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Impacts of Uncommon Schools in a Turnaround Setting

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Background and Study Overview

Uncommon Schools is a nonprofit charter management organization that starts and manages charter schools. The organization's approach is well established; Uncommon opened its first school in New Jersey more than 20 years ago. As of 2021, the organization operates 55 schools across Boston (Massachusetts), Camden (New Jersey), New York City, Newark (New Jersey), Rochester (New York), and Troy (New York); 36 percent are elementary schools, 45 percent are middle schools, and 18 percent are high schools. Historically, schools in the Uncommon network have focused on six key components:

1. A college preparatory mission, which is 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 a longer 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 leads to statistically significant and positive impacts on student achievement (Furgeson et al. 2012; Teh et al. 2010; Woodworth and Raymond 2013; Woodworth et al. 2017). One of the studies was reviewed and met What Works Clearinghouse evidence standards with reservations (Furgeson et al. 2012). The studies were limited to Uncommon schools located in Newark, New York City, and Rochester. Two studies examined students in middle school (Furgeson et al. 2012; Teh et al. 2010), and two studies examined students across all grade levels (Woodworth and Raymond 2013; Woodworth et al. 2017).

Uncommon typically opens new schools, building up from the earliest grades. However, as part of broader urban renewal initiatives and school turnaround efforts in Camden and Newark, New Jersey, Uncommon recently sought to apply its school model in a turnaround setting. The organization collaborated with two public school districts, Camden City School District and Newark Public Schools, to implement the Uncommon school model as a strategy for turning around persistently low-performing schools. In the Camden City School District, Uncommon partnered with the district as part of a renaissance school project, which allows a nonprofit entity to operate and manage a group of new or existing schools that are part of the district in an urban campus area.[1] In 2015–2016, Uncommon and the Camden City School District launched their first turnaround of a low-performing school (Bonsall Elementary School) in grades 1 through 4.[2] Uncommon's partnership with Newark Public Schools was

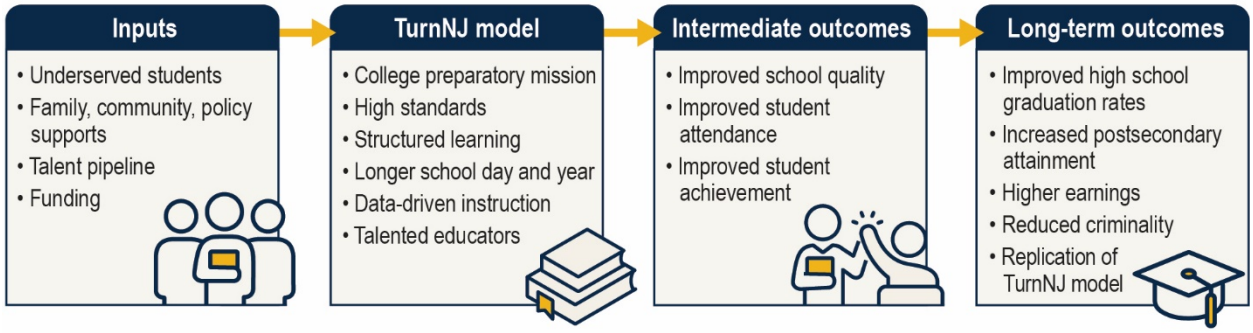
[1] Urban Hope Act, N.J.S.A. 18A:36C-13.
[2] During the prior school year, 2014–2015, Uncommon launched a limited turnaround effort, assuming management only of the school's kindergarten.

focused on a single charter restart of a struggling school. Uncommon took over the management of one of New Jersey's lowest-performing schools, Alexander Street Elementary, in 2014–2015.

Uncommon was awarded a 2016 grant from the U.S. Department of Education's Investing in Innovation Fund (i3) to support TurnNJ, a project intended to scale the initial implementation work of Uncommon's whole-school turnaround strategy in Alexander Street Elementary School and Camden Prep Mt. Ephraim Elementary School to additional grade levels in the two schools and to four other low-performing schools across Camden and Newark. The project continued Uncommon's existing partnerships with the Camden City School District and Newark Public Schools. In Camden, Uncommon now manages two elementary schools, one middle school, and one high school that remain part of Camden City School District; a second middle school will open in 2021–2022. In Newark, Uncommon continues to manage the same elementary school. (The New Jersey Department of Education is not involved in TurnNJ.)

Although there is promising evidence of the effectiveness of the Uncommon school model in a new and continuing charter school setting, the approach is untested in a struggling neighborhood school. The TurnNJ project hypothesizes that the Uncommon school model will lead to success when implemented in a turnaround setting (Figure 1). TurnNJ schools operate with the same six key attributes as the Uncommon Schools network, described above. Together, these six attributes are meant to improve school quality, student attendance, and student achievement in the short term, which will in turn lead to increased high school graduation, postsecondary attainment, and earnings, as well as reduced criminality.

Figure 1. Uncommon TurnNJ's logic model



To assess the effectiveness of the TurnNJ project, as required by its i3 grant, Uncommon engaged Mathematica as an independent evaluator. The goal of the study is to rigorously estimate the impact TurnNJ schools have on the math and English language arts (ELA) achievement of upper elementary and middle school students. Specifically, the study addresses the following research questions:

- What is the impact of enrollment in a TurnNJ school on students' math achievement one, two, three, and four years after enrollment?
- What is the impact of enrollment in a TurnNJ school on students' ELA achievement one, two, three, and four years after enrollment?

In addition, the study investigated the extent to which the TurnNJ schools implemented the six components of the Uncommon school model as intended.

Two key findings emerged:

- Enrollment in a TurnNJ school had positive and statistically significant impacts on student achievement in math that persisted up to four years after enrollment. After one year of enrollment, TurnNJ students had test score gains equal to an additional 1.8 years of learning in math compared to similar students at other schools. TurnNJ's cumulative impact after four years of enrollment exceeded the size of the poverty test score gap in math.
- Enrollment in a TurnNJ school had positive and statistically significant impacts on student achievement in English language arts that persisted up to four years after enrollment. After one year of enrollment, TurnNJ students had test score gains equal to an additional 1.9 years of learning in ELA relative to similar students at other schools. TurnNJ's cumulative impact after four years of enrollment was about 89 percent of the poverty test score gap in ELA.

These findings contribute to the existing literature on the effectiveness of the Uncommon school model and provide new evidence on the implementation of the Uncommon school model in a turnaround setting. Mixed evidence from previous studies examining the effectiveness of other turnaround initiatives suggests that designing and implementing a turnaround strategy that can improve student achievement is challenging (Redding and Nguyen 2020). The initial success of the TurnNJ strategy in a limited number of schools may offer a starting point for expanding the approach to turning around low-performing schools on a larger scale.

Sample and Methods

To address the study research questions, we first identified a comparison group of students who never attended a TurnNJ school but were similar to students who enrolled at TurnNJ schools. We then compared the achievement outcomes for TurnNJ 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 a TurnNJ school. In this chapter, we provide a brief overview of our approach. A more detailed description of the methods is provided in Appendix A.

Sample

Selecting TurnNJ schools

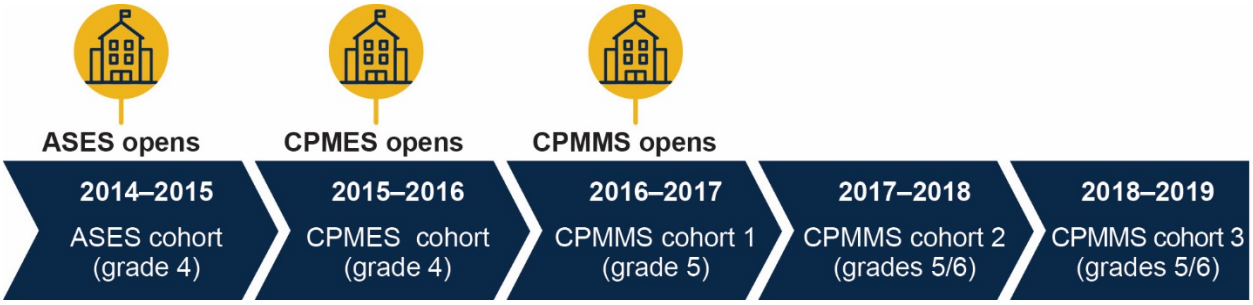
We sought to include as many TurnNJ schools in the sample as possible so that the results from the study would apply to a broad range of schools and grade levels. Four TurnNJ schools opened within the time frame of the study, and our sample includes three of the four schools: Alexander St. Elementary School (ASES), which reopened in Newark in 2014–2015 under the charter restart model; Camden Prep Mt. Ephraim Elementary School (CPMES), which reopened in Camden in 2015–2016 as a renaissance school; and Camden Prep Mt. Ephraim Middle School (CPMMS), which opened as a new renaissance school in 2016–2017. We could not include one school because it started with students in earlier grade levels who did not have the required data for analysis.[3] The results from the analysis therefore pertain to these three TurnNJ schools during this time period but may be suggestive of results one might expect from similar turnaround schools in urban settings.

Identifying students in TurnNJ schools

Within the three study schools, 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 (Figure 2). The two elementary schools in the study are represented by one cohort of students who enrolled in the TurnNJ school starting in 4th grade. We limited the sample to students who were in 4th grade during the opening year because that was the only grade and year in which students had test scores before attending a TurnNJ school (as required for our analyses). In both schools, approximately half of students in the sample previously attended the low-performing neighborhood school in 3rd grade, before it reopened under Uncommon management; the other half came from other schools.

[3] A second elementary school in Camden was not included because it opened with kindergarten and 1st grade. Students who began at a school before 4th grade could not be included because they did not have test scores the year prior to enrollment, which were needed for the analysis. A TurnNJ high school opened after the study period.

Figure 2. Timeline of school openings and cohorts



Note: ASES = Alexander St. Elementary School; CPMES = Camden Prep Mt. Ephraim Elementary School; CPMMS = Camden Prep Mt. Ephraim Middle School.

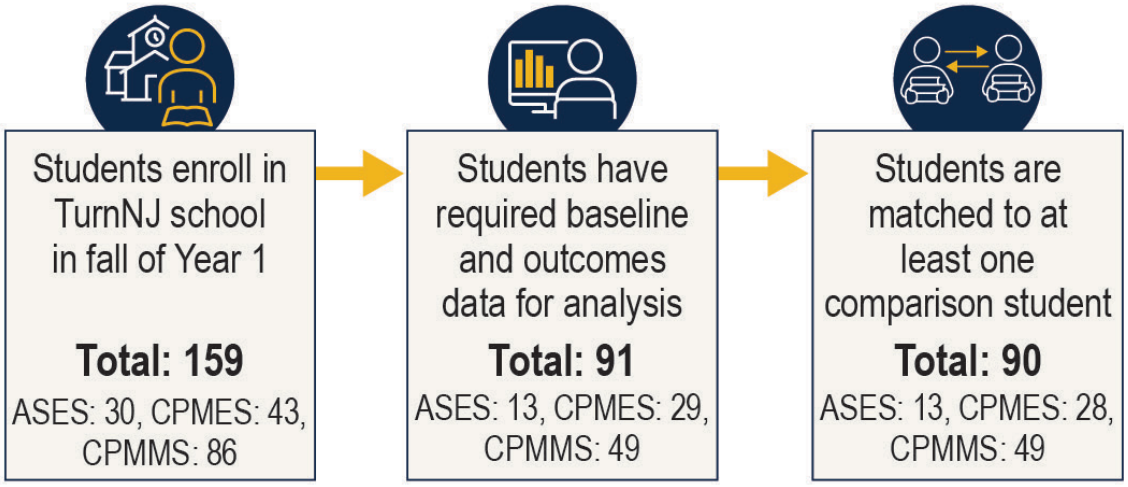
CPMMS includes three consecutive cohorts of students. The school was built up from 5th grade, so the first cohort includes only incoming 5th graders, and the subsequent cohorts include incoming 5th and 6th graders who were enrolling in an Uncommon school for the first time.[4]

Within the school cohorts, we identified and included in the sample TurnNJ students who had never previously attended an Uncommon school, had math and ELA test scores from the prior school year, and had no missing data on demographic characteristics. For the middle school, we excluded students from the sample who had previously attended an Uncommon elementary school, in order to isolate the impact of enrolling in a TurnNJ school.[5] Students who attended an Uncommon elementary school did not have math and ELA test scores before enrolling in an Uncommon school. Therefore, we would not have been able to capture the full, cumulative impact of new exposure to the Uncommon school model in the TurnNJ setting. Finally, we removed students 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 3 illustrates this process for defining an analysis sample, using the 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.)

[4] We did not include incoming 7th graders because there are very few students coming into a new middle school in 7th grade.

