

National Charter School Resource Center

at Safal Partners

# STUDENT ACHIEVEMENT IN CHARTER SCHOOLS

What the Research Shows



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The National Charter School Resource Center (NCSRC) is dedicated to supporting the development of high-quality charter schools. The NCSRC provides technical assistance to sector stakeholders and has a comprehensive collection of online resources addressing the challenges charter schools face. The website hosts reports, webinars, and newsletters focusing on facilities, funding opportunities, authorizing, English learners, special education, military families, board governance, and other topics. The NCSRC is funded by the U.S. Department of Education and led by education consulting firm Safal Partners.

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The charter sector has grown dramatically since its beginnings in Minnesota almost a quarter of a century ago. Today, an estimated 2.5 million children attend approximately 6,400 charter schools across the country, and all but 8 states have charter laws in place.<sup>i</sup> The expansion of the sector has been accompanied by an increase in public commentary about charter schools' impact on student achievement. Much of the debate, however, has been marked by rhetoric, with a reliance on data that are often outdated and research that may not utilize the most rigorous scientific research methods. For policymakers trying to address charter school, or teachers evaluating job options in charter schools, navigating the spectrum of opinions on charter schools can be a bewildering task.

Against this backdrop, the National Charter School Resource Center has developed this report to examine recent research and identify common findings for those policymakers, parents, educators, and other stakeholders seeking to gain a better understanding of the effectiveness of charter schools. Since methodological rigor was an important consideration in the selection of the reports, we identified and analyzed five studies that used a lottery-based methodology for at least a subset of analyzed schools (see section on methodology for more details). This methodology approximates randomized controlled trials considered the "gold standard" of evaluation. By limiting this report to such studies, we drew from the best available evidence about charter school impact. Keeping in mind the rapid growth and evolution of the sector and the differences in the charter context across states, we also ensured that the selected studies were all relatively recent, undertaken in the last five years.

The five studies analyzed for this report examine three questions at the heart of the debate around charter schools:

- > What is the impact of charter school attendance on the academic performance of charter school students in math and reading?
- > Do students who enroll in charter schools differ from students in traditional public schools?
- > What charter school practices are correlated with positive student outcomes, and what practices have little or no relationship to student outcomes?

Taken together, these studies provide insights about the profile and achievement levels of students attending charter schools and the potential effectiveness of specific practices widely adopted by charter schools. Our hope is that by summarizing what research shows – and equally, does not show – about charter school outcomes, demographics, and practices, we can make the research more accessible to stakeholders. We also hope to spur more high-quality research about charter schools by highlighting questions that remain unresolved.

The remainder of this paper is organized as follows:

- > In Section I, we provide an overview of our methodology and include a description of the lotterybased analysis used by the studies.
- > In Section II, we examine the performance of students attending charter schools.
- > In Section III, we present data on the demographic profile of students enrolling in charter schools.
- > In Section IV, we assess charter school practices to determine which ones correlate with positive outcomes, and which ones do not.
- > Finally, in Section V, we conclude with a discussion of the implications of our analysis.



**Overview of Studies:** Table 1 below provides a snapshot of the five selected studies. Appendix 1 offers additional detail about the five studies selected for this paper and further information about the rationale for their selection.

Table 1: Snapshot of studies analyzed for this report								
Study name	Principal author	Methodology	Grades	Geographical scope				
Knowledge is Power (KIPP) Middle Schools: Impacts on Achievement and Other Outcomes <sup>ii</sup>	Christina Tuttle et al.	Feb 2013	Matched comparison; Lottery-based methodology	5-8	National			
The Evaluation of Charter School Impacts <sup>™</sup>	Philip Gleason et al.	Jun 2010	Lottery-based methodology	4-8	National			
Getting Beneath the Veil of Effective Schools: Evidence from New York City <sup>iv</sup>	William Dobbie and Roland Fryer	Nov 2011	Lottery-based methodology; Matched comparison; Regression analysis	3-8	New York			
Student Achievement in Massachusetts' Charter Schools <sup>v</sup>	Joshua Angrist et al.	Jan 2011	Lottery-based methodology; Matched comparison; Regression analysis	4-12	Boston			
The New York City Charter Schools Evaluation Project <sup>vi</sup>	Caroline Hoxby et al.	Sep 2009	Lottery-based methodology	3-12	New York			

**Overview of lottery-based analysis:** Each of the selected studies relied, at least in part, on lotterybased analysis to determine the effect of charter school attendance on student achievement. This methodology offers researchers the unique opportunity to study the impact of charter schools without worrying that students attending charter schools are intrinsically different from other students. In many states, charter schools are required to use lotteries when the number of applicants exceeds the number of available seats. In such situations, a lottery determines which students are admitted to the charter school. The lottery randomly divides the applicant group into two groups:

- > Lottery winners, who enroll in the charter schools and become the treatment group. We refer to students in this group as "charter students."
- > Lottery losers, who do not enroll in the charter schools they applied to attend and become the control group. We refer to students in this group as "comparison students." These students often remain in traditional public schools; however, some may enroll in private schools or other charter schools.

Figure 1 illustrates this process. Since members of both groups belonged to the same applicant pool and were randomly assigned to their group, they are similar to each other not just on observable characteristics like race and income levels, but also difficult-to-measure characteristics such as motivation and family engagement. Comparing these two groups can help researchers isolate the impact of charter schools on student outcomes. Since the two groups came from the same pool of students and were randomly assigned to the groups, researchers can be more confident that the differences in performance that they see are attributable to the impact of the intervention (i.e., attending the charter school) as opposed to intrinsic differences in students or their families.



