

# THE PATHWAY TO ENROLLING IN A HIGH-PERFORMANCE HIGH SCHOOL: UNDERSTANDING BARRIERS TO ACCESS

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## **Abstract**

In 2017, Chicago Public Schools adopted an online universal application system for all high schools with the hope of providing more equitable access to high-performance schools. Despite the new system, black students and students living in low socioeconomic status (SES) neighborhoods remained less likely than their peers to enroll in a high-performance high school. In this paper, we characterize various constraints that students and families may face in enrolling in a high-performance high school, including eligibility to programs based on prior academic achievement, distance from high-performance options, elementary school performance ratings, and neighborhood SES. After adjusting for differences in these access factors, we find the gap between black and Latinx students' likelihood of enrolling in a high-performing high school is reduced by about 80 percent. We find a similarly large reduction in the enrollment gap between students from low and middle SES neighborhoods after adjusting for eligibility and distance factors. These findings have implications for policies that may help equalize access to high-performance schools through changes to eligibility requirements and improved transportation options.

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## 1. INTRODUCTION

Despite increases in the availability of information on school performance and the ability for students and families to choose schools other than their zoned school, many students continue to enroll in persistently low-performing schools. In this paper, we explore the potential barriers that students and families face in enrolling in a high-performance high school from access to application to enrollment, how these barriers vary by student background, and how they may contribute to observed differences in enrollment at high-performance high schools. To the extent that school accountability ratings (the measure we use of school performance) reflect school quality, differences in enrollment at high-performance schools likely reflect inequitable access to high-quality schools.

School districts and states have implemented various school accountability measures in order to provide transparent information to parents, schools, and policymakers about how well schools are educating students. Often, these ratings are intended to encourage students and families to consider a range of options and ultimately choose high-performing schools, thereby pressuring lower-performing schools to improve through increased competition for students. Despite this accountability-induced pressure, many schools continue to receive low ratings, and students continue to enroll in persistently low-rated schools.

In addition to the pressure from accountability systems, schools are competing more directly for students from the expansion of school choices within the public system, particularly in urban districts with charter schools and open-enrollment policies. Some school districts no longer have zoned or default neighborhood high schools, so all students must apply to enroll in a school. These kinds of choice systems have the potential to break the connection between students' residential location and school enrollment, although factors such as access to transportation and commute times are likely to limit students' choices to only a subset of schools.

Chicago Public Schools (CPS) is an example of a "choice" district with the goal of enrolling all students in a school receiving one of the top two ratings used in the district's accountability system (Chicago Public Schools 2017). (We refer to these top-rated schools as "high-performance high schools.") In spite of this goal, many ninth-grade students do not enroll in a high-performance high school. Previous research shows that about two thirds of first-time ninth graders were enrolled at a high-performance high school in Fall 2018 (Barrow and Sartain 2019). However, there is considerable variation by student race/ethnicity and socioeconomic status (SES). Less than one half of black students (47 percent) enroll in a high-performance high school, compared with 70 percent of Latinx students. Similarly, students living in the lowest SES neighborhoods in Chicago were much less likely to enroll in a high-performance high school than students living in the highest SES neighborhoods (52 percent versus 86 percent).

Our analysis of applications data finds that black students are less likely to apply to a high-performance high school compared with their nonblack peers, and this ultimately translates into different rates of enrollment in high-performance schools by student race/ethnicity. We observe similar, albeit smaller, differences between students living in low SES neighborhoods and their peers living in higher SES neighborhoods.

Assuming that families make optimal schooling decisions given their preferences, information, and constraints, one explanation for differences in enrollment patterns by school performance could be differences in preferences. However, we find that students of different racial/ethnic and SES backgrounds have similar preferences for “strong” high schools. In a survey administered to CPS eighth graders, black students were as likely as white or Asian students and more likely than Latinx students to indicate strong academic reputation as a very important factor considered when ranking high schools. Similarly, students living in the lowest SES neighborhoods in Chicago were just as likely as students in middle SES neighborhoods to rank academic reputation as an important factor in their school choice.

Another explanation may be the correlation between barriers to access, such as the location of high-performance high schools relative to home, and student demographics. Indeed, we find that the zoned school for black students is much less likely to have a high accountability rating than the zoned school for other students. Black students are also less likely to meet pre-application eligibility requirements for programs with strong academic reputations (e.g., selective schools and International Baccalaureate [IB] programs) due to lower academic performance in seventh grade. Further, black students tend to live in census tracts with lower levels of financial resources and attend lower-performing elementary schools than other students. Adjusting for these differences in access by student race/ethnicity, the predicted gap between enrollment rates of black and Latinx students in high-performance high schools closes from a 22 percentage point difference to an estimated 5 percentage point difference. Students from low SES neighborhoods also score lower on the academic achievement measures and attend lower-performing elementary schools than their higher SES peers, but the difference in distance to high-performance high schools by neighborhood SES is smaller than the difference between black and Latinx students. Nevertheless, adjusting for the eligibility, distance, and elementary school performance factors, the predicted gap in high-performance high school enrollment rates by neighborhood SES closes from a 12.7 percentage point gap to an estimated 4.1 percentage point gap. In both cases, the remaining gaps likely reflect differences in preferences and other unobserved factors that are correlated with race/ethnicity and neighborhood SES.

A better understanding of the choices students and families make can shed light on factors that are important to families and students when choosing a high school but are not captured in school accountability ratings. Further, uncovering some of the constraints that students and families face in enrolling in a high-performance school may help inform policies designed to equalize access to schools with the highest performance ratings. In the following sections, we provide an overview of the relevant school choice literature and provide more details about the Chicago context, their school rating system, and their school choice system. We then describe the data and methodology, followed by results. We document the pathway to enrolling in a high-performing high school, as well as how that path differs for different groups of students, show that differences are unlikely to be explained by students’ stated preferences over school characteristics, and explain the enrollment gap with various access factors. We end by discussing the implications of these findings for policy and creating more equitable access to high-performance schools.

## 2. LITERATURE

School choice is increasing, particularly in urban districts. Between 2001 and 2016, charter school enrollment jumped from 1 to 6 percent of students nationwide (National Center for Education Statistics 2019). But charter schools are only one option within the public school system, with many large urban districts offering a range of magnet and specialized schools as well. Evidence is mixed on who is most likely to participate in choice. In Chicago, for example, black students and students living in neighborhoods with the highest-poverty levels are more likely than other students to opt out of their zoned high school. In 2016, 86 percent of black ninth graders attended a high school other than their zoned school, compared with 68 percent of Latinx ninth graders; additionally, 86 percent of ninth graders living in neighborhoods with the lowest average income attended a high school other than their zoned school compared with 69 percent of ninth graders in the neighborhoods with the highest average income (Barrow and Sartain 2017). Similarly, in New York City, 59 percent of black students opted out of their zoned elementary school relative to 39 percent of Latinx students, and choice has been increasing among students eligible for free or reduced-price lunch (though we note that that study looks only at kindergarten enrollment) (Mader, Hemphill, and Abbas 2018). In contrast, the charter sector in North Carolina has become increasingly white over time (Ladd, Clotfelter, and Holbein 2017).

Additional research documents the characteristics of schools that are most attractive to families who engage in choice. Some use revealed preferences on applications to schools or stated preferences on parent surveys. This research shows that families value school quality (in terms of contributions to student learning), peer characteristics, and achievement levels (Harris and Larsen 2015; Teske, Fitzpatrick, and O'Brien 2009; Burgess et al. 2015; Glazerman and Dotter 2017; Lincove, Cowen, and Imbrogno 2018; Abdulkadiroglu et al. 2020). There are also numerous informational interventions that randomly assign some families and/or students to receive information about schools' performance levels or graduation rates. Those in the treated groups tend to choose schools with higher performance levels (i.e., test scores, graduation rates) when presented with this information (Hastings and Weinstein 2008; Corcoran et al. 2018). This suggests that school choices can be, at least in part, influenced by information.

Despite the rise in public school options and seemingly high demand for schools of choice, families and students may face challenges when navigating choice systems. For instance, some studies find that families have strong preferences for schools that are close to home (Teske, Fitzpatrick, and O'Brien 2009; Harris and Larsen 2015; Burgess et al. 2015; Glazerman and Dotter 2017; Lincove, Cowen, and Imbrogno 2018), and families may face trade-offs in terms of school performance and proximity to home (Hastings and Weinstein 2008). To the extent that there are no high-quality options near to home, students may enroll in lower-performing schools even if their families highly value academics. In Denver, black and Latinx students tend to live farther from "top" schools than do white students (Denice and Gross 2016), and in Chicago, black families interviewed in Pattillo (2015) reported that proximity to home was important because of safety concerns. Pattillo also found that families felt that safety limited their options such that they were trying to avoid schools they perceived as bad rather than choosing a high-quality school. In surveys of families about school choice, a Center on Reinventing Public Education (CRPE) report shows that low-income families may lack

reliable transportation, making access to schools farther from home difficult (Teske, Fitzpatrick, and O'Brien 2009). In other work by CRPE, parents with lower levels of education were more likely to cite lack of information about the choice process and complicated eligibility rules as barriers (Jochim et al. 2014).

