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**A LONGITUDINAL STUDY OF
THE EFFECT OF PARTICIPATION IN
THE SC 21ST CCLC AFTERSCHOOL PROGRAM
ON STUDENT PERFORMANCE ON STANDARDS
BASED TESTS**

**PREPARED FOR THE SOUTH CAROLINA
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AUGUST 17, 2012

EXECUTIVE SUMMARY

On the whole, it has been difficult for researchers to answer these questions arising from the 21st Community Learning Center purpose statement “to assist students, particularly those who attend high-poverty and low-performing schools, in meeting state and local standards in core academic subjects.” because of a lack of data. There are few large datasets of students who have received 21st CCLC services that cover a period of years. Moreover, few, if any, datasets contain identifiers that can track these students over time after they leave the 21st CCLC program and also contain students and their identifiers who did not receive 21st CCLC services but who attended the same schools as the 21st CCLC students.

South Carolina does have these datasets covering a six year period. A longitudinal study can, therefore, be conducted that compares the outcomes for 21st CCLC students to the outcomes for comparable non-21st CCLC students. This study initially set out to answer five, and ultimately six, research questions. The questions and the answers at this point are:

1. How are students’ learning trajectories impacted by the 21st CCLC program over time?

The study analyzed differences in students’ learning trajectories by comparing the 21st CCLC students to a group of students from the same schools with similar demographics and baseline performance levels. The data was stratified in order to allow the analysis to determine if the program changed students’ trajectories from what would have otherwise occurred had there been no program offered. Overall, the learning trajectory for all students, as measured by the z-score value of the students’ scale score on the state standardized tests, have an initial incline followed by a slight decline and an eventual flattening out of scores. The 21st CCLC program as a whole does not appear to affect the overall trajectory of students’ achievement on the state standardized test.

2. Does attendance at 21st CCLC learning centers improve performance on state and local standards in core academic subjects when students who attend 21st CCLC programs are compared to similar students who do not attend?

Improved performance on state and local standards in core academic subjects was measured by determining if participating in the 21st CCLC program improved the students’ odds of passing both HSAP tests. If baseline academic achievement is not taken into consideration, 21st CCLC students are less likely to pass both HSAP tests. However, if the baseline test scores are taken into account, the 21st CCLC students become just as likely to pass the HSAP test as the comparison students. This indicates that the program may help to improve the odds that under-performing students will pass both tests.

When the test score and HSAP analysis are taken together, there appears to be conflicting information. On the one hand, 21st CCLC students do not experience as steep an incline as the comparison students. However, in the final years of testing, these students have roughly the same test scores. Once these students reach high school, and most likely are not attending a 21st CCLC program, they appear to be just as likely to pass the HSAP test as students who do not attend.

When compared to other students in the same schools, students who participate in the 21st CCLC program have a much lower dropout rate, particularly in the 9th and 10th grade years; however, there is little difference in the dropout rate in the 11th grade.

Due to the smaller number of programs serving high school students, as well as inconsistent and low attendance rates for high school aged students in the 21st CCLC programs, effects of the program on the HSAP test and dropout rates rely heavily on students' participation in elementary and middle school. Most social programs have a diminishing effect over time, and the results of this study are inconclusive as to whether the program is having a lasting effect into high school.

3. Are there differences in outcome effects depending upon the amount of time students actually attend the 21st CCLC program?

The combination of the number of days that the student participated in the 21st CCLC program and the number of years that they participated has a significant contribution to the test score trajectory. However, the contribution is not linear. There is a sharper incline in the average z-score for both ELA and math in the middle years and the scores are highest in the later years for students who participated in the program for four or five years, which is when their fourth or fifth year of attendance would have occurred. Larger numbers of days that the student attended the program in a particular year has a positive impact on these trajectories. The number of years that students participated in the program had no effect on the odds of passing the HSAP tests.

Only a small percentage (2.9%) of 21st CCLC students included in the trajectory analysis participated in the program for four or five years. More than half of 21st CCLC students only participated for one year (55.4%). Therefore, while it appears that more attendance in the program will improve students' achievement on standardized tests over time, the effect is limited by the limited number of students remaining in the program over time.

4. Are there differences in outcome effects among students in different demographic groups attending the 21st CCLC program?

