

Charter School Performance in New York City

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Acknowledgements

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Introduction

Across the country, charter schools occupy a growing position in the public education landscape. Heated debate has accompanied their existence since their start in Minnesota two decades ago. Similar debate has occurred in New York City as well, with charter advocates extolling such benefits of the sector as expanding parental choice and introducing market-based competition to education. Little of that debate, however, is grounded in hard evidence about their impact on student outcomes. This report contributes to the discussion by providing evidence for charter students' performance in New York City for six years of schooling, beginning with the 2005-2006 school year and concluding in 2010-2011.

With the cooperation of the New York State Education Department (NYSED), CREDO obtained the historical sets of student-level administrative records. The support of NYSED staff was critical to CREDO's understanding of the character and quality of the data we received. However, it bears mention that the entirety of interactions with the Department dealt with technical issues related to the data. CREDO has developed the findings and conclusions independently.

This report provides the second in-depth examination of the results for charter schools in New York City by CREDO. Although New York City data was not made available to us for inclusion in the CREDO national charter school study from 2009, a citywide report was published in 2010.¹ This report has two main benefits. First, it provides an updated rigorous and independent view of the city's charter schools. Second, the study design is consistent with CREDO's reports on charter school performance in other locations, making the results amenable to being benchmarked against those nationally and in other locations.

The analysis presented here takes two forms. We first present the findings about the effects of charter schools on student academic performance. These results are expressed as the results that a typical charter school student in New York City would realize. The second set of findings is presented at the school level. Because schools are the instruments on which the legislation and public policy works, it is important to understand the range of performances for schools. These findings look at the performance of students by school and present school average results.

¹ CREDO. *Multiple Choice: Charter School Performance in 16 States* (2009). *Charter School Performance in New York City* (2010). Both are available at: <http://credo.stanford.edu>.

Compared to the educational gains that charter students would have realized in a traditional public school (TPS), the analysis shows that students in New York City charter schools on average make larger learning gains in both reading and mathematics. At the school level, 22 percent of the charter schools have significantly more positive learning gains than their TPS counterparts in reading, while 25 percent of charter schools have significantly lower learning gains. In math, nearly 63 percent of the charter schools studied outperform their TPS peers while approximately 14 percent perform worse.

Study Approach

This study of charter schools in New York City focuses on the academic progress of their enrolled students. Whatever else charter schools may provide their students, their contributions to their students' readiness for secondary education, high school graduation and post-secondary life remains of paramount importance. Indeed, if charter schools do not succeed in forging strong academic futures for their students, other outcomes of interest, such as character development or non-cognitive skills, cannot compensate. Furthermore, current data limitations prevent the inclusion of non-academic outcomes in this analysis.

This citywide analysis uses the Virtual Control Record (VCR) methodology that has been used in previous CREDO publications.² The approach is a quasi-experimental study design with matched student records that are followed over time. The current analysis begins with the general question of whether in the aggregate students in New York City charter schools outperform their TPS counterparts. This general question is then extended to consider whether the observed charter school performance is consistent when the charter school population is disaggregated along a number of dimensions, such as race/ethnicity, geographic location and so on. Answers to all these questions require that we ensure that the contribution of the schools – either the charter schools or the TPS schools – is isolated from other potentially confounding influences. For this reason, these analyses include an array of other variables whose purpose is to prevent the estimate of charter schooling to be tainted by other effects. In its most basic form, the analysis included controls for the student characteristics, such as standardized starting score, race/ethnicity, special education, free or reduced lunch program participation, English proficiency, grade level and grade retention.

² CREDO. *Multiple Choice: Charter School Performance in 16 States* (2009). Davis, Devora H. and Margaret E. Raymond. Choices for Studying Choice: Assessing Charter School Effectiveness Using Two Quasi-experimental Methods. *Economics of Education Review* 31, no. 2 (2012): 225-236. For the interested reader, links to these reports are available at <http://credo.stanford.edu>.

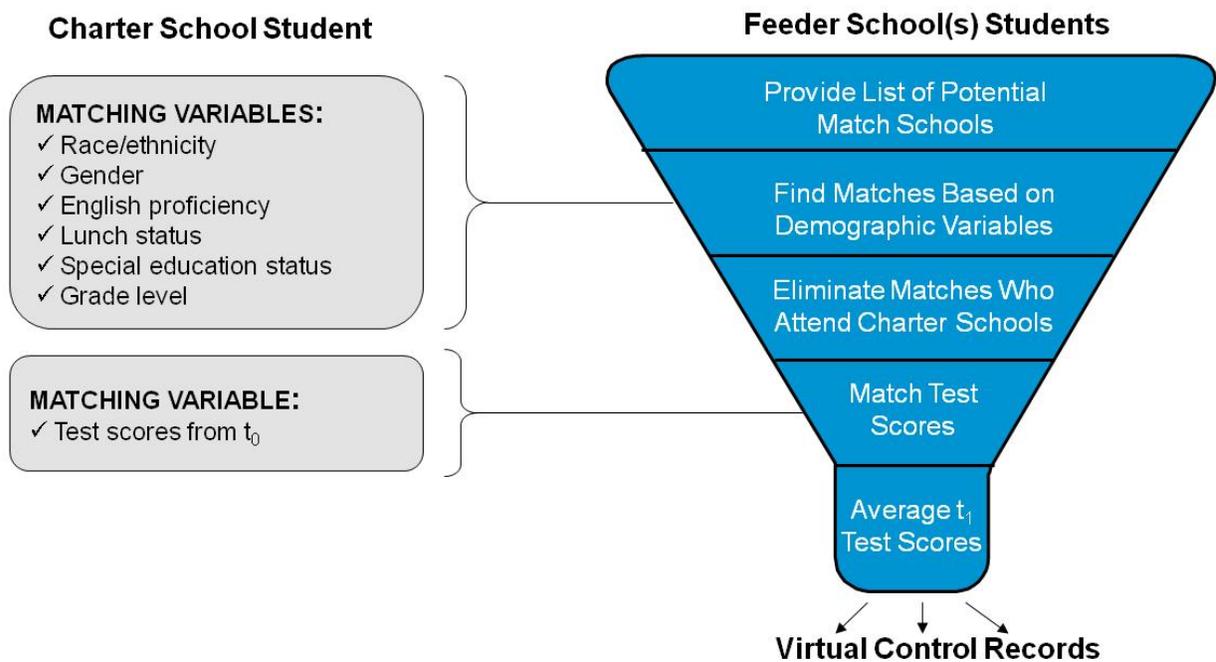
To create a reliable comparison group for our study, we attempted to build a VCR for each charter school student. A VCR is a synthesis of the actual academic experience of students who are identical to the charter school students, except for the fact that they attend a TPS that the charter school students would have attended if not enrolled in their charter school. We refer to the VCR as a 'virtual twin' because it takes the experience of multiple 'twins' and creates a single synthesis of their academic performance to use as the counterfactual to the charter school student's performance.

Our approach is displayed in Figure 1. We identify all the traditional public schools whose students transfer to a given charter school; each of these schools is a "feeder school." Once a TPS qualifies as a feeder school, all the students in the school become potential matches for a student in a particular charter school. All the student records from all the feeder schools are pooled – this becomes the source of records for creating the virtual match. Using the records of the students in those schools in the year prior to the test year of interest (t_0), CREDO selects all of the available TPS students that match each charter school student.

Match factors include:

- Grade-level
- Gender
- Race/Ethnicity
- Free or Reduced Price Lunch Status
- English Language Learner Status
- Special Education Status
- Prior test score on state achievement tests

Figure 1: CREDO Virtual Control Record Methodology



At the point of selection as a VCR-eligible TPS student, all candidates are identical to the individual charter school student on all observable characteristics, including prior academic achievement. The focus then moves to the subsequent year, t_1 . The scores from this test year of interest (t_1) for as many as seven VCR-eligible TPS students are then averaged and a Virtual Control Record is produced. The VCR produces a score for the test year of interest that corresponds to the expected gains a charter student would have realized if he or she had attended one of the traditional public schools that would have enrolled the charter school's students. The VCR provides the counterfactual "control" experience for this analysis.

For the purposes of this report, the impact of charter schools on student academic performance is estimated in terms of academic growth from one school year to the next. This increment of academic progress is referred to by policy makers and researchers as a "growth score" or "learning gains" or "gain scores." Using statistical analysis, it is possible to isolate the contributions of schools from other social or programmatic influences on a student's growth. Thus, all the findings that follow are measured as the average one-year growth of charter schools, relative to the VCR-based comparison.

With six years of student records in New York City, it is possible to create five periods of academic growth. One growth period needs a "starting score," (i.e., the achievement test result from the spring of one year) and a "subsequent score", (i.e., the test score from the following spring) to create a growth score. To simplify

the presentation of results, each growth period is referred to by the year in which the second spring test score is obtained. For example, the growth period denoted "2008" covers academic growth that occurred between the end of the 2006-2007 and the end of the 2007-2008 school years. Similarly, the time period denoted "2011" corresponds to the year of growth between the 2009-2010 and 2010-2011 school years.

With six years of data, and six tested grades (3rd - 8th) as well as three end-of-course exams in math (EOCs), there are over 40 different sets of data each for reading and math; each subject-grade-year group of scores (or, in the case of EOCs, subject-year group) has slightly different mid-point averages and distributions. The analysis is helped by transforming the test scores for all these separate tests into a common measurement. All test scores have been converted to "bell curve" standardized scores so that year-to-year computations of growth can be made.³

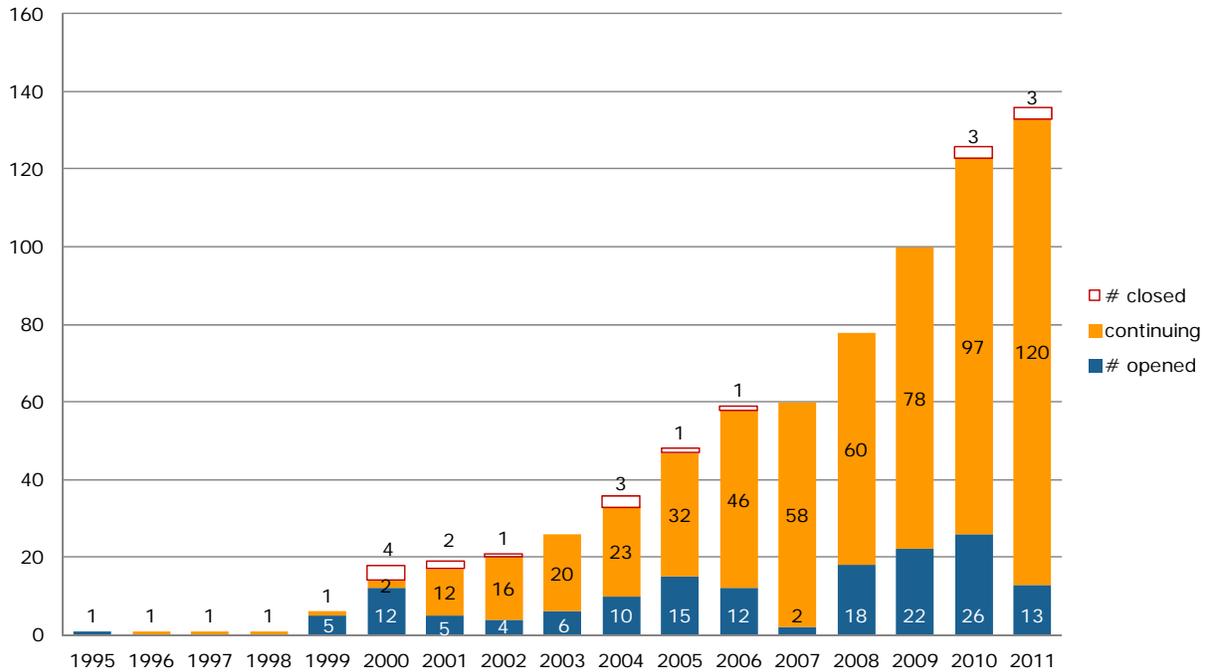
When scores are thus standardized into z-scores, every student is placed relative to his peers in his own city. A z-score of zero, for example, denotes a student at the 50th percentile in that city, while a z-score one standard deviation above that equates to the 84th percentile. Students who maintain their relative place from year to year would have a growth score of zero, while students who make larger gains relative to their peers will have positive growth scores. Conversely, students who make smaller academic gains than their peers will have negative growth scores in that year.

³ For each subject-grade-year set of scores, scores are centered around a standardized midpoint of zero, which corresponds to the actual average score of the test before transformation. Then each score of the original test is recast as a measure of deviation around that new score of zero, so that scores that fell below the original average score are expressed as negative numbers and those that were larger are given positive values. These new values are assigned so that in every subject-grade-year test, 68 percent of the former scores fall within a given distance, known as the standard deviation.