[5] To examine the impacts of TurnNJ for as expansive a sample as possible, we conducted a separate analysis that included both TurnNJ students new to Uncommon and TurnNJ students continuing from other Uncommon schools; findings from this analysis are presented in Appendix C.

Figure 3. Flow of TurnNJ 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: ASES = Alexander St. Elementary School; CPMES = Camden Prep Mt. Ephraim Elementary School; CPMMS = Camden Prep Mt. Ephraim Middle School. The number of students shown in the first box excludes those who had previously attended an Uncommon school.

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 TurnNJ schools included in this study appeared to have demographic characteristics similar to those of the broader Uncommon network. Both the Uncommon network and the subset of Uncommon TurnNJ schools in our sample serve a large percentage of students from traditionally disadvantaged groups, including families with low incomes. For example, in its i3 application, Uncommon reported that 83 percent of students in its network come from families with low incomes; our samples included between 91 and 97 percent of children from families with low incomes based on eligibility for free or reduced-price lunch.

Identifying similar students in other schools

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

Randomly assigning students to attend schools would ensure that the TurnNJ and comparison students are alike, which is why random assignment studies are known as the "gold standard" in research. When students are randomly assigned to schools, we can assume that all of the characteristics of students in those schools—including characteristics that can be measured, such as prior ELA and math achievement, and characteristics that cannot be measured, such as parent engagement—are similar. We can then

estimate impacts simply by comparing the means in math and ELA between students in the two schools without concern that non-school factors might be contributing to differences in achievement.

However, when students and their families choose to attend certain schools and are not randomly assigned to them, as is the case with TurnNJ schools, the factors that influence their decision to enroll in a school often influence their achievement. For example, parents who prefer a school with a record of high student achievement may be more likely to enroll their child in a particular school and more likely to engage in other activities, such as providing tutoring or help with homework, that influence their child's achievement. Because of these selection biases, we cannot simply calculate the impact estimate as the difference between all students' achievement levels in the different schools. This estimate would capture both the differences between the schools and the differences between the types of students and families that attend them. Instead, we must identify a subset of non-TurnNJ students who are most similar to TurnNJ students in meaningful ways and adjust for any remaining differences between them to minimize selection biases.

To respond to this challenge, we matched each student who attended a TurnNJ 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 1, separately for each cohort and for each of the eight outcomes: math achievement one, two, three, and four years after enrollment and ELA achievement one, two, three, and four years after enrollment.

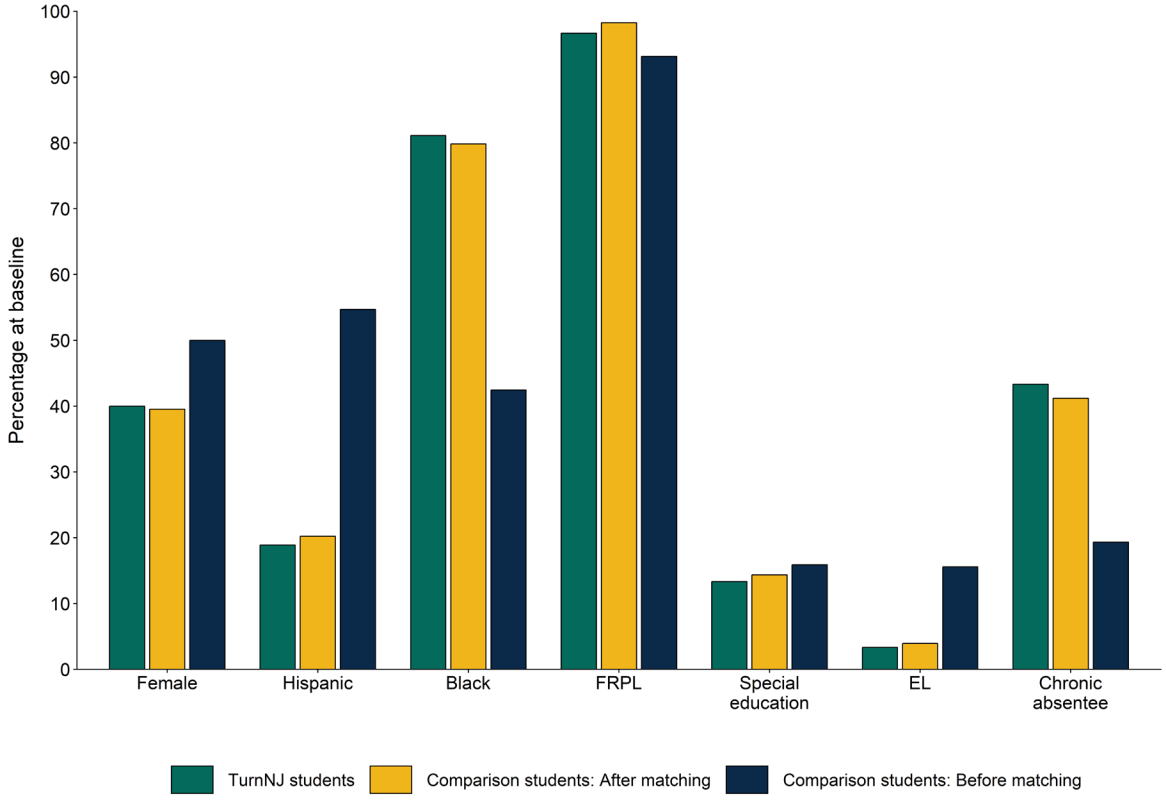
After matching, we confirmed that the TurnNJ students and the comparison students who were matched to them had similar prior test scores in math and ELA. Across the four years, the samples used to evaluate math achievement had differences in prior math scores between 0.05 and 0.12 standard deviations, and all of the samples used to evaluate ELA achievement had differences in baseline ELA scores between 0.00 and 0.02 (see tables of baseline math and ELA scores in Appendix A). These fall 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 funded by the U.S. Department of Education.

Box 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 TurnNJ
- Grades: Pre-K through 8
- School years: 2013–2014 through 2018–2019
- Schools: All public schools in the cities of Camden and Newark, including district, renaissance, and charter schools

We also confirmed that the TurnNJ students and matched students had similar demographic characteristics. Figure 4 shows three groups of students: the green bar represents the students included in the analysis who attended TurnNJ schools; the gold bar represents the students who were matched to TurnNJ students and thus included in the analyses; and the navy blue bar represents the comparison students before matching (the complete pool of students in Newark and Camden in the same grade levels and years who did not enroll in any Uncommon school). As the figure illustrates, the matched group is much more similar to the TurnNJ students than the larger pool of students in those cities.

Figure 4. Baseline characteristics of TurnNJ 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.

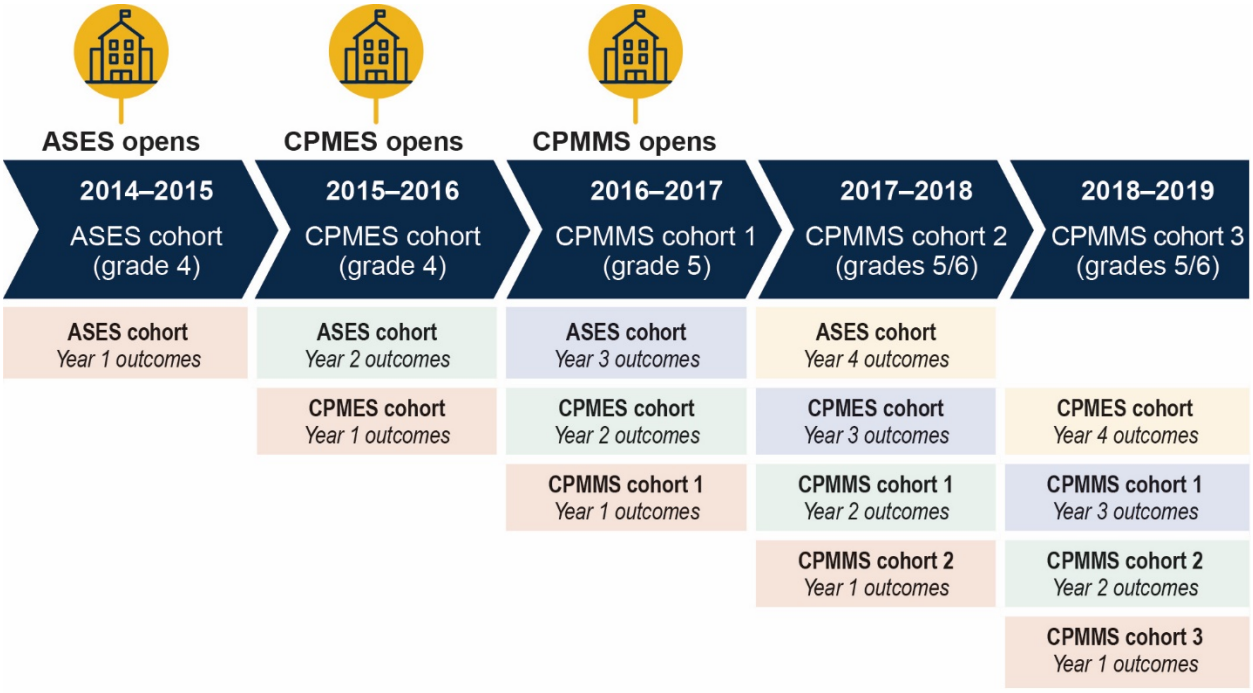
EL = English learner; FRPL = eligible for free or reduced-price lunch.

Outcomes

We measured math and ELA achievement using standardized test scores one to four years following enrollment in a TurnNJ school. We converted the scale scores to z-scores; within each city, school year, and grade level, 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 the same city, 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 year, two years, three years, and four years following enrollment. Figure 5 presents a timeline for the evaluation, including when each school opened, when students from each cohort enrolled in a TurnNJ school, and when we collected outcomes data for each cohort. As shown in the figure, each cohort started in a different year between 2014–2015 and 2018–2019, and as a result, their outcomes from Years 1–4 were collected in different 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 the 4th grade cohort from ASES collected in 2014–2015, the 4th grade cohort from CPMES collected in 2015–2016, the 5th grade cohort from CPMMS collected in 2016–2017, and the 5th and 6th grade cohorts from CPMMS collected in 2017–2018 and 2018–2019. Because 2018–2019 was the last school year of available data and the CPMMS cohorts began later, one CPMMS cohort drops out of the analysis each year beginning in Year 2. (The Year 1 outcomes have three CPMMS cohorts, the Year 2 outcomes have two CPMMS cohorts, the Year 3 outcomes have one CPMMS cohort, and the Year 4 outcomes have no cohorts.) We treat the student as the unit of analysis. Therefore, all students have equal weight in each analysis even though the schools and cohorts do not.

Figure 5. Timeline of school openings, cohort entry, and outcome measurement



Note: ASES = Alexander St. Elementary School; CPMES = Camden Prep Mt. Ephraim Elementary School; CPMMS = Camden Prep Mt. Ephraim Middle School. Cohorts with the same color are those that are included in the analysis of an outcome. For example, the Year 4 outcomes include the ASES 4th grade cohort in 2017–2018 and the CPMES 4th grade cohort in 2018–2019.

A complication with analyzing outcomes across four years is that not all students stay in the same schools during these years. In the case of the elementary cohorts from ASES and CPMES, all students attended other schools in Year 2 because their cohorts began in 4th grade, which is the last grade level in these elementary schools. In most cases, the middle school attended was also an Uncommon school: 87 percent of students in the ASES cohort attended other Uncommon middle schools in Newark that were not part of TurnNJ, and 77 percent of students in the CPMES cohort attended CPMMS. Therefore, in the case of the elementary cohorts, the outcomes in Years 2–4 largely capture a mix of the impact of attending the TurnNJ elementary school in Year 1 and the impact of also attending CPMMS or another Uncommon middle school in subsequent years.

We also 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 TurnNJ 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 and Camden, we were not able to follow students who moved outside of those cities. Seventeen percent of TurnNJ students in our Year 1 impact sample were not included in the impact estimates for Year 2 and beyond because they moved to another city.

Primary approach for estimating impacts

Because students were not randomly assigned to schools, we used statistical methods to account for differences between the TurnNJ and comparison students in our analysis of impacts. Our propensity score matching approach resulted in TurnNJ and comparison students with similar prior math and ELA achievement and demographic characteristics. To account for any remaining differences on these observable characteristics, 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. The full regression model and details about the construction of the variables included in the propensity score models and impact models are provided 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 the likelihood that a student would enroll in a TurnNJ school and math and ELA achievement. Our study accounted for differences on observable student characteristics, including 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 TurnNJ 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 influenced 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.

