



credo
CENTER FOR RESEARCH ON EDUCATION OUTCOMES

Charter School Performance in
South Carolina
2019

Charter School Performance in
South Carolina
2019



credo

CENTER FOR RESEARCH ON EDUCATION OUTCOMES

© 2019 CREDO

Center for Research on Education Outcomes
Stanford University
Stanford, CA
<https://credo.stanford.edu>

CREDO, the Center for Research on Education Outcomes at Stanford University, was established to improve empirical evidence about education reform and student performance at the primary and secondary levels. CREDO at Stanford University supports education organizations and policymakers in using reliable research and program evaluation to assess the performance of education initiatives. CREDO's valuable insight helps educators and policymakers strengthen their focus on the results from innovative programs, curricula, policies and accountability practices.

Acknowledgements

CREDO gratefully acknowledges the support of South Carolina's Department of Education, which contributed its data to this partnership. Our data access partnerships form the foundation of CREDO's work, without which studies like this would be impossible. We strive daily to justify the confidence you have placed in us.

Disclaimers

The views expressed herein do not necessarily represent the positions or policies of the organizations noted above. No official endorsement of any product, commodity, service or enterprise mentioned in this publication is intended or should be inferred. The analysis and conclusions contained herein are exclusively those of the authors and are not endorsed by any of CREDO's supporting organizations, their governing boards, or the state governments, state education departments or school districts that participated in this study.

This research used data collected and maintained by South Carolina's Department of Education. Results, information and opinions solely represent the analysis, information and opinions of the author(s) and are not endorsed by, or reflect the views or positions of, grantors, South Carolina's Department of Education or any employee thereof.

Table of Contents

Introduction	1
Study Approach	3
South Carolina Charter School Demographics	6
Analytic Findings of Charter School Impacts	9
Overall Charter School Impact on Student Progress	9
Charter School Impact by Growth Period	11
Charter School Impact by Students' Years of Enrollment	12
Charter School Impact by School Attribute	13
Charter School Impact by Delivery System	13
Charter School Impact by School Locale	16
Charter School Impact by School Grade Configuration	17
School-Level Analysis	18
The Range of School Quality	18
Growth and Achievement	20
Charter School Impacts by Student Subgroups	23
Charter School Impact for Students by Race/Ethnicity	23
Charter School Impact for Students in Poverty	29
Charter School Impact for Students in Poverty by Race/Ethnicity	32
Charter School Impact for English Language Learners	38
Charter School Impact for Special Education Students	40
Synthesis and Conclusions	43
APPENDICES	46
Appendix A: Descriptive Patterns of Achievement	47
Time Trend of Charter, Matched Charter, TPS, Feeder TPS, and VCR student achievement	47
Average Charter and VCR Achievement by Years in Charter	49
Appendix B: Sample Size in Each Subgroup	51
Appendix C: Technical Appendix	52
Source of Student-Level Data	52
Demographic Composition of Charter Students in the Study	52
Comparison of Starting Scores of Matched Students and VCRs	54
Measuring Academic Growth	55
Model for the Analysis of the Academic Impact of Charter Schools	55
Presentation of Results	56

Table of Figures

Figure 1: CREDO Virtual Control Record Methodology	4
Figure 2: Opened, Continuing, and Closed Charter Campuses, 2013-14 to 2017-18	6
Figure 3: Average Learning Gains in SC Charter Schools Compared to Gains for TPS VCRs	10
Figure 4: Average Learning Gains in SC Charter Schools Compared to Gains for VCR Students by Growth Period, 2015-2018	11
Figure 5: Average Learning Gains in SC Charter Schools Compared to Gains for VCR Students by Years in Charter	12
Figure 6: Student Learning Gains for Students in Online and Brick-and-Mortar Charter Schools Benchmarked against Learning Gains for Average TPS VCRs	14
Figure 6a: Student Learning Gains in Online Charter Schools Benchmarked against Students in Brick-and-Mortar Charter Schools.....	15
Figure 7: Average Learning Gains in SC Brick-and-Mortar Charter Schools Compared to Gains for VCR by School Locale	16
Figure 8: Average Learning Gains in SC Charter Schools Compared to Gains for VCR by School Grade Configuration	17
Figure 9: Relative Learning Gains for White Charter School Students Benchmarked against Their White TPS Peers	24
Figure 10: Learning Gains of Black Students Benchmarked against Learning Gains of White TPS Students	25
Figure 10a: Relative Learning Gains for Black Charter School Students Benchmarked against Their Black TPS Peers	26
Figure 11: Learning Gains of Hispanic TPS and Charter Students Benchmarked against Learning Gains of White TPS Students.....	27
Figure 11a: Relative Learning Gains for Hispanic Charter School Students Benchmarked against Their Hispanic TPS Peers	28
Figure 12: Overall Learning Gains for TPS and Charter Students in Poverty Compared to Students Not in Poverty	30
Figure 12a: Relative Learning Gains for Charter School Students in Poverty Benchmarked against Their TPS Peers in Poverty	31
Figure 13: Learning Gains of White TPS and Charter Students in Poverty Compared to Learning Gains of White TPS Students Not in Poverty.....	32
Figure 13a: Relative Learning Gains for White Charter School Students in Poverty Benchmarked against Their White TPS Peers in Poverty	33
Figure 14: Learning Gains of Black TPS and Charter Students in Poverty Compared to Learning Gains of White TPS Students Not in Poverty	34
Figure 14a: Relative Learning Gains for Black Charter School Students in Poverty Benchmarked against Their Black TPS Peers in Poverty	35
Figure 15: Learning Gains of Hispanic TPS and Charter Students in Poverty Compared to Learning Gains of White TPS Students Not in Poverty	36

Figure 15a: Relative Learning Gains for Hispanic Charter School Students in Poverty Benchmarked against Their Hispanic TPS Peers in Poverty.....37

Figure 16: Learning Gains for TPS and Charter Students with ELL Designation Compared to Non-ELL TPS Students38

Figure 16a: Relative Learning Gains for ELL Charter School Students Benchmarked against Their ELL TPS Peers39

Figure 17: Overall Learning Gains for TPS and Charter Students in Special Education Compared to TPS Students Not in Special Education40

Figure 17a: Relative Learning Gains for Charter School Students in Special Education Benchmarked against Their TPS Peers in Special Education41

Appendix Figure 1: Comparison of Reading Student Achievement in TPS, Feeders, VCR, Charter, and Matched Charter over Time47

Appendix Figure 2: Comparison of Math Student Achievement in TPS, Feeders, VCR, Charter, and Matched Charter over Time48

Appendix Figure 3: Comparison of Reading Achievement of Charter Students and VCRs by Years in Charter49

Appendix Figure 4: Comparison of Math Achievement of Charter Students and VCRs by Years in Charter50

Appendix Figure 5: Comparison of Starting Reading Scores of Matched Charter Students and VCRs54

Appendix Figure 6: Comparison of Starting Math Scores of Matched Charter Students and VCRs55

Table of Tables

Table 1: Demographic Comparison of Students in TPS, Feeders and Charters: 2016-17	7
Table 2: Demographic Composition of Overall, Brick-and-Mortar, and Online Charter Schools: 2016-17	8
Table 3: Transformation of Average Learning Gains to Days of Learning.....	10
Table 4: Performance of Charter Schools Compared to Traditional Schooling Alternatives in South Carolina.....	19
Table 5: School-Level Reading Growth and Achievement in SC Charter Schools	21
Table 6: School-Level Math Growth and Achievement in SC Charter Schools	22
Table 7: Charter School Impact on Student Subgroup Performance	42
Table 8: Summary of Statistical Significance of Findings for South Carolina Charter School Students Benchmarked Against Comparable TPS Students	43
Appendix Table 1: Number of Observations for All Results.....	51
Appendix Table 2: Demographic Composition of Charter Students in the Study: Period 1.....	52
Appendix Table 3: Demographic Composition of Charter Students in the Study: Period 2.....	53
Appendix Table 4: Demographic Composition of Charter Students in the Study: Period 3.....	53
Appendix Table 5: Demographic Composition of Charter Students in the Study: Period 4.....	53

List of Acronyms & Definitions

CREDO	Center for Research on Education Outcomes
EOC	End-of-Course Exam
ELLs	English Language Learners
TPS	Traditional Public School
VCR	Virtual Control Record
NAEP	National Assessment of Educational Progress
NCES	National Center for Education Statistics
Feeder	A feeder school is a traditional public school whose students have transferred to a given charter school. We use students attending feeder schools as potential matches for students attending charter schools.
Growth	The year-to-year change in academic performance relative to one's peers. Growth can be positive or negative.

Charter School Performance in South Carolina 2019

Introduction

Charter schools have been offering educational choices to families across the nation for over two decades. At the same time, the charter school movement has received criticism in many states with supporters praising the charter autonomy and opponents protesting the allocation of public school resources to charters. Only a fraction of the debate is grounded in well-researched evidence about charter school practices and their impact on student outcomes. This study continues CREDO's tradition in expanding the evidence base on charter school performance in the United States. This study offers an inaugural evaluation of charter school performance in South Carolina.

Since the enactment of South Carolina's public charter school law in 1996, more than 100 public charter schools in South Carolina have offered parents and students choices in their primary and secondary education. The original charter school law in South Carolina had a clear vision about the mission of charter schools in the state. The purpose of charter schools, according to the charter school law, is to create new, innovative, and flexible ways to promote educational improvement for all students and to close the achievement gaps between low- and high-performing student groups.¹

To deliver the promise of educational improvement, South Carolina's charter school law determines who can authorize a charter school and what expectations charter schools have to meet. Charter schools in South Carolina can be authorized by a public school district, the South Carolina Public Charter School District, or an institution of higher education. Authorizers are required to close charter schools that do not meet certain performance criteria over a period of time or that do not have similar racial composition to the local or target school district. In an effort to drive charter schools to deliver on their promise, in June 2019, lawmakers started exploring a proposal to tie public funding to academic performance.

Recent discussion on strengthening charter school accountability in South Carolina provides a fortunate timing for this study of the impact of charter school attendance on student academic progress in the state. Previously, there has not been a systematic study of charter school performance in South Carolina. The contribution of charter schools to student outcomes is particularly of interest, where South Carolina standings in NAEP assessments have shown persistent low achievement. By looking at the impact of charter schools on educational

¹ Sections 59-40-20 and 59-40-30 of the South Carolina Charter Schools Act of 1996.

trajectories, this study provides clear implications on whether South Carolina charter schools serve their mission of educational improvement and closed achievement gaps. This report has two main benefits. First, it provides a rigorous and independent view of the performance of the state'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 benchmarking both nationally and in other locations.

With the cooperation of South Carolina's Department of Education, CREDO obtained the historical sets of student-level administrative records for the school years from 2013-14 to 2017-18. The support of the South Carolina Department of Education's staff was critical to CREDO's understanding of the character and quality of the data we received. It is important to note that the entirety of interactions with the department dealt with technical issues related to the data. CREDO independently has developed the findings and conclusions presented here.

In this report, we present results from three sets of analysis. The first type of analysis concerns the overall impact of charter schooling. These results are expressed in terms of the academic progress that a typical charter school student in South Carolina would realize from a year of enrollment in a charter school. To help the non-technical reader grasp the findings, we translate the scientific estimates into estimated days of learning based on a typical 180-day school year.

The second set of findings looks at the performance of students by school attributes, as well as by school and presents school average results. Both legislation and public policy operate to influence school level decisions, so school-level results can provide important insights for policy makers. For example, a key school attribute is the instruction delivery system (i.e., online or brick-and-mortar education). As online charter schools serve students with different characteristics and deliver curriculum differently from brick-and-mortar charters, we break down charter impact by brick-and-mortar charters and online charters. The school-level findings allow us to understand the range of performance at the school level.

The third set of analyses looks at the impact of charter school attendance on different student subgroups. In these examinations, we pay particular attention to the differences in academic progress between historically disadvantaged student groups and their less-disadvantaged peers. These differences – called learning gaps – are the building blocks of the achievement gaps and provide a clear view to the progress South Carolina is making on closing achievement gaps over time.

The results show that in a year's time, the typical charter school student in South Carolina exhibits similar academic progress in reading and weaker growth in math compared to the educational gains that the student would have made in a traditional public school (TPS). Thinking of a 180-day school year as "one year of learning," an average South Carolina charter student experiences about the same 180 days of learning in reading weaker annual growth in math equivalent to only 127 days of learning.

Across charter schools in South Carolina, important performance differences emerge. Roughly 30 percent of charter schools show academic progress that is significantly stronger than the local district options in reading

and 15 percent do so in math. In contrast, 22 percent of charter schools post academic progress that is significantly weaker than the traditional public schooling alternatives in reading and 33 percent for math. Finally, analysis across student race/ethnicity groups reveals little differences in student performance of students, except for white students. White charter students account for the majority of charter students in South Carolina and they experience lower learning gains in reading and math in charter schools compared to the learning they would have received in traditional public schools. In addition, the analysis shows students in poverty and students receiving special education services experience lower learning gains associated with their charter attendance.



[Click here for an infographic about the Virtual Control Record method.](#)

Study Approach

This study of charter schools in South Carolina focuses on the academic progress (growth) of students in South Carolina's charter schools. In order to study their progress over time, a regular measure of academic performance is needed, so the analysis is constrained to enrolled students who took the state-mandated accountability tests. Our outcome of interest is the one-year gain in learning of charter school students.

Whatever else charter schools may provide their students, their contributions to students' readiness for secondary education, high school graduation, and post-secondary life remains of paramount importance. If charter schools do not succeed in forging strong academic futures for their students, they have failed in their mission. Furthermore, current data limitations prevent the inclusion of non-academic outcomes in this analysis.

To study academic performance of charter students in South Carolina, we relied on scores students received on South Carolina state standardized achievement tests. Achievement tests capture what a student knows at a point in time. These test results were fitted into a bell curve format that enabled us to see how students moved from year to year in terms of academic performance. Two successive test scores allow us to see how much progress a student makes over a one-year period; this is also known as a growth score or learning gain. (These terms are used interchangeably in this report.) Growth scores allow us to zero in on the contributions of schools separately from other things that affect point-in-time scores. The parsed effect of schools in turn gives us the chance to see how students' academic progress changes as the conditions of their education transform. This is the analytic foundation for our examination of the academic impact of enrollment in charter schools.

We employ the Virtual Control Record (VCR) method developed by CREDO in our analysis.² We strive to build a VCR for each charter school student. A VCR, or a "virtual twin", is a synthesis of the actual academic experiences

² Davis, D. H., & Raymond, M. E. (2012). Choices for studying choice: Assessing charter school effectiveness using two quasi-experimental methods. *Economics of Education Review*, 31(2), 225–236.

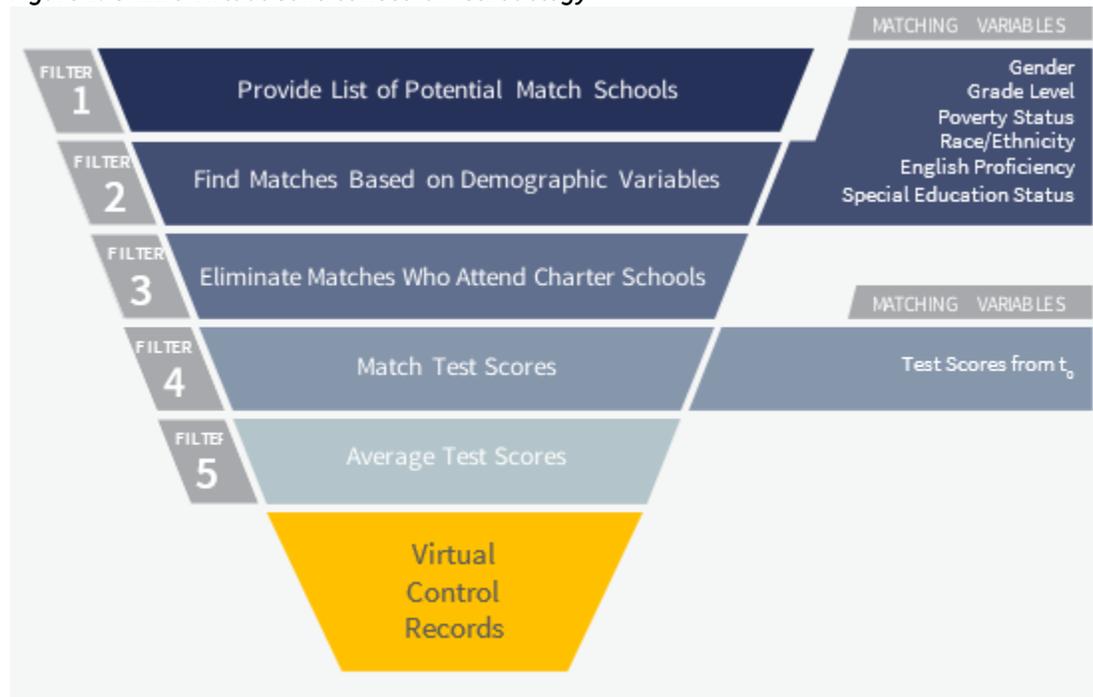
of up to seven students who are identical to the charter school student, except for the fact that the VCR students attend a TPS that each charter school's students would have attended if not enrolled in the charter school. This synthesized record is then used as the counterfactual condition to the charter 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 designated as a "feeder school." 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 who match each charter school student.

Match factors include:

- Grade level
- Gender
- Race/Ethnicity
- Poverty Status
- English Language Learner Status
- Special Education Status
- Prior test score on South Carolina state achievement tests

Figure 1: CREDO Virtual Control Record Methodology



At the point of selection as a VCR-eligible TPS student, all candidates and the individual charter school student have identical traits and matching baseline test scores. 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 result a charter student would have realized had he or she attended one of the traditional public schools.

The above VCR method has been used in previous CREDO publications. In our previous reports, if a charter student could be tracked for multiple periods in the study window, we matched the student for all the periods using the records in the year prior to the first growth period. In this study, we match the student period by period to conform to the new baseline equivalence criteria specified in Procedures Handbook Version 4.0 of What Works Clearinghouse (WWC).³ Altering the match in this way means that caution is advised when comparing findings in this study and previous reports.

Using statistical methods, we isolate the contributions of schools from other social or programmatic influences on a student's growth. Student growth data are analyzed in standard deviation units so that the results can be assessed for statistical differences. All the findings that follow are reported as the **average one-year growth** of charter school students relative to their VCR-based comparisons. With five years of student records in this study, it is possible to create four periods of academic growth. Additional details of the matching methodology are provided in the Technical Appendix. In this study of South Carolina, it was possible to create virtual matches for 85 and 84 percent of tested charter school observations in reading or math, respectively.

To assist the reader in interpreting the meaning of growth, we include an estimate of the number of days of learning required to achieve growth of particular units of standard deviations. This estimate was calculated by Dr. Eric Hanushek and Dr. Margaret Raymond based on the 2017 National Assessment of Educational Progress (NAEP) test scores.⁴ Using a standard 180-day school year, one standard deviation (s.d.) change in growth is equivalent to 590 days of learning.

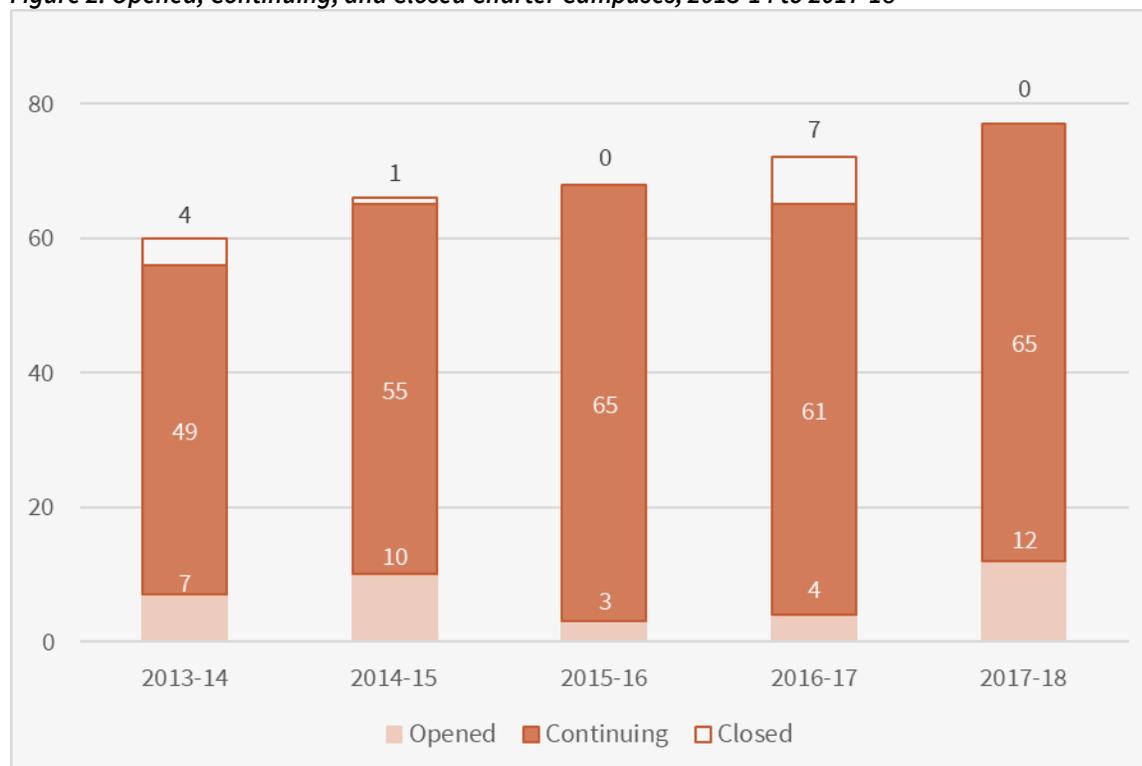
³ What Works Clearinghouse, "Procedures Handbook Version 4.0," 2017, https://ies.ed.gov/ncee/wwc/Docs/referenceresources/wwc_procedures_handbook_v4.pdf.