New York City Charter School Demographics

The New York City charter school sector has grown markedly since its inception in 1995. Figure 2 below notes the new, continuing and closed charter school campuses from the fall of 1995 to the fall of 2011.

Figure 2: Opened and Closed Charter Campuses, 1995-2011



According to the National Center for Education Statistics (NCES), there were 98 charter schools open in New York City in the 2009-2010 school year.⁴ Because charter schools are able to choose their location, the demographics of the charter sector may not mirror that of the TPS sector as a whole. Further, charter schools create a degree of sorting through their offer of different academic programs and alternate school models. In addition, parents and students who choose to attend charter schools select schools for a variety of reasons such as location, school safety, school size, academic focus or special interest programs. The cumulative result of all these forces is that the student populations at charters and their TPS feeders may differ. Table 1 below compares the student populations of all New York City’s traditional public schools, the charters’ feeder schools, and the charter schools themselves.

⁴ This was the most recent year available from the NCES Common Core of Data Public School Universe at the time this report was being prepared.

Table 1: Demographic Comparison of Students in TPS, Feeders and Charters

	TPS	Feeders	Charters
Number of schools	1530	759	98
Average enrollment per school	663	705	300
Total number of students enrolled	1,013,948	534,904	29,370
Students in Harlem	3%	4%	23%
Students in Poverty	74%	79%	74%
English Language Learners	14%	16%	5%
Special Education Students	17%	17%	12%
White Students	16%	13%	3%
Black Students	29%	33%	62%
Hispanic Students	39%	44%	31%
Asian/Pacific Islander Students	15%	10%	2%
Native American Students	0.4%	0.4%	0.2%

Table 1 above shows that, with the exception of students in poverty, the demographic profile of charter schools is quite different from that of the public school population in New York City as a whole. Charter schools have more Black students and fewer white, Hispanic and Asian/Pacific Islander students than the public school population in New York City as a whole. The feeder school populations would be expected to more closely align demographically, but the same demographic differences persist.

There has been considerable attention paid to the share of students in charter schools who are receiving Special Education services or who are English Language Learners. As shown in Table 1, a lower proportion of New York City's charter school population is designated as special education compared to all TPS, and this proportion is also lower than that of the feeder TPS population. The cause of this difference is unknown. Parents of children with special needs may believe that the TPS sector is better equipped to educate their children and therefore will be less likely to opt out for a charter. An alternate possibility is that charter schools and traditional public schools have different criteria for categorizing special education.

In the aggregate, charter schools enroll a smaller share of English language learners than the feeder schools and all of TPS. As with Special Education students, it is not possible to discern the underlying causes for these figures.

Table 2: Demographic Composition of Charter Students in the Study

Student Group	All Charter Students Tested		Matched Charter Students	
	Number	Percent	Number	Percent
New York Charter Students	22,505		19,534	
% Matched	19,534	87%		
Students attending Charter Schools in Harlem	5,472	24%	4,558	23%
Black Students	13,980	62%	12,247	63%
Hispanic Students	7,257	32%	6,368	33%
White Students	705	3%	557	3%
Students in Poverty	17,862	79%	16,400	84%
Special Education Students	3,139	14%	2,284	12%
English Language Learners	953	4%	702	4%
Grade Repeating Students	640	3%	123	1%

NOTE: The appendix includes additional descriptive demographics.

For this analysis, a total of 19,534 charter school students (with 39,585 observations across 5 growth periods) from 79 charter schools are followed for as many years as data are available.⁵ The students are drawn from Grades 3 – 8, since these are the continuous grades that are covered by the state achievement testing program for reading and math. High school students are also included in math whenever they take the end-of-course exam sequence in consecutive years, e.g., Algebra I in 9th grade and Geometry or Algebra II in 10th grade. An identical number of virtual comparison records are included in the analysis. In New York City, it was possible to create virtual matches for 87 percent of the tested charter school students in both reading and math. This proportion assures that the results

A Roadmap to the Graphics

The graphics in this report have a common format.

Each graph presents the average performance of charter students relative to their **pertinent comparison student**. The reference group differs depending on the specific comparison. Where a graph compares student subgroup performance, the pertinent comparison student is the same for both subgroups. Each graph is labeled with the pertinent comparison group for clarity.

The **height** of the bars in each graph reflects the magnitude of difference between traditional public school and charter school performance over the period studied.

Stars are used to reflect the level of statistical significance of the difference between the group represented in the bar and its comparison group; the absence of stars means that the schooling effect is not statistically different from zero.

Comparisons of the **performance of similar student subgroups** contain an additional test of the absolute difference between the charter school subgroup and their comparison VCRs. Where a charter school student subgroup has learning gains that are statistically significantly different, the bars have a gradient shade.

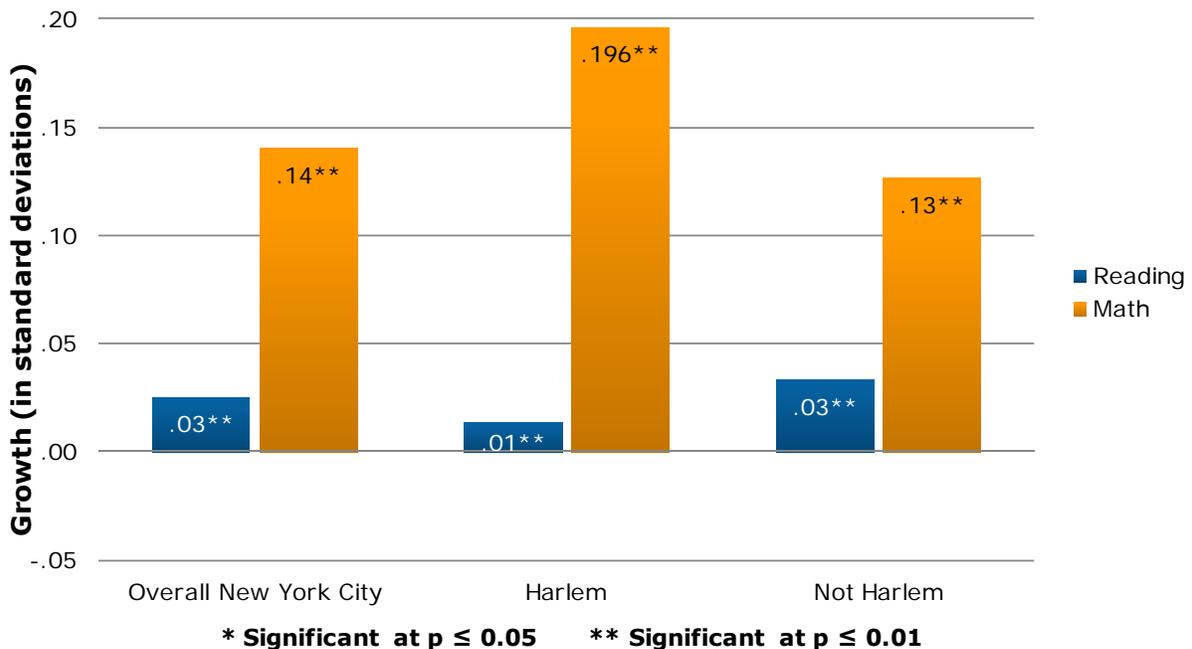
⁵ Schools that have opened recently or that have only recently begun serving tested grades will not have five growth periods of experience to include.

reported here can be considered indicative of the overall performance of charter schools in the city. The total number of observations is large enough to be confident that the tests of effect will be sensitive enough to detect real differences between charter school and TPS student performance at the statistically acceptable standard of $p < .05$. This is also true for each student subgroup examined, with the possible exception of grade-repeating students, as can be seen in Table 2 above.

Overall Charter School Impact

First, we examine whether charter schools differ overall from traditional public schools in how much their students learn, holding other factors constant. To answer this question, we average the pooled performance for all charter school students across all the growth periods and compare it with the same pooled performance of the VCRs. The result is a measure of the average one-year learning of charter school students compared to the average growth for VCRs in the city. The results appear in Figure 3. On average, students in New York City charter schools learned significantly more than their virtual counterparts in reading and mathematics.

Figure 3: Average Learning Gains in New York City Charter Schools, 2007-2011 Compared to Gains for VCR Students in Each Charter Schools' Feeder TPS



When we investigate the learning impacts of Harlem separately, we find that the results there differ from the citywide findings. In reading, charter schools in Harlem have a smaller impact on learning gains than overall or other neighborhoods in New York City. The reverse is true in math; students in Harlem charter schools have larger learning gains than students at charters elsewhere in the city.

The data is analyzed in units of standard deviations of growth so that the results will be statistically correct. These units, unfortunately, do not have much meaning for the average reader. Transforming the results into more accessible units is challenging and can be done only imprecisely. Therefore, Table 3 below, which presents a translation of various outcomes, should be interpreted cautiously.⁶

Table 3: Transformation of Average Learning Gains

Growth (in standard deviations)	Gain (in months of learning)
0.00	0.0
0.05	1.8
0.10	3.6
0.15	5.4
0.20	7.2
0.25	9.0
0.30	10.8
0.35	12.6

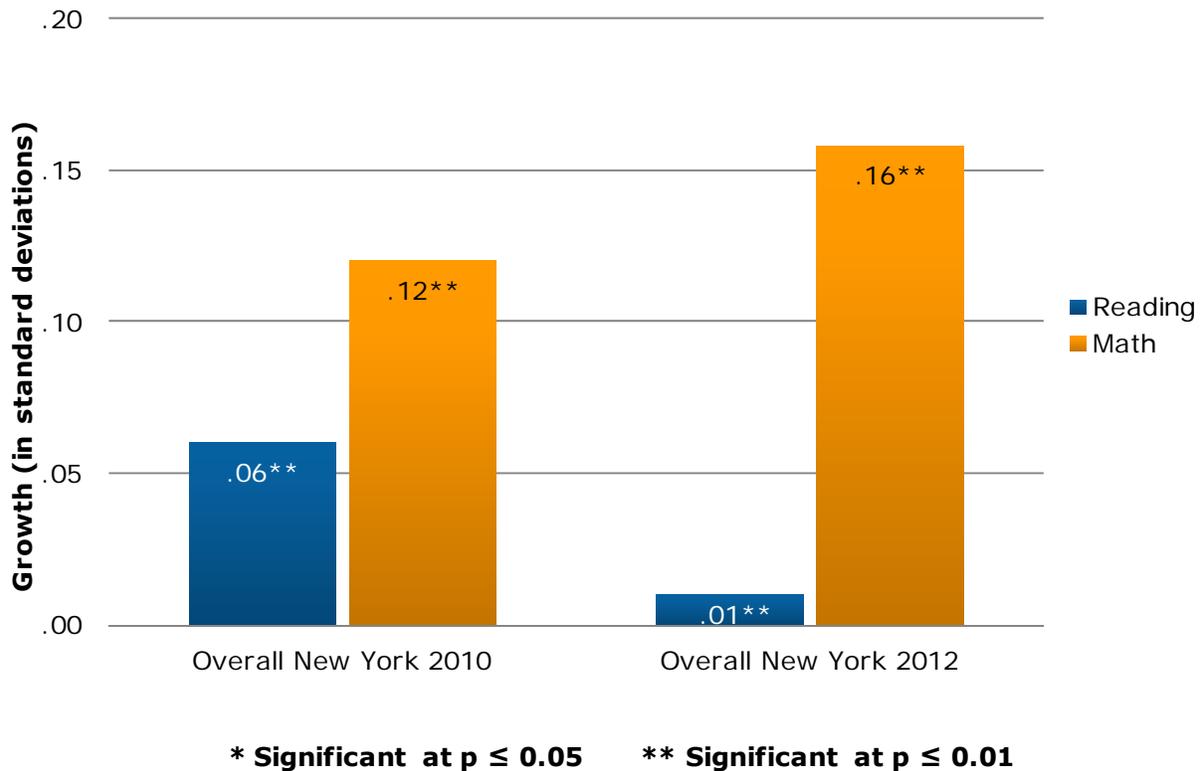
Using the results from Figure 3 and the transformations from Table 3, we can see that, on average, charter students in New York City gain an additional one month of learning in reading over their TPS counterparts per year of schooling. In math, the advantage for charter students is about five months of additional learning in one school year. Charter students in Harlem gain an additional seven months in math, but less than a full additional month in reading.

⁶ Hanushek, Eric A. and Steven G. Rivkin. Teacher quality. In *Handbook of the Economics of Education*, Vol. 2, ed. EA Hanushek, F Welch, (2006): 1051–1078. Amsterdam: North Holland.