Alternative approaches for estimating impacts

When estimating impacts, it is important to understand how consistent the findings are when using different analytic approaches (Box 2). For example, a key challenge in this evaluation is that different cohorts and schools contributed to each outcome year, and we responded by giving each student in the analysis equal weight, even if it meant that in some years we had greater representation from certain schools than in other years. But if one of the schools had a larger share of students and had larger impacts than other schools, then the decision to weight the analysis equally across schools would result in smaller impact estimates than if weighted equally across students. To address this concern, we also conducted one version of the analysis that gave equal weights to each school in each outcome year. By estimating the impacts using a variety of approaches, we could determine whether any alternative choices would have made a meaningful difference in our results. If the results are similar across many alternative approaches, it gives us greater confidence that our results accurately reflect the effect of TurnNJ schools on student achievement. We used a total of nine alternative approaches to the analysis, and we summarize the results in the next section. (A detailed description of the types of approaches we tested is in Appendix C.)

Box 2. Types of alternative approaches tested

- **Different criteria for selecting students.** For example, one approach limited comparison students to those from the same feeder schools as the TurnNJ students.
- **Different propensity score methods.** For example, we tested using the propensity scores for weighting rather than matching and tested different matching algorithms.
- **Different impact model.** We tested one variation that had a simplified regression model with fewer variables.
- **Different weighting.** We tested weighting the impacts equally by school and weighting equally by cohort.

Results

Students who enrolled in a TurnNJ school 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 a TurnNJ school.

Math impacts

The impacts of enrolling in a TurnNJ school on math achievement were large and statistically significant for one, two, three, and four years after enrollment. Figure 6 shows the mean math scores for the TurnNJ students in green and for the 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; TurnNJ students and their matched peers had average z-scores of -0.39 and -0.35, respectively. But only one year after enrollment, TurnNJ students went from being well below their city averages to well above them, moving from a z-score of -0.39 to 0.62, whereas the matched students had little change in their standing relative to the city means.

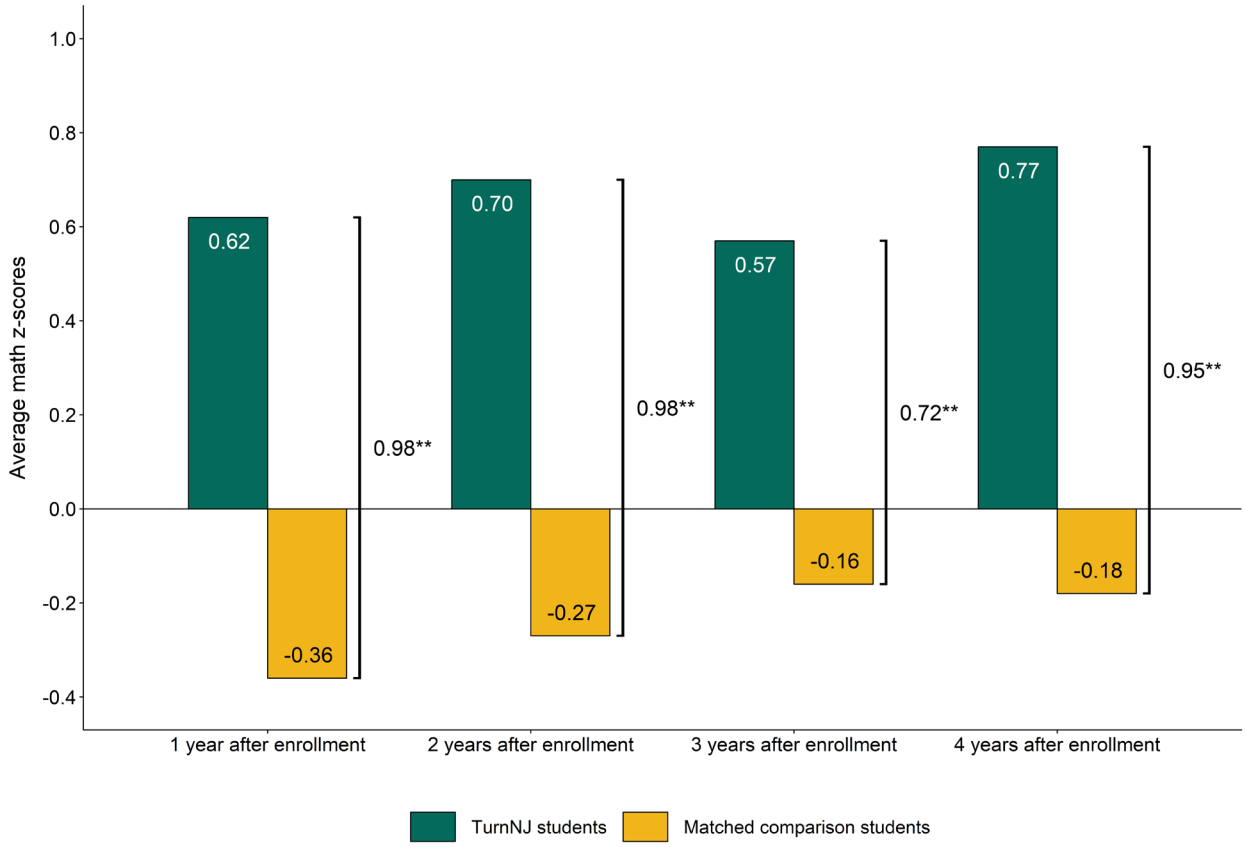
Students who enrolled in TurnNJ schools maintained their higher scores in the three years that followed. By four years after enrollment, math achievement outcomes for students who enrolled in a TurnNJ school exceeded those of their matched counterparts by nearly 1 standard deviation. One caveat is that the four-year outcomes are based solely on the students who began in 4th grade at the two elementary schools; it is unclear whether we can expect these large impacts to persist for students who were only followed in the analysis for one or two years.

These effect sizes translate to large differences in math learning between TurnNJ students and their most similar peers. Using benchmarks by Bloom et al. (2008) on average learning gains, TurnNJ students were ahead of their matched peers by approximately 1.8 additional years, or 22 additional months, of learning in math after one year of enrollment.[6] By four years, students who enrolled in a TurnNJ school were ahead of their peers by approximately 2.1 additional years, or 26 additional months, of learning in math.

Given that the vast majority (97 percent) of TurnNJ students are eligible for free or reduced-price lunch, another benchmark for interpreting TurnNJ's impacts on student achievement is the achievement gap in 8th grade between those who do and do not live in poverty. On average, 8th-grade students who are not eligible for free or reduced-price lunch perform 0.8 standard deviations in math above those who are eligible (Bloom et al. 2008). Uncommon's impact on math achievement four years after enrollment exceeds the size of the gap between students who are eligible for free or reduced-price lunch and those who are not. (See Appendix B for supplemental tables showing the sample sizes, impact estimates, standard errors, and *p*-values for each outcome subject and year.)

[6] See Appendix A for detailed information on the conversion of effect sizes to years of learning.

Figure 6. TurnNJ 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 a TurnNJ school in 4th, 5th, or 6th grade and the unadjusted means for matched students in Camden and Newark who never enrolled in a TurnNJ school or in any other 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 impact sizes in Table A.15 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 (Camden or Newark), and school year.

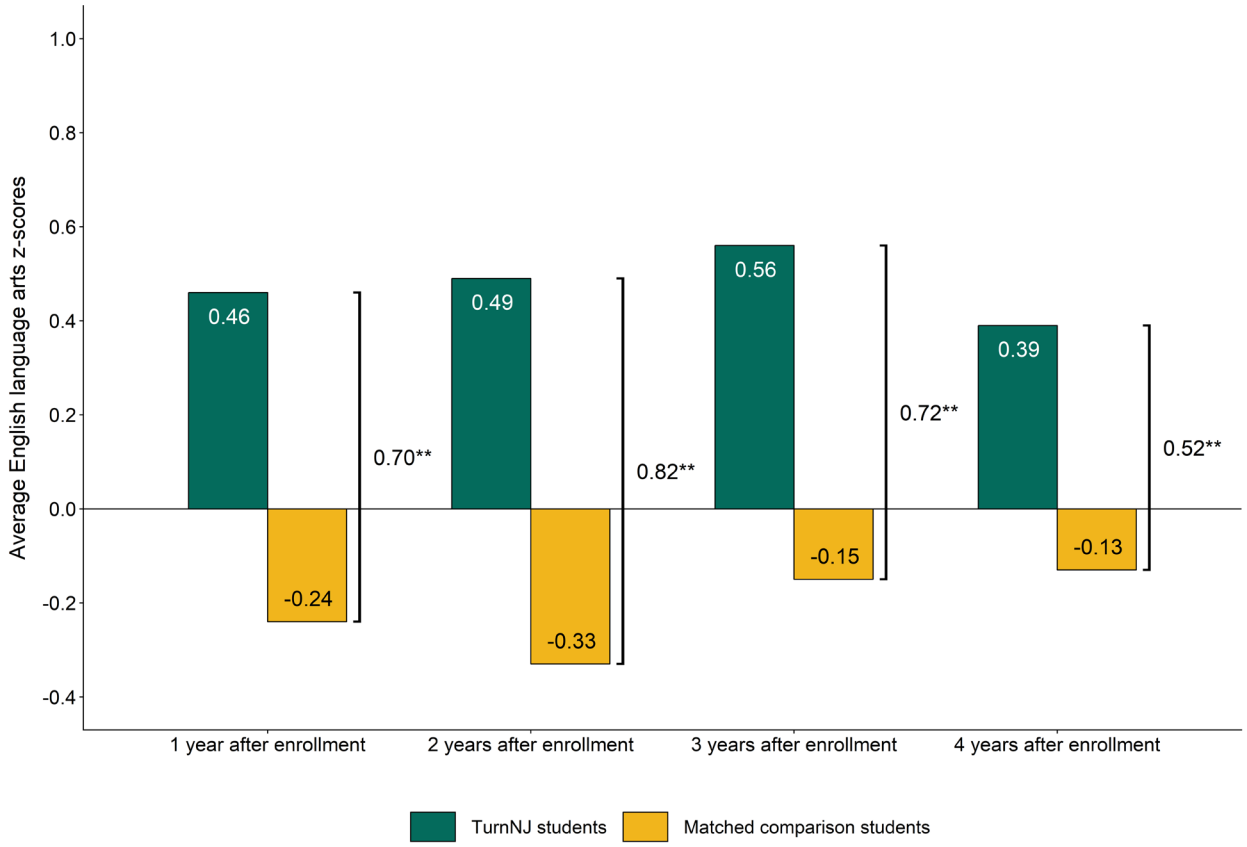
* Significantly different from zero at the .05 level, two-tailed test.

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

ELA impacts

Students who enrolled at a TurnNJ school also saw large gains in ELA achievement compared to their matched peers. The impacts were large and statistically significant at one, two, three, and four years following enrollment (Figure 7). In the year before enrollment, TurnNJ and comparison students both had average scores well below the city averages with z-scores of -0.27 and -0.23, respectively. After one year of enrollment in a TurnNJ 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, the TurnNJ students scored 0.70 standard deviations higher than the matched comparison students. These gains were equivalent to approximately 1.8 additional years, or 22 additional months, of learning in ELA.

Figure 7. TurnNJ impacts on English language arts 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 English language arts achievement for students who newly enrolled in a TurnNJ school in 4th, 5th, or 6th grade and the unadjusted means for matched students in Camden and Newark who never enrolled in a TurnNJ school or in any other 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. Standardized test scores were normalized to have a mean of 0 and standard deviation of 1, by grade level, city (Camden or 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.

The impacts largely persisted for up to four years after enrollment, although they were slightly smaller in the fourth year relative to the first three years after enrollment. However, the four-year outcomes did not include any of the cohorts that started in middle school, so it is unclear whether the trend would be the same with the middle school cohorts. The four-year impacts were still large and statistically significant.

The gains in ELA achievement were also substantial when comparing them to the achievement gap in 8th grade between students who do and do not live in poverty. On average, 8th-grade students who are 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 89 percent of the gap between students who are eligible for free or reduced-price lunch and those who are not.