⁴ Detailed information about the 2017 NAEP test scores can be accessed via the "NAEP Reading Report Card" at https://www.nationsreportcard.gov/reading_2017/?grade=4 and the "NAEP Mathematics Report Card" at https://www.nationsreportcard.gov/math_2017/?grade=4.

South Carolina Charter School Landscape

The South Carolina charter school sector grew slightly over the five-year study period. Figure 2 notes annually the newly opened, continuing, and closed charter school campuses from the 2013-14 school year to the 2017-18 year according to the National Center for Education Statistics (NCES).⁵ Figure 2 portrays an upward trend in the number of charter schools open in South Carolina over the five-year period.

Figure 2: Opened, Continuing, and Closed Charter Campuses, 2013-14 to 2017-18



The overall size of the charter school community has three different components and Figure 2 shows that each is dynamic. The first component is the number of new charter schools that open in a given year. The second is the number of existing charter schools that continue operations from one year to the next. The third is the number of charter school campuses that are closed in a given year. In South Carolina, charter campus expansion was partly driven by opening of new campuses. Our analysis begins with a total of 60 charter schools in the 2013-14

⁵ The data were retrieved from “Public Elementary/Secondary School Universe Survey Data,” National Center for Education Statistics, <https://nces.ed.gov/ccd/pubschuniv.asp>. “Opened schools” indicates schools opened as new schools in the fall of the displayed year. “Continuing schools” indicates schools that were opened prior to the fall of the displayed year and remain open into the next school year (i.e. a school listed as continuing in the 2016-17 column opened some time prior to 2016-17 and did not close in 2016-16). There were no charter schools that ceased operation in the years covered in this study.

school year. In 2014-15 ten new schools opened and one school closed at the end of that school year. In 2015-16 we saw three new openings and zero closures. In 2016-17 there were four new school openings and seven school closures. In 2017-18, there were 12 new school openings, leaving the total number of charter schools at 77.

The demographics of student population in charter schools may not mirror those of the TPS in South Carolina as a whole. As charter schools are able to choose their location, the demographic profile of the set of students they attract may differ from the overall community profile. Furthermore, charter schools may offer different academic programs and different school models which may disproportionately attract particular groups of students relative to TPS. In addition, parents and students choose to attend charter schools for a variety of reasons, such as location, school safety, small school size, academic focus, or special interest programs. The cumulative result of all these forces is that the student populations at charter schools and their TPS feeders may differ.⁶ Table 1 presents the characteristics of the student populations in all South Carolina traditional public schools, in those TPS that comprise the set of charter feeder schools, and in the charter schools themselves in the 2016-2017 school year.

Table 1: Demographic Comparison of Students in TPS, Feeders and Charters: 2016-17

	TPS	Feeders	Charters
Number of Schools	1,187	740	70
Average Enrollment per School	622	670	467
Total Number of Students Enrolled	738,560	495,553	32,685
Students in Poverty	60%	60%	51%
English Language Learners	6%	6%	3%
Special Education Students	12%	12%	9%
White Students	51%	51%	62%
Black Students	34%	33%	26%
Hispanic Students	9%	10%	6%
Asian/Pacific Islander Students	2%	2%	2%
Native American Students	0%	0%	0%
Multi-Racial Students	4%	4%	3%

The data in Table 1 show that the demographic profile of charter schools is different from that of the public school population in South Carolina as a whole and also different from the feeder schools their students would otherwise attend. In fact, the demographics for the feeder schools are more similar to the TPS population than to the charter population. The charter schools in South Carolina have larger shares of white students and smaller proportions of black and Hispanic students than TPS and feeder schools. The percentage of students in poverty enrolled in charter schools is noticeably smaller than in TPS and feeders.

⁶ A feeder school is a traditional public school (TPS) whose former students have transferred to a given charter school. Each charter school has its own set of feeder TPS but a single TPS can serve as a feeder to multiple charter schools. We use students attending feeder schools as potential matches for students attending charter schools.

The proportion of students in charter schools receiving special education services is a continuing topic of focus and debate. As seen in Table 1, nine percent of students in South Carolina charter schools receive special education services; three percentage points lower than the student populations in TPS and the feeder schools. The percentage of South Carolina charter school students with English Language Learner (ELL) designation is smaller than the percentage of ELL students in both TPS and feeders. The student profile for the entire charter school community as displayed in Table 1, indicates that charter schools have somewhat smaller percentages of educationally disadvantaged students.

Online charter schools have received increasing national attention in the educational landscape. With no physical or geographic barriers to enrollment, online charter schools draw students from across the state and use online instruction as the method of curriculum delivery. People often use the terms of “online schools”, “cyber schools”, and “virtual schools” interchangeably. In this study, we identify six online charter schools in South Carolina.

As shown in a one-year snapshot in Table 2, online charter schools educate roughly 30 percent of South Carolina charter students and serve different student populations than brick-and-mortar charters. Of particular interest is the high share of white students in South Carolina online charter schools (74 percent), which is much higher than in brick-and-mortar charter schools, and even higher than TPS and feeders. This larger fraction helps explain why the share of students who are black, Hispanic, or Asian/Pacific Islanders in online charters is lower than in other charter schools. Online charters also serve fewer English language learners and more students living in poverty than brick-and-mortar charters. The percentage of special education students is greater in South Carolina online charters than in brick-and-mortar charters. Overall, within-sector comparisons in Table 2 indicate that online charter schools serve larger shares of students in poverty and students receiving special education but smaller shares of minority students compared to brick-and-mortar charters.

Table 2: Demographic Composition of Overall, Brick-and-Mortar, and Online Charter Schools: 2016-17

	Charters	Brick-and-Mortar Charters	Virtual Charters
Number of Schools	70	64	6
Average Enrollment per School	467	357	1,638
Total Number of Students Enrolled	32,685	22,858	9,827
Students in Poverty	51%	48%	59%
English Language Learners	3%	3%	1%
Special Education Students	9%	8%	10%
White Students	62%	56%	74%
Black Students	26%	29%	17%
Hispanic Students	6%	7%	4%
Asian/Pacific Islander Students	2%	2%	1%
Native American Students	0%	0%	1%
Multi-Racial Students	3%	3%	3%

Analytic Findings of Charter School Impacts

Overall Charter School Impact on Student Progress

A foundational question of this study is whether charter schools differ overall from traditional public schools in how much their students grow academically. To answer this question, we estimate the one-year academic gains observed for all matched charter school students in all growth periods and compare their average learning gain with that of the VCR students.

Please refer to the text box titled Graphics Roadmap No. 1 where guidance is provided to help readers understand the charts that follow.

As described in the Study Approach section, student growth data are analyzed in units of standard deviations so that the results can be assessed for statistical differences. To help the reader interpret our analysis results, we transform standard deviation units of growth into days of learning based on a standard 180-day school year (Table 3).⁷

In order to understand “days of learning,” consider a student whose academic achievement is at the 50th percentile in one grade and also at the 50th percentile in the following grade the next year. The progress from one year to the next equals the average learning gains for a student between the two grades. That growth is fixed as 180 days of effective learning based on the typical 180-day school year.

Students with positive differences in learning gains have additional growth beyond the expected 180 days of annual academic progress while those with negative differences in learning gains have fewer days of academic progress in that same 180-day period of time. Interested readers can refer to the Study Approach section and Appendix C (Technical Appendix) for additional details on the computation of days of learning.

⁷ The values in Table 3 are updated from past reports using the latest (2017) NAEP scores, which show slower absolute annual academic progress than earlier administrations. See Eric A. Hanushek, Paul E. Peterson, and Ludger Woessmann, “Achievement Growth: International and U.S. State Trends in Student Performance”, *Education Next* 12 (July 2012): 1-35

Graphics Roadmap No. 1

The graphics in this section have a common format.

Each graph presents the average performance of charter students relative to their **pertinent comparison students**. The reference group differs depending on the specific comparison being made. 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.

We show two axes on the graphs to help the reader get a sense of learning gains. The **left axis** indicates standard deviation units of learning gains of charter students relative to their comparison students. The **right axis** displays the same learning gains in days of learning. The statistical tests are performed on the values as they are enumerated on the left axis.

The **height** of the bars in each graph reflects the difference between charter school performance and the comparison student group.

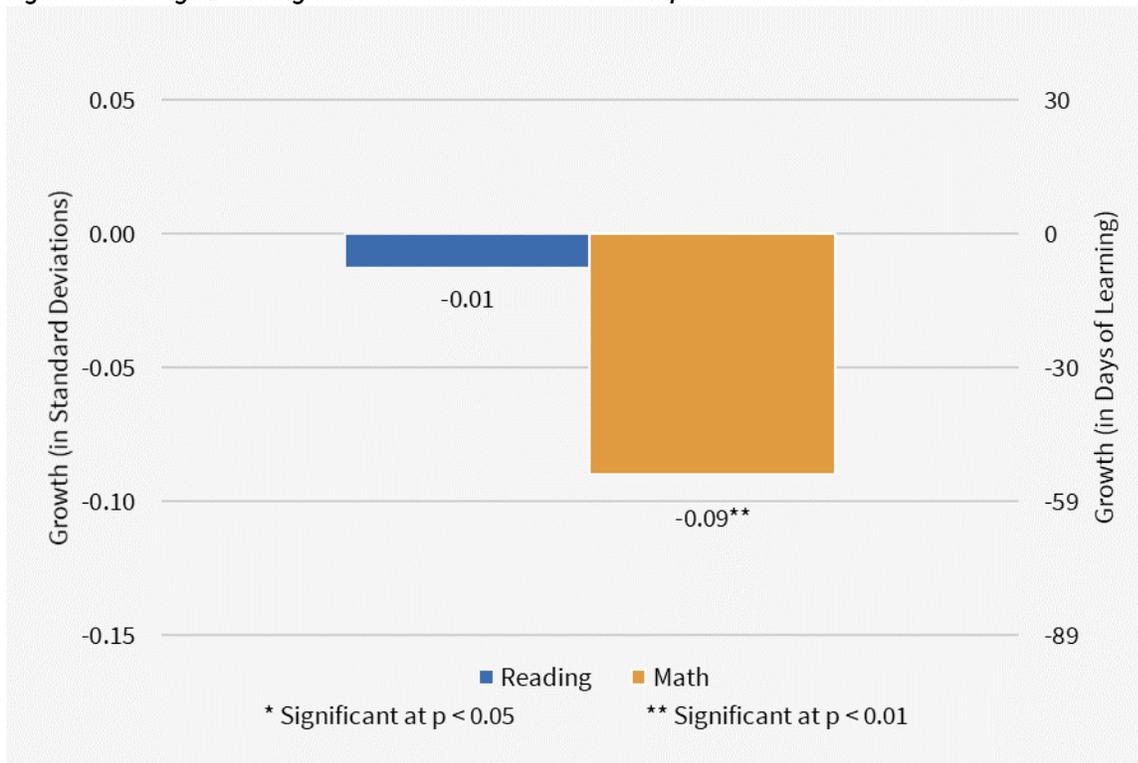
Stars are used to reflect the level of statistical significance of the difference between the group represented in the bar and its comparison group of similar students in TPS. The absence of stars means that the schooling effect is not statistically different from zero.

Table 3: Transformation of Average Learning Gains to Days of Learning

Standard Deviations	Days of Learning
0.05	30
0.10	59
0.15	89
0.20	118
0.25	148
0.30	177
0.35	207

Figure 3 displays the overall charter school impact on student academic progress in South Carolina. The reference group, represented by the 0.00 baseline in the graph, is the average TPS VCRs in the state. Using the results from Figure 3 and the transformations from Table 3, we can see that in a typical school year, charter students in South Carolina experience lower academic progress than their TPS peers in mathematics. The disadvantage for charter students is equivalent to 53 fewer days of learning in mathematics in a 180-day school year. Because the difference in the growth in reading is not statistically significant, South Carolina charter students experience similar growth in the 180-day period as they would have in a traditional school setting.

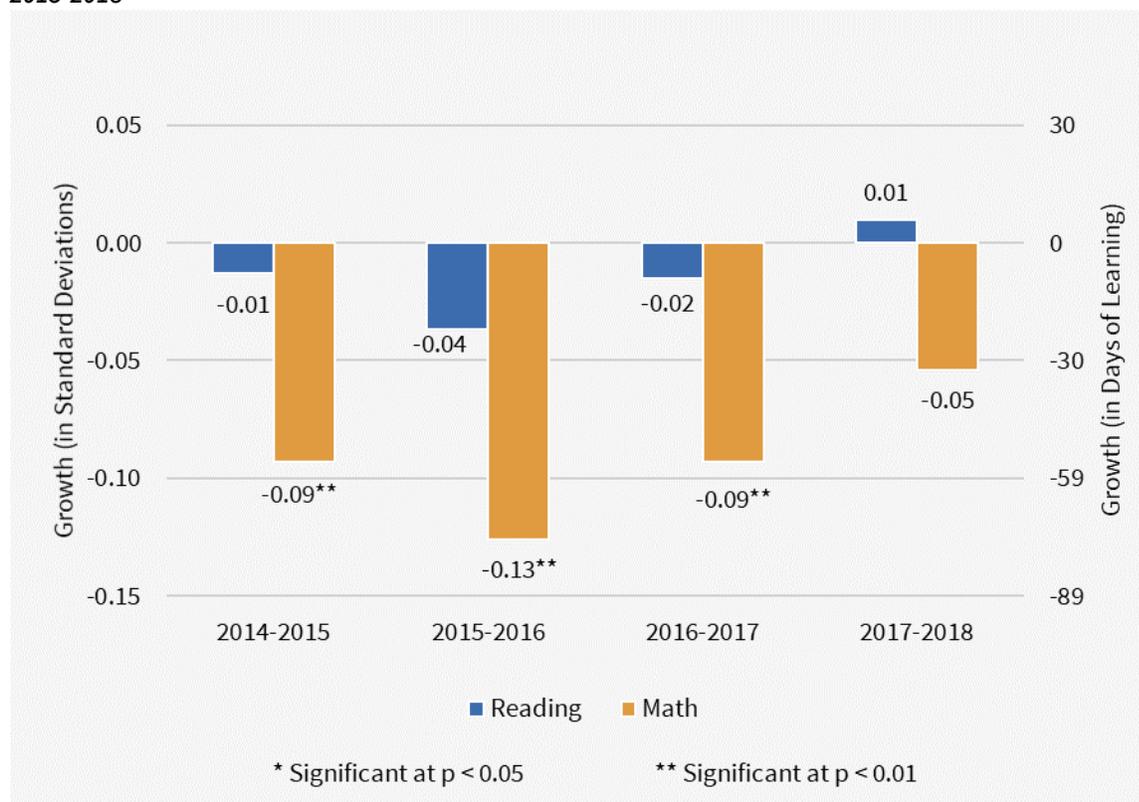
Figure 3: Average Learning Gains in SC Charter Schools Compared to Gains for TPS VCRs



Charter School Impact by Growth Period

To determine whether performance is consistent over the window of this study, the impact of attending a charter school on academic progress is examined separately for each of the four growth periods. Recall that a growth period is the measure of progress from one school year to the next. For example, in the presentation of results in Figure 4, the denotation "2015-2016" covers academic growth that occurred between the end of the 2014-2015 school year and the end of the 2015-2016 school year. Similarly, the denotation "2016-2017" corresponds to the year of growth between the 2015-2016 and the 2016-2017 school years.

Figure 4: Average Learning Gains in SC Charter Schools Compared to Gains for VCR Students by Growth Period, 2015-2018



Students in South Carolina charter schools posted learning progress in reading similar to the learning progress of their TPS counterparts across all growth periods that we studied, starting with 2014-15 and ending with 2017-18. At the same time, the gains of South Carolina charter school students in math changed over time. During the 2014-15 and the 2016-17 growth periods, charter students had 53 fewer days of learning progress in math than their TPS peers in the respective periods, while the gap was wider in 2015-16, reaching 77 fewer days of learning in math. The gains of South Carolina charter school students in the 2017-2018 growth period do not differ statistically from the performance of their TPS peers in math. Overall, the year-to-year trend is positive for South Carolina charter school students.

Charter School Impact by Students' Years of Enrollment

Students' academic growth may differ depending on how many years they enroll in a charter school. To test the relationship between progress and the length of enrollment in a charter school, we group separately test scores from students in the first year of charter enrollment, scores from students in their second year of charter attendance, scores from their third year of attendance, and scores of students in their fourth year in a charter school. In this scenario, the analysis is limited to the charter students who enroll for the first time in a charter school between the 2014-15 and 2017-18 school years and their TPS VCRs. Although this approach reduces the number of students included, it ensures an accurate measure of the effect of continued enrollment over time. The results for this subset of the full study sample should not be directly compared with other findings in this report. The results are shown below in Figure 5.

Figure 5: Average Learning Gains in SC Charter Schools Compared to Gains for VCR Students by Years in Charter

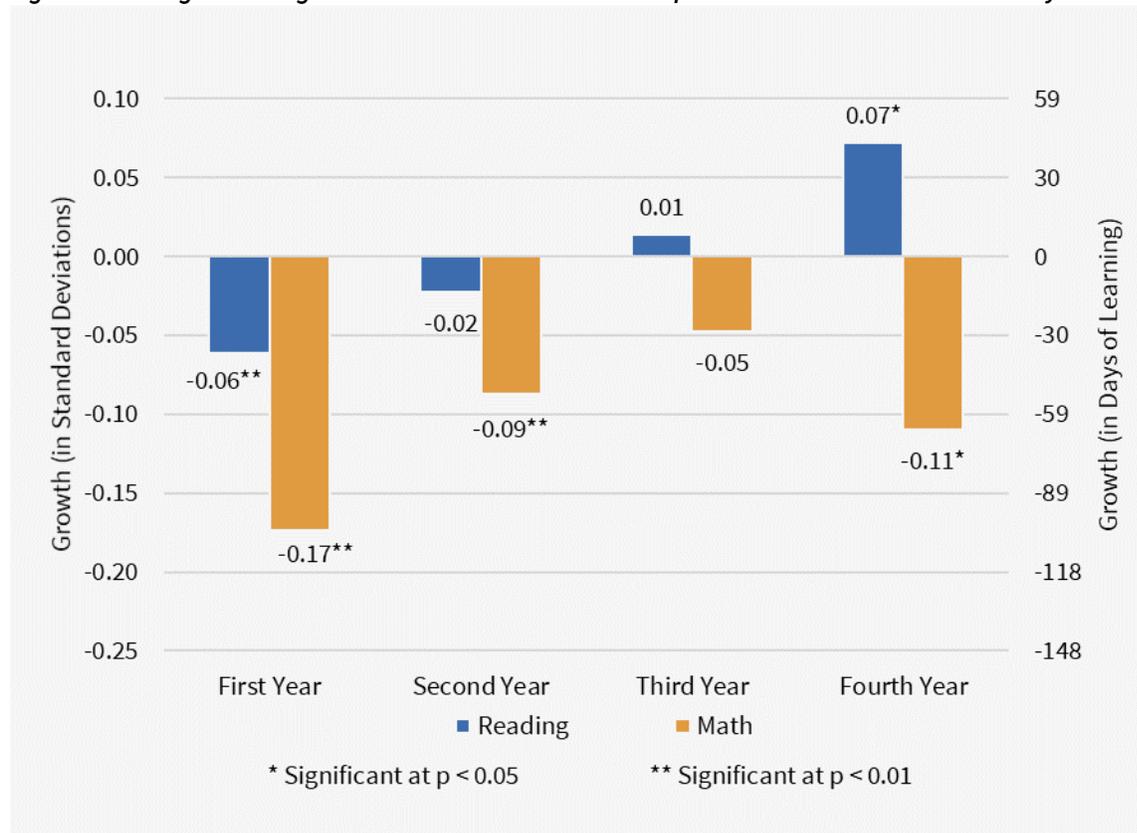


Figure 5 shows that South Carolina charter school students experience learning growth in the first year of charter attendance that is significantly weaker than that of VCR students enrolled in traditional public school settings. Students in their first year of charter school attendance have 35 and 100 fewer days of learning progress than their TPS counterparts in reading and math, respectively. Students in their second year of charter school attendance have similar growth in reading and weaker growth in math than students in a traditional public school setting; the gap amounts to 53 fewer days of learning in math. The learning progress of students in their third year of

charter school attendance is not different than the progress of their peers in TPS in either subject. Students in their fourth year of charter schooling post stronger academic progress in reading and weaker academic progress in math, compared to VCR students attending TPS. Students in the fourth year of charter attendance outperform their TPS counterparts by 41 additional days of learning in reading. At the same time, students in their fourth year of charter schooling have 65 fewer days of learning growth in math than their TPS peers. Overall, although learning growth in reading increases with the years of charter attendance, learning growth in math does not exhibit a consistent pattern.