Because families vary in terms of resource constraints or access to information in ways that are correlated with racial/ethnic background or SES, it is not surprising that studies have found differential application patterns to high-performance schools by these characteristics—even if all families prefer schools with strong academics. In Chicago, black students applying to high school were significantly less likely to apply to schools with top accountability ratings than their nonblack peers (Barrow and Sartain 2019), and relationships between student characteristics and applications have been documented in other locations, as well. In Denver, black and Latinx students were more likely to rank lower-rated schools on their applications than white students (Gross, DeArmond, and Denice 2015). In New York City, low-achieving students applied to less selective and lower-performing high schools than high-achieving students (Nathanson, Corcoran, and Baker-Smith 2013). Further, controlling for achievement, black, Latinx, low-income, and female students were less likely to be admitted to New York City's specialized high schools relative to white and male students (Corcoran and Baker-Smith 2018).

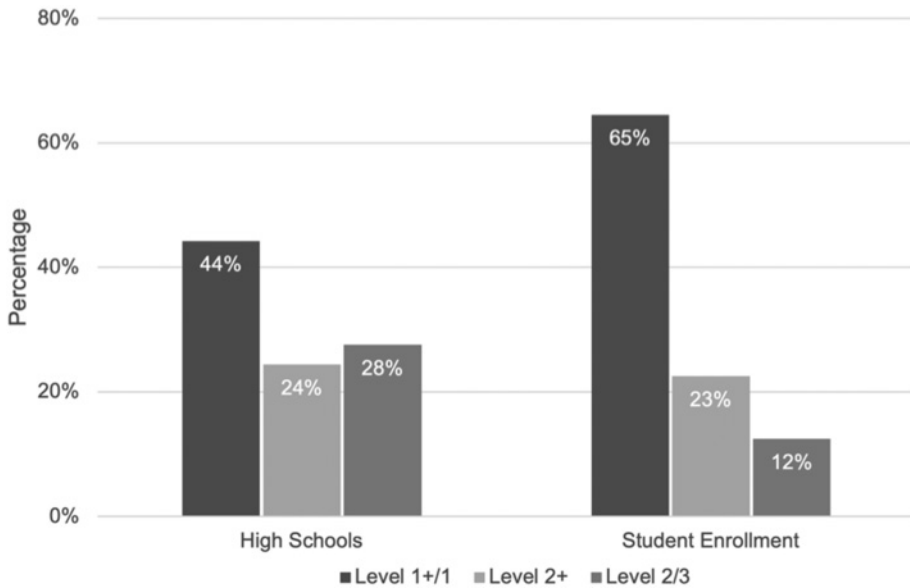
This paper adds to the school choice literature by quantitatively documenting different barriers that students face in accessing high-performance high schools. CPS is the largest school district with all schools participating in the centralized application process, meaning that we can include both charter and district-run schools to provide a more complete picture of the set of schools from which students choose. We unpack different steps of the application process for a cohort of eighth-grade students applying to high school, starting with options (and in particular, high-performance options) near students' homes, their eligibility to apply for various programs, their application choices, their offers, and ultimately their enrollment. Using rich administrative and survey data, we are able to account for differences in these various factors between black and Latinx students, as well as between students from different neighborhood SES, in order to show which factors may be contributing to differences in enrollment rates in high-performance high schools.

### **3. POLICY CONTEXT: CHICAGO PUBLIC SCHOOLS**

In this section, we outline a number of key aspects to better contextualize student enrollment in CPS high schools. We start with the school performance policy that generates the school accountability ratings available to the public. We then describe the high school options available to students, as well as a recent major change to the high school application process. This new application process generates centralized information about student preferences over high schools. Finally, we characterize different factors that influence student access to a high-performance high school, which are the focus of this paper.

#### **School Performance Ratings**

CPS evaluates each school's performance using the School Quality Rating Policy (SQRP), which also determines accountability status. Every year CPS generates a



Notes: Authors' calculations based on first-time, ninth-grade students who were enrolled in Chicago Public Schools in the fall of 2018, excluding students who are enrolled in a special education or alternative high school, and using the 2017–18 school-year School Quality Rating Policy (SQRP) ratings. These ratings are based on data from the 2016–17 school year and were available to fall 2018 first-time, ninth-grade students at the time they were applying to high schools in eighth grade. Percentages will not sum to 100 because six high schools did not have 2017–18 SQRP ratings.

Figure 1. Distribution of SQRP Accountability Ratings

weighted SQRP score for each school based on a variety of indicators. That score is then translated into one of five rating categories: Level 1+, Level 1, Level 2+, Level 2, or Level 3, with Level 1+ being the highest performance rating and Level 3 being the lowest. Schools rated Level 1+, 1, or 2+ are all in “Good Standing” for accountability purposes. However, the stated goal of the district is to enroll all students in “quality public schools,” and related district documents and policies often focus on Level 1+ and Level 1 schools. Level 2 schools are described as on “Remediation/Provisional Support” for accountability purposes, and Level 3 schools are on “Probation/Intensive Support.” Figure 1 shows the distribution of SQRP ratings across high schools, as well as the distribution of students enrolled in high schools with different performance ratings.<sup>1</sup> Nearly one half of high schools are high-performance schools with top SQRP ratings of Level 1+ or Level 1, and 65 percent of students are enrolled in one of those high schools. Although 28 percent of high schools receive a low SQRP rating, only 12 percent of ninth graders are enrolled in those high schools.

The SQRP ratings are publicly available and included in principal evaluations, and schools celebrate and advertise high SQRP ratings. The district’s online school application system allows students and families to filter programs based on the SQRP ratings, and an annual district analysis of “high-quality” seat availability across the city uses

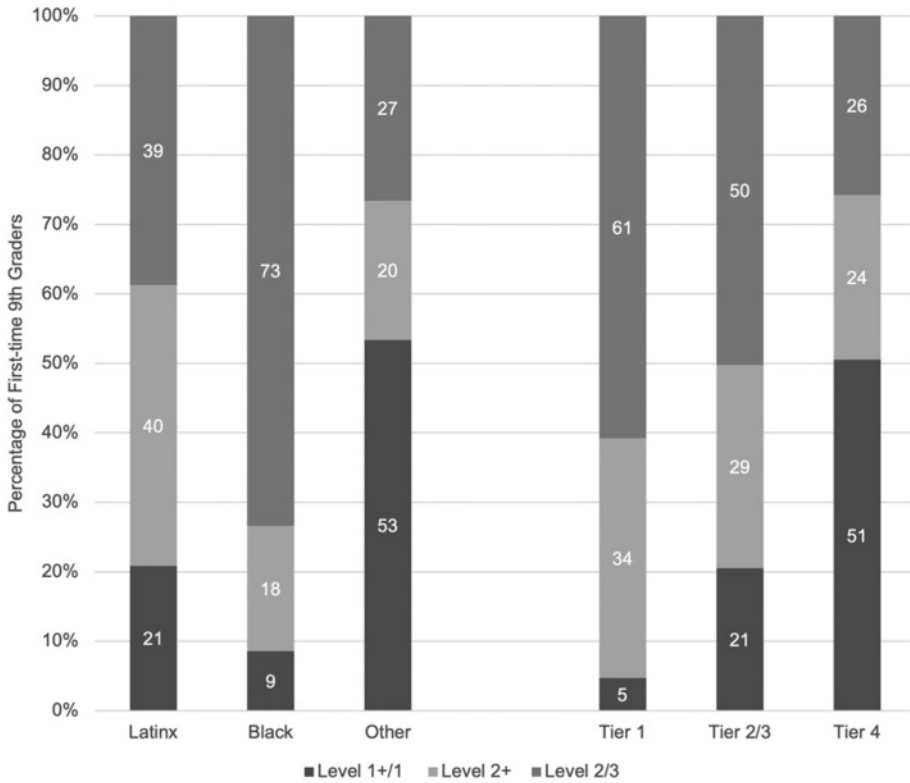
1. Student enrollment by SQRP rating is based on the sample of all first-time, ninth-grade students enrolled in CPS in fall 2018, excluding students who are enrolled in a special education or alternative high school. The sample of high schools by SQRP rating reflects the 156 high schools in which these students were enrolled. Six of the high schools do not have SQRP ratings.

SQRP ratings to define quality. For all of these reasons, we also define school performance based on SQRP ratings. We note, however, some shortcomings of using SQRP accountability ratings as a proxy for quality. Although CPS uses a fairly broad set of indicators to measure school performance that go beyond just test scores, the number of indicators are finite and thus may not fully capture all dimensions of schooling that matter to families and students.<sup>2</sup> Additionally, students apply to and enroll in high school programs whereas the SQRP rating system applies to the high school as a whole. While most (60 percent) of high schools have only one program, an overall school rating could mask differences in performance across programs within a high school. Further, even if the intent of SQRP is to capture school quality, some measures used in the rating system likely reflect a combination of a school's contribution to student learning and student family background and resources. Finally, because the weighted SQRP scores get translated into discrete ratings categories, schools can move from one category to another without much change in the underlying score. As a result, students may end up enrolled in a school that was high-performing at the time the student was making an enrollment decision but is mid-performing by the time they are enrolled, and vice versa.<sup>3</sup>

### High School Options

Another key piece of context is that CPS is an open enrollment school district. All students are zoned to a default high school based on their residential address, but they are welcome and encouraged to apply to other high school programs that may be a better fit, including specialized programs within their zoned high school and other neighborhood high schools. The options include charter school programs, selective enrollment programs, and career and technical education programs (CTE) among many others. As a result, roughly 75 percent of first-time ninth graders in CPS attend a high school other than their zoned school, with black students and students living in lower SES neighborhoods being the most likely to enroll in a high school other than their zoned school (Barrow and Sartain 2017). This finding is perhaps not surprising given that there are large differences in the accountability ratings of students' default high school both by race/ethnicity and neighborhood SES. Figure 2 shows the performance distributions of default high schools. Only 9 percent of black students are zoned to a high-performance high school (i.e., a high school with a Level 1+/1 accountability rating) compared with 21 percent of Latinx students and 53 percent of students of other races/ethnicities. For neighborhood SES, 5 percent of students living in tier 1 neighborhoods (the lowest SES) have a high-performance high school as their default option compared with 21 percent of students living in tier 2 or 3 neighborhoods and 51 percent of students living in tier 4 neighborhoods.