**Other analyses used:** Lottery-based studies have one important caveat: by definition, they only include results from charter schools that held lotteries. Not all charter schools have more applicants than available seats. For instance, Gleason et al. report that in 2005-06, only 130 out of the 492 charter middle schools nationwide that met their studies' recruitment guidelines (operating for at least two years at the time of recruitment and served a general population of students) were oversubscribed and used admission lotteries. Because the lottery studies can include only charter schools that were in high demand and oversubscribed, the results may not necessarily apply to the

full set of charter schools.<sup>vii</sup> To address this issue, three of the studies we reviewed supplemented the lottery-based analysis with other statistical methods that aim to control for observable factors, such as prior achievement and demographic characteristics, on which charter students may differ from the comparison group. One such method involves "matching" students in charter schools to their counterparts in traditional public schools based on factors such as demographic similarities and baseline achievement levels and then comparing the performance of the two groups. Another approach taken by regression studies is to compare large datasets of students in charter and traditional public schools, while statistically controlling for factors such as prior achievement to adjust for observed differences. Although not so rigorous as lottery-based analysis because of their inability to exclude selection bias caused by unobserved factors, these alternate methodologies enabled larger numbers of student outcomes to be evaluated. Where matching and regression studies produced similar overall findings to the lottery studies, we considered the findings to be particularly strong.

Assessment data: Our analysis of student outcomes primarily focuses on student achievement in math and reading, although some of the studies also looked at performance in subjects like science and social studies. All of the studies used state test results to assess achievement outcomes. Since assessments vary from state to state, the two multi-state studies adopted additional strategies to ensure comparability: Gleason et al. converted state test results to a comparable scale, whereas the KIPP study included a nationally norm-referenced test, the Terra Nova, in addition to state test scores.

In order to analyze which practices were correlated with positive student outcomes, Gleason et al., Angrist et al., Dobbie et al., and Tuttle et al. analyzed survey and/or interview data. Dobbie et al. also reviewed taped classroom observations and lesson plans.

### Limitations and caveats:

- First, the studies have fairly narrow geographic coverage. As can be seen from Table 1, only two of the studies are national in scope, and of these, one studied the impact of just the KIPP schools (in 13 of the 19 states then served by KIPP). Of the remaining three studies, one is focused on Massachusetts and two are focused on New York City.
- > Second, the studies analyzed by this report primarily focused on middle school grades, although a few also looked at some elementary and high school grades. The lack of studies that span grades and are geographically dispersed and national in scope limits our ability to extrapolate more generally.
- Third, in developing this report, we did not attempt to conduct a quantitative meta-analysis of the effects found by the five studies.<sup>viii</sup> Instead, this report should be viewed as a summary of the studies' results. To arrive at the conclusions presented in this paper, we looked at the studies to determine how many yielded positive and significant results, how many had insignificant results, and how many had negative and significant results.
- > Finally, we recognize that our analysis is a partial effort at understanding a complex reality. Our focus was on exploring and understanding what the studies had to say on the three specific questions outlined at the introduction to the report. Within these questions, we focused on common findings made by at least two out of the five studies. Given the scope of this report, we did not delve into other dimensions of education theory and practice.

## **SECTION TWO**

# Charter School Impact on Student Outcomes

Taken together, these five recent studies paint a picture of charter school students who perform as well as or better than the comparison group, although there are some differences in performance by sub-group. Student performance in charter schools is, in general, higher than student performance in the comparison group for three groups that have historically lagged behind: low-income students, urban students, and students with low prior achievement levels.

Analysis of the performance levels of three other subgroups – minority students, English learners (ELs) and students with disabilities – was conducted only by a small sub-set of studies, limiting our ability to draw conclusions. Only three of the studies looked at achievement levels disaggregated by race. All three found that minority students do better in charter schools compared to the comparison group. Only one of the studies looked at disaggregated results for ELs and students with disabilities and found that performance levels for these groups were comparable to the performance level for charter students as a whole. Table 2 provides a summary of findings.

#### Salient findings\*

- *Charter students overall* perform better in math and reading (4 of 5 studies)
- Low-income charter students perform better in math (all 5 studies) and reading (4 of 5 studies)
- Urban charter students perform better (5 of 5 studies) whereas non-urban charter students perform worse (2 of 2 studies)
- Charter students with *low prior* achievement perform better (2 of 3 studies)
- *Minority* charter students perform better (3 of 3 studies)
- Limited evidence that *ELs and students* with disabilities in charter schools perform better (only 1 study)
- No impact on student behavior (2 of 2 studies)

\* Statistically significant differences between charter students and the comparison group

overall and within student subgroups									
Study	Tuttle et al., 2013 (KIPP)	Hoxby et al., 2009 (NYC)	Angrist et al., 2011 (Mass)	Dobbie et al., 2011 (NYC)	Gleason et al., 2011 (National)				
All students in sample (math)	+	+	+	+	No difference				
All students in sample (reading)	+	+	+	+	No difference				
Low-income (math)	+	+	+	+	+				
Low-income (reading)	+	+	+	+	No difference				
Urban	+	+	+	+	+*				
Non-urban	NA	NA	-	NA	-*				
Low prior performance	+	NA	+	NA	No difference				
Minority	+	+	+ (urban)	NA	No difference				
English learner	+	NA	NA	NA	NA				
Special Education	+	NA	NA	NA	NA				

# Table 2: Charter school effects on math and English language arts achievement,

Kev:

Plus sign (+): Performance of charter students in this group is better than the comparison group with statistical significance at least at the 0.05 level

Minus sign (-): Performance of charter students in this group is worse than the comparison group with statistical significance at least at the 0.05 level

No difference: No statistically significant difference in performance found

NA: Not applicable since the study did not analyze the impact on this population

Parenthetical note signifies impact only for a particular sub-category of students within the group

\* Gleason et al. found that urbanicity was "no longer an influential factor" once other student characteristics were taken into account.

We elaborate on the five key findings below, reporting only statistically significant differences:

Overall, charter school students, especially low-income ones, performed as well as or better than the comparison group in math and reading: Four of the five studies found that charter school students outperformed the comparison group in math and reading, while the fifth, by Gleason et al., found no statistically significant difference in the performance level of the two groups in either subject. The positive impact was particularly strong for low-income charter school students. All five studies found positive and statistically significant impact on student achievement outcomes in math for lowincome students. Four out of the five studies found similar impact on student achievement outcomes in reading for low-income students. While these findings applied to the elementary, middle, and high school levels, not all studies covered all grades. Since all five studies covered the middle school, the results outlined here are most conclusive for grades 5-8.