Charter School Impact with 2010 Cohort

Because the charter school market is dynamic, new schools have opened since the previous report. To create an apples-to-apples comparison between the two reports, the subset of schools from the 2010 report were re-analyzed using only data released since the previous report. Both these and the 2010 results are shown in Figure 4.⁷

Figure 4: Original and Updated Impacts with the 2010 Charter School Cohort



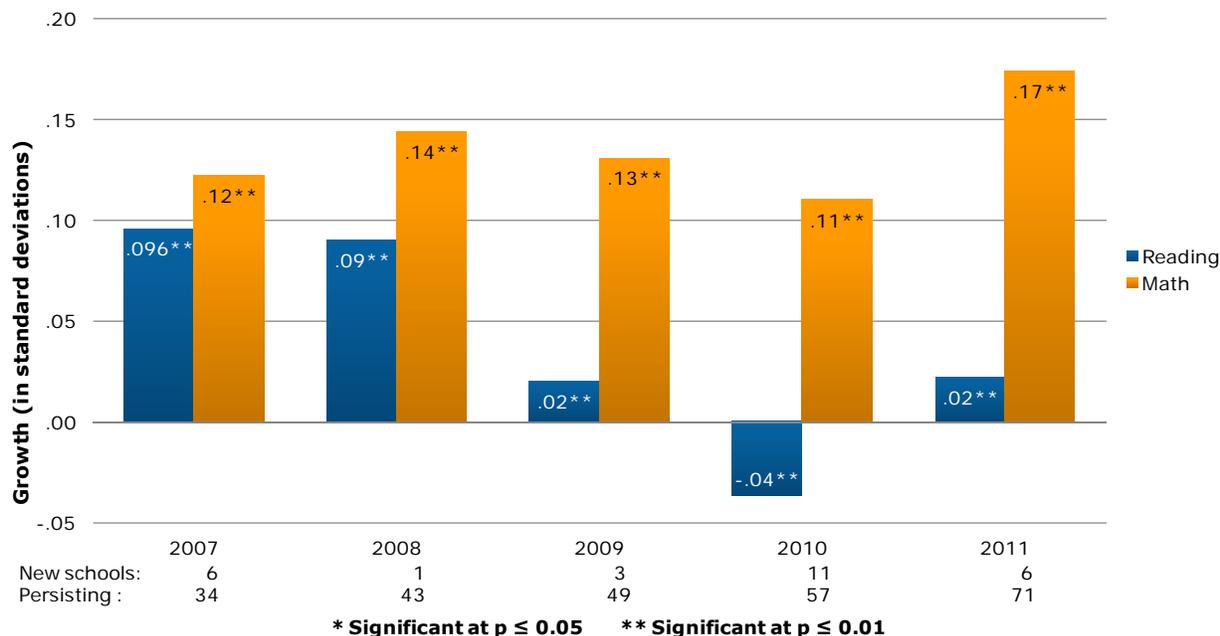
In the previous report, students from the 2010 charter school cohort learned significantly more than their TPS counterparts in reading and math. In more recent growth periods, charter students at these same schools also learn significantly more than their TPS peers in both reading and math. The updated reading effect size is smaller than the first report, but for math, the updated effect size is larger than the earlier finding.

⁷ CREDO. *Charter School Performance in New York City (2010)*. Available at <http://credo.stanford.edu>. The 2010 New York City report included data from the 2003-04 school year through the 2008-09 school year.

Charter School Impact by Growth Period

To determine whether performance remained consistent over all the periods of this study, the average charter school effects were disaggregated into the five growth periods. Results are shown in Figure 5 along with the number of newly opened and persisting schools for each growth period.

Figure 5: Impact by Growth Period, 2007-2011



While the results in math were consistent across all five periods, reading results were a different and somewhat puzzling story. After two periods of strong reading results for charter students compared to their TPS peers, the charter impact dropped sharply in 2009 and became negative in 2010. This is the only year analyzed in which the charter impact on reading was negative and significant. Further analysis was done to try to determine the underlying cause for this anomaly in the reading results. We had two hypotheses: 1) underperformance of new charter schools could be dragging down the results in 2010, or 2) TPS student growth increased sharply that year. Investigating the first hypothesis revealed that new charter schools did partially account for the results, but that the results for persisting charters also dipped substantially in 2010.⁸ A performance dip was also

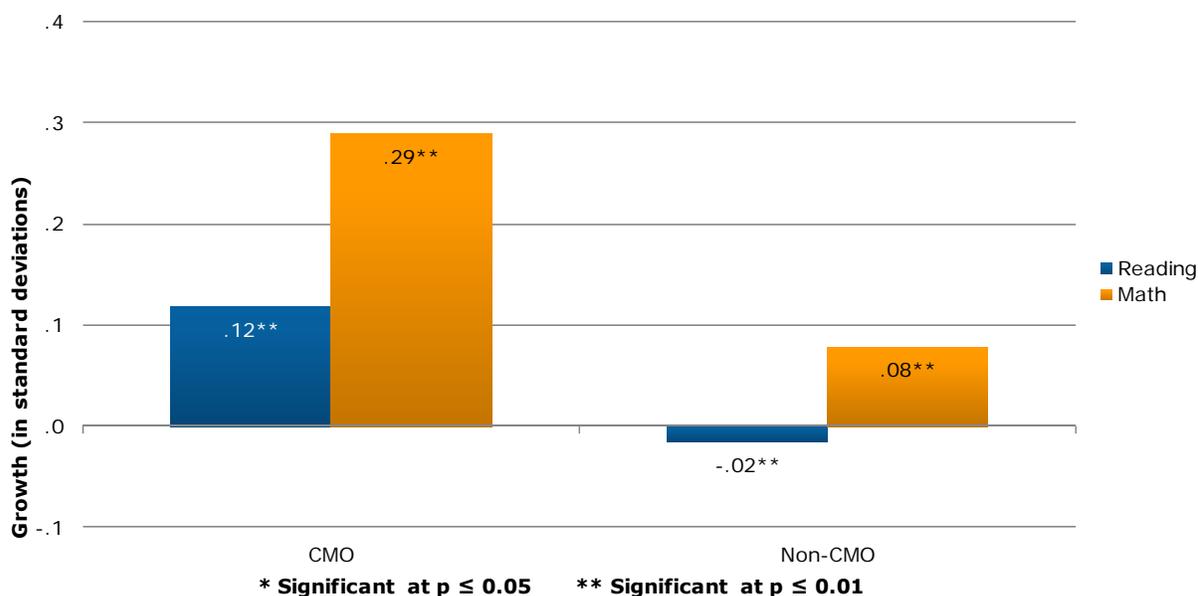
⁸ Note that new charters have negative impacts in every time period, but persisting charters have negative impacts only in the 2010 growth period. Additionally, the results are negative in 2010 for the older cohort of schools that appeared in the earlier report as well as the new cohort of schools whose results are included in this report.

seen in the corresponding TPS results, although this decrease in learning gains was less sharp than in the charter sector.

Charter School Impact by CMO Affiliation

The growth of charter management organizations (CMOs), which directly operate charter schools within a network of affiliated schools, has accelerated in recent years. Figure 6 below shows the charter impacts for students at schools that are part of a CMO and schools with no CMO affiliation.⁹

Figure 6: Impact by CMO Affiliation



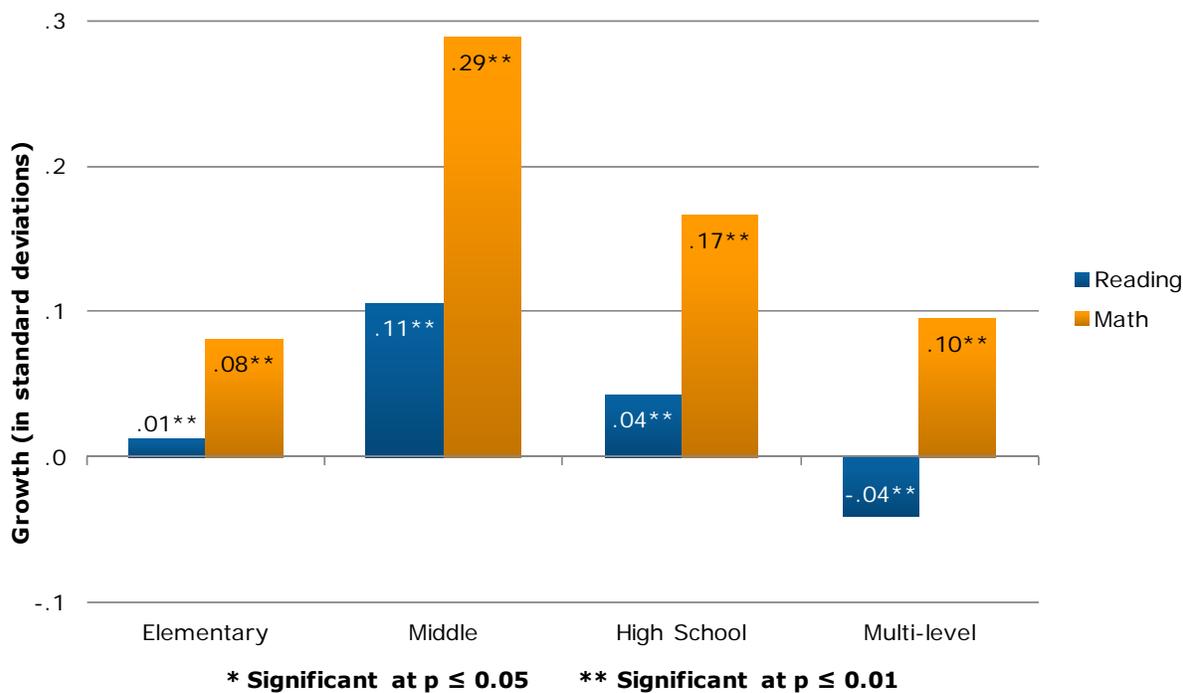
The results show that in reading, students in CMO-affiliated charter schools learn significantly more than their TPS counterparts, but students in charter schools not affiliated with a CMO learn significantly less than their TPS counterparts. Regardless of CMO affiliation, students in charter schools learn significantly more than their TPS peers in math. However, in both subjects, the results for CMO-affiliates are much more positive than the results for schools that are not part of a CMO.

⁹ For a more detailed look at CMO impacts nationally and for findings on specific CMOs, the interested reader can download *Charter School Growth and Replication Volume II* at <http://credo.stanford.edu>.

Charter School Impact by School Level

The flexibility and autonomy enjoyed by charter schools allows them to choose which grade levels to serve, with many charter operators deciding to focus on particular ages while others seek to serve a broader range of students. For example, multi-level charter schools serve grade ranges larger than traditional elementary, middle or high schools, such as a combination of middle and high school grades. These school levels are tracked by the National Center for Education Statistics (NCES), which allows us to disaggregate charter school impacts for different grade spans.

Figure 7: Impact by School Level



This study examined the outcomes of students enrolled in elementary, middle and high schools as well as multi-level schools.¹⁰ The results in Figure 7 above show that, on average, charter students have better learning gains than their virtual counterparts in both reading and math at charter elementary, middle and high schools. Students at multi-level charter schools have lower learning gains in

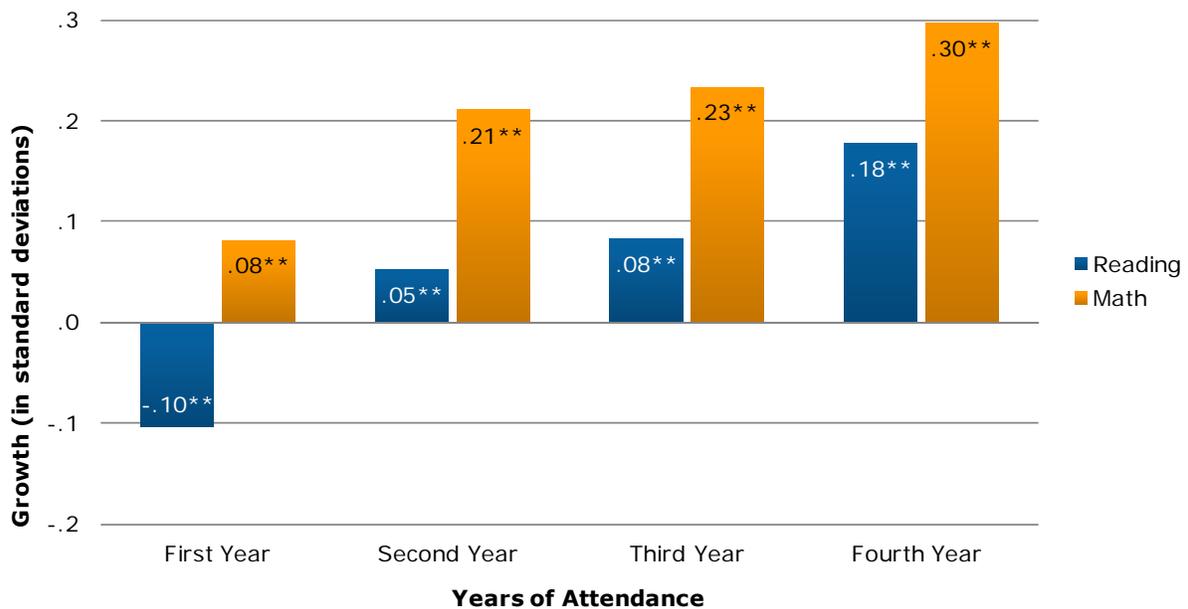
¹⁰ Although high school results are presented for both reading and math, the reading results are based on grades 6-8 that are part of charter schools with grades 6-12 and classified by NCES as high schools.

reading, but higher gains in math than their TPS peers. The largest positive effect in both subjects is found in charter middle schools.