2. Up to 30 percent of the rating for high schools is based on test score growth while the remaining 70 percent is based on percentage of students meeting college readiness benchmarks, attendance, freshmen on-track, and 4-year cohort graduation rate (10% each) and 1-year dropout rate, percentage meeting early college and career credentials, college enrollment, college persistence, My Voice My School 5Essentials school climate survey, and data quality (5% each). See Chicago Public Schools (2019).
3. For example, 65 percent of first-time, ninth-grade students were enrolled in a high-performance high school in fall 2018 if we use the SQRP ratings available at the time students were applying to high school programs. If, instead, we use the SQRP ratings of schools for the 2018–19 school year, only 57 percent of first-time, ninth-grade students were enrolled in a high-performance high school.



Notes: Authors' calculations based on the zoned high school for first-time, ninth-grade students who were enrolled in Chicago Public Schools in the fall of 2018, excluding students who are enrolled in a special education or alternative high school, and using the 2017–18 school-year School Quality Rating Policy ratings. These ratings are based on data from the 2016–17 school year and were available to fall 2018 first-time, ninth-grade students at the time they were applying to high schools in eighth grade.

**Figure 2.** Performance Distribution of Students' Default Neighborhood High School, by Student Race/Ethnicity and Neighborhood Socio-economic Status

Beginning with eighth-grade students who applied to enroll in high school in the fall of 2018, CPS adopted a universal application system called GoCPS and moved all high school program applications, including charter schools, to a single Web-based platform with a common application deadline. The centralized application system uses an algorithm to match applicants and high schools, offering students a seat in the highest-ranked program on their application for which they qualified and for which seats are available.<sup>4</sup> (For more details on the implementation of GoCPS, see Barrow and Sartain 2019.) These enrollment systems typically have the long-term goal of improving student outcomes and increasing family satisfaction by minimizing the barriers that students face when attempting to enroll in a preferred high school. The application data merged with other CPS data on demographics, residential location, and high school enrollment enable us to examine the path to enrolling in a high-performance high school, starting with access and eligibility to apply to different high school programs.

4. Students complete separate applications for selective enrollment high schools and all other choice programs. The matching algorithm is serial dictatorship for selective enrollment programs and deferred acceptance for choice programs.



Through GoCPS, there are two applications available—one for choice programs (the choice application) and one for selective enrollment high school (SEHS) programs (the SEHS application). There are 273 choice programs; 185 admit students by lottery and 88 admit students by points, where points are based on factors such as grades, test scores, and auditions. Ninety-one percent of the seats available to incoming ninth graders are choice programs. SEHS programs use points-based admission. There are 11 SEHSs in CPS, and only 9 percent of the seats available to incoming ninth graders are at SEHSs. With the introduction of GoCPS, we note that the district maintained zoned high schools, and students who intend to enroll in the general education program at their zoned high school do not have to complete an application.

Not all programs are options available to all students. There are two ways CPS uses eligibility prior to making admissions decisions. First, students are not allowed to apply to programs for which they do not meet pre-application eligibility criteria. When a student logs onto the GoCPS Web site, all programs to which a student is eligible to apply are listed in alphabetical order. Programs to which a student is not eligible to apply are displayed on a gray background following the eligible program list, and these cannot be selected. Eligibility criteria may be determined by the high school or may be program-specific (e.g., IB programs have a common eligibility requirement in order to apply of a 2.5 grade point average [GPA] in seventh grade and being at or above the 24th percentile on math and reading tests in seventh grade). Both types of choice programs (lottery and points) may have pre-application requirements, and all SEHSs have a pre-application requirement that students score at or above the 24th percentile on the seventh-grade math and reading tests. Second, after students apply to and rank programs, students need to complete post-application screens. Students must complete the screen before being eligible to receive an offer for that program. For example, arts programs typically require portfolio submissions. Students can apply to these programs but will not be eligible to receive an offer if they do not submit their portfolio. In this paper, we refer to any criteria that students must meet in order to apply as *eligibility requirements* and any post-application requirements that must be met to be considered for an offer of admission as *post-application screens*.<sup>5</sup>

### Factors Affecting the Pathway to a High-Performance High School

There are a number of factors that likely influence a student's path to a high-performance high school. Consider an eighth-grade student deciding how to rank high school programs on her application. The student and her family may compare high school programs across a variety of dimensions, including program type, quality, extracurricular activities, and so forth. Based on their preferences and the various program characteristics, students then rank a set of programs from most to least preferred. Thus, students' applications will play a large part in determining where a student will ultimately enroll—specifically, the performance levels of the schools to which students

5. A third type of eligibility is minimum point levels needed for admission to a program. For programs like IB, each program sets its own minimum point level for admission. For SEHS programs, there is a district minimum point level to be eligible and then cutoffs for admission above that level are determined program by program based on the number of seats available, student preferences, student application points, and student neighborhood tier.

apply and the order in which they rank those schools will influence whether a student ends up enrolled in a high-performance high school. For example, because roughly one half of students receive an enrollment offer from their top-ranked choice program (Barrow and Sartain 2019), students who do not list a program in a high-performance high school at the top of their choice application will be less likely to end up enrolled in a high-performance high school. In addition, factors like seventh-grade GPA and test scores affect both whether a student is eligible to apply to choice programs with eligibility criteria and a student's likelihood of admission to choice programs that use points-based admissions.

In order to assess whether students have access to high school programs in high-performance schools, our empirical strategy is to estimate how much of the difference between student groups in ranking a program in a high-performance high school at the top of the choice application may be explained by factors that likely reflect differences in access. We do a similar estimation exercise for differences in enrolling in a high-performance high school (choice or SEHS). When we analyze how different factors relate to the performance rating of a student's top-ranked school, we will focus on the rating of his top-ranked program on the choice application since the majority of available seats are in choice programs and all SEHSs have high performance ratings. Students who only complete a SEHS application will have a missing rating for their top-ranked program. When we analyze the relationships between the factors and the performance rating of the enrolled high school we will use the performance rating of the enrolled high school regardless of whether the student enrolled in a choice program or a SEHS program.<sup>6</sup> For analyses of applications and enrollment, we consider four categories of access factors—eligibility, distance, elementary (K–8) school performance, and community SES. Eligibility factors include grades, test scores, and attendance rates, and distance factors include distance to the nearest high-performance high school and distance to the nearest Chicago Transit Authority (CTA) train stop. Ideally, we would have a measure of how well a student's elementary school is able to support students in the high school application process. Without such information, we use the elementary school accountability points with the idea that higher performing elementary schools may also be better at supporting students in navigating high school choice. Finally, the community SES factors include measures of poverty and SES with the idea that these may also reflect something about the potential resources available to students to support them in navigating the choice process. Importantly, these factors are more amenable to being addressed by policy decisions than factors like preferences. For instance, eliminating GPA minimums or changing to lottery admissions could increase access to particular programs for students with relatively low GPAs, or CPS might target additional parent and community group outreach and support to lower SES neighborhoods. We discuss these factors in more detail in the Data and Methodology section that follows.

6. If we include SEHS programs when considering whether a student ranked a high-performance high school at the top of his application, differences by student race/ethnicity or neighborhood tier are smaller. Further, eligibility factors will play a larger role since students with relatively low test scores will not be eligible to apply to SEHSs. We also find that elementary school performance is relatively more important for ranking a high-performance high school at the top.

## 4. DATA AND METHODOLOGY

### Data Description

We use administrative data provided by the school district and archived by the UChicago Consortium on School Research, including student enrollment and demographic files and applications to high school for the cohort of first-time ninth graders entering high school in fall 2018. We also have survey data about applying to high school for this same cohort of students administered when they were in eighth grade. To the administrative and survey data, we merge publicly available high school performance data, as well as the location of high schools and CTA train stations.

Student enrollment and demographic files include the student's school of attendance for eighth and ninth grade, as well as the student's race/ethnicity, gender, census block group of the residence, and IEP status. The UChicago Consortium creates two SES indices using data from the American Community Survey at the census block-group level. One is a measure of the concentration of poverty that is based on the adult male employment rate and the percentage of families with income above the poverty line. Another is a measure of social status that is based on the mean level of education among adults and the percentage of employed persons who work as managers or professionals. In both cases, the measures are standardized across census block groups to have mean zero and standard deviation of one. These indices are linked to the student's residential census block group.