Although focused just on New York City, the study by Hoxby et al. serves to underscore the extent to which impact is possible. The study reported that, on average, a student attending a charter school from grades K-8 would score 30 points higher on statewide math tests and 23 points higher on statewide English Language Arts (ELA) tests in the eighth grade than he or she would have if enrolled in a traditional public school for the same time period. The authors extrapolate that a gain of this magnitude would have closed much of the achievement gap between the average student in a low-income New York City neighborhood and the average student in an affluent suburb of New York City.

Hoxby et al. also found that a student who attends a charter high school has Regents examination (state-wide standardized examinations administered by the New York State) scores that are about 3 points higher for each year spent at the charter school prior to taking the test; and is about 7 percent more likely to earn a Regents diploma by age 20 for each year enrolled in that school. In a similar vein, the KIPP study by Tuttle et al. found that the average impact for a KIPP student on state tests three years after enrollment translated into an extra 11 months of learning in math and an extra 8 months of learning in reading over three years compared to national norms. This difference, the authors point out, is equivalent to closing 47% of the math achievement gap and 29% of the reading achievement gap between higher and lower income students.

While students in urban charter schools seem to be outperforming the comparison group, students in non-urban charter schools are lagging behind: All the studies found positive and statistically significant impact on student achievement outcomes for charter school students in urban areas, an intriguing finding since traditional public schools have historically found urban areas to be particularly challenging when it comes to improving student performance.<sup>ix</sup> Conversely, the two studies (Gleason et al. and Angrist et al.) that also looked at charter schools in non-urban areas found a statistically significant, negative impact compared to traditional public schools. Since controlling for school and student characteristics eliminated the difference, the authors of both studies postulate that the negative impact of charter schools in non-urban areas is being driven not by their location but by differences in student-level characteristics, such as student demographics, and/or school-level characteristics, such as the age of the school, length of school day, authorizer type, and total revenues by student.<sup>x</sup>

**Overall, students with low prior achievement levels in charter schools performed better than the comparison group:** Three studies (Tuttle et al., Angrist et al., and Gleason et al.) evaluated the performance of students with low prior achievement levels across the two groups. Of these, two found statistically significant positive impact in both reading and math, whereas the third found no statistically significant impact. The two studies that found positive impact (Angrist et al. and Tuttle et al.) also found that urban charter schools boost achievement levels most for students who start off with the lowest scores.

**There is some evidence, although limited, that minority students in charter schools performed better than or similar to the comparison group:** Four studies disaggregated the achievement effect data by race. Three studies (Tuttle et al., Hoxby et al., and Angrist et al.) found that Black and Hispanic students in urban settings performed better than the comparison group.<sup>xi</sup> Gleason et al. did not find any difference in the performance of minority students in charter schools as compared to the comparison group. Limited impact on student behavior and attitudes: Two studies – Tuttle et al. and Gleason et al. – looked beyond student learning outcomes to examine the impact of charter school admission or attendance on certain student behaviors and attitudes, but, in general, found no impact. Neither study found any impact of charter school admission or attendance on most measures of student engagement (such as student-reported involvement in extracurricular activities and effort in school) or student educational aspirations (as measured by student and parent expectations that the student will graduate from high school or aspires to attend and complete college). Tuttle et al. did find that KIPP students reported an additional 35 to 53 minutes per night spent on homework.

## **SECTION THREE**

# Profile of Students Enrolling in Charter Schools

If charter school students perform as well as or better than the comparison group, could this difference be attributed to differences in the profiles of the two student groups? This question has emerged as a central one in the debate over charter schools, with charter school critics asserting that charter schools "cream" students who are more advantaged, either because of demographic factors or because they have more motivated families, from traditional public schools and exit students who do not perform well.

As discussed elsewhere in this report, the lottery-based methodology mitigates this concern by comparing the performance of lottery winners and lottery losers who are drawn from the same pool of charter applicants and, thus, fundamentally share the same extrinsic and intrinsic characteristics. Additionally, the five studies compared the profile of students in the sampled charter schools with the profiles of students in traditional public schools.xii Each of the studies examined differences in profile along at least four aspects: prior achievement levels, income, race, ELs, and students with disabilities. We summarize their conclusions in Table 3. Our analysis indicates that charter schools covered by the studies generally serve higher proportions of low income and minority students, but lower proportions of ELs and students with disabilities.

#### Salient findings\*

- Charter schools generally serve higher proportions or comparable proportions of low income (3 of 5 studies) and Black students (4 of 5 studies)
- Charter schools generally serve lower proportions of Hispanic (4 of 5 studies), ELs (4 of 5 studies), and students with disabilities (3 of 5 studies)
- \* Charter students as compared to the comparison group

#### Table 3: Comparison of student characteristics in charter schools with student characteristics in traditional public schools

	Study	Tuttle et al., 2013 (KIPP) <sup>1</sup>	Hoxby et al., 2009 (NYC) <sup>2</sup>	Angrist et al., 2011 (Mass) <sup>3</sup>		Dobbie et al., 2011 (NYC)⁴	Gleason et al., 2011 (National)⁵
				Urban	Non- Urban		
S	Low-income students	+	+	+	-	No Difference	No Difference
stic	Black students	+	+	+	-	+	-
acteri	Hispanic students	-	-	-	-	-	No Difference
t Char	English learners*	-	-	-	-	-	No Difference
tuden	Students receiving special ed.*	-	No Difference	-	+	-	No Difference
St	Baseline scores	-	No Difference	+	+	-	+

#### Key:

#### Rows:

**Plus sign (+):** disproportionately greater % of students with this characteristic in charter schools in sample compared to traditional public schools, at a statistical significance at least at the 0.05 level in cases where authors provided statistical tests; or, in the case of baseline scores, higher baseline scores for charter students.

