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An Evaluation of Uncommon Schools: Understanding Impacts and Practices in Two Regions

November 30, 2022

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I. Background and Study Overview

Uncommon Schools is a nonprofit charter management organization that starts and manages public charter schools, primarily in traditionally underserved communities. The organization's approach is well established; Uncommon opened its first school in New Jersey more than 20 years ago. As of fall 2022, it operates 53 schools serving approximately 20,000 students across Boston (Massachusetts), Camden (New Jersey), New York City (NYC; New York), Newark (New Jersey), and Rochester (New York). Uncommon's network includes 19 elementary schools, 25 middle schools, and 9 high schools. Historically, Uncommon has defined its approach to focus on six key components:

1. A college preparatory mission, infused throughout the school environment at all grade levels
2. High standards for academics and character, including a rigorous curriculum and focus on student achievement
3. A highly structured and joyful learning environment, in which teachers are trained and supported to maximize instructional time
4. A longer school day and school year than for typical schools
5. A focus on accountability and data-driven instruction, with school leaders using data on student progress to inform instructional changes
6. A faculty of committed, talented, and well-trained teachers and leaders, emphasizing commitment to the Uncommon mission and frequent opportunities for teachers to develop through trainings, observations, and feedback

Uncommon's model for operating schools is promising, with rigorous evidence of effectiveness in improving student outcomes. Several previous studies of Uncommon schools found that enrollment in an Uncommon school led to statistically significant and positive impacts on student achievement (Burnett et al. 2021; Furgeson et al. 2012; Teh et al. 2010; Woodworth and Raymond 2013; Woodworth et al. 2017). The studies were limited to Uncommon schools located in Newark, NYC, and Rochester. Two studies examined students in middle school (Furgeson et al. 2012; Teh et al. 2010), and two examined students across all grade levels (Woodworth and Raymond 2013; Woodworth et al. 2017). The fifth study examined upper elementary and middle school students in three schools that were part of an effort to implement Uncommon's school model as a whole-school turnaround strategy (Burnett et al. 2021). To date, one of the studies has been reviewed and met What Works Clearinghouse evidence standards with reservations (Furgeson et al. 2012).

Uncommon was awarded a 2016 grant from the U.S. Department of Education's Charter Schools Program (CSP) to support replication and expansion of its school model, based on the existing evidence of effectiveness. As part of the grant, Uncommon engaged Mathematica to conduct a rigorous external evaluation to assess the network's effects on student outcomes and examine the key practices implemented in schools that are part of it. The study aims to address gaps in the existing evidence base for Uncommon's impacts, focusing on the network's two largest regions (Newark and NYC). In particular, all previous impact studies of Uncommon's schools used a quasi-experimental design, and none included a comprehensive analysis of Uncommon's school model to provide context for interpreting impacts on students.

Specifically, the study addresses the following research questions:

- What is the impact of enrollment in an Uncommon Newark middle school on students' math and English language arts (ELA) achievement?
- What is the impact of receiving an offer of admission to an Uncommon NYC middle school on students' math and ELA achievement?
- How was the Uncommon school model implemented across the Newark and NYC regions? To what extent did key components of the model vary across regions or schools? How, if at all, has the model changed?

To address these research questions, we conducted two separate impact analyses and an implementation evaluation. We examined the impacts of enrollment in Uncommon Newark middle schools using a quasi-experimental matched comparison design, as we did not have access to school admissions lottery data. To assess the impacts of Uncommon middle schools in NYC, we used an experimental design, which is the gold standard for studying policy and program impacts, based on Uncommon's admissions lottery data. We also conducted interviews with school and network leaders to examine school policies and practices in the Newark and NYC regions.

Three key findings emerged:

1. Enrollment in an Uncommon Newark middle school between the 2014–2015 and 2018–2019 school years had positive and statistically significant impacts on student achievement in math and ELA that persisted up to four years after enrollment. The cumulative impact in math after three years of enrollment was approximately the same size as the poverty test score gap in math, and the cumulative impact in ELA after four years of enrollment was more than three-fourths of the poverty test score gap in ELA.
2. For the subsample of students who applied to Uncommon NYC middle schools and had a random chance of being selected, receiving an offer of admission for the 2017–2018 or 2018–2019 school years and subsequently enrolling had no discernable impacts on student achievement in math or ELA one or two years after the offer was made. This finding should be interpreted with caution due to the limited proportion of applicants with available outcome data who had a truly random chance of receiving an admissions offer. This restricted analysis sample, and the weaker correlation between Uncommon admissions offers and attendance relative to more narrowly focused randomized controlled trials, limit the validity of generalizing our results to the broader population of Uncommon applicants.
3. Uncommon's school model is highly centralized, with strong alignment of practices across schools, but offers opportunities for flexibility based on school context. Since spring 2020, the model has evolved and adapted in response to the COVID-19 pandemic and heightened concerns about racial justice while remaining guided by the key components of mission, standards, structure, time, data, and talent.

II. Newark Impact Analysis: Sample and Methods

To examine the impact of Uncommon middle schools in the network's Newark region, we first identified a comparison group of students who never attended an Uncommon school in Newark but were similar to those who did. We then compared the achievement outcomes for Uncommon students to those for the comparison group by using a regression model that accounted for students' demographic characteristics and math and ELA achievement before enrolling in an Uncommon school in Newark. In this chapter, we provide a brief overview of our approach, which mirrors that described in Impacts of Uncommon Schools in a Turnaround Setting (Burnett et al. 2021). A more detailed description of the methods is provided in Burnett et al. and Appendix A.

A. Sample

1. Selecting Uncommon schools in Newark

The sample included students from all five Uncommon middle schools in Newark that were open during the 2014–2015 to 2018–2019 school years: Central Avenue, Clinton Hill, Downtown, Vailsburg, and West Side Park. Each of these schools serves students in grades 5–8. Uncommon typically enrolls new students in kindergarten (the first year of elementary school) and grade 5 (the first year of middle school). We could not examine the outcomes of elementary students starting in kindergarten because they did not yet have the prior test scores required for matching them to similar students enrolling in other schools. For this reason, we limited our analysis to Uncommon middle schools in Newark. The results from the analysis pertain to the five middle schools open during the study time frame but may be suggestive of results from other Uncommon schools.

2. Identifying students in Uncommon middle schools in Newark

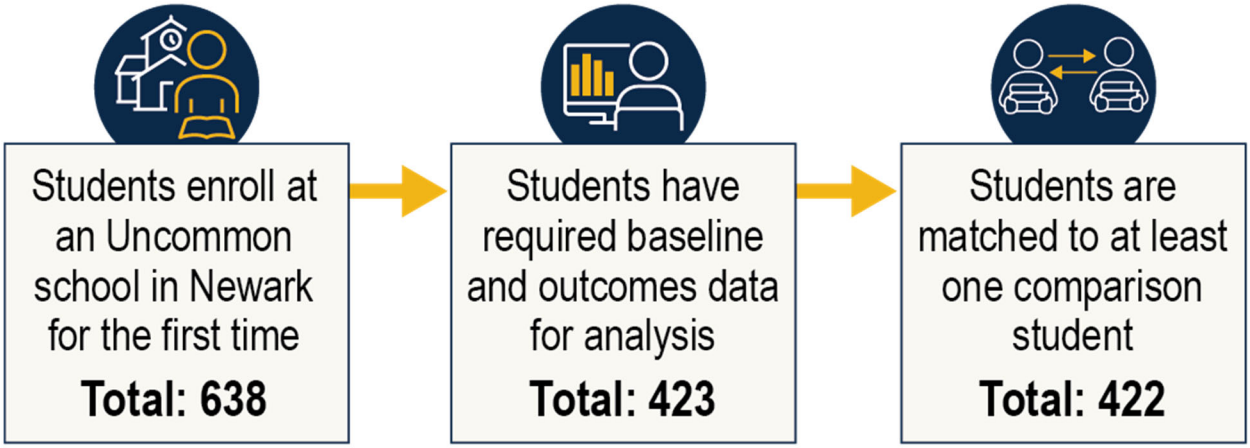
Within the Uncommon middle schools in Newark, we tracked data on groups of students who began school at the same time—referred to hereafter as cohorts—to assess their math and ELA achievement for up to four years following their initial enrollment. We examined outcomes for a total of five cohorts beginning each year from 2014–2015 to 2018–2019. Each cohort included both incoming 5th- and 6th-grade students who were enrolling in an Uncommon school in Newark for the first time.

Within the school cohorts, we identified and included in the sample Uncommon students who had never previously attended an Uncommon elementary or middle school, had math and ELA test scores from the prior school year, and had no missing data on demographic characteristics. Nearly 9 out of 10 (86 percent) Uncommon middle school students in Newark had previously attended Uncommon elementary schools, so our sample represented a minority of Uncommon middle school students. However, excluding continuing Uncommon students was the only way that we could isolate the impact of enrolling in an Uncommon school in Newark.[1] Finally, we excluded Uncommon students from the sample if we could not identify any students from other schools with similar traits during our matching process, which we describe in the next section. Figure II.1 illustrates this process for defining an analysis sample, using the

[1] To examine the impacts for as expansive a sample as possible, we conducted a separate analysis that included both students new to Uncommon and students continuing from other Uncommon schools; findings from this analysis are presented in Appendix B. Relative to students new to Uncommon, students continuing from another Uncommon school had higher baseline test scores in the year before entering an Uncommon middle school.

students included in our analysis of one-year math outcomes as an example. (Sample sizes for all analysis samples are included in Tables A.2 and A.3 in Appendix A.)

Figure II.1. Flow of Uncommon Newark students from initial enrollment to analysis sample (one-year math impact sample)



Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: These are the sample sizes for the one-year math outcome. The other outcomes have different sample sizes and are reported in Appendix A.

The sample of students from the Uncommon middle schools included in this study appeared to have demographic characteristics similar to those of students in the broader Uncommon network. Both the network and the subset of Uncommon middle schools in Newark serve a large percentage of students from historically disadvantaged groups, including families with low incomes. For example, in its CSP application, Uncommon reported that 83 percent of students in its network come from families with low incomes; between 91 and 93 percent of children included in our samples were from families with low incomes based on eligibility for free or reduced-price lunch.

3. Identifying similar students in other schools

The goal of this analysis was to compare the level of achievement in math and ELA of Uncommon middle school students in Newark to their expected level of achievement if they had enrolled in other public schools in Newark. We refer to the difference between students' level of achievement in Uncommon and their expected achievement if enrolled at other schools as an "impact estimate." Because it is not possible for any student to attend an Uncommon school and another public school at the same time, the best way to calculate this estimate was to compare Uncommon students to students who were very similar but attended other local schools. Our impact estimates were more likely to be accurate when the groups of students were more alike.

To identify students similar to the Uncommon students in our sample, we matched each eligible student who attended an Uncommon middle school with up to 10 students who were very similar but attended a different public school in the same city, using a method called propensity score matching. We matched students based on their standardized test scores from the prior school year and demographic characteristics shown in Box II.1, separately for each cohort and for each of the seven outcomes: math

achievement one, two, and three years after enrollment and ELA achievement one, two, three, and four years after enrollment.[2]

Box II.1. Data used in the analysis

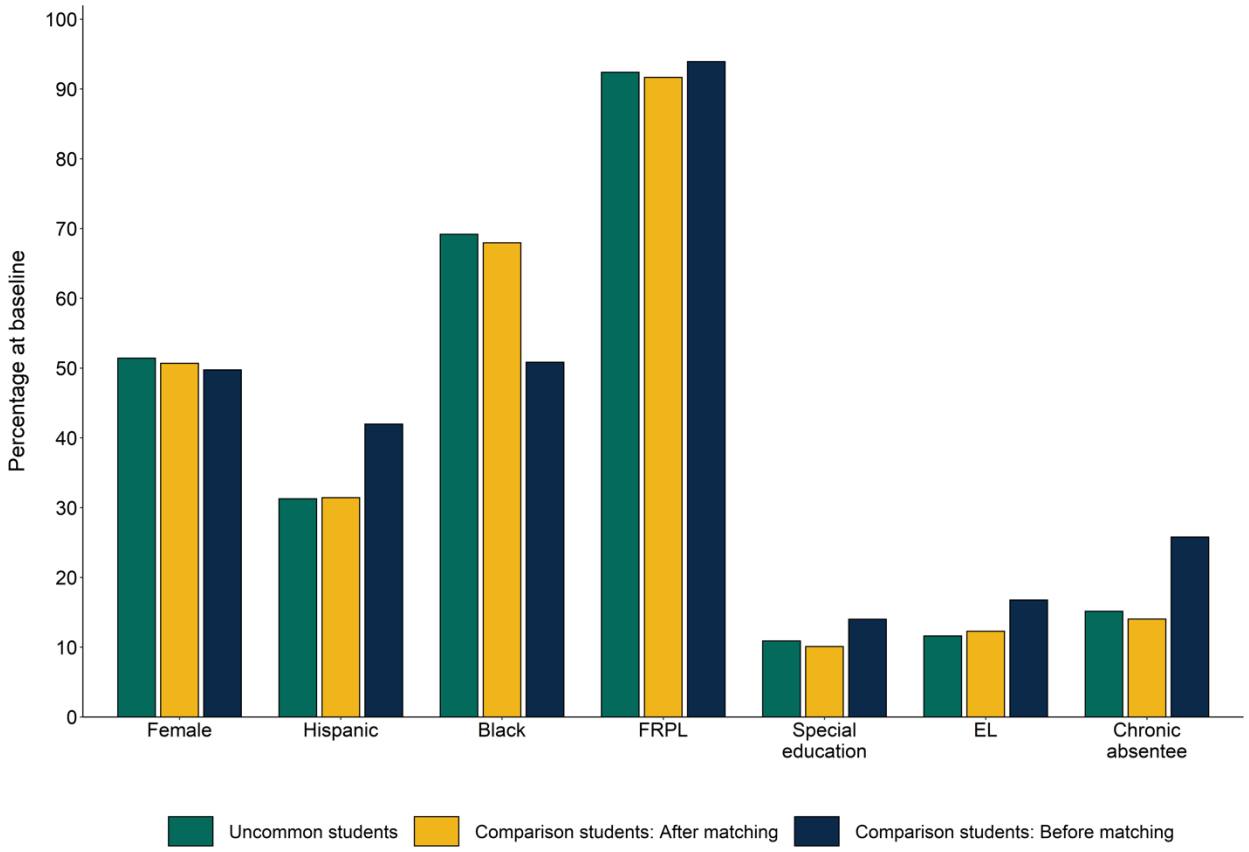
- Source: New Jersey Department of Education
- Data used for matching:
  - Student demographics, including gender, race, ethnicity, English learner status, special education status, low-income status, attendance, grade level
  - Standardized test scores in math and ELA from the prior school year
  - Information on testing accommodations and alternative assessments
- Data used to assess outcomes: standardized test scores in math and ELA from one to four years following enrollment in Uncommon
- Grades: Pre-K through 8
- School years: 2013–2014 to 2018–2019
- Schools: All public schools in Newark, including district, renaissance, and public charter schools

After matching, we confirmed that the Uncommon students and comparison students matched to them had similar prior test scores in math and ELA. Across the four years, the samples used to evaluate math achievement had differences in prior math scores between 0.02 and 0.03 standard deviations, and the samples used to evaluate ELA achievement had differences in baseline ELA scores between -0.02 and 0.03 standard deviations (see tables of baseline math and ELA scores in Appendix A). These fell well below the equivalence threshold of less than 0.25 standard deviations set by the What Works Clearinghouse, the body funded by the U.S. Department of Education that evaluates the rigor of educational research studies.

We also confirmed that the Uncommon students and matched students had similar demographic characteristics. Figure II.2 shows three groups of students: the green bar represents the students included in the analysis who attended Uncommon schools; the gold bar represents the students who were matched to Uncommon students and thus included in the analysis; and the navy blue bar represents the comparison students before matching (the complete pool of students in Newark in the same grade levels and school years who did not enroll in any Uncommon school). As the figure illustrates, for the one-year math impact sample, the matched group is much more similar to the sample of Uncommon students than the larger pool of students in Newark. The baseline characteristics for Uncommon students and matched students were similar for all outcome samples; detailed tables for each sample are included in Appendix A.

[2] We were not able to measure math achievement for four years following enrollment because most Uncommon 8th graders took the Algebra 1 assessment, but most 8th graders outside of Uncommon took the grade 8 general math assessment. Therefore, we did not have enough students in the comparison group who were similar to Uncommon students and took the same math assessment in the fourth year.

Figure II.2. Baseline characteristics of Uncommon Newark students and comparison students before and after matching (one-year math impact sample)



Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: Chronic absentee is defined as a student missing more than 10 percent of total school days in any baseline year. FRPL, special education, and EL status were determined based on whether a student ever had such a status in any baseline year.

EL = English learner; FRPL = eligible for free or reduced-price lunch.

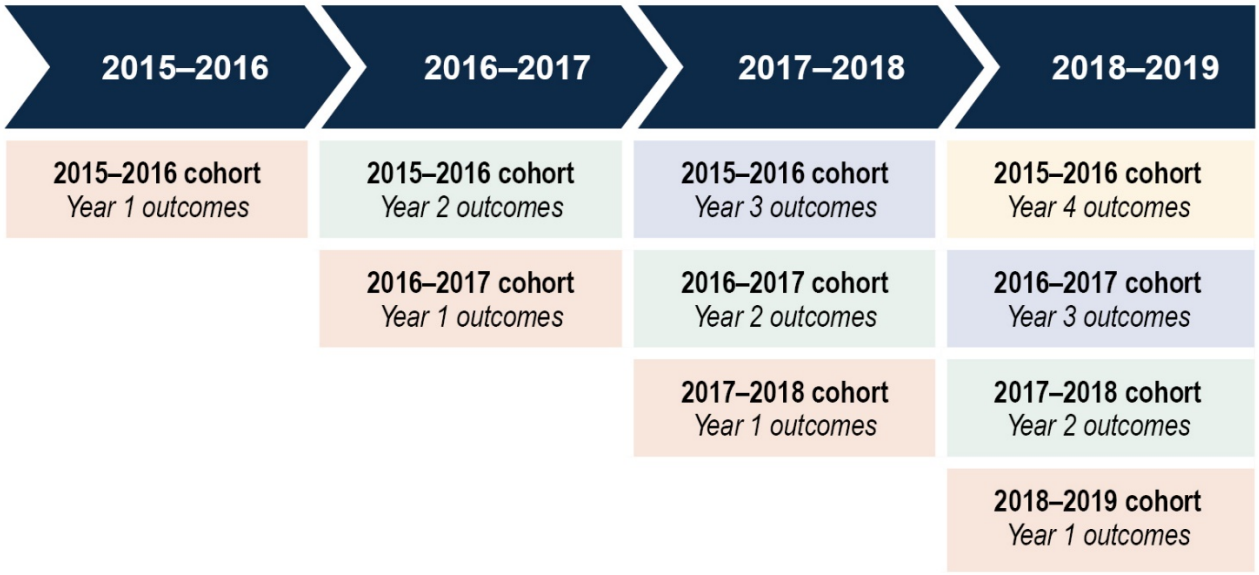
B. Outcomes

We measured math and ELA achievement using standardized test scores from state assessments. We measured math achievement for one to three years following enrollment in an Uncommon school and ELA achievement for one to four years following enrollment. We converted the scale scores to z-scores; within each school year, grade level, and the city of Newark, we rescaled the scores to have a mean of 0 and standard deviation of 1. Therefore, negative scores indicate scores below the mean of students in Newark in the same school year and grade level, and positive scores indicate those above the mean.

We pooled, or combined data, across schools, cohorts, and school years to analyze outcomes for one to four years following enrollment. Figure II.3 shows when students from each cohort enrolled in an Uncommon school and when their data were collected. As shown in the figure, each cohort started in a different school year between 2015–2016 and 2018–2019, and as a result, their outcomes from one to four years after enrollment (Years 1–4) were collected in different school years. The cohorts contributing to

outcomes in each year after enrollment are shown in one color along a diagonal. For example, the Year 1 outcomes, which are shaded in red, consist of data collected from all four cohorts. Because 2018–2019 was the last school year for which data were available, there are four years of outcomes for the 2015–2016 cohort, but just one year of outcomes for the 2018–2019 cohort. We treat the student as the unit of analysis. Therefore, all students have equal weight in each analysis even though the cohorts do not.

Figure II.3. Timeline of outcome measurement, by cohort entry year



Note: Cohorts with the same color are those included in the analysis of an outcome. For example, the Year 2 outcomes include data on the 2015–2016 cohort collected in 2016–2017, data on the 2016–2017 cohort collected in 2017–2018, and data on the 2017–2018 cohort collected in 2018–2019.

We included students in the analysis who left the Uncommon network at any point during their trajectory. This classification enabled us to account for possible bias from certain types of students leaving Uncommon schools (for example, if students who are struggling academically are more likely to leave). However, because we did not collect data outside of public schools in Newark, we were not able to follow students who left Newark public schools. Four percent of Uncommon students who were in our Year 1 impact samples were not included in the impact estimates for Year 2 and beyond because they left Newark public schools.

C. Primary approach for estimating impacts

To account for any remaining differences in observable characteristics between Uncommon students and their matched peers, we estimated impacts using a regression model that controlled for math and ELA scores from the prior school year and the same demographic characteristics used for propensity score matching. We conducted the analysis separately for each combination of subject and number of years after enrollment. We provide the full regression model and details about the construction of the variables included in the propensity score models and impact models in Appendix A.

Results of these analyses should remove much of the bias in the impact estimates if the propensity score model and impact model are able to account for all factors that influence both math and ELA achievement

and the likelihood that a student would enroll in Uncommon. Our study accounted for differences in observable student characteristics—prior standardized test scores and demographic characteristics—using propensity score matching and regression analyses. However, there may be unobservable characteristics that influence both enrollment in Uncommon and academic achievement that our statistical methods do not account for, which would bias our results. For example, the study did not account for internal traits, such as motivation, or characteristics of students' families, neighborhoods, and the prior schools they attended. If any of these factors influenced a student's decision to enroll and their math or ELA achievement, the results of the study would not be equivalent to the results from a randomized controlled trial. This is a limitation of any study that does not use random assignment and compares the outcomes of students from different schools.

We also conducted sensitivity analyses to examine whether our findings were robust to different analytic decisions, as well as analyses to estimate the impacts of enrolling in an Uncommon school separately for demographic subgroups. Detailed descriptions of these analyses are in Appendix A.

III. Newark Impact Analysis: Results

Students who enrolled in an Uncommon middle school in Newark had higher average achievement in math and ELA compared to similar students who attended other schools. The benefits for students persisted for all four years after their initial enrollment in an Uncommon school.

A. Math impacts

The impacts on math achievement of enrolling in an Uncommon middle school in Newark were large and statistically significant for all years we measured (up to three years after enrollment). Figure III.1 shows the mean math scores for the Uncommon students in green and the matched comparison students in gold. The brackets show that the impact estimate is the difference between these means. In the year before enrollment, the average math achievement of these groups was essentially the same; Uncommon students and their matched peers had average z-scores of 0.16 and 0.14, respectively. (Their average scores were approximately 0.15 standard deviations above the mean of all public school students in Newark in the same grade level and school year.) However, only one year after enrollment, the average score for Uncommon students was more than a half standard deviation above the average in Newark (0.54), whereas matched students had no change in their standing relative to the city average. (See Appendix B for supplemental tables showing the sample sizes, impact estimates, standard errors, and *p*-values for each outcome subject and year.)