Application data include students' ranking over two sets of high school programs—SEHS programs and choice programs (all high school programs outside of the 11 SEHS programs). Students applying to SEHS programs rank up to 6 programs. Students applying to choice programs rank up to 20 out of more than 250 programs. Choice programs include general education programs at traditional neighborhood high schools, CTE, IB, military, music and arts programs, and charter schools. In addition to students' rankings of SEHS and choice programs, these data include students' national percentile rankings (NPRs) on seventh-grade math and reading tests, GPA, and their attendance rate, which determine eligibility to apply to programs with pre-application eligibility criteria and may contribute to application points for programs that admit students based on application points rather than lottery. For programs with post-application screens such as admissions exams, auditions, or attending an information session, the applications data also include data that we use to determine whether students completed those requirements. Students who do not complete a post-application screen are not eligible for admission to that program; however, even if a student completes a screen, she is not guaranteed admission to that program. Finally, these data also contain the SES tier corresponding to the student's residential census tract; these tiers are used for determining admission to the SEHS programs and some magnet programs. (See Barrow, Sartain, and de la Torre 2018 for more detail about CPS high school applications and admissions.)

All CPS students in grades 6–12 are administered the annual 5Essentials school climate survey, and schools typically allocate dedicated time for students to complete the survey. We added questions to the survey specifically for eighth-grade students to understand the qualities of high school programs that students consider as important. In this paper, we provide student responses to the importance of the following factors: safety, academics, extracurricular opportunities, parent preferences, distance from home, and

**Table 1.** Descriptive Statistics for Chicago Public School Ninth-Grade Students

Student Characteristics	First-Time Ninth Grade Students (1)	Application Sample (2)	Enrolled in a Level 1+ /1 HS (3)	Enrolled in a Level 2+ HS (4)	Enrolled in a Level 2/3 HS (5)
Rank Level 1+ /1 school at top		74%	90%	40%	43%
SES tier 1	28%	28%	23%	38%	39%
SES tier 2	29%	29%	27%	32%	32%
SES tier 3	26%	26%	28%	22%	23%
SES tier 4	17%	17%	22%	8%	6%
Latinx	49%	50%	53%	50%	30%
Black	35%	35%	26%	45%	67%
Other race/ethnicity	16%	15%	21%	5%	3%
Female	50%	51%	53%	51%	44%
IEP	14%	15%	11%	19%	25%
N	26,141	22,538	15,028	4,972	2,528

Notes: Column 1 includes all first-time ninth-grade students enrolled in Chicago Public Schools (CPS) in fall 2018, excluding students enrolled in a special education or alternative high school. The application sample shown in column 2 further limits the sample to students who applied to high school through the GoCPS application (in order to have data on student program rankings) and drops students who are missing data on census block of residence, math or reading test scores, or grade point average. Columns 3–5 are restricted to students in the application sample; ten students in the application sample are attending a school without a high school SQRP rating. SES tier 1–4 is how CPS categorizes a student's census block in terms of socioeconomic status (SES) and elementary school performance level, with tier 1 neighborhoods being the lowest SES and tier 4 the highest. HS = high school; IEP = individualized education plan.

friends in attendance. The response rate to the survey is 88 percent for the application sample; the high response rate helps to ensure that the findings we report are generalizable to the CPS population of high school applicants.

### Application Sample

In table 1, we present descriptive statistics for the 2018–19 ninth-grade cohort that we analyze in this paper, showing the characteristics of all first-time ninth-grade students, the application sample, and the application sample by the accountability rating of the high school where the student enrolled. The application sample (column 2) is a subset of all first-time ninth-grade students (column 1) limited to students who applied to high school through the GoCPS application (in order to have data on students' program rankings) and drops students who are missing data on census block group of residence, test scores, or GPA. This sample represents 86 percent of the cohort of first-time ninth-grade students and looks very similar to the entire cohort. Twenty-eight percent of application students live in CPS tier 1 census tracts (the lowest SES neighborhoods in the city), while 17 percent live in CPS tier 4 census tracts (the highest SES neighborhoods in the city). One half of students are Latinx, 35 percent are black, and 15 percent are of another race/ethnicity. Fifteen percent have individualized education plans (IEPs).

Columns 3 through 5 of table 1 indicate a relationship between student characteristics and the performance rating of the high school attended. Specifically, students living in the most affluent areas of the city (tier 4) are somewhat overrepresented at high-performance high schools (rated Level 1+ or 1), as are Latinx students and students of other races/ethnicities. Black students are overrepresented at low-performance high schools. Sixty-seven percent of the student population at low-performance high schools is black compared with 35 percent of the application sample. While students living in

**Table 2a.** Means and Standardized Differences in Access Factors by Race/Ethnicity

	Latinx Students (1)	Black Students (2)	Other Students (3)	Standardized Difference (Black — Latinx) (4)
<b>Eligibility</b>				
Math test score (NPR)	52.48	46.69	76.97	−0.20***
Reading test score (NPR)	55.42	53.64	76.78	−0.07***
GPA (4.0 scale)	2.79	2.49	3.45	−0.33***
Attendance rate (% of enrolled days)	95.82	95.39	96.72	−0.09***
<b>Distance measures</b>				
Minimum distance to high-performance HS (miles)	1.12	1.81	1.38	0.74***
Minimum distance to a train stop (miles)	2.04	2.02	1.67	−0.01
<b>Elementary school performance</b>				
Elementary school SQRP (SD units)	0.08	−0.41	0.76	−0.49***
<b>Community SES factors</b>				
CPS tier index (SD units)	−0.14	−0.27	1.03	−0.13***
Concentration of poverty (SD units)	−0.17	0.61	−0.82	0.78***
Social status (SD units)	−0.39	0.19	0.84	0.59***
Observations	11,252	7,802	3,484	

Notes: Eligibility measures are from seventh grade. Math and reading test scores are shown as national percentile rankings. Distance calculations are taken from the centroid of the student's census block of residence to the specified location and are constructed as straight-line distance. For community SES measures, the CPS tier index is associated with the student's census tract of residence, and the concentration of poverty and social status measures are associated with the student's census block. The standardized differences are based on values standardized using all students in the application sample. The means reported for the school and community SES measures are based on these standardized values of the underlying indexes. Latinx students include all students who report their ethnic identity is Latinx regardless of their racial identity. Black students include students who report their racial identity is black. Other students include students who report their racial identity is Asian, white, American Indian/ Alaska Native, Native Hawaiian/ Other Pacific Islander, multiple racial identities, or for whom the information is missing. CPS = Chicago Public Schools; GPA = grade point average; HS = high school; NPR = national percentile ranking; SD = standard deviation; SES = socioeconomic status; SQRP = School Quality Rating Policy.

\*\*\*  $p$ -value for a two-sample  $t$ -test with equal variances  $<0.001$ .

lower SES census tracts are also more likely to be enrolled at low-performance high schools, the relationship between student race/ethnicity and high school performance level is stronger than the relationship between neighborhood SES and high school performance level. In our analysis, we analyze differences in access factors and outcomes between black and Latinx students and between students living in tier 1 neighborhoods (lowest SES) and students living in tier 2 or 3 neighborhoods (middle SES). We focus on these groups of students because they make up the vast majority of the CPS student body—black and Latinx students combined are 84 percent of CPS ninth graders, and students living in tier 1, 2, or 3 neighborhoods are 83 percent of CPS ninth graders.

Though not a focus of this paper, we note that there are large differences in enrollment patterns by student IEP status, as well. Of students enrolled in Level 1+/1 high schools, 11 percent have IEPs compared with 25 percent at Level 2/3 high schools. In addition, female students are overrepresented at high-rated high schools, with male students more likely to attend low-rated high schools.

### Access Factors

In tables 2a and 2b, we present descriptive statistics for four groups of access factors that we consider in our analysis by race/ethnicity (table 2a) and by neighborhood SES

**Table 2b.** Means and Standardized Differences in Access Factors by Neighborhood SES

	Tier 1 Students	Tier 2 or 3 Students	Tier 4 Students	Standardized Difference (Tier 1 – Tier 2/3)
	(1)	(2)	(3)	(4)
<b>Eligibility</b>				
Math test score (national percentile ranking)	46.65	51.24	67.77	−0.25***
Reading test score (national percentile ranking)	50.96	54.99	71.21	−0.25***
GPA (4.0 scale)	2.59	2.73	3.18	−0.20***
Attendance rate (% of enrolled days)	95.32	95.84	96.16	−0.13***
<b>Distance measures</b>				
Minimum distance to high-performance HS (miles)	1.40	1.28	1.58	0.06***
Minimum distance to a train stop (miles)	1.63	1.82	2.13	−0.28***
<b>Elementary school performance</b>				
Elementary school SQR (SD units)	−0.40	0.04	0.56	−0.44***
<b>Community SES factors</b>				
CPS tier index (SD units)	−0.94	0.04	1.42	−0.98***
Concentration of poverty (SD units)	0.60	0.01	−1.02	0.58***
Social status (SD units)	−0.59	−0.02	1.03	−0.57***
Observations	6,335	12,334	3,869	

Notes: Eligibility measures are from seventh grade. Distance calculations are taken from the centroid of the student's census block of residence to the specified location and are constructed as straight-line distance. For community SES measures, the CPS tier index is associated with the student's census tract of residence, and the concentration of poverty and social status measures are associated with the student's census block group. The standardized differences are based on values standardized using all students in the application sample. The means reported for the school and community SES measures are based on these standardized values of the underlying indexes. Neighborhood tier is defined by CPS at the census tract level using an index of SES based on census measures and elementary school performance. Tier 1 students live in the lowest SES census tracts as measured by the CPS tier index; tier 4 students live in the highest SES census tracts. CPS = Chicago Public Schools; GPA = grade point average; HS = high school; NPR = national percentile ranking; SD = standard deviation; SES = socioeconomic status; SQR = School Quality Rating Policy.

