91.75%	1.18%	4.90%	0.84%	1.33%	2319914	51.29%
Lunch status							
Unreduced lunch	94.97%	0.39%	2.66%	0.81%	1.17%	2509915	55.49%
Free lunch	87.59%	2.13%	7.87%	0.81%	1.60%	1810989	40.04%
Reduced lunch	93.97%	0.68%	3.64%	0.60%	1.10%	202032	4.47%
IEP							
No	92.26%	1.00%	4.61%	0.74%	1.39%	3806975	84.17%
Yes	90.41%	1.64%	5.75%	1.12%	1.09%	715961	15.83%
ELL status							
Not ELL	91.94%	1.13%	4.88%	0.82%	1.22%	3888030	85.96%
ELL	92.17%	0.90%	4.22%	0.66%	2.04%	634906	14.04%
Homeless status							
Not Homeless	92.38%	0.98%	4.55%	0.80%	1.29%	4371335	96.65%
Shelters	70.48%	7.45%	16.81%	1.51%	3.74%	11136	0.25%
Unsheltered	75.41%	5.00%	14.46%	1.25%	3.88%	1521	0.03%
Doubled Up	81.47%	4.32%	10.97%	0.77%	2.47%	129861	2.87%
Hotel/Motel	74.55%	4.22%	15.62%	1.21%	4.40%	9083	0.20%
Residency status							
Resident in the attending school	91.97%	1.10%	4.78%	0.80%	1.35%	4426286	97.86%
Others	92.16%	1.00%	5.35%	0.62%	0.87%	96650	2.14%
School level variables							

Avg. number of enrolled students	792.88	516.4	498.49	368.39	651.21	432.34	789.98	489.68	717.15	469.18	781.82	512.29
Avg. percent - African-American	26.91	33.9	59.65	38.86	35.77	38.52	19.52	27.69	32.02	34.75	27.7	34.39
Avg. percent - Hispanic	4.51	4.51	4.34	5.55	4.42	5.17	4.5	4.11	5.15	5.27	4.51	4.57
Avg. percent - White	61.00	32.57	30.92	34.35	53.65	36.80	68.10	28.39	53.41	32.50	60.27	32.97
Avg. percent - Free/Reduced lunch	44.22	33.03	75.65	32.79	60.65	32.15	41.14	28.2	48.23	33.81	45.38	33.3
Avg. percent - ELL/Special Ed.	3.87	6.79	6.54	12.18	3.73	7.46	3.63	6.33	5.58	8.87	3.91	6.94
Avg. in-school suspension rate	10.03	90.30	5.97	61.04	14.53	119.59	5.32	47.71	8.77	90.13	10.15	91.40
Avg. ELA proficiency rate	53.24	19.66	31.22	22.81	43.69	20.31	55.76	17.08	51.17	20.24	52.53	19.96
Avg. Math proficiency rate	45.54	20.57	25.65	22.37	35.27	21.58	46.97	18.73	44.62	21.58	44.83	20.86
Neighborhood level variables												
Avg. median household income	77867.50	28905.17	57096.88	26644.67	64412.85	24026.04	77570.82	27108.70	76009.73	28911.90	76967.37	28872.20
Avg. percent - White	72.00	26.16	47.43	32.88	65.66	31.31	77.16	22.11	67.43	26.63	71.41	26.65
Avg. percent - African American	17.82	27.06	43.52	35.78	25.56	32.32	12.59	22.37	21.25	28.09	18.48	27.61
Avg. percent - Hispanic	2.96	2.00	3.12	2.72	2.83	2.59	2.84	1.88	3.21	2.42	2.96	2.05
Avg. percent - Some college or higher	67.89	13.25	61.34	13.32	61.62	13.49	67.09	14.41	68.47	13.95	67.52	13.36
Avg. percent - Homeownership	71.31	15.88	55.43	20.46	66.25	16.23	73.02	13.10	68.74	15.97	70.87	16.06