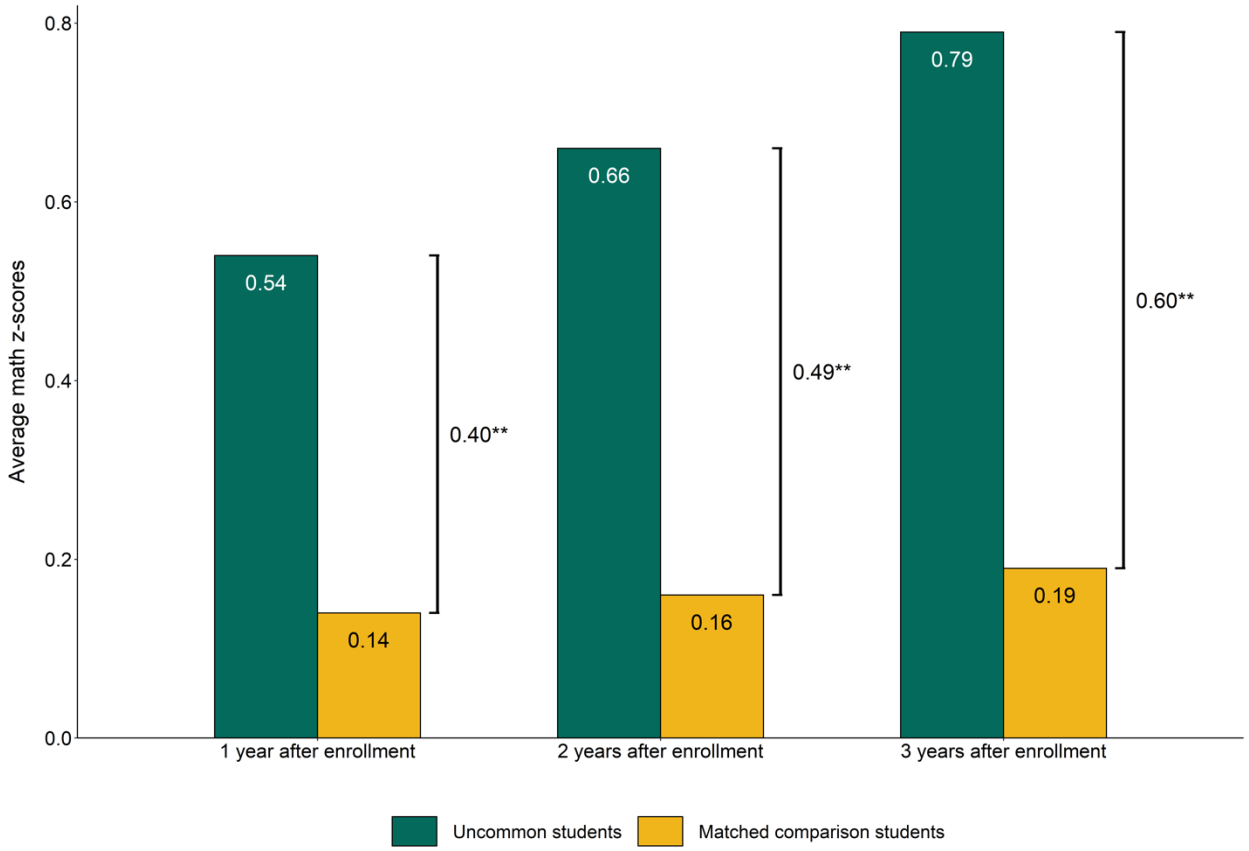
Students who enrolled in Uncommon middle schools in Newark maintained their higher scores in the two years that followed. By three years after enrollment, math achievement outcomes for students who enrolled in an Uncommon school exceeded those of their matched counterparts by 0.60 standard deviations.

These effect sizes translate to large differences in math learning between Uncommon students and their most similar peers. Using benchmarks by Bloom et al. (2008) on average learning gains, Uncommon students were ahead of their matched peers by nearly nine additional months of learning in math after one year of enrollment.[3] By three years, students who enrolled in an Uncommon middle school were ahead of their peers by approximately 1.4 additional years, or 17 additional months, of learning in math.

Given that the vast majority (92 percent) of Uncommon students in our sample were eligible for free or reduced-price lunch, another benchmark for interpreting Uncommon's impacts on student achievement is the nationwide achievement gap in 8th grade between those who do and do not live in poverty. On average, 8th-grade students not eligible for free or reduced-price lunch perform 0.8 standard deviations in math above those who are eligible (Bloom et al. 2008).[4] Uncommon's impact on math achievement three years after enrollment is approximately the same size as the achievement gap between students eligible for free or reduced-price lunch and those who are not.

[3] See Appendix A for detailed information on the conversion of effect sizes to years of learning.
[4] Bloom et al. (2008) did not calculate the poverty gap for students in 7th grade, which is the grade level for most students in the analysis sample for the three-year impacts on math achievement. We used the gap in 8th grade as the closest benchmark for our sample.

Figure III.1. Uncommon Newark impacts on math achievement, by years after enrollment



Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: This figure reports the regression-adjusted means in math achievement for students who first enrolled in an Uncommon middle school in Newark in 5th or 6th grade and the unadjusted means for matched students in Newark who never enrolled in an Uncommon school. The means are reported in standard deviation units so that the difference between the green bar and the gold bar represents the estimated effect size. (Differences may deviate from reported effect sizes in Table B.1 in Appendix B by one-tenth due to rounding.) Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year.

* Significantly different from zero at the .05 level, two-tailed test.

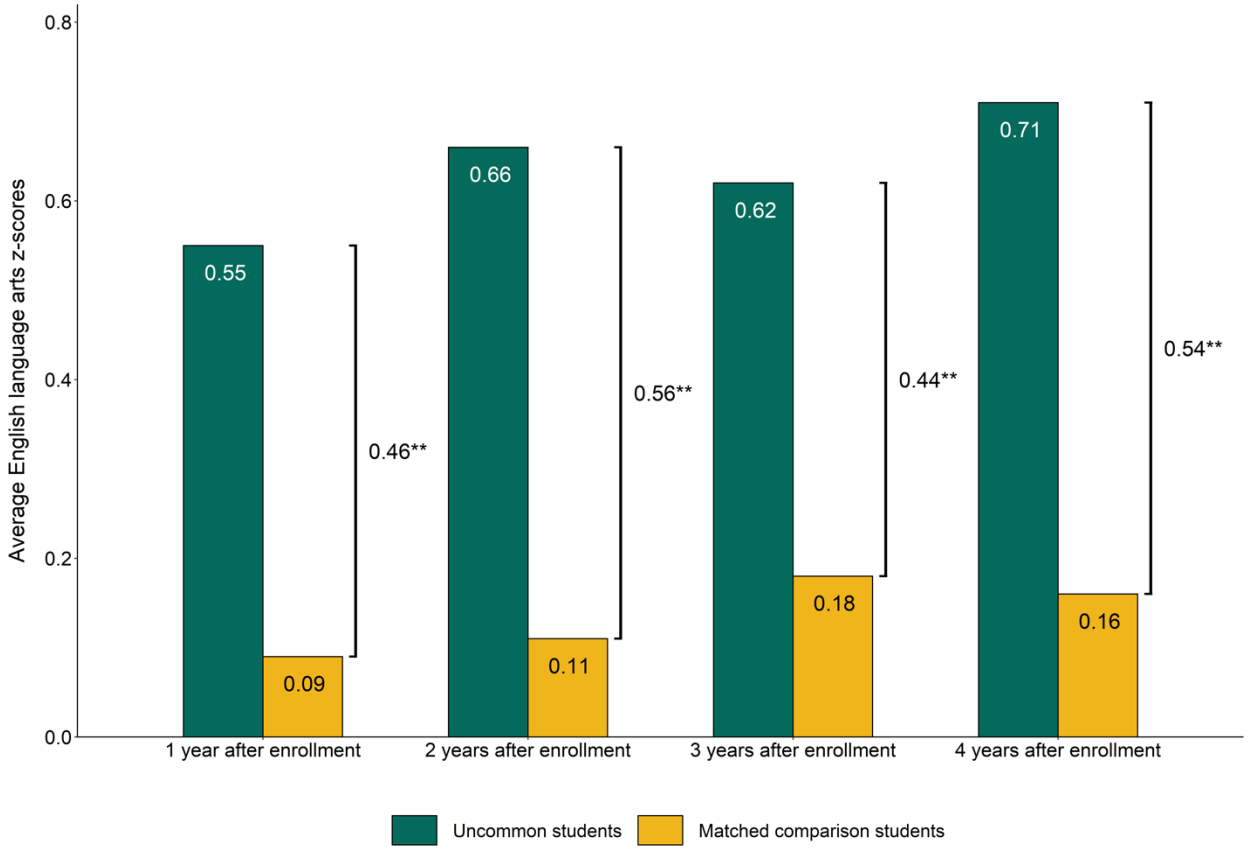
** Significantly different from zero at the .01 level, two-tailed test.

B. ELA impacts

Students who enrolled in an Uncommon middle school in Newark also saw large gains in ELA achievement compared to their matched peers. The impacts were large and statistically significant for all years we measured, up to four years following enrollment (Figure III.2). In the year before enrollment, Uncommon and matched comparison students both had similar average z-scores of 0.11 and 0.10, respectively. After one year of enrollment in an Uncommon school, students' average ELA scores improved to 0.46 standard deviations above the city mean, whereas the matched comparison students had nearly the same average z-score as before. As a result, Uncommon students scored nearly half a standard

deviation higher than the matched comparison students. These gains were equivalent to approximately 1.2 additional years, or 14 additional months, of learning in ELA.

Figure III.2. Uncommon Newark impacts on ELA achievement, by years after enrollment



Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: This figure reports the regression-adjusted means in ELA achievement for students who first enrolled in an Uncommon middle school in Newark in 5th or 6th grade and the unadjusted means for matched students in Newark who never enrolled in an Uncommon school. The means are reported in standard deviation units so that the difference between the green bar and the gold bar represents the estimated effect size. (Differences may deviate from reported effect sizes in Table B.2 in Appendix B by one-tenth due to rounding.) Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year.

* Significantly different from zero at the .05 level, two-tailed test.

** Significantly different from zero at the .01 level, two-tailed test.

ELA = English language arts.

The large impacts persisted for up to four years after enrollment. By four years, ELA achievement outcomes for students who enrolled in an Uncommon school exceeded those of their matched counterparts by 0.54 standard deviations, which translates to 1.8 additional years, or 22 additional months, of learning in ELA.

The gains in ELA achievement were also substantial when compared to the nationwide achievement gap in 8th grade between students who do and do not live in poverty. On average, 8th-grade students not

eligible for free or reduced-price lunch perform 0.66 standard deviations in ELA above those who are eligible (Bloom et al. 2008). Uncommon's impact on ELA achievement four years after enrollment is equal to 82 percent of the gap between students eligible for free or reduced-price lunch and those who are not.

C. Results by gender, special education status, and race and ethnicity

The impact of enrolling in an Uncommon middle school in Newark was large and statistically significant in math and ELA in all outcome years for the subgroups of students we examined: students identifying as female and those identifying as male, students eligible for special education and those who were not, Black and non-Black students, and Hispanic and non-Hispanic students. However, there were some differences in the magnitude of the impacts for certain subjects and years:

- Male students had significantly larger gains in ELA than female students from two to four years after enrollment and significantly larger gains in math one year after enrollment. For example, by the end of two years, female Uncommon students were ahead of their matched peers in ELA achievement by 0.47 standard deviations, equivalent to 1.3 years of learning in ELA, but male students were even further ahead—with average test scores 0.65 standard deviations higher than their matched peers, equivalent to approximately 1.8 years of learning in ELA. This difference appears to be driven in part by trends within the matched comparison group; female students in the matched comparison group consistently outperformed their male counterparts and saw improvement in their average test scores over time.
- Students eligible for special education services had larger gains in math two years after enrollment than students who were not eligible. Students who enrolled in Uncommon and were eligible for special education services had average math scores 0.66 standard deviations above their matched peers two years after enrollment, equivalent to an average of 1.4 years of learning in math. This impact was significantly larger than the impact for students not eligible for special education services, who scored 0.47 standard deviations above their matched peers in math, equivalent to approximately one full year of learning in math.

The findings of large, positive impacts on math and ELA achievement were robust to a wide range of alternative analytic approaches, including different criteria for selecting students, different propensity score methods, a different impact model, and a different approach to weighing cohorts and students (Appendix B).

IV. New York City Impact Analysis: Sample and Methods

To examine the impacts of Uncommon's NYC middle schools, we used school application and lottery data from Uncommon as well as student-level administrative records from the NYC Department of Education (DOE). We first analyzed administrative data from all applications for admission to Uncommon schools in NYC for the 2017–2018 and 2018–2019 school years to (1) estimate each applicant's probability of receiving at least one Uncommon school admissions offer (based on repeated simulations of the Uncommon lottery process used to assign offers) and (2) identify the set of applicants who had a truly random chance of being offered admission. We then linked these applicants' data to administrative records of math and ELA test scores, as well as other student characteristics. We used these linked data to compare academic achievement outcomes between applicants who were admitted to Uncommon schools in NYC through the lottery and those who did not receive an offer through the lottery, controlling for students' previous achievement levels and background characteristics.

This chapter provides a brief overview of our approach, which mirrors the approach of Abdulkadiroglu et al. (2017). We provide more detailed descriptions of the methods used to simulate the lottery process and the methods for estimating impacts on achievement in Appendix C.

A. Sample

1. Selecting applicants with lottery offers for Uncommon NYC schools

The analysis sample included a specific subset of all applicants to Uncommon NYC schools for admission to grade 5 during the 2017–2018 or 2018–2019 school years. In particular, the analysis sample included the subset of these applicants for whom an offer for admission to at least one Uncommon school was determined by the lottery admissions process and the chance of receiving at least one offer or no offers was not certain. This sample included grade 5 applicants to 12 Uncommon middle schools in NYC that were open during the 2017–2018 or 2018–2019 school years. Table C.2 in Appendix C lists these schools by name and presents the total number of grade 5 applicants for fall 2018 admission by school, as well as the number of applicants initially offered admission, the number waitlisted for a subsequent offer, and the number who enrolled at the school for the 2018–2019 school year.

Uncommon typically enrolls new students in kindergarten (the first year of elementary school) and grade 5 (the first year of middle school). We could not examine the achievement outcomes of elementary students starting in kindergarten during the application years of focus, given that these applicants were not tested in math and ELA until grade 3—beyond the span of years covered by the administrative data collected by the study team. The results from the analysis therefore pertain to the 12 middle schools presented in Table C.2 in Appendix C.

2. Linking applicants to enrollments and outcomes in Uncommon NYC schools

To capture the outcomes and background characteristics of applicants who were admitted to and enrolled in an Uncommon school in grade 5, we first linked this subset of applicants to administrative data collected directly from Uncommon. Applicants matched to these administrative records attended an Uncommon school during at least one of the 2016–2017 to 2018–2019 school years. For those applicants, linked administrative data provided information on which grade and schools they attended each year, days attended, their scaled scores from each annual exam in math and ELA, student gender, student race and

ethnicity, free or reduced-price lunch eligibility, English language learner status, and whether the student had an individualized education program in place.

3. Linking applicants to enrollments and outcomes in other NYC public schools

To capture outcomes and background characteristics of applicants who did not subsequently attend an Uncommon school, we coordinated with NYC DOE to match our pool of grade 5 Uncommon NYC applicants to student-level administrative data covering traditional public and public charter schools in NYC. Using applicants' first name, last name, and date of birth as reported on Uncommon school applications, NYC DOE attempted to match applicants to administrative data corresponding to traditional public schools between school years 2016–2017 and 2018–2019. If the applicant had provided consent to be included in research when submitting the application, NYC DOE also attempted to match them to administrative data corresponding to public charter schools during the same school years. For applicants matched to NYC DOE administrative records, data similar to those from the Uncommon school administrative data were provided, allowing us to also observe outcomes and background characteristics for this subset of applicants who did not subsequently enroll in an Uncommon NYC school.

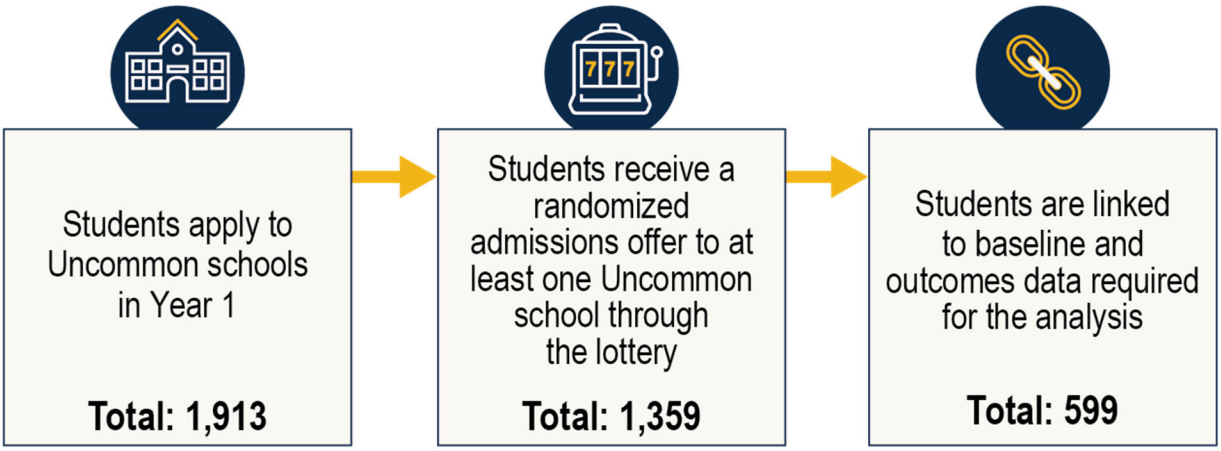
4. Effective analysis sample of Uncommon NYC applicants

Among the 1,913 grade 5 applicants to Uncommon NYC schools for the 2017–2018 or 2018–2019 school years, our analysis sample consisted of the subset of 599 applicants who met two criteria:

1. Had an estimated probability of receiving a lottery offer for admission to an Uncommon school that was greater than zero and less than one prior to the lottery
2. Were linked to administrative data with both of the following:
    a. At least one outcome: a valid math or ELA test score for the school year after they applied
    b. A corresponding baseline measure: a valid test score from the same year as the application period, to control for baseline academic achievement levels

Across both school years, we estimated an uncertain chance of an offer from the lottery for 1,359 of the 1,913 total grade 5 applicants. Among that group, we could link 849 applicants to grade 5 test score outcomes in either an Uncommon NYC school, a traditional NYC public school, or a different NYC public charter school. Our final sample of 599 applicants reflected the portion of those 849 also linked to grade 4 test scores (Figure IV.1).

Figure IV.1. Flow of Uncommon NYC grade 5 applicants from initial applicant cohorts to analysis sample



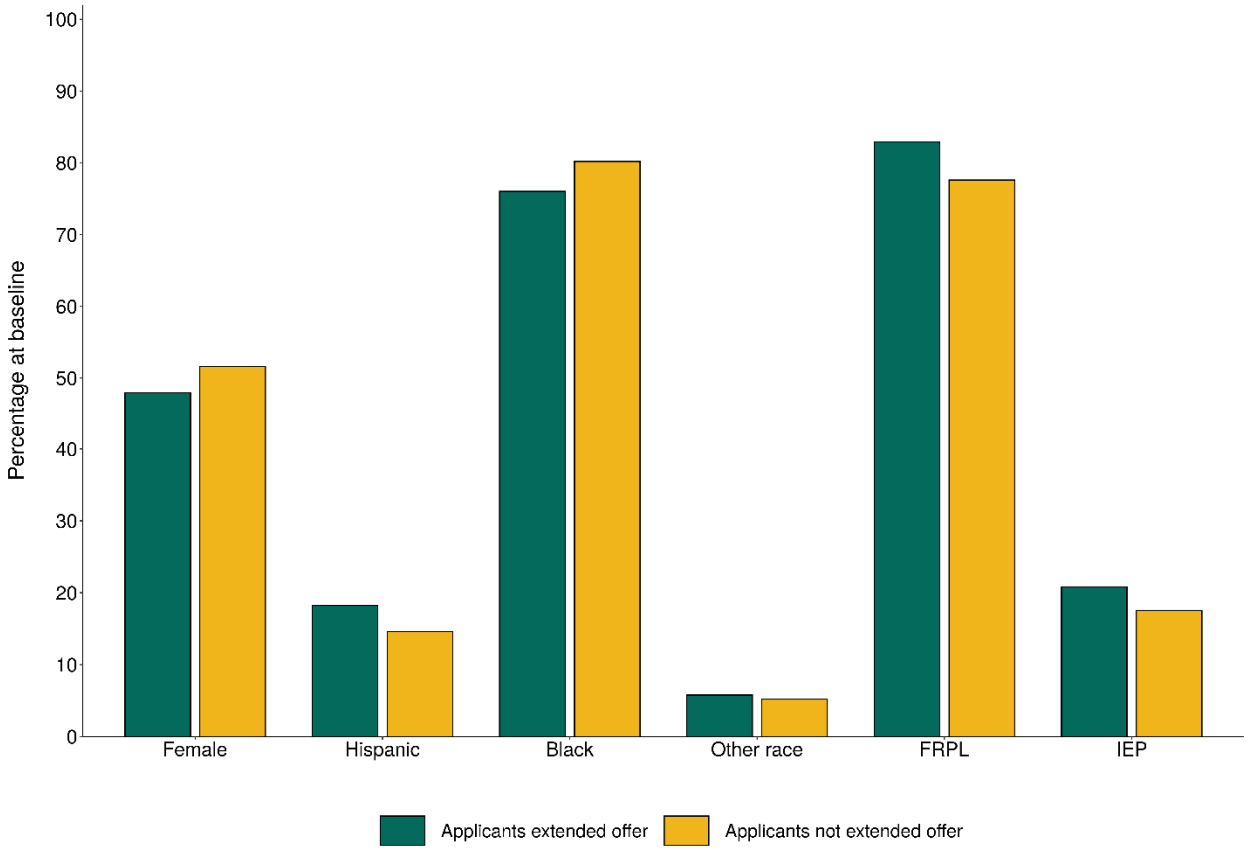
Source: Administrative data from Uncommon and the NYC Department of Education spanning the 2016–2017 to 2018–2019 school years.

Appendix Table C.1 details the number of applicants for whom lottery outcomes were uncertain and who were linked to outcome data (the analysis sample), and, among those students, the percentage who received an initial offer through the lottery and the percentages who subsequently enrolled in an Uncommon school or a different traditional public or public charter school in NYC. Approximately 63 percent of applicants in the analysis sample received an initial offer for an Uncommon school through the lottery. Among those students who did so, 43 percent (or about 27 percent of the overall analysis sample) subsequently enrolled in an Uncommon school. Applicants who did not receive an initial offer from the lottery still had the potential to enroll from waitlist offers, and 14 percent of the overall analysis sample ultimately enrolled at an Uncommon school from a waitlist position. Among applicants linked to student background characteristics, we did not find statistically significant differences in any characteristic between applicants included in the study sample and those excluded because (1) they did not have a random chance of receiving a lottery offer, or (2) they could not be linked to baseline and Year 1 test scores. (See Appendix Table C.3 for additional details.)

Applicants in the analysis sample who received an initial lottery offer appeared to have demographic characteristics and previous levels of academic achievement similar to those applicants who did not receive an initial offer. Both groups included large percentages of students from historically disadvantaged groups, particularly Black students (76 to 80 percent) and those from households with lower incomes, as defined by eligibility for free and reduced-price lunch (78 to 83 percent). The background characteristics of the sample of Uncommon school applicants were generally not statistically different by lottery status—that is, whether they received an initial lottery offer. Figure IV.2 presents descriptive statistics by lottery status for the analysis sample. Across the set of observed background characteristics for this sample, eligibility for free and reduced-price lunch is the one noticeable difference by lottery status, having a *p*-value of less than 0.05. This difference can be attributed to the fact that the lottery-based offer assignment mechanism for some Uncommon NYC middle schools place a higher priority on admitting students eligible for free and reduced-price lunch. More rigorous diagnostics of differences by lottery offer status for the analysis sample, which account for different probabilities of receiving a lottery offer, are presented in Appendix Table C.4 and show a similar pattern. In addition,

applicants who received offers had grade 4 math test scores that were lower, on average, after controlling for applicants' likelihood of receiving an offer. To control for these differences when estimating impacts, we included covariates for free and reduced-price lunch eligibility and grade 4 test scores in ELA and math, in addition to other student background characteristics.

Figure IV.2. Baseline characteristics of Uncommon NYC middle school applicants in the analysis sample, by lottery offer status



Source: Administrative data from Uncommon and the NYC Department of Education from the 2016–2017 to 2018–2019 school years.