\*\*\*  $p$ -value for a two-sample  $t$ -test with equal variances  $<0.001$ .

tier (table 2b). Eligibility factors are included in the top panel, followed by distance factors, elementary school performance, and community SES factors in the bottom panel. Columns 1, 2, and 3 show means for each student group, and column 4 shows the standardized differences in means for the focal analysis. In the case of race/ethnicity, we focus on differences between black and Latinx students, and in the case of neighborhood SES we focus on differences between students living in tier 1 neighborhoods and students living in tier 2 or 3 neighborhoods. The community and school factors have been standardized within the application sample to have mean zero and standard deviation of one.

The eligibility factors—math and reading test NPRs, GPA, and attendance rate—are measures that are sometimes used as eligibility criteria to apply to programs, sometimes used to determine application points for admission, and sometimes used for both. For example, students have to have a minimum GPA of 2.5 and a minimum NPR of 24 on both the reading and math tests in seventh grade in order to apply to any IB diploma program. In addition, the number of IB application points, which determine whether a student is admitted to an IB program, are based on seventh-grade GPA and test score percentiles. On average, Latinx students achieve an NPR of 52 on the math test compared with an average of 47 for black students, equivalent to a 0.20 standard

deviation difference. Latinx students also have a somewhat higher average NPR in reading. Average GPA for Latinx students is about one quarter of a grade point higher than the average GPA for black students, a difference of 0.33 standard deviation. All differences are statistically significant with *p*-values below 0.001. Thus, eligibility factors may help explain some of the difference in application and enrollment rates at high-SQRP high schools between black and Latinx students.

Similarly, students from tier 2/3 neighborhoods score higher on the eligibility factors than students from tier 1 neighborhoods. For both math and reading tests, students living in tier 1 neighborhoods score an average of 0.25 standard deviations below students living in tier 2/3 neighborhoods. Their GPAs are 0.2 standard deviation below students living in tier 2/3 neighborhoods, and their attendance rate is about 0.1 standard deviation lower. Thus, eligibility factors may also help explain differences in application and enrollment rates between students living in tier 1 neighborhoods and students living in tier 2/3 neighborhoods.

The distance factors reflect distance measures between a student's residential census block group and the block group of the nearest high-performance high school or CTA train stop. For these measures we see that, on average, black students live substantially farther from the nearest high-performance high school than Latinx students. Latinx students live on average 1.1 miles from the nearest high-performance high school while black students live an average of 1.8 miles from a high-performance high school. This is a difference of nearly 0.75 standard deviation and statistically different from zero at the 0.1 percent level. In contrast, both black and Latinx students live an average of 2 miles from the nearest CTA train station.

Distances may also play a factor in explaining differences in application and enrollment rates between students living in tier 1 neighborhoods and students living in tier 2/3 neighborhoods, but again the differences are a bit mixed. Students from tier 1 neighborhoods live 0.12 mile or 0.06 standard deviation further from the nearest high-performance high school than students from tier 2/3 neighborhoods. However, tier 1 students live about 0.2 mile or 0.3 standard deviation closer to a CTA train stop than tier 2/3 students, which may make it somewhat easier to get to a school depending on its proximity to the same CTA train line.

The elementary school performance measure is the SQRP index for the school attended in eighth grade (typically this is an elementary school serving grades K–8, and it is only available for students enrolled in CPS). Latinx students attend elementary schools that are just above average on the SQRP index, whereas black students attend elementary schools that are 0.4 standard deviation below average. As a result, there is a nearly 0.5 standard deviation gap in the SQRP index between black and Latinx students for the elementary school attended. There is a similarly sized gap in the SQRP index between students from tier 1 and tier 2/3 neighborhoods of 0.44 standard deviation.

Finally, the community SES factors include the CPS tier index and the UChicago Consortium indices for concentration of poverty and social status. We note that the CPS index is at the census tract level, whereas the UChicago Consortium indices are at the census block group level. Differences between black and Latinx students in terms of their neighborhood resource factors are mixed. On average, both black and Latinx students live in census tracts that are below average on the CPS tier index, but the average tier index for black students is 0.13 standard deviation units below the average

CPS tier index for Latinx students. Black students also live in census block groups with higher concentrations of poverty. The difference in the average poverty concentration index between black and Latinx students is nearly 0.8 standard deviation. In contrast, black students live in census block groups that score higher on the social status index, a difference of nearly 0.6 standard deviation unit.

We present the means and standardized differences by neighborhood tier in table 2b, even though we do not try to use the community SES factors to explain differences between ranking and enrollment patterns by neighborhood tier. Because neighborhood tier is directly defined or closely related to these factors, it is difficult from a policy standpoint to think about being able to change a factor without also changing neighborhood tier. As a group, these measures represent the largest differences between tier 1 and tier 2/3 students. There is a 1 standard deviation unit gap in the tier index and 0.6 standard deviation gaps for each of the poverty concentration and social status indices.

### Analytic Approach

In order to quantify the extent to which the differences we observe in various access factors by race/ethnicity and neighborhood SES can explain enrollment patterns in high-performance high schools, we adapt a technique developed by DiNardo, Fortin, and Lemieux (1996) that they use to examine questions like: How would the wage distribution have changed from 1973 to 1992 if union participation had remained at its 1973 level? We adapt their technique to examine the distributions of the SQR performance level of enrolled high school or top-ranked high school for different student groups. In particular, we want to ask how the distribution of black student enrollment by high school performance might look if the distributions of black student grades and test scores, for example, were the same as the distributions for Latinx students, but the relationship between grades, test scores, and high school performance for black students was unchanged.

Consider the following distribution of enrolled high school performance:

$$g(SQRP) = \int f(SQRP|x)h(x)dx, \quad (1)$$

where  $f(SQRP|x)$  is the density of enrolled high school SQR performance for a given set of individual characteristics,  $x$ . The set of characteristics,  $x$ , are distributed  $h(x)$ .

The observed density of enrolled high school SQR performance for black students can be written:

$$g(SQRP|r = black) = \int f^{black}(SQRP|x)h(x|r = black)dx. \quad (2)$$

Similarly, the observed density of enrolled high school SQR performance for Latinx students can be written:

$$g(SQRP|r = Latinx) = \int f^{Latino}(SQRP|x)h(x|r = Latinx)dx. \quad (3)$$

The goal of our analysis is to estimate what the distribution of enrolled high school SQR performance for black students might look like if black students had the same distribution of observable characteristics (distance from high-performing high schools, test scores,



GPA, etc.) that Latinx students have, but that the distribution of enrolled high school SQRP given those characteristics was unchanged. This can be written as:

$$g_{Latinx}^{Black}(SQRP) = \int f^{Black}(SQRP|x)h(x|r = Latinx)dx. \tag{4}$$

Bayes rule implies that:

$$h(x) = \frac{h(x|r = Black)Pr(r = Black)}{Pr(r = Black|x)} \tag{5}$$

and

$$h(x) = \frac{h(x|r = Latinx)Pr(r = Latinx)}{Pr(r = Latinx|x)}, \tag{6}$$

where  $Pr(r = Black)$  and  $Pr(r = Latinx)$  are the probabilities that a given sample comes from the black student population and the Latinx student population, respectively.  $Pr(r = Black|x)$  and  $Pr(r = Latino|x)$  are the probabilities that a sample comes from a particular race/ethnicity group, given the observed characteristics.

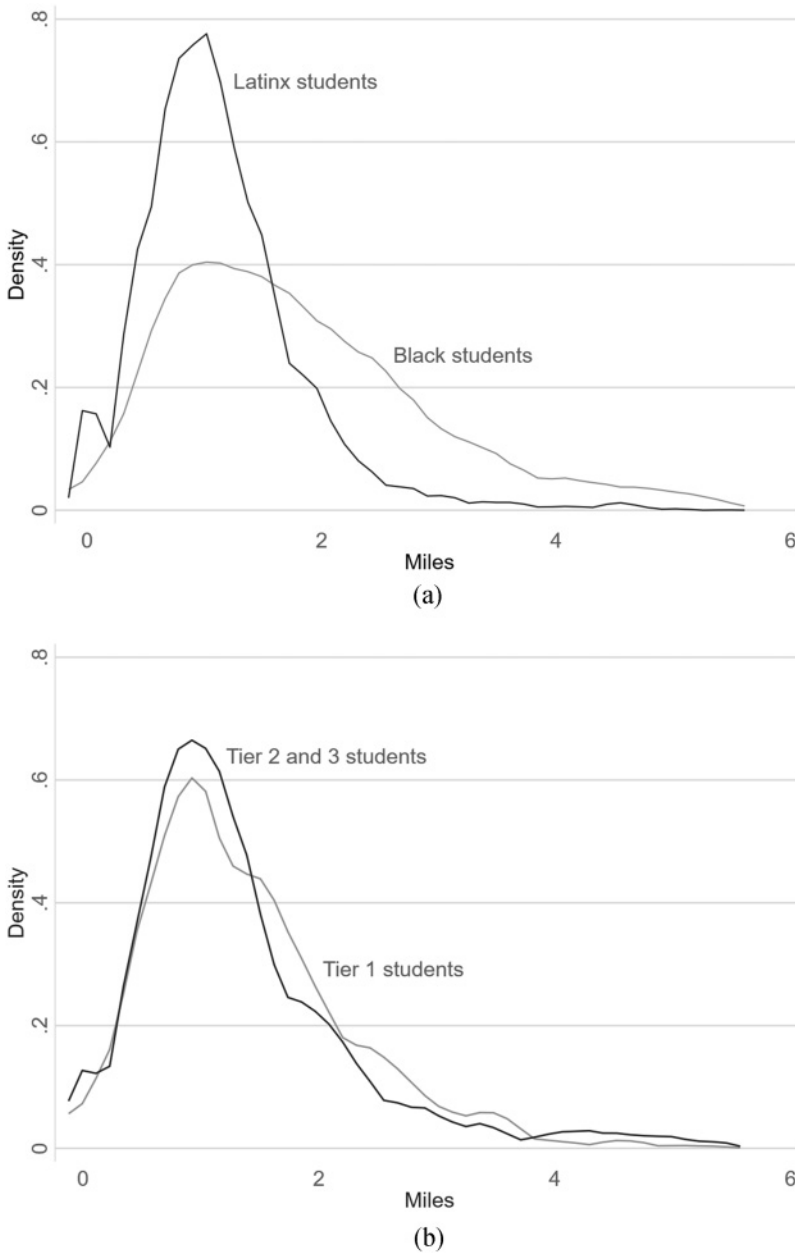
We can set  $Pr(r = Black) = Pr(r = Latinx)$ —the probability of a sample coming from the black students or the Latinx students is the same—so that we can rewrite the distribution of characteristics of black students in terms of the distribution of characteristics in the Latinx student population and the probabilities that a given sample comes from a particular student group, given the observed characteristics. Namely,  $h(x|r = Black) = h(x|r = Latinx) \cdot \frac{Pr(r=Black|x)}{Pr(r=Latinx|x)}$ .