Charter School Impact by School Attribute

Charter School Impact by Delivery System

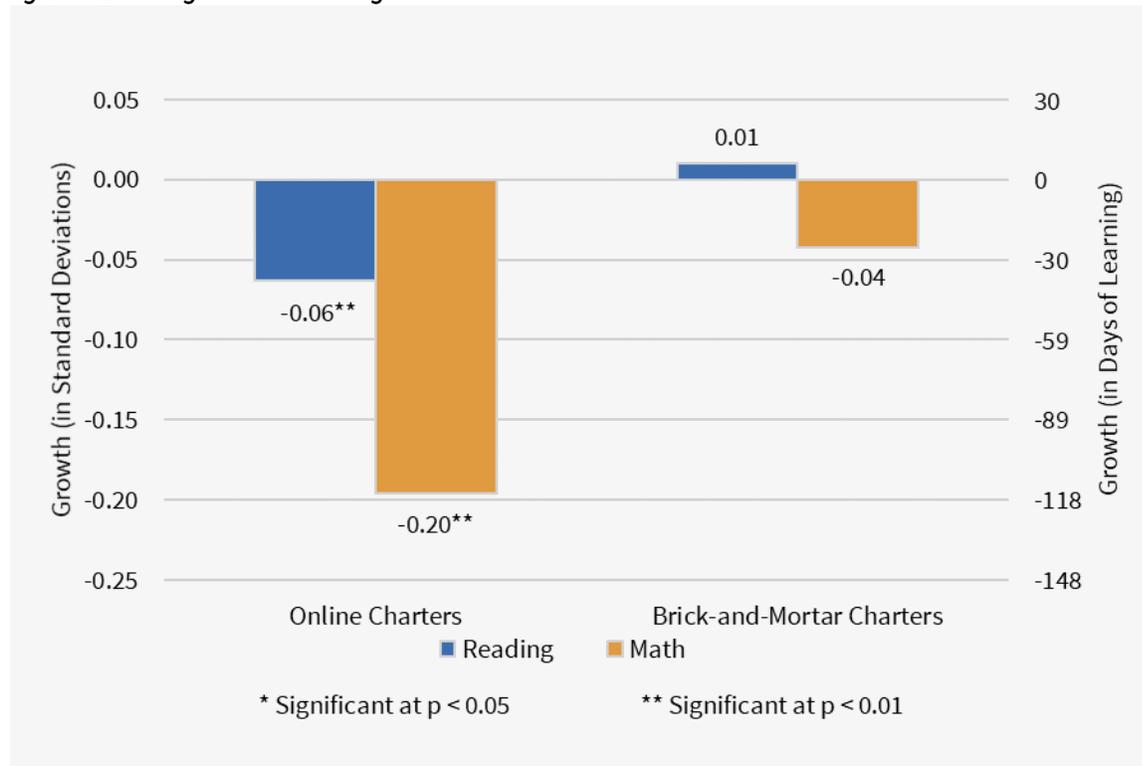
The charter sector in South Carolina is comprised of both brick-and-mortar charter schools and online charter schools. Students from all over the state can attend online charter schools and receive instruction online. As Table 2 reveals, online charter schools enroll about 30 percent of charter students; nearly 10,000 of the state's roughly 33,000 students attend the six online campuses in South Carolina. Table 2 also shows that online schools have different student compositions compared to brick-and-mortar charters. CREDO's earlier study also finds that online charter schools across the nation serve students with higher mobility rates and, across the group of online schools studied, had significantly negative impacts on student academic progress.⁸

In this sector, we break down the charter school impact on student performance by delivery system and display two distinct comparisons in two graphs:

1. Figure 6 compares the performance of students in online charter schools and students in brick-and-mortar charters against the performance of a common reference group, the "statewide average TPS VCR."
2. Figure 6a compares the difference in learning of students enrolled in online charter schools and those who attend brick-and-mortar charters.

⁸ James L. Woodworth, Margaret E. Raymond, Kurt Chirbas, Maribel Gonzalez, Yohannes Negassi, Will Snow, and Christine Van Donge, *Online Charter School Study 2015*, CREDO (Center for Research on Education Outcomes), Stanford University, <https://credo.stanford.edu/pdfs/Online%20Charter%20Study%20Final.pdf>.

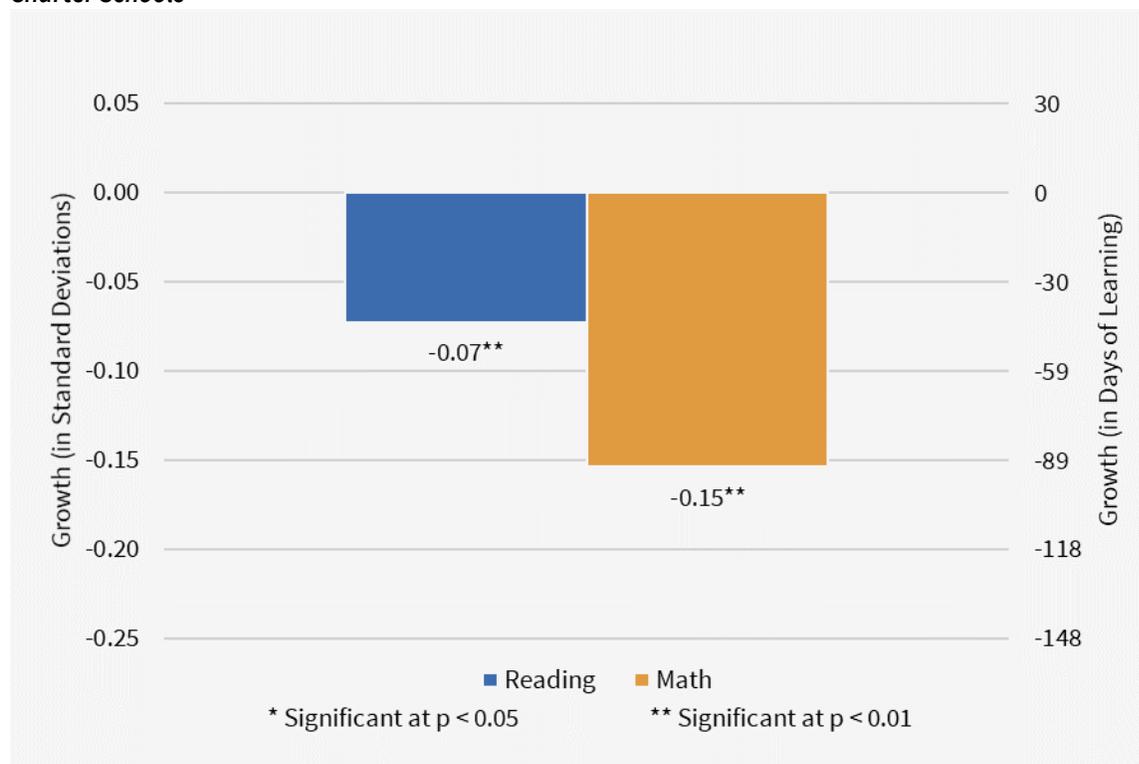
Figure 6: Student Learning Gains for Students in Online and Brick-and-Mortar Charter Schools Benchmarked against Learning Gains for Average TPS VCRs



According to Figure 6, students attending online charter schools have weaker growth in both reading and math compared to the average TPS VCRs. The gap translates to 35 and 118 fewer days of learning for online charter students in reading and math, respectively. In contrast, students in brick-and mortar charters post academic progress in reading and math similar to that of the average TPS (VCR) students.

Figure 6a benchmarks the performance of students in online charter schools against that of students attending brick-and-mortar charters (whose performance is represented by the 0.00 line). Online charter school students gain significantly less in both subjects. To be specific, they are behind brick-and-mortar charter students by 41 days of learning in reading. The lag in math is greater, with online charter students growing at a rate equivalent to 89 fewer days of learning as compared to students in brick-and-mortar charters.

Figure 6a: Student Learning Gains in Online Charter Schools Benchmarked against Students in Brick-and-Mortar Charter Schools



Figures 6 and 6a above demonstrate two important points: First, South Carolina online charter students fall behind in both reading and math compared to the average VCR in TPS and brick-and-mortar charter schools. Second, the negative performance of online charter students is large enough to depress the –otherwise similar to TPS– academic progress of brick-and-mortar charter students in the overall results, leading to a negative overall South Carolina charter effect in growth in math in Figure 3.

Charter School Impact by School Locale

Depending on their locales, charter schools may serve different student populations, face different levels of available human capital or both. Though charter schools in urban areas receive the bulk of media attention, charter schools in other locales may produce different results. The analysis in Figure 7 looks at where the charter school is located with regard to locale and then estimates the relative growth of the students in that setting. The results in Figure 7 represent the disaggregated impacts of charter school enrollment for urban, suburban, town, and rural brick-and-mortar charter schools. In this breakdown, charter students in different locations are compared with their virtual twins in TPS.⁹ Since online charter schools can serve students across the state, putting an online school in any of the categories may skew the results, so they are excluded from the analysis. For the following analysis, the comparison is made relative to whatever actual progress each group of VCRs realized. The reader should not assume that the transformation of each VCR group to 0.00 means that all the VCRs have equivalent academic growth.

Figure 7: Average Learning Gains in SC Brick-and-Mortar Charter Schools Compared to Gains for VCR by School Locale

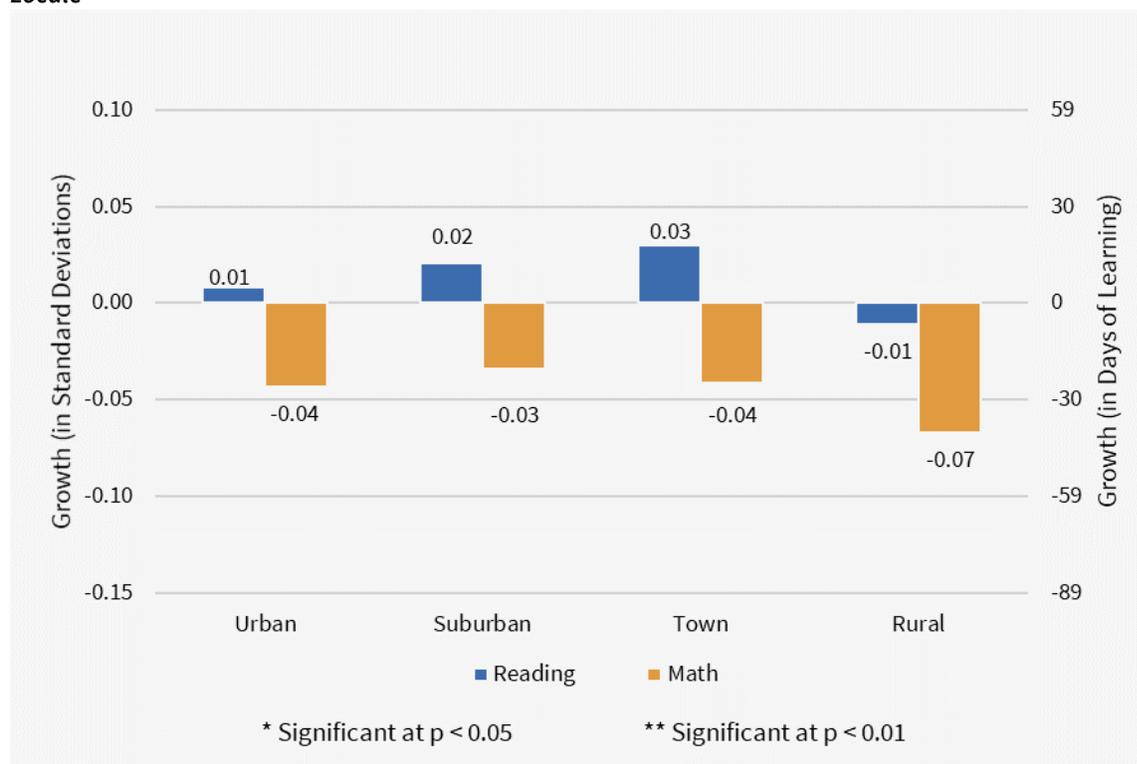


Figure 7 illustrates differences in the relative academic growth of charter students across locales. Figure 7 shows that South Carolina charter students in urban, suburban, rural or town locations perform similarly to their

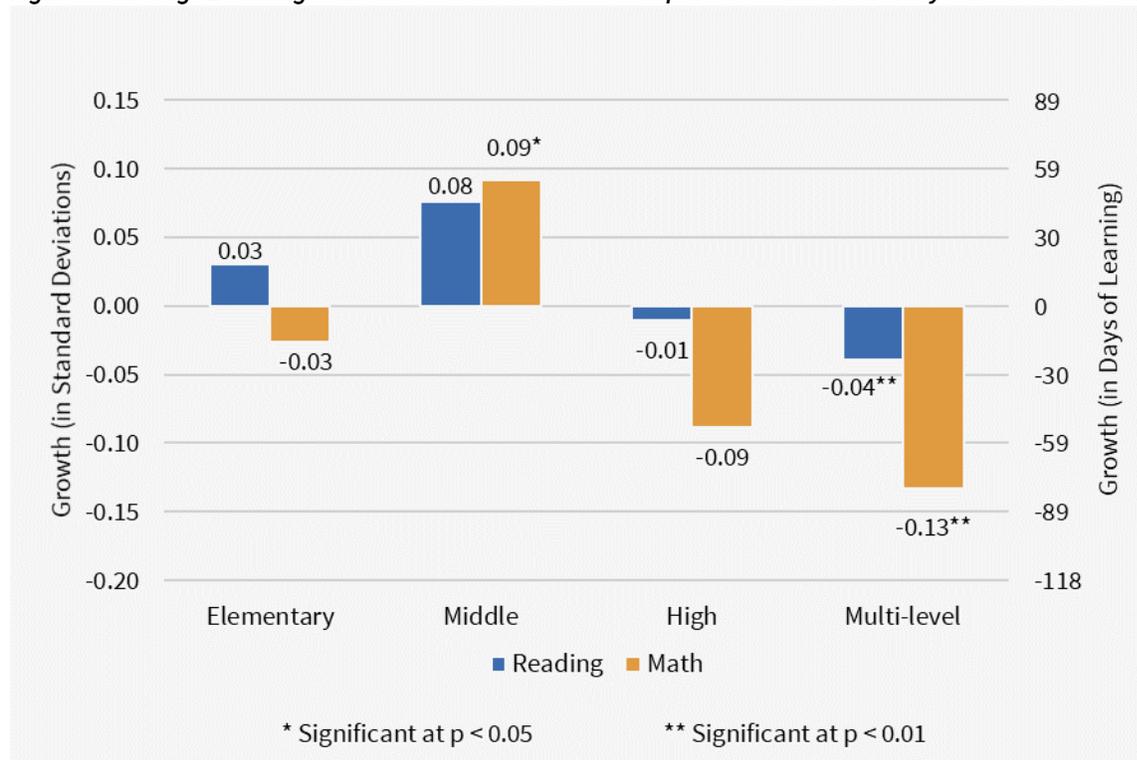
⁹ The National Center for Education Statistics defines 12 urban-centric locales which are divided into four main locale types: city, suburb, rural, and town.

respective TPS VCRs in both reading and math. These findings are consistent with the aggregate brick-and-mortar learning gains presented in Figure 6.

Charter School Impact by School Grade Configuration

All charter schools choose which grade levels to offer. Some charter operators focus on particular grades, some seek to serve a full range of grades, and others develop by adding one additional grade each year. The National Center for Education Statistics assigns schools the label of “elementary school,” “middle school,” “high school,” or “multi-level” school based on their predominant grade pattern.¹⁰ The designation “multi-level charter schools” can apply to a school that serves elementary and middle grades, middle and high grades, or all K-12 grades. Looking at performance by school grade configuration helps inform us whether specialization in a specific range of grades produces better results. Figure 8 shows the learning gains of students in charter schools of different grade configurations compared to their respective VCRs in TPS. The reader should not assume that the transformation of each VCR group to 0.00 means that all the VCRs have equivalent academic growth.

Figure 8: Average Learning Gains in SC Charter Schools Compared to Gains for VCR by School Grade Configuration



The results in Figure 8 show that, on average, charter middle school students are the most advantaged by charter enrollment compared to their TPS virtual twins in math. Their growth in reading is similar to TPS. The math result

¹⁰ CREDO uses the designation by NCES. The sole exception is that CREDO considers a school to be a high school if the lowest grade served is ninth grade or above.

for charter middle schools is equivalent to 53 additional days of learning. Students attending elementary or high charter schools demonstrate similar growth in reading and math, compared to their TPS VCRs.

Inferior progress is found among charter students enrolled in multi-level schools. When compared to their TPS virtual twins multi-level charter students are found to have 24 and 77 fewer days of learning than TPS VCRs in reading and math, respectively.

School-Level Analysis

The numbers reported in the previous sections represent the typical learning gains at the student level across the state; they reveal what would be the likely result if a typical student were enrolled in any of the South Carolina charter schools. The prior results do not discern whether some charter schools are better than others. Since school-level results are of interest to policy makers, parents and the general public, we aggregate charter student performance to the school level for each charter school in the state. This view is necessarily limited to charter schools with a sufficient number of tested students to make a reliable inference on performance.

It is important to understand the counterfactual used in this section. As shown in Table 1 earlier in the report, the student populations within the typical charter school and their feeder schools differ, making whole-school to whole-school comparisons unhelpful. Here instead, we pool each school's VCRs to simulate "apples to apples" for traditional public schools and to serve as the control condition for testing the performance of charter schools. This simulated TPS reflects a precise estimate of the progress students enrolled in each charter school would obtain if they enrolled in their local TPS option.

The Range of School Quality

To determine the range of charter school performance, we estimate the annual learning impact of each charter school over the two most recent growth periods (2016-2017 and 2017-2018). The estimated learning impact for each charter school can be positive (statistically different from zero with a positive sign), negative (statistically different from zero with a negative sign), or zero. We use it to infer how the academic quality of a charter school compares to the quality of traditional public schools which students in that charter school would have potentially attended if they had not attended a charter school.

Our total sample consists of 54 schools with reading scores and 55 schools with math scores in the 2016-2017 and 2017-2018 growth periods.¹¹ Table 4 below shows the breakout of the performance for the included South Carolina charter schools.

¹¹ As noted in Table 1, charter schools are smaller on average than their corresponding feeder schools. Furthermore, 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 representation of the school's impact. Our criterion for inclusion is at least 60 matched charter student records over the two growth periods or at least 30 matched charter records for schools with only one growth period. Given that Figure 2 shows a large number of new charters schools in the

Table 4 shows the performance comparison of charter schools in South Carolina relative to traditional public schooling options in reading and math, respectively. In reading, 16 out of 54 South Carolina charter schools, or 30 percent, perform significantly better than the traditional schooling environments the charter students would have otherwise attended. In math, 8 of 55 or 15 percent of charter schools post growth that is significantly higher than that of their traditional public schooling counterparts. The results show that the share of charter schools performing significantly better than the traditional schooling alternatives is higher in reading but lower in math than the national average. To benchmark these figures at the national level using the 2013 National Charter Study II, 25 percent of charter schools outperform the traditional schooling alternatives in reading and 29 percent do so in math.¹²

Table 4: Performance of Charter Schools Compared to Traditional Schooling Alternatives in South Carolina

Subject	Significantly Worse		Not Significantly Different		Significantly Better	
	Number	Percent	Number	Percent	Number	Percent
Reading	12	22%	26	48%	16	30%
Math	18	33%	29	53%	8	15%

At the other end of the distribution, 12 of 54 South Carolina charter schools, or 22 percent, have reading performance that is significantly weaker than the traditional public schooling option. As a comparison point, 19 percent of charter schools nationally have significantly weaker performance than the traditional public schooling alternative.¹¹ In math, 18 out of 55 of charter schools, or 33 percent, post growth results weaker than the traditional public schooling option compared to the 2013 national figure of 31 percent.

In reading, 26 of 54 South Carolina charter schools, or 48 percent, do not differ significantly from the traditional public school option. In math, 29 of 55 charter schools (53 percent) have growth results that are indistinguishable from the traditional public school option. It is important to emphasize that “no difference in growth” does not reflect the actual level of growth; it is possible for charter schools to have high levels of growth that are similar to that of the traditional schooling alternative, and the reverse is also true.

recent years, it is important to note that newer schools are less likely to have tested grades and two growth periods of test scores to be included in the analysis of this section.