Charter School Impact by Students' Years of Enrollment

Student growth in charter schools may change as students continue their enrollment over time. To test this, students were grouped by the number of consecutive years they were enrolled in charter schools. In this scenario, the analysis is limited to the charter students who enrolled for the first time in a charter school between 2006-2007 and 2010-2011. Although the number of students included will be smaller, it is the only way to make sure that the available test results align with the years of enrollment. This question examines whether the academic success of students who enroll in a charter school changes as they continue their enrollment in a charter school.

Figure 8: Impact by Students' Years of Enrollment



* Significant at $p \leq 0.05$ ** Significant at $p \leq 0.01$

The results in Figure 8 suggest that new charter school students have an initial loss in reading and an initial gain in math compared to their counterparts in traditional public schools. This positive finding for math contrasts with the parallel result in the 2009 national study which showed a negative first year impact on student learning in both subjects. In the second and subsequent years of attendance in charter schools, students experience increasing positive returns to charter school attendance in both reading and math.

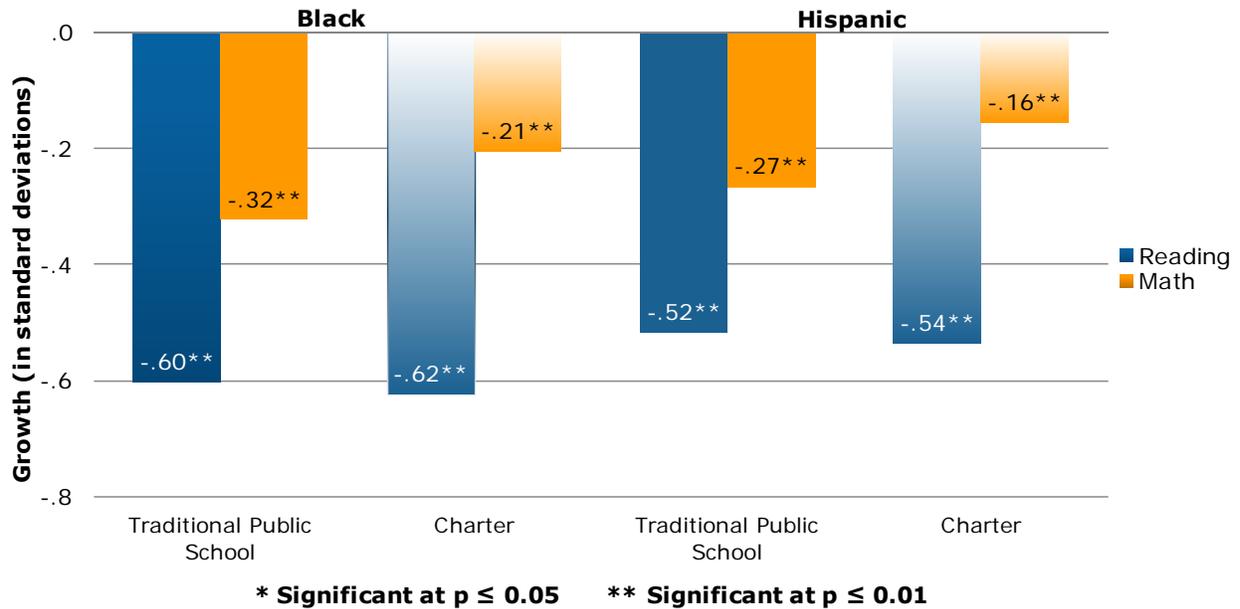
Charter School Impact by Race/Ethnicity

Attention in US public education to achievement differences by racial and ethnic backgrounds has increased since the passage of the *No Child Left Behind* Act in 2001. The effectiveness of charter schools across ethnic and racial groups is especially important given the proportion of charter schools that are focused on serving historically underserved students. The impact of charter schools on the academic gains of Black and Hispanic students is presented in Figure 9 below.

The graph displays two distinct comparisons, described below:

- The first comparison displays the performance of TPS students in the subgroups of interest relative to the "average white student in TPS;" in this comparison, the white student does not qualify for subsidized school meals, Special Education services or English Language Learner support and is not repeating a grade. The values that appear in each vertical bar indicate the magnitude of difference from this comparison student, and the stars indicate the level of statistical significance. Thus, if there is no difference in the learning gains, the bar would be missing entirely; if the learning of the student group in question is not as great as the comparison baseline, the bar is negative and if the learning gains exceed the comparison, the bar is positive.
- A second comparison tests whether the learning gains in the charter school student subgroup differs significantly from their peers in the same student subgroup in their feeder TPS. Where the difference is significant, the charter school bar has gradient shading.

Figure 9: Impact with Black and Hispanic Students

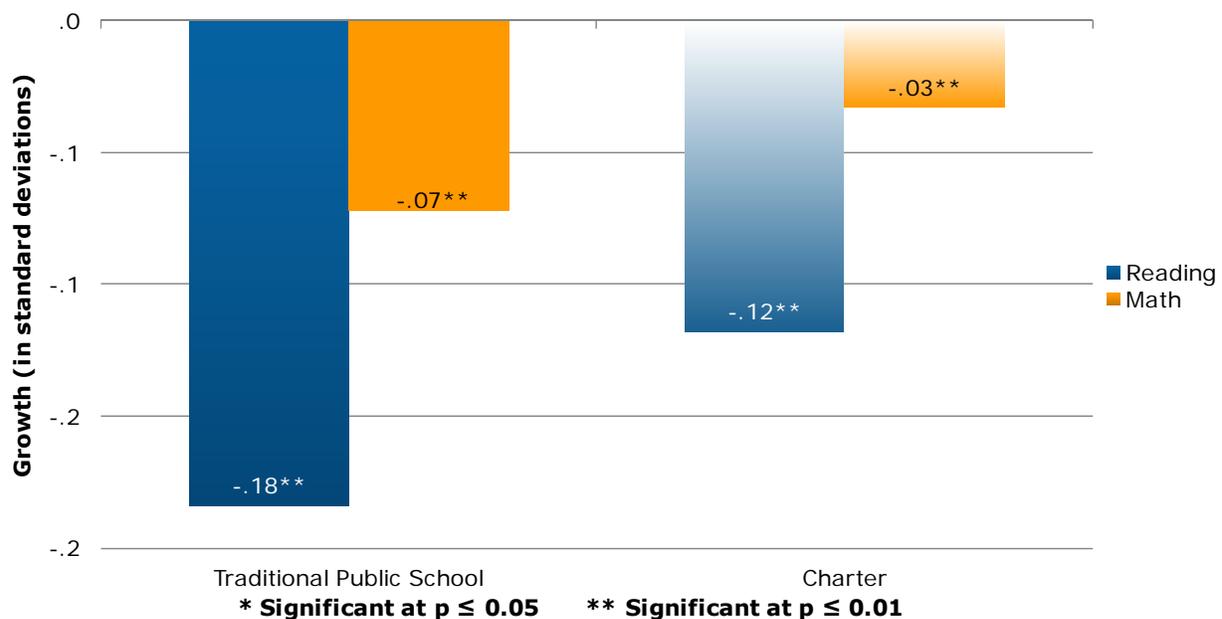


On average, Black and Hispanic students in both TPS and charter schools have significantly smaller gains in reading and math than those of average white students in TPS, the baseline of comparison. Black and Hispanic students enrolled in charter schools show significantly worse performance in reading and significantly better performance in math compared to their TPS counterparts.

Charter School Impact with Students in Poverty

Much of the motivation for developing charter schools aims at improving education outcomes for students in poverty. The enrollment profiles of charter schools across the country underscore this fact; in New York City, 74 percent of charter students are eligible for subsidized school meals, a proxy for low income households. Thus, the impact of charter schools on the learning of students in poverty is important in terms of student outcomes and as a test of the commitment of charter school leaders and teachers to address the needs of this population. Figure 10 presents the results for students in poverty. In this graph, the comparison student is a student who pays full price for school meals in TPS, a proxy for not being in poverty.

Figure 10: Impact with Students in Poverty

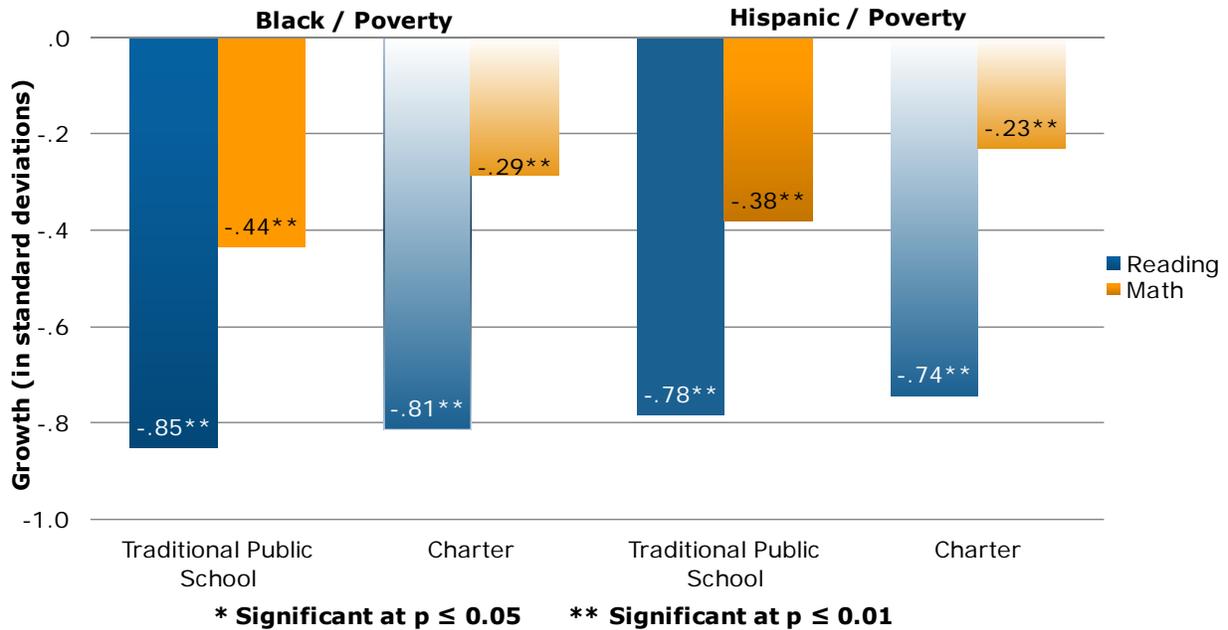


As shown in the figure above, in New York City, students in poverty perform significantly worse in reading and math than their non-poverty peers regardless of whether they attend a TPS or a charter. However, students in poverty who are enrolled in charter schools learn significantly more per year in both subjects than students in poverty in TPS.

Charter School Impact with Race/Ethnicity and Poverty

Many charter schools have a dual mission to educate historically underserved minority students who are also living in poverty. The impact of charter schools on the academic gains of Black students living in poverty and Hispanic students living in poverty is presented below.