Being a female contributed to a faster rate of growth in test scores and increased the likelihood that the 21st CCLC student would pass both HSAP tests. 21st CCLC students who

are minorities have slower rates of growth and are less likely to pass both HSAP tests. Being above the poverty line contributed to a faster rate of growth in test scores and contributes to the overall likelihood of all students to pass both HSAP tests.

The 21st CCLC program as a whole has traditionally targeted students in minority groups who are below the poverty line and these demographic groups are more heavily represented in the program than other demographic group (In 2011, 81.72% of students served were minorities and 89.4% of students served received free or reduced lunch). Therefore, it appears that the program is targeting the appropriate demographic in those respects.

5. Are there differences in outcome effects among students in different grade levels attending the 21st CCLC program?

Grade level had a significant impact on the initial status of growth trajectory for all students; however there was little variation by grade level over time. Grade level of participation in the 21st CCLC was not a significant contributor to changes in test scores over time or to the likelihood of passing the HSAP test.

Students who were retained in grade level had significantly lower increases and greater declines in growth trajectories and were much less likely to pass the HSAP.

6. Are there differences by service providing organization?

Although it was not included in the final research questions, the type of organization that provided the 21st CCLC programming was included as a covariate that had the potential to impact the outcomes of 21st CCLC students. It was discovered that the type of organization had a significant impact on students' growth trajectories. Students who participated in programming provided by community based organizations, clubs, or faith-based organizations had greater improvements in test scores than did students who participated in programming provided by public school administrations.

There are four implications for further research in the study.

1. Analysis should be conducted again when six years of data are available for the PASS test. Further studies should target programs that have operated for multiple years, with and without 21st CCLC funding, in order to increase the number of students in the study who participate for more than three years.
2. Further research should be conducted with existing 21st CCLC programs that serve high school students on HSAP passage rates and dropout rates to identify ways to attract and effectively serve older students. The interaction between the 21st CCLC program and other funding streams that serve these same students in high school should be considered.

3. Analysis should be conducted when more of the 21st CCLC students have reached graduation age, in order to permit analysis of graduation rates and a more comprehensive analysis of drop-out rates.
4. Differences between the programming provided by community based, clubs, and faith-based organizations and school administered programs should be further researched.

There are two implications for state policy in the study.

1. Efforts should be made to support programs in retaining students in the program for multiple years.
2. Additional support should be provided to existing 21st CCLC programs that serve high school students and funding be targeted to programs that would serve older students at risk for dropping out.

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INTRODUCTION

The South Carolina 21st Century Community Learning Center program exists “1) to create or expand community learning centers that provide academic enrichment opportunities to assist students, particularly those who attend high-poverty and low-performing schools, in meeting state and local standards in core academic subjects; 2) to offer students a broad array of enrichment activities that can complement their regular academic programs; and 3) to offer literacy and other educational services to the families of participating children.” (Title IV, Part B, of the Elementary and Secondary Education Act, as amended.)

Numerous questions arise from the statement “to assist students, particularly those who attend high-poverty and low-performing schools, in meeting state and local standards in core academic subjects.” What is the best way to do this? Is it different for different subsets of students? Over time, is there a difference in meeting standards between the students who receive 21st CCLC services and similar students who do not?

On the whole, it has been difficult for researchers to answer these questions because of a lack of data. The federal reporting system does not keep track of individual students and depends on summary records kept at the site level. Most states follow suit. Therefore, there are few large data sets of students who have received 21st CCLC services that cover a period of years. Moreover, few, if any, datasets contain identifiers that can track these students over time after they leave the 21st CCLC program and also contain students and their identifiers who did not receive 21st CCLC services but who attended the same schools as the 21st CCLC students.

South Carolina does have these datasets covering a six year period. The South Carolina 21st CCLC Grantee Evaluation Management System (GEMS®) contains records of approximately 70,000 students who attended 21st CCLC programs in South Carolina from 2007 through 2011. These records include student identification numbers and Palmetto Achievement Challenge Tests (PACT) and Palmetto Assessment of State Standards (PASS) test scores. The records also include demographic information, program attendance and the school the students were attending in the year they were first entered into the GEMS® database.

A longitudinal study can, therefore, be conducted that compares the outcomes for 21st CCLC students to the outcomes for comparable non-21st CCLC students. Such an undertaking is fraught with a number of methodological difficulties, but these difficulties can be overcome.

Purpose of the Study and Research Questions

The purpose of this evaluation study is to inform the SC Department of Education (SCDE) on how the South Carolina 21st CCLC program has impacted students in the state over time.