FRPL = eligible for free or reduced-price lunch; IEP = individualized education program.

B. Outcomes

We measured math and ELA achievement using standardized test scores from state assessments. We measured achievement for both cohorts of applicants during their first year after the application and enrollment process, as well as the previous year, to control for applicants' baseline achievement level. For the first cohort (applicants for fall 2017), we also measured achievement of applicants during their second year after the application and enrollment process. We converted test scale scores to z-scores; within each school year, grade level, and subject, we rescaled the scores to have a statewide mean of 0 and a standard deviation of 1 using statewide statistics reported by New York State technical reports. Therefore, negative scores indicate scores below the mean of students in New York in the same school year, grade level, and subject, whereas positive scores indicate those above the mean.

We pooled, or combined data, across schools, cohorts, and school years to analyze outcomes one year after enrollment. For each set of impact estimates reported, applicants were weighted equally, and we included a cohort indicator to control for average differences attributable to a specific school year or cohort. Year 2 outcomes analyzed included only one cohort and one school year. Moreover, for the analysis of Year 2 outcomes, we included students from the initial group of applicants who left or entered Uncommon schools after Year 1. This classification enabled us to account for possible bias from certain types of students leaving or joining Uncommon schools more often than other types of students (for example, if students who are struggling academically are more likely to leave or join Uncommon schools in Year 2). However, due to cross-sector or cross-district student mobility, the number of applicants in the first cohort for whom we were able to link Year 2 outcome data was greatly reduced from the number of applicants in the first cohort with linked Year 1 data. For example, Year 2 impact estimates for math included 102 of the 287 applicants from the first cohort who were included in the estimates for math in Year 1. Sample sizes by cohort and school year are reported in Appendix Table D.2.

C. Primary approach for estimating impacts

Our approach investigated whether attending Uncommon NYC schools increased students' academic achievement relative to attending a school in the counterfactual group of schools that applicants otherwise would have attended. Importantly, we used an experimental study design that leveraged the lottery-based randomization of Uncommon NYC applicants to receive or not receive admissions offers. This type of experimental design can generate more rigorous estimates of the impacts of attending an Uncommon NYC school than quasi-experimental study designs, such as approaches that match control groups of students in other schools based on similar observable characteristics.

Specifically, we used the approach to measuring schools' effects on student outcomes via unified school lotteries developed by Abdulkadiroglu et al. (2017) and implemented in different contexts by Bergman (2018), Winters and Shanks (2021), and Abdulkadiroglu et al. (2021). This approach controlled for the degrees of uncertainty with which applicants had a chance of being offered admission to an Uncommon school via lottery, comparing changes in achievement levels between applicants who received admissions offers (the treatment group) and applicants who had a similar chance of receiving an offer but did not (the control group).

1. Estimating applicants' probability of admission to Uncommon NYC schools

An important first step in this approach was estimating the probability of each applicant receiving an initial admission offer to Uncommon NYC schools for any random run of the lottery process, which Abdulkadiroglu et al. (2017) called the propensity score. In unified lotteries like the Uncommon NYC lottery, this estimation is complicated by the different possible ordered combinations of schools to which a student might apply and the different applicant types each school prioritizes. Because of this complexity, any given lottery run that randomizes applicants' lottery numbers and then determines an order of assignment for admission offers might result in a different set of lottery outcomes for a group of students with similar characteristics. To address this issue, we first developed a program that reconstructed the Uncommon schools lottery mechanism for admission offers in each year and school according to the lottery process details documented in the Uncommon NYC Charter Schools Admissions Policy. We then conducted repeated simulations of this lottery process to estimate each student's probability of admission at each school before a particular lottery instance.

2. Estimating the impacts of Uncommon NYC offers and enrollments

To estimate the impacts of enrolling in an Uncommon NYC school, we followed the approach proposed by Abdulkadiroglu et al. (2017) and estimated a two-stage least squares model that incorporated the estimated applicant-level admissions offer probabilities. The first stage modeled applicants' enrollment in an Uncommon school as a function of whether they were offered admission through the lottery, their probability of receiving an offer, and a set of background characteristics. We then used the fitted model of enrollments as a function of offers in the second-stage model of how applicants' achievement outcomes were affected by enrolling in an Uncommon school compared to the school an applicant would have otherwise attended had the applicant not received an offer for an Uncommon school through the lottery. We refer to this estimate as the treatment-on-the-treated (TOT) effect.

In addition to estimating the TOT effect, we also present estimates of the impact of being offered admission to an Uncommon school—the intent-to-treat (ITT) estimates. These were estimated using a reduced-form model of applicants' academic achievement as a function of whether the applicant received an offer to enroll in an Uncommon school through the lottery process. Importantly, this approach leveraged the random nature of offer assignments through the lottery to estimate a causal relationship between receiving an offer and the achievement outcome of interest. In contrast, the estimates of the TOT effect went one step further by also modeling the relationship between receiving an offer and enrolling in an Uncommon school, which is not a one-to-one relationship.

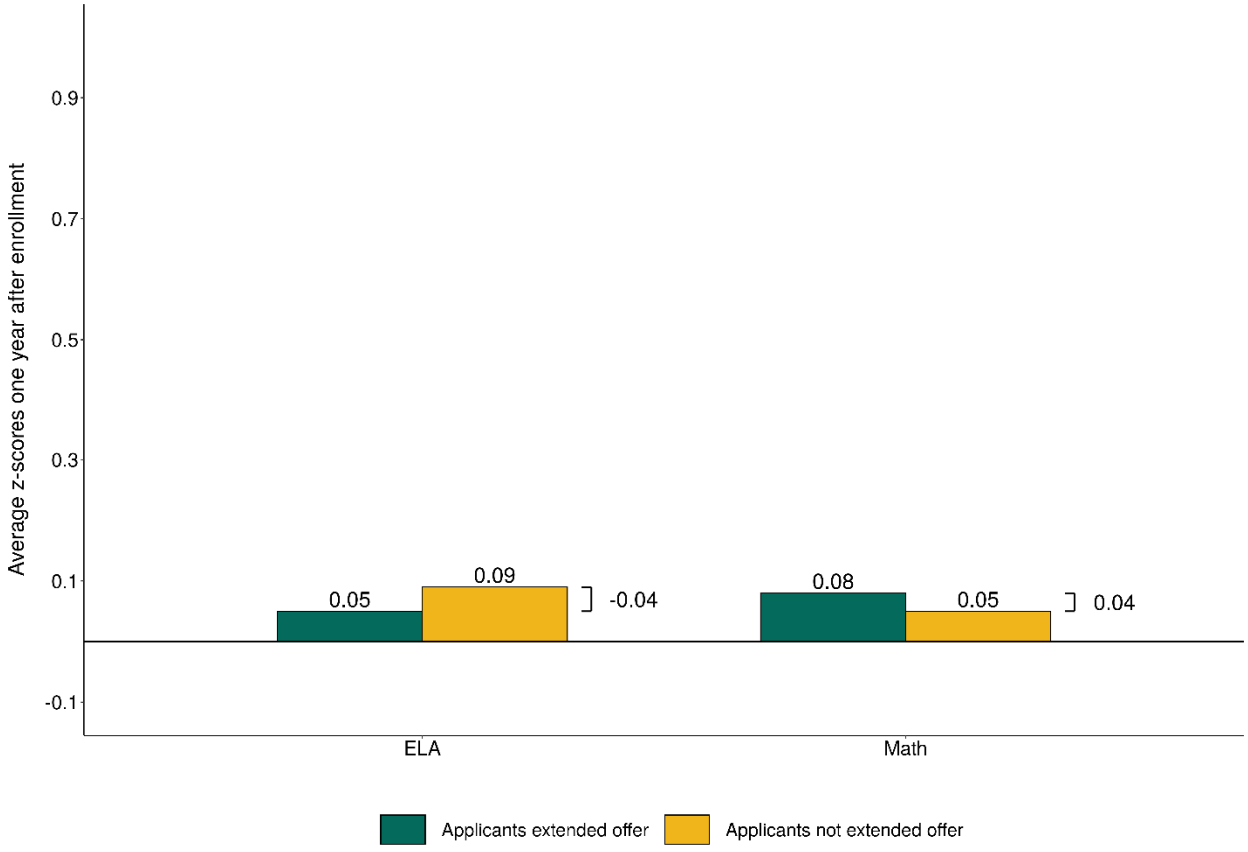
V. New York City Impact Analysis: Results

Enrolling in an Uncommon NYC middle school did not have a statistically significant effect on average achievement in math or ELA relative to the average non-Uncommon school where applicants to Uncommon schools ultimately enrolled. For context, there are several limitations to the study design, detailed toward the end of this chapter.

A. Year 1 achievement impacts

The Year 1 ITT impacts of receiving a lottery offer to enroll in an Uncommon middle school were not statistically significant, estimated at a decrease of 0.04 standard deviations in ELA achievement and an increase of 0.04 standard deviations in math (Figure V.1).

Figure V.1. Uncommon NYC Year 1 ITT impacts on achievement, by subject



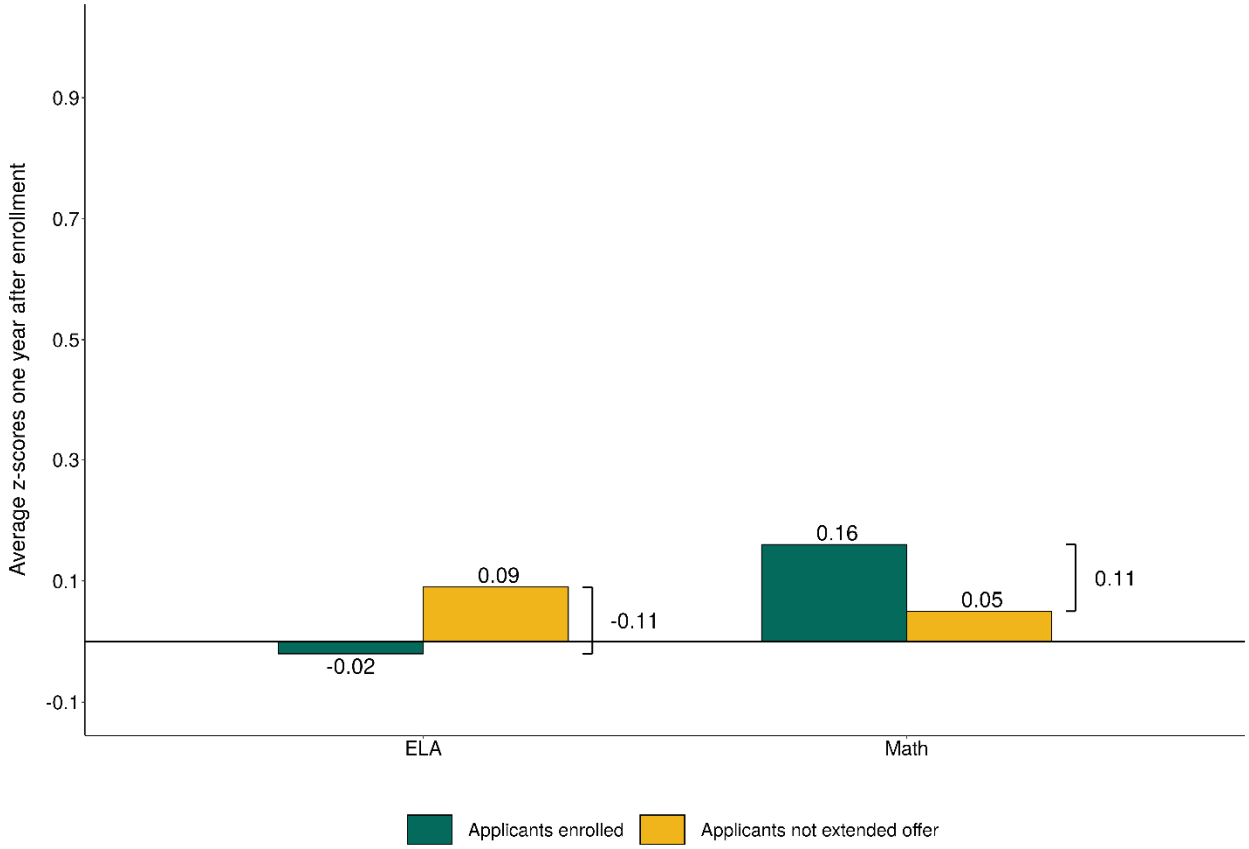
Source: Authors' estimates using administrative data from Uncommon and the NYC Department of Education spanning the 2016–2017 to 2018–2019 school years.

Note: This figure reports the regression-adjusted means in achievement for applicants who did not receive enrollment offers from the grade 5 Uncommon NYC lottery alongside the analogous measure for the group of applicants who did. Estimates are reported in standard deviation units, so the difference between the green and gold bars represents the estimated effect size. Standardized test scores were normalized to have a statewide mean of 0 and standard deviation of 1 by grade level, subject, and school year.

ELA = English language arts; ITT = intent to treat.

The Year 1 TOT impacts of enrolling in an Uncommon middle school through the lottery process also were not statistically significant, estimated at a decrease of 0.11 standard deviations in ELA achievement and an increase of 0.11 standard deviations in math relative to the set of non-Uncommon schools where other applicants enrolled (Figure V.2).

Figure V.2. Uncommon NYC Year 1 TOT impacts on achievement, by subject



Source: Authors' estimates using administrative data from Uncommon and the NYC Department of Education spanning the 2016–2017 to 2018–2019 school years.

Note: This figure reports the regression-adjusted means in achievement for applicants who did not receive enrollment offers from the Uncommon NYC middle schools lottery alongside the analogous measure (non-offer mean plus impact estimate) for the group of applicants who did. Estimates are reported in standard deviation units, so the difference between the green and gold bars represents the estimated effect size. (Differences may deviate from reported impact sizes in Appendix Table D.1 by one-tenth due to rounding.) Standardized test scores were normalized to have a statewide mean of 0 and standard deviation of 1 by grade level, subject, and school year.

ELA = English language arts; TOT = treatment on the treated.

ITT and TOT estimates (and their standard errors) for models of Uncommon NYC impacts on math and ELA achievement gains, as well as first-stage estimates of the relationship between lottery-based offers for Uncommon enrollment and enrolling at an Uncommon school, are presented in Appendix Table D.1. Separate results by application year cohort are reported in Appendix Table D.2.

B. Study limitations

There are several limitations of this analysis that could not be addressed by either the available data or the study design. They include the facts that (1) the first-stage relationship between an initial lottery offer and enrolling in an Uncommon NYC middle school was not tightly correlated, at only 34 percentage points; (2) a similar portion of applicants who did not receive an initial lottery offer eventually enrolled in an Uncommon NYC middle school from waitlists (roughly 30 percent of applicants without an initial lottery offer); and (3) the data did not allow us to track applications to other sectors submitted by our sample of Uncommon applicants, or whether they received offers from these applications to other sectors or offers from their Uncommon waitlist positions that they declined.

Each of these points suggests that the lottery mechanism for assigning admissions offers to Uncommon schools is less strongly correlated with attending the schools than more narrowly focused randomized control study designs. For these reasons, we recommend the reader exercise caution in interpreting the results of this study, given that the aforementioned caveats muddy interpretation of the results relative to the original application of these methods in Denver, where waitlists are not used and there is only one unified lottery to which families apply (Abdulkadiroglu et al. 2017).

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VI. Implementation of Uncommon's School Model

Learning more about Uncommon's school model and how schools implement it is a first step toward understanding potential factors associated with Uncommon's effectiveness in improving student achievement, including potential variation in effectiveness across regions. To examine the school model as implemented during the CSP grant period (2016–2021), we conducted semi-structured telephone interviews in spring 2021 with six network-level administrative (home office) staff and 11 elementary, middle, and high school leaders from the Newark (New Jersey) and NYC regions included in our impact analysis. We examined common themes in the respondents' perspectives on Uncommon's school model, including the mission, academic and character standards, learning structure, extended instructional time, data-driven approach, and hiring and support of school staff. We also explored recent adaptations to the school model that Uncommon implemented to address pandemic-related challenges and other issues that emerged beginning in spring 2020.

A. Summary of implementation findings

Three key implementation findings emerged:

1. Uncommon's school model is highly centralized, with strong alignment of practices across schools, but offers opportunities for flexibility based on school context.
2. Uncommon maintains a culture of continuous improvement characterized by regular data use and an emphasis on providing and receiving feedback.
3. Uncommon's school model has evolved and adapted in response to the COVID-19 pandemic and heightened concerns about racial justice since spring 2020 while remaining consistently guided by the key components of mission, standards, structure, time, data, and talent.

Next, we describe respondents' overall characterizations of Uncommon's school model. We then highlight the main features of each component of the model, as reported by respondents, in supplemental boxes (Boxes VI.2–VI.7). Finally, we discuss each of our key findings and describe the supporting evidence.

B. The Uncommon school model

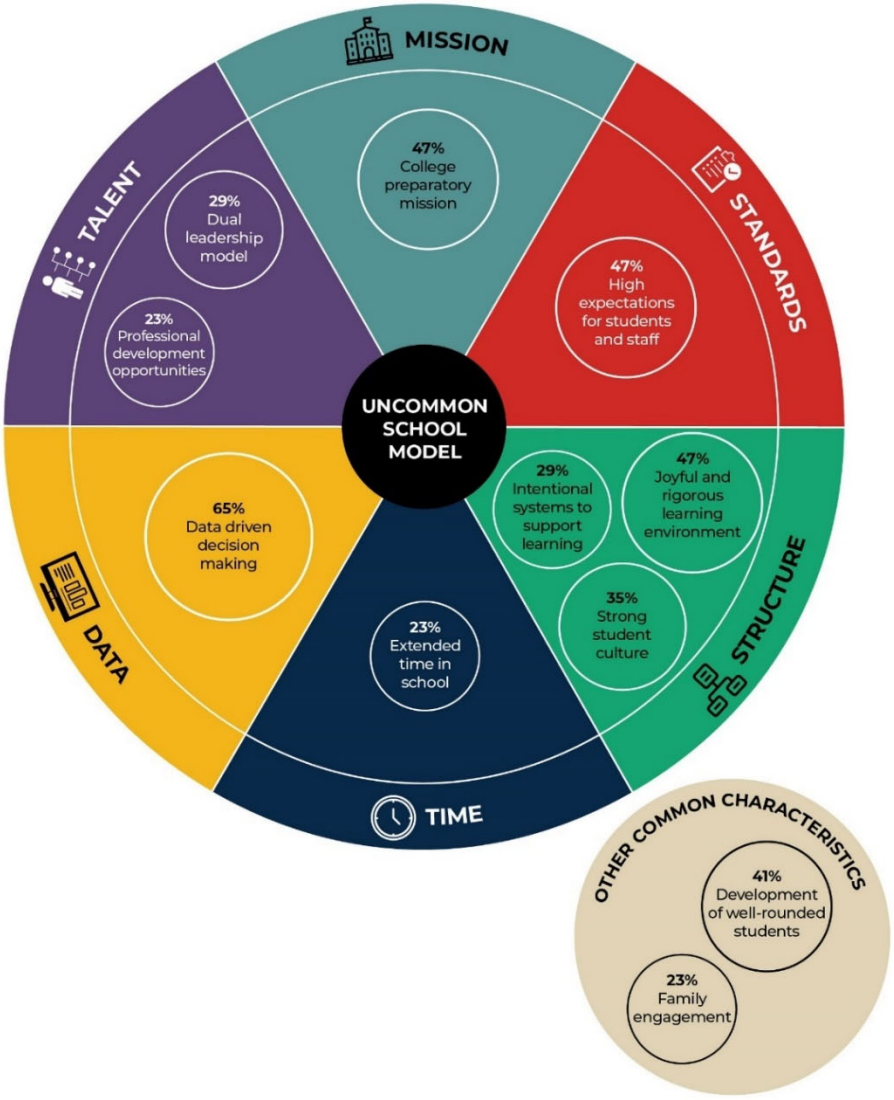
Historically, schools in the Uncommon network have adopted a model with six key components (Box VI.1). We were interested in examining the extent to which Uncommon schools across our sample continued to emphasize these components directly and consistently during the grant period. In the semi-structured interviews, we also asked respondents to identify the key components that define an Uncommon school. The question was open ended; we did not prompt respondents about specific components and only recorded components they identified as defining an Uncommon school. Despite the open-ended nature of the question, respondents' descriptions of the Uncommon school model were notably consistent.

Box VI.1. Components of Uncommon's school model

1. **Mission.** A college preparatory mission
2. **Standards.** High standards for academics and character
3. **Structure.** A highly structured and joyful learning environment
4. **Time.** A longer school day and a longer school year than for typical schools
5. **Data.** A focus on accountability and data-driven instruction
6. **Talent.** A faculty of committed, talented, and well-trained teachers and leaders

They most often cited the focus on data use as a distinguishing feature of an Uncommon school. In addition, respondents frequently noted the college preparatory mission and high expectations for students and staff. They also commonly mentioned some additional characteristics of Uncommon schools that were not explicit components of the school model: developing well-rounded students and building strong partnerships with the community and families (that is, family engagement) (Figure VI.1).

Figure VI.1. Common characteristics of an Uncommon school, as cited by respondents, and alignment with the key components



Source: Interviews with six home office staff and 11 school leaders in spring 2021. Percentages reflect the proportion of respondents citing the characteristic.

The most cited school model component was the frequent use of data to inform practices. Almost half of the school-level respondents and all of the home office respondents noted that being data driven is one of the main components of the Uncommon school model. Data are used to improve instruction, encourage

accountability in teaching, inform the design and evolution of teaching and learning initiatives, and measure and drive actions to support school and network achievement.

Respondents also frequently cited Uncommon's college preparatory mission. Almost half of respondents described preparing students to attend and succeed in college as a key component of the school model.

Respondents similarly emphasized that Uncommon schools hold high expectations for students and staff in service to their mission of having students get to and through college. Respondents commonly cited the combination of "joy and rigor" as a defining characteristic of Uncommon schools and critical to the classroom learning environment. More than half of respondents said that a joyful and engaged culture among students and staff is one of the most important indicators of a successful school within the Uncommon network. Almost half of the respondents described rigorous academics and a joyful community as complementary forces that are challenging to balance but a key priority at Uncommon.

> "When I think about what makes Uncommon 'Uncommon,' we expect the best from our staff, because that's what we know our students deserve. We expect the best from our students because we know that's what they're capable of. And we do whatever is necessary in order to make sure that everyone is able to meet that bar."
>
> *Home office respondent*

More than one-fourth of school and home office staff referenced Uncommon's unique dual leadership model as a key to success. Home office staff noted that although many schools outside of the Uncommon network expect principals to do everything, Uncommon schools implement a dual leader model, in which the principal oversees instructional tasks and the director of operations handles logistical tasks. This leadership model is carried through to the Uncommon home office level and aligns with the school model's emphasis on hiring and developing strong educators because it allows principals to act as instructional leaders, focused on effectively supporting teachers.

Respondents commonly cited two areas in which Uncommon continues to evolve its model. The first was an emphasis on developing well-rounded students who are prepared to succeed not only academically, but also socially and emotionally. Respondents described the importance of supporting students in finding their passions outside of academics, as these passions often develop into their focus in college. A handful of respondents also described strong partnerships with families as an important part of the Uncommon school model. Respondents indicated that an Uncommon school is distinguished by its responsiveness to families' needs and concerns, and strong communication with the school community.

> "Every school has some good teachers, and [the] number one thing that separates a good school from a great school is the ability of instructional leadership to develop other teachers to be just as strong as the best teachers. And so that's what we do. We try to create a culture where learning can thrive."
>
> *Home office respondent*

Box VI.2. Mission

Uncommon's mission is to get students to and through college to empower them in achieving economic freedom and fulfilling lives. Uncommon intentionally operates schools in underserved communities where students have struggled getting into college. The network perceives high-quality teachers as one of the most critical ingredients in improving school quality and, in turn, increasing student enrollment and success in college. To that end, Uncommon offers ongoing professional development opportunities to teachers to best position them to support students.