¹² Cremata et al., *National Charter School Study 2013*.

Growth and Achievement

While the impacts of charter schools on academic growth relative to their local competitors is informative, we are also interested in how well students perform in absolute terms. Since many of the students served by charter schools start at low levels of achievement, the combination of absolute achievement and relative growth is vital to understanding student success overall.

For each school, the tested achievement of their students over the same two periods covered by the academic growth analysis (2016-2017 and 2017-2018) is averaged and transformed to a percentile within the statewide distribution of achievement.¹³ The 50th percentile indicates statewide average performance for all public school students (traditional and charter). A school achievement level above the 50th percentile indicates that the school's overall achievement exceeds the statewide average. We use standard deviations discussed above to measure growth. We display each school's achievement and growth in a two-dimensional plot, displayed in Tables 5 and 6.

Graphics Roadmap No. 2

There are **four quadrants** in each of the Tables 5 and 6. 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. The value in the center of each quadrant is the sum of the four sections in that quadrant. These percentages are generated from the 2016 and 2017 growth periods.

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

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

The major quadrants were delineated using national charter school data. We would expect the majority 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 40 percent of schools to achieve between the 30th and 70th percentiles. These expectations are based on how we view a normal distribution with the majority of the sample falling within one standard deviation from the mean.

¹³ Average achievement was computed using students' z-scores from the end of the growth period (e.g., spring 2016 and spring 2017). The resulting school-level mean was then converted into a percentile.

Table 5: School-Level Reading Growth and Achievement in SC Charter Schools

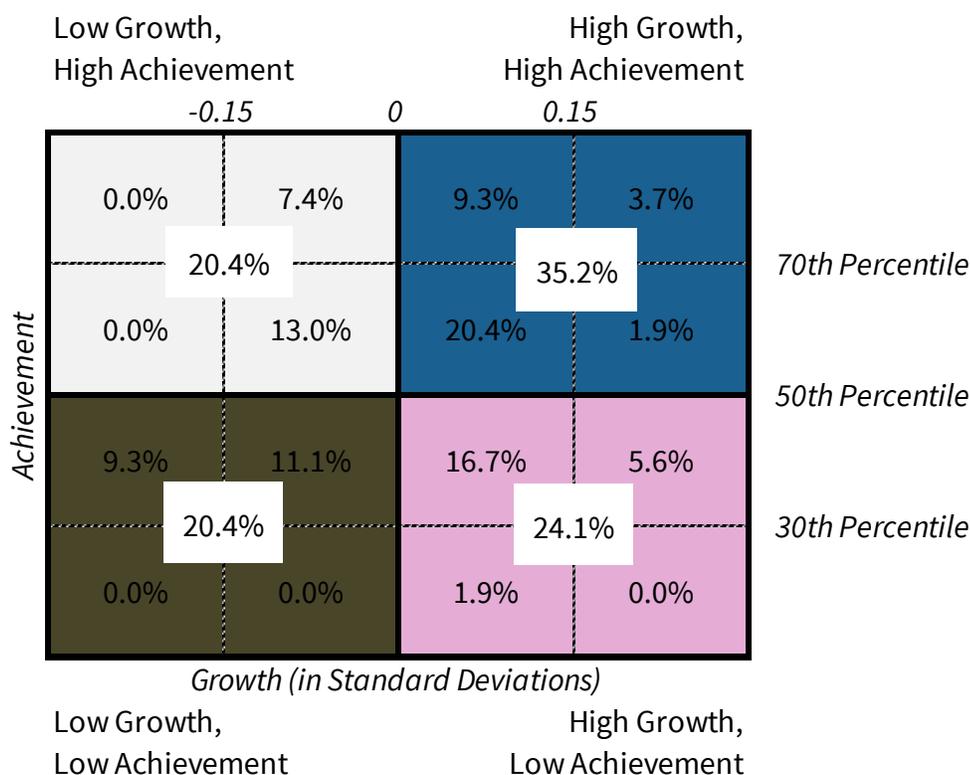
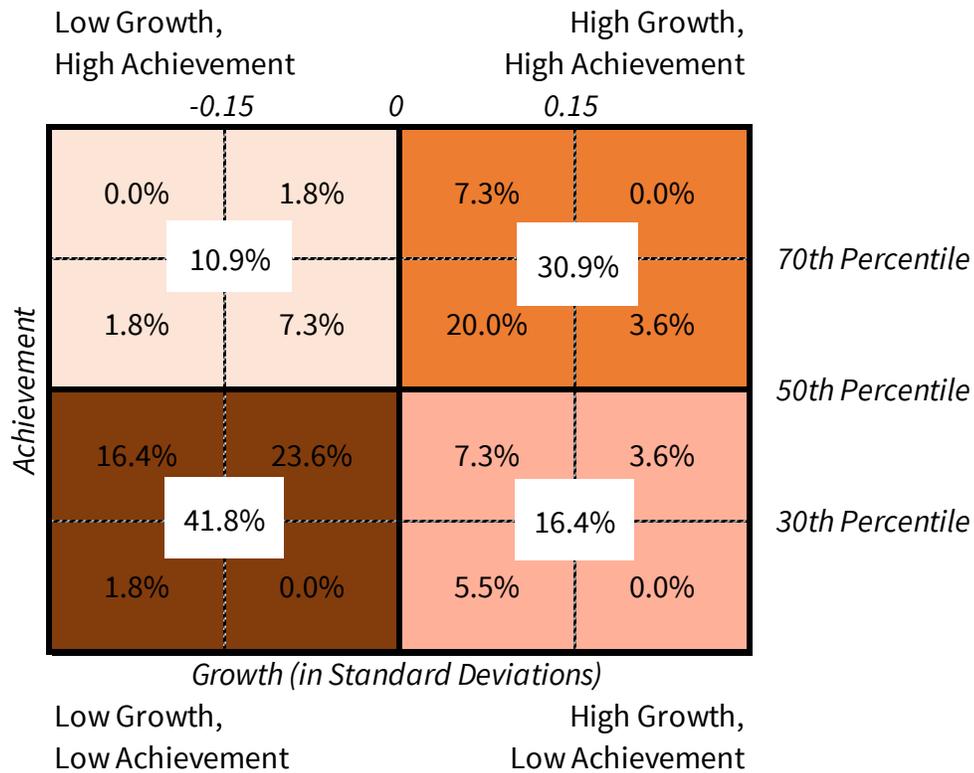


Table 5 presents the reading achievement and growth results for the South Carolina charter schools included in this analysis. In the table, 59 percent (32 of the 54) of South Carolina charter schools, have positive average growth compared to their peer schools. This percentage is the sum of the eight squares in the blue and pink quadrants in the right half of the table. Thirty-five percent (19 out of 54) of charters have positive growth and average achievement above the 50th percentile of the state (i.e., the total for the blue quadrant on the top right). A total of 24 percent (13 out of 54) of charter schools in the pink box post above-average gains but remain below the state average in absolute achievement. Over time, if the 24 percent of charter schools in the pink box maintain or improve their average growth, their achievement would increase, eventually moving them into the blue box.

Roughly 41 percent of schools post smaller learning gains than their peer TPS (the sum of gray and brown quadrants on the left half of the table). If their growth remains steady or worsens, they will fall in the overall distribution of achievement as other schools pull away. Approximately 44 percent of charters perform below the 50th percentile of achievement (the sum of the brown and pink cells in the lower portion of the table). The area of the greatest concern is the roughly 20 percent (11 out of 54) of schools that fall into the lower left quadrant of the table. These schools are characterized by both low achievement and low growth.

Table 6: School-Level Math Growth and Achievement in SC Charter Schools



In math, 26 of the 55 South Carolina charter schools (47 percent) have positive average growth in math, as seen in the combined orange and pink quadrants in the right half of Table 6. About 31 percent of charters have positive growth and average achievement above the 50th percentile (the orange quadrant in the upper right of the table). Approximately 58 percent of charters post achievement results below the 50th percentile of the state for math (the sum of cells in the lower half of the table); these percentages are larger than those presented in Table 5 for reading. In the pink quadrant in the lower right of the table, roughly 16 percent of the schools are classified as having low achievement and have high growth. As in Table 5, the schools of the greatest concern are those in the lower left (brown) quadrant that have both low achievement and low growth; they account for roughly 42 percent (24 out of 55) of the South Carolina charter schools.

Charter School Impacts by Student Subgroups

Charter School Impact for Students by Race/Ethnicity

One of the enduring advances of the *No Child Left Behind Act* of 2001 and the subsequent *Every Student Succeeds Act* of 2015 is the recognition that average results may not be evenly distributed across all students. Attention to the differences in the performance of students of various racial/ethnic backgrounds and other attributes has become standard practice in most assessments of school performance. Table 1 shows that South Carolina charter schools serve a somewhat diverse student population. Their ability to support the progress of disadvantaged students is an important policy goal in the state and a strong focus of this study. The effectiveness of charter schools across ethnic and racial groups is especially important given the significant shares of historically underserved students that charter schools enroll. This section investigates the impact of charter school attendance on learning gains of students of different racial backgrounds compared to their peers in the same group in traditional settings.

The impact of charter schools on the academic gains of white, black and Hispanic students is presented in Figures 9 through 11a. For Black and Hispanic students, we present two related graphs. Graphics Roadmap No. 3 in the sidebar provides guidance on how to interpret the graphs and their relation to each other. In short, the first graph depicts the growth of TPS students and charter students in the particular subgroup of

Graphics Roadmap No. 3

Figures 9 through 11a show two important contrasts for Black and Hispanic student groups. For each student subgroup we present two graphs:

The **first graph** displays the growth of TPS students and charter students in the particular **subgroup of interest** compared to the growth of the "average White TPS student." In this comparison, the White TPS student is male and is not in poverty, is not receiving special education services, or English Language Learner support and is not repeating his current grade. The graph sets the performance of the average White TPS student to **zero** and shows how learning of students in the subgroup compares.

The **stars** indicate if the learning gains of the subgroup are statistically different from the reference group. Thus, if there are no stars, we interpret the difference in learning gains as similar to the white TPS comparison student. The reader should not be swayed by seemingly large differences if there are no stars. 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. If the learning gains exceed the comparison, the bar is positive.

Graphs labeled "a" display the results of a second comparison testing whether the learning gains in the charter school student subgroup differ significantly from their VCRs in the same student subgroup. In these graphs, the performance of the TPS peers in the subgroup are set to **zero** and the learning gains of the charter school students in the subgroup are measured against that **baseline**. As with the first graph, stars denote statistical significance.

interest as compared to the growth of the "average white TPS student". Graphs labeled "a" show whether the learning gains in the charter school student subgroup differ significantly from their VCRs in the same subgroup.

White students account for approximately 62 percent of the student population in charter schools in South Carolina. Figure 9 displays the differences in learning between white students enrolled in TPS and white students enrolled in charter schools. The 0.00 baseline reflects the one-year academic progress of white TPS VCRs in South Carolina. White students in charter schools show weaker learning growth in math than white students attending traditional public school settings, which is equivalent to 59 fewer days of learning. White students in charter schools post learning growth in reading similar to the learning growth of white students in traditional public school settings.

Figure 9: Relative Learning Gains for White Charter School Students Benchmarked against Their White TPS Peers

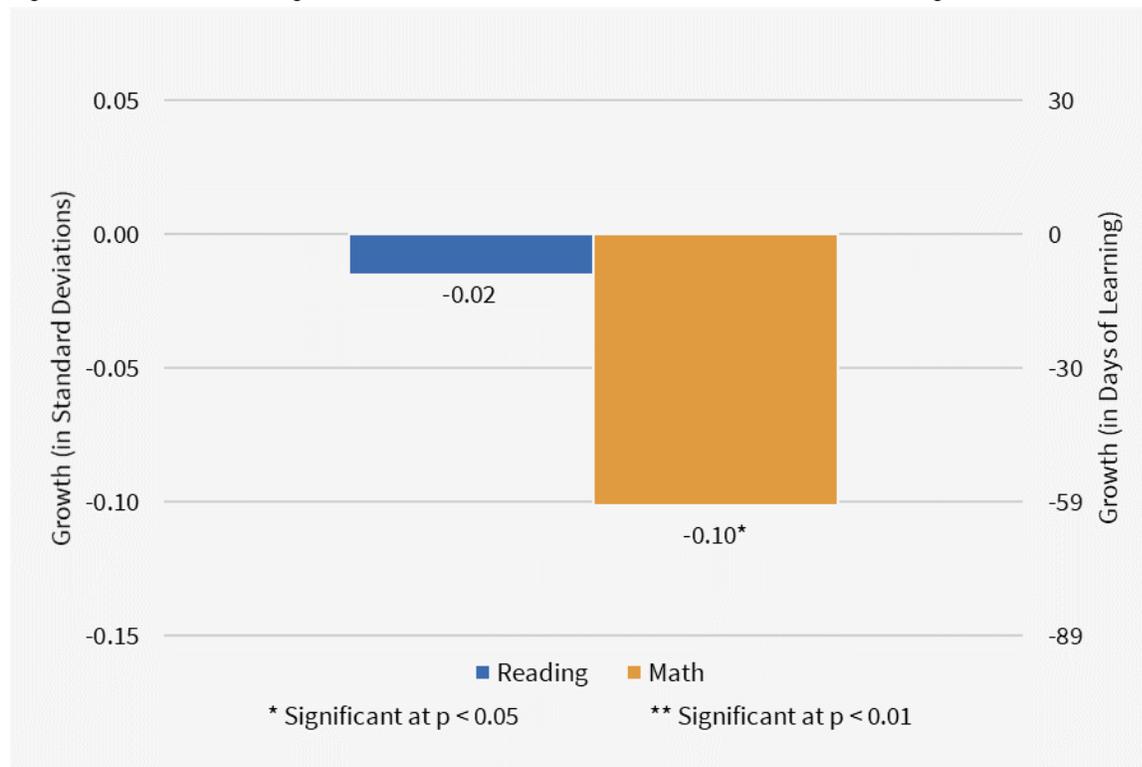
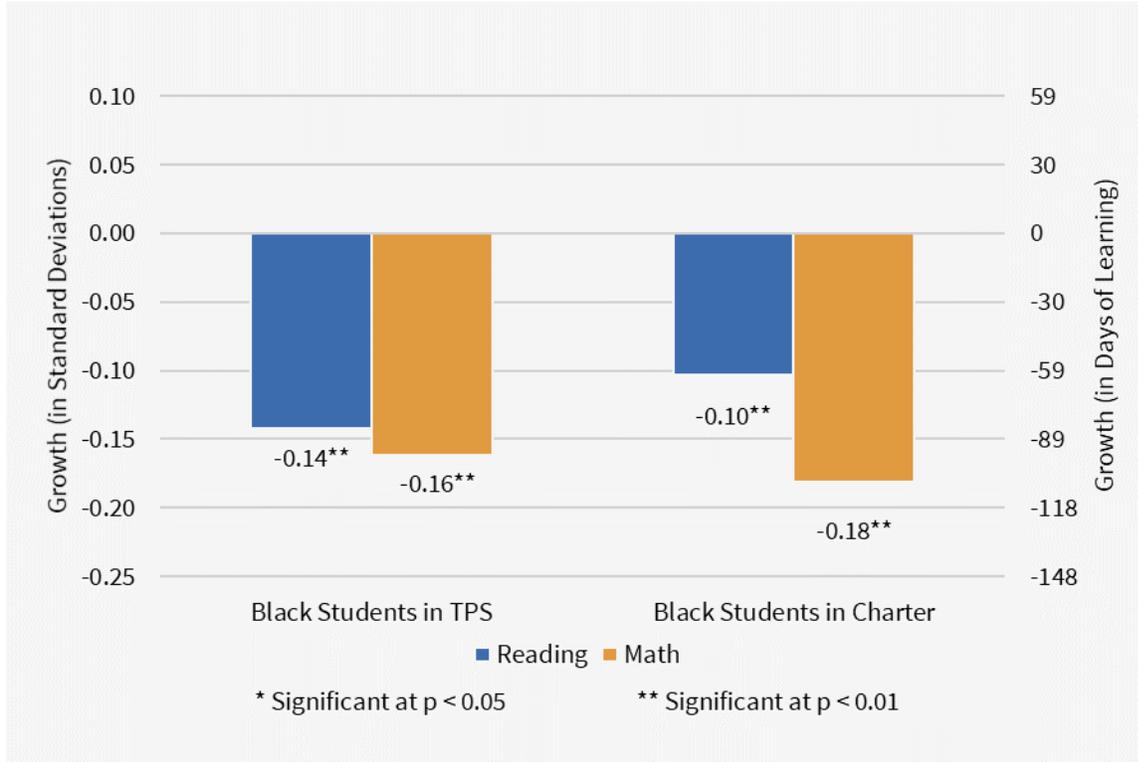
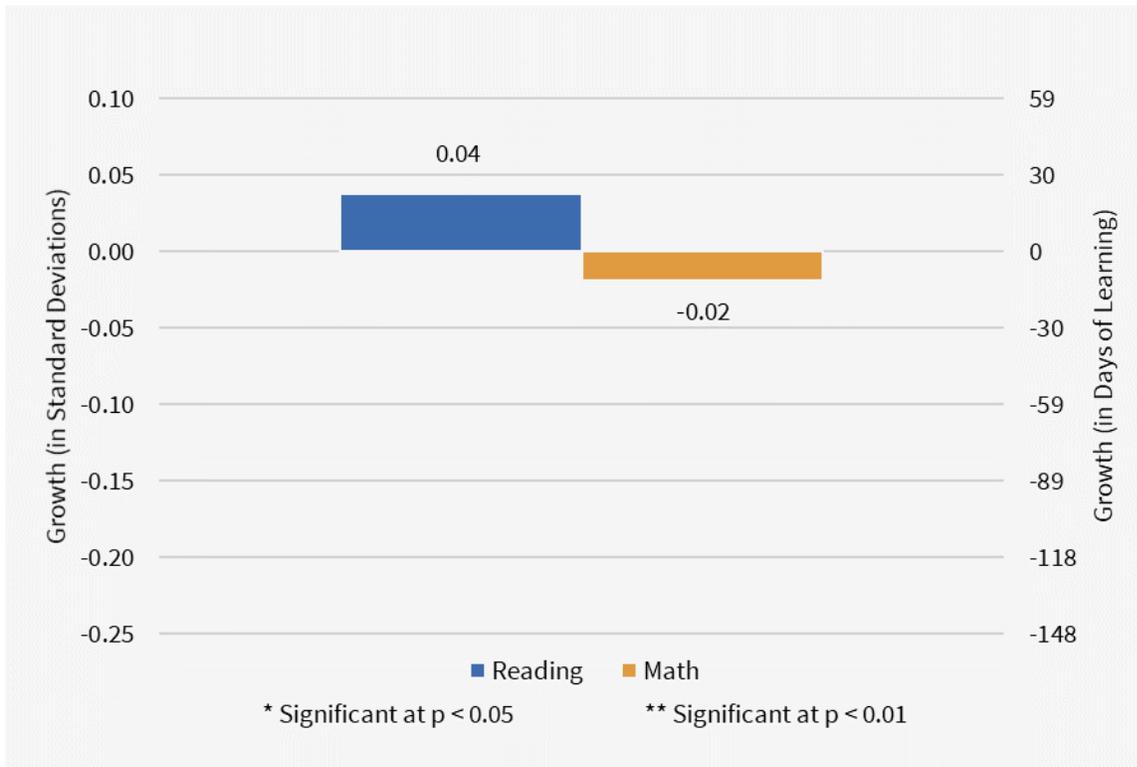


Figure 10: Learning Gains of Black Students Benchmarked against Learning Gains of White TPS Students



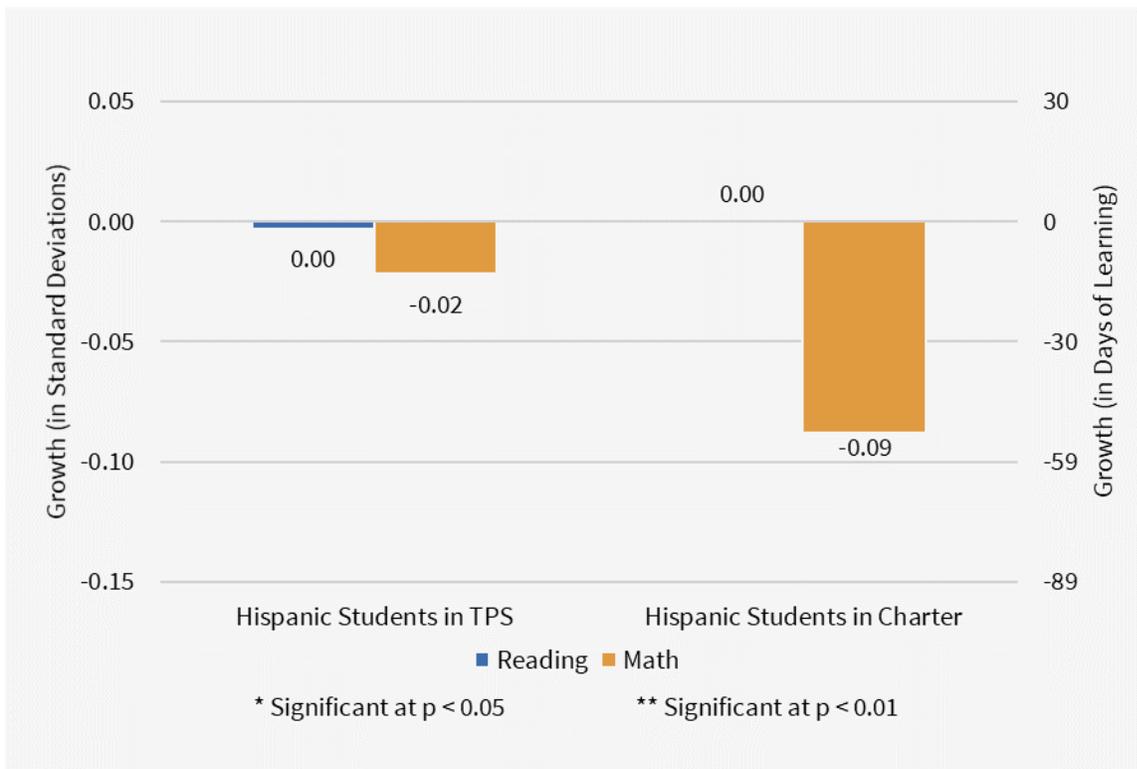
Black students account for roughly 26 percent of the charter school population in South Carolina. As shown in Figure 10, black students in TPS are found to have significantly weaker annual academic learning gains in reading and math when compared to the average white TPS (VCR) student. The learning gap between black students in TPS and white students in TPS is equivalent to 83 and 94 fewer days of learning in reading and math, respectively. Black charter school students exhibit weaker learning growth compared to white TPS students in both math and reading. The learning gap between black charter students and white TPS students is equivalent to 59 and 106 fewer days of learning in reading and math, respectively.