Thus, we can write equation 4 as:

$$g_{Latino}^{Black}(SQRP) = \int \theta(x)f^{Black}(SQRP|x)h(x|r = Black)dx, \tag{7}$$

where  $\theta(x) = \frac{Pr(r=Latinx|x)}{Pr(r=Black|x)}$ . That is, the problem is reduced to one of reweighting where the estimated  $\theta$  are the counterfactual weights.

For example, in figure 3a, we plot the distributions of the distance between student residences and the nearest high-performing high school for both black and Latinx students (see Appendix figures A.1, A.2, and A.3 [available in a separate online appendix that can be accessed on *Education Finance and Policy's* Web site at [www.mitpressjournals.org/efp](http://www.mitpressjournals.org/efp)] for the distributions of other variables that we use in this analysis); in figure 3b we plot the same distributions for students living in tier 1 neighborhoods and students living in tier 2 or 3 neighborhoods. The mass of the distance distribution for Latinx students lies to the left of the distribution for black students, although there is still substantial overlap of the distributions. We can create counterfactual weights for the black students in the data such that the weighted minimum distance distribution for black students is exactly the same as the observed minimum distance distribution for Latinx students. Effectively we create weights that increase the weight of black students who live relatively close to high-performing high schools and decrease the weight of black students who live relatively far from high-performing high schools. We then use these weights to reweight the distribution of SQRP for the high schools attended (or top-ranked) by black students. We perform a similar exercise to generate reweighted distributions for students living in tier 1 neighborhoods.



Notes: Distances are calculated in miles as-the-crow-flies between the census block group of a student's residence and the census block group of the high school.

**Figure 3.** Distributions of the Minimum Distance in miles to a School Quality Rating Policy Level 1+ or Level 1 High School for (a) Black and Latinx Students and (b) Students Living in Tier 1 Neighborhoods and Those Living in Tier 2 or 3 Neighborhoods

We use logit regression and multiple access factors to derive weights for this exercise. To begin, we create “simple” weights that sum to one within each student group, black and Latinx, for example, so that the unconditional probabilities of an observation

being a black or Latinx student are equal—that is, one half of the weighted student observations are black and one half are Latinx. For each individual in the group, the simple weight equals one divided by the total number in the group. Then, we estimate a logistic regression with the simple weights to predict a student’s race/ethnicity group as a function of the access factors. This gives us estimates of the conditional probabilities in  $\theta(x)$ . The counterfactual weight is then the simple weight multiplied by the appropriate estimated odds ratio from the logistic regression.<sup>7</sup>

## 5. RESULTS

In this section, we start by showing more detail about the observed differences in high school application and enrollment patterns by student race and neighborhood SES. Next, we turn to eighth-grade students’ reports about the qualities they are looking for when they are considering where to enroll in high school. Finally, we show the extent to which differences in access factors might explain gaps in ranking and enrolling in high performance high schools by race/ethnicity and neighborhood SES.

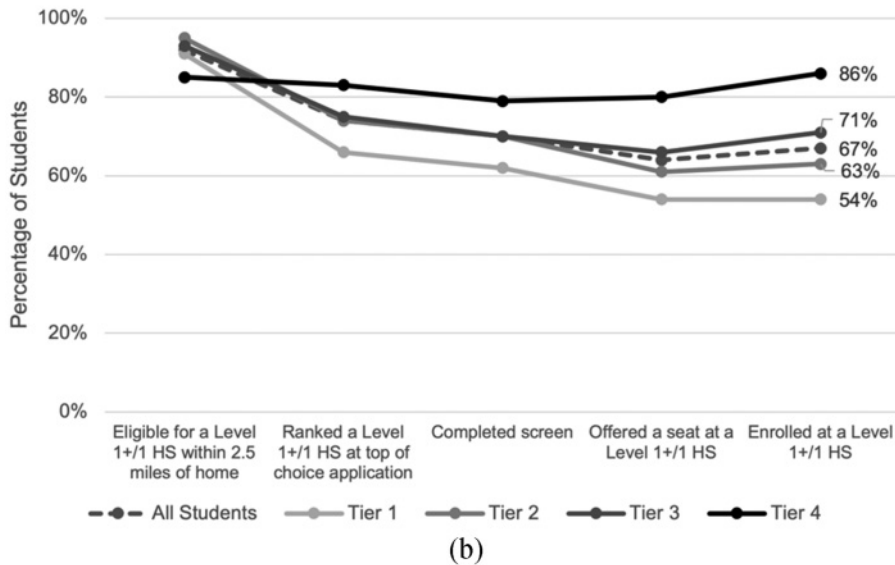
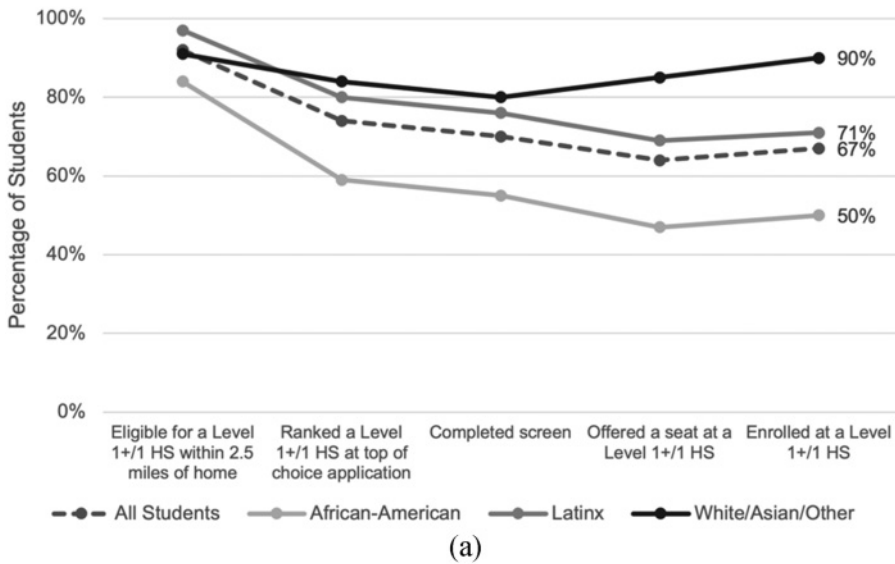
### Applications and Enrollment

Because of CPS’s centralized application system, we can learn more about the pathway to enrolling in a high-performance high school, as well as identify steps at which students may face differential barriers to enrolling. To begin, we look at:

1. Being eligible to apply to a program in a high-performance high school within 2.5 miles of home;
2. Ranking a high-performance high school at the top of the choice application;
3. Completing post-application screens (if applicable);
4. Receiving an offer from a high-performance high school, either choice or SEHS; and
5. Enrolling in a high-performance high school, either choice or SEHS.

For steps 1–3, we focus on access and applications to choice programs in high-performance high schools. We do so because nearly all students complete a choice application, and most students will end up enrolled in a choice program. Whereas more than 60 percent of sample students apply to at least one SEHS program, fewer than one third of those applicants will be offered a SEHS seat, and only 15 percent of the sample enrolls in a SEHS enrollment program. In contrast, 98 percent of the sample completes a choice application, and 85 percent enrolls in a choice program. In addition, all SEHS programs are in high-performance high schools, so ranking a high-performance SEHS program at the top of the SEHS application only depends on whether a SEHS application is submitted, even though the likelihood of receiving an offer is relatively low.

7. Standard errors are estimated using bootstrap methods. We draw random samples of the data with replacement equal in size to the original samples within groups. For each draw we estimate the counterfactual weights and the corresponding share of students enrolling in a high-performance high school. We repeat the process 1,000 times to obtain 1,000 counterfactual estimates of the share of black or tier 1 students ranking a high-performance high school at the top of their choice application or enrolling in a high-performance high school. Our standard errors are the square-root of the variances of these estimates.