Figure 11: Impact with Black and Hispanic Students in Poverty



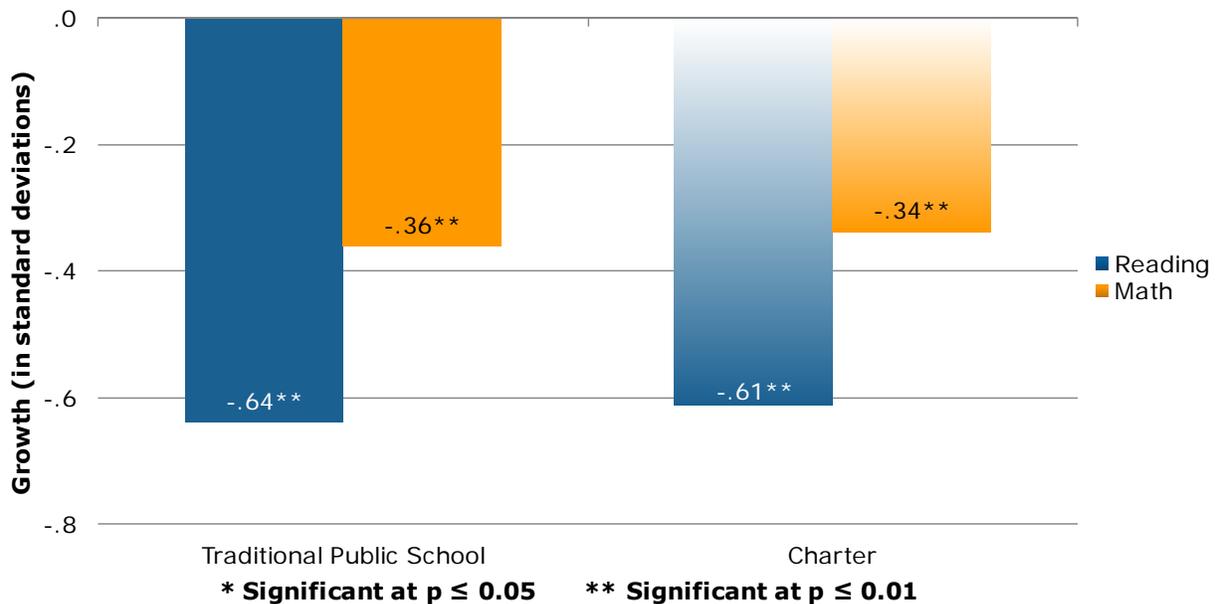
Black and Hispanic students in poverty in both TPS and charter schools have smaller gains in reading and math than those of the average non-poverty white TPS student, the baseline of comparison. However, Black and Hispanic students in poverty who are enrolled in charter schools show significantly better performance in reading and math than their TPS peers.

Charter School Impact with Special Education Students

The demographic comparisons in the CREDO national charter school report released in 2009 indicated that across the charter sector, schools serve fewer Special Education students than the traditional public schools both in number of students and as a proportion of their enrollment. In some cases, this is a deliberate and coordinated response with local districts, based on a balance of meeting the needs of the students and a consideration of cost-effective strategies for doing so. In New York City, the overall proportion of charter school students who are Special Education is 12 percent, compared to 17 percent in TPS citywide and in the charter schools' feeder schools. Anecdotal evidence suggests that TPS and charters may differ in their criteria for designating students as needing to be assessed for special education services; this topic has been flagged for future study on student enrollments.

It is especially difficult to compare the outcomes of Special Education students, regardless of where they enroll. The most serious challenge rests on the small numbers of Special Education students. Consequently, there is tremendous variation when all categories are aggregated, a necessary and messy requirement for comparison purposes. Of all the facets of the current study, this one deserves the greatest degree of skepticism. With this cautionary note, the results are presented in Figure 12 below.

Figure 12: Impact with Special Education Students

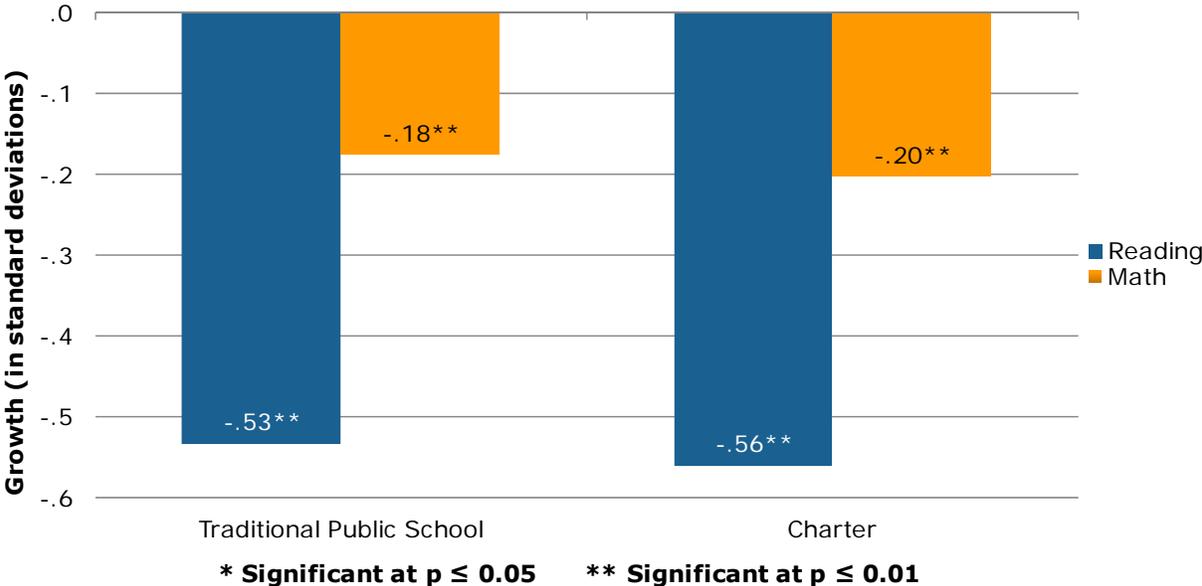


Special Education students enrolled in both TPS and charter schools perform significantly worse than students not receiving special education services in reading and math. In charter schools in New York City, Special Education students receive a significant benefit from charter school attendance compared to their counterparts in TPS in both reading and math.

Charter School Impact with English Language Learners

Students who enroll in school without sufficient English proficiency represent a growing share of public school students. Their success in school today will greatly influence their success in the world a decade from now. Since their performance as reflected by National Assessment of Education Progress lags well behind that of their English proficient peers, their learning gains are a matter of increasing focus and concern nationally and in New York City.

Figure 13: Impact with English Language Learners



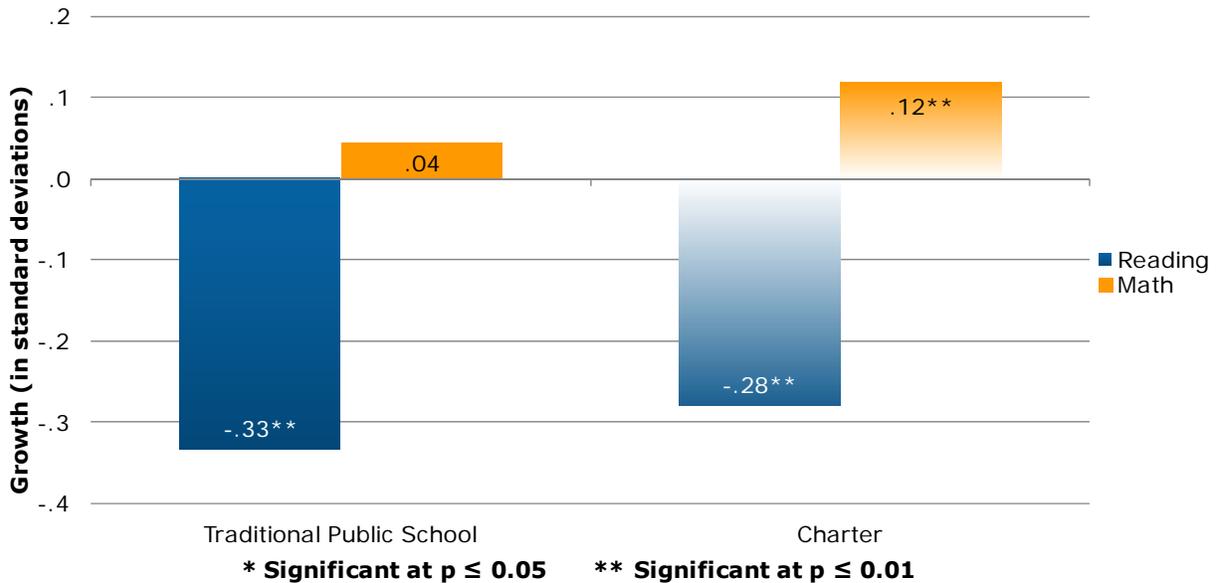
New York City’s English Language Learners have roughly the same learning gains in reading and math regardless of whether they attend a traditional public or charter school. These learning gains are significantly smaller than the city’s native/fluently English speakers in both subjects.

Charter School Impact with Grade-Repeating Students

This study examined the outcomes of students who were retained. Often a highly charged topic, the underlying premise is that additional time in a grade can help students by remediating deficits and shoring up grade-level competencies. Existing research on the outcomes of students who have been retained is limited.

Retention practices differ widely across the country and between the charter and TPS sectors. The fact that retained charter students have the lowest match rate (19 percent) of any subgroup in our study suggests that charter schools are more likely to retain academically low-performing students. The results of learning gains following retention appear in Figure 14.

Figure 14: Impact with Grade-Repeating Students



In both TPS and charter schools, the retained students included in the analysis perform worse than non-retained students in reading. In math, TPS students who were retained had similar learning gains as their non-retained counterparts, while retained students at charter schools had greater learning gains than non-retained students. Retained students at charter schools have larger learning gains than retained students in TPS in both reading and math.

Charter School Impact by Student's Starting Decile

A general tenet of charter schools is a commitment to the education and development of every child. Further, many charter schools, including several in New York City, have as part of their mission a specific emphasis on serving students who have not thrived academically in TPS and whose early performance is well below average. We examined the performance of charter schools to see if they produced equivalent results across the spectrum of student starting points and in relation to the results observed for equivalent students in TPS.

To do this, for charter school students and their VCRs, their baseline achievement test scores in reading and math were disaggregated into deciles. In this analysis, the base of comparison is the average academic growth of the TPS students in Decile 5, which corresponds to students in the 50th to 60th percentiles in the city. Student achievement growth in each decile for charter school students and their VCRs was then compared. The results appear in Figures 15 and 16 below.

Figure 15: Impact by Students' Starting Decile – Reading

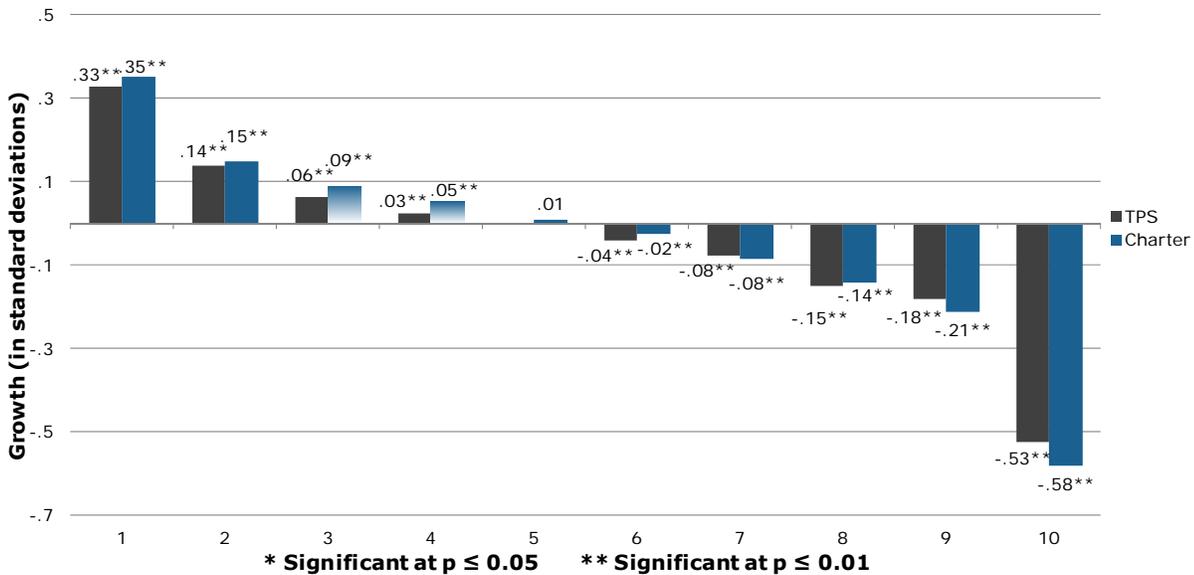
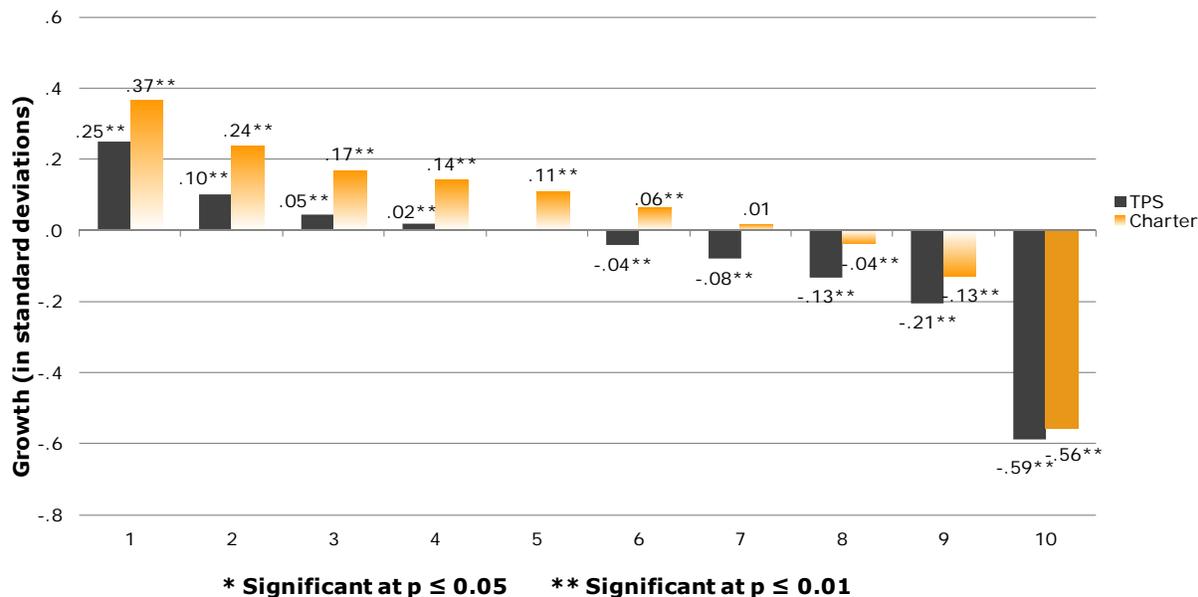