**Minus sign (-):** disproportionately fewer % of students with this characteristic in charter schools in sample compared to traditional public schools, at a statistical significance at least at the 0.05 level in cases where authors provided statistical tests; or, in the case of baseline scores, lower baseline scores for charter students.

No difference: No statistically significant difference found

Parenthetical note signifies impact for a particular sub-group of students

\* Signifies participation in EL or Special Ed. Services, not eligibility

#### Columns:

<sup>1</sup> KIPP students compared to feeder elementary schools

<sup>2</sup> Lotteried students compared to traditional school students in NYC

<sup>3</sup> Lotteried students compared to traditional school students in MA. Results based on weighted average of middle and high school results reported. Results shown separately for non-urban and urban students because demographics differ significantly between regions. Since the study does not report statistical significance of differences, pluses and minuses are based on simple raw comparison of percentages or baseline scores.

<sup>4</sup> Lotteried students compared to all students in NYC

<sup>5</sup> Lottery losers (very similar to lottery winners) compared to all students in the schools they attended. Gleason et al. use this comparison as their measure of whether charter schools are "creaming" because it compares applicants to non-applicants. It looks at lottery losers, rather than lottery winners, because otherwise baseline achievement (measured in the first year after the lottery) could reflect charter school impact rather than pre-charter achievement.

We elaborate on four key findings below:

#### Charter schools serve the same or a greater proportion of low-income students, especially in

**urban areas:** All five studies used eligibility for free and reduced price lunch programs as a proxy for family income. Three of the five studies (Tuttle et al., Angrist et al.'s urban analysis, and Hoxby et al.) found higher proportions of low-income students in charter schools. Dobbie et al. and Gleason et al. found no statistical difference in the proportion of low-income students in charter schools compared to that of the comparison group. Angrist et al.'s non-urban analysis found a smaller percentage of low-income in non-urban charter schools.

Charter schools serve the same or a greater proportion of Black students, but a lower proportion of Hispanic students: Four of the five studies (all except Gleason, et al.) found that charter schools in their samples served a significantly greater proportion of Black students than in traditional public schools. Conversely, four out of five studies (all except Gleason, et al.) found that charter schools serve a smaller proportion of Hispanic students compared to traditional public schools. One reason for this difference may be that a lower percentage of Hispanic families apply to charter schools because of language, information, or cultural barriers.

**Charter students were disproportionately less likely to be classified as ELs or students with disabilities:** Four studies found that charter students were less likely to be classified as ELs, with the outlier, Gleason et al., finding no difference between charter students and the comparison group. One possible reason put forward by the studies for the lower percentages of ELs is the lower percentage of Hispanic students enrolled in sample charter schools, since Hispanic students constitute a majority of ELs. Three of the five studies (Dobbie et al., Tuttle et al., and Angrist et al.) also found that charter students were less likely to participate in special education programs, with Hoxby et al. and Gleason et al. finding that they had about the same probability of participating in special education. These findings are consistent with data from prior research indicating that charter schools enroll fewer students with disabilities.<sup>xiii</sup>

The researchers acknowledge that data reporting issues make it challenging to draw wider conclusions from these findings about lower EL and special education program enrollment in charter schools. For instance, Hoxby et al. point out that the percentages reported in their study reflect *participation* in programs for ELs and students with disabilities, not *eligibility*; in some cases, charter schools may underreport data on EL and special education program participation. In other cases, a charter school may use immersion or inclusion models rather than special programs to address the needs of ELs and students with disabilities and, thus, may not see the need to record them separately.<sup>xiv</sup>

**Research about the prior achievement levels of charter school students compared to the comparison group is inconclusive:** Two of the studies (Dobbie et al. and Tuttle et al.) found that charter students had lower baseline scores in math and English compared to the comparison group. On the contrary, Angrist et al. and Gleason et al. found that charter school applicants were, on average, higher achieving in both math and reading. Hoxby et al. did not draw conclusions since the population of charter students with prior test scores was too small to provide a reliable comparison.

No evidence that attrition rates from charter schools are higher for traditionally disadvantaged groups: Two of the studies looked at the data to see if there was any evidence of charter schools exiting students from traditionally disadvantaged groups. Neither found any evidence to this effect. The Tuttle et al. study examined whether KIPP schools exit students at higher rates. It found that attrition rates for KIPP schools are approximately equivalent, on average, to the attrition rates from district schools – 37% over three years for both groups – and that the rate of attrition from KIPP schools was significantly less than district schools for Black students, Hispanic students, and students eligible for free and reduced lunch.<sup>xv</sup> Hoxby et al. similarly found no evidence that students who returned to traditional public schools were more likely to be female, Hispanic, Black, low income or ELs.<sup>xvi</sup> Also, these students did not exhibit lower test scores or lower achievement gains compared to their fellow charter school students.

## **SECTION FOUR**

# **Charter School Practices**

One of the core elements of the value proposition of charter schools is their role as incubators of innovative practices. Indeed, many of the practices widely adopted by charter schools and often associated with the charter sector, such as increased instructional time and intensive tutoring, are increasingly being adopted by traditional public schools as well. But do these practices actually affect student achievement?

All five studies explored the relationship between certain school practices that are widely associated with charter schools and student achievement, although with varying levels of rigor. Dobbie et al., Hoxby et al., and Gleason et al. analyzed a diverse set of practices and conducted more rigorous analyses of the relationship between specific practices and student achievement. The Tuttle et al. analysis focused on school data and parent and student surveys from KIPP schools. Finally, the Angrist et al. study surveyed school leaders to understand the incidence of certain practices across urban and non-urban charter schools but did not conduct analyses to test for correlations between the practices and student performance.