Notes: Completed screen is restricted to the student’s top-ranked program on the choice application, even though students could have applied to multiple programs that required screens. Offered a seat at a Level 1+/1 HS and Enrolled at a Level 1+/1 HS include offers from and enrollment in both choice and selective enrollment high schools. We use the School Quality Rating Policy rating level that corresponds to the ratings available when first-time ninth-grade students were enrolled in eighth grade and applying to high school, as that is the information that was available when they were making application and enrollment decisions. For the cohort entering high school in fall 2018, these ratings would have been released in fall 2017 and are based on data from the 2016–17 school year.

Figure 4. Pathway to Enrolling in a High-Performance High School for (a) Students by Race and (b) Students by Neighborhood Tier

We show this pathway overall and by student race/ethnicity in figure 4a. Almost all applicants (92 percent) are eligible for at least one choice program in a high-performance high school within 2.5 miles of their home, and 74 percent list a program

at a high-performance high school at the top of their choice application.<sup>8</sup> (See figure A.4 available in the online appendix for a depiction of the pathway to enrolling in a SEHS, specifically. We note that 80 percent of students are eligible to apply to a SEHS, but few students end up enrolled at a SEHS, particularly among the student groups of interest in this paper [12% each for black and Latinx students and 13% for tier 1 students].) Once we consider whether an applicant completed any required post-application screens, only 70 percent of the sample has a high-performance choice program ranked at the top for which he is eligible to be admitted. Next, 64 percent of students received initial offers from a program at a high-performance high school, regardless of rank or whether it is a SEHS or choice program. Ultimately, 67 percent of the sample enrolled at a high-performance high school. This is higher than the share initially offered a seat both due to changes in waitlists after initial offers and to students enrolling in a high-performance neighborhood or other program to which they were entitled to enroll without needing to apply (for example, students enrolled in a high school that also serves students in the middle grades were guaranteed enrollment at that same school). Taken together, this evidence suggests that the step where the largest share of students falls off the path to enrollment in a high-performance high school is at the point of listing a program at a high-performance school at the top of their choice application.<sup>9</sup>

The overall numbers, however, mask heterogeneity by student race/ethnicity. Almost all Latinx students (97 percent) live within 2.5 miles of a high-performance program for which they are eligible, compared with 84 percent of black students, a difference of 13 percentage points. The difference widens to 21 percentage points when we consider applications: 80 percent of Latinx students rank a high-performance program at the top of their application compared with 59 percent of black students. Their pathways to enrollment stay roughly parallel after this node. Ultimately, 71 percent of Latinx students, 50 percent of black students, and 90 percent of other race/ethnicity students enroll in a high-performance high school for ninth grade.

Patterns by neighborhood SES are somewhat different (see figure 4b). Students living in the highest SES neighborhoods are somewhat less likely than students living in lower SES neighborhoods to live close to a high-performance high school that offers programs for which they are eligible. However, this difference flips once we look at applications and enrollment, and the gap in the pathways for low and high SES students continues to widen when going from ranking a high-performing program at the top of the choice application to being offered a high-performing seat to enrolling in a high-performing high school. Ninety-one percent of students living in tier 1 neighborhoods (the lowest SES category) live within 2.5 miles of a high-performing high school, compared with 85 percent of students living in tier 4 neighborhoods (the highest SES category), a tier 4 minus tier 1 difference of -6 percentage points. This difference widens to +17 percentage points when we look at being offered a seat at a high-performing program and widens further to +32 percentage points when we look at enrollment. We now turn to unpacking factors that may be related to these gaps in access by race/ethnicity

8. We focus on the student's top-ranked program. The deferred acceptance algorithm for selection begins by putting all students in their top program, and then applying the lottery or points-based admissions rules for programs over capacity. For this reason, students are most likely to receive an offer from their top-ranked program.

9. For the SEHS pathway, the biggest drop occurs at the point of being offered a SEHS seat.

**Table 3.** Percent of Eighth-Grade Students Indicating a Factor is “Very Important” to Them When Considering Their Top High School Option

Survey Item	All 8th Graders				Tier 2 or 3		
	Latinx	Black	Other	Tier 1	Tier 2 or 3	Tier 4	
It is a safe high school.	52	47	59	57	51	54	54
It has a strong academic reputation.	48	43	54	55	48	48	51
It has a special program that interests me.	44	42	49	40	46	44	43
I was impressed by the information I received about this high school.	41	36	48	39	42	40	40
It has interesting extracurricular activities.	38	34	45	36	39	38	36
The number of Advanced Placement (AP) classes it offers.	36	32	42	41	36	36	36
It offers Career & Technical Education or is a College & Career Academy.	33	30	41	25	35	34	27
It has a good athletic program.	32	28	40	26	34	31	29
The diversity of the students.	27	23	33	27	27	27	26
My parents want me to go there.	26	25	29	27	27	26	25
It is close to my home.	20	19	22	19	20	20	19
My friends attend or will attend this high school.	19	17	21	21	19	19	20

Notes: The survey was administered to all CPS eighth graders in the winter of 2019 after students had applied to high school but before they had received their offers. The response rate was 89 percent overall; 90 percent for Latinx students, 87 percent for black students, and 92 percent for other race/ethnicity students; 88 percent for students in tier 1 neighborhoods, 89 percent for students in tier 2 neighborhoods, 90 percent for students in tier 3 neighborhoods, and 92 percent for students in tier 4 neighborhoods. This table presents responses from students who ultimately enrolled in any SEHS or choice CPS high school for ninth grade. CPS = Chicago Public Schools; SEHS = selective enrollment high school.

and neighborhood SES, starting with students’ stated preferences for school characteristics.

### Stated Preferences for Schools

One potential explanation for differential patterns in school enrollment is that student preferences for school characteristics vary by race/ethnicity or neighborhood SES. Table 3 shows student reports about the importance of various school characteristics when considering their most preferred high school. About one half of students (52 percent) said that safety at the high school was a very important factor when thinking about the high school they most wanted to attend. Across student groups high school safety was the factor most students considered to be very important, ranging from 47 percent of Latinx students to 59 percent of black students.<sup>10</sup> After high school safety, 48 percent of students said the school’s academic reputation was a very important consideration. Just over one half (54 percent) of black students said having a strong academic reputation was very important, compared with 43 percent of Latinx students, and students living in tier 1 neighborhoods were as likely as students living in tier 2 or 3 neighborhoods to say that a strong academic reputation was very important (48 percent). Therefore, based on student reports of the importance of academics in considering high school choices, we do not think that differential preferences for school quality can explain the

10. Across all of these survey items about high school characteristics, Latinx students were less likely to say that various factors were “very important” to them when considering their top high school choice. Due to concern of differential likelihood of endorsing items across student groups, we explored student responses to other items on the same survey that were not related to high school choice. For other items, we did not find a consistent pattern between endorsing items and student race/ethnicity.

**Table 4.** Predicted Changes in Applications to and Enrollment in High-Performance High Schools after Accounting for Access Factors

Access factors	Black Students		Tier 1 Students	
	Predicted Change: Ranking Top (standard error)	Predicted Change: Enrolling (standard error)	Predicted Change: Ranking Top (standard error)	Predicted Change: Enrolling (standard error)
	(1)	(2)	(3)	(4)
Eligibility	3.84 (0.572)	6.14 (0.588)	2.94 (0.574)	5.63 (0.587)
Distance	3.06 (0.734)	4.35 (0.726)	5.44 (3.935)	6.79 (5.283)
Elementary	2.96 (0.609)	3.25 (0.647)	2.12 (0.681)	2.57 (0.709)
Community	8.06 (2.108)	6.37 (2.420)	NA	NA
Eligibility, distance, & elementary	9.29 (0.812)	11.93 (0.821)	6.12 (1.322)	8.570 (1.737)
Eligibility, distance, elementary, & community SES	14.23 (1.954)	16.62 (2.150)	NA	NA
Percent of observed gap explained by all available factors	67%	77%	68%	67%
Observed gap: Black v. Latinx or Tier 1 v. Tier 2/3	21.17	21.64	9.02	12.67

Notes: Black student application and enrollment rates are reweighted using the access factor distributions for Latinx students. Similarly, the tier 1 student application and enrollment rates are reweighted using the access factor distributions for tier 2 and 3 students. The predicted increase in the percentage of a student group ranking a high-performance school at the top or attending a high-performance school is calculated as the difference between the reweighted mean and the observed mean. Standard errors are estimated using bootstrap methods. We draw random samples of the data with replacement equal in size to the original samples within student race/ethnicity or tier groups. For each draw we estimate the counterfactual weights and the corresponding share of black or tier 1 students ranking or enrolling in a high-performance high school. We repeat the process 1,000 times to obtain 1,000 counterfactual estimates of the share of students, and the standard errors are the square-root of the variances of these estimates. SES = socioeconomic status.

fact that black students and students living in tier 1 neighborhoods are less likely to enroll in high-performance high schools than other students.<sup>11</sup>

**Explaining Differential Enrollment Patterns**

We now turn to quantifying the extent to which racial/ethnic and socioeconomic differences in the access factors can explain differences in students’ likelihood of ranking first or enrolling in a high-performance high school. We implement the strategy described in the Data and Methodology section to construct counterfactual distributions of student ranking and enrollment in high schools by school performance rating.