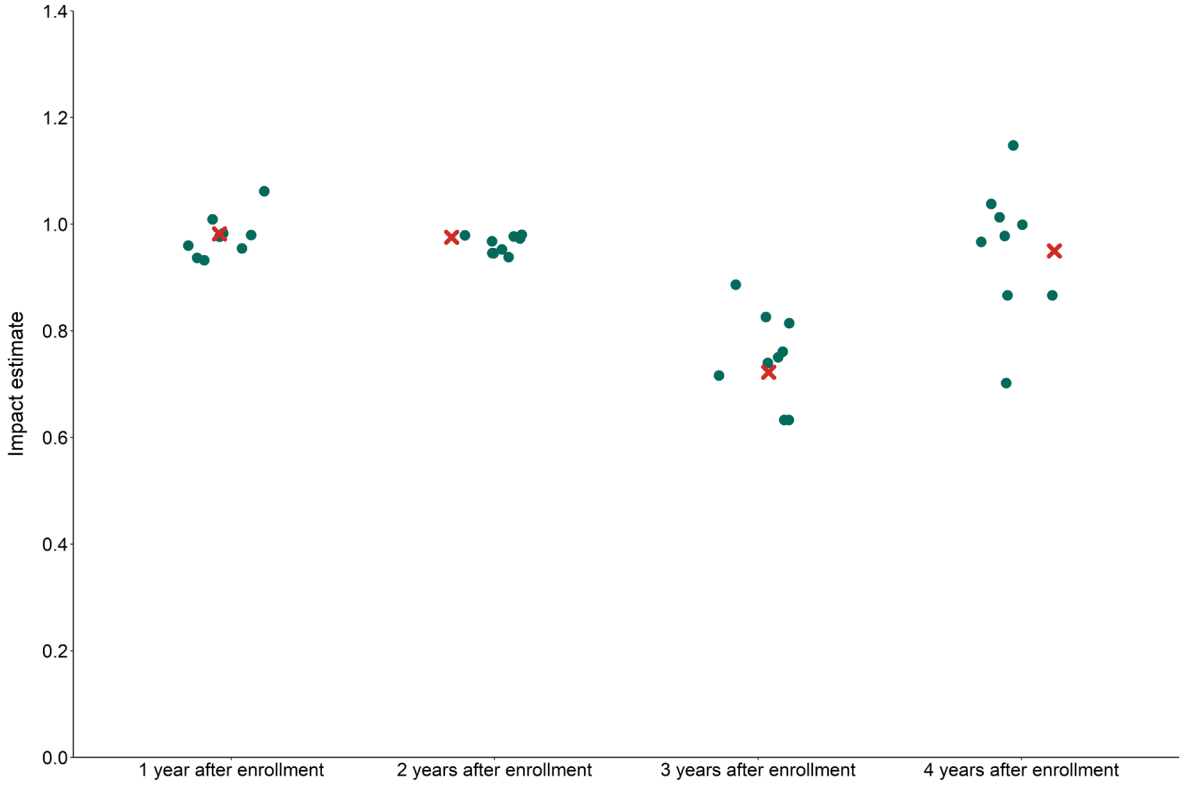
Results from alternative approaches for estimating impacts

As described in the methods chapter, we analyzed the data in nine other ways to ensure that the findings were not simply a result of the analytic decisions we made. For example, our primary analysis gave equal weighting to students, but we also conducted an analysis that gave equal weighting to schools and another that gave equal weighting to cohorts.

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

Figure 8 shows the adjusted difference in the average math z-scores between students enrolled in TurnNJ schools and the matched students who enrolled in other schools. The red "x" represents the results from our primary analysis, and the green dots represent the results from the alternative approaches. Most of the alternative approaches resulted in differences between the TurnNJ and comparison students in math achievement close to 1 standard deviation in the first two years. The findings for the three-year and four-year impacts from the alternative approaches vary more because the sample sizes are smaller, but all approaches still found large and statistically significant impacts.

Figure 8. TurnNJ impacts on math achievement, by alternative approach to the analysis and years after enrollment

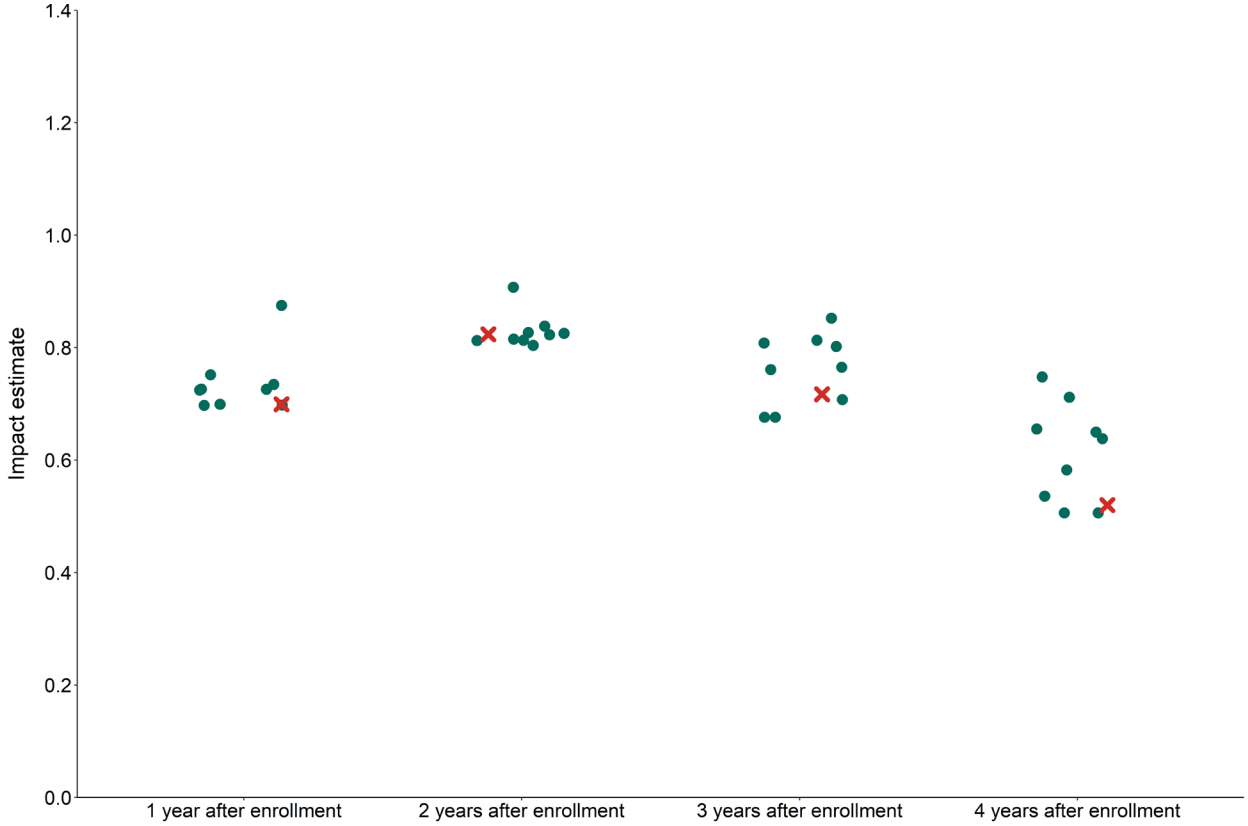


Source: Administrative data from the New Jersey Department of Education from the 2013–2014 to 2018–2019 school years.

Note: This figure reports the estimated regression-adjusted differences in mean math achievement between the TurnNJ students and comparison students. The difference in means is reported in standard deviation units. The "x" indicates the impact estimate for the primary approach, and the dots indicate impact estimates for alternative approaches. A description of each alternative approach is provided in Appendix C.

The pattern of results in ELA across the alternative approaches was similar. Most alternative approaches resulted in differences between the TurnNJ and comparison students that were close to the estimates from our primary analysis (Figure 9). At four years after enrollment, the red "x" representing the estimate from our primary analysis is lower than the estimates from seven of the nine approaches, suggesting that our benchmark Year 4 estimate may be conservative. Overall, the results from the alternative approaches suggest that the large gains that students experienced from enrolling in TurnNJ schools were not inflated due to the analytic decisions that we made.

Figure 9. TurnNJ impacts on English language arts 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 English language arts achievement between the TurnNJ students and comparison students. The difference in means is reported in standard deviation units. The "x" indicates the impact estimate for the primary approach, and the dots indicate impact estimates for alternative approaches. A description of each alternative approach is provided in Appendix C.

Box 3. Fidelity of implementation of Uncommon model in TurnNJ schools

Goal. The implementation analysis was intended to assess whether the key components of the Uncommon school model were implemented with fidelity in the TurnNJ schools.

Data and methods. To assess implementation fidelity, we used (1) survey data from Uncommon staff for the 2018–2019 and 2019–2020 school years and (2) bell times and academic calendars for the 2018–2019 and 2019–2020 school years. Uncommon administers an annual survey to school staff; we added items to the survey instruments to collect data for the study. Survey data included all school instructional staff in the TurnNJ schools and all other schools in Uncommon's Newark and Camden regions.

Measures for each of the six components were developed from these data as follows:

1. College preparatory mission: single survey item
2. High standards for academics and character: composite measure using multiple survey items
3. Highly structured learning environment: composite measure using multiple survey items
4. Longer school day and longer school year: composite measure based on the daily bell times and academic calendars for each school
5. Focus on accountability and data-driven instruction: single survey item
6. Faculty of committed and talented leaders and teachers: composite measure using multiple survey items

Separately for each of the six components, we then compared the mean value for each of the four TurnNJ schools to the mean value for all non-TurnNJ Uncommon elementary schools and middle schools in New Jersey (10 schools in 2018–2019 and 11 schools in 2019–2020).

Results. Most components of the Uncommon school model, as measured by our data sources, were implemented similarly in the TurnNJ schools and in other Uncommon schools in New Jersey. During the 2018–2019 school year, across four of the five components measured using survey data, a majority of TurnNJ schools either equaled or exceeded the non-TurnNJ mean, indicating that the TurnNJ schools were successful in achieving the same quality of implementation of standards, staff, mission, and data use relative to other Uncommon schools. For the fifth component—highly structured learning environment—measured using survey data, two TurnNJ schools were below the Uncommon mean. For instructional time, there were no differences between TurnNJ schools and other schools in New Jersey. During the 2019–2020 school year, a majority of the TurnNJ schools had mean values for all six components that were approaching the mean for the non-TurnNJ schools, but they equaled or exceeded the non-TurnNJ mean across only two components. The results were similar when all four TurnNJ schools were included and when only the three TurnNJ schools in the impact sample were included.

Implications. The findings suggest the Uncommon school model was largely implemented with fidelity in the TurnNJ schools during the period in which we measured outcomes, and the estimated impacts on students reflect the impacts of the TurnNJ project as intended. Notably, the TurnNJ schools appeared to be implementing the Uncommon school model within three to five years of opening nearly as consistently as other Uncommon schools.

(A detailed discussion of the implementation fidelity analysis is in Appendix D.)

Discussion

This study expanded upon prior research by showing that the positive effects of attending Uncommon schools on students' math and ELA achievement observed in other studies extended to those attending three of Uncommon's TurnNJ schools (Furgeson et al. 2012; Teh et al. 2010; Woodworth and Raymond 2013, Woodworth et al. 2017). It also expanded on the limited literature on the effectiveness of different types of school turnaround efforts.

The results of this study were on the high end of standardized impacts in math and ELA that have been reported in other studies of turnaround initiatives. Charter-managed turnaround efforts in the New Orleans Recovery School District, Boston Public Schools, and Loche High School in the LA Unified School District led to positive impacts in ELA and math (Abdulkadiroglu et al. 2016; Harris and Larsen 2016; Herman et al. 2012), but other charter-managed efforts in Tennessee's Achievement School District and the School District of Philadelphia showed no significant impacts (Zimmer et al. 2017; Hallgren et al. 2020). Across these studies, the greatest differences between students attending the turnaround schools and comparison students were approximately 0.4 standard deviations for one year after enrollment in both math and ELA (Harris and Larsen 2016). In the current study, we observed one-year impacts of 1.0 standard deviation in math and 0.7 standard deviations in ELA. These results provide promising evidence of the effectiveness of three TurnNJ schools managed by Uncommon in improving students' academic outcomes.

At the same time, we should exercise caution when extending the results beyond the schools in this study because the study used a small sample size in two similar settings and did not include a comprehensive evaluation of the implementation of the TurnNJ model. It is unclear whether the TurnNJ model would be as successful in other schools and districts. Although our implementation analysis showed that the TurnNJ schools implemented most components of the Uncommon school model similarly to other non-TurnNJ schools in the Uncommon network, the study did not examine how these components contribute to strong academic achievement.

Conclusions

Students who enrolled in a TurnNJ school had higher average achievement in math and ELA than similar students who attended other schools for all four years after their initial enrollment in a TurnNJ school. After only one year from their initial enrollment, TurnNJ students were approximately 1.8 years ahead of matched comparison students in both subjects. After four years, TurnNJ students' learning gains relative to comparison students were equivalent to approximately 2.1 years in math and 1.6 years in ELA. These results were consistent across the nine alternative approaches to our analysis.

Since the time of the study, Uncommon TurnNJ has expanded to serve more students in additional schools and grade levels. A new elementary school opened in Camden in 2017–2018 for kindergarten and 1st grade and was built out to grade 4 by 2020–2021. In addition, a new high school in Camden opened in the 2020–2021 school year for 9th graders and will build out one additional grade level per year until it serves all four grades.