To prepare students for long-term success, Uncommon strives to do the following:

- Ensure that students build strong academic skills
- Encourage students to pursue extracurricular activities to build on their passions, continuing through college
- Prepare students to lead and contribute to their communities

Box VI.3. Standards

Most academic standards are consistent across Uncommon schools.

- State assessment scores are important metrics of academic success for elementary and middle school students. At the high school level, schools monitor student progress using Advanced Placement (AP) courses, AP index scores, unweighted grade point averages (GPAs), and SAT scores. To promote college readiness, Uncommon prioritizes meeting and exceeding state-level standards for AP exams, SATs, and state assessments throughout the schools in the network, as well as maintaining GPAs of at least a 3.0.
- Both middle schools and high schools use network-wide quarterly interim assessment scores to measure academic success; these assessments are also used in some elementary grades. Uncommon also uses STEP and mCLASS assessments to assess students' literacy proficiency and tailor instruction.

All Uncommon schools promote a college-going culture.

- Uncommon maintains a visual culture in schools by hanging up college banners, flags, and alumni posters, and by naming classrooms after colleges as early as elementary school, when students also engage in activities to increase their awareness of college. The network holds events such as alumni homecoming, when alumni visit to speak about their experiences in college, as well as college spirit week, senior signing day for seniors to announce their schools, and field trips to college campuses.
- High schools take a multipronged approach to preparing students to build a vision and plan for college; it includes a 9th-grade freshman forum addressing college-related topics, college seminars in multiple grades, college fairs and tours, support from a college counselor on all aspects of college admissions and financial aid, and family engagement.

Character standards are mostly promoted uniformly across Uncommon schools.

- Students attend an ongoing advisory class where they reflect on the school values and ways to embody them.
- Students regularly attend a morning circle to reinforce their schools' core values and praise students as they uphold those values.
- Students participate in "close-the-loop" conversations to mend relationships with peers or teachers and address the core values a student failed to meet.

Box VI.4. Structure

Most Uncommon curricula and assessments are centrally aligned.

- The majority of Uncommon's curricula and assessments, especially ELA, math, history, and science courses, are written centrally by expert teachers and the Curriculum and Assessment team. This team prepares daily lesson plans, quarterly interim assessments, and smaller, weekly assessments, and then shares these materials across the network to ensure alignment. Curricula and assessments are designed to align with standards assessed by AP, SAT, and state exams.
- More nuanced or specialized courses (for example, a differential equations math course for grade 12 students) are not currently centrally aligned. The curricula and interim assessments for these courses are developed by an individual teacher or a group of teachers at the school level.

Uncommon has specific classroom management structures.

- Uncommon has structures in place to create a clear and consistent classroom management system. School leaders and teachers receive centralized training and coaching on Uncommon systems and techniques; for example, a system for distributing materials in the classroom and a system for transitioning between subjects in the classroom or between classrooms.
- Teachers use a variety of classroom management techniques. Before spring 2020, they included the following:
  - A point or paycheck system to reward positive behaviors and hold students accountable for negative behaviors
  - A behavior chart with green (positive), yellow (neutral), and red (negative) behavior indicators
  - Opportunities for students to earn points on a leader board, prizes, and certificates
- Since spring 2020, in response to the effects of the pandemic and increased concerns about racial justice, schools have eliminated strict uniform policies, prioritized teachers' use of effective de-escalation techniques, and stopped using the point and color chart discipline systems.

Uncommon implements a range of accommodations for students with unique learning needs.

- Students with limited English proficiency meet several times a week with an English language learning teacher for targeted instruction to build English fluency.
- Students with disabilities participate in the general education model, with push-in supports from special education teachers. Pull-out, small-group instruction is provided as needed.

Box VI.5. Time

Uncommon offers an extended school day and year (Table VI.1).

Table VI.1. Average length of time in school, by region and grade level (pre-pandemic)

	NYC	Newark
Elementary schools	8 hours 30 minutes	9 hours
Middle schools	8 hours 15 minutes	9 hours 30 minutes
High schools	8 hours	8 hours

The use of extended time varies across region and school level:

- Elementary schools in NYC and Newark use the extra time for academic content.
- NYC middle schools use the extra time to provide 90 minutes of math instruction and 60 minutes of instruction in other core curriculum classes (reading, writing, science, and history) in addition to 30–60 minutes of physical education, visual arts, or music.
- Newark middle schools use the extra time to provide small-group instruction and homework support clubs.
- NYC high schools use the extra time for academic content. In addition, the extended school day includes 60 minutes of post-academic programming, which encompasses office hours, homework makeup, detention, sports, and extracurriculars.
- Newark high schools use the extra time for core academic content.

Use of Saturday school varied by grade level and region before the pandemic (Table VI.2). Most Saturday schools were phased out during the 2021–2022 school year.

Table VI.2. Use of Saturday school (pre-pandemic)

	NYC	Newark
Elementary schools	No Saturday school offered	Saturday school offered for select students for exam preparation
Middle schools	Some schools offered Saturday school*	No Saturday school offered
High schools	Saturday school offered variably for ad hoc credit recovery, detention makeups, and exam review*	No Saturday school offered

*No longer offered as of the 2021–2022 school year.

The pandemic temporarily reduced the amount of instructional time in Uncommon schools, primarily during spring 2020:

- All schools in the network switched to fully remote instruction from mid-March 2020 through the end of the 2019–2020 school year. High school students received some live instruction each day, whereas elementary and middle school students primarily participated in asynchronous video instruction and office hours.
- During the 2020–2021 school year, instructional time increased but did not completely return to typical levels. Schools started off the school year in a remote instruction format with a slightly shorter day and then opened with a hybrid format combining in-person and remote instruction during October and November in most schools. With the introduction of in-person instruction, schools cut back on instructional time to implement health and safety protocols, such as hand sanitizing and temperature taking.

Box VI.6. Data

Uncommon has cultivated a strong culture of using data to inform all decisions.

- Teachers participate in weekly data meetings with an instructional leader to review student data to inform instructional priorities, including what content teachers will reteach.
- School leaders use data to assess and monitor student achievement within their school, and provide teachers whose students are struggling with coaching and support aligned to areas of need. They also use these data to target student supports, such as supplemental parent-teacher conferences and summer school.
- Home office staff use data to assess and monitor student achievement across the schools in the network. Specifically, they use these data to drive network organizational decisions, such as adjusting the centralized curricula if widespread skill gaps are present in a specific subject or topic area.
- Home office staff and school leaders use student achievement data to identify the most effective teachers and document and scale their teaching practices across the network.
- Uncommon has a "Data Day" after every interim assessment. Schools are closed for students on this day, and teachers examine the data from their classroom to identify gaps and work with colleagues to brainstorm lesson plans to address them.
- During the summer, the network provides centralized training on data-driven instruction across all regions.

During the pandemic, Uncommon adapted its approach to data collection and analysis.

- Particularly during the early phase of remote learning, schools administered fewer structured assessments, as they were primarily focused on keeping students engaged. To continue monitoring student learning, school leaders measured student engagement indicators such as the percentage of assignments submitted, the percentage of time spent in virtual class, and attendance.
- During remote learning, teachers still participated in weekly meetings with their instructional leaders, but these meetings occurred virtually.

Box VI.7. Talent

Uncommon school staff receive many forms of support for professional learning.

- The home office coordinates professional development for school leadership staff twice a quarter, as well as via a yearly retreat. Principals and instructional leadership teams coordinate ongoing professional development offered to school staff. Teachers receive professional development on Fridays, which are half-instruction days for students.
- Summer professional development, which typically focuses on instructional techniques or content, is planned and facilitated by the network's content development team. This professional learning includes four weeks for new teachers and three weeks for returning teachers.
- Teachers and instructional leaders hold weekly data meetings, during which teachers receive tailored coaching and support.
- Staff can provide feedback about professional development by filling out staff surveys.

Uncommon focuses on hiring and retaining diverse educators.

- Recruiting efforts for teachers and leaders prioritize educators with identities, experiences, and backgrounds that reflect Uncommon student populations, and the home office tracks diversity statistics. Recruitment practices to support diversity goals include outreach to historically Black colleges and universities (HBCUs) to build a recruitment pipeline.
- Uncommon runs a Summer Teaching Fellows program for college students as a method for recruiting staff; annually, more than 70 percent of fellows are people of color.
- Uncommon has begun creating leadership development initiatives to support and promote the advancement of educators of color in its network.

C. Key finding #1: Uncommon's school model is highly centralized, with strong alignment of practices across schools, but offers opportunities for flexibility based on school context

Uncommon's approach is highly centralized across all six components of the school model. However, respondents indicated that schools have the autonomy to customize specific practices and priorities within that framework based on the specific needs of the students and families in the communities they serve. Below, we describe evidence of this alignment and flexibility across each component of the school model.

1. Mission

Respondents' descriptions of Uncommon's mission were highly consistent from the home office to the school level, and across schools within the network. Fifteen of the 17 respondents said Uncommon's main mission is getting students to and through college. The two remaining respondents referred to a commitment to closing the opportunity gap and serving underserved communities. At the same time, regional differences in how respondents described the mission demonstrate how particular focus areas are tailored based on local context. For example, Newark school respondents emphasized a deep connection with the specific communities their schools serve as an important part of their mission. All respondents from NYC high schools spoke specifically about their school mission in helping students develop the skills and values that define strong character.

2. Time

Schools across the Uncommon network implement a longer school day and year relative to a typical traditional public school. However, the extent and use of the additional time vary by school context. For example, NYC Uncommon middle schools use the extended school day to provide a full 90 minutes of instruction in math and 60 minutes in each of the other core subjects. Newark Uncommon middle schools use the extended learning time for small group instruction and homework support clubs. Similarly, before the 2021–2022 school year, NYC middle and high schools occasionally used Saturday school, whereas Newark middle and high schools did not. These variations allow schools to meet the specific needs of their student populations and local context.

3. Standards

Across schools, respondents described similar methods for measuring academic success. Most school leader respondents across grade levels mentioned interim assessment scores as important tools for assessing and supporting academic growth and success over the course of the year. Students complete these network-wide assessments quarterly, with schools aiming to be within or above 5 percent of the network average. Schools also use similar measures for academic success within specific grade ranges. For example, high schools use AP index scores,[5] SAT scores, and unweighted student GPAs; elementary and middle schools use state assessments to measure student achievement. In addition to exam metrics, elementary schools focus on subject matter-specific growth and year-to-year growth as important metrics.

Uncommon schools adopt centrally aligned behavior standards. However, most respondents explained that there are opportunities for innovation, leader autonomy, and discretion if their school needs to change aspects of the behavior plan. For example, schools' core values differ based on the school and community

[5] AP index scores measure the percentage of students who pass an AP exam over the total number of students who possibly could have taken the AP course and exam.

context. Some examples of core values include service, courage, wonder, and integrity, which schools infuse into student materials and school culture.

4. Data

Approaches to data use and the systems and supports in place for teachers to use data are highly centralized and strongly aligned across the schools in the network. Every teacher receives coaching from an instructional leader—a veteran teacher at the school who receives extensive professional development to take on this leadership role. All respondents indicated that assigned instructional leaders support teachers in using student data to drive instruction through weekly one-on-one meetings. During these meetings, teachers and their instructional leaders assess student data to ensure that all students achieve certain benchmarks. If students are not meeting achievement goals, teachers alter their approach to meet the needs of the students in their classrooms.

> "You can walk into any Uncommon school, and you will find those weekly data meetings occurring and you'll find reteaching happening consistently."
>
> *Home office respondent*

Uncommon has a centralized data system that houses the network-wide quarterly interim assessment data, which both home office staff and school leaders use to understand teacher effectiveness and student achievement at the network and school levels. Home office staff primarily examine these data to understand performance among all schools in the network and identify performance areas that are not consistent across schools. School leaders examine the data to better understand student learning within their school and compare their school outcomes to those of other schools in the network. For example, school leaders use the assessment data to identify which teachers need additional support and which are especially effective and could serve as a resource for others. In addition, Uncommon has continuously invested in enhancing its data tools so home office staff and school leaders can access a range of student academic, disciplinary, and college access data; evaluate trends; and identify actions that support student success.

5. Structure

Uncommon's curricula and assessments are centralized and consistent across the network. Respondents reported that expert teachers and the network-level curriculum and assessment team write the majority of Uncommon's curricula and assessments and then share them broadly across the network for all teachers to use.

Uncommon's classroom management and classroom systems are similarly consistent across schools. Respondents noted that an observer would likely see the same approach to teaching and learning across all schools in the network because teachers receive centralized training and coaching on Uncommon's

> "We've spent a lot of time…watching our best teachers and kind of codifying those practices, and it starts with… bite-size skills…. For example, our best teachers...stand still when they're giving directions and speak with a loud confident tone when delivering instructions…. We spend time…giving granular feedback on those things because we know that building a strong community and building a strong culture in your classroom starts with making sure that you're being really clear of what you're asking and expecting of students. And so we really focus on that…. That's how we try our best to create a consistent classroom experience for everyone."
>
> *School leader respondent*

systems and techniques. Twelve of 17 respondents said that Uncommon uses clear and consistent classroom management systems across the network to create a structured learning environment. There are also systems that align across schools in the network that help create and support a structured learning environment, such as a system for distributing materials in class and one for transitioning between subjects or classrooms. Twelve respondents also cited the fact that Uncommon trains teachers to build a culture of encouragement and trust with high expectations for students as a feature of a consistent structure across schools.

6. Talent

The performance review process of school staff and school leaders is consistent among all schools in the Uncommon network. Respondents described a midyear review process to assess performance among principals and teachers across the network. This review uses a common rubric to assess principals, teachers, deans, deans of students, and deans of curriculum and instruction.

In addition to performance reviews, the professional development activities for principals are usually managed centrally. Professional development for school leaders is coordinated at the home office level. School leaders attend a regionally coordinated retreat annually and receive other professional development sessions twice a quarter. Professional development offered to school staff is coordinated by principals and instructional leadership teams at each school. New and returning teachers receive professional development over the summer, tailored support during data meetings, and other professional development every Friday during the school year.

D. Key finding #2: Uncommon maintains a culture of continuous improvement characterized by regular data use and an emphasis on providing and receiving feedback

During discussions with home office staff and school leaders, continuous improvement emerged as a central theme across all respondents and all components of the school model. In particular, respondents indicated that Uncommon supports continuous improvement using data and regular feedback loops. At all levels of the organization, there is reportedly a strong commitment to using data to understand whether Uncommon schools are achieving their mission of getting students to and through college. In addition, Uncommon strives to maintain high standards by using evaluation data from staff and school walk-throughs to provide real-time feedback to staff at all levels. Uncommon regularly evaluates policies and practices, using data to identify effective practices that are scalable across the network.

1. Mission

Staff perceived the regular use of data across the Uncommon network as critical to schools' efforts to achieve their mission of getting students to and through college. When describing a "successful" Uncommon school, all respondents emphasized that performing well on a variety of school metrics is the main way to gauge success and inform feedback. Eleven respondents said that assessing success is informed by data points such as college acceptance rates, college graduation rates, SAT scores, scores on AP exams, and state assessment scores. Some respondents described using comparison benchmarks to measure a school's success. For example, schools might examine whether their outcomes meet or exceed the state assessment scores and other outcomes of the highest-performing subgroups in the state.

2. Time

The extended school year implemented across the Uncommon network not only establishes a longer school day and year for students, but also dedicates extended time for teacher planning and professional development outside of the academic year. This structure facilitates Uncommon's commitment to developing teachers and continuously improving instructional practices. Staff viewed the additional three weeks of summer professional development for returning teachers and four weeks for new teachers as critical to the Uncommon approach. The additional time allows teachers to not only plan for the year but also learn the curriculum and practice, and receive feedback.

3. Standards

Uncommon uses evaluation data, including staff surveys and regular feedback, to drive continuous improvement in school achievement and school culture. Several respondents described evaluation as embedded in the school environment. They specifically referenced the yearly 360 staff evaluations,[6] school walk-throughs by deans of students, and real-time feedback to staff on all levels. Additionally, schools use a common school culture rubric to set and assess cultural expectations. School leaders use this rubric while conducting regular walk-throughs and identify areas for improving school culture.

4. Data

Respondents reported that Uncommon has a systematic culture of data use to promote continuous improvement. Eleven of the 17 respondents specified that teachers consistently use student data to inform and drive their instruction. In addition, all respondents said that teachers receive support in using student data to drive instruction through weekly one-on-one meetings with their assigned instructional leader. With coaching and guidance from the instructional leader, teachers learn how to collect and use data effectively to inform their teaching and develop action plans. For example, during these weekly meetings, teachers work with their instructional leader to review any available data for that week (such as exit tickets or assessment data) and then use the data to plan material to reteach and prepare for upcoming lessons.

In addition, home office staff and school leaders use quarterly interim assessment data to compare classrooms within a school and schools within the network. They then use these data to identify which teachers need more support. Teachers in need of support might receive more professional development and more one-on-one time with a school leader or an instructional leader.

5. Structure

Although Uncommon has long-standing centralized systems for classroom management and curriculum and instruction, network staff regularly review data to inform improvements to these systems. When a practice looks promising, Uncommon strives to scale it up to strengthen the network. For example, a high school principal identified that some high school students were consistently falling short of achieving a 3.0 GPA. To address this problem, the principal worked with the home office to implement a pilot program called Target 3.0. Target 3.0 gives students dedicated time during the school day (one-hour blocks two days a week) to analyze their academic performance data, set goals, and create action plans to raise their GPAs. For example, students might identify changes they need to make to study habits and create and track a plan for improvement. Because data from students' improvement through this initiative

[6] 360 staff evaluations are yearly peer-rated surveys that staff complete on behalf of their colleagues.

were promising, Uncommon scaled up Target 3.0 and implemented it in the other high schools in the network. A home office respondent explained, "We're trying to do our best…to scale practices across the network…. If someone is doing a particularly good job at a particular thing, we're going to identify it, go in, try to understand it, codify it, and then roll it out back across the network."

6. Talent

Respondents referred to Uncommon as having a feedback-oriented culture where coaching is provided at all levels of the organization. In fact, nearly two-thirds of respondents noted that one of the most important factors in hiring decisions is an applicant's willingness to receive feedback.

Specifically, respondents noted the following ways staff regularly receive feedback:

- New teachers are observed and receive feedback multiple times a week.
- Returning teachers are observed and receive feedback twice a month.
- Teachers and their instructional leaders meet weekly.
- Assistant superintendents conduct weekly school visits to provide feedback to principals.

> "We just believe that you get better by doing your work, by getting feedback and coaching on your work…. And we often say that the best musicians, the best basketball players in the world still get coaching to try to get better, and I think that's true at Uncommon…. And so I think that is first and foremost. The most important thing is that there's just a culture of coaching and a culture of development, and a culture of growth."
>
> *Home office respondent*

Respondents also noted how Uncommon uses surveys to evaluate and provide feedback on every level of the organization. School culture data used to evaluate school performance are gathered through the following:

- Annual teacher self-evaluations
- Annual peer-rated 360 evaluations
- Annual student and family surveys[7]
- Midyear review process[8]
- Annual staff surveys[9]

Uncommon uses observations, coaching, and surveys throughout the year to provide feedback for staff at all levels. As one respondent noted, "No evaluation should ever be a surprise because there is constant communication about feedback of what you are doing well and where you need to grow…which allows us to stay on the same page and continue to build trust with each other…we are just trying to help each other get better."

[7] Students and their families take this survey to measure the "health and wealth" of the school.
[8] This process measures staff performance for both principals and teachers.
[9] School staff provide feedback to principals and the home office to inform future professional development opportunities.

E. Key finding #3: Uncommon's school model has evolved and adapted in response to the COVID-19 pandemic and heightened concerns about racial justice since spring 2020 while remaining consistently guided by the key components of mission, standards, structure, time, data, and talent

Historically guided by the key components of mission, standards, structure, time, data, and talent, respondents indicated that Uncommon's model is evolving and responsive to changing circumstances. This adaptable approach was demonstrated during the COVID-19 pandemic, as well as the attention to racial justice that heightened in spring 2020. For example, over the past two years Uncommon has increased its focus on incorporating social-emotional learning (SEL) and developing culturally responsive curricular and instructional approaches (Box VI.8).

1. Mission

Respondents consistently reported that the mission of getting students to and through college has persisted across the schools in the Uncommon network even in the face of major challenges brought on by the COVID-19 pandemic. When speaking about these challenges, most respondents said that although the mission has remained the same, their on-the-ground practices had to be flexible and evolve to meet the needs of their students, teachers, and communities. Staff also noted that schools are continuing to revise and modify existing policies and develop new ones in response to the pandemic, as well as heightened concerns about racial justice. However, policy decisions are still guided by the same key components.

2. Time

At the onset of the pandemic, Uncommon prioritized assessing students' technology needs, deploying Chromebooks, and ensuring Wi-Fi access for all of its students. Although Uncommon was successful in meeting students' technology needs, like other schools throughout the country, it faced challenges in maintaining the same amount of instructional time through its remote and hybrid models compared to the amount before the pandemic began.

In summer 2021, Uncommon focused on enhancing summer programming as an approach to help close skill gaps that emerged during the period of remote and hybrid instruction. At the high school level, Uncommon expanded the eligibility criteria for students to attend its traditional five-week intensive Summer Academy, which provides credit recovery opportunities for students in danger of not passing courses. The summer programming used an in-person, small-group instructional model. Each student had the option to earn credit for up to three courses during Summer Academy.

At the elementary school level, which previously consisted of opt-in summer tutoring and enrichment programming, Uncommon launched its first summer program for the students who struggled the most in reading, math, or both during the school year. Modeled after the high school Summer Academy, this K–5 Summer Success program was staffed by high-performing veteran teachers and leaders and hosted in person.

For the 2021–2022 school year, Uncommon adjusted school schedules and instructional programming to support a learning acceleration model. The model immerses students in grade-level learning while providing substantial time for targeted, small-group instruction focused on closing skill gaps. For example, middle schools have added a guided reading block that did not previously exist in the school schedule. Uncommon's central curriculum team is using weekly data to develop "just-in-time" instructional materials to help teachers close skill gaps.

3. Standards

> "I think our approach has certainly had to change as the requirements and the needs of kids have changed, and so there hasn't been…this kind of cookie-cutter, one-size-fits-all approach to supporting students."
>
> *School leader respondent*

In response to the effects of the pandemic and increased concerns about racial justice since spring 2020, schools in the Uncommon network have implemented changes in two key areas: (1) discipline and culture standards and (2) community-building norms.

Uncommon had begun adapting many restorative approaches to discipline before spring 2020. For example, about half of respondents mentioned implementing "close-the-loop" conversations[10] facilitated by either a teacher or a dean of students. Since spring 2020, Uncommon has expanded these approaches even more and shifted away from punitive disciplinary systems. Respondents referenced an increased focus on restorative practices and community to build relationships between students and teachers.

Staff mentioned the following changes made in response to the effects of the pandemic and increased concerns about racial justice:

- Schools are phasing out the color chart and point systems.
- Schools are altering uniform policies so students are no longer required to wear dress shoes and pants.
- Schools have reduced consequences for rule violations.
- Schools have adapted their approaches to community building for students and teachers. Schools introduced a non-instructional day to promote wellness; increased the frequency of community building to four days from two to three; conducted virtual celebrations during remote learning; and increased communication with families.

Most school respondents described needing to shift their focus as a result of the pandemic to ensure that students could pass their classes and demonstrate basic grade-level proficiency. They found students had considerably more difficulty meeting foundational academic milestones, given the social and emotional effects of the pandemic and the challenges of learning remotely. Given this context, Uncommon has increased its focus on integrating SEL, both to support students' recovery from pandemic-related trauma and as a key component for academic success.

[10] "Close-the-loop" conversations occur between students and teachers to address a behavioral issue, aim to repair the relationship, and come to an agreement about how to move forward to prevent the same issue in the future.

Box VI.8. Changes since spring 2020: Spotlight on DEI and SEL

In response to the pandemic and heightened concerns about racial justice, Uncommon has intensified its focus on diversity, equity, and inclusion (DEI) and social-emotional learning (SEL) to ensure its schools provide affirmative learning environments that inspire, support, and prepare all students to pursue a postsecondary degree. Below, we highlight a few of the many components of this work.