In table 4, we present the estimated change in the percentage of black students ranking a high-performance high school at the top of their application (column 1) or enrolling in a high-performance high school (column 2) based on reweighting by various access factors; standard errors for the estimates are in parentheses. The observed gap in the likelihood that a black student ranks a high-performance high school at the top of her application relative to a Latinx student is 21 percentage points (shown in the bottom row of the table). Similarly, black students are 22 percentage points less likely

11. In other potential indicators of preference differences, Barrow, Sartain, and de la Torre (2018) report differences in top-ranked choice program characteristics by student groups. Black students and tier 1 students are more likely to rank a CTE program at the top than Latinx and tier 4 students, while Latinx and tier 4 students are more likely to rank an IB program. Charter school programs are also more popular with tier 1 and black students than with tier 4 and Latinx students. Of course, some of these differences may be driven by access factors like pre-application eligibility requirements rather than preferences.

than Latinx students to enroll in a high-performance high school. Columns 3 and 4 parallel columns 1 and 2 but for students living in tier 1 neighborhoods. The observed gap in the likelihood that a student living in a tier 1 neighborhood ranks a high-performance high school at the top of their application relative to a student living in a tier 2 or tier 3 neighborhood is 9 percentage points. The high-performance enrollment gap between tier 1 and tier 2/3 students is nearly 13 percentage points.

When we reweight black students to have the same distribution of test scores, grades, and attendance rates (eligibility factors) as Latinx students, we predict a 3.8 percentage point increase in the share of black students ranking a high-performance high school at the top of their application (column 1) and a 6.1 percentage point increase in the share of black students enrolling in a high-performance high school (column 2). We predict similar percentage point increases in applications to and enrollment in a high-performance high school when we reweight tier 1 students to have the same distribution of eligibility factors as students living in tier 2 and 3 neighborhoods (columns 3 and 4, respectively). These results indicate that eligibility requirements alone act as a barrier for some black and Tier 1 students, but much of the difference remains, particularly between black and Latinx students. Reweighting by distance factors alone predicts a 3.0 percentage point increase in the share of black students ranking a high-performance high school at the top and a 4.3 percentage point increase in the share of black students attending a high SQRP high school. The distance factors predict even larger changes for tier 1 students, of 5.4 percentage points for ranking top and 6.8 percentage points for enrolling. When we use both sets of factors to reweight, however, the predicted percentage point increases are very similar for both black and tier 1 students. We predict 6.6 and 7.0 percentage point increases in the share of black and tier 1 students, respectively, ranking a high-performance high school at the top. These factors predict even larger increases in the shares of students enrolling in a high-performance high school—a 10.6 percentage point increase for black students and a 10.4 percentage point increase for students living in tier 1 neighborhoods.

In addition to eligibility and distance, we also consider the resources of the student's elementary school and community as measured by the elementary school's score in the district's accountability system and community SES indices.<sup>12</sup> As mentioned in our table 2b discussion, we do not adjust for community SES factors by neighborhood tier because these factors and neighborhood tier are largely co-determined. Reweighting by the performance index of a student's eighth-grade school predicts a 3 percentage point increase in both the probability that a black student ranks a high-performance high school at the top of their application and the probability of enrolling in a high-performance high school. The predicted increases are somewhat smaller for students living in tier 1 neighborhoods. The predicted increases for black students when we reweight by measures of the SES of their neighborhood are even larger—an 8 percentage point increase in the probability of ranking a high-performance high school program at the top of their choice application and a 6 percentage point increase in the probability of enrolling in a high-performance high school. Individually, reweighting by community SES factors results in the largest increase in the percentage of black

12. Elementary school accountability scores are only available for students who were enrolled in a CPS elementary school, so the estimation sample is somewhat smaller.



students ranking a high-performance high school at the top of their choice application, while eligibility and community SES predict the largest increases in the percentage of black students enrolling at a high-performance high school. For tier 1 students, the distance factors predict the largest increases for both outcomes.

Combining all four categories of access factors, we predict a 14 percentage point increase in the share of black students ranking a high-performance high school at the top and a 16.6 percentage point increase in the share of black students attending a high-performance high school.<sup>13</sup> Estimated standard errors are around 2 percentage points for both estimates. This suggests that if black and Latinx students had the same distribution of eligibility factors, distances from schools and CTA transportation, and elementary school performance and community SES, the gap in enrolling in a high-performance high school would close by 77 percent. Similarly, if tier 1 students had the same distribution of eligibility factors, distances from high-performance schools and CTA transportation, and elementary school performance, the gap in enrolling in a high-performance high school would close by 67 percent.<sup>14</sup> For both groups, the remaining gaps may be explained by unobserved factors as well as some systematic differences in information or preferences.<sup>15</sup>

## 6. DISCUSSION

In a large school system with open enrollment and myriad school and program choices, families can face a seemingly unbounded number of options for high school. Despite the potentially overwhelming decision, there appears to be an appetite for school choice in the Chicago setting, as 77 percent of ninth-grade students opt for an option outside of their default zoned school and 65 percent ultimately enroll in a high school with strong accountability ratings (i.e., high-performance high schools). However, families face different constraints and may not have complete information about what various high schools may offer for their children. Indeed, we find that differences in access factors can explain nearly 80 percent of the gap in enrollment at high-performance high schools between black and Latinx students and nearly 70 percent of the gap between tier 1 and tier 2/3 students.

The goal of this paper is to document potential barriers along the path to enrolling in a high-performance high school, particularly those that might be reduced through changes in policy. For example, districts may consider assessing where

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13. These reflect a 10 percentage point decline in the percentage ranking a Level 2+ school at the top, and a 6 percentage point decline in the percentage ranking a Level 2 or 3 school at the top. For enrollment, the corresponding declines are 8 percentage points each. See panels a and b of figure A.5, available in the online appendix.
  14. The eligibility, geography, and elementary school factors reduce the share of tier 1 students ranking a level 2+ school at the top by 5 percentage points and the share ranking a level 2 or 3 school at the top by 2 percentage points. The corresponding declines for enrollment are 6 and 3 percentage points, respectively. See panels b and d of Figure A.5, available in the online appendix.
  15. We used student survey responses about the factors that were important to them when thinking about their most-preferred high school option to attempt to proxy for preferences. Based on a principal component analysis, we generated three indices: high school characteristics (e.g., academic reputation, program availability), influence of family and friends, and distance and safety concerns. While we find systematic differences in the indices by student race/ethnicity and SES, these survey indices do not explain any of the gap in likelihood of enrolling in or ranking a high-performance high school by student race/ethnicity or SES. Results are available upon request.

high-performance schools and high-quality programs are located and ensure that students of all backgrounds can access those schools. This may mean opening new high-quality options, or reallocating programs, but it could also mean exploring ways to alleviate transportation issues, particularly in urban areas where districts could rely on robust public transportation systems. Parents and elementary school counselors may need more support in evaluating the wide range of high school options available to students and determining the best match for students based on their interests and qualifications. Districts may also want to reconsider the academic prerequisites that affect eligibility and the probability of admission. For example, any program with minimum GPA requirements will disproportionately disqualify black boys who have the lowest grades, on average, in the district. Thus, eliminating GPA eligibility requirements may help close enrollment gaps by race. Or, instead of admitting students in order of points determined by grades and test scores, programs could hold a lottery for all students who meet the prerequisites. Finally, because community SES factors explain the largest difference in enrollment patterns by student race/ethnicity, the district may wish to invest in providing additional support via neighborhood-based partners like community centers and churches that are working directly with students as they consider high school options and complete applications.

These kinds of changes to policies and investments in student supports should result in more equitable access to high-performance high schools. While there are seats available in high-performance high schools, the total number of open seats is insufficient to meet the district's goal of having all students attend a Level 1+ or Level 1 high school. Based on Chicago Public Schools (2017), there were roughly 8,200 open seats at high-performance high schools. Filling these seats with 2,050 students at each grade level would increase the percentage of ninth-grade students enrolled in a high-performance high school from 65 percent to 73 percent. Thus, the supply of high-performance seats would be a limiting factor, and the district would need to create an additional 7,100 seats to meet its enrollment goal.

Further, the conversation around school choice and open enrollment, at least in part, implies that families should be moving children to the schools that the district deems as high-performance. Another approach could be to increase investments in zoned high schools so that all students had a default high-quality option near their home. In areas where students are more isolated or where fewer high school options are located, districts may want to direct additional resources to improving the culture and climate in those neighborhood high schools. We know that in the education community there is no silver bullet or easy answer to improving school culture, but it is an option that deserves to be on the table.

Finally, we cannot fully explain the differences in enrollment patterns by student/race ethnicity or neighborhood SES with the factors considered. The remaining (but much smaller) difference in enrollment rates for various student groups is likely due to differences in preferences over high schools and other unobserved factors. Students and their families may be applying to high schools based on other information about program quality, reputation, or other characteristics not captured by the accountability ratings. Accountability ratings likely contain some information about school quality, but they have limitations, including that they reflect, in part, what students bring to the table (in terms of prior achievement/academic orientation, family

resources, etc.). Families may also highly value aspects of schools that are not reflected by those ratings, like wraparound/health services or siblings who already attend the school. Chicago, for example, began a review of their ratings policy in 2020 to determine how to more adequately assess schools' "quality," acknowledging that the current system may overemphasize certain factors and underestimate schools' contribution to students' learning and development. Exploring what students and families are looking for in a high school, as well as what they think makes a school a good match for them, would be an important area for future qualitative research. It is also something a school district with a choice portfolio like CPS could do in order to make sure that the supply of desired programs matches the demand for them. Regardless, we believe it is important to honor the fact that families are making the best decisions they can given the information and constraints they face, and research should continue to play a role in understanding those constraints in order to inform policy decisions that can improve access to high-quality schooling options.

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