Figure 10a: Relative Learning Gains for Black Charter School Students Benchmarked against Their Black TPS Peers



A second comparison examines the learning gains for the same student group across the two school settings in order to see whether black students, fare better in one environment or the other. Figure 10a displays the differences in learning growth between black students enrolled in TPS and black students enrolled in charter schools. In South Carolina, black charter school students experience similar growth to their black TPS counterparts in both reading and math.

Figure 11: Learning Gains of Hispanic TPS and Charter Students Benchmarked against Learning Gains of White TPS Students



An equivalent analysis for Hispanic students is presented in Figures 11 and 11a. Hispanic students account for nine percent of charter school students in South Carolina. Hispanic students in TPS have statistically similar academic growth in both reading and math compared to the average white TPS student. Hispanic students in charter schools also have similar learning growth in math and reading, when compared to white TPS students over the same time period.

Figure 11a: Relative Learning Gains for Hispanic Charter School Students Benchmarked against Their Hispanic TPS Peers

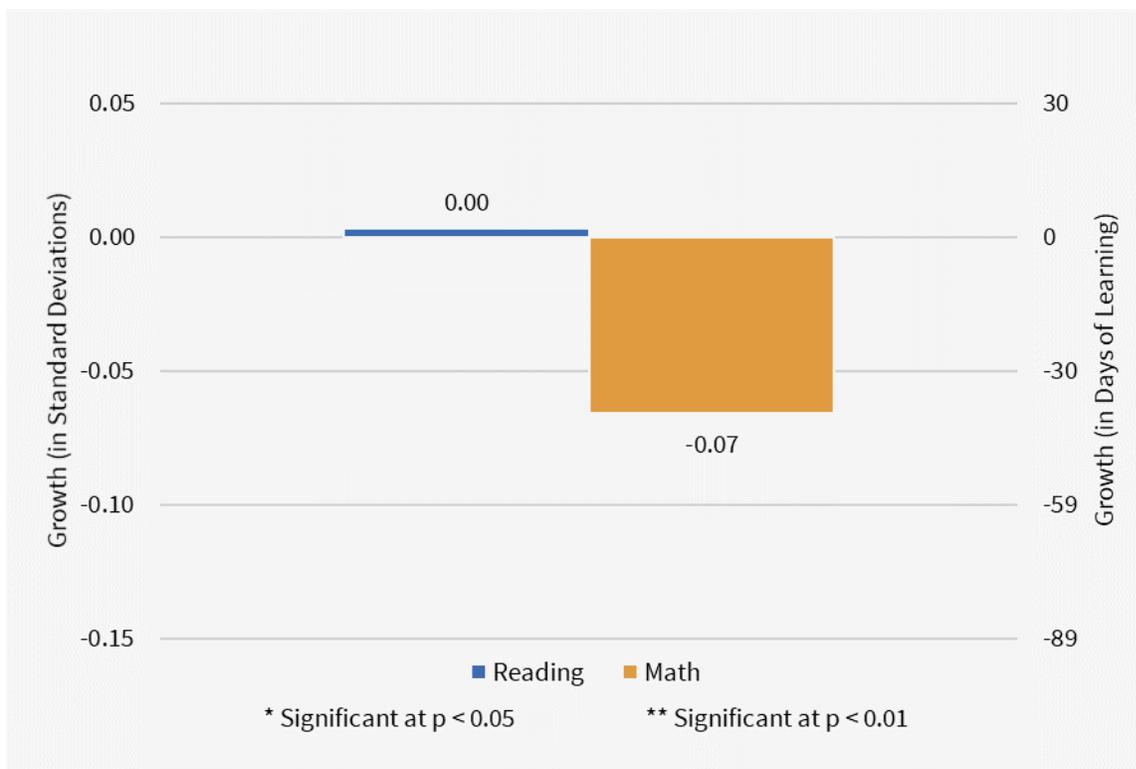


Figure 11a displays the differences in learning between Hispanic students enrolled in TPS and Hispanic students enrolled in charter schools. Hispanic students in charter schools show similar learning growth to Hispanic students attending traditional public school settings, in both math and reading.

To summarize the race/ethnicity analyses, white students in charter schools post significantly lower academic progress than the average white TPS student in math. Black students in both charter schools and TPS make less annual academic progress to the average white TPS student in reading and math. When we compare the progress of black students across sectors, black charter students post similar growth to that of black TPS VCRs in both reading and math. Hispanic TPS and charter students post similar gains in math and reading, compared to the average white TPS student. When the focus shifts to comparing the outcomes of Hispanic students across sectors, Hispanic charter students are on a par with Hispanic TPS peers in both subjects.

The results indicate that charter school enrollment does not significantly diminish learning for black or Hispanic students. At the same time, we find that the overall negative learning gains in math associated with charter attendance are primarily driven by the significantly lower learning gains of white charter students compared to white TPS VCRs. The overall insignificant charter school impact on learning gains in reading masks the negative impact of charter attendance on the academic progress in reading of white students, who represent 62 percent of the student population in charter schools in South Carolina.

Charter School Impact for Students in Poverty

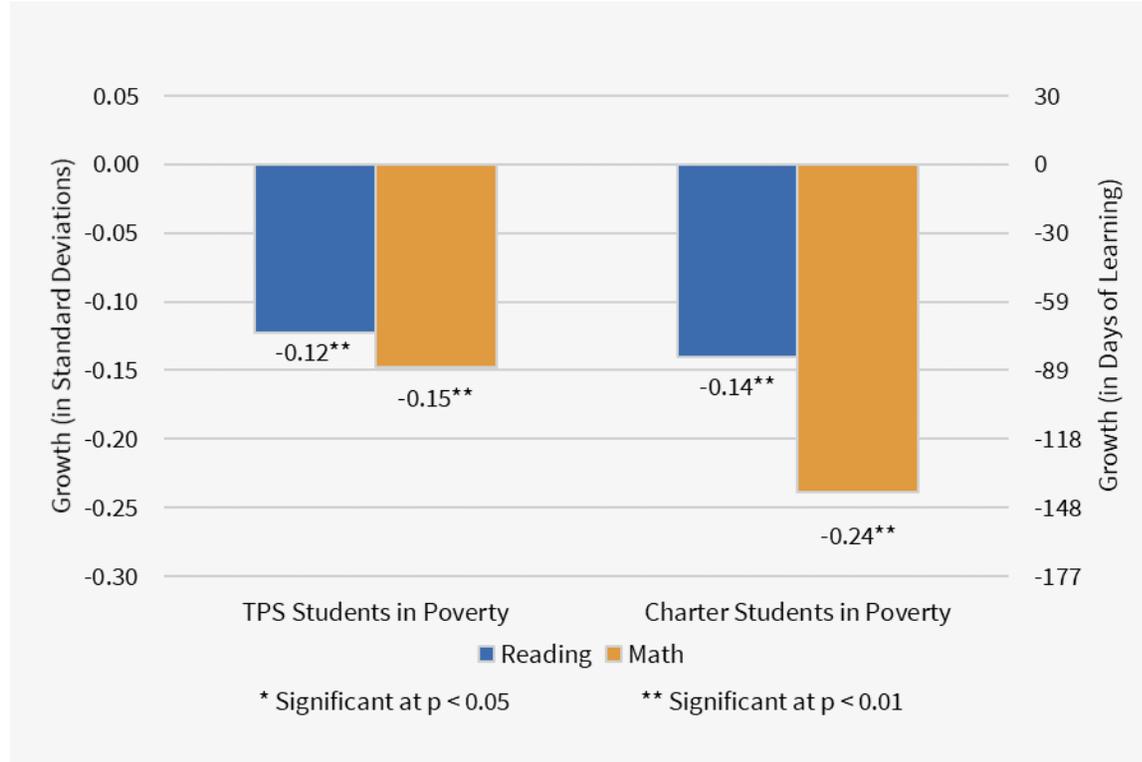
Many charter school operators expressly aim to improve educational outcomes for traditionally underserved students, especially for students in poverty. According to the latest data collected by the National Alliance for Public Charter Schools, students in poverty account for 55 percent of the national charter school population.¹⁴ In South Carolina, 51 percent of charter school students are in poverty, compared to 60 percent of TPS students (Table 1).

Our information on poverty reflects South Carolina's Department of Education's information on poverty status. Figure 12 presents the annual academic growth for students in poverty. It is important to note that in this graph, the baseline differs from the race/ethnicity graphs presented earlier: it is a student who is not in poverty in TPS. The study isolates the relationship between poverty and growth. This provides a picture of the difference in the impact of charter attendance on students in poverty compared to similar students in TPS who are not in poverty. The set of bars on the left side of Figure 12 (-.12** for reading and -.15** for math) represent a TPS student in poverty. The set of bars on the right side of Figure 12 (-.14** for reading and -.24** for math) represent the impact of being a student in poverty and attending a charter school.¹⁵ Both sets of bars are compared to TPS students who are not in poverty, represented by the .00 line.

¹⁴ The data were retrieved from "National Charter School Facts," National Alliance for Public Charter Schools, <https://data.publiccharters.org/>, when the report was produced.

¹⁵ The learning gains for a charter student in poverty include both the gains associated with charter attendance and the gains associated with being in poverty.

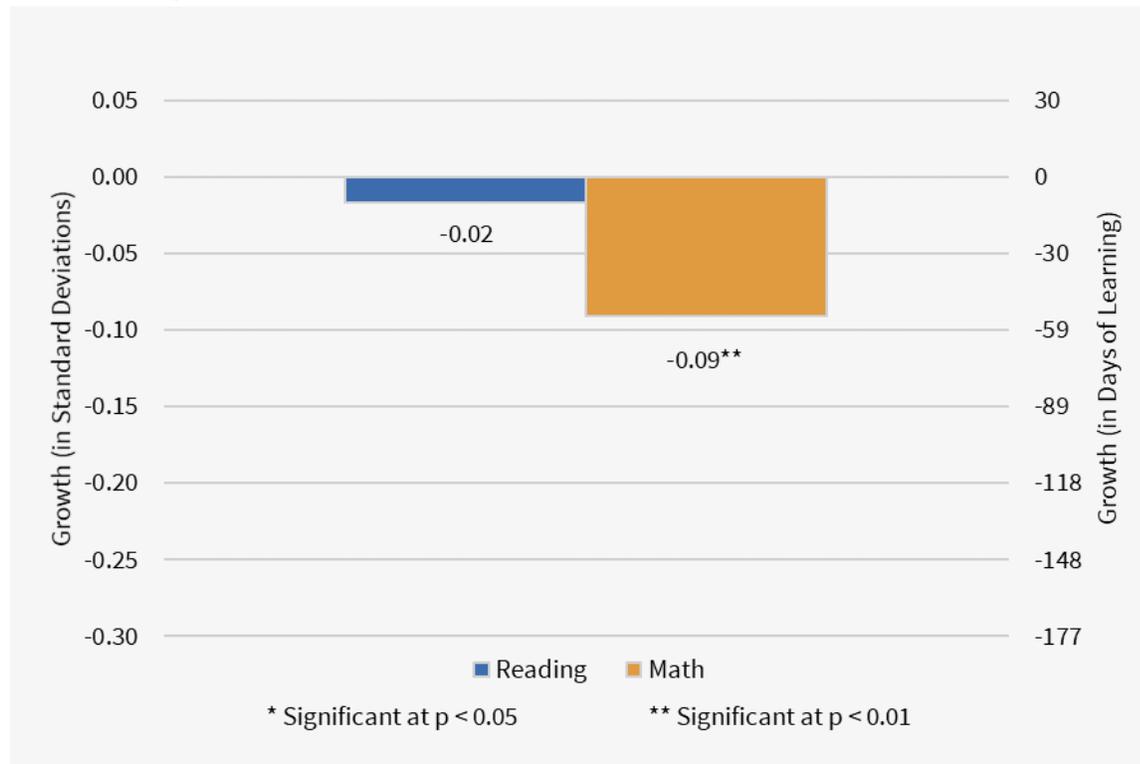
Figure 12: Overall Learning Gains for TPS and Charter Students in Poverty Compared to Students Not in Poverty



The results in Figure 12 suggest that student in poverty, regardless of whether they attend TPS or charter schools, significantly underperform TPS students not in poverty in both reading and math. TPS students in poverty make less academic progress than non-poverty TPS students by 71 days of learning in reading and 89 days of learning in math. Charter school students in poverty achieve less academic growth in reading compared to their non-poverty TPS students as well, with the deficit amounting to 83 days of learning in reading and 142 days of learning in math. These results show that learning gaps for charter and TPS students on the basis of socio-economic status have persisted.

Figure 12a compares the growth of charter students in poverty versus their TPS peers. Charter school students in poverty make similar progress to TPS peers in poverty in reading, but less progress in math. The learning gap in math between charter students in poverty and TPS students in poverty is equivalent to 53 fewer days of learning.

Figure 12a: Relative Learning Gains for Charter School Students in Poverty Benchmarked against Their TPS Peers in Poverty

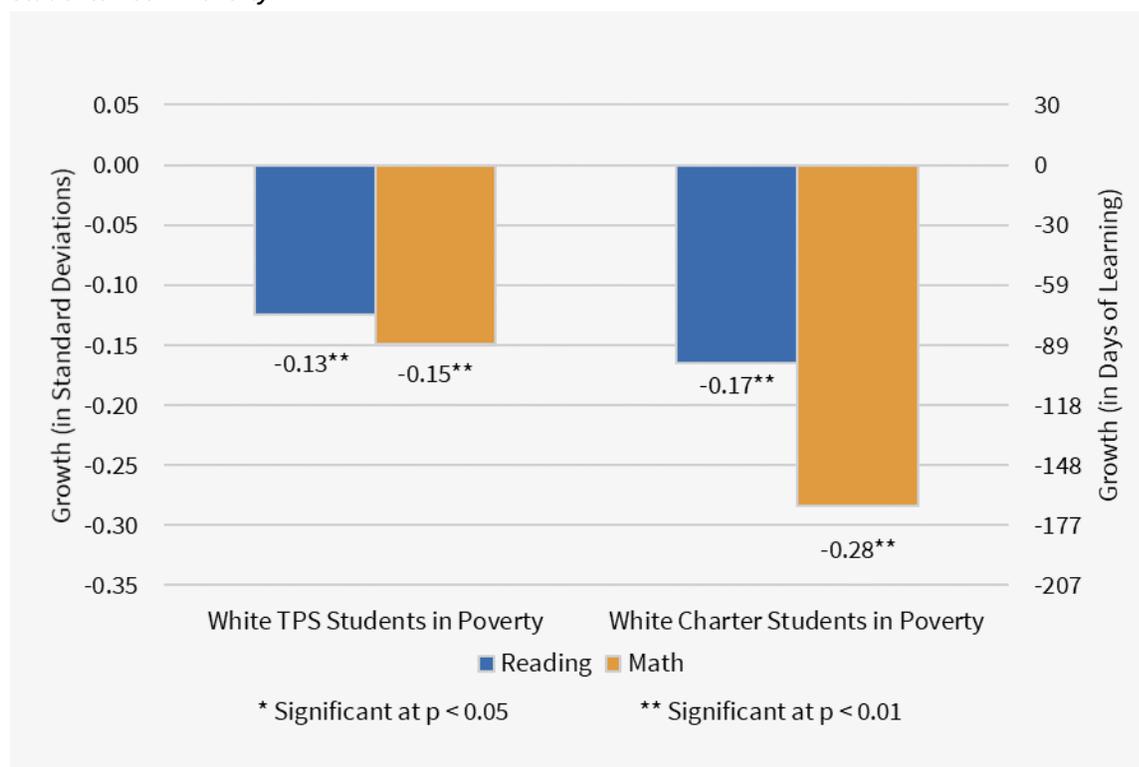


Charter School Impact for Students in Poverty by Race/Ethnicity

In public education, some of the most academically challenged students are those who are both living in poverty and also members of historically underserved racial or ethnic minorities. These students represent a large subgroup. Within the national charter school community, these groups receive special attention. To examine the extent to which gaps are being addressed in South Carolina, we further disaggregate the charter school impact on students in poverty by race/ethnicity groups. We start the discussion by showing the impact of South Carolina charter schools on the academic gains of white students living in poverty, presented in Figures 13 and 13a. Figures 14 and 14a show the academic progress of black students living in poverty. Figures 15 and 15a show the progress of Hispanic students in poverty.

Figure 13 compares white students living in poverty, enrolled in TPS or charter schools, with the average white TPS student who is not in poverty. The results show that white TPS students living in poverty make less academic progress annually in reading and math than white TPS students not living in poverty in South Carolina. White TPS students in poverty exhibit approximately 77 fewer days of learning in reading and 89 fewer days of learning in math than white non-poverty TPS students. White charter students in poverty experience lower growth in reading and math compared to white non-poverty TPS students. White charter students in poverty experience 100 and 165 fewer days of learning than white non-poverty TPS students in reading and math, respectively.

Figure 13: Learning Gains of White TPS and Charter Students in Poverty Compared to Learning Gains of White TPS Students Not in Poverty



When focusing on the peer-to-peer comparison as displayed in Figure 13a, we find that white charter students living in poverty make similar learning gains in reading and weaker learning gains in math compared to their white TPS peers in poverty. The gap in the learning progress in math between white charter students in poverty and white TPS students in poverty is equivalent to 83 fewer days of learning.