Figure 16: Impact by Students' Starting Decile – Math



Both figures demonstrate the expected “S”-shaped curve to the results. The overall curve reflects the typical pattern of larger learning gains for students with lower prior scores and larger learning losses for students with higher starting scores, a phenomenon known as “regression to the mean.” Here, the relative magnitudes are important: Do charter schools produce relatively better growth results than TPS? If so, the charter curve would have larger gains on the low end and smaller losses on the high end of the distribution.

For students in New York City, the results are quite different for reading than for math. Figure 15 shows that charter schools do better than TPS in just two deciles in reading (Deciles 3 and 4). In math, however, charter schools outperform TPS with students from all but the top decile.

School-level Analysis

Comparative School-level Quality While the numbers reported above represent the average learning gains for charter school students across the city, the pooled average effects tell only part of the story. Parents and policymakers are also interested in school-level performance. In order to determine the current distribution of charter school performance, the average effect of charter schools on student learning over the two most recent growth periods (2010 and 2011) is compared to the experience the students would have realized in their local traditional public schools.¹¹ The performance of the VCR students associated with each charter school comprises this measure of the local educational market. This analysis provides an average contribution to student learning gains for each charter school. This measure is called the school's effect size; as for the overall and by-year impacts, it is expressed in standard deviations of growth.

As noted in Table 1, charter schools are generally smaller than their corresponding feeder schools. In addition, some charter schools elect to open with a single grade and mature one grade at a time. Consequently, care is needed when making school-level comparisons to ensure that the number of tested students in a school is sufficient to provide a fair test of the school impact. Our

A Note about Tables 5 and 6

There are four quadrants in each table. We have expanded on the usual quadrant analysis by dividing each quadrant into four sections. The value in each box is the percentage of charter schools with the corresponding combination of growth and achievement. These percentages are generated from the 2010 and 2011 periods.

The uppermost box on the left denotes the percentage of charters with very low average growth but very high average achievement. The box in the bottom left corner is for low-growth, low-achieving schools.

Similarly, the topmost box on the right contains the percentage of charters with very high average growth and very high average achievement, while the bottom right corner contains high-growth, low-achieving schools.

The major quadrants were delineated using national charter school data. We would expect about 46% of schools to have an effect size between -0.15 and 0.15 standard deviations of growth (the two middle columns). Similarly, we would expect about 50% of schools to achieve between the 30th and 70th percentiles. Therefore, if schools were randomly distributed, we would expect about 6% in any small square and about 25% of the schools to appear in the middle four squares.

¹¹ We chose to include only the two most recent growth periods in this analysis for two reasons. First, we wanted a highly relevant contemporary distribution of charter school performance. Second, using only two periods of data ensured that all schools' effect sizes were measured fairly; they are all based on one or two periods of data instead of one period for some schools and five periods for others.

criteria for inclusion was at least 60 matched charter student records over the two years, or, for new schools with only one year of data, at least 30 matched charter records. Of our total sample of 72 schools with reading test scores in 2010 and 2011, four schools had an insufficient number of individual student records to calculate a representative school-wide average growth score. Of 78 schools with math test scores in 2010 and 2011, six had an insufficient number. Table 4 below shows the breakout of performance for the New York City charter schools which meet our criteria for inclusion by having a sufficient number of charter student records.

Table 4: Performance of Charter Schools Compared to Their Local Markets

Subject	Significantly Worse		Not Significant		Significantly Better	
	Number	Percent	Number	Percent	Number	Percent
Reading	17	25.0%	36	52.9%	15	22.1%
Math	10	13.9%	17	23.6%	45	62.5%

In reading, 22 percent of charter schools perform significantly better than their traditional public school market, while nearly 63 percent perform significantly better in math. Both of these results are better than the national average proportion of better-performing charters (17%).¹² The lowest school effect size in reading was -0.35 standard deviations of growth, while the highest effect size was 0.28. The gap between the lowest and highest effect sizes was larger in math; they were -0.49 and 0.57, respectively. A larger proportion of charter schools were not significantly different from their market in reading than in math.

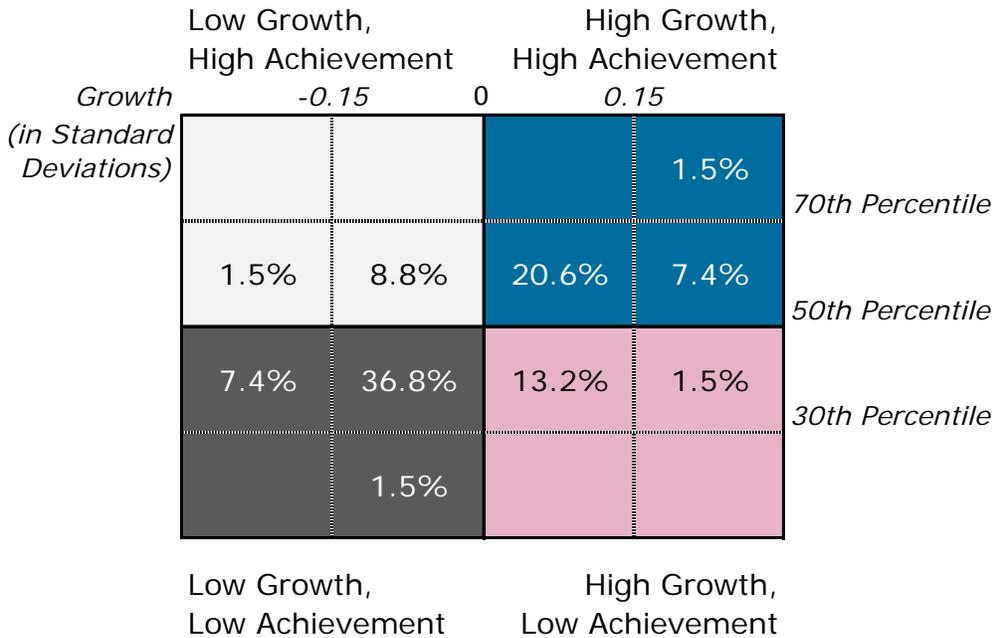
Impact of Growth on Achievement While the impacts of charter schools on academic growth relative to their local competitors is instructive, it is necessary to take a wide-angle view to determine how well these students are being prepared. Because many of the students served by charter schools start at low levels of achievement, it is vital to understand how well their academic growth advances them in absolute achievement. To do this, each school’s average growth is placed in the context of their average achievement level compared to the rest of the city, as in Tables 5 and 6 below. For growth, we use the effect sizes discussed above. The school’s average achievement level is the mean achievement of the students over the same two periods covered by the effect size (2010 and 2011).¹³ The 50th

¹² CREDO. *Multiple Choice: Charter School Performance in 16 States* (2009). <http://credo.stanford.edu>.

¹³ Average achievement was computed using students’ z-scores from the end of the growth period (e.g., spring 2010 and spring 2011), and the resulting school-level mean was then converted into a percentile.

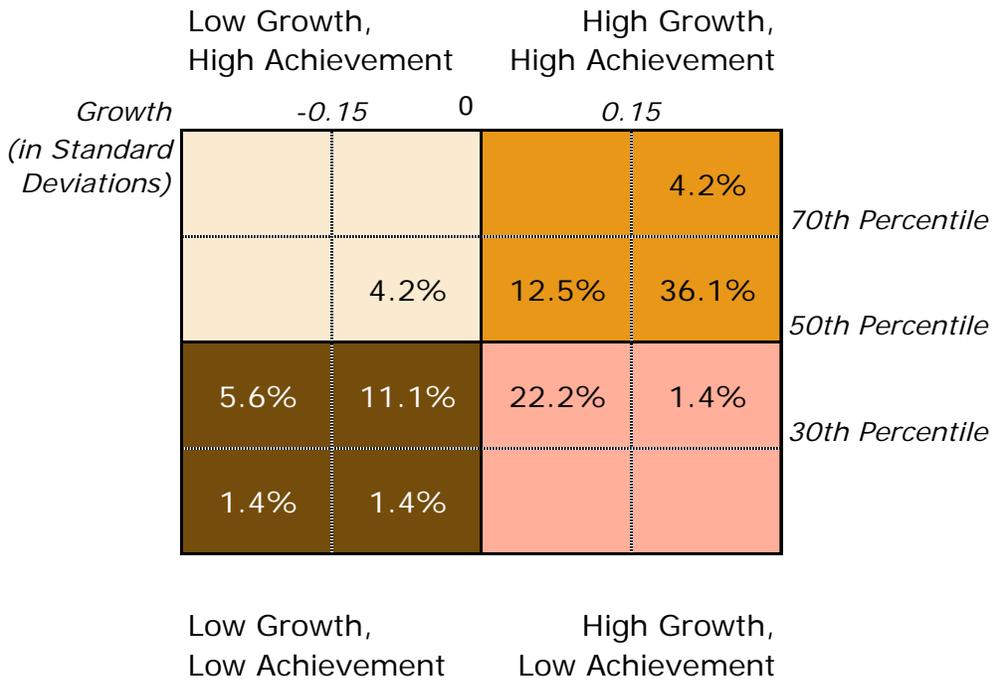
percentile indicates citywide average performance for all public school students (traditional and charter). A school achievement level above the 50th percentile indicates that the school performs above the citywide average.

Table 5: Reading Growth and Achievement



In New York City, 30 of the 68 charter schools (44 percent) had positive average growth in reading, regardless of their average achievement (this percentage is the sum of the squares in the blue and purple quadrants, the right half of the table). About 30 percent of charters had positive growth and average achievement above the 50th percentile of the city (i.e., the total for the blue quadrant on the top right). About 60 percent of charters perform below the 50th percentile of achievement (the sum of the gray and purple in the lower portion of the table). Of concern is the nearly 46 percent of charters in the lower left gray quadrant, which represents low growth and low achievement.

Table 6: Math Growth and Achievement



For math, 55 of the 72 charter schools (76 percent) had positive average growth, as seen in the orange and pink quadrants. The majority of charter schools, nearly 53 percent, had both positive growth and average achievement above the 50th percentile (the top right, orange quadrant). About 43 percent of charters have achievement results below the 50th percentile of the city (the sum of lower half of the table). Almost 24 percent of New York City charters have positive growth and achievement below the 50th percentile in the city, as seen in the lower right, pink quadrant. If those schools continue their trends of positive academic growth, their achievement would be expected to rise over time.