Table 3

Result of logistic regression for five counties

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
School year (reference=2008)						
2009	0.924***			0.928***	0.925***	0.928***
	(0.00861)			(0.00864)	(0.00860)	(0.00864)
2010	0.858***			0.865***	0.863***	0.865***
	(0.00820)			(0.00825)	(0.00823)	(0.00825)
2011	0.884***			0.891***	0.890***	0.892***
	(0.00844)			(0.00850)	(0.00848)	(0.00850)
2012	0.872***			0.885***	0.881***	0.886***
	(0.00838)			(0.00849)	(0.00845)	(0.00850)
2013	0.879***			0.890***	0.887***	0.892***
	(0.00841)			(0.00849)	(0.00845)	(0.00851)
2014	0.854***			0.868***	0.863***	0.870***
	(0.00824)			(0.00837)	(0.00831)	(0.00839)
2015	0.816***			0.832***	0.828***	0.834***
	(0.00788)			(0.00802)	(0.00798)	(0.00805)
2016	0.792***			0.809***	0.804***	0.811***
	(0.00770)			(0.00785)	(0.00779)	(0.00787)
2017	0.774***			0.792***	0.786***	0.794***
	(0.00760)			(0.00776)	(0.00769)	(0.00778)
2018	0.766***			0.785***	0.778***	0.787***
	(0.00754)			(0.00771)	(0.00763)	(0.00773)
2019	0.724***			0.743***	0.736***	0.745***
	(0.00728)			(0.00745)	(0.00737)	(0.00748)
2020	0.615***			0.632***	0.625***	0.634***
	(0.00640)			(0.00657)	(0.00649)	(0.00659)
2021	0.637***			0.650***	0.643***	0.652***
	(0.00672)			(0.00686)	(0.00678)	(0.00688)
2022	0.630***			0.642***	0.636***	0.644***
	(0.00666)			(0.00678)	(0.00671)	(0.00680)
Grade (reference=Kindergarten)						
1st grade	0.960***			0.965***	0.963***	0.966***
	(0.00783)			(0.00787)	(0.00784)	(0.00787)
2nd grade	0.907***			0.915***	0.913***	0.916***

	(0.00758)	(0.00764)	(0.00761)	(0.00764)
3rd grade	0.855***	0.863***	0.862***	0.864***
	(0.00731)	(0.00737)	(0.00735)	(0.00737)
4th grade	0.829***	0.833***	0.838***	0.834***
	(0.00719)	(0.00721)	(0.00726)	(0.00723)
5th grade	0.799***	0.801***	0.807***	0.803***
	(0.00708)	(0.00709)	(0.00714)	(0.00710)
6th grade	0.755***	0.761***	0.773***	0.768***
	(0.00690)	(0.00703)	(0.00706)	(0.00712)
7th grade	0.734***	0.737***	0.750***	0.743***
	(0.00681)	(0.00696)	(0.00695)	(0.00706)
8th grade	0.805***	0.802***	0.822***	0.810***
	(0.00743)	(0.00755)	(0.00758)	(0.00766)
9th grade	0.916***	1.328***	0.910***	1.320***
	(0.00817)	(0.0136)	(0.00809)	(0.0138)
10th grade	0.893***	1.304***	0.893***	1.297***
	(0.00810)	(0.0136)	(0.00808)	(0.0138)
11th grade	0.815***	1.164***	0.821***	1.162***
	(0.00769)	(0.0125)	(0.00773)	(0.0127)
12th grade	0.739***	1.037***	0.745***	1.037***
	(0.00697)	(0.0112)	(0.00702)	(0.0114)
Gender (reference=Female)				
Male	1.054***	1.050***	1.052***	1.050***
	(0.00501)	(0.00492)	(0.00493)	(0.00492)
Ethnicity (reference=White)				
Asian	1.338***	1.617***	1.584***	1.646***
	(0.0161)	(0.0199)	(0.0194)	(0.0204)
Black	1.253***	1.455***	1.413***	1.461***
	(0.00795)	(0.0121)	(0.0110)	(0.0122)
Hispanic	1.163***	1.281***	1.276***	1.286***
	(0.0136)	(0.0152)	(0.0150)	(0.0153)
Others	1.281***	1.380***	1.374***	1.387***
	(0.0161)	(0.0173)	(0.0172)	(0.0174)
Lunch (reference=Unreduced lunch)				
Free lunch	2.302***	1.817***	1.936***	1.800***
	(0.0130)	(0.0107)	(0.0110)	(0.0106)
Reduced lunch	1.134***	0.963***	0.986	0.952***
	(0.0118)	(0.0102)	(0.0104)	(0.0101)
Homeless (reference=Not homeless)				
Shelters	3.096***	2.844***	2.973***	2.841***
	(0.0742)	(0.0702)	(0.0714)	(0.0699)