It is important to note a few disclaimers and caveats before we summarize the results. Unlike the analysis of overall achievement effects, this portion of the studies could not rely on the lotterybased analysis. Instead, the studies examined the *correlation* between certain practices and the achievement effects found by the lottery portions of the studies. Thus, while interpreting results related to practices, it is important to note that the data merely show positive associations and do not necessarily indicate that these policies or practices cause achievement to improve. In particular, the lack of experimental variation in practices in the data sets (e.g., almost all schools in the Tuttle et al. study followed the same educational practices) limits the ability of researchers to infer causality between the practices and school effectiveness. Finally, the task of interpreting correlations is further complicated because some practices are routinely bundled together; for instance, a longer school year and a longer school day are often adopted together by most schools, making it difficult to extract the impact of each individual component. That stated, the practices that have been observed to have an effect are consistent with an extensive body of research exploring effective schools over the past 40 years.<sup>xvii</sup> Below, we summarize practices that the studies found to be correlated with student achievement as well as some practices that the studies found had no impact on student achievement. Appendix 3 presents the full list of practices analyzed by the studies.

## a. Practices correlated with student achievement

The majority of studies examined only a few practices. Among these, two practices were found by at least three studies each to affect student achievement positively: increased instructional time and a school-wide behavior system. The discussion below highlights these common findings across studies, as well as some other conclusions that were unique to one or more of the studies.

### Increased instructional time, especially on core subjects

All five studies found that urban charter schools in their data set stayed open longer than local traditional public schools. For example, Hoxby et al. found that the charter school year was about two and a half weeks longer than the traditional school year and the charter school day was 90 minutes longer than the traditional school day. Dobbie et al. found that high achieving charter schools provided more instructional time than other charter schools and traditional public schools. They found that high achieving charter elementary schools provided about 27% more instructional hours per year than a typical New York City school, while high achieving charter middle schools provided about 28% more. Charter schools that were not as high achieving as the high-performing charter schools, on the other hand, provided 11% and 21% more instructional time at the elementary and middle school levels respectively.<sup>xviii</sup>

The studies also found that increased instructional time is positively correlated with student achievement. Hoxby et al. and Dobbie et al. found a positive association between increased instructional time and student achievement. Gleason et al. found a positive association between a longer school day and student achievement in math, although no correlation was found between instructional time and student achievement in language arts. The findings of these analyses are also reflected in the Angrist et al. finding that urban charter schools spend more days in school per year and more minutes per day than non-urban charter schools. Readers may recall that the Angrist study found urban charter schools significantly outperformed non-urban charter schools with respect to student achievement.

More instructional time in itself may not be sufficient unless the time is devoted to core subjects. For instance, Tuttle et al. and Dobbie et al. found a positive association between longer time devoted to math and ELA and improved student achievement in these subjects. Furthermore, where core subjects were not taught during the extended hours, Tuttle et al. found a negative relationship between a longer school day and achievement.

### **School culture**

We have used the term "school culture" to describe a set of findings in four of the studies about the impact of certain school-wide behavioral norms on student performance (the fifth, Gleason et al., did not examine this area). We provide further detail below:

Dobbie et al. found that school culture and expectations, which it defines as "a relentless focus on academic goals and having students meet them...very high expectations for student behavior and discipline...and adherence to a 'No Excuses' philosophy" are positively correlated with student achievement. Similarly, Angrist et al. found the "No Excuses" policy to be more prevalent in urban schools than rural schools, but did not test for correlation with achievement. As described by various researchers, "No Excuses" schools emphasize strict discipline, extended time in school, and an intensive focus on basic reading and math skills.<sup>xix</sup>

- > Hoxby et al. similarly found positive correlation between schools having a mission statement that emphasizes academic performance and a "Small Rewards/Small Punishments disciplinary policy" and student academic performance. The authors define the Small Rewards/Small Punishments disciplinary policy as expecting small courtesies and punishing small infractions, usually at the classroom level.
- > Tuttle et al. finds that school-wide behavior systems are positively correlated with student achievement in reading and math. They define school-wide behavior systems as a combination of (1) behavior standards and discipline policies that are established and enforced consistently across the entire school and (2) a behavior code that includes positive rewards for students who consistently behave well and negative sanctions for students who violate rules.

In addition to these findings, we summarize below three practices that one or more studies found to be highly correlated with student achievement.

- > High-dosage tutoring Dobbie et al. found that high-achieving charter schools were far more likely to offer high-dosage tutoring, defined as teaching a small group of six or fewer students at least four times a week. For instance, 33% of high-achieving elementary schools in their sample offered high-dosage tutoring compared to 10% of low-achieving schools. They also found an association between higher-achieving middle schools and high-dosage tutoring. None of the other studies looked at this factor.
- > Use of data from interim assessments to inform differentiated instruction The two New York City based studies, Dobbie et al. and Hoxby et al., found a positive association between the use of data to inform instruction and student outcomes. Dobbie et al. found that gains in math and ELA were associated with regular interim assessments combined with four or more differentiation strategies. Hoxby et al. reported that achievement improved with regular diagnostic tests, although the effect was no longer significant when compared with other characteristics.
- > Teacher evaluation and compensation policies Dobbie et al. found that schools that give teachers formal or informal feedback ten or more times per semester have higher annual math and ELA gains. Hoxby et al. established that school policies that compensate teachers based on performance or duties, as opposed to seniority and credentials, are associated with student achievement.

## b. Practices not correlated with student achievement

Below, we have highlighted two practices that multiple studies examined without finding an evident association between the practices and student learning outcomes. Both concern issues central to education reform debates.

### **Teacher experience and credentials**

Research generally finds that teachers improve their practice in the early years of teaching, but that their performance levels off subsequently.<sup>xx</sup> This finding was supported by the three studies that looked at the impact of teacher experience on student outcomes. Tuttle et al. and Gleason et al. could not discern a correlation between the impact of charter schools and teacher experience. Dobbie et al. reported that charter schools with more certified teachers (89% or more) and more teachers with master's degrees (at least 11%) had lower gains than other charter schools.