Harlem

In this section, we delve more deeply into charter school performance in Harlem. With nearly a quarter of New York City charter school students attending school in Harlem, this borough has been the most notable target of charter school investment in all of New York City. As with the earlier citywide graphs, each graph in this section displays two distinct comparisons:

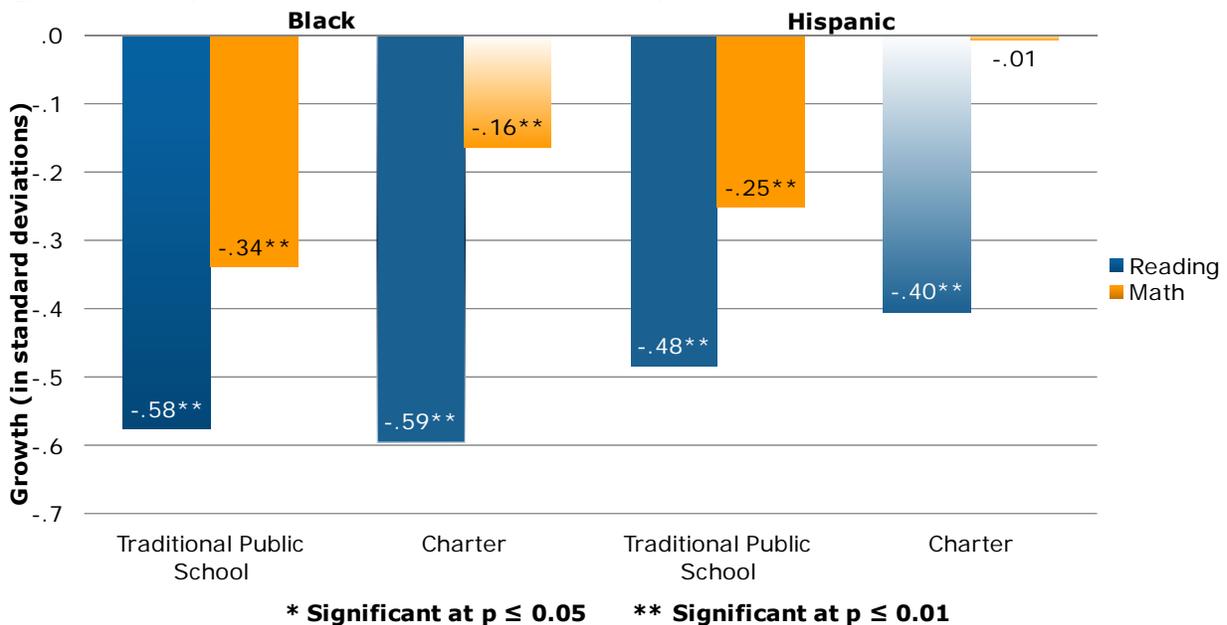
- The first comparison displays the performance of Harlem TPS and charter students in the subgroup of interest relative to the "average citywide student in TPS." The values that appear in each vertical bar indicate the magnitude of

difference from this comparison student, and the stars indicate the level of statistical significance. Thus, if there is no difference in the learning gains, the bar would be missing entirely; if the learning of the Harlem student group in question is not as great as the citywide comparison baseline, the bar is negative and if the learning gains exceed the comparison, the bar is positive.

- A second comparison tests whether the learning gains in the Harlem charter school student subgroup differs significantly from their peers in the same student subgroup in Harlem traditional public schools. Where the difference is significant, the charter school bar has gradient shading.

Impact with Black and Hispanic Students Nearly 75 percent of Harlem charter students are Black and about 25 percent are Hispanic, making these two historically underserved groups almost the entire student population in the borough’s charter schools. The impact of charter schools on the academic gains for Black and Hispanic students in Harlem are in Figure 17 below.

Figure 17: Impact with Harlem Black and Hispanic Students

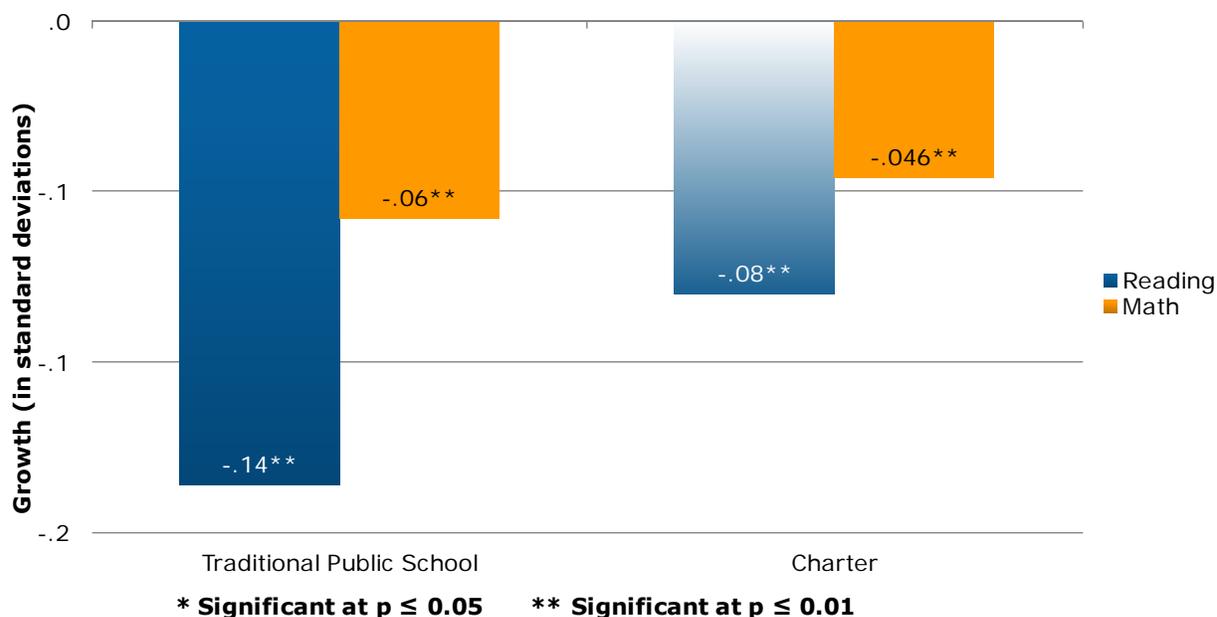


As with the citywide results, Black students in both traditional public and charter schools in Harlem have smaller learning gains in reading and math than those of white students citywide in traditional public schools, the baseline of comparison. In reading, Black students in Harlem traditional public and charter schools have similar learning gains. However, in math, Black Harlem charter school students have significantly better performance compared to Black students in Harlem TPS.

Hispanic students in both traditional public and charter schools in Harlem have lower rates of growth in reading than the average white student citywide in traditional public schools, the baseline of comparison. In math, Hispanic students in Harlem traditional public schools have lower rates of growth than the average white student citywide. However, Hispanic charter school students in Harlem have learning gains that are similar to the average white student citywide in math. These results are better than the citywide results for Hispanic students; in Harlem, Hispanic students in charter schools have erased the learning gap in math and post significantly better learning gains than their Harlem TPS peers in both subjects.

Impact with Students in Poverty In addition to Blacks and Hispanics, another historically underserved group, students in poverty, comprises the vast majority of the Harlem charter school population. Results for these students are shown below.

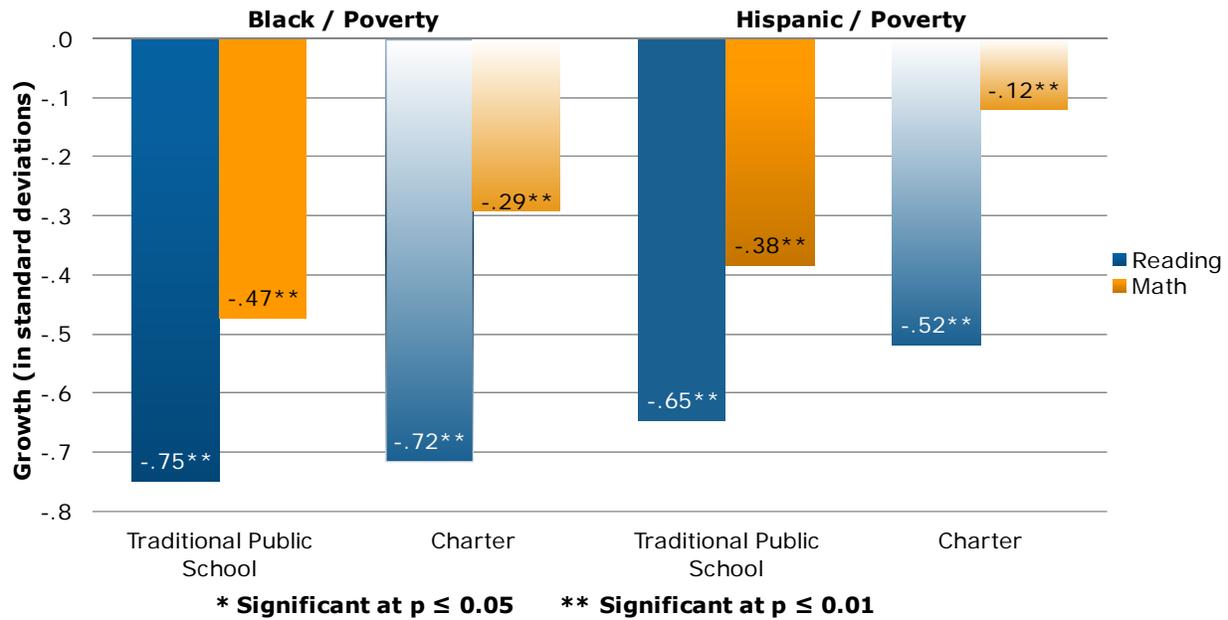
Figure 18: Impact with Harlem Students in Poverty



In Harlem, as with the citywide results, students in poverty grow at a rate that is significantly worse than their non-poverty peers citywide in both reading and math. As shown in the figure above, Harlem students in poverty enrolled in charter schools receive a significant benefit in reading, but have similar gains in math compared to Harlem students in poverty attending TPS.

Impact by Race/Ethnicity and Poverty In Harlem, 84 percent of minority students are living in poverty, making charter schools' impact with these students extremely important. The impact of Harlem charter schools on the academic gains of Black and Hispanic students living in poverty is presented in Figure 19.

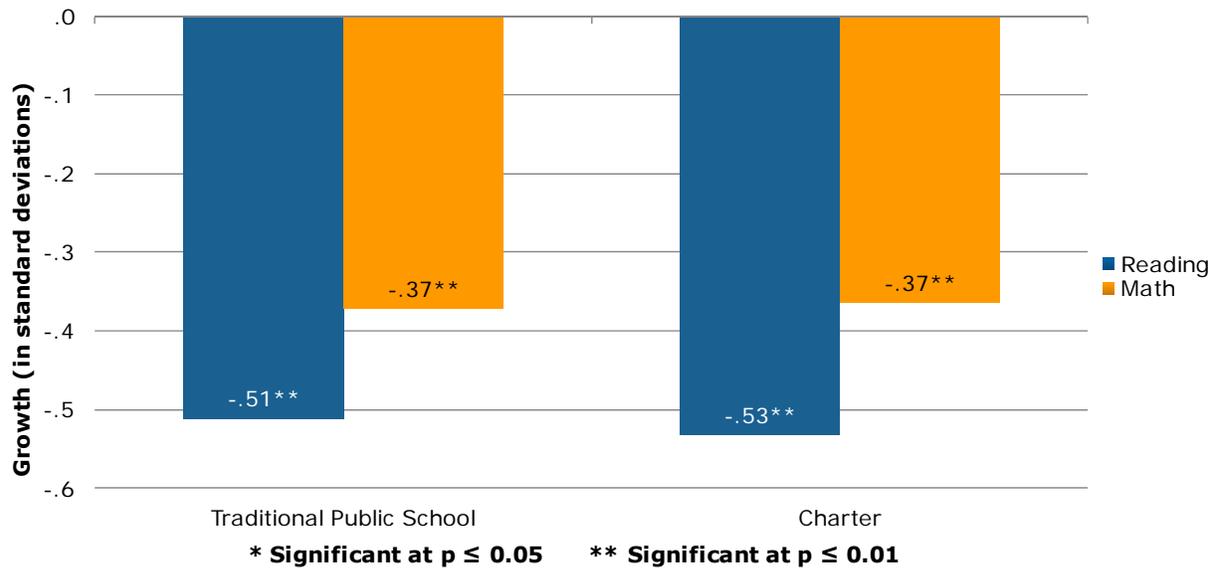
Figure 19: Impact with Harlem Black and Hispanic Students in Poverty



Harlem's Black and Hispanic students in poverty in both TPS and charter schools have smaller gains in reading and math than those of the average non-poverty White TPS student citywide, the baseline of comparison. Black students in poverty who are enrolled in Harlem charter schools show significantly better performance in reading and math compared to Black students in poverty in Harlem TPS. The same sector differences apply to Hispanic students in poverty in Harlem; the students in charter schools have a learning gain advantage.

Impact with Special Education Students About 12 percent of charter school students in Harlem are designated as receiving special education services and administered the regular assessment. Due to the unknown proportion of Special Education students who are administered alternate assessments, it is difficult to make a strong comparison of the learning gains for Special Education students. Given this caveat, the results for Harlem students who receive special education services are shown below.