Figure 13a: Relative Learning Gains for White Charter School Students in Poverty Benchmarked against Their White TPS Peers in Poverty

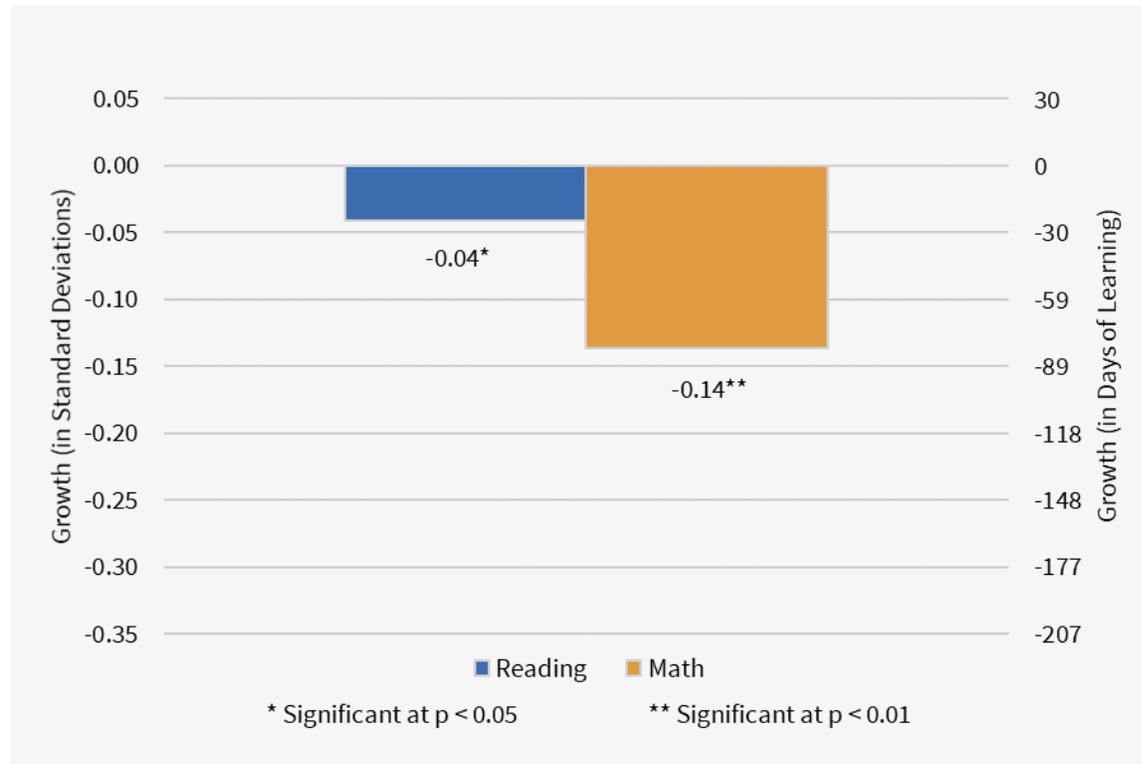
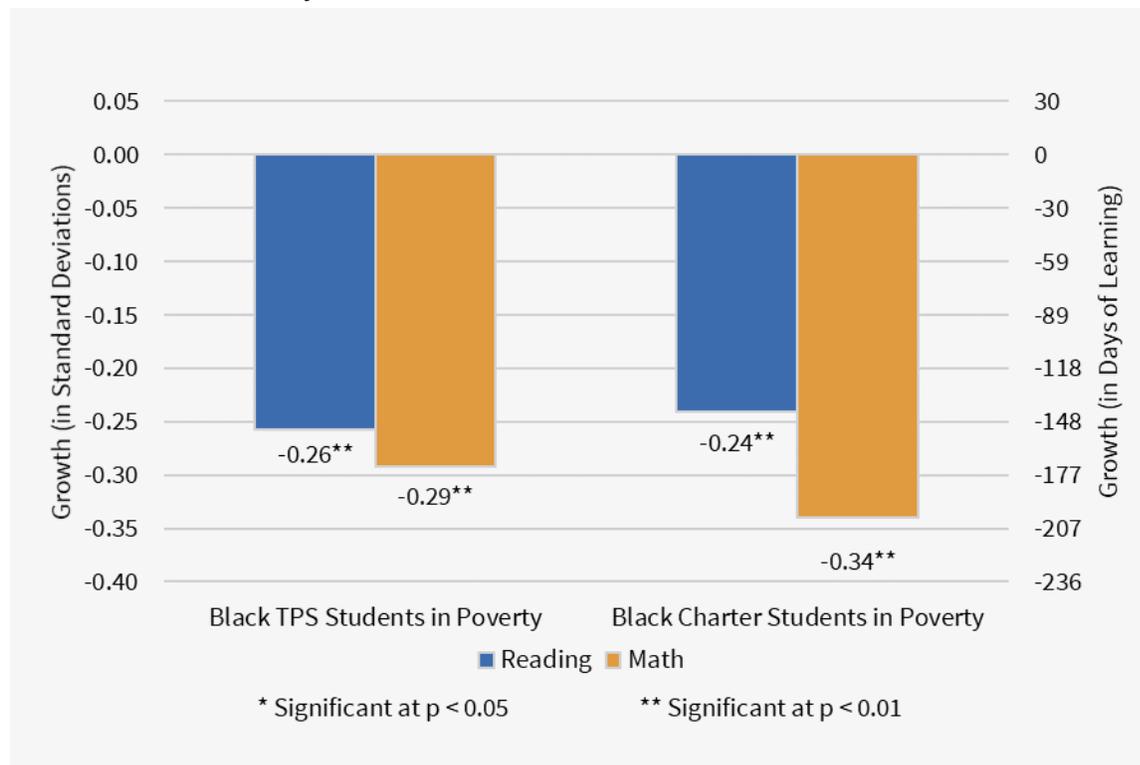


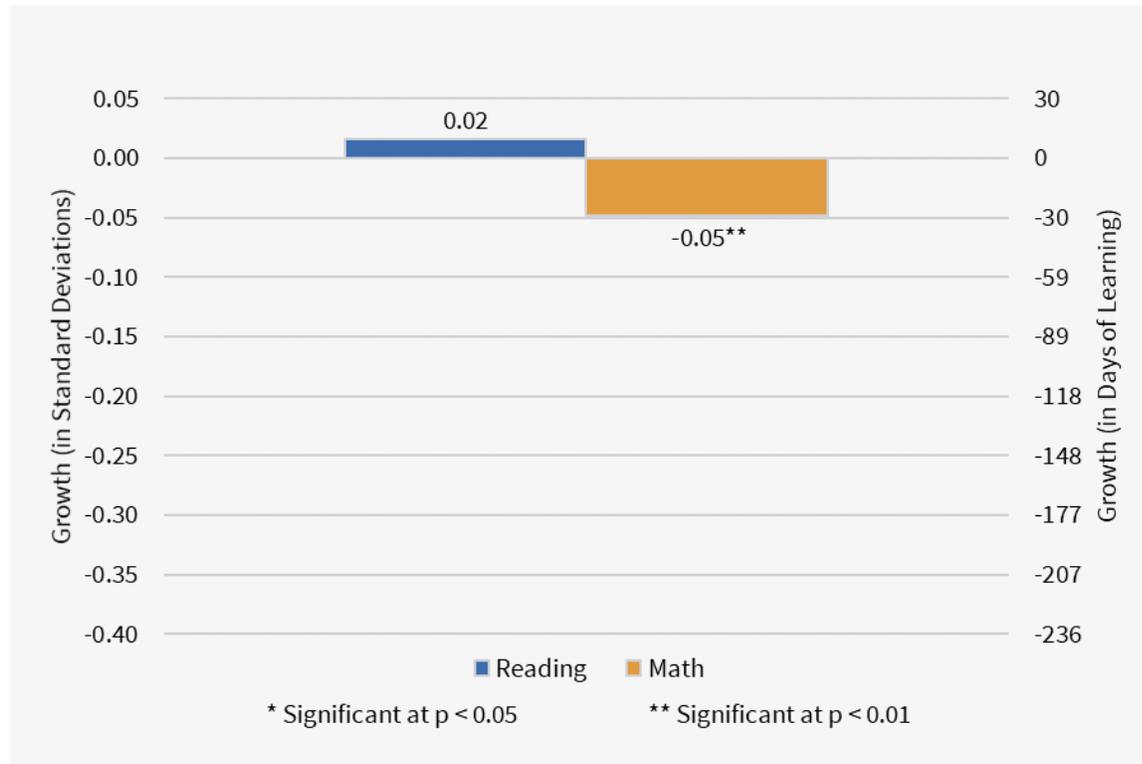
Figure 14 compares black students living in poverty, enrolled in TPS or charter schools, with the average white TPS student who is not in poverty. The patterns show that black students living in poverty, regardless of TPS or charter attendance, make less academic progress annually than white TPS students not living in poverty in South Carolina. Black TPS students in poverty exhibit approximately 153 fewer days of learning in reading and 171 fewer days of learning in math than white non-poverty TPS students. Black charter students in poverty experience 142 fewer days of learning in reading and 201 fewer days in math than white non-poverty TPS students.

Figure 14: Learning Gains of Black TPS and Charter Students in Poverty Compared to Learning Gains of White TPS Students Not in Poverty



When focusing on comparison across similar peers as displayed in Figure 14a, we find that black charter students living in poverty make similar learning gains but less progress in math relative to their TPS peers in reading. The gap in learning progress in math between black charter students living in poverty and black TPS students living in poverty is equivalent to 30 fewer days of learning.

Figure 14a: Relative Learning Gains for Black Charter School Students in Poverty Benchmarked against Their Black TPS Peers in Poverty



A learning gap is also found between Hispanic students in poverty (in either charter or TPS) and white TPS VCRs who are not in poverty in both reading and math. As shown in Figure 15, Hispanic TPS students living in poverty fall behind white non-poverty VCRs in by 65 days of learning in reading and 94 days of learning in math. Hispanic students in poverty enrolled in charter schools also exhibit weaker learning gains compared to TPS white students not living in poverty, and the gaps translate to 71 fewer days of learning in reading and 136 fewer days in math. Figure 15a indicates that the progress of Hispanic students in poverty in neither reading nor math is significantly associated with the school sector they attend.

Figure 15: Learning Gains of Hispanic TPS and Charter Students in Poverty Compared to Learning Gains of White TPS Students Not in Poverty

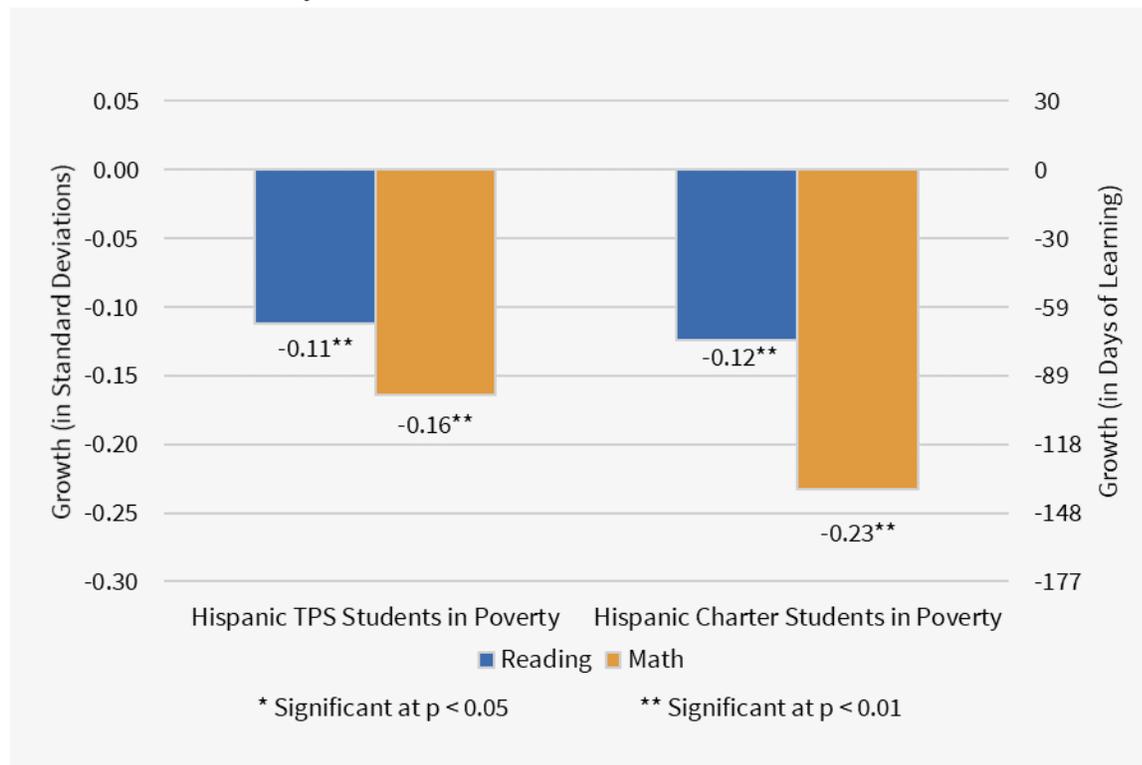
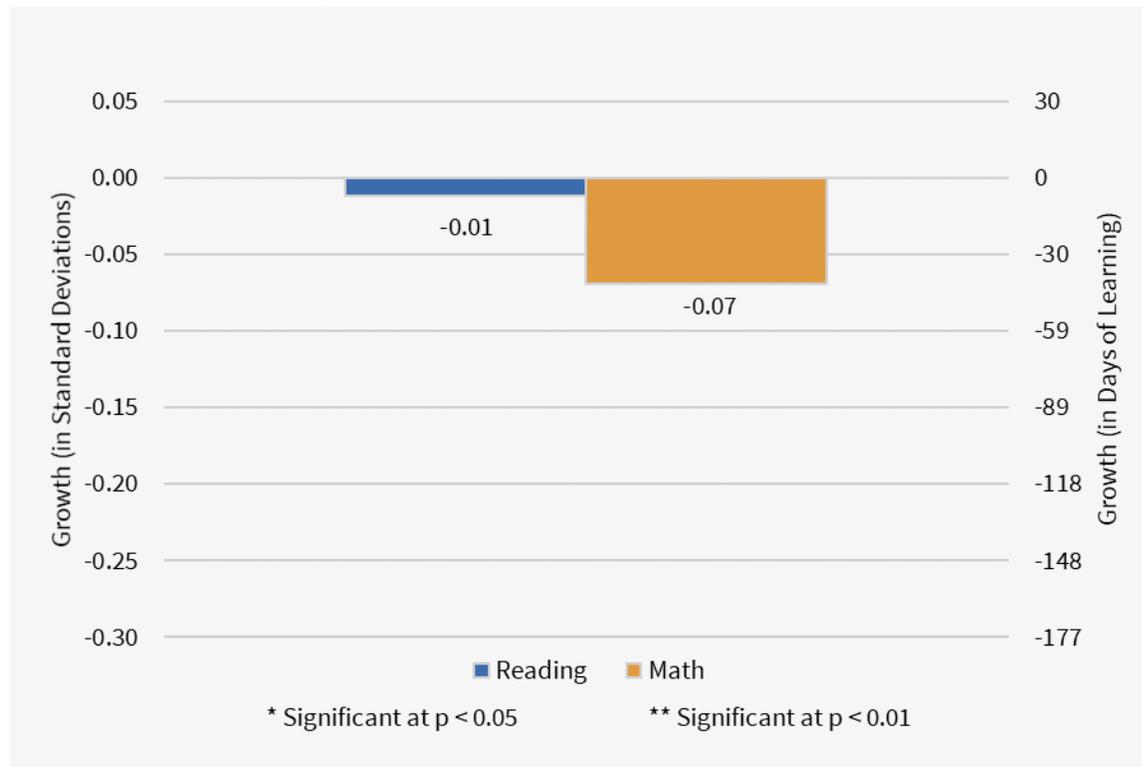


Figure 15a: Relative Learning Gains for Hispanic Charter School Students in Poverty Benchmarked against Their Hispanic TPS Peers in Poverty

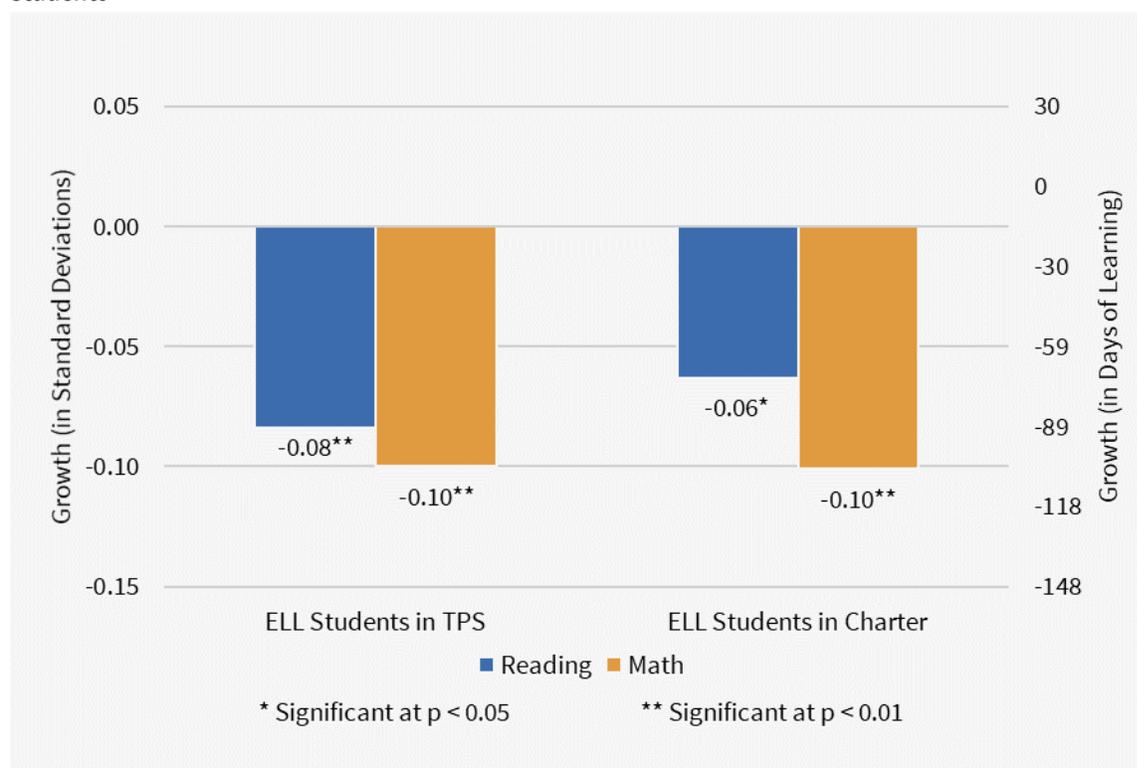


To summarize the findings illustrated in Figures 13 through 15a, there are huge performance gaps in both reading and math between white, black, and Hispanic students living in poverty (no matter where they study) and white non-poverty students in TPS. Charter schools and TPS produce similar learning gains for Hispanic students in poverty in both subjects. At the same time, charter attendance negatively affects the learning progress in math of black and white students living in poverty.

Charter School Impact for English Language Learners

There is a growing population of students enrolled in the public school system with a primary language other than English. Their present success in school will influence their progress in the future once they exit the school system. The 2017 National Assessment of Education Progress (NAEP) documented the performance gap between English language learners (ELL) and their English proficient peers, with ELL students having weaker performance.¹⁶ Even though the share of charter school students who are English Language Learners in South Carolina is only three percent, demographic trends in the country point to larger shares over time. The analyses in Figure 16 and Figure 16a can provide important baselines for comparisons over time.

Figure 16: Learning Gains for TPS and Charter Students with ELL Designation Compared to Non-ELL TPS Students

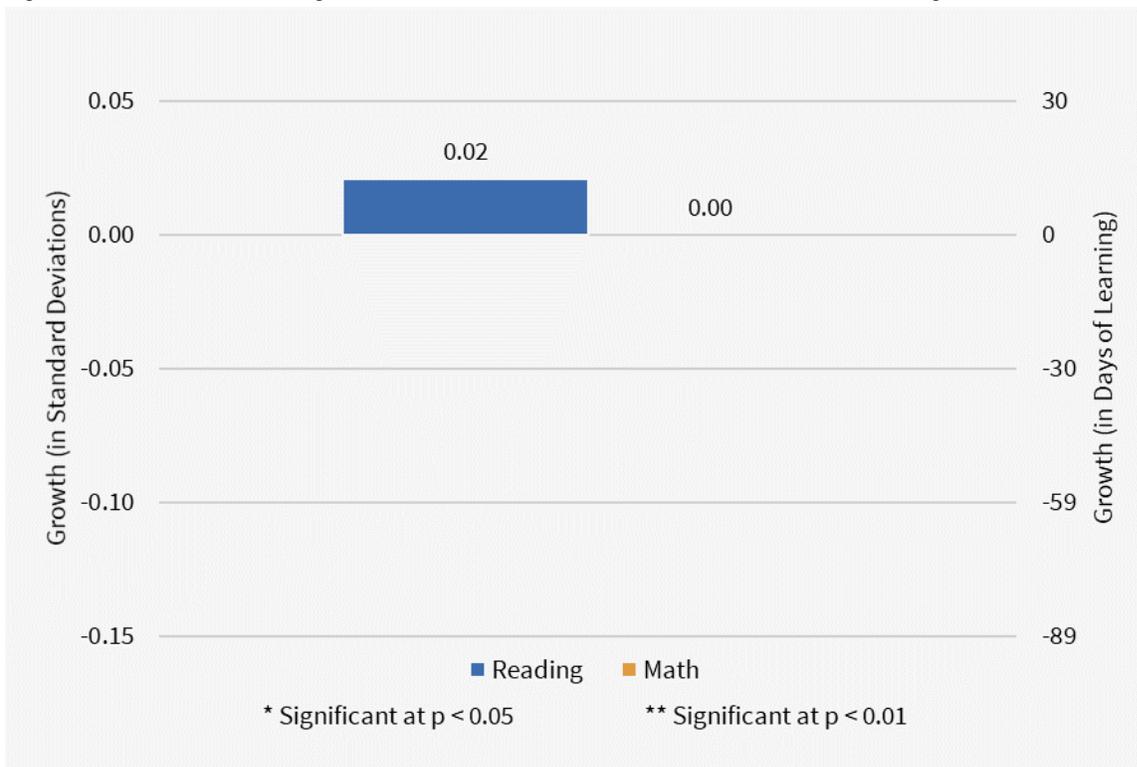


The comparison student for Figure 16 is a TPS student who is English proficient. English language learners in TPS schools achieve weaker learning gains in both subjects, relative to non-ELL TPS students, amounting to 47 and 59 fewer days of learning in reading and math, respectively. Charter school students with ELL designation make less academic progress in reading and math gains compared to non-ELL TPS students. The difference in academic progress between charter ELL students and TPS non-ELL students is equivalent to 35 fewer days of learning in reading and 59 fewer days of learning in math. When the progress in ELL students is compared across school

¹⁶ “National Student Group Scores and Score Gaps,” NAEP Mathematics Report Card, https://www.nationsreportcard.gov/math_2017/nation/gaps/?grade=4#?grade=4.

settings, as displayed in Figure 16a, charter ELL students post similar progress to their TPS ELL peers in both reading and math.