The expansion of TurnNJ provides opportunities for more research that can further our understanding of the impacts of TurnNJ in more schools and grade levels. This research should include learning more about how schools are implementing the six core components of the Uncommon school model and which are most promising in a turnaround setting. Uncommon could contribute to the field by disseminating information on the TurnNJ approach that can be used by districts in their efforts to turn around persistently low-performing schools.

Going forward, Uncommon plans to implement some changes to its approach in schools, including modifications to the behavior system, additional trainings for teachers on culturally responsive instruction, and curricular changes to better reflect the cultures and identities of their students. Future research will be useful for understanding the impacts of changes to Uncommon's approach and the impacts of the Uncommon school model across a broader range of outcomes. It will be important to look beyond academic outcomes—particularly standardized tests—to social-emotional outcomes, and to examine how students experience instruction in TurnNJ and other Uncommon schools and how they perceive themselves as learners.

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Appendix A

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 TurnNJ school.

Data

Using data obtained from the New Jersey Department of Education for the 2013–2014 through 2018–2019 school years, we created the variables for our analysis shown in Table A.1.[7] 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 SD of 1. Test scores were normed by grade level, school year, and city (Newark or Camden). Test scores from 2013–2014 were from the New Jersey Assessment of Skills and Knowledge (NJASK), test scores from 2014–2015 through 2017–2018 were from the Partnership for Assessment of Readiness for College and Careers (PARCC), and test scores from 2018-19 were from the New Jersey Student Learning Assessments (NJSLA). A separate value was calculated for each school year for students in grades 3–8.
Reading z-score	Continuous	Standardized reading test scores were normed to have a mean of 0 and SD of 1. Test scores were normed by grade level, school year, and city (Newark or Camden). Test scores from 2013–2014 were from the NJASK, test scores from 2014–2015 through 2017–2018 were from the PARCC, and test scores from 2018-19 were from the NJSLA. A separate value was calculated for each school year for students in grades 3–8.
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 APA, 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 3–8.
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 3–8.
Female[a]	Binary (0/1)	An indicator was set to 0 if gender was male and set to 1 if gender was female.
Hispanic[a]	Binary (0/1)	An indicator was set to 0 if ethnicity was not Hispanic/Latino and set to 1 if ethnicity was Hispanic/Latino.

[7] The data vendor for the New Jersey Department of Education indicated the need to exercise caution when reviewing the non-state assessment score data provided for CPMES in the 2015–2016 school year due to submission errors. (The state assessment scores are submitted separately by the testing vendor.) As such, we took several steps to check the data and examine the robustness of our findings to the inclusion of these data. First, we reviewed the relevant data and conducted diagnostics comparing values for the affected demographic and enrollment variables for students in the cohort to values for the same cohort of students in adjacent years. We found no notable discrepancies in values across years. We then enlisted a programmer external to the study team to conduct an independent review of the data and found similar results. Finally, we estimated impacts excluding the relevant data. We found similar impacts when (1) estimating impacts excluding all students in the 2015–2016 CPMES cohort from the sample and comparing them to impacts that included these students in the sample and (2) estimating impacts for students in the 2015–2016 CPMES cohort for the 2015–2016 school year and comparing them to impacts estimated for subsequent school years.

Variable name	Type	Description
Black[a]	Binary (0/1)	An indicator was set to 0 if race was not Black and set to 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 was set to 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 was set to 1 if the student was retained in any baseline school year.
Ever SPED	Binary (0/1)	An indicator was set to 0 if the student was never eligible to receive special education services and was set to 1 if the student was ever eligible to receive special education services in any baseline school year.
Ever ELL	Binary (0/1)	An indicator was set to 0 if the student was never classified as an English learner (EL) and was set to 1 if the student was classified as ELL 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 was set to 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 was set to 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 a Turn NJ school or an eligible comparison school.
Entry grade	Continuous	The grade level in which a student began attending a Turn NJ 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.

Sample

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

We excluded all those who 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 4th-grade cohort repeated 5th grade, we would report their grade 4 outcomes in Year 1, grade 5 outcomes in Years 2 and 3, and grade 6 outcomes in Year 4. We would not report this student's grade 7 outcomes. Grade repetition was infrequent, and the rates were similar across TurnNJ students and comparison students. For example, among students included in the analysis of one-year math impacts, 4 percent of TurnNJ students and 4 percent of comparison students were repeating their baseline year grade. Across all outcome samples, grade repetition rates for TurnNJ students ranged from 0 to 5 percent, and the difference in grade repetition rates between TurnNJ and comparison students ranged from less than 1 percentage point to 4 percentage points. For the two analysis samples with retention rate differences of more than 2 percentage points (four-year math and reading outcomes), a larger percentage of comparison students were retained relative to TurnNJ 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	
	TurnNJ	Comparison	TurnNJ	Comparison	TurnNJ	Comparison
1 year	159	10,744	91	8,417	90	724
2 years	108	7,503	62	6,050	59	452
3 years	79	5,090	47	4,088	44	328
4 years	58	3,878	34	3,079	32	235

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

Note: As shown in Figure 5 in the report, the outcome years pool students across cohort years and grade levels.

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

Table A.3. Number of students for the impact estimates in English language arts, 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	
	TurnNJ	Comparison	TurnNJ	Comparison	TurnNJ	Comparison
1 year	159	10,744	91	8,417	90	714
2 years	108	7,503	62	6,077	59	451
3 years	79	5,090	47	4,124	45	318
4 years	58	3,878	35	3,085	33	256

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

Note: As shown in Figure 5 in the report, the outcome years pool students across cohort years and grade levels.

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

Methods

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 impacts on math and English language arts achievement. We implemented these procedures in R version 3.5.1, using the MatchIt and glmnet packages, and Stata version 16.1.

Propensity score model

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

$$logit(T_i) = \alpha + \beta X_i$$

where T is an indicator for ever enrolling in a TurnNJ school 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, alternative assessment status, testing accommodation status, grade level, school year, and baseline math and ELA test scores; and α and β are parameters to be estimated. We ran separate models by school level (elementary or middle), city (Camden or Newark), and outcome sample, as there were some students who had the required math scores for analysis but not the required ELA scores, or vice versa. However, we used the same specifications across all the models to ensure a consistent approach in our analysis.

We tested variations of the model specification and selected the specification that achieved the greatest level of covariate balance across the separate models for each combination of school level and city while maintaining a reasonable sample size. The features we varied included quadratic terms for the standardized test scores, models with interaction terms, models with fixed effects for the school attended in the baseline year, and models with school-level baseline covariates. The school-level covariates included an indicator for whether the baseline school was a traditional public school or a charter, and school averages of the student-level variables, including the school average z-score in math and English language arts and the percentage of students in the school with each of the demographic characteristics.

We ultimately selected the model that included one interaction term: Black and math z-score. Because we did not have theory-based hypotheses about interactions, we tested all possible two-way interactions using a procedure called least absolute shrinkage and selection operator (LASSO) regression with the R package glmnet. The program identified several interactions across the models, but Black and math z-score was the interaction that was identified most frequently across the separate propensity score models. We did not include quadratic terms, fixed effects, or school-level covariates. The variations of the models with fixed effects and with school-level covariates tended to explain a much greater proportion of the variation in enrollment in TurnNJ schools but resulted in very few matches and low levels of balance on student-level covariates.

Matching method

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

- Nearest neighbor matching: Each TurnNJ student was matched to comparison students with the nearest propensity scores.
- 10:1 ratio matching: Each TurnNJ 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 a TurnNJ student had a greater distance to its nearest comparison student, the student was not matched.

Before selecting this approach, we tested other variations of matching procedures, including matching without replacement, different matching ratios, and using optimal matching, rather than nearest neighbor matching. Optimal matching is a different approach to nearest neighbor matching where instead of selecting the nearest neighbor to each treatment observation, the algorithm seeks to minimize an overall distance measure across all matched pairs. Our selected approach achieved better covariate balance than the other approaches. The results from other matching approaches are provided in Appendix C.

Diagnostics

To select our propensity model and matching method, 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 TurnNJ 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.11 show the means and standardized mean differences for TurnNJ and comparison students on math and English language arts test scores in the year before enrollment. Tables A.12 through A.19 show the percentage of TurnNJ and comparison group students with each demographic characteristic. In both types of tables, we show both the matched comparison group and the larger pool of comparison students before matching (shaded in gray). This 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: unmatched treatment units, matched treatment units, matched control units, and unmatched control units (see example in Figure A.1). We ensured that all the matched TurnNJ and comparison students (in the middle panels) had overlapping propensity scores.

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

Test subject at baseline	TurnNJ students N = 90		Comparison students in Camden and Newark: After matching N = 724		Comparison students in Camden and Newark: Before matching N = 8,417		Difference between TurnNJ and matched comparison students	
	Mean	SD	Mean	SD	Mean	SD	Standardized difference	*p*-value of difference
Math	-0.39	0.93	-0.35	0.92	0.03	0.99	-0.05	0.67
ELA	-0.27	0.90	-0.26	0.90	0.01	0.99	-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 (Camden or Newark), and school year.

ELA = English language arts; SD = standard deviation.

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

Test subject at baseline	TurnNJ students N = 90		Comparison students in Camden and Newark: After matching N = 714		Comparison students in Camden and Newark: Before matching N = 8,417		Difference between TurnNJ and matched comparison students	
	Mean	SD	Mean	SD	Mean	SD	Standardized difference	*p*-value of difference
Math	-0.39	0.93	-0.34	0.95	0.03	0.99	-0.06	0.61
ELA	-0.27	0.90	-0.23	0.92	0.01	0.99	-0.05	0.69

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 (Camden or Newark), and school year.

ELA = English language arts; SD = standard deviation.

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

Test subject at baseline	TurnNJ students		Comparison students in Camden and Newark: After matching		Comparison students in Camden and Newark: Before matching		Difference between TurnNJ and matched comparison students	
	N = 59		N = 452		N = 6,050			
	Mean	SD	Mean	SD	Mean	SD	Standardized difference	*p*-value of difference
Math	-0.29	0.94	-0.23	0.96	0.04	0.99	-0.06	0.67
ELA	-0.24	0.92	-0.21	0.97	0.02	0.98	-0.03	0.84

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 (Camden or Newark), and school year.

ELA = English language arts; SD = standard deviation.

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

Test subject at baseline	TurnNJ students		Comparison students in Camden and Newark: After matching		Comparison students in Camden and Newark: Before matching		Difference between TurnNJ and matched comparison students	
	N = 59		N = 451		N = 6,077			
	Mean	SD	Mean	SD	Mean	SD	Standardized difference	*p*-value of difference
Math	-0.29	0.94	-0.28	0.94	0.04	0.99	0.00	0.98
ELA	-0.24	0.92	-0.25	0.94	0.01	0.98	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 (Camden or Newark), and school year.

ELA = English language arts; SD = standard deviation.

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

Test subject at baseline	TurnNJ students		Comparison students in Camden and Newark: After matching		Comparison students in Camden and Newark: Before matching		Difference between TurnNJ and matched comparison students	
	N = 44		N = 328		N = 4,088			
	Mean	SD	Mean	SD	Mean	SD	Standardized difference	*p*-value of difference
Math	-0.28	0.96	-0.16	1.04	0.02	0.98	-0.12	0.46
ELA	-0.12	0.88	-0.05	0.96	-0.01	0.96	-0.08	0.61

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 (Camden or Newark), and school year.

ELA = English language arts; SD = standard deviation.

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

Test subject at baseline	TurnNJ students		Comparison students in Camden and Newark: After matching		Comparison students in Camden and Newark: Before matching		Difference between TurnNJ and matched comparison students	
	N = 45		N = 318		N = 4,124			
	Mean	SD	Mean	SD	Mean	SD	Standardized difference	*p*-value of difference
Math	-0.32	0.98	-0.21	1.07	0.04	0.99	-0.10	0.51
ELA	-0.14	0.88	-0.09	1.04	0.00	0.97	-0.05	0.76

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 (Camden or Newark), and school year.

ELA = English language arts; SD = standard deviation.

Table A.10. Math and English language arts achievement at baseline for students included in the four-year math impact estimates

Test subject at baseline	TurnNJ students		Comparison students in Camden and Newark: After matching		Comparison students in Camden and Newark: Before matching		Difference between TurnNJ and matched comparison students	
	N = 32		N = 235		N = 3,079			
	Mean	SD	Mean	SD	Mean	SD	Standardized difference	*p*-value of difference
Math	-0.23	0.96	-0.11	1.04	0.00	0.98	-0.12	0.53
ELA	-0.08	0.96	-0.07	1.01	-0.03	0.95	-0.01	0.96

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 (Camden or Newark), and school year.