There are five research questions which are proposed to be answered by this study. These are:

1. How are students' learning trajectories impacted by the 21st CCLC program over time?
2. Does attendance at 21st CCLC learning centers improve performance on state and local standards in core academic subjects when students who attend 21st CCLC programs are compared to similar students who do not attend?
3. Are there differences in outcome effects depending upon the amount of time students actually attend the 21st CCLC program?
4. Are there differences in outcome effects among students in different demographic groups attending the 21st CCLC program?
5. Are there differences in outcome effects among students in different grade levels attending the 21st CCLC program?

METHODOLOGY

This study will be based on a quasi-experimental model. Individual students who have participated in the South Carolina 21st CCLC program during school years 2007, 2008 and 2009 will be compared on standards-based tests, which measure specific skills defined by the state of South Carolina, to students who attended the same schools during 2007, 2008, and 2009 and who have not participated in the South Carolina 21st CCLC program.

A literature review was conducted to form the basis for the research questions. Research questions were discussed and confirmed with 21st CCLC staff at SCDE to ensure that the study would meet the needs of the Department. The study aims at answering the research questions and was conducted in four phases.

Phase 1 –Data Gathering

In this phase, SWS staff communicated with the appropriate personnel at the State Department of Education to clarify and formally request the data needed from the Department. The formal request was submitted to SCDE on March 6, 2012. SCDE provided the data to SWS on May 15, 2012. The data files included gender, race, socioeconomic status indicator (indicating whether the student's family is below the poverty line), school attended, days absent from the regular school day, grade level in each year, progression through school (retention, promotion, graduation, or drop out), State standardized test scores (PACT in 2006-2008 and PASS in 2009-2011), End of Course (EOC) test scores, and High School Assessment Program (HSAP) test scores. The records were linked using a de-identified random number. The State Unique Numbering System (SUNS) ID was provided only for those students who had participated in the 21st CCLC so that the academic achievement data could be linked to program data.

Program data such as attendance in the afterschool program and after school program characteristics were obtained from the South Carolina 21st CCLC Grantee Evaluation Management System (GEMS®). The data was linked using the SUNS ID and imported into the longitudinal database for analysis. Once program data was imported into the longitudinal database, the SUNS ID was removed from the dataset. Individual student data included in the analysis was de-identified.

Phase 2 – Analysis of Changes in Standardized Test Scores

The State standardized tests for South Carolina measure the students' mastery of the state academic standards for learning in each grade level. For the 2006, 2007, and 2008 school years, students in South Carolina took the Palmetto Achievement Challenge Test (PACT) in ELA and Mathematics. In 2009, 2010, and 2011, students in South Carolina took the Palmetto

Assessment of State Standards (PASS) in ELA and Mathematics. In order to determine if the trajectory of students' learning as measured by the standardized tests is improved by the 21st CCLC program, students who participated in the 21st CCLC were compared to a matched sample of students who attended the same schools and who did not participate in the program.

Identification of the Experimental Group

The experimental group was derived from 3rd through 8th grade students who attended a South Carolina public school and who participated in 21st CCLC after school programming during the 2007, 2008, or 2009 school years. During these three years, SUNS numbers were provided for 21,704 3rd through 8th grade public school students who participated in 21st CCLC after school programming. Of these, 21,347 were successfully matched to data obtained from SCDE.

Of those successfully matched to data obtained from SCDE, 2,680 students were removed from the analysis either because they did not have baseline scores (PACT test scale score data from the year prior to their participation) or because fewer than 10 students participated from the same school.

Preliminary analysis indicated that students who participated in 21st CCLC programming for fewer than 30 days in any school year had significantly higher baseline test scores than students who participated for more than 30 days in any school year (ELA *mean difference*=36.7, *t*=17.16, *df*=4882.04, *p*<.01 and Math *mean difference*=37.81, *t*=17.17, *df*=4898.31, *p*<.01). Furthermore, the definition of a regular attendee as defined by the US Department of Education, is any student who participates for 30 days or more. Therefore, 3,554 students who participated in the after school program for fewer than 30 days in any school year were removed from the analysis. An additional 428 students were removed because fewer than 10 regular attendees participated from the same school and ten additional students were removed because the student's demographic grouping did not have a comparable match in the comparison group.