- **DEI training for teachers and students**. Teachers receive DEI-focused professional development throughout the year, including training on culturally responsive teaching practices grounded in Hammond's Ready for Rigor Framework (Hammond 2015). Every school has a team of educators who volunteer to be DEI facilitators, receiving network-level training to deliver quarterly DEI sessions for their peers. These facilitators also train students at the middle and high school levels to deliver DEI-based workshops for their peers; at the elementary school level, educators deliver them. As part of a revamping of disciplinary policies, Uncommon is training educators in conflict de-escalation strategies rooted in understanding how cultural differences can influence students' classroom behavior.
- **Changes to curriculum and instruction.** In the classroom, Uncommon has increased project-based learning activities that center on students' lives and communities; audited curricula with a DEI lens; diversified texts used for learning; and introduced new courses, such as African American history.
- **Six core routines.** To strengthen the experiences of staff and students and promote well-being, schools in the network have embedded six core routines:
    1. Mindful breathing and meditation
    2. Gratitude reflection
    3. Mood Meter check-in, a tool in the Yale Center for Emotion Intelligence RULER framework that uses a color-based system for expressing emotional states
    4. Classroom or school charter, which is also part of the RULER framework—a living document that students co-create to establish a vision for their learning environment
    5. Best-self reflection
    6. Practices for examining and mitigating emotional triggers
- **DEI/SEL rubric and resources**. The home office developed a DEI/SEL rubric to guide best practices across schools and assess schools' proficiency and growth in each critical competency area. The office also designed professional development and a K–12 resource library to support principals and educators in implementing strategies to strengthen DEI and SEL.

4. Data

Respondents reported that Uncommon's use of data to support academic achievement has been consistent over the past five years, but the introduction of remote instruction during the pandemic changed the way the network collected data. Most respondents indicated they used more technology and online platforms to gather data virtually during remote learning. For example, schools used features embedded in remote learning platforms, such as a chat box and polls, to collect data in innovative ways. In addition, Uncommon adopted online assessments such as Amplify's mCLASS assessment to help assess literacy skill growth. Uncommon also adapted interim assessments and instructional observations to be administered virtually.

5. Structure

Although the approach to classroom management and structuring the learning environment has changed since spring 2020, the adaptations still align with Uncommon's founding mission of preparing students for long-term success. Most respondents noted that in the wake of the pandemic and heightened concerns about racial justice, schools have adopted a more intense focus on SEL. For example, Uncommon has added professional development and introduced intentional practices related to SEL in the school and classroom. In addition, respondents described an increased focus on training teachers to be culturally responsive and an increased effort to ensure curricula reflect DEI goals. Uncommon staff found it necessary to be intentional about teaching DEI "because you can't ask the student to explore their emotions without doing it from a sense of their identity."

6. Talent

In response to external factors since spring 2020, Uncommon schools adjusted their professional development. As both home office and school staff noted, the network prioritized the social-emotional health of staff and students over professional development during the pandemic. Nearly half of respondents noted that the content of professional development shifted to best practices for remote instruction and classroom management in a virtual environment. These professional development sessions focused more on discussion and less on content, which facilitated more brainstorming and best practice sharing than had been possible in the past.

Schools also adapted the workload and expectations for teachers beginning in spring 2020 while maintaining a feedback-oriented culture. Teachers have had fewer meetings and a shortened school day to help reduce burnout. Approximately half of school staff respondents indicated that staff morale has remained high during the pandemic. As one school principal explained, "We've had to do a lot more…individual wellness check-ins with teachers to see how they are," but survey measures of staff morale have been at similar levels since 2016, "so morale is definitely still high." To maintain a feedback-oriented culture, home office staff mentioned implementing intermittent surveys (three to four times a year) to acquire feedback from staff more frequently than in previous years.

Since spring 2020, Uncommon schools have increased their emphasis on a commitment to recruiting and supporting a diverse set of educators who reflect their student populations. Respondents perceived that Uncommon schools were already focused on prioritizing diversity in hiring.

Respondents cited the following strategies to hire diverse staff before 2020:

- The Summer Teaching Fellows program,[11] noted as an important and successful method for recruiting talented and diverse staff
- Uncommon's recruitment team connecting with HBCUs to recruit staff; two staff members specifically referenced a strong relationship between Uncommon and Morehouse College
- The home office recruitment team leading the drive to recruit and retain diverse staff; the team dedicates resources to digital advertising to reach diverse audiences and monitors diversity statistics

To better develop and support educators committed to inclusiveness and equitable practices, Uncommon has introduced the following since spring 2020:

- School-based DEI facilitators (volunteer educators), trained by a central team to deliver DEI workshops for their peers and guide conversations with students around DEI topics
- Intensive and ongoing training in culturally responsive instructional approaches

F. Looking ahead

These descriptive findings contribute to greater understanding of how the Uncommon school model is implemented and the practices potentially associated with Uncommon's effectiveness in improving student achievement. Going forward, it will be useful to document the network's efforts to implement planned policy changes, such as modifications to the behavior system, and any concurrent changes in student outcomes. Some of the changes since spring 2020, such as virtual data collection, are likely to be temporary, whereas others, such as increasing culturally responsive curricular and instructional approaches, are expected to endure. In addition, given that this study's impact analysis is limited to outcomes before the 2019–2020 school year, the policy changes Uncommon implemented are not reflected in the achievement impacts. Implementation and effectiveness of these new practices are an important topic for future research.

[11] This program consists of a summer internship offered to college students entering their senior year to teach summer school and receive professional development from Uncommon. Some of the interns then receive offers to work for Uncommon full time after graduation.

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VII. Discussion

Findings from the study provide mixed evidence of Uncommon's impacts on student achievement. In particular, the differences in findings by region and by method, as well as the focus on middle school students and the limited sample of the lottery-based analysis, underscore the need for additional, rigorous research on Uncommon's impacts over a wider scope of schools and students.

The finding of positive and statistically significant impacts of enrollment in Newark middle schools on student achievement in math and ELA is largely consistent with previous studies of Uncommon's effectiveness. Students who enrolled in an Uncommon Newark middle school between the 2014–2015 and 2018–2019 school years had higher average achievement in math and ELA than similar students who attended other public schools in Newark during the same period. The achievement difference persisted throughout middle school and approached the size of the poverty test score gap in both math and ELA. However, this analysis of impacts for Newark middle schools used a quasi-experimental design, which cannot account for possible bias due to unobservable characteristics that influence both enrollment in Uncommon and academic achievement. In addition, it focused on students newly enrolling in Uncommon schools in middle schools—a minority of the students served.

The analysis of NYC middle schools sought to address this gap in the literature by using a school admissions lottery-based design to estimate experimental impacts. We found no discernable impacts on student achievement in math or ELA after one or two years for students who applied to Uncommon NYC middle schools for the 2017–2018 or 2018–2019 school years. However, it is important to exercise caution when drawing conclusions from these findings. A key limitation of our analysis is the small sample, which may not be generalizable to the broader population of Uncommon applicants. Our analysis included less than one-third of the nearly 2,000 applicants to Uncommon middle schools in the relevant school years due to the constraints of the experimental methods and the availability of outcome data. In addition, several factors suggest the lottery mechanism that assigns admissions offers for Uncommon schools, which we relied on to identify the treatment and control students for the analysis, was less strongly correlated with attending a given Uncommon school than more narrowly focused randomized controlled trial study designs. Given these limitations, we cannot draw any broad conclusions on the effectiveness of Uncommon NYC middle schools based on this particular analysis.

Our initial lottery-based analysis provides an important opportunity for future research that builds on our methods and generates experimental impacts for a wider scope of schools and grade levels. In particular, researchers and practitioners should consider how to collaborate to conduct research that generates robust, value-added findings. For example, future lottery-based analysis could benefit from systematic, documented waitlist systems and data consortiums that link lottery and enrollment data across all school sectors. This research could add value to the field more broadly by generating and comparing both quasi-experimental and experimental impacts for multiple regions, and furthering our understanding of how to evaluate the effectiveness of charter networks using similar methods. Going forward, future research on Uncommon's effectiveness will also be useful for understanding the impacts of planned changes to the network's approach, as described in the previous chapter, and the impacts of the Uncommon school model across a broader range of outcomes not limited to student achievement in math and ELA; for example, college preparation or social-emotional skills.

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Appendix A

Newark Impact Analysis: Data and Methods

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In this appendix, we provide technical details on the data, sample, and methods used for the primary analysis to determine the impacts of enrolling in an Uncommon middle school in Newark. We also describe how each alternative approach was different from the primary approach. We present the results from the alternative approaches in Appendix B.

A. Data

Using data obtained from the New Jersey Department of Education for the 2014–2015 to 2018–2019 school years, we created the variables for our analysis shown in Table A.1. We used each of these variables in the models for both propensity score matching and conducting the impact analyses.

Table A.1. Student-level variables constructed for analysis

Variable name	Type	Description
Math z-score	Continuous	Standardized math test scores were normed to have a mean of 0 and standard deviation of 1. Test scores were normed within the city of Newark by grade level and school year. Test scores from 2014–2015 to 2017–2018 were from the Partnership for Assessment of Readiness for College and Careers (PARCC); test scores from 2018–2019 were from the New Jersey Student Learning Assessments (NJSLA). A separate value was calculated for each school year for students in grades 4–7.
ELA z-score	Continuous	Standardized ELA test scores were normed to have a mean of 0 and standard deviation of 1. Test scores were normed by grade level, school year, and city (Newark). Test scores from 2014–2015 to 2017–2018 were from the PARCC; test scores from 2018–2019 were from the NJSLA. A separate value was calculated for each school year for students in grades 4–8.
Alternative assessment	Binary (0/1)	An indicator was set to 0 if a student did not take an alternative assessment in a given school year and was equal to 1 if a student took an alternative assessment in a given school year. An alternative assessment could be either the Alternate Proficiency Assessment, given to special education students; or Access for ELLs, given to English learners. A separate value was reported for each school year for students in grades 4–8.
Accommodation	Binary (0/1)	An indicator was set to 0 if a student did not have a testing accommodation in a given school year and was equal to 1 if a student was given a testing accommodation in a given school year. A separate value was reported for each school year for students in grades 4–8.
Female[a]	Binary (0/1)	An indicator was set to 0 if gender was male and 1 if gender was female.
Hispanic[a]	Binary (0/1)	An indicator was set to 0 if ethnicity was not Hispanic/Latino and 1 if ethnicity was Hispanic/Latino.
Black[a]	Binary (0/1)	An indicator was set to 0 if race was not Black and 1 if race was Black. The non-Black races included White, Asian, Pacific Islander, and American Indian.
Ever FRPL	Binary (0/1)	An indicator was set to 0 if the student was never eligible to receive free or reduced-price lunch and 1 if the student was ever eligible to receive free or reduced-price lunch in any baseline school year.
Ever retained	Binary (0/1)	An indicator was set to 0 if the student was never retained and 1 if the student was retained in any baseline school year.

Variable name	Type	Description
Ever SPED	Binary (0/1)	An indicator was set to 0 if the student was never eligible to receive special education services and 1 if the student was ever eligible to receive special education services in any baseline school year.
Ever EL	Binary (0/1)	An indicator was set to 0 if the student was never classified as an English learner and 1 if the student was classified as English learner in any baseline school year.
Ever chronic absentee	Binary (0/1)	An indicator was set to 0 if the student was never classified as a chronic absentee and 1 if the student was classified as a chronic absentee in any baseline school year. A student was classified as a chronic absentee when missing at least 10 percent of school days in a given school year.
Ever Uncommon	Binary (0/1)	An indicator was set to 0 if the student never attended an Uncommon school and 1 if the student attended an Uncommon school in any school year. This variable was used to define the treatment and comparison groups.
Entry year	Continuous	The school year in which a student began attending an Uncommon school or an eligible comparison school.
Entry grade	Continuous	The grade level in which a student began attending an Uncommon school or an eligible comparison school.

[a] This variable was considered time invariant. We used data from the baseline year if reported. If not reported, we obtained data from another year of available data, starting with one year before the baseline year, then one year following the baseline year, then two years before the baseline year, and so on, until a value was identified.

B. Sample

Tables A.2 and A.3 show the sample sizes for math and ELA from one to four years following enrollment. We report three sample sizes for the Uncommon Newark and comparison students: (1) those who were in eligible cohort schools and grade levels, (2) those who had required data and were eligible for matching, and (3) those who were matched and included in the impact estimates.

We excluded all of those for whom we did not have data on the demographic characteristics and standardized test scores required for the analyses. Our analysis included students who repeated grades in any of the years of the study. For example, if a student who started in a grade 5 cohort repeated 5th grade, we would report those grade 5 outcomes in Years 1 and 2, grade 6 outcomes in Year 3, and grade 7 outcomes in Year 4. We would not report this student's grade 8 outcomes. Grade repetition was infrequent, and the rates were similar across Uncommon students and comparison students. For example, among students included in the analysis of one-year math impacts, 0.5 percent of Uncommon students and 1.9 percent of comparison students were repeating their baseline year grade. Across all outcome samples, grade repetition rates for Uncommon students ranged from 0 to 4 percent, and the difference in grade repetition rates between Uncommon and comparison students ranged from less than 1 percentage point to 3 percentage points. For the two analysis samples with retention rate differences of more than 2 percentage points (two-year math and ELA outcomes), a larger percentage of Uncommon students were retained relative to comparison students.

Table A.2. Number of students for the impact estimates in math, by years after enrollment

Number of years after enrollment	Students in initial cohort schools and grade levels[a]		Students with required data and eligible for matching		Students matched and included in impact estimates	
	Uncommon Newark	Comparison	Uncommon Newark	Comparison	Uncommon Newark	Comparison
1 year	638	32,426	423	24,544	422	3,490
2 years	515	21,578	332	16,564	332	2,694
3 years	389	13,035	216	5,038	216	1,608

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: As shown in Figure II.3 in the report, the outcome years pool students across cohort years and grade levels.

[a] The number of students in the initial Uncommon cohorts excludes those who had previously attended an Uncommon school.

Table A.3. Number of students for the impact estimates in ELA, by years after enrollment

Number of years after enrollment	Students in initial cohort schools and grade levels[a]		Students with required data and eligible for matching		Students matched and included in impact estimates	
	Uncommon Newark	Comparison	Uncommon Newark	Comparison	Uncommon Newark	Comparison
1 year	638	32,426	423	24,591	422	3,475
2 years	515	21,578	332	16,570	332	2,674
3 years	389	13,035	257	9,964	257	2,011
4 years	230	5,537	149	3,954	148	1,065

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: As shown in Figure II.3 in the report, the outcome years pool students across cohort years and grade levels.

[a] The number of students in the initial Uncommon cohorts excludes those who had previously attended an Uncommon school.

ELA = English language arts.

C. Methods for the primary approach to estimate impacts

In this section, we provide additional details on the propensity score matching procedure used to create a balanced sample and the model used to estimate the impacts of enrolling in an Uncommon middle school in Newark on math and ELA achievement. We used the same approach described in a recent study of the impacts of the Uncommon school model in turnaround settings in Camden and Newark (Burnett et al. 2021). For that study, we tested several variations of propensity score models and matching methods before selecting the approach that led to the most similar groups of Uncommon and comparison students. Given the similar sample of schools and student populations for this study, we started with the *a priori* assumption that the approach we used in Burnett et al. (2021) would also be appropriate in this context. We used the same propensity score model and matching approach and then performed diagnostics to

ensure that these decisions were suitable for the new sample. We also used a range of alternative approaches to illustrate the extent to which different analytic decisions would change the results.

We implemented these procedures in R version 3.5.1, using the MatchIt and glmnet packages, and Stata version 16.1.

1. Propensity score model

We used a logistic model to estimate the probability that a student enrolled in an Uncommon school, as follows:

$$\text{(A.1)}\ logit(T_i) = \alpha + \beta_1 X_i + \beta_2 Z_i + \beta_3 X_i Z_i$$

where T is an indicator for ever enrolling in an Uncommon Newark school for student i; X is a vector of student baseline math and ELA test scores; Z is a vector of student covariates including students' race and ethnicity, gender, special education status, free or reduced-price lunch eligibility, English learner status, chronic absentee status, retention status, alternative assessment status, testing accommodation status, grade level, and school year; XZ is an interaction between an indicator for whether a student was identified as Black and their baseline math score (this interaction was identified as part of our model-building process, described in Burnett et al. 2021); and α, β_1, β_2, and β_3 are parameters to be estimated.

We ran separate models for each outcome sample (math Years 1, 2, and 3 and ELA Years 1, 2, 3, and 4), because there were different students available for matching in each. However, we used the same specifications across all models to ensure a consistent approach in our analysis.

2. Matching method

The matching method for our benchmark approach had the following features:

- **Nearest neighbor matching.** Each Uncommon student was matched to comparison students with the nearest propensity scores.
- **10:1 ratio matching.** Each Uncommon student could be matched with up to 10 comparison students.
- **Matching with replacement.** Once matched, a comparison student could be matched again.
- **Caliper.** All matches were required to have a maximum distance, known as a "caliper," of 0.2 standard deviations of a propensity score. If an Uncommon student had a greater distance to the nearest comparison student, the student was not matched.

We provide the results from other matching approaches in Appendix B.

3. Diagnostics

We conducted two types of diagnostics: covariate balance and overlap in propensity scores. We assessed covariate balance by calculating absolute standardized mean differences on all covariates between Uncommon Newark and matched comparison students. We prioritized achieving covariate balance on all baseline standardized test scores and ensured that they all had absolute standardized mean differences well below 0.25 to comply with What Works Clearinghouse standards. Tables A.4 through A.10 show the means and standardized mean differences for Uncommon Newark and comparison students on math and ELA test scores in the year before enrollment. Tables A.11 through A.17 show the percentage of Uncommon Newark and comparison group students with each demographic characteristic. In both groups

of tables, we show both the matched comparison group and the larger pool of comparison students before matching (shaded in gray). This presentation illustrates the improvement in creating balanced samples through matching.

We reviewed the overlap in propensity scores in the treatment and control groups using jitter plots that divided the sample into four groups: (1) unmatched treatment units, (2) matched treatment units, (3) matched control units, and (4) unmatched control units (see example in Figure A.1). We ensured that all the matched Uncommon and comparison students (in the middle panels) had overlapping propensity scores.

Table A.4. Math and ELA achievement at baseline for students included in the one-year math impact estimates

	Uncommon Newark students		Comparison students in Newark: after matching		Comparison students in Newark: before matching		Difference between Uncommon and matched comparison students	
	N = 422		N = 3,490		N = 24,544			
Test subject at baseline	Mean	SD	Mean	SD	Mean	SD	Standard-ized difference	*p*-value of difference
Math	0.16	0.92	0.14	0.92	-0.05	0.96	0.03	0.55
ELA	0.11	0.85	0.09	0.93	-0.08	0.95	0.01	0.79

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year.

ELA = English language arts; SD = standard deviation.

Table A.5. Math and ELA achievement at baseline for students included in the one-year ELA impact estimates

	Uncommon Newark students		Comparison students in Newark: after matching		Comparison students in Newark: before matching		Difference between Uncommon and matched comparison students	
	N = 422		N = 3,475		N = 24,591			
Test subject at baseline	Mean	SD	Mean	SD	Mean	SD	Standard-ized difference	p-value of difference
Math	0.16	0.92	0.12	0.94	-0.05	0.96	0.04	0.43
ELA	0.11	0.85	0.10	0.92	-0.08	0.95	0.01	0.86

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year.

ELA = English language arts; SD = standard deviation.

Table A.6. Math and ELA achievement at baseline for students included in the two-year math impact estimates

	Uncommon Newark students		Comparison students in Newark: after matching		Comparison students in Newark: before matching		Difference between Uncommon and matched comparison students	
	N = 332		N = 2,694		N = 16,564			
Test subject at baseline	Mean	SD	Mean	SD	Mean	SD	Standard-ized difference	p-value of difference
Math	0.19	0.91	0.17	0.95	-0.04	0.95	0.02	0.72
ELA	0.11	0.85	0.11	0.95	-0.07	0.95	0.00	0.94

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year.

ELA = English language arts; SD = standard deviation.

Table A.7. Math and ELA achievement at baseline for students included in the two-year ELA impact estimates

	Uncommon Newark students		Comparison students in Newark: after matching		Comparison students in Newark: before matching		Difference between Uncommon and matched comparison students	
	N = 332		N = 2,674		N = 16,570			
Test subject at baseline	Mean	SD	Mean	SD	Mean	SD	Standard-ized difference	p-value of difference
Math	0.19	0.91	0.17	0.94	-0.04	0.95	0.02	0.68
ELA	0.11	0.85	0.09	0.94	-0.07	0.95	0.03	0.66

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year.

ELA = English language arts; SD = standard deviation.

Table A.8. Math and ELA achievement at baseline for students included in the three-year math impact estimates

	Uncommon Newark students		Comparison students in Newark: after matching		Comparison students in Newark: before matching		Difference between Uncommon and matched comparison students	
	N = 216		N = 1,608		N = 5,038			
Test subject at baseline	Mean	SD	Mean	SD	Mean	SD	Standard-ized difference	p-value of difference
Math	0.21	0.90	0.19	0.95	-0.06	0.93	0.02	0.77
ELA	0.12	0.83	0.13	0.91	-0.08	0.94	-0.01	0.92

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year.

ELA = English language arts; SD = standard deviation.

Table A.9. Math and ELA achievement at baseline for students included in the three-year ELA impact estimates

	Uncommon Newark students		Comparison students in Newark: after matching		Comparison students in Newark: before matching		Difference between Uncommon and matched comparison students	
	N = 257		N = 2,011		N = 9,964			
Test subject at baseline	Mean	SD	Mean	SD	Mean	SD	Standard-ized difference	*p*-value of difference
Math	0.19	0.90	0.18	0.96	-0.04	0.95	0.02	0.81
ELA	0.12	0.83	0.13	0.93	-0.06	0.95	-0.02	0.79

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year.

ELA = English language arts; SD = standard deviation.

Table A.10. Math and ELA achievement at baseline for students included in the four-year ELA impact estimates

	Uncommon Newark students		Comparison students in Newark: after matching		Comparison students in Newark: before matching		Difference between Uncommon and matched comparison students	
	N = 148		N = 1,065		N = 3,954			
Test subject at baseline	Mean	SD	Mean	SD	Mean	SD	Standard-ized difference	*p*-value of difference
Math	0.16	0.90	0.18	0.93	-0.07	0.93	-0.02	0.79
ELA	0.12	0.79	0.12	0.92	-0.08	0.95	-0.01	0.95

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year.

ELA = English language arts; SD = standard deviation.

Table A.11. Baseline characteristics for students included in the one-year math impact estimates

	Percentage at baseline			*p*-value of difference between Uncommon and matched comparison students
	Uncommon Newark students	Comparison students in Newark: after matching	Comparison students in Newark: before matching	
Characteristic	N = 422	N = 3,490	N = 24,544	
Female	51.4	50.7	49.7	0.77
Hispanic	31.3	31.4	42.0	0.95
Black	69.2	68.0	50.8	0.61
Eligible for FRPL	92.4	91.7	93.9	0.59
Retained	1.4	1.5	2.2	0.85
Special education	10.9	10.1	14.0	0.61
English learner	11.6	12.3	16.8	0.69
Chronic absentee	15.2	14.0	25.8	0.53
Took an alternative assessment	5.5	6.1	5.9	0.58
Received a testing accommodation	11.8	8.7	15.4	0.03

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: Chronic absentee is defined as a student missing more than 10 percent of total school days in any baseline year. FRPL, eligibility for special education services, and English learner status were determined based on whether a student ever had such a status in any baseline year of student records available.

FRPL = eligible for free or reduced-price lunch.