ELA = English language arts; SD = standard deviation.

Table A.11. Math and English language arts achievement at baseline for students included in the four-year English language arts impact estimates

Test subject at baseline	TurnNJ students		Comparison students in Camden and Newark: After matching		Comparison students in Camden and Newark: Before matching		Difference between TurnNJ and matched comparison students	
	N = 33		N = 256		N = 3,085			
	Mean	SD	Mean	SD	Mean	SD	Standardized difference	*p*-value of difference
Math	-0.27	0.97	-0.25	1.04	0.00	0.98	-0.02	0.93
ELA	-0.10	0.95	-0.08	1.03	-0.03	0.95	-0.02	0.93

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 (Camden or Newark), and school year.

ELA = English language arts; SD = standard deviation.

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

Characteristic	Percentage at baseline: TurnNJ students N = 90	Percentage at baseline: Comparison students in Camden and Newark: After matching N = 724	Percentage at baseline: Comparison students in Camden and Newark: Before matching N = 8,417	*p*-value of difference between TurnNJ and matched comparison students
Female	40.0	39.5	50.0	0.93
Hispanic	18.9	20.2	54.7	0.76
Black	81.1	79.9	42.4	0.78
Eligible for free or reduced-price lunch	96.7	98.3	93.2	0.30
Retained	0.0	0.0	3.7	n.a.
Special education	13.3	14.4	15.9	0.79
English learner	3.3	3.9	15.6	0.78
Chronic absentee	43.3	41.2	19.3	0.70
Took an alternative assessment	2.2	2.1	9.6	0.93
Received a testing accommodation	16.7	19.6	18.7	0.50

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. Free or reduced-price lunch 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.

n.a. = not applicable.

Table A.13. Baseline characteristics for students included in the one-year English language arts impact estimates

Characteristic	Percentage at baseline: TurnNJ students N = 90	Percentage at baseline: Comparison students in Camden and Newark: After matching N = 714	Percentage at baseline: Comparison students in Camden and Newark: Before matching N = 8,417	*p*-value of difference between TurnNJ and matched comparison students
Female	40.0	40.7	50.0	0.89
Hispanic	18.9	20.3	54.6	0.75
Black	81.1	80.8	42.5	0.95
Eligible for free or reduced-price lunch	96.7	98.1	93.2	0.37
Retained	0.0	0.1	3.7	0.78
Special education	13.3	13.0	15.9	0.94
English learner	3.3	4.1	15.5	0.72
Chronic absentee	43.3	40.9	19.4	0.66
Took an alternative assessment	2.2	3.1	9.6	0.65
Received a testing accommodation	16.7	18.1	18.7	0.74

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. Free or reduced-price lunch 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.

n.a. = not applicable.

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

Characteristic	Percentage at baseline: TurnNJ students N = 59	Percentage at baseline: Comparison students in Camden and Newark: After matching N = 452	Percentage at baseline: Comparison students in Camden and Newark: Before matching N = 6,050	*p*-value of difference between TurnNJ and matched comparison students
Female	33.9	33.3	50.1	0.93
Hispanic	18.6	23.2	53.0	0.43
Black	81.4	77.9	43.2	0.55
Eligible for free or reduced-price lunch	94.9	95.6	92.4	0.81
Retained	1.7	2.0	2.7	0.86
Special education	6.8	6.0	14.9	0.82
English learner	1.7	2.5	15.1	0.70
Chronic absentee	33.9	32.4	14.6	0.82
Took an alternative assessment	1.7	2.0	9.8	0.87
Received a testing accommodation	3.4	3.5	14.1	0.96

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. Free or reduced-price lunch 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.

n.a. = not applicable.

Table A.15. Baseline characteristics for students included in the two-year English language arts impact estimates

Characteristic	Percentage at baseline: TurnNJ students N = 59	Percentage at baseline: Comparison students in Camden and Newark: After matching N = 451	Percentage at baseline: Comparison students in Camden and Newark: Before matching N = 6,077	*p*-value of difference between TurnNJ and matched comparison students
Female	33.9	31.3	50.0	0.69
Hispanic	18.6	20.6	52.9	0.72
Black	81.4	78.9	43.3	0.66
Eligible for free or reduced-price lunch	94.9	94.8	92.4	0.96
Retained	1.7	1.9	2.7	0.93
Special education	6.8	8.5	14.9	0.65
English learner	1.7	4.0	15.0	0.39
Chronic absentee	33.9	31.1	14.6	0.67
Took an alternative assessment	1.7	2.4	9.8	0.74
Received a testing accommodation	3.4	4.9	14.1	0.62

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. Free or reduced-price lunch 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.

n.a. = not applicable.

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

Characteristic	Percentage at baseline: TurnNJ students N = 44	Percentage at baseline: Comparison students in Camden and Newark: After matching N = 328	Percentage at baseline: Comparison students in Camden and Newark: Before matching N = 4,088	*p*-value of difference between TurnNJ and matched comparison students
Female	38.6	39.9	49.7	0.88
Hispanic	11.4	13.4	49.7	0.71
Black	88.6	85.7	45.3	0.60
Eligible for free or reduced-price lunch	93.2	93.3	90.9	0.98
Retained	2.3	3.0	1.5	0.78
Special education	6.8	5.0	12.8	0.61
English learner	2.3	2.5	13.9	0.93
Chronic absentee	34.1	30.6	9.2	0.64
Took an alternative assessment	2.3	2.1	11.0	0.94
Received a testing accommodation	2.3	2.0	5.9	0.92

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. Free or reduced-price lunch 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.

n.a. = not applicable.

Table A.17. Baseline characteristics for students included in the three-year English language arts impact estimates

Characteristic	Percentage at baseline: TurnNJ students N = 45	Percentage at baseline: Comparison students in Camden and Newark: After matching N = 318	Percentage at baseline: Comparison students in Camden and Newark: Before matching N = 4,124	*p*-value of difference between TurnNJ and matched comparison students
Female	37.8	40.7	49.9	0.71
Hispanic	11.1	12.5	49.9	0.79
Black	88.9	87.7	45.2	0.82
Eligible for free or reduced-price lunch	93.3	94.2	90.9	0.83
Retained	2.2	3.4	1.5	0.69
Special education	6.7	4.9	12.7	0.63
English learner	2.2	1.8	13.8	0.83
Chronic absentee	35.6	29.3	9.2	0.39
Took an alternative assessment	2.2	1.6	10.9	0.76
Received a testing accommodation	2.2	1.8	5.9	0.85

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. Free or reduced-price lunch 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.

n.a. = not applicable.

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Table A.18. Baseline characteristics for students included in the four-year math impact estimates

Characteristic	Percentage at baseline: TurnNJ students N = 32	Percentage at baseline: Comparison students in Camden and Newark: After matching N = 235	Percentage at baseline: Comparison students in Camden and Newark: Before matching N = 3,079	*p*-value of difference between TurnNJ and matched comparison students
Female	40.6	42.5	49.8	0.84
Hispanic	9.4	9.7	47.7	0.96
Black	90.6	90.9	46.4	0.97
Eligible for free or reduced-price lunch	90.6	92.0	90.0	0.79
Retained	0.0	0.0	1.1	n.a.
Special education	0.0	0.0	11.4	n.a.
English learner	3.1	2.4	13.4	0.79
Chronic absentee	34.4	31.7	6.1	0.76
Took an alternative assessment	3.1	1.5	12.2	0.52
Received a testing accommodation	0.0	0.0	1.1	n.a.

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. Free or reduced-price lunch 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.

n.a. = not applicable

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Table A.19. Baseline characteristics for students included in the four-year English language arts impact estimates

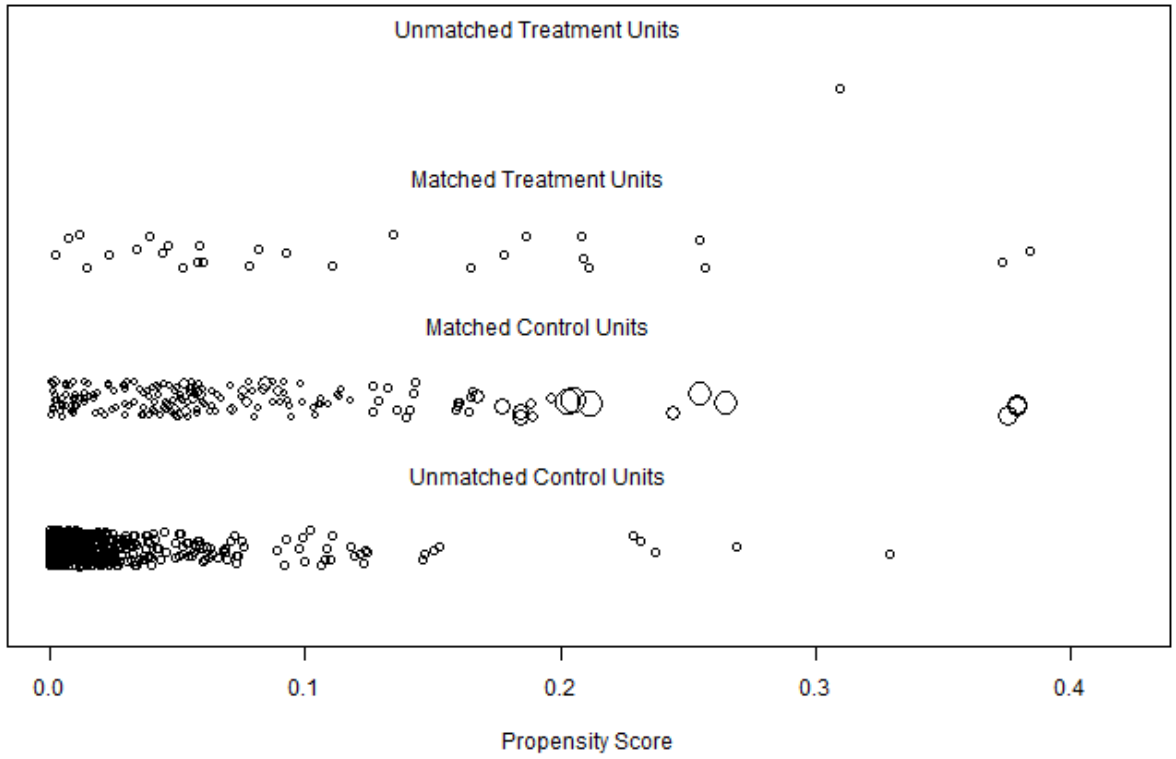
Characteristic	Percentage at baseline: TurnNJ students N = 33	Percentage at baseline: Comparison students in Camden and Newark: After matching N = 256	Percentage at baseline: Comparison students in Camden and Newark: Before matching N = 3,085	*p*-value of difference between TurnNJ and matched comparison students
Female	39.4	41.0	49.6	0.86
Hispanic	9.1	9.8	47.6	0.90
Black	90.9	90.2	46.6	0.90
Eligible for free or reduced-price lunch	90.9	92.6	90.0	0.73
Retained	0.0	0.0	1.1	n.a.
Special education	3.0	4.1	11.4	0.76
English learner	3.0	4.7	13.4	0.67
Chronic absentee	33.3	28.4	6.2	0.56
Took an alternative assessment	3.0	3.9	12.2	0.81
Received a testing accommodation	0.0	0.0	1.1	n.a.

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. Free or reduced-price lunch 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.

n.a. = not applicable.

Figure A.1. Distribution of propensity scores for the Camden grade 4 propensity score model



Note: The dots represent the weight a student has in the analysis. All treatment units (TurnNJ 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 TurnNJ students due to matching with replacement. Smaller dots indicate that multiple comparison students were matched to the same TurnNJ student.

Impact estimates

We estimated the impacts of TurnNJ enrollment using a statistical model that compares the regression-adjusted mean math and English language arts outcomes of the TurnNJ and comparison groups. The model is as follows:

$$y_i = \alpha + \beta X_i + \theta T_i + e_i$$

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 a TurnNJ 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 a TurnNJ 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 (1 to 4 years after enrollment). The impact model did not include any quadratic or interaction terms.

We used the analysis weights generated by the MatchIt package in R to account for the features of the matching design so that the comparison group is weighted to look like the TurnNJ group. Each TurnNJ student and the matched comparison students can be thought of as a group. Within each group, the TurnNJ student is given a weight of 1 and the comparison students are given 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 TurnNJ 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 3rd grade to the end of 4th grade and from the end of 4th grade to the end of 5th grade, averaged (for one-year impacts)—0.54 standard deviations (SDs) in math and 0.38 SDs in ELA
- From the end of 3rd grade to the end of 5th grade and from the end of 4th grade to the end of 6th grade, averaged (for two-year impacts)—0.55 SDs in math and 0.39 SDs in ELA
- From the end of 3rd grade to the end of 6th grade and from the end of 4th grade to the end of 7th grade, averaged (for three-year impacts)—0.49 SDs in math and 0.36 SDs in ELA
- From the end of 3rd grade to the end of 7th grade (for four-year impacts)—0.45 SDs in math and 0.33 SDs in ELA

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Appendix B

Results from the Impact Analysis

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In this appendix, we provide additional details about the results that correspond to Figures 6 and 7 in the results chapter of the report. These results include the statistical significance of the impact estimates using *p*-values, with the traditional threshold of $p < 0.05$. We also 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 TurnNJ enrollment on student achievement.