### **Class size**

Class size reduction is widely debated as a potential influence on student learning outcomes. However, research into the impact of class size on student outcomes has been inconclusive, with class size reduction working for some students in certain settings, but found to be mixed or not discernible in other settings and circumstances.<sup>xxi</sup> The three studies that examined the impact of this practice (Tuttle et al., Hoxby et al., and Dobbie et al.) found no relationship between class size and student achievement.

## **SECTION FIVE**

# Implications

Overall, despite some variations and with the caveats identified in the methodology section, the five studies covered by this report suggest that charter school students perform as well as or better in math and reading as compared to the comparison group. The impact is most evident for low-income students, urban students, and students with low prior achievement levels, three groups that have historically lagged behind. The studies also indicate that charter students and applicants do not differ materially in terms of income level or race from the comparison group, although they are less likely to be classified as ELs or students with disabilities. Finally, the studies surface a small set of practices that seem to be positively associated with better student learning outcomes.

From our analysis, we outline below some of our key takeaways, posed in the form of questions for charter stakeholders:

How can the charter sector as a whole increase its impact on student outcomes? The early years of the charter sector were characterized by a few shining examples of charter schools whose individual performances did not translate into a sector-wide impact on student outcomes. However, the charter schools analyzed by the five studies covered by this report are, on the whole, having a positive average impact on student performance in math and reading, and especially on the performance of students who are low-income, urban, and with low prior achievement levels. Although the studies primarily covered charter schools that have lotteries due to demand and, thus, are likely to be better performers, these results are also consistent with other recent research, most notably a June 2013 study by CREDO, which found that charter schools are having a positive impact on student outcomes.<sup>xxii</sup> The challenge now is to accelerate this positive trend through strategies such as scaling up effective practices, replicating effective schools, starting high-quality individual schools, supporting underperforming schools, and closing ineffective ones.

- > How can the sector meet the needs of ELLs and students with disabilities? Overall, the studies suggest that charter schools tend to serve fewer ELs and students with disabilities, a conclusion that is in line with findings from other research. There is a strong need for charter schools to make a concerted effort and identify innovative ways to recruit, engage, and serve these student groups and their families. Individual charter schools that have successfully done so act as examples for others in the sector.
- What additional research is needed to shed light on the biggest dilemmas facing the charter school sector? There is a need for more studies focused on various geographies and populations of students that have been under-studied (e.g., nonurban, elementary, Hispanic, English learners, and special education students) to further validate the findings listed in this paper, especially given the large variation in charter school effectiveness identified by other studies.<sup>xxiii</sup> Additionally, research that follows charter school students beyond high school graduation would illuminate other charter school benefits, such as the impact on post-secondary access and persistence. Finally, as charter schools experiment with different approaches and innovative classroom models (e.g., models of blended learning), there is a need for research that identifies and validates best practice and helps the sector develop an understanding of the conditions necessary for success.
- > How can successful practices be replicated efficiently and effectively in the charter sector as a whole as well as in traditional public schools? One of the promises held out by charter schools is their role as nimble engines of innovation, identifying solutions to some of the most intransigent problems facing education today. Indeed, our analysis has surfaced several practices that are positively correlated with positive student learning outcomes. The challenge now lies in disseminating these and other best practices more widely, so that the sector moves beyond pockets of excellence. In this regard, there is a strong need for mechanisms that promote collaboration to ensure that learnings transition across charter schools as well as traditional public schools.

As more current and rigorous research on the effectiveness of charter schools emerges, it is our hope that the evolving base of evidence on what works will inform both policies and practices, thereby enabling the charter sector – and public education more widely – to close the achievement gap and move towards improved outcomes for all students.

# **APPENDICES**

# Appendix 1: Study Profiles

Below, we provide brief profiles on each of the studies highlighted in this report and additional detail about the methodology employed by the selected studies.

**National Study of KIPP Middle Schools, 2013.** Tuttle et al.<sup>xxiv</sup> examined 41 Knowledge is Power Program (KIPP) charter middle schools in 13 of the 19 states served by KIPP and the District of Columbia. A lottery-based study of applicants in 13 KIPP middle schools for the 2008-09 and 2009-10 school years compared lottery winners to lottery losers. A matched comparison study compared achievement outcomes of students at 41 KIPP schools to those of a sample of all students in the same district whose demographic characteristics and baseline achievement matched those of the treatment group. Student outcomes were measured using state test scores in ELA, math, science and social studies, together with a nationally norm-referenced test, the Terra Nova. Parent and student surveys measuring attitudes and behavior in grades 5-8 provided additional data.

**New York City Charter Schools, 2009.** Hoxby et al.<sup>xxv</sup> studied 93% of all charter school students in New York City enrolled in grades 3 through 12 at a charter school in operation as of the 2005-06 school year. The study used a lottery- based study to estimate charter schools' effect on student achievement. Achievement test results for lottery winners who attended charter schools<sup>xxvi</sup> and lottery losers who remained in regular public schools were evaluated for the school years between 2000-01 and 2007-08. The study also matched lottery applicants to their records in the New York City Department of Education administrative database to extract student characteristic data.

**Massachusetts Charter Schools, 2011.** Angrist et al.<sup>xxvii</sup> examined almost all charter schools in Massachusetts. A lottery-based study compared achievement test scores of lottery winners and lottery losers who applied for admission to 15 charter middle schools, nine urban and six non-urban, and six charter high schools, mostly in the Boston area. An observational study compared achievement test scores of a broad sample of charter school students in Massachusetts to a broad sample of traditional public school students. The study used Massachusetts Department of Education administrative and test data from 2001-2008 and data from school administrator surveys to identify school instructional practices that might be linked to school effectiveness.