Table A.12. Baseline characteristics for students included in the one-year ELA impact estimates

Characteristic	Percentage at baseline			*p*-value of difference between Uncommon and matched comparison students
	Uncommon Newark students	Comparison students in Newark: after matching	Comparison students in Newark: before matching	
	N = 422	N = 3,475	N = 24,591	
Female	51.4	52.2	49.7	0.76
Hispanic	31.3	31.1	41.9	0.93
Black	69.2	68.2	50.9	0.67
Eligible for FRPL	92.4	92.5	93.9	0.97
Retained	1.4	1.7	2.2	0.69
Special education	10.9	10.4	14.0	0.73
English learner	11.6	10.5	16.8	0.49
Chronic absentee	15.2	13.3	25.9	0.30
Took an alternative assessment	5.5	5.3	5.9	0.87
Received a testing accommodation	11.8	8.2	15.4	0.01

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: Chronic absentee is defined as a student missing more than 10 percent of total school days in any baseline year. FRPL eligibility, eligibility for special education services, and English learner status were determined based on whether a student ever had such a status in any baseline year of student records available.

ELA = English language arts; FRPL = eligible for free or reduced-price lunch.

Table A.13. Baseline characteristics for students included in the two-year math impact estimates

Characteristic	Percentage at baseline			*p*-value of difference between Uncommon and matched comparison students
	Uncommon Newark students	Comparison students in Newark: after matching	Comparison students in Newark: before matching	
	N = 332	N = 2,694	N = 16,564	
Female	52.1	52.8	49.8	0.81
Hispanic	33.1	34.6	42.7	0.60
Black	66.6	64.6	49.9	0.48
Eligible for FRPL	93.4	92.6	93.8	0.63
Retained	1.5	1.7	2.0	0.84
Special education	10.8	9.9	13.4	0.58
English learner	11.4	11.5	15.9	0.98
Chronic absentee	12.0	10.9	23.0	0.53
Took an alternative assessment	5.1	6.0	5.5	0.52
Received a testing accommodation	11.1	7.8	12.1	0.04

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: Chronic absentee is defined as a student missing more than 10 percent of total school days in any baseline year. FRPL eligibility, eligibility for special education services, and English learner status were determined based on whether a student ever had such a status in any baseline year of student records available.

FRPL = eligible for free or reduced-price lunch.

Table A.14. Baseline characteristics for students included in the two-year ELA impact estimates

Characteristic	Percentage at baseline			*p*-value of difference between Uncommon and matched comparison students
	Uncommon Newark students	Comparison students in Newark: after matching	Comparison students in Newark: before matching	
	N = 332	N = 2,674	N = 16,570	
Female	52.1	51.1	49.8	0.74
Hispanic	33.1	34.1	42.7	0.72
Black	66.6	65.0	49.9	0.58
Eligible for FRPL	93.4	92.2	93.8	0.44
Retained	1.5	1.5	2.0	0.97
Special education	10.8	10.7	13.4	0.92
English learner	11.4	12.3	15.9	0.65
Chronic absentee	12.0	10.3	23.0	0.33
Took an alternative assessment	5.1	5.9	5.5	0.57
Received a testing accommodation	11.1	7.7	12.1	0.03

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: Chronic absentee is defined as a student missing more than 10 percent of total school days in any baseline year. FRPL eligibility, eligibility for special education services, and English learner status were determined based on whether a student ever had such a status in any baseline year of student records available.

ELA = English language arts; FRPL = eligible for free or reduced-price lunch.

Table A.15. Baseline characteristics for students included in the three-year math impact estimates

Characteristic	Percentage at baseline			*p*-value of difference between Uncommon and matched comparison students
	Uncommon Newark students	Comparison students in Newark: after matching	Comparison students in Newark: before matching	
	N = 216	N = 1,608	N = 5,038	
Female	49.1	47.7	50.1	0.71
Hispanic	37.0	37.6	44.1	0.86
Black	62.5	61.3	48.4	0.74
Eligible for FRPL	92.6	91.6	93.5	0.62
Retained	1.4	1.7	1.9	0.76
Special education	9.7	9.8	11.3	0.97
English learner	12.0	11.4	16.0	0.79
Chronic absentee	9.7	8.0	20.2	0.38
Took an alternative assessment	6.5	6.2	6.5	0.87
Received a testing accommodation	9.7	6.7	8.2	0.11

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: Chronic absentee is defined as a student missing more than 10 percent of total school days in any baseline year. FRPL eligibility, eligibility for special education services, and English learner status were determined based on whether a student ever had such a status in any baseline year of student records available.

FRPL = eligible for free or reduced-price lunch.

Table A.16. Baseline characteristics for students included in the three-year ELA impact estimates

Characteristic	Percentage at baseline			*p*-value of difference between Uncommon and matched comparison students
	Uncommon Newark students	Comparison students in Newark: after matching	Comparison students in Newark: before matching	
	N = 257	N = 2,011	N = 9,964	
Female	51.4	51.2	49.8	0.97
Hispanic	34.2	35.9	43.3	0.60
Black	65.4	63.4	49.5	0.53
Eligible for FRPL	93.0	93.3	93.0	0.85
Retained	1.6	1.6	1.7	1.00
Special education	9.7	9.8	12.1	0.98
English learner	11.3	11.8	14.1	0.81
Chronic absentee	11.3	10.2	20.1	0.60
Took an alternative assessment	5.8	5.8	5.4	0.98
Received a testing accommodation	9.7	6.2	9.6	0.03

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: Chronic absentee is defined as a student missing more than 10 percent of total school days in any baseline year. FRPL eligibility, eligibility for special education services, and English learner status were determined based on whether a student ever had such a status in any baseline year of student records available.

ELA = English language arts; FRPL = eligible for free or reduced-price lunch.

Table A.17. Baseline characteristics for students included in the four-year ELA impact estimates

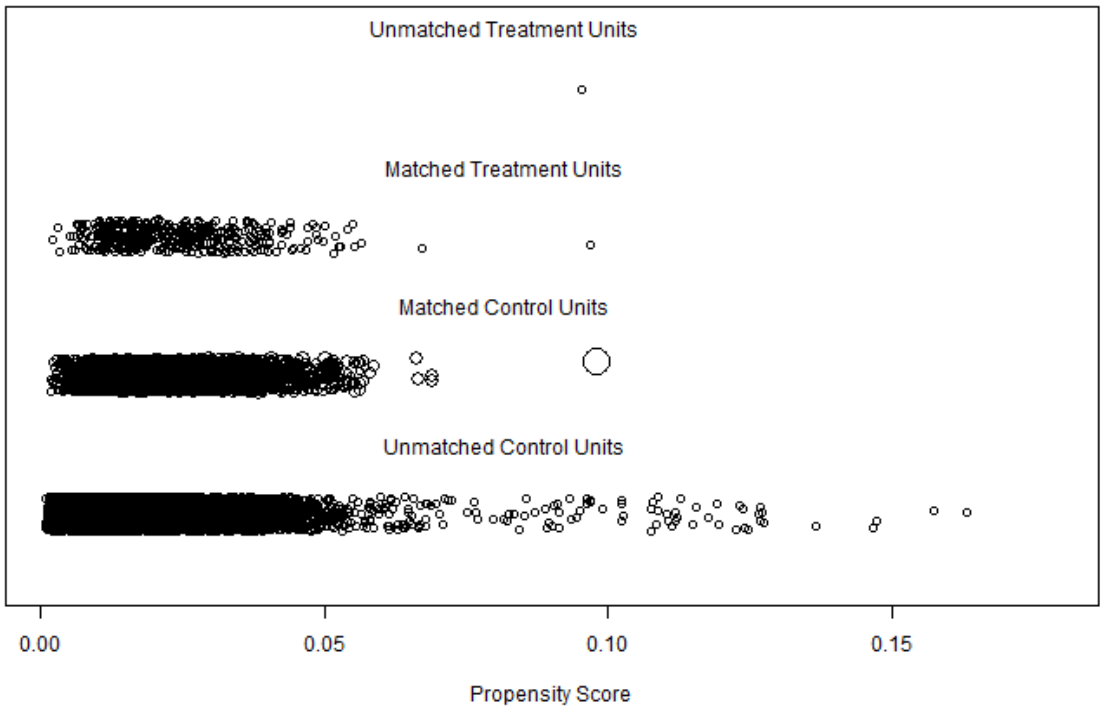
Characteristic	Percentage at baseline			*p-value of difference between Uncommon and matched comparison students*
	Uncommon Newark students	Comparison students in Newark: after matching	Comparison students in Newark: before matching	
	N = 148	N = 1,065	N = 3,954	
Female	51.4	51.9	49.6	0.90
Hispanic	34.5	37.2	41.5	0.51
Black	65.5	62.3	50.9	0.44
Eligible for FRPL	90.5	90.4	91.4	0.97
Retained	0.0	0.1	1.5	0.75
Special education	6.1	4.1	12.1	0.26
English learner	10.1	10.0	12.0	0.95
Chronic absentee	8.1	7.2	16.0	0.68
Took an alternative assessment	6.8	6.6	5.5	0.96
Received a testing accommodation	0.0	0.2	0.1	0.56

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: Chronic absentee is defined as a student missing more than 10 percent of total school days in any baseline year. FRPL eligibility, eligibility for special education services, and English learner status were determined based on whether a student ever had such a status in any baseline year of student records available.

ELA = English language arts; FRPL = eligible for free or reduced-price lunch.

Figure A.1. Distribution of propensity scores for the math Year 1 propensity score model



Note: The dots represent the weight a student has in the analysis. All treatment units (Uncommon students) have a weight of 1, so they are all the same size. For the control units, larger dots represent students who were matched with multiple Uncommon students due to matching with replacement. Smaller dots indicate that multiple comparison students were matched to the same Uncommon student. (Up to 10 comparison students could be matched to the same Uncommon student.)

Impact estimates

We estimated the impacts of enrolling in an Uncommon middle school in Newark by using a statistical model that compares the regression-adjusted mean math and ELA outcomes of the Uncommon Newark and comparison groups. The model is as follows:

$$(A.2)\ y_i = \alpha + \beta X_i + \theta T_i + e_i$$

where y represents the outcome (standardized math or ELA score) for student i; X is a vector of student covariates including students' race and ethnicity, gender, special education status, free or reduced-price lunch eligibility, English learner status, chronic absentee status, retention status, grade level, school year, and baseline math and ELA test scores; T is an indicator for ever enrolling in an Uncommon school; e is a student-level error term; and α, β, and θ are parameters to be estimated, with robust standard errors clustered at the school level. In this framework, the θ term represents the impact of enrollment in an Uncommon school. Also, in this framework, larger schools and cohorts have a greater influence on the impact estimate than smaller schools and cohorts. We estimated separate models for each combination of subject (math or ELA) and duration (one to four years after enrollment). The primary impact model did not include any quadratic or interaction terms. However, the subgroup analyses included the interaction between the subgroup of interest (for example, an indicator for identifying as Black) and the treatment indicator.

We used the analysis weights generated by the MatchIt package in R to account for the features of the matching design so the comparison group is weighted to look like the Uncommon group. Each Uncommon Newark student and the matched comparison students can be thought of as a group. Within each group, the Uncommon student is given a weight of 1 and the comparison students a preliminary weight of $1/n_c$, where n_c is the number of comparison students in the group. Each comparison student's weight is then added up across the groups in which it was matched. Finally, the comparison weights are rescaled to sum to the number of uniquely matched comparison students. These weights enable us to estimate the average treatment effect on the treated.

Conversion to years of learning

After estimating the impacts of Uncommon enrollment, we converted the effect sizes to years of learning, using the following benchmarks derived in Bloom et al. (2008) for average annual student achievement gains:

- From the end of 4th grade to the end of 5th grade, averaged (for one-year impacts)—0.56 standard deviations (SDs) in math and 0.40 SDs in ELA
- From the end of 4th grade to the end of 6th grade, averaged (for two-year impacts)—0.49 SDs in math and 0.36 SDs in ELA
- From the end of 4th grade to the end of 7th grade, averaged (for three-year impacts)—0.42 SDs in math and 0.32 SDs in ELA
- From the end of 4th grade to the end of 8th grade (for four-year impacts)—0.31 SDs in ELA

Methods for the alternative approaches to estimate impacts

This section describes the alternative approaches for estimating impacts of enrolling in an Uncommon middle school in Newark on math and ELA achievement. Table A.18 describes the purpose of each analysis and explains how it is different from the primary approach. The results from these approaches are presented in Appendix B.

Table A.18. Description of alternative analyses

Name of approach	Analytic decision that it addresses	How the approach differs from the primary approach[a]
Feeder school restriction	Sample: most restrictive	Restricts the pool of comparison students eligible for matching only to those who attended a baseline school that at least one Uncommon student also attended in the baseline year.
Regression model without matching	Sample: least restrictive	Estimates impacts using the benchmark impact model without matching in advance and without limiting the comparison group to matched students (comparison group includes all eligible students who never enrolled in an Uncommon school).
Mahalanobis distance matching	Matching approach	Uses Mahalanobis distance instead of the distance between propensity scores to determine matches (Cochran and Rubin 1973).
Propensity score matching without a caliper	Matching approach: less restrictive	Removes the caliper so that all Uncommon students are matched with comparison students with the nearest propensity scores, even if their propensity scores are more than 0.2 standard deviations apart.
1:1 propensity score matching	Matching approach: more restrictive	Uncommon students are matched with just 1 comparison student each instead of 10.
Optimal matching	Matching approach: different algorithm	Uses "optimal matching," a matching algorithm that seeks to minimize the average distance in propensity scores across the whole sample rather than the distance of individual matched pairs (Rosenbaum 2002).
Propensity score weighting	Propensity score method: matching vs. weighting	Uses propensity score weighting rather than matching; all eligible Uncommon and comparison students are included in the sample; Uncommon students receive a weight of 1, and comparison students receive a weight equal to the inverse of the propensity score.
Parsimonious impact model	Impact model: fewer covariates	Limits the independent variables in the impact model to treatment status, cohort year, site, and grade level; and the math or ELA z-score from the prior school year (math for math outcomes and ELA for ELA outcomes).
Impact model with equally weighted cohorts	Impact model weighting: equally weighted cohorts	Rescales the analysis weights so the weights within each Uncommon cohort sum to 1 and the weights of the students matched to students within each Uncommon cohort also sum to 1.

[a] The description column explains the aspect of the alternative approach that is different from the primary approach. All other aspects of the alternative approach are the same as the primary.

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Appendix B

Newark Impact Analysis: Detailed Results

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In this appendix, we provide additional details about the results for the Newark analyses presented in Chapter III in the report. The appendix includes tables showing the results corresponding to Figures III.1 and III.2, which include the statistical significance of the impact estimates using *p*-values, with the traditional threshold of $p < 0.05$. We next discuss an alternate interpretation of the impact estimates using Bayesian posterior probabilities and present the likelihood that our impact estimates reflect a large positive impact of enrollment in Uncommon middle schools on student achievement. Next, we provide detailed results for the impact analyses for each demographic subgroup examined: female, male, Black, non-Black, Hispanic, non-Hispanic, eligible for special education, and not eligible for special education. Finally, we provide the results for the alternative approaches to the impact analyses described in Appendix A.

Detailed results

Tables B.1 and B.2 report the sample sizes, coefficients, standard errors, and *p*-values for the math and ELA impacts. To improve the interpretability of the coefficients, we also provide the conversion of the coefficients to cumulative years of learning based on benchmarks by Bloom et al. (2008) on average learning gains. For example, an impact of 0.40 translates to approximately 0.72 years of math learning for students in grades 5 and 6.

Table B.1. Uncommon Newark impacts on math achievement, by years after enrollment

Number of years after enrollment	N	Coefficient	Standard error	*p*-value	Effect size converted to cumulative years of learning	Percentage of alternative approaches with effect size > 6 months	Percentage of alternative approaches with significant ($p < 0.05$) result
1 year	3,912	0.40**	0.03	<0.001	0.72	100	100
2 years	3,026	0.49**	0.03	<0.001	1.02	100	100
3 years	1,824	0.60**	0.04	<0.001	1.41	100	100

Note: This table reports the coefficients from linear regressions of standardized math test scores on an indicator variable for enrollment in an Uncommon Newark school. Separate models were run for each outcome year. Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year. Regression controls include one year of baseline test scores in math and ELA, as well as indicator variables for baseline demographic characteristics. The model used analysis weights to reflect the propensity score matching approach. Robust standard errors are reported. The effect sizes were converted to years of learning using benchmarks by Bloom et al. (2008) on average learning gains. The nine alternative approaches are described in Table A.18 of Appendix A.

* Significantly different from zero at the .05 level, two-tailed test.

** Significantly different from zero at the .01 level, two-tailed test.

ELA = English language arts.

Table B.2. Uncommon Newark impacts on ELA achievement, by years after enrollment

Number of years after enrollment	N	Coefficient	Standard error	*p*-value	Effect size converted to cumulative years of learning	Percentage of alternative approaches with effect size > 6 months	Percentage of alternative approaches with significant ($p < 0.05$) result
1 year	3,897	0.46**	0.03	<0.001	1.16	100	100
2 years	3,006	0.56**	0.03	<0.001	1.55	100	100
3 years	2,268	0.44**	0.04	<0.001	1.39	100	100
4 years	1,213	0.54**	0.06	<0.001	1.80	100	100

Note: This table reports the coefficients from linear regressions of standardized ELA test scores on an indicator variable for enrollment in an Uncommon Newark school. Separate models were run for each outcome year. Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year. Regression controls include one year of baseline test scores in math and ELA, as well as indicator variables for baseline demographic characteristics. The model used analysis weights to reflect the propensity score matching approach. Robust standard errors are reported. The effect sizes were converted to years of learning using benchmarks by Bloom et al. (2008) on average learning gains. The nine alternative approaches are described in Table A.18 of Appendix A.

* Significantly different from zero at the .05 level, two-tailed test.

** Significantly different from zero at the .01 level, two-tailed test.

ELA = English language arts.

Alternative approach to interpreting impact estimates

We recognize that the estimated impacts are not necessarily the true impacts of enrolling in Uncommon Newark schools; there are inevitable biases in our estimate due to the small sample size and our imperfect ability to match Uncommon Newark students to comparison students. We also acknowledge that *p*-values frequently are misinterpreted (Greenland et al. 2016; Wasserstein and Lazar 2016). To gain additional information on the level of confidence with which we can posit that Uncommon positively impacted enrolled students, we used an alternative approach to interpreting impact estimates called BASIE (BAyeSian Interpretation of Estimates).

The BASIE approach uses Bayesian methods to directly estimate the probability that the true effect of an intervention is of a certain size.[12] To implement the BASIE approach, we used (1) the impact estimate and standard error for the intervention that was evaluated and (2) how common it is for generally similar interventions to have effects. The commonality of similar interventions achieving positive effects of different sizes is called the prior evidence. For example, to estimate the probability that Uncommon had a true effect of greater than 0.5 standard deviations, we considered both the impact estimate and standard error from this study, as well as the distribution of effects from studies of other educational interventions—specifically, the frequency of effects greater than 0.50 standard deviations. Under the BASIE approach, effect estimates from a particular study similar to the prior evidence are judged to be more credible; effect estimates that are very different are deemed less credible.

Using the BASIE approach, in Table B.3 we report the probability that the true impacts of Uncommon Newark were positive at all; the probability that the true impacts were greater than 0.25 standard deviations; and the probability that the true impacts were greater than 0.5 standard deviations. These

[12] See Deke and Finucane (2019) for more information on the BASIE approach.

probabilities are reported for each of our outcome periods. We show that we are more than 78 percent confident that the true impacts were positive for both math and ELA, and for all years; we are also more than 99 percent confident that the true impacts were greater than 0.25 standard deviations for both subjects in the first two years. These probabilities, along with the consistent results from the nine alternative analyses, provide greater confidence about the large positive impacts we observed for enrollment in Uncommon Newark schools.

Table B.3. Probability that Uncommon Newark enrollment had a positive impact on students

Outcome	Estimated impact	Probability that true impact was: Greater than 0 SDs	Greater than 0.25 SDs	Greater than 0.5 SDs
One year after enrollment				
ELA achievement	0.46	>0.99	>0.99	0.08
Math achievement	0.40	>0.99	>0.99	<0.01
Two years after enrollment				
ELA achievement	0.56	>0.99	>0.99	0.93
Math achievement	0.49	>0.99	>0.99	0.32
Three years after enrollment				
ELA achievement	0.44	0.79	0.31	0.04
Math achievement	0.60	>0.99	>0.99	0.98
Four years after enrollment				
ELA achievement	0.54	>0.99	>0.99	0.61

Note: The probability that the impact was above the specified levels is calculated using the estimated impact, estimated standard error, and prior evidence from the What Works Clearinghouse that met standards.

ELA = English language arts; SD = standard deviation.

Results by gender, special education status, race and ethnicity, and cohort

The impact of enrolling in an Uncommon school was large and statistically significant in math and ELA in all years for the subgroups of students we examined: students identifying as female and those identifying as male, students eligible for special education and those who were not, Black and non-Black students, and Hispanic and non-Hispanic students. However, there were some differences in the magnitude of the impacts for certain subjects and years.

Students identifying as female and those identifying as male each experienced large and statistically significant impacts in both math and ELA from one to four years after enrollment. However, male students had significantly larger gains in ELA than female students from two to four years after enrollment and significantly larger gains in math one year after enrollment (Tables B.7, B.9, B.11). The magnitude of the impacts in math two and three years after enrollment was similar for both groups of students.

Both students who were eligible for special education services and those who were not had large, statistically significant gains in math and ELA one to two years after enrolling in Uncommon.[13] The gains

[13] We did not analyze the results by special education status for three or four years after enrollment because the sample size of students eligible for special education services was not large enough for the analysis. We did not analyze the results if there were fewer than 20 students in a subgroup.

for students eligible for special education services and those not eligible were similar for ELA in both years and similar for math in the first year after enrollment. However, students who were eligible for special education services had larger gains in math two years after enrollment than did students not eligible (Table B.6).

The impacts of enrolling in Uncommon were positive, large, and statistically significant for all of the racial and ethnic groups we examined: Black, non-Black, Hispanic, and non-Hispanic. The differences between groups were not statistically significant for either math or ELA from one to four years after enrollment (Tables B.4 through B.10).

In addition, all four cohorts we examined (consisting of students who began 5th or 6th grade in 2015–2016, 2016–2017, 2017–2018, or 2018–2019) had positive and statistically significant impacts in both subjects and for all years we examined (Tables B.11 and B.12).

Table B.4. Uncommon Newark one-year impacts on math achievement, by subgroup

Subgroup	N	Subgroup coefficient	Subgroup standard error	Subgroup *p*-value	Interaction *p*-value
Gender					
Female	1,986	0.37**	0.03	<0.001	<0.001
Male	1,926	0.44**	0.03	<0.001	
Race					
Black	2,664	0.39**	0.03	<0.001	0.410
Non-Black	1,248	0.43**	0.04	<0.001	
Ethnicity					
Hispanic	1,229	0.46**	0.04	<0.001	0.074
Non-Hispanic	2,683	0.38**	0.03	<0.001	
Special education status					
Eligible	399	0.35**	0.04	<0.001	0.132
Not eligible	3,513	0.41**	0.03	<0.001	

Note: This table reports the coefficients from linear regressions of standardized math test scores on an indicator variable for enrollment in an Uncommon school in Newark in the 5th or 6th grade. The comparison group consists of matched students who never enrolled in an Uncommon school; matching was conducted by grade level and year of enrollment using propensity scores.

* Significantly different from zero at the .05 level, two-tailed test.

** Significantly different from zero at the .01 level, two-tailed test.

Table B.5. Uncommon Newark one-year impacts on ELA achievement, by subgroup

Subgroup	N	Subgroup coefficient	Subgroup standard error	Subgroup *p*-value	Interaction *p*-value
Gender					
Female	2,031	0.45**	0.03	<0.001	0.205
Male	1,866	0.48**	0.04	<0.001	
Race					
Black	2,661	0.48**	0.04	<0.001	0.256
Non-Black	1,236	0.42**	0.05	<0.001	
Ethnicity					
Hispanic	1,211	0.44**	0.04	<0.001	0.471
Non-Hispanic	2,686	0.48**	0.03	<0.001	
Special education status					
Eligible	406	0.52**	0.03	<0.001	0.054
Not eligible	3,491	0.46**	0.03	<0.001	

Note: This table reports the coefficients from linear regressions of standardized ELA test scores on an indicator variable for enrollment in an Uncommon school in Newark in the 5th or 6th grade. The comparison group consists of matched students who never enrolled in an Uncommon school; matching was conducted by grade level and year of enrollment using propensity scores.