Detailed results

Tables B.1 and B.2 report the sample sizes, coefficients, standard errors, and *p*-values for the math and English language arts 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 0.98 translates to approximately 1.82 years of math learning for students in 4th, 5th, and 6th grade. We also summarize the results across alternative analyses by showing the percentage that had statistically significant results and the percentage that had impact magnitudes greater than one year of learning. All alternative analyses met these criteria.

Table B.1. TurnNJ 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 analyses with effect size > 1 school year	Percentage of alternative analyses with significant (p < 0.05) result
1 year	814	0.98**	0.08	<0.001	1.82	100	100
2 years	511	0.98**	0.09	<0.001	1.77	100	100
3 years	372	0.72**	0.14	<0.001	1.47	100	100
4 years	267	0.95**	0.17	<0.001	2.12	100	100

Note: This table reports the coefficients from linear regressions of standardized math test scores on an indicator variable for enrollment in a TurnNJ 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 (Camden or Newark), and school year. Regression controls include one year of baseline test scores in math and English language arts, 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 C.1 of Appendix C.

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

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

Table B.2. TurnNJ impacts on English language arts 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 analyses with effect size > 1 school year	Percentage of alternative analyses with significant (p < 0.05) result
1 year	804	0.70**	0.04	<0.001	1.84	100	100
2 years	510	0.82**	0.05	<0.001	2.11	100	100
3 years	363	0.72**	0.10	<0.001	1.99	100	100
4 years	289	0.52**	0.07	<0.001	1.59	100	100

Note: This table reports the coefficients from linear regressions of standardized math test scores on an indicator variable for enrollment in a TurnNJ 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 (Camden or Newark), and school year. Regression controls include one year of baseline test scores in math and English language arts, 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 C.1 of Appendix C.

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

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

Alternate approach to interpreting impact estimates

We recognize that the estimated impacts are not necessarily the true impacts of enrolling in TurnNJ schools; there are inevitable biases in our estimate due to the small sample size and our imperfect ability to match TurnNJ to comparison students. We also acknowledge that *p*-values are frequently misinterpreted (Wasserstein and Lazar 2016; Greenland et al. 2016). To provide additional information on the level of confidence with which we can posit that TurnNJ positively impacted enrolled students, we used an alternate 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.[8] 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 intervention achieving positive effects of different sizes is called the prior evidence. For example, to estimate the probability that TurnNJ 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, and specifically, the frequency of effects greater than 0.50 standard deviations. Under the BASIE approach, effect estimates from a particular study that are 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 TurnNJ were positive at all, the probability that the true impacts were greater than 0.5 standard deviations, and the probability that the true impacts were greater than 1 standard deviation. These probabilities are reported

[8] See Deke and Finucane 2019 for more information on the BASIE approach.

for each of our outcome periods. We show that we are more than 99 percent confident that the true impacts were positive for both math and ELA and for all years, and we are also more than 99 percent confident that the true impacts were greater than 0.5 standard deviations for both subjects in the first two years. This, along with the consistent results from the 10 alternative analyses, provides greater confidence about the large, positive impacts we observed for TurnNJ.

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

Outcome	Estimated impact	Probability that true impact was:		
		Greater than 0 SDs	Greater than 0.5 SDs	Greater than 1 SD
One year after enrollment				
ELA achievement	0.70	>0.99	>0.99	0.00
Math achievement	0.98	>0.99	>0.99	0.05
Two years after enrollment				
ELA achievement	0.82	>0.99	>0.99	0.00
Math achievement	0.98	>0.99	>0.99	0.04
Three years after enrollment				
ELA achievement	0.72	>0.99	0.89	0.00
Math achievement	0.72	>0.99	0.62	0.00
Four years after enrollment				
ELA achievement	0.52	>0.99	0.38	0.00
Math achievement	0.95	>0.99	0.83	0.00

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.

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Appendix C

Alternative Approaches to the Impact Analysis

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In this appendix, we describe the alternative approaches we used to estimate the impacts of enrolling in a TurnNJ school.

Alternative approaches that use the same definition of TurnNJ enrollment

This section provides results for alternative approaches to the same research question as our primary approach. These analyses examine the impacts of attending a TurnNJ school on math and ELA achievement for students enrolling in a TurnNJ school for the first time. Table C.1 describes the purpose of each analysis and explains how it is different from the primary approach. Tables C.2 through C.9 provide the impact estimates from the primary approach and each alternative approach for every subject/year combination.

Table C.1. Description of alternative analyses

Name of approach	Analytic decision that it addresses	How the approach is different from the primary approach[a]
Feeder school restriction	Sample: most restrictive	Restricts the pool of comparison students eligible for matching to only those who attended a baseline school that was also attended by at least one TurnNJ student in the baseline year
Regression model without matching	Sample: least restrictive	Estimates impacts using the benchmark impact model without matching in advance and limiting the comparison group to matched students (comparison group includes all eligible students who did not attend a TurnNJ or other Uncommon school)
Propensity score matching without a caliper	Matching approach: less restrictive	Removes the caliper so that all TurnNJ 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	TurnNJ 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 global distance rather than the distance of individual pairs
Propensity score weighting	Propensity score method: matching vs. weighting	Uses propensity score weighting rather than matching; all eligible TurnNJ and comparison students are included in the sample; TurnNJ students are given 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 English language arts z-score from the prior school year (math for math outcomes and English language arts for English language arts outcomes)
Impact model with equally weighted schools	Impact model weighting: equally weighted schools	Rescales the analysis weights so that the weights within each TurnNJ school sum to 1 and the weights of the students matched to students within each TurnNJ school also sum to 1 (the weights of students from the TurnNJ schools sum to 3 and the weights of students from comparison schools sum to 3)
Impact model with equally weighted cohorts	Impact model weighting: equally weighted cohorts	Rescales the analysis weights so that the weights within each TurnNJ cohort sum to 1 and the weights of the students matched to students within each TurnNJ cohort also sum to 1 (the weights of students from the TurnNJ cohorts sum to 5 and the weights of students from comparison schools sum to 5)

[a] The description column explains the aspect of the sensitivity test that is different from the primary approach. All other aspects of the alternative approach are the same as the primary, as described in the methods section of the report and Appendix A.

Table C.2. TurnNJ impacts on math achievement one year after enrollment, by sensitivity test

Analysis	N	Coefficient	Standard error	*p*-value
Benchmark	814	0.98	0.08	<0.001
Feeder school restriction	666	1.01	0.08	<0.001
Regression model without matching	8,508	0.95	0.11	<0.001
Propensity score matching without a caliper	856	0.93	0.09	<0.001
1:1 propensity score matching	173	0.98	0.06	<0.001
Optimal matching	1,001	0.98	0.08	<0.001
Propensity score weighting	8,508	0.94	0.10	<0.001
Parsimonious impact model	814	0.98	0.08	<0.001
Impact model with equal weighting of schools	814	1.06	0.06	<0.001
Impact model with equal weighting of cohorts	814	0.96	0.07	<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 a TurnNJ 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 (Camden or Newark), and school year.

Table C.3. TurnNJ impacts on English language arts achievement one year after enrollment, by sensitivity test

Analysis	N	Coefficient	Standard error	*p*-value
Benchmark	804	0.70	0.04	<0.001
Feeder school restriction	650	0.72	0.03	<0.001
Regression model without matching	8,508	0.73	0.05	<0.001
Propensity score matching without a caliper	849	0.70	0.04	<0.001
1:1 propensity score matching	177	0.87	0.08	<0.001
Optimal matching	1,001	0.73	0.04	<0.001
Propensity score weighting	8,508	0.70	0.04	<0.001
Parsimonious impact model	804	0.70	0.05	<0.001
Impact model with equal weighting of schools	804	0.73	0.04	<0.001
Impact model with equal weighting of cohorts	804	0.75	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 a TurnNJ 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 (Camden or Newark), and school year.

Table C.4. TurnNJ impacts on math achievement two years after enrollment, by sensitivity test

Analysis	N	Coefficient	Standard error	*p*-value
Benchmark	511	0.98	0.09	<0.001
Feeder school restriction	392	0.98	0.11	<0.001
Regression model without matching	6,112	0.98	0.12	<0.001
Propensity score matching without a caliper	547	0.97	0.12	<0.001
1:1 propensity score matching	117	0.98	0.11	<0.001
Optimal matching	682	0.94	0.11	<0.001
Propensity score weighting	6,112	0.95	0.10	<0.001
Parsimonious impact model	511	0.97	0.10	<0.001
Impact model with equal weighting of schools	511	0.95	0.06	<0.001
Impact model with equal weighting of cohorts	511	0.95	0.05	<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 a TurnNJ 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 (Camden or Newark), and school year.

Table C.5. TurnNJ impacts on English language arts achievement two years after enrollment, by sensitivity test

Analysis	N	Coefficient	Standard error	*p*-value
Benchmark	510	0.82	0.05	<0.001
Feeder school restriction	385	0.80	0.08	<0.001
Regression model without matching	6,139	0.84	0.08	<0.001
Propensity score matching without a caliper	550	0.82	0.05	<0.001
1:1 propensity score matching	117	0.91	0.11	<0.001
Optimal matching	682	0.83	0.06	<0.001
Propensity score weighting	6,139	0.81	0.06	<0.001
Parsimonious impact model	510	0.83	0.06	<0.001
Impact model with equal weighting of schools	510	0.81	0.04	<0.001
Impact model with equal weighting of cohorts	510	0.82	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 a TurnNJ 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 (Camden or Newark), and school year.

Table C.6. TurnNJ impacts on math achievement three years after enrollment, by sensitivity test

Analysis	N	Coefficient	Standard error	*p*-value
Benchmark	372	0.72	0.14	<0.001
Feeder school restriction	284	0.89	0.14	<0.001
Regression model without matching	4,135	0.81	0.18	<0.001
Propensity score matching without a caliper	403	0.83	0.15	<0.001
1:1 propensity score matching	87	0.74	0.09	<0.001
Optimal matching	517	0.76	0.16	<0.001
Propensity score weighting	4,135	0.75	0.15	<0.001
Parsimonious impact model	372	0.72	0.14	<0.001
Impact model with equal weighting of schools	372	0.63	0.09	<0.001
Impact model with equal weighting of cohorts	372	0.63	0.09	<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 a TurnNJ 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 (Camden or Newark), and school year.

Table C.7. TurnNJ impacts on English language arts achievement three years after enrollment, by sensitivity test

Analysis	N	Coefficient	Standard error	*p*-value
Benchmark	363	0.72	0.10	<0.001
Feeder school restriction	272	0.81	0.11	<0.001
Regression model without matching	4,171	0.81	0.14	<0.001
Propensity score matching without a caliper	394	0.76	0.11	<0.001
1:1 propensity score matching	86	0.85	0.12	<0.001
Optimal matching	517	0.76	0.16	<0.001
Propensity score weighting	4,171	0.80	0.14	<0.001
Parsimonious impact model	363	0.71	0.10	<0.001
Impact model with equal weighting of schools	363	0.68	0.08	<0.001
Impact model with equal weighting of cohorts	363	0.68	0.08	<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 a TurnNJ 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 (Camden or Newark), and school year.

Table C.8. TurnNJ impacts on math achievement four years after enrollment, by sensitivity test

Analysis	N	Coefficient	Standard error	*p*-value
Benchmark	267	0.95	0.17	<0.001
Feeder school restriction	177	1.15	0.22	<0.001
Regression model without matching	3,113	1.00	0.17	<0.001
Propensity score matching without a caliper	286	1.04	0.22	<0.001
1:1 propensity score matching	63	0.70	0.12	<0.001
Optimal matching	374	0.97	0.19	<0.001
Propensity score weighting	3,113	1.01	0.18	<0.001
Parsimonious impact model	267	0.98	0.18	<0.001
Impact model with equal weighting of schools	267	0.87	0.11	<0.001
Impact model with equal weighting of cohorts	267	0.87	0.11	<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 a TurnNJ 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 (Camden or Newark), and school year.