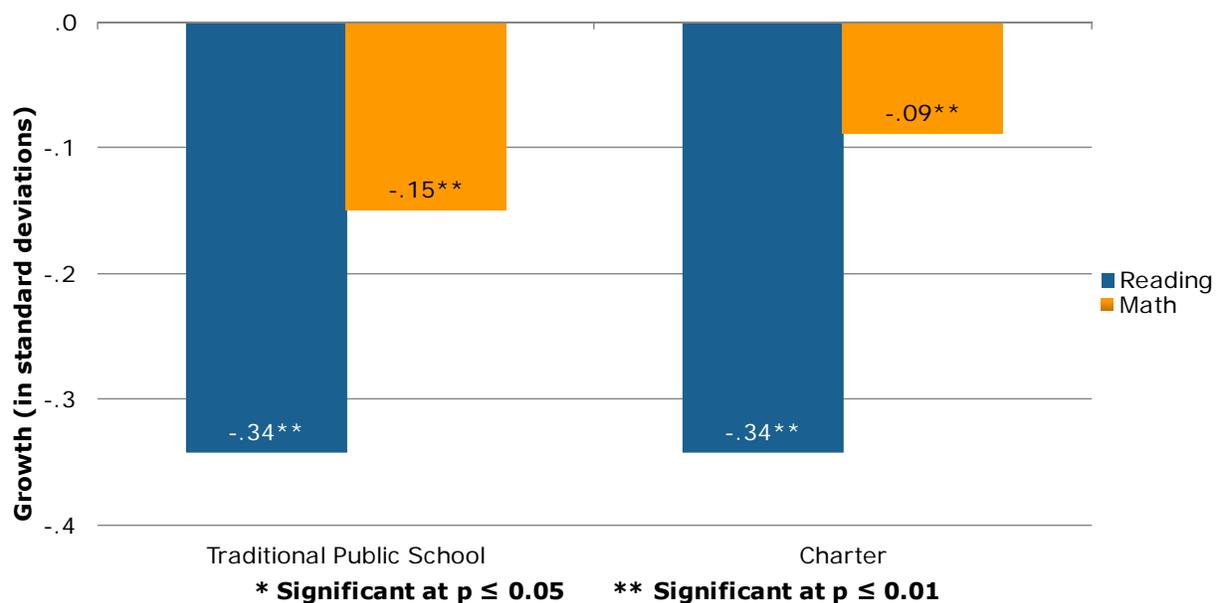
Figure 20: Impact with Harlem Special Education Students



Harlem Special Education students in both TPS and charter schools learn significantly less than the average regular education student in TPS citywide, the baseline of comparison. Special education students in Harlem charter schools receive no significant benefit or loss in either reading or math compared to their counterparts in Harlem TPS.

Impact with English Language Learners Although English Language Learners comprise a small proportion of charter students citywide and in Harlem, educating these students is critically important. The impacts for Harlem students who are English Language Learners are shown in Figure 21.

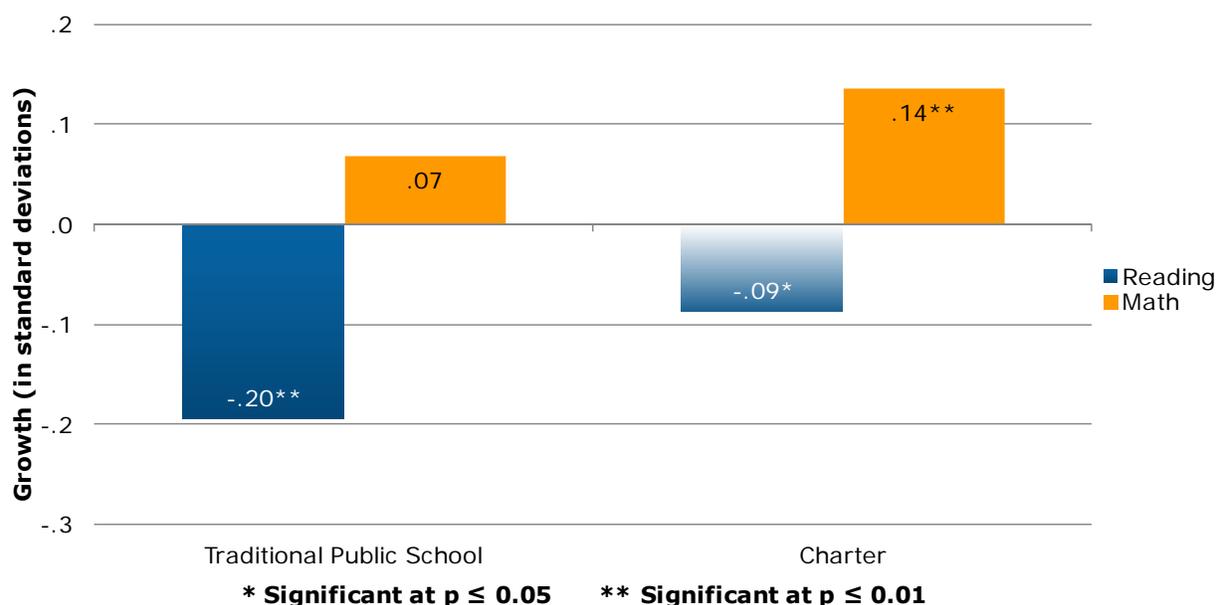
Figure 21: Impact with Harlem English Language Learners



Students who are English Language Learners in Harlem traditional public and charter schools have significantly lower learning gains in reading and math than the typical citywide TPS student who is a native or fluent English speaker. There are no significant differences in learning gains between English Language Learners in Harlem TPS and those in Harlem charter schools.

Impact with Grade-Repeating Students As was found citywide, retained charter students in Harlem have the lowest match rate of any subgroup in our study, which suggests that Harlem charter schools are more likely to retain academically low-performing students than their feeder TPS. The results for Harlem students who are repeating a grade are shown in Figure 22 below.

Figure 22: Impact with Harlem Grade-Repeating Students



Retained students in Harlem TPS and charter schools have lower reading gains compared to non-retained students citywide in traditional public schools, the baseline of comparison. However, students repeating a grade in Harlem charter schools perform significantly better in reading than their TPS counterparts. In math, retained students in Harlem TPS have learning gains that are similar to non-retained students in TPS citywide. Although retained students in Harlem charter schools have significantly better learning gains in math than non-retained students citywide in TPS, their performance is statistically similar to their Harlem TPS counterparts. This is likely because the impacts shown above are for a small number of students in each sector, which makes it harder to distinguish differences between groups.

Comparative School-level Quality As with the citywide results, comparing charter school performance to the local traditional public school alternative in Harlem can be an informative measure of quality. Using the same criteria that were described in the section above on citywide comparative school-level quality, it was possible to include 15 Harlem charter schools in reading and math for this analysis. The results for these Harlem charter schools are shown in Table 7 below.

Table 7: Performance of Harlem Charter Schools Compared to Their Local Markets

Subject	Significantly Worse		Not Significant		Significantly Better	
	Number	Percent	Number	Percent	Number	Percent
Reading	1	6.7%	10	66.7%	4	26.7%
Math	3	20.0%	3	20.0%	9	60.0%

In reading, 27 percent of Harlem charter schools perform significantly better than their traditional public school market, and 60 percent perform significantly better in math. Compared to charters citywide, a larger proportion of Harlem charter schools outperform their market in reading and about the same proportion outperform their market in math. However, both the reading and math results for Harlem charter schools are better than the national average proportion of higher-performing charters (17%).¹⁴ A much larger proportion of charter schools were not significantly different from their market in reading (two-thirds) than in math (20 percent).

Synthesis and Conclusions

Based on the findings presented here, the typical student in New York City charter schools gains more learning in a year than his TPS counterparts, amounting to one month of additional gains in reading and five months in math. The learning advantage in Harlem equates to less than a full month of additional learning in reading but an additional seven months of progress in math. These outcomes are consistent with the result that charter schools have significantly better results than TPS for minority students who are in poverty, with more pronounced impacts in math than in reading.

A substantial share of New York City charter schools appear to outpace TPS in how well they support academic learning gains in their students in both reading and math. About 22 percent of New York City charters outpace the learning impacts of TPS in reading, and 63 percent do so in math. Only a few of the schools included in the study have academic results that are significantly worse than their TPS counterparts in math (about 14 percent), while one-quarter of charter schools underperform compared to their local markets in reading.

The student-to-student and school-to-school results show charter schools to be performing well relative to the local alternatives. The larger question of whether

¹⁴ CREDO. *Multiple Choice: Charter School Performance in 16 States* (2009). <http://credo.stanford.edu>.

charter schools are helping students achieve at high levels is also important. Nearly 46 percent of New York City charter schools have below-average growth and below-average achievement in reading, and the same is true for nearly 20 percent of the charter schools in math. Students in these schools will not only have inadequate progress in their overall achievement but will fall further and further behind their peers in the city over time.

The share of underperforming charter schools is offset, however, by the proportion of charter schools that either are already achieving at high levels or are positioned to reach those levels. In math, three-quarters of charter schools have positive academic growth. For reading, the proportion is over 44 percent. Should these trends continue, the share of schools that currently lag the citywide average for absolute achievement would be expected to decline. These absolute improvements are within sight in New York City.

Table 8 presents a summary of the results.

Table 8: Summary of Statistically Significant Findings

	Reading	Math
New York City Charter Students	Positive	Positive
Harlem Charter Students	Positive	Positive
Charters in 2007	Positive	Positive
Charters in 2008	Positive	Positive
Charters in 2009	Positive	Positive
Charters in 2010	Negative	Positive
Charters in 2011	Positive	Positive
CMO-affiliated Charters	Positive	Positive
Non-CMO-affiliated Charters	Negative	Positive
Elementary Charter Schools	Positive	Positive
Middle Charter Schools	Positive	Positive
High School Charter Schools	Positive	Positive
Multi-Level Charter Schools	Negative	Positive
First Year Enrolled in Charter School	Negative	Positive
Second Year Enrolled in Charter School	Positive	Positive
Third Year Enrolled in Charter School	Positive	Positive
Fourth Year Enrolled in Charter School	Positive	Positive
Black Charter School Students	Negative	Positive
Hispanic Charter School Students	Negative	Positive
Charter Students in Poverty	Positive	Positive
Black Charter School Students in Poverty	Positive	Positive
Hispanic Charter School Students in Poverty	Positive	Positive
Special Education Charter School Students	Positive	Positive
Grade-repeating Charter School Students	Positive	Positive
Harlem Black Charter Students		Positive
Harlem Hispanic Charter Students	Positive	Positive
Harlem Charter Students in Poverty	Positive	
Harlem Black Charter Students in Poverty	Positive	Positive
Special Education Charter School Students	Positive	Positive
Grade-repeating Harlem Charter School Students	Positive	

Appendix

The numbers in the tables below represent the number of charter observations associated with the corresponding results in the report. An equal number of VCRs were included in each analysis.

Student Group	Matched Charter Students	
	Reading	Math
New York Charter Students	38,147	41,022
Students in Harlem	9,015	9,638
Students in Charters in 2007	3,982	4,134
Students in Charters in 2008	5,600	5,843
Students in Charters in 2009	7,455	7,871
Students in Charters in 2010	9,368	10,289
Students in Charters in 2011	11,742	12,885
Students in Urban Schools	38,147	41,022
Students in Elementary Schools	18,109	18,481
Students in Middle Schools	9,886	10,044
Students in High Schools	1,095	2,813
Students in Multi-level Schools	9,057	9,684
Students First Year Enrolled in Charter School	8,832	10,011
Students Second Year Enrolled in Charter School	5,060	5,490
Students Third Year Enrolled in Charter School	2,659	2,807
Students Fourth Year Enrolled in Charter School	937	1,153
Black Students	24,463	25,538
Hispanic Students	11,781	13,585
White Students	1,112	1,124
Students in Poverty	32,006	34,485
Black Students in Poverty	20,284	21,150
Hispanic Students in Poverty	10,557	12,147
Special Education Students	4,148	4,211
English Language Learners	1,106	1,266
Grade Repeating Students	421	393

Student Group	Matched Charter Students	
	Reading	Math
Students in Decile 1	1,045	1,307
Students in Decile 2	2,832	3,751
Students in Decile 3	4,605	5,473
Students in Decile 4	5,647	5,643
Students in Decile 5	6,282	6,203
Students in Decile 6	5,302	5,682
Students in Decile 7	4,660	4,441
Students in Decile 8	3,138	3,885
Students in Decile 9	2,683	2,554
Students in Decile 10	1,953	2,083

Student Group	Matched Charter Students	
	Reading	Math
Harlem Charter Students	9,015	9,638
Harlem Black Students	6,516	6,919
Harlem Hispanic Students	2,430	2,652
Harlem Students in Poverty	7,566	8,085
Harlem Black Students in Poverty	5,311	5,612
Harlem Hispanic Students in Poverty	2,187	2,410
Harlem Special Education Students	1,158	1,133
Harlem English Language Learners	226	242
Harlem Grade Repeating Students	118	111