Unsheltered	2.580***		2.443***	2.578***	2.446***
	(0.158)		(0.153)	(0.159)	(0.153)
Doubled Up	1.757***		1.640***	1.721***	1.638***
	(0.0150)		(0.0140)	(0.0146)	(0.0140)
Hotel/Motel	2.659***		2.780***	2.646***	2.761***
	(0.0714)		(0.0769)	(0.0718)	(0.0763)
ELL (reference=Not ELL)					
ELL	0.917***		0.901***	0.915***	0.904***
	(0.00552)		(0.00575)	(0.00579)	(0.00586)
Residency status (reference=Resident in the attending school)					
Others	0.676***		0.754***	0.771***	0.767***
	(0.00913)		(0.0108)	(0.0110)	(0.0110)
Special Education (reference=Not Special Ed.)					
Yes	1.174***		1.133***	1.187***	1.142***
	(0.00672)		(0.00647)	(0.00674)	(0.00652)
Enrolled students		0.980***	0.965***		0.965***
		(0.00000531)	(0.000623)		(0.000644)
Percent-Free/Reduced lunch		1.011***	1.004***		1.003***
		(0.000145)	(0.000148)		(0.000164)
Percent-Black		0.991***	0.987***		0.987***
		(0.000128)	(0.000141)		(0.000243)
Percent-Hispanic		0.994***	1.001+		1.004***
		(0.000551)	(0.000570)		(0.000665)
Percent-ELL/IEP		0.997***	0.994***		0.994***
		(0.000319)	(0.000332)		(0.000347)
In-school suspension		1.002	0.999		0.993***
		(0.00193)	(0.00191)		(0.00194)
ELA proficiency rate		0.992***	0.987***		0.987***
		(0.000276)	(0.000301)		(0.000323)
Math proficiency rate		0.991***	0.995***		0.995***
		(0.000242)	(0.000254)		(0.000257)
Median Household Income			0.991***	0.996***	0.998***

			(0.000000209)		(0.000000187)	(0.000000187)
Rate - Black			0.878***		0.496***	1.048*
			(0.0111)		(0.00685)	(0.0231)
Rate - Hispanic			0.561***		0.204***	0.541***
			(0.0578)		(0.0223)	(0.0690)
Rate - Some college degree or higher			0.419***		0.324***	0.994
			(0.0130)		(0.00945)	(0.0338)
Homeownership rate			0.470***		0.600***	0.982
			(0.0114)		(0.0141)	(0.0239)
Observations	4522936	4522936	4522936	4522936	4522936	4522936
Pseudo R^2	0.040	0.032	0.023	0.052	0.045	0.053

Exponentiated coefficients; Standard errors in parentheses
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Model 1: Student-level variables are included.
Model 2: School-level variables are included.
Model 3: Neighborhood-level variables are included.
Model 4: Student- and school-level variables are included.
Model 5: Student- and neighborhood-level variables are included.
Model 6: Student-, school-, and neighborhood-level variables are included.

Table 4

Result of multinomial logistic regression with student-, school-, and neighborhood-level variables for five counties (reference category = remained)

Outcome – Transfer type	Within districts	Outside districts	Home/Private school	Another state/country
School year (reference=2008)				
2009	2.272***	0.714***	1.101**	1.400***
	(0.0710)	(0.00822)	(0.0378)	(0.0318)
2010	2.094***	0.696***	1.125***	1.077**
	(0.0661)	(0.00811)	(0.0388)	(0.0256)
2011	2.320***	0.706***	1.148***	1.093***
	(0.0722)	(0.00822)	(0.0393)	(0.0259)
2012	2.327***	0.681***	1.270***	1.147***
	(0.0727)	(0.00803)	(0.0425)	(0.0270)
2013	1.989***	0.711***	1.352***	1.143***
	(0.0622)	(0.00827)	(0.0448)	(0.0270)
2014	1.912***	0.686***	1.383***	1.139***
	(0.0607)	(0.00803)	(0.0459)	(0.0269)
2015	1.900***	0.644***	1.303***	1.145***
	(0.0598)	(0.00759)	(0.0435)	(0.0271)
2016	1.889***	0.613***	1.385***	1.119***
	(0.0593)	(0.00731)	(0.0457)	(0.0265)
2017	1.767***	0.592***	1.580***	1.076**
	(0.0563)	(0.00717)	(0.0509)	(0.0257)
2018	1.634***	0.575***	1.792***	1.099***
	(0.0526)	(0.00701)	(0.0565)	(0.0261)
2019	1.473***	0.545***	1.476***	1.174***
	(0.0487)	(0.00681)	(0.0482)	(0.0275)
2020	1.207***	0.462***	1.618***	0.870***
	(0.0412)	(0.00599)	(0.0520)	(0.0218)
2021	1.058	0.449***	2.096***	0.934**
	(0.0380)	(0.00602)	(0.0651)	(0.0232)
2022	1.185***	0.452***	1.741***	0.949*
	(0.0411)	(0.00607)	(0.0556)	(0.0235)