Table C.9. TurnNJ impacts on English language arts achievement four years after enrollment, by sensitivity test

Analysis	N	Coefficient	Standard error	*p*-value
Benchmark	289	0.52	0.07	<0.001
Feeder school restriction	190	0.65	0.07	<0.001
Regression model without matching	3,120	0.66	0.04	<0.001
Propensity score matching without a caliper	315	0.71	0.07	<0.001
1:1 propensity score matching	66	0.75	0.16	<0.001
Optimal matching	385	0.58	0.07	<0.001
Propensity score weighting	3,120	0.64	0.05	<0.001
Parsimonious impact model	289	0.54	0.07	<0.001
Impact model with equal weighting of schools	289	0.51	0.07	<0.001
Impact model with equal weighting of cohorts	289	0.51	0.07	<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 a TurnNJ 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 (Camden or Newark), and school year.

Alternative approach that uses a different definition of TurnNJ enrollment

To better understand the impacts of TurnNJ enrollment on a more inclusive group of TurnNJ students, we also conducted an analysis that included (1) students who enrolled in the TurnNJ elementary schools in the first years they opened, (2) students who enrolled in a TurnNJ school for the first time in middle school, and (3) students who enrolled in the TurnNJ middle school and had previously attended a TurnNJ elementary school during the 2015-2016 school year or later. The goal of this analysis was to examine TurnNJ's impacts for a sample that was as inclusive as possible of all students enrolling in a TurnNJ school.

The additional students who attended a TurnNJ elementary school and subsequently enrolled in 5th grade at CPMMS in the 2016–2017, 2017–2018, or 2018–2019 school years did not have baseline math and ELA test scores that were measured before enrollment in any TurnNJ schools. These students were matched to comparison students in Camden who had similar baseline achievement and demographic characteristics but did not enroll in CPMMS.

Tables C.10 and C.11 present findings from this alternative approach. The impacts of TurnNJ enrollment on this larger sample of students were positive and significant for both math and ELA one, two, three, and four years after enrollment. The magnitudes of the impacts were smaller relative to our primary analysis, which included only students enrolling in TurnNJ schools who had baseline math and ELA test scores that were measured before enrollment in any TurnNJ or other Uncommon school. This alternative analysis likely underestimates the cumulative impact of TurnNJ enrollment because it does not account for the impacts of attending a TurnNJ elementary school before enrolling in a TurnNJ middle school.

Table C.10. TurnNJ impacts on math achievement for new students and students with prior exposure to Uncommon, by years after enrollment

Number of years after enrollment	N	Coefficient	Standard error	*p*-value
1 year	1,678	0.46	0.13	<0.001
2 years	983	0.50	0.19	0.012
3 years	535	0.57	0.16	<0.001
4 years	272	0.90	0.15	<0.001

Note: This table reports the coefficients from linear regressions of standardized math test scores on an indicator variable for enrollment in a TurnNJ 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 (Camden or Newark), and school year.

Table C.11. TurnNJ impacts on English language arts achievement for new students and students with prior exposure to Uncommon, by years after enrollment

Number of years after enrollment	N	Coefficient	Standard error	*p*-value
1 year	1,687	0.31	0.08	<0.001
2 years	979	0.47	0.12	<0.001
3 years	533	0.49	0.20	0.015
4 years	294	0.56	0.06	<0.001

Note: This table reports the coefficients from linear regressions of standardized math test scores on an indicator variable for enrollment in a TurnNJ 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 (Camden or Newark), and school year.

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Appendix D

Implementation Fidelity Analysis

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In keeping with the requirements of the i3 grant and to provide context for interpreting the estimates of the TurnNJ model's effectiveness, we measured the fidelity with which the key components of the Uncommon school model were implemented in the four TurnNJ schools supported by the grant. Specifically, we examined the fidelity of implementation of the six components identified in the logic model: (1) college preparatory mission, (2) high standards for academics and character, (3) highly structured learning environment, (4) longer school day and longer school year, (5) focus on accountability and data-driven instruction, and (6) faculty of committed and talented leaders and teachers (Figure 1).

Component measures

To measure the implementation of each component, we used two main data sources (Table D.1). First, we collected data for the 2018–2019 and 2019–2020 school years from an annual staff survey administered to staff in Uncommon schools. Our analysis included responses from school instructional staff in the four TurnNJ schools and all other elementary and middle schools in Uncommon's New Jersey regions (455 educators in 14 schools during the 2018–2019 school year and 477 educators in 15 schools during the 2019–2020 school year), aggregated to the school level. We used single survey items to measure college preparatory mission and focus on accountability and data-driven instruction. We constructed composite measures using multiple survey items for three components: high standards for academics and character, highly structured learning environment, and faculty of committed and talented leaders and teachers. Composite measures were constructed as simple averages of the values for each survey item. We used principal components analysis to confirm that each composite was unidimensional and computed the standardized Cronbach's alpha to confirm that each measure was internally consistent, or reliable.

We also collected bell times and academic calendars for the four TurnNJ schools and all other elementary and middle schools in Uncommon's New Jersey regions for the 2018–2019 and 2019–2020 school years. We used these data to construct a measure of annual instructional time for each school.

All component measures relied on extant data and were not intended to be comprehensive measures of each component of the Uncommon school model. Rather, the measures attempted to capture characteristics of the school environment that align conceptually with each component.

Table D.1. Measures of Uncommon school model components

Uncommon school model component	Measure	Cronbach's alpha[a]
College preparatory mission	Single school staff survey item: 1. School staff share a mission to prepare all students to succeed in college.	n.a.
High standards for academics and character	Composite of school staff survey items: 1. My principal keeps the school focused on student achievement and conveys a sense of urgency. 2. My primary instructional leader helps me internalize/plan my lesson plans and prepare for quality instruction. 3. My primary instructional leader meets with me at least 2–3 times per month to give me feedback on my instruction, plan for the upcoming week, or do a general check-in. 4. My primary instructional leader gives me quality support and feedback that improves my ability to raise student achievement.	0.94
Highly structured learning environment	Composite of school staff survey items: 1. Operational systems at my school run smoothly and maximize the time students spend learning. 2. I believe that the school's code of conduct and discipline systems make every attempt to minimize time spent by teachers on disciplinary matters. 3. The school's dean of students is effective in managing the school culture and discipline systems.	0.81
Longer school day and longer school year	Instructional hours per year, constructed using school bell times and academic calendars	n.a.
Focus on accountability and data-driven instruction	Single school staff survey item: 1. My primary instructional leader helps me to use data to drive instruction and raise student achievement.	n.a.
Faculty of committed and talented teachers and leaders	Composite of school staff survey items: 1. This school year, I have had opportunities at work to learn and grow. 2. There is at least one person on the school's leadership team who encourages my development. 3. I am comfortable going to one of my school leaders to raise concerns. 4. I know what is expected of me in order to be successful at work. 5. Staff morale at the school is positive. 6. In the last month, my principal and/or director of operations recognized or praised my work. 7. Overall, I am satisfied at my school.	0.95

Note: All survey items asked the respondent to provide a rating on a Likert scale of agreement between 1 and 5, where 1 indicated strong disagreement with the statement, 2 indicated disagreement with the statement, 3 indicated neither agreement nor disagreement with the statement, 4 indicated agreement with the statement, and 5 indicated strong agreement with the statement.

[a] For all three composite measures, the alphas exceeded the conventional standard for reliability of greater than 0.7.

n.a. = not applicable.

Fidelity assessment

To assess whether the TurnNJ schools implemented each component with fidelity, we used non-TurnNJ Uncommon elementary and middle schools in New Jersey (10 schools in 2018–2019 and 11 schools in 2019–2020) as a benchmark for the Uncommon model. For each component, we first compared the mean value for each of the four TurnNJ schools to the mean value for all non-TurnNJ Uncommon elementary and middle schools in New Jersey. We considered a TurnNJ school to have implemented the component with fidelity if the school mean equaled or exceeded the non-TurnNJ Uncommon mean. We then calculated the percentage of TurnNJ schools that met this standard for implementing the component with fidelity.

We found that during the 2018–2019 school year, the three TurnNJ schools operating during that time period and included in the impact analysis implemented five of six components of the Uncommon school model with fidelity (Table D.2). This finding suggests that the estimated impacts on students reflect the impacts of the TurnNJ project as intended. During the 2019–2020 school year, only two of the six components met our standards for implementation fidelity. However, in both years, a majority of the TurnNJ schools had mean values similar to the mean values of other Uncommon schools across all components (Tables D.3 and D.4). For each component, a majority of TurnNJ schools had a value within at least three-tenths of the Uncommon mean on measures using a 5-point scale. In addition, for most components, all TurnNJ schools had a value within the range of values for non-TurnNJ schools in the Uncommon network. (The results are similar when we include all four TurnNJ schools operating during the 2018–2019 and 2019–2020 school years.)

Table D.2. Percentage of TurnNJ schools implementing with fidelity, by key component and school year

Key components of TurnNJ school model	2018–2019		2019–2020	
	Percentage of schools implementing with fidelity[a]	Met fidelity threshold[b]	Percentage of schools implementing with fidelity[a]	Met fidelity threshold[b]
College preparatory mission	67	Yes	33	No
High academic and character standards	67	Yes	67	Yes
Highly structured learning environment	33	No	33	No
Longer school day and year	100	Yes	100	Yes
Accountability and data-driven instruction	67	Yes	33	No
Committed and talented leaders and teachers	67	Yes	33	No

Source: Uncommon staff surveys administered in the 2018–2019 and 2019–2020 school years. School-level means were calculated as a simple average of staff survey responses. Staff response rates ranged from 90 to 94 percent, so nonresponse weights were not used.

[a] TurnNJ school is implementing a key component of the Uncommon school model with fidelity if the school mean equals or exceed the Uncommon network mean.

[b] Meeting the fidelity threshold indicates that at least 60 percent of schools are implementing the key component with fidelity.

Table D.3. Implementation of the Uncommon school model during the 2018–2019 school year, by school and key component

Key components of TurnNJ school model	Uncommon network mean (range)[a]	TurnNJ school A mean	TurnNJ school B mean	TurnNJ school C mean
College preparatory mission (single item, 1–5 scale)	4.6 (4.2-5.0)	4.6	4.8	4.5
High academic and character standards (composite measure, 1–5 scale)	4.3 (3.8-4.8)	4.6	4.4	3.7
Highly structured learning environment (composite measure, 1–5 scale)	4.1 (3.6-4.7)	3.8	4.7	3.6
Accountability and data-driven instruction (single item, 1–5 scale)	4.3 (4.0-4.9)	4.3	4.4	3.9
Committed and talented leaders and teachers (composite measure, 1–5 scale)	4.4 (3.8-4.8)	4.5	4.6	3.8

Source: Uncommon staff surveys administered in the 2018–2019 school year. School-level means were calculated as a simple average of staff survey responses. Staff response rates ranged from 90 to 94 percent, so nonresponse weights were not used.

Note: The table does not include one component, longer school day and year, because school day length and year were consistent across all elementary schools in New Jersey and across all middle schools in New Jersey, including the TurnNJ schools. During the 2018–2019 school year, elementary school instructional time totaled approximately 1,710 hours, and middle school instructional time totaled approximately 1,777 hours.

[a] Includes all elementary and middle schools operating in New Jersey as part of the Uncommon network during the 2018–2019 school year.

Table D.4. Implementation of the Uncommon school model during the 2019–2020 school year, by school and key component

Key components of TurnNJ school model	Uncommon network mean (range)[a]	TurnNJ school A mean	TurnNJ school B mean	TurnNJ school C mean
College preparatory mission (1–5 scale)	4.6 (4.1-4.9)	4.5	4.9	4.2
High academic and character standards (1–5 scale)	4.4 (3.9-4.8)	4.3	4.7	3.9
Highly structured learning environment (1–5 scale)	4.2 (3.0-4.8)	3.9	4.5	4.0
Accountability and data-driven instruction (1–5 scale)	4.4 (3.9-4.8)	4.5	4.7	3.8
Committed and talented leaders and teachers (1–5 scale)	4.4 (4.2-4.7)	4.2	4.7	4.2

Source: Uncommon staff surveys administered in the 2019–2020 school year. School-level means were calculated as a simple average of staff survey responses. Staff response rates ranged from 90 to 94 percent, so nonresponse weights were not used.

Note: The table does not include one component, longer school day and year, because school day length and year were consistent across all elementary schools in New Jersey and across all middle schools in New Jersey, including the TurnNJ schools. During the 2019–2020 school year, elementary school instructional time totaled 9 hours per day before pandemic-related closures and 8.25 hours per day after pandemic-related closures, with a total school year length of 190 days. Middle school instructional time totaled 9 hours per day before pandemic-related closures and 8.5 hours per day after pandemic-related closures, with a total school year length of 185 days.

[a] Includes all elementary and middle schools operating in New Jersey as part of the Uncommon network during the 2019–2020 school year.

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