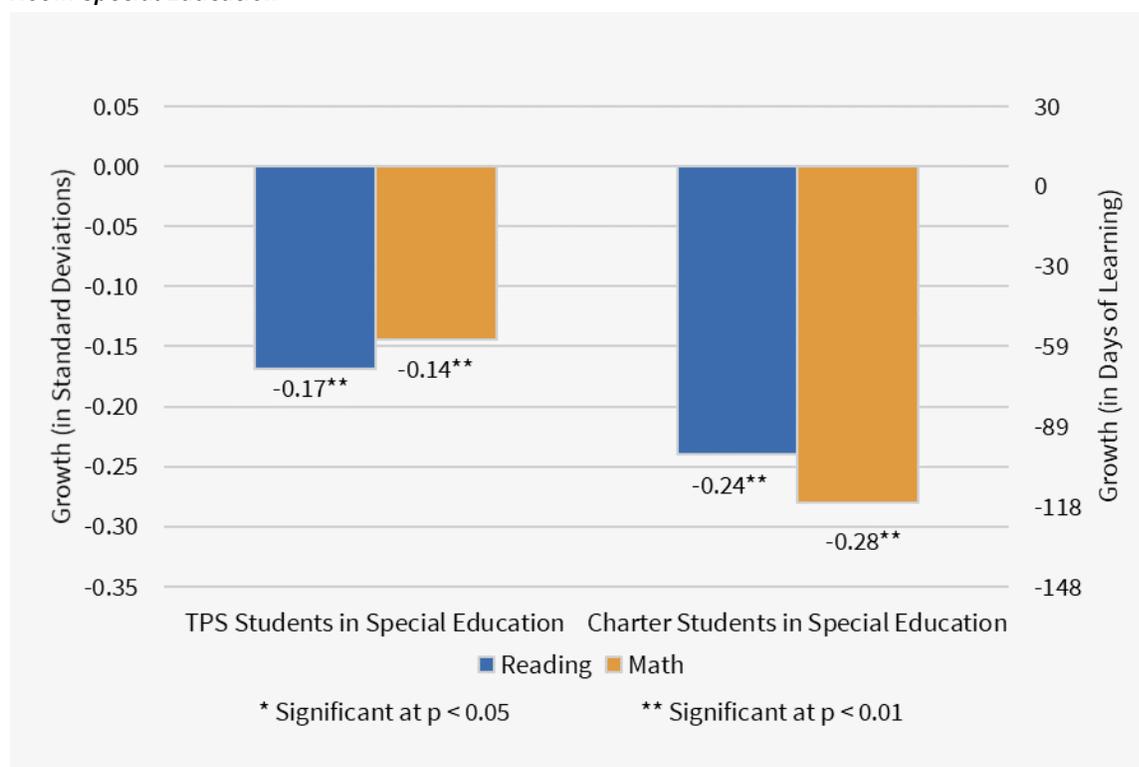
Figure 16a: Relative Learning Gains for ELL Charter School Students Benchmarked against Their ELL TPS Peers



Charter School Impact for Special Education Students

Because of the differences in individual needs, comparing the outcomes of special education students is difficult, regardless of where they enroll. In the ideal world, we would only compare students with the same Individual Education Program (IEP) designation, matching for it along with the rest of the matching variables. That approach faces real challenges, however, because of the large number of designations. The finer distinction leads to very small numbers of cases that match between charter schools and their feeder schools, which hinders the analysis. To obtain any estimates of charter school impacts for students with special education needs, it is necessary to aggregate across all IEP categories. It is important to consider this when viewing the results in Figure 17 and Figure 17a. In South Carolina, nine percent of students in charter schools receive some form of special education.

Figure 17: Overall Learning Gains for TPS and Charter Students in Special Education Compared to TPS Students Not in Special Education



In Figure 17, we first compare students receiving special education services in TPS and charter schools to students in TPS not receiving special education services. South Carolina special education students in both TPS and charter schools have significantly weaker academic growth than students in TPS who do not receive special education services. Figure 17 shows that TPS students in special education programs experience 100 fewer days of learning in reading and 83 fewer days of learning in math when compared to TPS students not receiving special education services. A special education student in charter schools also makes less progress than a non-special-

education student in TPS, and the gap is larger, reaching 142 fewer days of learning in reading and 165 fewer days in math.

Figure 17a contrasts the growth of special education students attending charter schools relative to their peers in TPS. Figure 17a shows that charter students in special education fare worse than their TPS VCRs in reading and math. The gap in academic progress between charter students in special education and TPS students in special education is equivalent to 41 and 83 fewer days of learning in reading and math, respectively.

Figure 17a: Relative Learning Gains for Charter School Students in Special Education Benchmarked against Their TPS Peers in Special Education

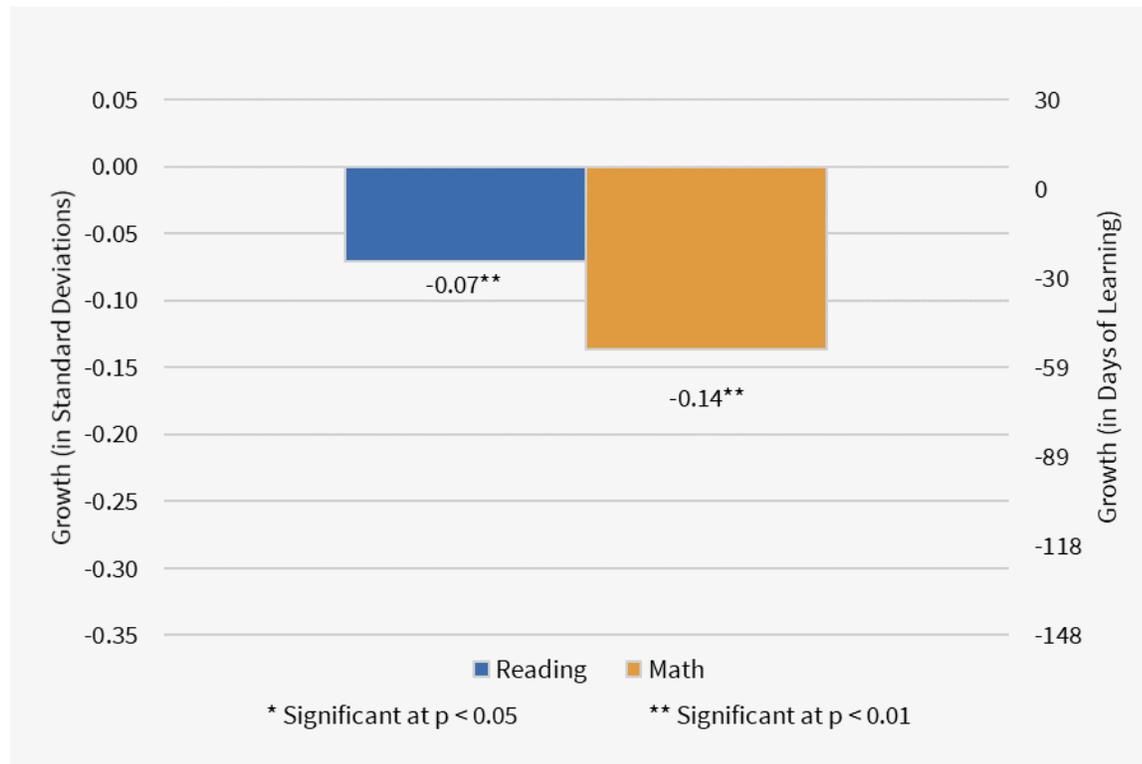


Table 7 summarizes the effect that charter schools have on student group populations. The coefficients represent the growth of each group relative to their counterpart group in TPS.

Table 7: Charter School Impact on Student Subgroup Performance

Student Group	Charter Effect on Student Groups Benchmarked against their TPS Peers	
	Reading	Math
Overall Charter Effect	-0.01	-0.09**
Charter School Students in Poverty	-0.02	-0.09**
White Charter Students	-0.02	-0.10*
White Charter Students in Poverty	-0.04*	-0.14**
Black Charter Students	0.04	-0.02
Black Charter Students in Poverty	0.02	-0.05**
Hispanic Charter Students	0.00	-0.07
Hispanic Charter Students in Poverty	-0.01	-0.07
English Language Learner Charter Students	0.02	0.00
Special Education Charter Students	-0.07**	-0.14**

* Significant at the 0.05 level, **Significant at the 0.01 level

Synthesis and Conclusions

Summary of Findings

In this study, we examine the academic progress of students in South Carolina charter schools in a year's time compared to the gains of identical students in the traditional public schools the students would have otherwise attended. The study employs five years of annual data from 2013-14 to 2017-2018, in order to create four year-to-year measures of progress, referred to as growth or gains. Table 8 summarizes the key findings of this report.

Table 8: Summary of Statistical Significance of Findings for South Carolina Charter School Students Benchmarked Against Comparable TPS Students

	Reading	Math
South Carolina Charter Students	Similar	Negative
Students in Online Charter Schools	Negative	Negative
Students in Brick-and-Mortar Charter Schools	Similar	Similar
Students in Charters in 2014-15	Similar	Negative
Students in Charters in 2015-16	Similar	Negative
Students in Charters in 2016-17	Similar	Negative
Students in Charters in 2017-18	Similar	Similar
Students in Urban Brick-and-Mortar Charter Schools	Similar	Similar
Students in Suburban Brick-and-Mortar Charter Schools	Similar	Similar
Students in Town Brick-and-Mortar Charter Schools	Similar	Similar
Students in Rural Brick-and-Mortar Charter Schools	Similar	Similar
Students in Elementary Charter Schools	Similar	Similar
Students in Middle School Charter Schools	Similar	Positive
Students in High School Charter Schools	Similar	Similar
Students in Multi-level Charter Schools	Negative	Negative
First Year Enrolled in Charter School	Negative	Negative
Second Year Enrolled in Charter School	Similar	Negative
Third Year Enrolled in Charter School	Similar	Similar
Fourth Year Enrolled in Charter School	Positive	Negative
White Charter School Students	Similar	Negative
Black Charter School Students	Similar	Similar
Hispanic Charter School Students	Similar	Similar
Special Education Charter School Students	Negative	Negative
English Language Learner Charter School Students	Similar	Similar
Charter Students in Poverty	Similar	Negative
White Charter Students in Poverty	Negative	Negative
Black Charter Students in Poverty	Similar	Negative
Hispanic Charter Students in Poverty	Similar	Similar

On average, students in South Carolina charter schools experience similar learning gains in reading and weaker growth in math in a year than their TPS peers. The disadvantage in math for charter students is as if the students obtained 53 fewer days of learning in a typical 180-day school year.

In South Carolina, there are different types of operation for charter schools. Online and brick-and-mortar charters have distinct physical or geographic boundaries, student profiles, and means of curriculum delivery. Our investigation reveals remarkably weaker growth in both reading and math among online charter students relative to the average TPS students or brick-and-mortar charter students. In fact, the poor performance of online charter schools depresses the overall charter impact on student academic growth.

Beyond the overall results, the analysis probes the consistency of charter school performance in South Carolina over many dimensions. Brick-and-mortar charter school students in urban, suburban, town or rural areas grow similarly to their TPS peers in respective settings in both reading and math.

Comparison of charter performance by grade span shows that students in South Carolina charter elementary and high schools exhibit similar growth in reading and math compared to their TPS peers. Charter middle school students show similar progress in reading, while they gain an edge over their TPS peers in math. However, students in charter multi-level schools experience weaker growth in reading and math than their TPS peers.

The learning gains associated with charter school attendance vary across different demographic subgroups. White charter students post lower academic growth than their respective virtual twins in TPS. On the other hand, black and Hispanic students obtain similar learning gains in both subjects as compared to their respective virtual twins in TPS. For students in poverty, attendance in charter schools produces similar learning gains in reading and weaker learning gains in math compared to TPS attendance, particularly white and black students in poverty. Hispanic students in poverty post similar gains in reading and math to those of their TPS virtual twins. Charter English language learners are on par in both subjects compared to their peers enrolled in TPS. Charter students in special education experience weaker learning progress in both reading and math compared to their peers in TPS.

The school-level results reveal that around 30 and 15 percent of South Carolina charter schools outpace their local TPS alternatives in reading and math, respectively. Still, 22 percent of charter schools have results that are significantly lower than TPS for reading and 33 percent of charter schools are underperforming in math growth relative to their local TPS alternatives.

The student-to-student and school-to-school results show charter schools to be either behind or on a par with TPS. The complementary question of whether charter schools are helping students reach high levels of achievement is also important. Around 56 and 42 percent of charter schools in South Carolina fall above the 50th percentile in achievement in reading and math, respectively. These outcomes are of course influenced by locational decisions and the starting points of the students they serve. In addition, 59 percent of charter schools

have positive academic growth in reading and 47 percent of charter schools have positive academic growth in math irrespective of achievement. Some schools below the 50th percentile of achievement have positive growth in reading and math. With positive and sustained growth, these schools will likely post achievement gains over time. However, the outlook for a considerable proportion of South Carolina charter schools with below-average growth and low achievement (20 percent for reading and 42 percent for math) is a source of great concern, especially in a 20 plus-year old charter sector such as the one in South Carolina. Students in these schools will fall further behind their TPS peers in the state academically over time if their negative growth persists.

Implications

In South Carolina, the enabling charter school law intends charter schools to promote educational improvement for all students and to close the achievement gaps between low-performing and high-performing student groups.¹⁷ The findings of this study suggest that the charter schools' goal of educational improvement is unevenly met, compared to the progress made in the traditional public school setting. In the aggregate, after taking into account differences in student populations, the overall learning progress of students in South Carolina charter schools is weaker than the progress made in TPS in math, and not different from TPS in reading.

The charter schools' goal of closing the achievement gaps also remains aspirational. Less advantaged student subgroups (white students in poverty in reading and math, special education students in reading and math, and students in poverty in math) progress less in a year's time than traditionally more advantaged groups (white non-poverty non-ELL non-special education students). The slower learning progress made in a year's time suggests that the achievement gaps are widening in South Carolina.

The study highlights areas needing attention. Results showing 22 and 33 percent of charter schools posting significantly lower growth for their students compared to the alternative in reading and math, respectively, suggest that practices require attention in order to improve student outcomes. The collective impact of these results on students' academic careers and later life outcomes remains of deep concern. Schools that persistently post significantly weaker academic gains than TPS signal opportunities to strengthen authorizer practice.

At the same time, our study reveals areas of success. A significant share of schools shows high growth and high achievement, particularly in reading. Those schools can serve as strong examples of academic progress and provide valuable models for all South Carolina schools to emulate. Further research is necessary to understand why we see positive results for these schools. Practices found in these schools that prove to be successful in improving student outcomes can be disseminated and replicated. Replication of the successful school models could rapidly increase the number of high quality seats in South Carolina.

¹⁷ Section 59-40-20 of the South Carolina Charter Schools Act of 1996.

APPENDICES

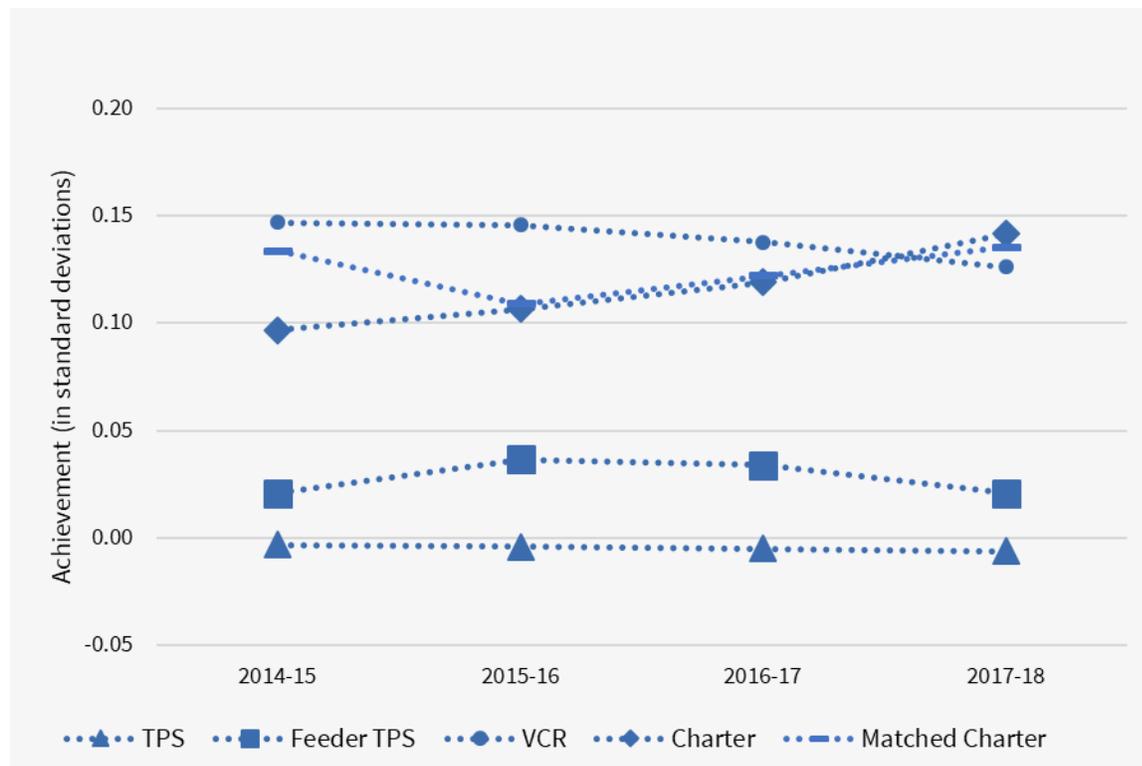
Appendix A: Descriptive Patterns of Achievement

Time Trend of Charter, Matched Charter, TPS, Feeder TPS, and VCR student achievement

Even though VCR are selected to match the demography and prior achievement of charter students, the trajectory of charter students may differ from that of VCRs. The achievement of charter students may also differ from the average achievement in the feeder schools (which may differ from the achievement of VCRs) or the average achievement across traditional public schools in South Carolina. Appendix Figures 1 and 2 compare average achievement for five groups: All students in TPS, all students in Feeder TPS, VCRs, all students in charter schools, and charter students with a growth measure and a VCR match for reading and math, respectively.

In Appendix Figures 1 and 2 the average student achievement in a TPS is close to the 0.00 line across years as expected from the normalization of test scores in each year. It is important to note that this does not mean that the average achievement of students in TPS has remained unchanged.