* Significantly different from zero at the .05 level, two-tailed test.

** Significantly different from zero at the .01 level, two-tailed test.

ELA = English language arts.

Table B.6. Uncommon Newark two-year impacts on math achievement, by subgroup

Subgroup	N	Subgroup coefficient	Subgroup standard error	Subgroup *p*-value	Interaction *p*-value
Gender					
Female	1,596	0.50**	0.03	<0.001	0.437
Male	1,430	0.48**	0.03	<0.001	
Race					
Black	1,962	0.47**	0.04	<0.001	0.209
Non-Black	1,064	0.54**	0.04	<0.001	
Ethnicity					
Hispanic	1,041	0.56**	0.03	<0.001	0.047
Non-Hispanic	1,985	0.46**	0.04	<0.001	
Special education status					
Eligible	302	0.66**	0.05	<0.001	0.002
Not eligible	2,724	0.47**	0.03	<0.001	

Note: This table reports the coefficients from linear regressions of standardized math test scores on an indicator variable for enrollment in an Uncommon school in Newark in the 5th or 6th grade. The comparison group consists of matched students who never enrolled in an Uncommon school; matching was conducted by grade level and year of enrollment using propensity scores.

* Significantly different from zero at the .05 level, two-tailed test.

** Significantly different from zero at the .01 level, two-tailed test.

Table B.7. Uncommon Newark two-year impacts on ELA achievement, by subgroup

Subgroup	N	Subgroup coefficient	Subgroup standard error	Subgroup *p*-value	Interaction *p*-value
Gender					
Female	1,540	0.47**	0.03	<0.001	<0.001
Male	1,466	0.65**	0.04	<0.001	
Race					
Black	1,960	0.57**	0.04	<0.001	0.286
Non-Black	1,046	0.52**	0.04	<0.001	
Ethnicity					
Hispanic	1,022	0.54**	0.04	<0.001	0.701
Non-Hispanic	1,984	0.56**	0.04	<0.001	
Special education status					
Eligible	321	0.61**	0.05	<0.001	0.155
Not eligible	2,685	0.55**	0.03	<0.001	

Note: This table reports the coefficients from linear regressions of standardized ELA test scores on an indicator variable for enrollment in an Uncommon school in Newark in the 5th or 6th grade. The comparison group consists of matched students who never enrolled in an Uncommon school; matching was conducted by grade level and year of enrollment using propensity scores.

* Significantly different from zero at the .05 level, two-tailed test.

** Significantly different from zero at the .01 level, two-tailed test.

ELA = English language arts.

Table B.8. Uncommon Newark three-year impacts on math achievement, by subgroup

Subgroup	N	Subgroup coefficient	Subgroup standard error	Subgroup *p*-value	Interaction *p*-value
Gender					
Female	873	0.56**	0.05	<0.001	0.064
Male	951	0.64**	0.04	<0.001	
Race					
Black	1,121	0.57**	0.05	<0.001	0.221
Non-Black	703	0.64**	0.05	<0.001	
Ethnicity					
Hispanic	685	0.66**	0.05	<0.001	0.082
Non-Hispanic	1,139	0.56**	0.05	<0.001	

Note: This table reports the coefficients from linear regressions of standardized math test scores on an indicator variable for enrollment in an Uncommon school in Newark in the 5th or 6th grade. The comparison group consists of matched students who never enrolled in an Uncommon school; matching was conducted by grade level and year of enrollment using propensity scores.

* Significantly different from zero at the .05 level, two-tailed test.

** Significantly different from zero at the .01 level, two-tailed test.

Table B.9. Uncommon Newark three-year impacts on ELA achievement, by subgroup

Subgroup	N	Subgroup coefficient	Subgroup standard error	Subgroup *p*-value	Interaction *p*-value
Gender					
Female	1,163	0.39**	0.04	<0.001	0.004
Male	1,105	0.49**	0.04	<0.001	
Race					
Black	1,443	0.45**	0.05	<0.001	0.672
Non-Black	825	0.42**	0.05	<0.001	
Ethnicity					
Hispanic	810	0.41**	0.05	<0.001	0.456
Non-Hispanic	1,458	0.45**	0.04	<0.001	

Note: This table reports the coefficients from linear regressions of standardized ELA test scores on an indicator variable for enrollment in an Uncommon school in Newark in the 5th or 6th grade. The comparison group consists of matched students who never enrolled in an Uncommon school; matching was conducted by grade level and year of enrollment using propensity scores.

* Significantly different from zero at the .05 level, two-tailed test.

** Significantly different from zero at the .01 level, two-tailed test.

ELA = English language arts.

Table B.10. Uncommon Newark four-year impacts on ELA achievement, by subgroup

Subgroup	N	Subgroup coefficient	Subgroup standard error	Subgroup *p*-value	Interaction *p*-value
Gender					
Female	629	0.40**	0.06	<0.001	<0.001
Male	584	0.69**	0.06	<0.001	
Race					
Black	760	0.53**	0.07	<0.001	0.622
Non-Black	453	0.57**	0.06	<0.001	
Ethnicity					
Hispanic	447	0.58**	0.06	<0.001	0.484
Non-Hispanic	766	0.52**	0.07	<0.001	

Note: This table reports the coefficients from linear regressions of standardized ELA test scores on an indicator variable for enrollment in an Uncommon school in Newark in the 5th or 6th grade. The comparison group consists of matched students who never enrolled in an Uncommon school; matching was conducted by grade level and year of enrollment using propensity scores.

* Significantly different from zero at the .05 level, two-tailed test.

** Significantly different from zero at the .01 level, two-tailed test.

ELA = English language arts.

Table B.11. Uncommon Newark impacts on math achievement, by cohort year and number of years after enrollment

Cohort year	One year		Two years		Three years	
	N	Coefficient (Standard error)	N	Coefficient (Standard error)	N	Coefficient (Standard error)
2015–2016	1,659	0.38** (0.04)	1,540	0.41** (0.04)	1,165	0.60** (0.05)
2016–2017	1,094	0.32** (0.03)	984	0.57** (0.03)	659	0.62** (0.04)
2017–2018	565	0.45** (0.03)	501	0.63** (0.03)	n.a.	n.a.
2018–2019	593	0.59** (0.04)	n.a.	n.a.	n.a.	n.a.

Note: This table reports the coefficients from linear regressions of standardized math test scores on an indicator variable for enrollment in an Uncommon Newark school. Separate models were run for each outcome year and cohort year. Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year. Regression controls include one year of baseline test scores in math and ELA, as well as indicator variables for baseline demographic characteristics. The model used analysis weights to reflect the propensity score matching approach. Robust standard errors are reported.

* Significantly different from zero at the .05 level, two-tailed test.

** Significantly different from zero at the .01 level, two-tailed test.

ELA = English language arts; n.a. = not available. (The 2018–2019 school year was the last year of data collection.)

Table B.12. Uncommon Newark impacts on ELA achievement, by cohort year and number of years after enrollment

Cohort year	One year		Two years		Three years		Four years	
	N	Coefficient (Standard error)	N	Coefficient (Standard error)	N	Coefficient (Standard error)	N	Coefficient (Standard error)
2015–2016	1,653	0.46** (0.04)	1,530	0.62** (0.04)	1,386	0.50** (0.04)	1,213	0.54** (0.06)
2016–2017	1,090	0.44** (0.03)	978	0.47** (0.03)	882	0.35** (0.04)	n.a.	n.a.
2017–2018	563	0.59** (0.03)	498	0.55** (0.04)	n.a.	n.a.	n.a.	n.a.
2018–2019	591	0.40** (0.02)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Note: This table reports the coefficients from linear regressions of standardized ELA test scores on an indicator variable for enrollment in an Uncommon Newark school. Separate models were run for each outcome year and cohort year. Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year. Regression controls include one year of baseline test scores in math and ELA, as well as indicator variables for baseline demographic characteristics. The model used analysis weights to reflect the propensity score matching approach. Robust standard errors are reported.

* Significantly different from zero at the .05 level, two-tailed test.

** Significantly different from zero at the .01 level, two-tailed test.

ELA = English language arts; n.a. = not available. (The 2018–2019 school year was the last year of data collection.)

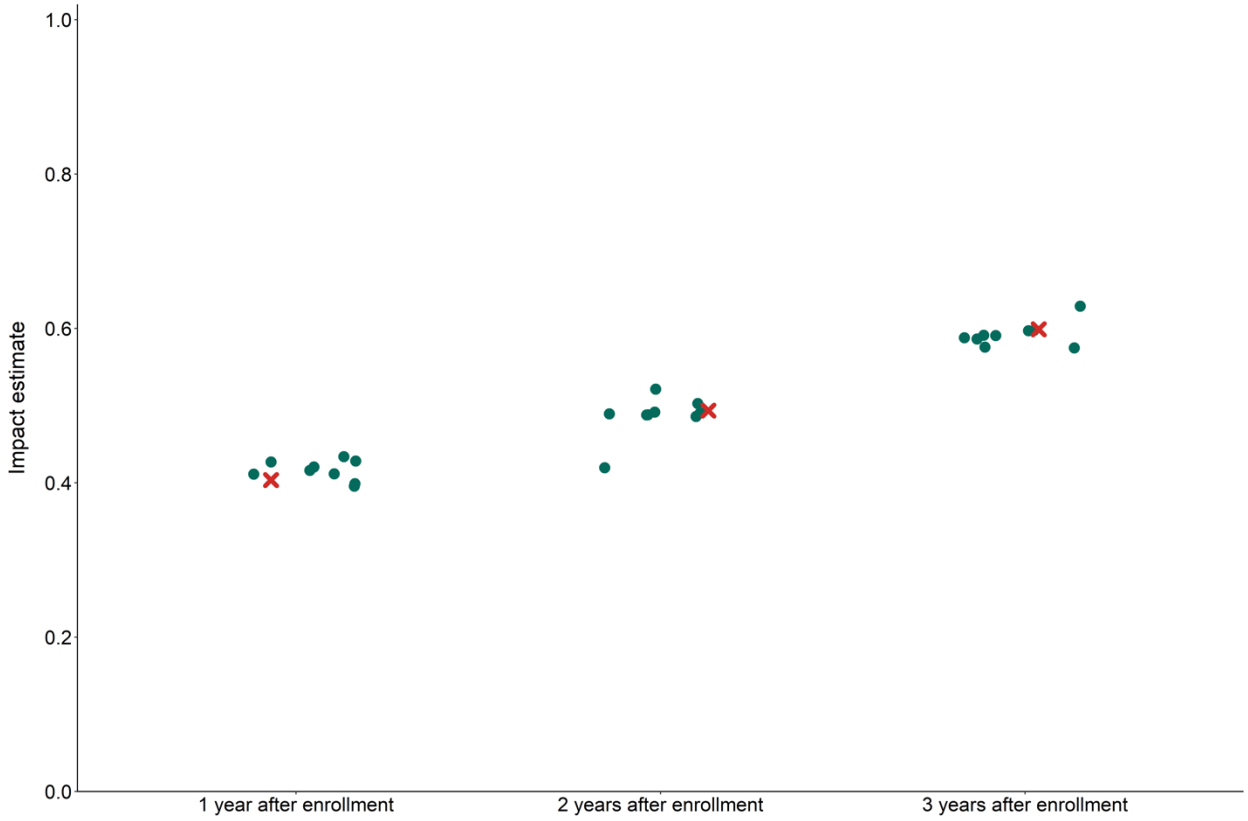
Results from alternative approaches to the impact analysis that use the same definition of enrollment

This section provides results for alternative approaches to the same research question as our primary approach, described in Appendix A. These analyses examine the impacts of enrolling in an Uncommon middle school in Newark on math and ELA achievement for students enrolling in an Uncommon school for the first time.

The results of our analyses were similar, whether weighting equally by student or cohort, for both math and ELA and across all years. All cohorts had strong, positive, and statistically significant impacts, and none appeared to drive the strong results for the full sample. Moreover, all of the analyses resulted in statistically significant impacts in math and ELA for all years we measured.

Figure B.1 shows the adjusted difference in the average math z-scores between students enrolled in Uncommon schools and the matched students who enrolled in other schools. The three instances of the red "x" represent the results from our primary analysis, and the green dots represent the results from the alternative approaches. All alternative approaches resulted in differences between the Uncommon and comparison students in math achievement at or above 0.4 standard deviations each year, and all were statistically significant.

Figure B.1. Uncommon Newark impacts on math achievement, by alternative approach to the analysis and years after enrollment

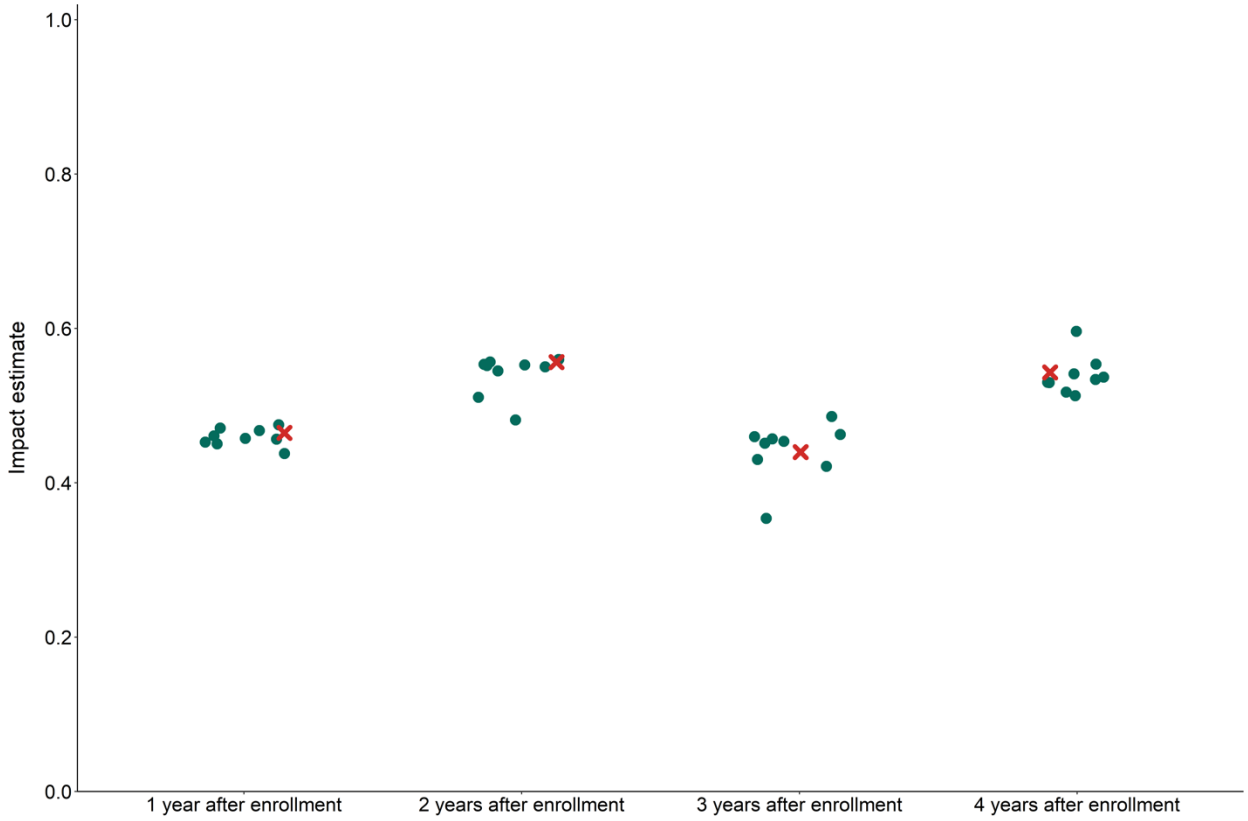


Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: This figure reports the estimated regression-adjusted differences in mean math achievement between the Uncommon students and comparison students. The difference in means is reported in standard deviation units. The three instances of "x" indicate the impact estimates for the primary approach, and the dots indicate impact estimates for alternative approaches. The estimated impacts from each alternative approach and year were statistically significant at the .01 level with a two-tailed test. A description of each alternative approach is provided in Appendix A.

The pattern of results in ELA across the alternative approaches was similar. Most alternative approaches resulted in differences between the Uncommon and comparison students that were close to the estimates from our primary analysis (Figure B.2). All alternative approaches resulted in differences between the Uncommon and comparison students in ELA achievement above 0.3 standard deviations each year, and all were statistically significant. Overall, the results from the alternative approaches suggest that the large gains students experienced from enrolling in Uncommon middle schools in Newark were not inflated due to the analytic decisions we made.

Figure B.2. Uncommon Newark impacts on ELA achievement, by alternative approach to the analysis and years after enrollment



Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: This figure reports the estimated regression-adjusted differences in mean ELA achievement between the Uncommon students and comparison students. The difference in means is reported in standard deviation units. The four instances of "x" indicate the impact estimates for the primary approach, and the dots indicate impact estimates for alternative approaches. The estimated impacts from each alternative approach and year were statistically significant at the .01 level with a two-tailed test. A description of each alternative approach is provided in Appendix A.

ELA = English language arts.

Tables B.13 through B.19 provide detailed impact estimates from the primary approach and each alternative approach for every combination of subject and year.

Table B.13. Uncommon Newark impacts on math achievement one year after enrollment, by approach to the analysis

Analysis	N	Coefficient	Standard error	*p*-value
Primary	3,912	0.40	0.03	<0.001
Feeder school restriction	3,537	0.41	0.03	<0.001
Regression model without matching	24,967	0.42	0.02	<0.001
Mahalanobis distance matching	3,855	0.42	0.03	<0.001
Propensity score matching without a caliper	3,989	0.40	0.02	<0.001
1:1 propensity score matching	838	0.43	0.04	<0.001
Optimal matching	4,653	0.43	0.04	<0.001
Propensity score weighting	24,967	0.41	0.02	<0.001
Parsimonious impact model	3,912	0.40	0.03	<0.001
Impact model with equal weighting of cohorts	3,912	0.43	0.03	<0.001

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: This table reports the coefficients from linear regressions of standardized math test scores on an indicator variable for enrollment in an Uncommon Newark school. Separate models were run for each outcome year. Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year. The approach differed for each row in the table. See Table A.18 in Appendix A for a description of each approach.

Table B.14. Uncommon Newark impacts on ELA achievement one year after enrollment, by approach to the analysis

Analysis	N	Coefficient	Standard error	*p*-value
Primary	3,897	0.46	0.03	<0.001
Feeder school restriction	3,575	0.45	0.03	<0.001
Regression model without matching	25,014	0.46	0.02	<0.001
Mahalanobis distance matching	3,855	0.46	0.02	<0.001
Propensity score matching without a caliper	3,988	0.45	0.02	<0.001
1:1 propensity score matching	832	0.44	0.04	<0.001
Optimal matching	4,653	0.47	0.03	<0.001
Propensity score weighting	25,014	0.46	0.02	<0.001
Parsimonious impact model	3,897	0.47	0.03	<0.001
Impact model with equal weighting of cohorts	3,897	0.48	0.03	<0.001

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: This table reports the coefficients from linear regressions of standardized ELA test scores on an indicator variable for enrollment in an Uncommon Newark school. Separate models were run for each outcome year. Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year. The approach differed for each row in the table. See Table A.18 in Appendix A for a description of each approach.

ELA = English language arts.

Table B.15. Uncommon Newark impacts on math achievement two years after enrollment, by approach to the analysis

Analysis	N	Coefficient	Standard error	*p*-value
Primary	3,026	0.49	0.03	<0.001
Feeder school restriction	2,808	0.49	0.04	<0.001
Regression model without matching	16,896	0.49	0.03	<0.001
Mahalanobis distance matching	2,939	0.50	0.03	<0.001
Propensity score matching without a caliper	3,068	0.49	0.03	<0.001
1:1 propensity score matching	659	0.42	0.04	<0.001
Optimal matching	3,652	0.49	0.07	<0.001
Propensity score weighting	16,896	0.49	0.03	<0.001
Parsimonious impact model	3,026	0.49	0.03	<0.001
Impact model with equal weighting of cohorts	3,026	0.52	0.03	<0.001

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: This table reports the coefficients from linear regressions of standardized math test scores on an indicator variable for enrollment in an Uncommon Newark school. Separate models were run for each outcome year. Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year. The approach differed for each row in the table. See Table A.18 in Appendix A for a description of each approach.

Table B.16. Uncommon Newark impacts on ELA achievement two years after enrollment, by approach to the analysis

Analysis	N	Coefficient	Standard error	*p*-value
Primary	3,006	0.56	0.03	<0.001
Feeder school restriction	2,767	0.55	0.04	<0.001
Regression model without matching	16,902	0.55	0.03	<0.001
Mahalanobis distance matching	2,941	0.56	0.03	<0.001
Propensity score matching without a caliper	3,055	0.55	0.03	<0.001
1:1 propensity score matching	657	0.51	0.04	<0.001
Optimal matching	3,652	0.48	0.06	<0.001
Propensity score weighting	16,902	0.55	0.03	<0.001
Parsimonious impact model	3,006	0.56	0.03	<0.001
Impact model with equal weighting of cohorts	3,006	0.55	0.03	<0.001

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: This table reports the coefficients from linear regressions of standardized ELA test scores on an indicator variable for enrollment in an Uncommon Newark school. Separate models were run for each outcome year. Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year. The approach differed for each row in the table. See Table A.18 in Appendix A for a description of each approach.

ELA = English language arts.

Table B.17. Uncommon Newark impacts on math achievement three years after enrollment, by approach to the analysis

Analysis	N	Coefficient	Standard error	*p*-value
Primary	1,824	0.60	0.04	<0.001
Feeder school restriction	1,685	0.60	0.05	<0.001
Regression model without matching	5,254	0.59	0.03	<0.001
Mahalanobis distance matching	1,776	0.58	0.03	<0.001
Propensity score matching without a caliper	1,785	0.57	0.04	<0.001
1:1 propensity score matching	424	0.63	0.06	<0.001
Optimal matching	2,376	0.59	0.03	<0.001
Propensity score weighting	5,254	0.59	0.03	<0.001
Parsimonious impact model	1,824	0.59	0.04	<0.001
Impact model with equal weighting of cohorts	1,824	0.60	0.04	<0.001

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: This table reports the coefficients from linear regressions of standardized math test scores on an indicator variable for enrollment in an Uncommon Newark school. Separate models were run for each outcome year. Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year. The approach differed for each row in the table. See Table A.18 in Appendix A for a description of each approach.

Table B.18. Uncommon Newark impacts on ELA achievement three years after enrollment, by approach to the analysis

Analysis	N	Coefficient	Standard error	*p*-value
Primary	2,268	0.44	0.04	<0.001
Feeder school restriction	2,090	0.49	0.05	<0.001
Regression model without matching	10,221	0.46	0.04	<0.001
Mahalanobis distance matching	2,199	0.45	0.03	<0.001
Propensity score matching without a caliper	2,205	0.46	0.04	<0.001
1:1 propensity score matching	508	0.43	0.07	<0.001
Optimal matching	2,827	0.35	0.06	<0.001
Propensity score weighting	10,221	0.46	0.04	<0.001
Parsimonious impact model	2,268	0.45	0.04	<0.001
Impact model with equal weighting of cohorts	2,268	0.42	0.04	<0.001

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: This table reports the coefficients from linear regressions of standardized ELA test scores on an indicator variable for enrollment in an Uncommon Newark school. Separate models were run for each outcome year. Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year. The approach differed for each row in the table. See Table A.18 in Appendix A for a description of each approach.

ELA = English language arts.