Analyses conducted on PACT test scale score data identified large inconsistencies between scores based on grade levels (See Figures 1a and 1b). The Cut-Off Scores for each grade level were identified to use for standardization. Because standardization had to be done by grade level, 3,471 students who had missing data for grade level during the baseline period or whose test scores fell outside the range of cut-off scores for a particular subject were also removed from the analysis. These students whose test scores fell outside the range of cut-off scores for a particular subject were most likely students with a special need who took the SC-Alt PACT test in 2007 or 2008.

As a result, 11,204 3rd through 8th grade students who participated in 21st CCLC programs in 215 different sites during the 2007, 2008, or 2009 school years were loaded into the dataset as the study group.

Identification of the Comparison Group

The comparison group is a stratified random sample of students who attended the same schools in 2007, 2008, or 2009 as those in the 21st CCLC dataset but who did not participate in the 21st CCLC programming. Students who had participated in the 21st CCLC program in 2010, 2011 or 2012 were identified and removed from the comparison group to eliminate the possibility of there being a program effect on the comparison group.

The 21st CCLC dataset was divided into 769 different demographic combinations of race (black, white, Hispanic, other), gender (male, female), socioeconomic indicator (yes, no), school level (elementary, middle), baseline ELA PACT Performance Level (below basic, basic, proficient, advanced), and baseline Math PACT Performance Level (below basic, basic, proficient, advanced), and baseline year (2006, 2007, 2008). Demographic groupings for which there were no 21st CCLC students were excluded. For each demographic combination, the number of students from the 21st CCLC dataset in that demographic combination was randomly sampled from the comparison population.

As a result, 11,204 3rd through 8th grade students who attended the same schools but who did not participate in the 21st CCLC program were loaded into the dataset as the comparison group.

Compilation of the Dataset

The scale scores for the PACT (administered in 2006, 2007, and 2008) vary by grade level (See Figures 1a and 1b below), which causes a moderate average increase from year to year for all students on the PACT tests. The scale scores for the PASS (administered in 2009, 2010, and 2011) have a consistent range across all six grade levels (See Figures 2a and 2b below). When PACT scale scores are compared to the PASS scale scores, the average for all students increases from 2008 (last year of PACT) to 2009 (first year of PASS), then levels off from year to year of PASS administration. Standardization of the test scores by year and by grade level allows for comparison of observations from the different state standardized tests, which have approximately normal distributions within each grade level in each year of the administration.

Figure 1a: PACT Mathematics Cut-Off Scores

Grade	Below Basic	Basic	Proficient	Advanced
3	260-297	298-315	316-325	326-344
4	351-398	399-415	416-426	427-451
5	458-498	499-516	517-527	528-552
6	555-598	599-616	617-627	628-655
7	654-699	700-716	717-726	727-756
8	754-799	800-817	818-826	827-853

Figure 1b: PACT English Language Arts Cut-Off Scores

Grade	Below Basic	Basic	Proficient	Advanced
3	253-295	296-309	310-330	331-352
4	345-394	395-409	410-429	430-445
5	445-494	495-510	511-530	531-549
6	541-595	596-611	612-628	629-652
7	639-695	696-711	712-728	729-751
8	742-796	797-812	813-826	827-848

Figure 2a: PASS Mathematics Cut-Off Scores

Grade	Not Met	Met	Exemplary
3	300-599	600-642	643-900
4	300-599	600-648	649-900
5	300-599	600-660	661-900
6	300-599	600-647	648-900
7	300-599	600-643	644-900
8	300-599	600-648	649-900

Figure 2b: PASS English Language Arts Cut-Off Scores

Grade	Not Met	Met	Exemplary
3	300-599	600-641	642-900
4	300-599	600-657	658-900
5	300-599	600-658	659-900
6	300-599	600-657	658-900
7	300-599	600-651	652-900
8	300-599	600-656	657-900

Standardization of PACT and PASS test data was performed using the scale scores of students in the sample included in this analysis only. Each student's z score was calculated by subtracting the grade level average score from the original scale score then dividing by the grade level standard deviation. The resulting z scores have a mean score of 0 and standard deviation of 1 for each grade level in each school year. The z scores were calculated for both English Language Arts and Mathematics.