Grade (reference=Kindergarten)				
1st grade	0.984	0.977*	0.791***	0.998
	(0.0202)	(0.0103)	(0.0227)	(0.0181)
2nd grade	0.936**	0.926***	0.788***	0.937***
	(0.0195)	(0.0101)	(0.0224)	(0.0173)
3rd grade	0.946**	0.861***	0.780***	0.859***
	(0.0198)	(0.00968)	(0.0223)	(0.0163)
4th grade	0.924***	0.818***	0.795***	0.849***
	(0.0196)	(0.00935)	(0.0227)	(0.0162)
5th grade	0.820***	0.786***	0.908***	0.813***
	(0.0181)	(0.00915)	(0.0251)	(0.0158)
6th grade	0.739***	0.726***	0.998	0.828***
	(0.0179)	(0.00877)	(0.0284)	(0.0170)
7th grade	0.724***	0.699***	0.988	0.785***
	(0.0184)	(0.00861)	(0.0283)	(0.0165)
8th grade	0.764***	0.734***	1.481***	0.784***
	(0.0192)	(0.00908)	(0.0391)	(0.0166)
9th grade	1.749***	1.214***	2.041***	0.789***
	(0.0451)	(0.0161)	(0.0641)	(0.0200)
10th grade	1.574***	1.208***	2.034***	0.777***
	(0.0422)	(0.0162)	(0.0646)	(0.0199)
11th grade	1.396***	1.054***	1.861***	0.756***
	(0.0387)	(0.0147)	(0.0605)	(0.0197)
12th grade	1.064*	1.082***	1.340***	0.483***
	(0.0317)	(0.0144)	(0.0469)	(0.0141)
Gender (reference=Female)				
Male	1.113***	1.045***	1.057***	1.014
	(0.0120)	(0.00620)	(0.0129)	(0.00903)
Ethnicity (reference=White)				
Asian	1.228***	0.995	0.764***	3.482***
	(0.0482)	(0.0198)	(0.0289)	(0.0581)
Black	2.083***	1.423***	0.926**	1.592***
	(0.0444)	(0.0150)	(0.0224)	(0.0272)
Hispanic	1.345***	1.060***	0.902**	2.337***
	(0.0426)	(0.0174)	(0.0296)	(0.0459)
Others	1.398***	1.381***	1.051	1.754***
	(0.0524)	(0.0218)	(0.0333)	(0.0415)
Lunch (reference=Unreduced lunch)				

Free lunch	2.100***	2.079***	1.233***	1.340***
	(0.0362)	(0.0156)	(0.0195)	(0.0166)
Reduced lunch	1.227***	0.987	0.779***	0.948*
	(0.0382)	(0.0133)	(0.0242)	(0.0218)
Homeless (reference=Not homeless)				
Shelters	2.916***	2.691***	2.672***	3.114***
	(0.123)	(0.0819)	(0.212)	(0.169)
Unsheltered	2.519***	2.301***	1.769*	3.484***
	(0.329)	(0.182)	(0.406)	(0.483)
Doubled Up	1.843***	1.555***	1.110**	1.949***
	(0.0318)	(0.0166)	(0.0375)	(0.0389)
Hotel/Motel	2.671***	2.768***	1.818***	3.494***
	(0.155)	(0.0924)	(0.175)	(0.188)
ELL (reference=Not ELL)				
ELL	0.847***	0.813***	0.916***	1.264***
	(0.0161)	(0.00685)	(0.0176)	(0.0158)
Residency status (reference=Resident in the attending school)				
Others	0.810***	0.910***	0.639***	0.472***
	(0.0323)	(0.0154)	(0.0307)	(0.0180)
Special Education (reference=Not Special Ed.)				
Yes	1.479***	1.104***	1.488***	0.825***
	(0.0190)	(0.00787)	(0.0228)	(0.0107)
Enrolled students	0.921***	0.972***	0.953***	0.990***
	(0.00198)	(0.000803)	(0.00180)	(0.00152)
Percent-Free/Reduced lunch	0.993***	1.007***	1.001+	0.994***
	(0.000466)	(0.000203)	(0.000473)	(0.000344)
Percent-Black	0.994***	0.982***	0.988***	1.006***
	(0.000606)	(0.000306)	(0.000835)	(0.000500)
Percent-Hispanic	0.984***	1.020***	1.017***	0.999
	(0.00145)	(0.000872)	(0.00195)	(0.00130)
Percent-ELL/IEP	1.017***	0.976***	1.001	1.015***
	(0.000587)	(0.000523)	(0.00106)	(0.000657)
In-school suspension	0.881***	1.038***	0.890***	0.985**
	(0.00527)	(0.00227)	(0.0112)	(0.00511)
ELA proficiency rate	0.961***	0.989***	1.002*	1.002*