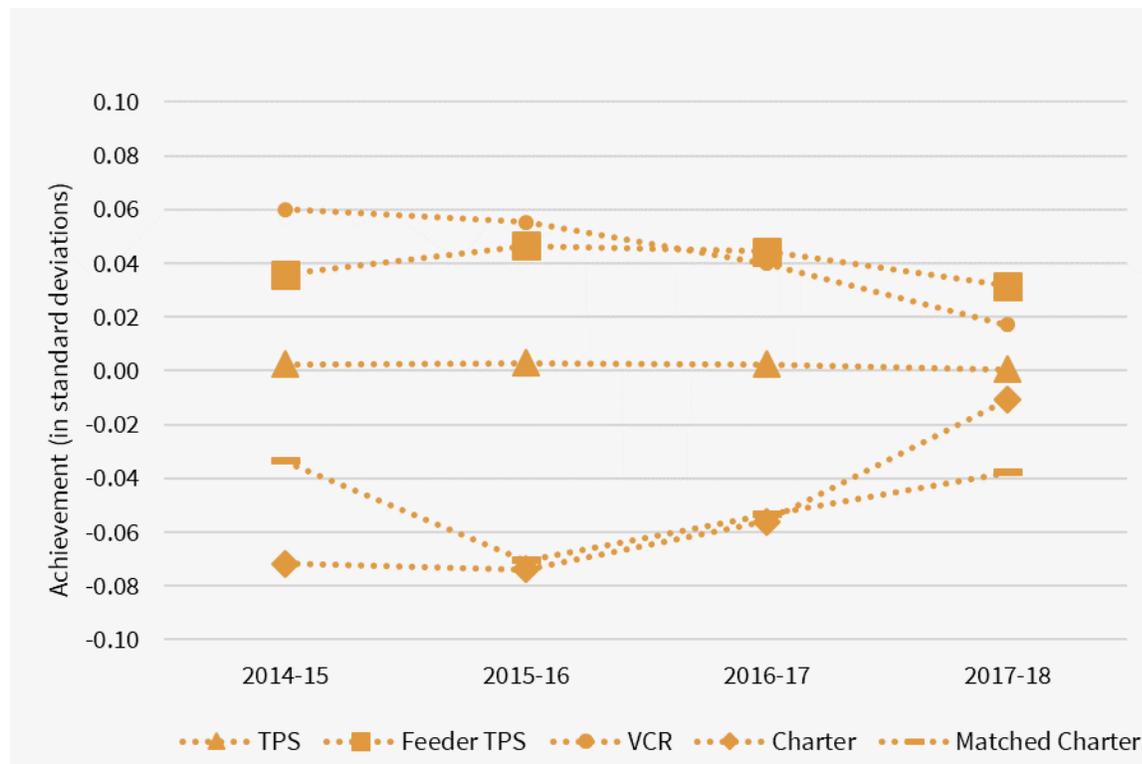
Appendix Figure 1: Comparison of Reading Student Achievement in TPS, Feeders, VCR, Charter, and Matched Charter over Time



Appendix Figure 1 shows that the math achievement of charter students (“Charter”) or charter students with growth and a VCR (“Matched Charter”) is higher than the achievement of students in TPS and Feeder TPS, but

lower than the average reading achievement of VCRs. Appendix Figure 1 also shows that the average math achievement of VCRs is much higher than the average math achievement in traditional public school whose student(s) have transferred to a charter school (“Feeder TPS”). At the same time, the average math achievement of students making up the VCRs is higher than the average reading achievement of all students Feeder TPS and across all TPS. Appendix Figure 1 suggests that the math performance of TPS students similar to charter students is much higher than the average math performance in the schools they attend, while those schools have similar average math performance to the whole TPS sector.

Appendix Figure 2: Comparison of Math Student Achievement in TPS, Feeders, VCR, Charter, and Matched Charter over Time

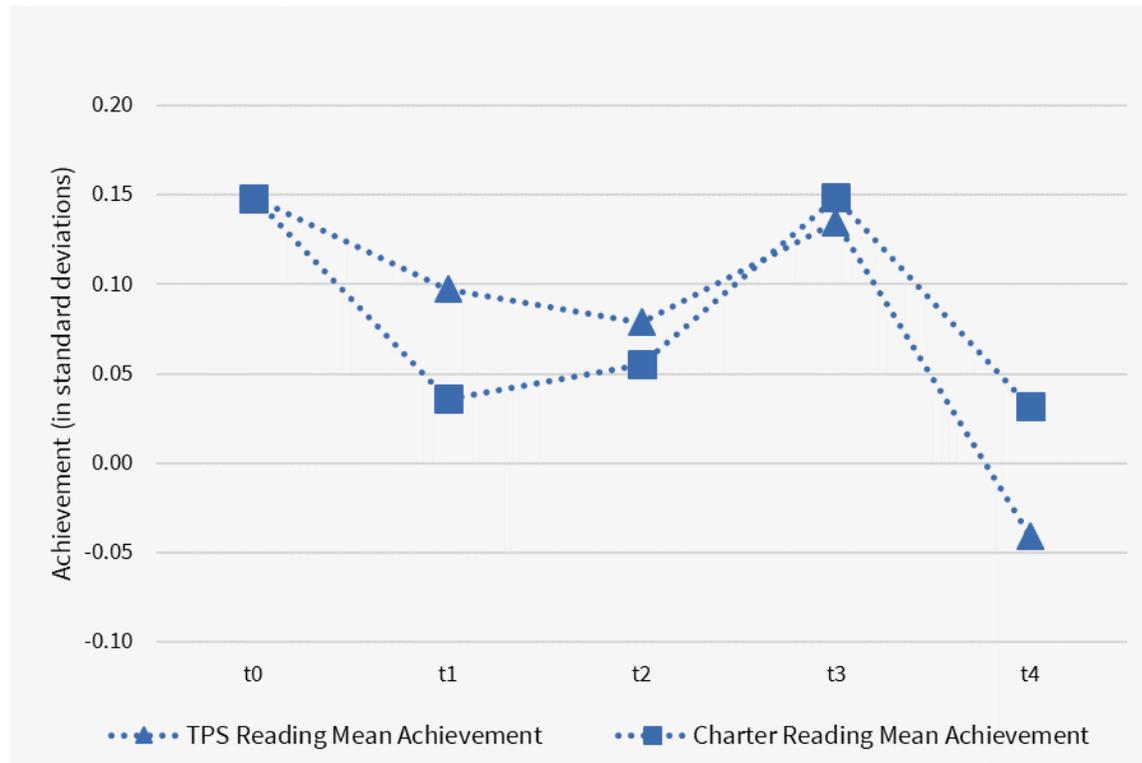


Appendix Figure 2 shows that the reading achievement of charter students (“Charter”) or charter students with growth and a VCR (“Matched Charter”) is lower than the achievement of students in TPS, Feeder TPS, or VCR, although the gap has lessened in recent years. Appendix Figure 2 also shows that the average reading achievement of VCRs is close to the average achievement in traditional public school whose student(s) have transferred to a charter school (“Feeder TPS”). At the same time, the average reading achievement of students making up the VCR or all students in Feeder TPS is higher than the average reading achievement of students across all TPS, while the gap gets smaller in more recent years. Appendix Figure 2 suggests that the reading performance of TPS students similar to charter students (VCRs) is similar to the average reading performance in the schools they attend, while those schools have higher average reading performance than the whole TPS sector.

Average Charter and VCR Achievement by Years in Charter

Appendix Figures 3 and 4 focus on matched charter students, who enroll for their first time in a charter school between 2014-15 and 2017-18 school years, and their TPS VCRs. Appendix Figures 3 and 4 show how the average achievement of students in charter school progresses over the years of charter school attendance compared to the achievement of their TPS counterparts (VCR) in reading and math, respectively. It is important to note that the first (t1), second (t2) etc. year of charter attendance may correspond to different school years for different students. Appendix Figures 3 and 4 show that before charter enrollment, in t0, matched charter students and their TPS comparisons have identical achievement by design in the Virtual Control Record methodology in reading and math, respectively.

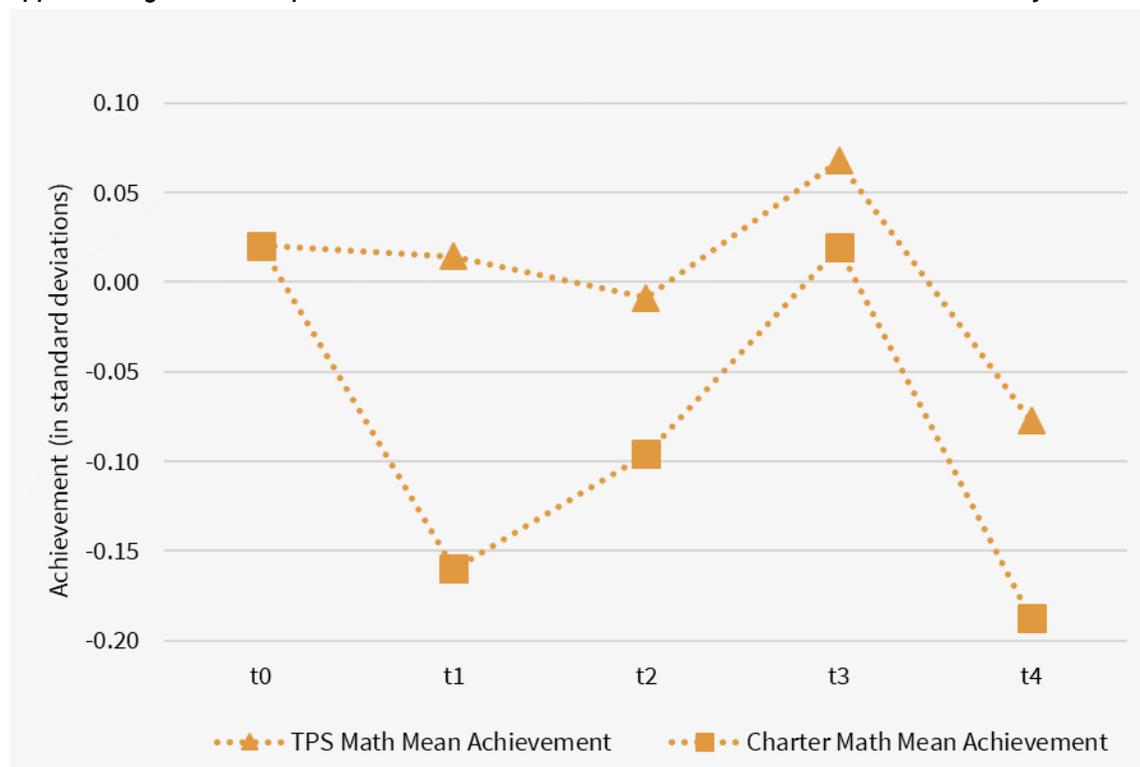
Appendix Figure 3: Comparison of Reading Achievement of Charter Students and VCRs by Years in Charter



Appendix Figure 3 shows that in the first year (t1) of charter school attendance matched charter students have lower achievement in reading than the achievement of similar students in a traditional public school setting. Matched charter students are also performing at a lower level in reading than where they would perform in a traditional public school setting in their second (t2) and fourth (t4) year of charter school attendance. Only in their third (t3) year of charter attendance charter students outperform slightly their peers in TPS in reading achievement. Appendix Figure 3 suggests that although charters and VCRs start at similar levels of reading

achievement, charter attendance of the former may be associated with persistently lower levels of reading achievement over time, compared to the latter.

Appendix Figure 4: Comparison of Math Achievement of Charter Students and VCRs by Years in Charter



Appendix Figure 4 shows the average math achievement of matched charter students and their TPS counterparts (VCRs). By design, matched charter students and their VCR have very similar achievement in the year prior to charter enrollment (in t0). In the first year (t1) of charter school attendance, matched charter students have lower achievement in math than the achievement of similar students in a traditional public school setting. Matched charter students also grow at a lower rate in math than where they would perform in a traditional public school setting (VCRs) in their second (t2), third (t3), and fourth (t4) year of charter school attendance. Appendix Figure 4 reveals that although charter school students and VCRs start at comparable levels of math achievement, charter attendance of the former may be associated with persistently lower levels of math achievement over time, compared to the latter.

Appendix B: Sample Size in Each Subgroup

The numbers in the table 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.

Appendix Table 1: Number of Observations for All Results

Student Group	Matched Charter Student Records	
	Reading	Math
South Carolina Charter Students Tested & Matched	39,041	37,640
Students in Charters in 2014-2015	8,471	8,025
Students in Charters in 2015-2016	9,442	9,144
Students in Charters in 2016-2017	10,241	9,905
Students in Charters in 2017-2018	10,887	10,566
Students in Urban Charter Schools	19,640	18,522
Students in Suburban Charter Schools	8,284	8,110
Students in Town Charter Schools	2,818	2,751
Students in Rural Charter Schools	8,299	8,257
Students in Elementary Charter School	10,264	10,142
Students in Middle School Charter Schools	1,896	1,864
Students in High School Charter Schools	3,053	2,570
Students in Multi-level School Charter Schools	23,828	23,064
Students First Year Enrolled in Charter School	13,115	12,657
Students in Second Year Enrolled in Charter School	4,419	4,172
Students in Third Year Enrolled in Charter School	1,766	1,668
Students in Fourth Year Enrolled in Charter School	444	385
Black Charter School Students	11,076	10,999
Hispanic Charter School Students	2,278	2,258
White Charter School Students	24,805	23,606
Charter School Students in Poverty	21,046	20,559
Black Charter School Students in Poverty	9,016	8,995
Hispanic Charter School Students in Poverty	1,741	1,715
Special Education Charter School Students	2,771	2,751
English Language Learner Charter School Students	1,307	1,337
Grade Repeating Charter School Students	413	503

Appendix C: Technical Appendix

Source of Student-Level Data

For the purpose of this study, student-level data were provided by South Carolina’s Department of Education. CREDO has no power to audit or control the quality of records held by the South Carolina Department of Education. Therefore, we recognize that there is a level of data specificity that is beyond the means CREDO can control.

Demographic Composition of Charter Students in the Study

This study examines the performance of students in charter schools who participated in annual accountability testing in South Carolina, occurring in grades 3-8 and in whatever grade the end-of-course assessments were taken. The test scores allow us to use a common measure of performance across schools and over time. However, in each growth period of the study, students who are enrolled in non-tested grades are not included in the analysis of performance. This partially accounts for the differences in school and student counts in our analysis data compared to other published figures about the charter school population in South Carolina.

As discussed in the Study Approach section, we match tested charter students by period if they can be tracked for two, three, or four periods in the study so as to conform to the new baseline equivalence requirement in the *Procedures Handbook Version 4.0 of What Works Clearinghouse*. Appendix Tables 2-3 present the student profiles across all and across matched South Carolina charter students tested in math in each matching period.

Appendix Table 2: Demographic Composition of Charter Students in the Study: Period 1

Student Group	All Charter Students Tested		Matched Charter Students	
	Number	Percent	Number	Percent
South Carolina Charter Students	25,400		22,039	
% Matched	22,039	87%		
Black Students	7,390	29%	6,442	29%
Hispanic Students	1,736	7%	1,279	6%
White Students	15,335	60%	13,828	63%
Students in Poverty	13,890	55%	12,228	55%
Special Education Students	2,184	9%	1,666	8%
English Language Learners	951	4%	696	3%
Grade Repeating Students	830	3%	377	2%

Appendix Table 3: Demographic Composition of Charter Students in the Study: Period 2

Student Group	All Charter Students Tested		Matched Charter Students	
	Number	Percent	Number	Percent
South Carolina Charter Students	11,849		9,756	
% Matched	9,756	82%		
Black Students	3,313	28%	2,864	29%
Hispanic Students	891	8%	616	6%
White Students	7,176	61%	6,095	62%
Students in Poverty	6,122	52%	5,241	54%
Special Education Students	995	8%	717	7%
English Language Learners	568	5%	395	4%
Grade Repeating Students	232	2%	109	1%

Appendix Table 4: Demographic Composition of Charter Students in the Study: Period 3

Student Group	All Charter Students Tested		Matched Charter Students	
	Number	Percent	Number	Percent
South Carolina Charter Students	5,659		4,381	
% Matched	4,381	77%		
Black Students	1,570	28%	1,265	29%
Hispanic Students	434	8%	259	6%
White Students	3,430	61%	2,774	63%
Students in Poverty	2,837	50%	2,300	52%
Special Education Students	442	8%	278	6%
English Language Learners	288	5%	166	4%
Grade Repeating Students	43	1%	11	0%

Appendix Table 5: Demographic Composition of Charter Students in the Study: Period 4

Student Group	All Charter Students Tested		Matched Charter Students	
	Number	Percent	Number	Percent
South Carolina Charter Students	1,996		1,466	
% Matched	1,466	73%		
Black Students	579	29%	429	29%
Hispanic Students	160	8%	104	7%
White Students	1,182	59%	909	62%
Students in Poverty	1,028	52%	791	54%
Special Education Students	151	8%	90	6%
English Language Learners	126	6%	80	5%
Grade Repeating Students	22	1%	6	0%

Note: Appendix Tables 2 through 5 refer to every student who tested in Math.

Appendix Figure 6: Comparison of Starting Math Scores of Matched Charter Students and VCRs

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
TPS	37,640	-.0013555	.0048132	.9338131	-.0107895	.0080785
Charter	37,640	-.0018092	.0048172	.9345854	-.011251	.0076327
combined	75,280	-.0015823	.0034048	.9341932	-.0082558	.0050911
diff		.0004537	.0068097		-.0128933	.0138007

diff = mean(TPS) - mean(Charter) t = 0.0666
 Ho: diff = 0 Welch's degrees of freedom = 75279.9

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
 Pr(T < t) = 0.5266 Pr(|T| > |t|) = 0.9469 Pr(T > t) = 0.4734

Measuring Academic Growth

With three years of data, each subject-grade-year group of scores has slightly different mid-point averages and distributions. For end-of-course assessments (EOCs) there are only subject-year groups because EOCs are not grade specific. This means a student takes this assessment after completing the course, no matter what grade he is in. In our study, scores for all these separate tests are transformed to a common scale. All test scores have been converted to standardized scores to fit a "bell curve", in order to allow for year-to-year computations of growth.¹⁸

When scores are standardized, every student is placed relative to their peers in the entire state of South Carolina. A student scoring in the 50th percentile in South Carolina receives a standardized score of zero, while a standardized score of one would place a student in 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.

Model for the Analysis of the Academic Impact of Charter Schools

After constructing a VCR for each charter student, we then set out to develop a model capable of providing a fair measure of charter impact. The National Charter School Research Project provided a very useful guide to begin

¹⁸ 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 variation around that new score of zero, so that scores that fall below the original average score are expressed as negative numbers and those that are higher receive positive values.

the process¹⁹. First, it was useful to consider student growth rather than achievement. A growth measure provided a strong method to control for each student’s educational history as well as the many observable differences between students that affect their academic achievement. The baseline model included controls for each student’s grade, race, gender, free or reduced price poverty status, special education status, English language learner status, and whether he was held back the previous year. The literature on measuring educational interventions found that the best estimation techniques must also include controls for baseline test scores.²⁰ Each student’s prior year test score is controlled for in our baseline model. Additional controls are also included for year, and period (first year in charter, second year in charter, etc.). The study’s baseline model is presented below.

$$\Delta A_{i,t} = \theta A_{i,t-1} + \beta X_{i,t} + \rho Y_t + \gamma C_{i,t} + \varepsilon_{i,t} \quad (1)$$

where the dependent variable is

$$\Delta A_{i,t} = A_{i,t} - A_{i,t-1} \quad (2)$$

and A_{it} is the state-by-test z-score for student i in period t ; A_{it-1} is the state-by-test z-score for student i in period $t - 1$; $X_{i,t}$ is a set of control variables for student characteristics and period; Y_t is a year fixed effect; C is a vector of variables for whether student i attended a charter school and what type of charter school in period t ; and ε is the error term. Errors are clustered around charters schools and their feeder patterns as well. The parameters of interest are estimated using Ordinary Least Squares (OLS) in STATA 14.

The baseline model above was extended to explore additional interactions beyond a simple binary to indicate charter enrollment. One type of extension included both “double” and “triple” interactions between the charter variable and student characteristics. For example, to identify the impact of charter schools on different racial groups, we estimate models that break the charter variable into “charter_black,” “charter_hispanic,” etc. To further break down the impact of charters by race and poverty, the variables above were split again. For example, black students in charter schools are split further into students in poverty (“charter_black_poverty”) and those that do not (“charter_black_nonpoverty”).

Presentation of Results

In this report, we present the impacts of attending charter schools in terms of standard deviations. The base measures for these outcomes are referred to in statistics as z-scores. A z-score of 0 indicates the student’s achievement is average for his or her grade. Positive values of the effect size represent higher performance while negative values represent lower performance. Likewise, a positive effect size value means a student or group of

¹⁹ Julian Betts and Paul Hill, “Key Issues in Studying Charter Schools and Achievement: A Review and Suggestions for National Guidelines,” National Charter School Research Project, White Paper Series No. 2, May 2006.

²⁰ Julian Betts and Y. Emily Tang, “The Effect of Charter Schools on Student Achievement: A Meta-Analysis of the Literature,” National Charter School Research Project, May 2006.

students has improved relative to the students in the state taking the same exam. This remains true regardless of the absolute level of achievement for those students. As with the z-scores, a negative effect size means the students have on average lost ground compared to their peers.

It is important to remember that a school can have a positive effect size for its students (students are improving) but still have below-average achievement. Students with consistently positive effect sizes will eventually close the achievement gap if given enough time; however, such growth might take longer to close a particular gap than students spend in school.

While it is fair to compare two effect sizes relationally (i.e., 0.08 is twice 0.04), this must be done with care as to the size of the lower value. It would be misleading to state one group grew twice as much as another if the values were extremely small such as 0.0001 and 0.0002.

Finally, it is important to consider whether an effect size is significant or not. In statistical models, values which are not statistically significant should be considered as no different from zero. Two effect sizes, one equal to .001 and the other equal to .01, would both be treated as no effect if neither were statistically significant.

To assist the reader in interpreting the meaning of effect sizes, we include an estimate of the average number of days of learning required to achieve a particular effect size. This estimate was calculated by Dr. Eric Hanushek and Dr. Margaret Raymond based on the latest (2017) 4th and 8th grade test scores from the National Assessment of Educational Progress (NAEP). Using a standard 180-day school year, each one standard deviation (s.d.) change in effect size was equivalent to 590 days of learning in this study. The values in Table 3 are updated from past reports using more recent NAEP scores, which show slower absolute annual academic progress than earlier administrations.²¹

²¹ Hanushek, Peterson, and Woessmann, "Achievement Growth: International and U.S. State Trends in Student Performance."