Analysis of the Data

The data was exported to SAS 9.2 and SPSS 20 for analysis. Analyses compared students' learning trajectories as measured by standardized test scores from 2006 (baseline year), 2007, 2008, 2009, 2010, and 2011. The learning trajectories were examined by employing a mixed effect model with maximum likelihood estimation and unstructured covariance structure. This

model is most commonly used in longitudinal data analysis since it is the most parsimonious and requires no assumptions in the residual structure¹. Furthermore, this analysis explicitly models individual changes across time and allows for flexibility in the number of observations and measurement intervals per subject². Through the analysis, individual changes in students' standardized scale scores over time, systematic differences in the changes, the shape of the growth curves, and group differences in the initial status and the rate of growth were explored, while controlling for the effects of covariates. These controlled effects are considered covariates, since they may affect the outcome of the dependent variable. Covariates included student demographics and school-level characteristics. Finally, the effects of covariates on only the 21st CCLC students' initial status and the growth rate were examined.

Members of the research team discussed the findings to determine relevance to the research questions. Tables and Graphs describing the findings were developed and imported into Microsoft Word.

Phase 3 – Analysis of Rates of Success on the HSAP

The South Carolina High School Assessment Program (HSAP) test, also known as the Exit Exam, is based on the South Carolina Curriculum Standards for English Language Arts (ELA) and mathematics that teachers use in classroom instruction. The test measures the mastery of skills that have been addressed up through the end of the tenth grade. Students take the test for the first time at the end of the 10th grade. Once they pass a test, they do not take that particular test again. Students are given multiple opportunities, if necessary, to pass the HSAP tests. Both the ELA and the math tests must be passed before the student may graduate high school with a state diploma. A score of 200 or better on the test indicates that the student has passed.

In order to determine if the 21st CCLC program improves the likelihood that students who participate will pass both HSAP tests, the dataset was re-sampled to obtain as many students in the sample that had taken both HSAP tests as possible. Students who participated in the 21st CCLC were compared to a random sample of students who attended the same schools and who did not participate in the program. For purposes of this analysis, 2,681 21st CCLC and 5,259 students who attended the same schools but who did not participate in the 21st CCLC program at any time during the study period were included in the analysis.

Each case was coded as 1 (passed both tests) or 0 (attempted, but did not pass both tests). The number of attempts was calculated for all test administrations, so if a student took both the math and the ELA portions of the test one time each, the number of attempts is equal to 2.

¹ Shek, D. & Ma, C. (2011) Longitudinal Data Analyses Using Linear Mixed Models. *The Scientific World Journal*. 11, 42-76.

² Francis, D.J., Fletcher, J.M., Stuebing, K.K., Davidson, K.C., and Thompson, N.M. (1991) Analysis of Change: Modeling individual growth. *Journal of Consulting and Clinical Psychology*. 59(1), 27-37.

The data was exported to SAS 9.2 and SPSS 20 for analysis. Binary logistic regression analyses were conducted to determine how much the 21st Century Community Learning Center program has helped students in the program pass both of the HSAP tests. The effects of the 21st CCLC on the academic achievement of students in the program were measured by setting students who were not on the program as a reference group, while controlling for the effects of demographics (i.e., gender, race, and SEI), number of times the student had been retained in a grade level, number of attempts to pass both HSAP tests, and average days of school absence, as well as school characteristics (i.e., Title and student and teacher ratio). These controlled effects are considered covariates, since they may affect the outcome of the dependent variable.

Members of the research team discussed the findings to determine relevance to the research questions. Tables and Graphs describing the findings were developed and imported into Microsoft Word.

Phase 4 – Analysis of Dropout Rates

In order to determine if the 21st CCLC program improves the likelihood that students who participate will not drop out of school, the entire dataset of students who attended schools served by the 21st CCLC (those who attended and those who did not) was utilized. Students were considered to have dropped out of school if the indicator obtained from the SCDE database was D07, D08, D09, D10, or D11. Drop outs in earlier grades were not considered. Dropout rates for students in their 12th grade year were not considered as the sample had not aged enough to make this comparison valid. This is discussed further in the limitations section.

For purposes of this analysis, 18,148 21st CCLC students who reached grades seven through twelve during the study period and 60,284 comparison group students who reached grades seven through twelve during the study period were included.

Phase 5 –Development of the Report

In developing the report, the following steps were conducted:

1. The evaluation team achieved consensus on:
 - *What Happened?* (Findings of the Study) What did the analyses reveal?
 - *So What?* (Conclusions of the Study) What meanings do the findings have for the research questions?
 - *Now What?* (Recommendations of the Study) What changes and additions does the evaluation team believe might be useful?
2. The sections of the report were assigned to different team members for drafting and all team members edited the report.