**New York City Charter Schools, 2011.** Dobbie and Fryer<sup>xxviii</sup> examined only charter elementary and middle schools in New York City. A lottery-based analysis compared achievement outcomes of lottery winners and lottery losers who applied to 13 elementary charter schools and nine charter middle schools. An observational study compared outcomes for students attending 22 charter elementary and 13 charter middle schools and a sample of students attending traditional public schools in the school zones that charter students were zoned to attend. The study used administrative and test data from 2003-04 to 2009-10 provided by the New York City Department of Education. Supplemental data included school specific data gathered from interviews with principals, teachers, and students, coded lesson plans, and videotaped classroom observations.

**National Study of Charter Middle Schools, 2010.** Gleason et al.<sup>xxix</sup> compared lottery winners and lottery losers who applied for admission to 36 charter middle schools in 15 states for 2005-06 and 2006-07. The study collected student administrative and test data from states, districts, and schools for the baseline year and two subsequent years. Surveys of students, parents, principals, and authorizers of the participating charter schools provided additional data.

# Appendix 2: Charter Effectiveness Studies, Detailed Summary

Article name, Date Published	Principal Author	Data analyzed for study	Methodology used	Grades Included	Number of schools in study	Study seeks to identify practices of successful schools?	Geography
KIPP Middle Schools: Impacts on Achievement and Other Outcomes Feb 2013	Christina Tuttle et al.	State, district and school data including state test scores, Terra Nova nationally norm- referenced test, student attitude/ behavior surveys; principal web- based surveys. National Center for Education Statistics (NCES) data including Common Core of Data (CCD) and Private School Survey (PSS).	Lottery– based study using Intent to Treat (ITT) regression model and Treatment on the Treated (TOT) impact- based model Matched comparison design study. Propensity score matching technique.	5-8	13	Yes	National 13 states + DC
The Evaluation of Charter School Impacts Jun 2010	Philip Gleason et al.	State, district and school administrative data. State test results (converted to a comparable scale), Principal, student and parent surveys. Authorizer and state surveys.	Lottery-based study	4-7	36	Yes	National, 15 states

Article name, Date Published	Principal Author	Data analyzed for study	Methodology used	Grades Included	Number of schools in study	Study seeks to identify practices of successful schools?	Geography
Getting Beneath the Veil of Effective Schools: Evidence from New York City Nov 2011	William Dobbie and Roland Fryer	NYC DOE demographic data and state test scores. Principal, teacher and student interviews; coded lesson plans, videotaped classroom observations.	Lottery-based study Observational study using matching and regression estimators	3-5 5-8 3-5 5-8	13 (ES) 9 (MS) 22 (ES) 13 (MS)	Yes	New York
Student Achievement in Massachusetts' Charter Schools Jan 2011	Joshua Angrist et al.	State MCAS test scores. School administrator surveys.	Lottery-based study Observational Study using matching and regression models	4-12 4-12	15 (MS) 6 (HS) 50 (MS) 31 (HS) 3 (alt HS)	Yes	MA (9 urban MS, 6 non- urban MS; 4 urban HS, 2 non-urban HS in lottery -based study)
The New York City Charter Schools Evaluation Project Sept 2009	Caroline Hoxby et al.	Administrative database of NYC Department of Education ("New York City Basic Educational Data System").	Lottery-based study using multiple regression.	3-12	43	Yes	New York (93% of NYC charter schools, 94% of entrants are lotteried)

Key: ES: Elementary school; MS: Middle school; HS: High school; alt HS: alternative high school

# Appendix 3: Achievement Effects of School Practices

	Study	Tuttle et al., 2013 (KIPP)	Hoxby et al., 2009 (NYC)	Angrist et al., 2011 (Mass)	Dobbie and Fryer, 2011 (NYC)	Gleason et al., 2011 (National)
	Use of data to guide instruction		+		+	
	High-dosage tutoring				+	
	Use of ability grouping					+ (math)
	Principal experience	+				
	School-wide behavior system	+	+	+(urban)	+	
	Longer school day/ year	+	+	+(urban)	+	+ (weak, math)
	Increased time in core subjects	+	+ (reading)	+(urban)	+	
ices	Internal evaluation/ regular feedback for teachers		+		+	
	Teacher performance- based pay		+			
Pract	Mission statement emphasizing academic performance		+			
	Reserved parent seat on school board		-			
	Parental Engagement – regular feedback				+	
	Teacher certification; higher degrees or certification level				-	
	Smaller class size					
	Higher per pupil expenditure					+ (weak)
	Provision of wrap- around services				-	
	Higher total school enrollment					- (math)

Key: plus sign (+): positive impact; minus sign (-): negative impact; parenthetical note signifies impact for a particular sub-group of students

## **END NOTES**

<sup>i</sup> "The Public Charter School Dashboard." NAPCS Dashboard. January 1, 2013. Accessed September 19, 2014. http:// dashboard.publiccharters.org/dashboard/home and "Laws & Legislation." The Center for Education Reform. January 1, 2014. Accessed September 19, 2014. https://www.edreform.com/issues/choice-charter-schools/lawslegislation/

<sup>ii</sup> Tuttle, Christina; Gill, Brian; Gleason, Phillip; Knechtel, Virginia; Nichols-Barrer, Ira; Resch, Alexandra (2013). *KIPP Middle Schools: Impacts on Achievement and Other Outcomes*. Mathematica Policy Research

<sup>III</sup> Gleason, Phillip; Clark, Melissa; Tuttle, Christina Clark; Dwoyer, Emily. (2010). *The Evaluation of Charter School Impacts*. Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, U.S. Department of Education.

<sup>iv</sup> Dobbie, Will & Fryer Jr., Roland G. (2011). *Getting Beneath the Veil of Effective Schools: Evidence from New York City*. Center for Education Policy Research, Harvard University.

<sup>v</sup> Angrist, Joshua D.; Cohodes, Sarah R.; Dynarski, Susan M.; Fullerton, Jon B.; Kane, Thomas J.; Pathak, Parag A.; Walters, Christopher R. (2011). *Student Achievement in Massachusetts' Charter Schools*. Center for Education Policy Research, Harvard University.