Table B.19. Uncommon Newark impacts on ELA achievement four years after enrollment, by approach to the analysis

Analysis	N	Coefficient	Standard error	*p*-value
Primary	1,213	0.54	0.06	<0.001
Feeder school restriction	1,116	0.52	0.05	<0.001
Regression model without matching	4,103	0.53	0.05	<0.001
Mahalanobis distance matching	1,169	0.51	0.04	<0.001
Propensity score matching without a caliper	1,221	0.55	0.05	<0.001
1:1 propensity score matching	294	0.60	0.06	<0.001
Optimal matching	1,639	0.53	0.07	<0.001
Propensity score weighting	4,103	0.54	0.05	<0.001
Parsimonious impact model	1,213	0.53	0.05	<0.001
Impact model with equal weighting of cohorts	1,213	0.54	0.06	<0.001

Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: This table reports the coefficients from linear regressions of standardized ELA test scores on an indicator variable for enrollment in an Uncommon Newark school. Separate models were run for each outcome year. Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year. The approach differed for each row in the table. See Table A.18 in Appendix A for a description of each approach.

ELA = English language arts.

Results from an alternative approach that uses a different definition of enrollment in Uncommon

To better understand the impacts of enrolling in an Uncommon middle school in Newark for a more inclusive group of students, we also conducted an analysis that included both students who had previously attended an Uncommon school (either elementary or middle school) and those enrolling in an Uncommon school for the first time. The goal of this analysis was to examine Uncommon's impacts for a sample that was as inclusive as possible of all students enrolling in an Uncommon midfdle school. For the one-year math and ELA outcomes for this analysis, approximately 21 percent of the 5th graders and 6 percent of the 6th graders were enrolling in an Uncommon school for the first time.

Tables B.20 and B.21 present findings from this alternative approach. The impacts of Uncommon enrollment on this larger sample of students were positive and significant for ELA one, two, and three years after enrollment. However, the impacts for math one, two, and three years after enrollment and the impacts for ELA four years after enrollment were close to 0 and nonsignificant each year. The magnitudes of all impacts were smaller relative to our primary analysis, which included only students enrolling in Uncommon schools who had baseline math and ELA test scores that were measured before enrollment in any Uncommon school. This alternative analysis likely underestimates the cumulative impact of Uncommon enrollment because it does not account for the impacts of attending an Uncommon elementary school before enrolling in an Uncommon middle school.

Table B.20. Uncommon Newark impacts on math achievement for new and continuing Uncommon students, by years after enrollment

Number of years after enrollment	N	Coefficient	Standard error	*p*-value
1 year	13,749	0.01	0.03	0.695
2 years	9,702	0.04	0.03	0.248
3 years	3,576	-0.02	0.04	0.554

Note: This table reports the coefficients from linear regressions of standardized math test scores on an indicator variable for enrollment in an Uncommon Newark school. Separate models were run for each outcome year. Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year.

Table B.21. Uncommon Newark impacts on ELA achievement for new and continuing Uncommon students, by years after enrollment

Number of years after enrollment	N	Coefficient	Standard error	*p*-value
1 year	13,720	0.14	0.02	<0.001
2 years	9,694	0.12	0.03	<0.001
3 years	5,913	0.13	0.04	<0.001
4 years	2,409	0.04	0.05	0.455

Note: This table reports the coefficients from linear regressions of standardized ELA test scores on an indicator variable for enrollment in an Uncommon Newark school. Separate models were run for each outcome year. Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Newark), and school year.

ELA = English language arts.

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Appendix C

NYC Impact Analysis: Sample and Estimation Methods

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In this appendix, we provide additional details on the data, sample, and methods used for the primary analysis to determine the impacts of enrolling in an Uncommon middle school in NYC.

A. Applicant admission offers and enrollment patterns

Table C.1. Grade 5 Uncommon NYC applications, lottery outcomes, and enrollments

	All Uncommon applicants		Applicants with a random chance to receive an Uncommon offer	
	Uncommon applicants	Uncommon applicants linked to outcome data	Uncommon applicants	Uncommon applicants linked to outcome data
Total number of applicants	1,913	872	1359	599
2017	1,020	359	800	293
2018	893	513	542	306
Average number of schools	4.15	4.14	4.54	4.54
Average probability of an Uncommon offer	0.59	0.60	0.48	0.48
Did not receive an initial Uncommon offer (%)	30.7%	30.3%	37.5%	37.1%
Enrolled at a waitlisted Uncommon school	10.0%	11.6%	11.9%	13.7%
Enrolled at a non-Uncommon school	9.3%	18.7%	11.5%	23.4%
Enrolled at both an Uncommon and a non-Uncommon school during Year 1	0.0%	0.1%	0.1%	0.2%
Not linked to any administrative data	11.6%	0.0%	14.2%	0.0%
Received an Uncommon offer (%)	69.3%	69.7%	62.5%	62.9%
Enrolled at an Uncommon school	32.1%	36.7%	22.4%	26.9%
Enrolled at a non-Uncommon school	16.7%	33.0%	18.1%	36.1%
Enrolled at both an Uncommon and a non-Uncommon school during Year 1	0.3%	0.3%	0.2%	0.5%
Not linked to any administrative data	20.5%	0.0%	22.1%	0.0%

Source: Authors' estimates using administrative data from Uncommon NYC and the New York Department of Education spanning the 2016–2017 through 2018–2019 school years.

Note: This table reports percentages of all applicants, applicants with a random chance of receiving an offer to enroll at an Uncommon school, percentages of applicants in each of those groups that could be linked to administrative data, and their ultimate lottery and enrollment outcomes. Applicants who also applied to and enrolled at a non-Uncommon charter school were not linked to administrative data if they did not consent to have their information used for research.

Table C.2. Grade 5 Uncommon NYC applications and lottery outcomes (2018)

School	All Uncommon applicants				Applicants with a random chance to receive lottery offer	
	Total applicants	Applicants offered seats via lottery	Applicants enrolled via lottery offers	Additional enrollments via waitlists	Total applicants	Applicants offered seats via lottery
Bedford Stuyvesant Collegiate Charter School	305	89	56	17	213	46
Brooklyn East Collegiate Charter School	269	89	17	2	196	68
Brownsville Collegiate Charter School	305	90	14	3	199	61
Excellence Boys Middle Academy	153	16	7	3	118	13
Excellence Girls Middle Academy	218	5	14	12	134	2
Kings Collegiate Charter School	404	90	70	26	278	26
Leadership Prep Bedford Stuyvesant Uncommon Prep Charter School	338	5	15	13	224	1
Leadership Prep Brownsville Middle Academy	320	25	20	8	215	10
Leadership Prep Canarsie Middle Academy	377	39	44	24	271	11
Leadership Prep Ocean Hill Middle Academy	331	10	10	4	224	2
Ocean Hill Collegiate Charter School	286	89	47	7	200	56
Williamsburg Collegiate Charter School	270	89	44	6	187	48
Total number of applicants	893	636	358	125	542	344

Source: Authors' estimates using administrative data from Uncommon NYC and the New York Department of Education spanning the 2016–2017 through 2018–2019 school years.

Note: This table presents numbers of total applicants and number of applicants by offer status, waitlist status, and enrollment status within each Uncommon NYC middle school. Total number of applicants and offer status are also reported within each Uncommon NYC middle school for the subset of applicants who received an offer that was truly randomized (probability greater than zero and less than one) by the lottery process.

B. Applicant background characteristics

Table C.3. Comparison of baseline characteristics for Uncommon Schools NYC applicants included and not included in the analysis of impacts in Year 1

Characteristic	All applicants linked to administrative data	Applicants included in analyses	Applicants excluded from analyses	*p*-value: Difference by study inclusion
Female	50.6%	47.8%	52.8%	0.071
Race and ethnicity				
Hispanic	17.4%	17.4%	17.5%	1.000
Black	77.3%	76.1%	78.2%	0.389
Other	5.3%	6.5%	4.3%	0.088
Age	9.80	9.78	9.82	0.271
Eligible for free/reduced-price meals	81.5%	82.1%	81.0%	0.642
Individualized education plan	19.6%	20.7%	18.9%	0.431
Baseline math achievement (SD)	-0.10	-0.13	-0.05	0.229
Baseline ELA achievement (SD)	-0.00	-0.02	0.03	0.497
Number of applicants	1389	599	790	

Source: Authors' estimates using administrative data from Uncommon NYC and the New York Department of Education spanning the 2016–2017 through 2018–2019 school years.

Note: This table compares mean values of background characteristics between applicants to Uncommon NYC middle schools who were included in the analysis of outcomes in Year 1 and applicants not included because they either (1) did not have a random chance of receiving or not receiving an Uncommon offer through the lottery, or (2) were unable to be linked to administrative data at a traditional or public charter school.

SD = standard deviation.

C. Estimating applicants' probability of admission

To estimate the effect of attending an Uncommon school on students' academic achievement, we built on the approach developed by Abdulkadiroglu et al. (2017) for using a local average treatment effect framework to measure schools' effects on student outcomes when districts administer multi-school lotteries. An important first step in this approach is estimating the probability of each applicant receiving an admission offer to Uncommon NYC schools for any random run of the lottery process, which Abdulkadiroglu et al. (2017) call the propensity score. In multi-school lotteries such as the Uncommon NYC lottery, this approach is complicated because of the different possible ordered combinations of schools to which a student might apply and the different prioritization of applicant types at each school.

When an Uncommon NYC school receives more applications than the allotted number of seats, admissions offers are determined by a publicly held random lottery that assigns seats in order of specified priority groups and by random numbers within those groups. For example, the first three preference groups for middle schools include, in order of priority, homeless children and youth, applicants with siblings enrolled at the school, and children of Uncommon employees. Applicants are matched to the most preferred school listed on their application for which the lottery process can assign them an admission offer, freeing up capacity at their lesser-preferred schools for other applicants. Applicants are

then placed on waitlists for any schools on their application that they preferred more than the one from which they received an offer.

Given the complexity of the Uncommon NYC multi-school lottery, any given lottery run that randomizes applicants' lottery numbers and then determines an order of assignment for admission offers might result in a different set of lottery outcomes for a group of students with similar characteristics compared to another lottery run. To address this issue, we first developed a program that reconstructed the Uncommon schools lottery mechanism for admission offers in each year and school according to the lottery process details as documented in the Uncommon New York City Charter Schools Admissions Policy. We then conducted repeated simulations of this lottery process to estimate each student's probability of admission at each school, based on the proportion of simulation runs that resulted in the student being admitted to that school.

These simulations involved the following steps:

- We first identified the lottery rules; the schools to which each student applied, along with their preference ranking of schools; and each student's priority group at each school. Next, we assigned each student a random lottery number and applied the lottery priority group and offer assignment order rules to determine each school's mapping of admission offers to applicants. We then saved that single lottery simulation's results of student admission offers or non-offers to each school for later calculations.
- For subsequent runs of the simulation, we repeated this process by assigning each student a new random lottery number. With each run of the simulation, students might receive admission offers to different schools. We saved the results from each.
- Ultimately, we conducted 10,000 simulations and calculated the percentage of times each student was offered admission to an Uncommon NYC school to which they applied. The overall proportion of simulations in which a student received an offer is that student's probability of admission to an Uncommon school before the lottery process being conducted.

D. Estimating the impacts of Uncommon offers and enrollments

To estimate the impacts of enrolling in an Uncommon NYC school, we followed the approach proposed by Abdulkadiroglu et al. (2017) and estimated a two-stage least squares model that incorporated the estimated applicant-level admissions offer probabilities. The first stage equation (1) modeled applicant enrollment in an Uncommon school as a function of whether they were offered admission through the lottery, their probability of receiving an offer, and a set of background characteristics:

$$\text{(C.1)}\ enroll_i = \beta_0 + \beta_1 X_i + \delta_1 offer_i + \sum_{k=1}^{99} \alpha_k p_{ik} + e_i$$

where $enroll_i$ is a binary indicator of whether a student i enrolls in an Uncommon school; X_i is a vector of student i's characteristics, including students' baseline achievement level, gender, race and ethnicity, eligibility for free or reduced-price meals, and whether they implemented an individualized education plan (IEP); $offer_i$ is a binary indicator of whether student i received an initial lottery offer for admission to

an Uncommon school; and p_{ik} is an indicator of whether student *i* had a probability of admission to any Uncommon school within the *k*th percentile.[14]

The fitted values $\widehat{enroll}_\iota$ from equation (1) were used in the second stage equation (2), where y_i is student *i*'s test score of interest and the other variables are as defined above:

$$\text{(C.2)}\ y_i = \gamma_0 + \gamma_1 X_i + \sigma_1 \widehat{enroll}_\iota + \sum_{k=1}^{99} \psi_k p_{ik} + u_i$$

After accounting for each student's probability of an Uncommon admission offer, σ_1 is the effect of enrolling in an Uncommon school compared to the school an applicant would have otherwise attended had the applicant not received an offer for an Uncommon school through the lottery. We refer to this as the treatment-on-the-treated (TOT) effect.

In addition to estimating the TOT effect, we also present estimates of the impact of being offered admission to an Uncommon school—the intent-to-treat (ITT) estimates. They are estimated using a form of equation (1) where $enroll_i$ is replaced with test score y_i. The ITT impact estimate in this model is δ_1. Importantly, this leverages the random nature of offer assignments through the lottery to estimate a causal relationship between receiving an offer and the achievement outcome of interest. The estimates of the TOT effect go one step further by also modeling the relationship between offers and enrollments, which is not a one-to-one relationship.

To ensure our simulations of multiple lottery randomizations of applicants' offers to enroll at an Uncommon NYC middle school matched expectations of randomizing applicants to schools, we performed balance checks similar to those suggested by Abdulkadiroglu et al. (2017). We separately regressed each observable baseline student characteristic onto an indicator for receiving any Uncommon NYC middle school offer, and an indicator for the school year and controls for the estimated probability of receiving an initial offer through the lottery process. The results of these tests (presented in Appendix Table C.4) show that, outside of the expected difference along FRPL eligibility (due to the corresponding lottery priority group for a subset of schools), applicant characteristics appear to be balanced across lottery outcomes. Because this average difference exists between applicants who did or did not receive admission offers to an Uncommon school, we included covariates in the impact estimation model to control for such differences. These covariates included students' FRPL eligibility, gender, race, ethnicity, English language learner status, and whether an IEP had been implemented for the applicant.

[14] We "coarsened" a student's probability of admission using multiple rounding schemes and report the result of balancing diagnostics for each in Appendix Table C.4. The main specification rounds probabilities in 1-percent bin widths.

Table C.4. Tests of covariate balance along admission offer status

Characteristic	Means: Applicants with no offer	Difference: Applicants with offer, accounting for offer probability			
		No controls	Simulated score (2.5% bins)	Simulated score (hundredths)	Simulated score (thousandths)
Number of schools applied to	2.27	3.61 **	3.05 **	2.96 **	2.54 **
	(1.65)	(0.26)	(0.29)	(0.30)	(0.39)
Female	0.51	-0.06	-0.09 *	-0.08	-0.19 **
	(0.50)	(0.04)	(0.05)	(0.05)	(0.07)
Race and ethnicity					
Hispanic	0.16	0.02	-0.03	-0.03	0.01
	(0.37)	(0.03)	(0.04)	(0.04)	(0.05)
Black	0.79	-0.04	0.00	0.00	-0.04
	(0.41)	(0.04)	(0.04)	(0.04)	(0.06)
Other	0.05	0.02	0.03	0.03	0.03
	(0.23)	(0.02)	(0.02)	(0.02)	(0.03)
Age	9.77	0.05	0.03	0.02	0.03
	(0.63)	(0.04)	(0.04)	(0.04)	(0.06)
Eligible for free/reduced-price meals	0.77	0.08 *	0.08 *	0.09 *	0.07
	(0.42)	(0.03)	(0.04)	(0.04)	(0.05)
Individualized education plan	0.18	0.04	0.05	0.04	0.02
	(0.39)	(0.03)	(0.04)	(0.04)	(0.05)
English learners	0.02	0.01	0.00	0.00	0.02
	(0.13)	(0.01)	(0.02)	(0.02)	(0.02)
Baseline achievement					
ELA mean (SD)	0.03	-0.09	-0.16	-0.14	-0.12
	(0.85)	(0.08)	(0.09)	(0.09)	(0.12)
Math mean (SD)	-0.07	-0.11	-0.19 *	-0.19 *	-0.17
	(0.96)	(0.08)	(0.09)	(0.09)	(0.13)
Number of applicants	219–222	587–599	587–599	587–599	587–599

Source: Authors' estimates using administrative data from Uncommon NYC and the New York Department of Education spanning the 2016–2017 through 2018–2019 school years.

Note: This table presents numbers of total applicants and number of applicants by offer status, waitlist status, and enrollment status within each Uncommon NYC middle schools. Total number of applicants and offer status are also reported within each Uncommon NYC middle school for the subset of applicants who received an offer that was truly randomized (probability greater than 0 and less than 1) by the lottery process. Standardized test scores were normalized to have a statewide mean of 0 and standard deviation of 1 by grade level, subject, and school year.

ELA = English language arts; ITT = intent to treat, the effect of receiving a lottery-based offer on academic achievement; TOT = treatment on the treated, the effect of receiving a lottery-based offer on academic achievement among applicants who enrolled in an Uncommon school.

* Significantly different from zero at the .05 level, two-tailed test.

** Significantly different from zero at the .01 level, two-tailed test.

Appendix D

NYC Impact Analysis: Supplemental Results

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This appendix presents intent-to-treat (ITT) and treatment-on-the-treated (TOT) estimates of impacts on achievement in grade 5 math and ELA, as well as standard errors in parentheses. Overall impacts for Year 1 across grade 5 cohorts in the 2017–2018 and 2018–2019 school years are presented in Appendix Table D.1. Separate estimates by cohort and by follow-up Years 1 and 2 after enrollment are presented in Appendix Table D.2. Finally, Appendix Table D.3 presents exploratory analyses that mimic Appendix Table B.1 but include waitlist enrollments as part of the treatment group of applicants.

Table D.1. Overall ITT and TOT impacts of initial lottery offers to Uncommon NYC schools on achievement, by subject

	ITT	TOT	ITT	TOT
	(1)	(2)	(3)	(4)
First-stage estimates				
Uncommon enrollment	n.a.	0.34**	n.a.	0.33**
		(0.03)		(0.03)
Impact estimates				
ELA achievement	-0.04	-0.13	-0.04	-0.11
	(0.06)	(0.17)	(0.06)	(0.17)
Math achievement	0.02	0.06	0.04	0.11
	(0.06)	(0.17)	(0.06)	(0.17)
Covariates included?	N	N	Y	Y
Number of applicants	587–588	587–588	587–588	587 - 588

Source: Authors' estimates using administrative data from Uncommon NYC and the New York Department of Education spanning the 2016–2017 through 2018–2019 school years.

Note: This table presents, by row, estimates of (1) applicants' likelihood of enrolling at an Uncommon school conditional of receiving a random lottery-based admission offer; and (2) impacts by test subject of (a) receiving such an offer (ITT columns), and (b) receiving an offer and enrolling at an Uncommon school (TOT columns). Standardized test scores were normalized to have a statewide mean of 0 and standard deviation of 1, by grade level, subject, and school year.

ELA = English language arts; ITT = intent to treat, the effect of receiving a lottery-based offer on academic achievement; TOT = treatment on the treated, the effect of receiving a lottery-based offer on academic achievement among applicants who enrolled in an Uncommon NYC school.

* Significantly different from zero at the .05 level, two-tailed test.

** Significantly different from zero at the .01 level, two-tailed test.

Year 2 achievement impacts. As a descriptive aspect of the study, we also investigated impacts for Uncommon applicants in their second year after the application and enrollment process, where we also did not find any statistically significant effects (Appendix Table D.2). We label these estimates as descriptive because the sample size for Year 2 estimates was dramatically smaller than in Year 1, given that we could only track Year 2 outcomes for applicants in the first cohort of applicants to enroll in fall 2017. (The subsequent cohort was not tested in Year 2 due to test waivers stemming from the COVID-19 pandemic.) These estimates are presented descriptively and should not be interpreted as part of the study design, both because they involve only the first cohort of applicants and also because our data track relatively few applicants into their second year (likely due to student mobility between sectors or districts over time). In particular, Year 2 estimates for math include 102 applicants' outcomes, compared to the 287 applicants of that same cohort included in the analysis sample for Year 1 math outcomes.

The Year 2 TOT impacts of enrolling in an Uncommon NYC middle school through the lottery process were also not statistically significant, estimated at a decrease of 0.13 standard deviations for math and an increase of 0.07 standard deviations for ELA.

Table D.2. Uncommon NYC TOT impacts on achievement, by cohort year and number of years after enrollment

Cohort year	Year 1—ELA		Year 2—ELA		Year 1—Math		Year 2—Math	
	N	Coefficient (standard error)	N	Coefficient (standard error)	N	Coefficient (standard error)	N	Coefficient (standard error)
2017–2018	285	-0.10	95	0.07	287	0.02	102	-0.13
		(0.20)		(0.25)		(0.19)		(0.21)
2018–2019	302	-0.10	n.a.	n.a.	301	0.33	n.a.	n.a.
		(0.33)				(0.38)		

Source: Authors' estimates using administrative data from Uncommon NYC and the New York Department of Education spanning the 2016–2017 through 2018–2019 school years.

Note: This table presents, by cohort and year, estimates of the impact on math and ELA achievement of receiving an offer and enrolling at an Uncommon school.

ELA = English language arts.

Exploratory analysis of impacts of any enrollment at Uncommon middle schools. Despite our inability to account for waitlist offers using available data, we attempted secondary analyses that replaced indicators and probability estimates of offers with versions representing the likelihood of an initial lottery or waitlist offer for a school the applicant ranked as more preferred than an existing offer on record. Because we observed only enrollments, not waitlist offers, this exercise underestimates the probability of a waitlist offer and overestimates the probability of enrolling at an Uncommon school on the condition of receiving an offer from the waitlist. Therefore, we caution against interpreting them as anything other than correlational relationships.

In light of the aforementioned forced relationship between waitlist enrollments and waitlist offers, the results of this exploratory analysis show a much stronger first-stage relationship between offer and enrollment (first row of Appendix Table D.3). As a result, the corresponding impact estimates have substantially smaller standard errors, partially contributing to the statistical significance of the impact estimates for math in Appendix Table D.3. The math impact estimates for math using this approach are also larger in magnitude than those using the more rigorous design in Appendix Table D.1. Including waitlist enrollments, the estimated ITT and TOT effects of attending an Uncommon school on grade 5 achievement in math are statistically significant increases of 0.15 and 0.27 standard deviations, respectively. These estimates are likely larger because incorporating waitlist enrollments results in more applicants contributing toward the TOT estimate. However, this analysis also does a poorer job of controlling for selection bias regarding enrollment at Uncommon schools, given the lack of information on who did or did not receive offers from a waitlist.

Table D.3. Overall ITT and TOT impacts of initial lottery or waitlist offers to Uncommon NYC schools on achievement, by subject

	ITT	TOT	ITT	TOT
	(1)	(2)	(3)	(4)
First-stage estimates				
Uncommon enrollment	n.a.	0.55**	n.a.	0.54**
		(0.05)		(0.05)
Impact estimates				
ELA	-0.05	-0.09	-0.04	-0.07
	(0.06)	(0.12)	(0.06)	(0.11)
Math	0.14*	0.26*	0.15*	0.27*
	(0.06)	(0.11)	(0.06)	(0.11)
Covariates included?	N	N	Y	Y
Number of applicants	587–588	628–629	587–588	628–629

Source: Authors' estimates using administrative data from Uncommon NYC and the New York Department of Education spanning the 2016–2017 through 2018–2019 school years.

Note: This table presents, by row, estimates of (1) applicants' likelihood of enrolling at an Uncommon school conditional on receiving either a random lottery-based admission offer or a waitlist offer; and (2) impacts by test subject of (a) receiving such an offer (ITT columns), and (b) receiving an offer and enrolling at an Uncommon school (TOT columns). Standardized test scores were normalized to have a statewide mean of 0 and standard deviation of 1, by grade level, subject, and school year.

ELA = English language arts; ITT = Intent to treat, the effect of receiving a lottery-based offer on academic achievement; TOT = Treatment on the treated, the effect of receiving a lottery-based offer on academic achievement among applicants who enrolled in an Uncommon NYC school.

* Significantly different from zero at the .05 level, two-tailed test.

** Significantly different from zero at the .01 level, two-tailed test.

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