	(0.000772)	(0.000408)	(0.000851)	(0.000742)
Math proficiency rate	1.010***	0.987***	1.000	1.006***
	(0.000668)	(0.000323)	(0.000701)	(0.000598)
Median Household Income (In 2021 Inflation Adjusted Dollars)	1.001	0.994***	0.996***	0.995***
	(0.000472)	(0.000258)	(0.000461)	(0.000357)
Rate - Black	1.660***	0.894***	1.173+	0.917+
	(0.0817)	(0.0245)	(0.0972)	(0.0436)
Rate - Hispanic	142.8***	0.0887***	0.00516***	3.831***
	(32.37)	(0.0153)	(0.00229)	(1.035)
Rate - Some college degree or higher	1.307***	1.119*	1.248*	1.576***
	(0.105)	(0.0492)	(0.116)	(0.113)
Homeownership rate	0.485***	1.391***	1.043	1.347***
	(0.0250)	(0.0433)	(0.0819)	(0.0707)
Observations	4522936			
Pseudo R^2	0.068			

Exponentiated coefficients; Standard errors in parentheses
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 1.1

Results of logistic regression for student-level variables

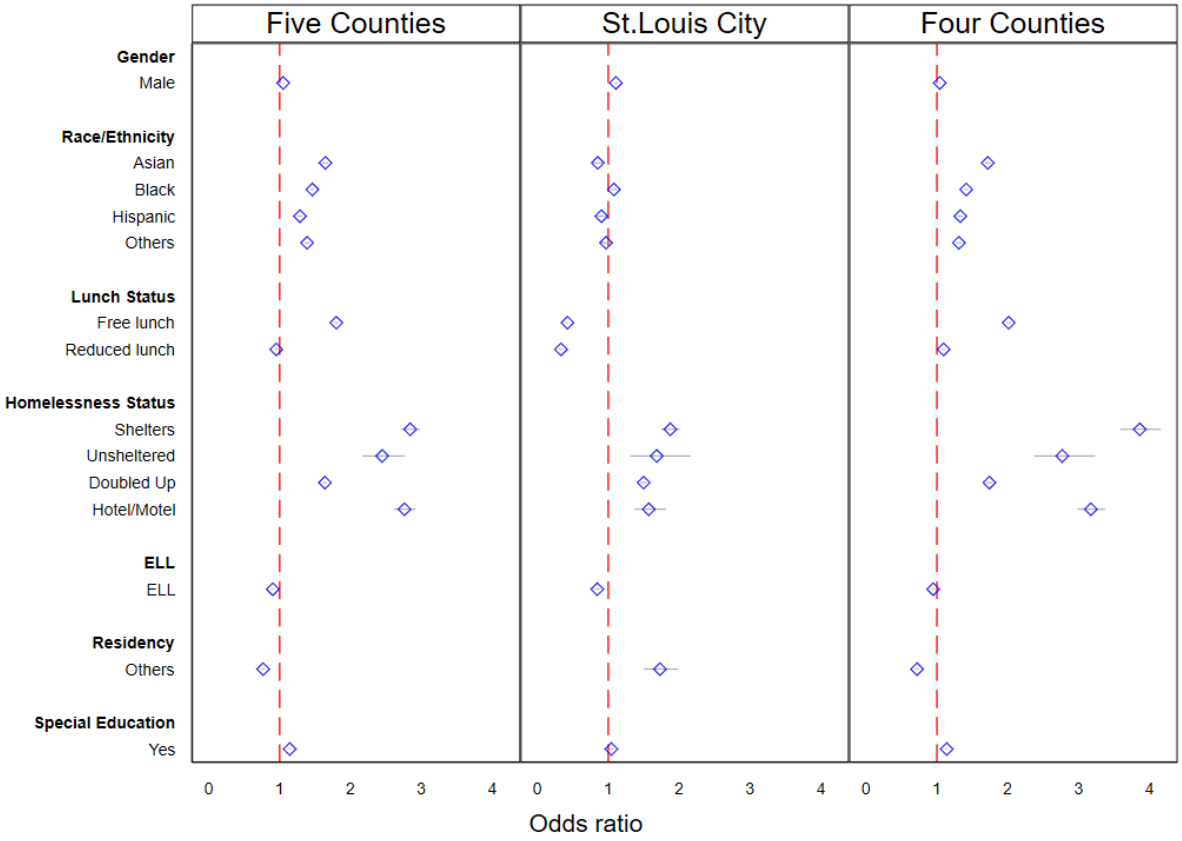

Figure 1.2

Results of logistic regression for school-level variables

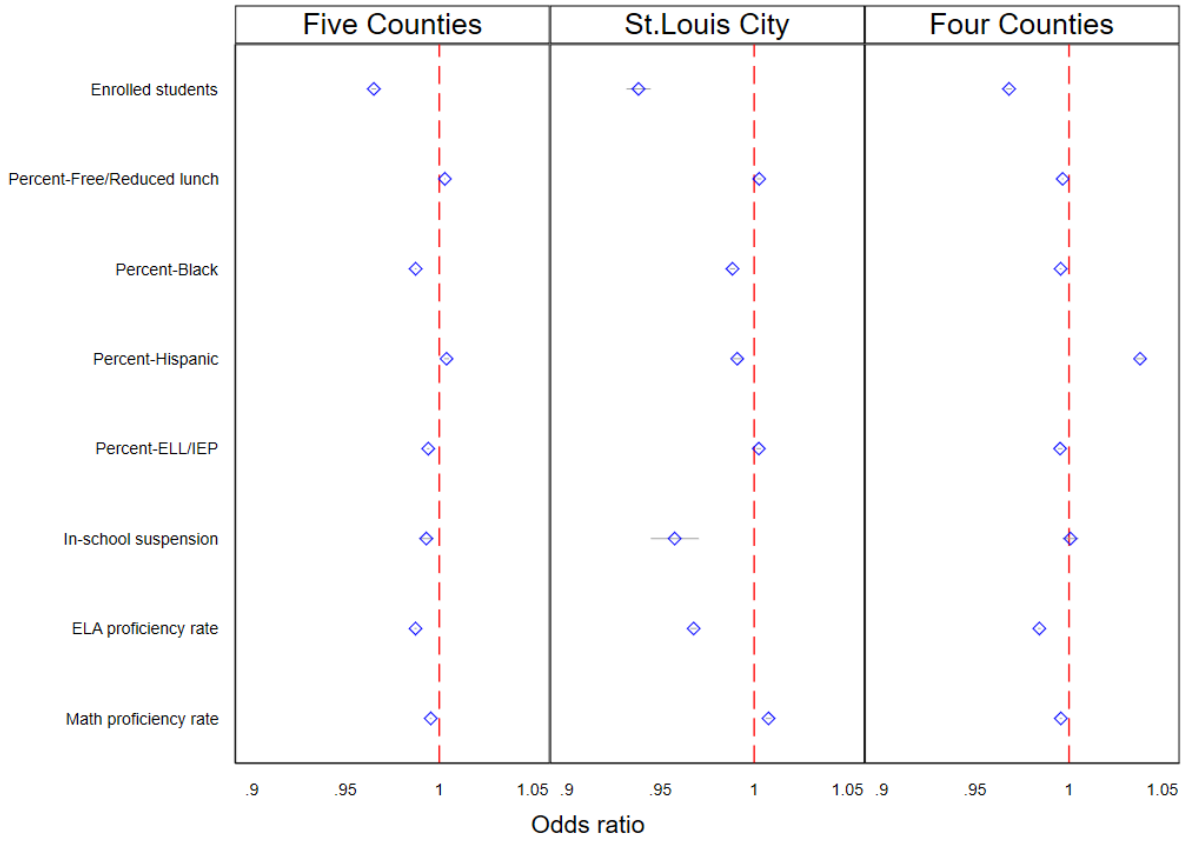

Figure 1.3

Results of logistic regression for neighborhood-level variables