<sup>vi</sup> Hoxby, Caroline M.; Murarka, Sonali; Kang, Jenny (2009). *How New York City's Charter Schools Affect Achievement*. The New York City Charter Schools Evaluation Project. Unless otherwise noted, references to the Hoxby et al. report refer to the Technical Report.

<sup>vii</sup> For instance, Gleason et al. also found that charter schools in the study shared some similarities with charter schools not in the study (e.g., location, size, resources available, autonomy, and operating structure), but also differed in other aspects (e.g., teacher salary, student profile, and academic programming). Together these factors suggest a need for caution in generalizing the results to all charter schools.

Viii See http://www.crpe.org/sites/default/files/pub\_NCSRP\_BettsTang\_Oct11\_0.pdf for an example of such a metaanalysis

<sup>ix</sup> One study (Gleason et al.) found that urbanicity was "no longer an influential factor" once other student characteristics were taken into account (p. xviii).

\* Gleason et al. control for both student level and school level factors; Angrist et al. control only for student level factors.

<sup>xi</sup> Angrist et al. reported positive impacts on English language and math scores for non-white middle and high school students in urban charter schools (except for Hispanic high school students in math). Tuttle et al. and Hoxby et al. found positive impact for charter students overall and no different impact for minority students, leading us to infer positive achievement impact for minority students.

<sup>xii</sup> The studies defined the comparison groups in slightly different ways. We note the comparison groups in the notes to Table 3.

<sup>xiii</sup> GAO "CHARTER SCHOOLS: Additional Federal Attention Needed to Help Protect Access for Students with Disabilities" Retrieved from http://www.gao.gov/products/GAO-12-543;

<sup>xiv</sup> For further exploration of the possible reasons for the gap in enrollment of SPEDs, please see the following: M. A. Winters. *Why the Gap? Special Education and New York City Charter Schools*. Center for Reinventing Public Education. September 2013; [2] L. M. Rhim and P. O'Neill. *Improving Access and Creating Exceptional Opportunities for Students with Disabilities in Public Charter Schools*. National Center for Special Education in Charter Schools. October 2013

<sup>xiv</sup> Individualized Education Program (IEP), Team Meetings and Changes to the IEP. U.S. Department of Education, Office of Special Education Programs 10.04.06 http://idea.ed.gov/explore/view/p/%2Croot%2Cdynamic%2CTopica IBrief%2C9%2C

<sup>xv</sup> Tuttle et al. do not present separate results for ELs or SPEDs. Black student attrition rates derived from a prior Mathematica working paper.

<sup>xvi</sup> Hoxby et al. do not show results for SPEDs.

<sup>xvii</sup> For a summary of early effective schools research, see Edmonds, Ronald. 1979. "Effective Schools for the Urban Poor." Educational Leadership, 37(1):15-24.

<sup>xviii</sup> Dobbie, Will, and Roland G Fryer. "Getting Beneath the Veil of Effective Schools: Evidence From New York City." *American Economic Journal: Applied Economics*, 2011, 9. Accessed September 19, 2014. http://www. nyccharterschools.org/sites/default/files/resources/effective\_schools\_fryer.pdf.

<sup>xix</sup> Carter, Samuel C. 2000. *No Excuses: Lessons from 21 High-Performing, High-Poverty Schools*. Heritage Foundation and Thernstrom, Abigail, and Stephan Thernstrom. 2004. *No Excuses: Closing the Racial Gap in Learning*. Simon & Schuster.

<sup>xx</sup> See http://www.urban.org/uploadedpdf/1001455-impact-teacher-experience.pdf for a summary of the research.

<sup>xxi</sup> See http://www.brookings.edu/research/papers/2011/05/11-class-size-whitehurst-chingos for a summary of the research.

<sup>xxii</sup> Cremata, E., Davis, D., Dickey, K., Lawyer, K, Negassi, Y., Raymond, M.E., and Woodworth, J.L. (2013, June 25). *National charter school study 2013*. Stanford, CA: Stanford University. Retrieved from http://credo.stanford.edu/ documents/NCSS%202013%20Final%20Draft.pdf. The CREDO study does not use the lottery-based methodology and hence, was not selected as one of the studies analyzed for this paper.

<sup>xxiii</sup> Cremata, E., Davis, D., Dickey, K., Lawyer, K, Negassi, Y., Raymond, M.E., and Woodworth, J.L. (2013, June 25). *National charter school study 2013*. Stanford, CA: Stanford University. Retrieved from http://credo.stanford.edu/ documents/NCSS%202013%20Final%20Draft.pdf

<sup>xxiv</sup> Tuttle, Christina; Gill, Brian; Gleason, Phillip; Knechtel, Virginia; Nichols-Barrer, Ira; Resch, Alexandra (2013). *KIPP Middle Schools: Impacts on Achievement and Other Outcomes.* Mathematica Policy Research

<sup>xxv</sup> Hoxby, Caroline M.; Murarka, Sonali; Kang, Jenny (2009). *How New York City's Charter Schools Affect Achievement*. The New York City Charter Schools Evaluation Project.

xxvi Treatment-on-the-treated effects were estimated using lotteried-in status as an instrument for enrollment.

<sup>xxvii</sup> Angrist, Joshua D.; Cohodes, Sarah R.; Dynarski, Susan M.; Fullerton, Jon B.; Kane, Thomas J.; Pathak, Parag A.; Walters, Christopher R. (2011). *Student Achievement in Massachusetts' Charter Schools*. Center for Education Policy Research, Harvard University.

<sup>xxviii</sup> Dobbie, Will & Fryer Jr., Roland G. (2011). *Getting Beneath the Veil of Effective Schools: Evidence from New York City*. Center for Education Policy Research, Harvard University.

<sup>xxix</sup> Gleason, Phillip; Clark, Melissa; Tuttle, Christina Clark; Dwoyer, Emily. (2010). *The Evaluation of Charter School Impacts*. Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, U.S. Department of Education.

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