3. The final report includes: an executive summary; an introduction to the study; a methodology section; findings of the study; discussion of the findings; conclusions; and implications for further research.

Limitations of the Study

The analysis is limited by the quasi-experimental design of the study. Students in the experimental group (21st CCLC students) are recommended to participate in the program by teachers and/or administrators based on identified risk factors and may self-select into or out of the program. Because of this, students in the program are unlike other students in their school, either because they exhibit the identified risk factors whereas other students do not or because they self-selected to participate in the program whereas other students who exhibited those same risk factors may not have chosen (or their parent/guardian may not have chosen) to participate. Stratification by demographic variables such as gender, race, and socioeconomic indicator, and baseline PACT scores minimizes but does not eliminate these limitations.

Furthermore, students who attend schools served by the 21st CCLC program are a transient population, students may attend the 21st CCLC program in varying (not continuous) years, and data collection methods implemented in the schools during the earlier years of this study were imperfect. As a result, the dataset is unbalanced in that it has unequal sample sizes in each school year and grade level, the observation intervals and measurement occasions for each student are inconsistent, and there are missing data for students. As discussed previously in the analysis of data for changes in standardized test scores, the method selected for the longitudinal analysis has been shown to have the advantage of overcoming these limitations.

Stratification by baseline PACT Performance Levels also presents a limitation to the analysis. Due to the variety of values for each PACT scale score, it was not feasible to stratify by the scale score value for ELA and math. Each Performance Level has a range of up to 300 scale score values. Stratification by Performance Level allowed for a student with a scale score of 300 being categorized in the same stratification grouping as a student with a scale score of 599, which resulted in some significant variation in baseline scores between groups.

Differences in tests administered during the study period present another limitation. For the 2006, 2007, and 2008 school years, students in South Carolina took the Palmetto Achievement Challenge Test (PACT) in ELA and Mathematics. In 2009, 2010, and 2011, students in South Carolina took the Palmetto Assessment of State Standards (PASS) in ELA and Mathematics. The average scores for all students in these schools during the study period form a moderate rise year to year in scale scores on the PACT test, a rise in scale scores in the year from the PACT to the PASS, then a leveling off from year to year of PASS administration. The two tests are not directly comparable from year to year. However, the scale scores for these tests are normally distributed for each grade level in each year. Therefore, the data was standardized by grade level

calculating the z-score where Mean=0 and SD=1. The resulting data allows for determination of change from the mean for each year thereby allowing comparison of observations from the different State standardized tests. However, 3,471 21st CCLC students had to be dropped from the analysis due to the fact that their grade level was missing or the scale score did not match the range of possible scores for their grade level.

Grade levels for 2006 were not provided by SCDE. For 2006, students' grade levels were computed based on the 2007 grade level and the PACT scale score and performance level received. For example, if a student was in fifth grade in 2007, and their PACT performance level for 2006 was below basic, and their ELA PACT scale score fell between 345 and 394, the student was coded as being in the fourth grade for 2006. Grade levels for other school years were also extrapolated when the data for a particular year was missing and other years were available. For example, a student who had missing grade level information for 2009, was coded in the 5th grade for 2008, and in the 7th grade for 2010, was re-coded to a 6 for grade level in 2009.

Finally, the data model presents a limitation in the ability of the study to analyze graduation and drop-out rates. The first group of students entered the study in 2007. Of these who entered in 2007, only 915 of the 21st CCLC group and 2,578 of the comparison group were in the eighth or ninth grade. Only those who were in the eighth or ninth grade in 2007 would have had the opportunity to graduate by the end of the 2011 school year. Some of these students were retained in a grade level, moved out of the state, or had a progression status that was unknown at the time of this report. Therefore, of those included in the 21st CCLC study group, 48 were known to have received a state high school diploma, two were known to have received a state certificate, and 145 were known to have dropped out. Of those included in the comparison group, 906 were known to have received a state high school diploma, 29 were known to have received a state certificate, and 840 were known to have dropped out. As this represents only 1.3% of the entire 21st CCLC study sample and 12.1% of the entire comparison study sample, conclusions regarding the impact of the 21st CCLC program on graduation rates would not be statistically valid and therefore, graduation rates are not analyzed.