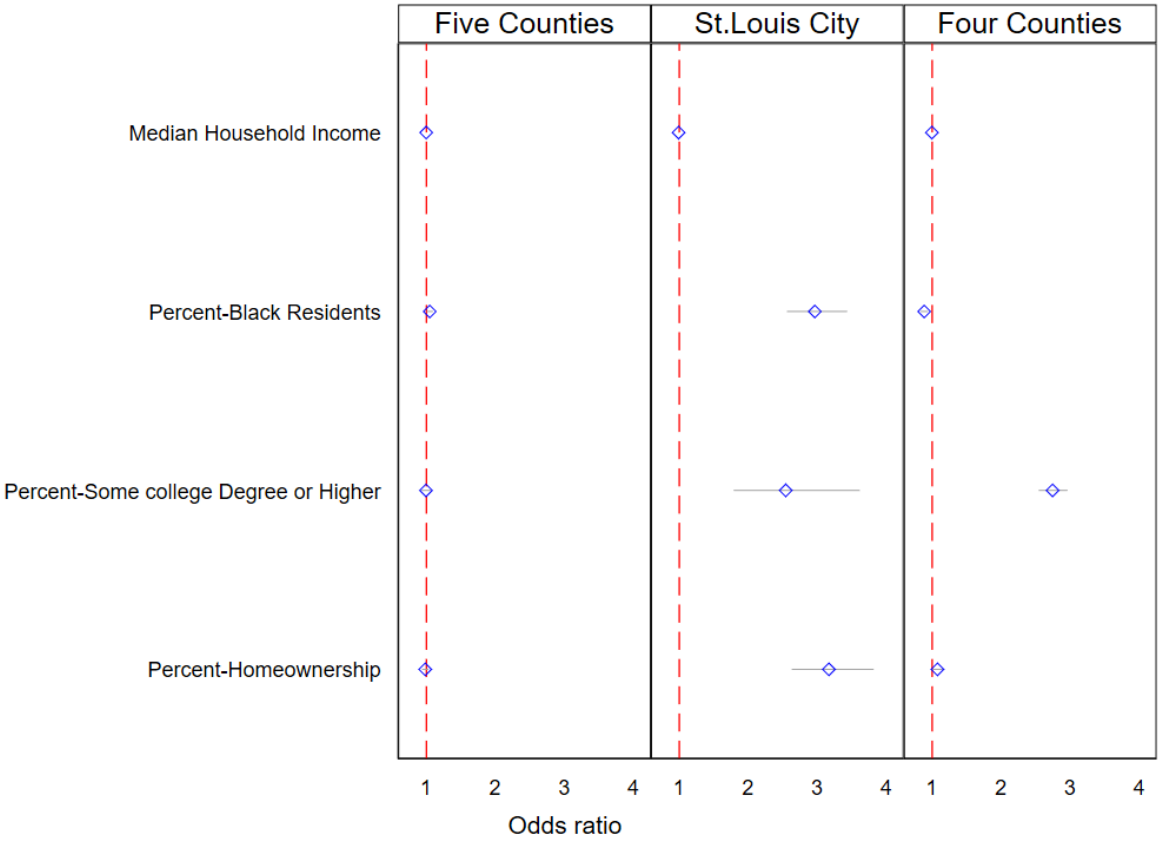

Figure 2.1

Results of multinomial logistic regression for student-level variables

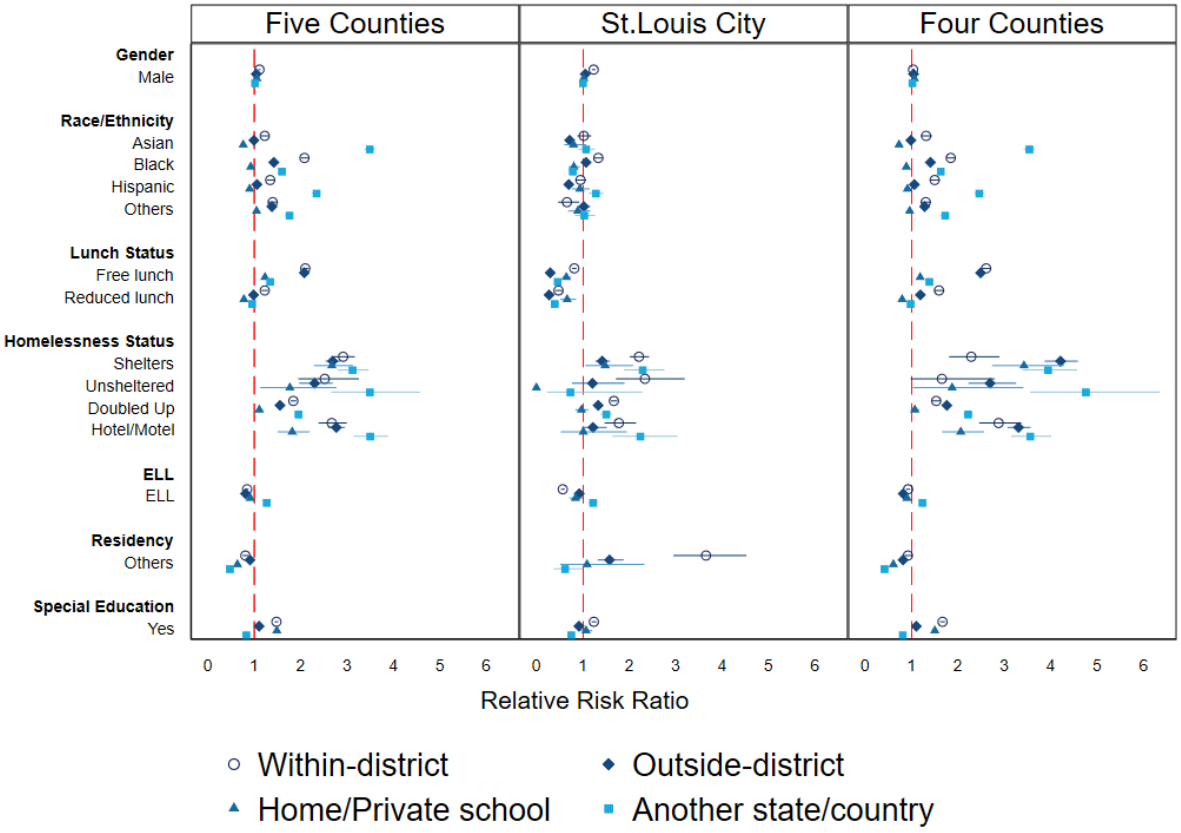

Figure 2.2

Results of multinomial logistic regression for school-level variables

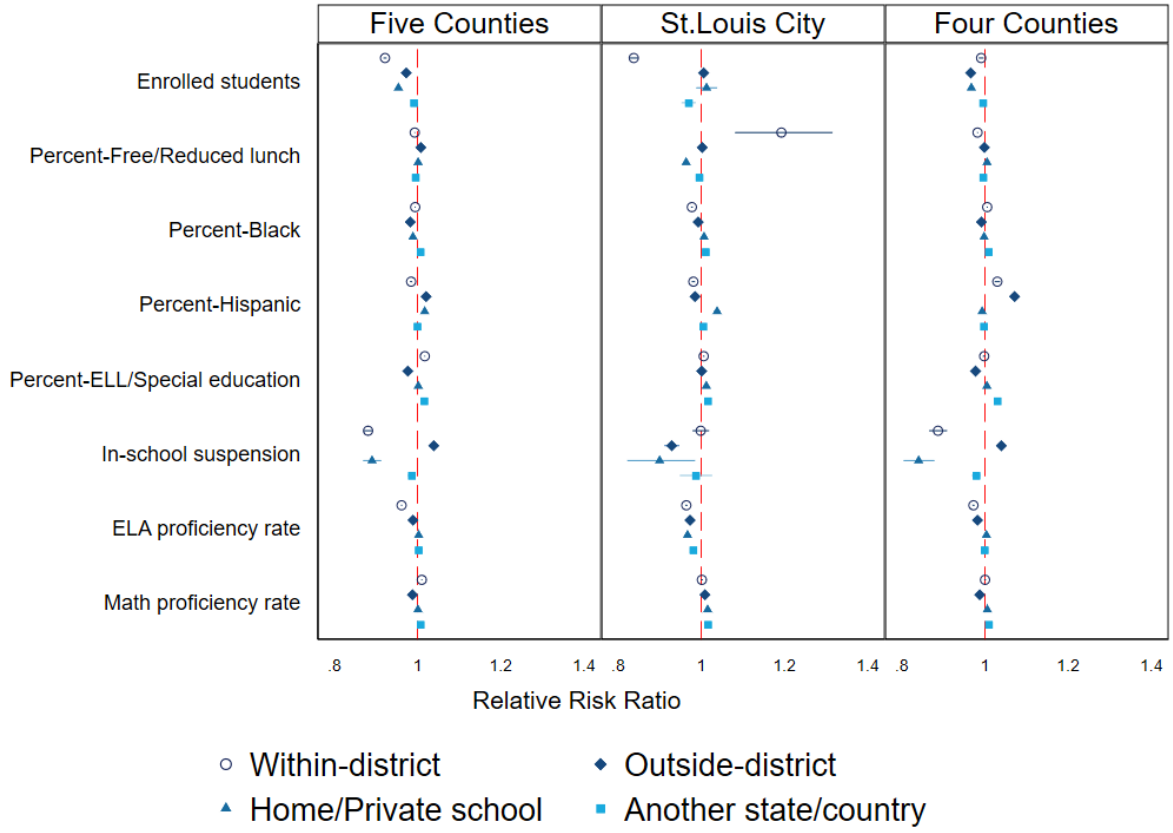

Figure 2.3

Results of multinomial logistic regression for neighborhood-level variables