FINDINGS

Achievement on State Standardized Tests

Students who participated in the SC 21st CCLC in 2007, 2008, and 2009 were compared to a stratified random sample of students who attended the same schools but who did not participate in the program. Analyses compared students' standardized test scores from 2006 (baseline year), 2007, 2008, 2009, 2010, and 2011. Differences in academic achievement by demographic and school-level variables were taken into account.

As discussed in the methodology, average scores reported in Table 4 for the math and ELA State standardized tests are reflective of two tests that have different scores and performance levels. Standardization of the test scores by grade level and by year allowed for comparison of observations from the different State standardized tests, which have normally distributed scale scores by grade level in each year.

Of the 11,204 21st CCLC students who were included in the analysis of the State standardized test scores, 5,715 (51%) were female, 5,489 (49 %) were male, 8,389 (74.9%) were Black, 2,180 (19.5%) were White, 438 (3.9%) were Hispanic, and 197 (1.8%) were of other races; 9,161 (81.8%) of these students were marked as being below the poverty line (socioeconomic indicator). Of the students in the 21st CCLC program who were included in the analysis of the State standardized test scores, 1,918 (17.1%) attended schools in a city during the initial study period, 1,783 (15.9%) attended schools in a suburban area, 2,638 (23.5%) attended schools in a town, and 4,865 (43.4%) attended schools in a rural area; 10,887 (97.2%) students attended a school during the initial study period where Title I services were implemented school wide. The average student to teacher ratio at the school attended during the initial study period for 21st CCLC students was 10.99 to 1 (sd=2.91).

Of the 11,204 comparison students who were included in the analysis of the State standardized test scores, 5,715 (51%) were female, 5,489 (49 %) were male, 8,389 (74.9%) were Black, 2,180 (19.5%) were White, 438 (3.9%) were Hispanic, and 197 (1.8%) were of other races; 9,161 (81.8%) of these students were marked as being below the poverty line (socioeconomic indicator). Of the comparison students who were included in the analysis of the State standardized test scores, 2,365 (21.1%) attended schools in a city during the initial study period, 2,580 (23%) attended schools in a suburban area, 2,647 (23.6%) attended schools in a town, and 3,612 (32.2%) attended schools in a rural area; 10,317 (92.1%) students attended a school during the initial study period where Title I services were implemented school wide. The average student to teacher ratio at the school attended during the initial study period for comparison students was 11.77 to 1 (sd=2.94).

Table 3: Demographics of Students Included in the Analysis of Standardized Test Scores		
	21st CCLC Students	Matched Comparison Students
Total Students	11,204	11,204
Female	51.0%	51.0%
Male	49.0%	49.0%
Black	74.9%	74.9%
White	19.5%	19.5%
Hispanic	3.9%	3.9%
Other	1.8%	1.8%
City	17.1%	21.1%
Suburb	15.9%	23.0%
Town	23.5%	23.6%
Rural	43.4%	32.2%
Below Poverty	81.8%	81.8%
Above Poverty	18.2%	18.2%
School Wide Title I	97.2%	92.1%
Not School Wide Title I	2.8%	7.9%
Average Student to Teacher Ratio	10.99	11.77

The average grade level in the 2006 school year was 4.2 ($n=3,569$, $sd=1.04$) for the 21st CCLC students and 4.4 ($n=6,559$, $sd=1.19$) for matched non-21st CCLC students. The average days absent for the 21st CCLC students was 5.0 ($n=3,566$, $sd=5.07$) and 6.3 ($n=6,573$, $sd=6.15$) for matched non-21st CCLC students. Progression data for 2006 was not available for this study. The average ELA standardized test score for the 2006 school year for the 21st CCLC students was 415.6 ($n=3,569$, $sd=102.14$) and 443.7 ($n=6,599$, $sd=117.52$) for matched non-21st CCLC students. The average math standardized test score for the 2006 school year for the 21st CCLC students was 418.1 ($n=3,569$, $sd=105.69$) and 447.5 ($n=6,599$, $sd=120.33$) for matched non-21st CCLC students.

The average grade level of students in the 2007 school year for the 21st CCLC students was 4.81 ($n=7,557$, $sd=1.25$) and 5.0 ($n=9,228$, $sd=1.43$) for matched non-21st CCLC students. The average days absent in 2007 for the 21st CCLC students was 5.6 ($n=7,555$, $sd=5.49$) and 7.1 ($n=9,224$, $sd=6.77$) for matched non-21st CCLC students. In 2007, 1.2% of 21st CCLC students

and 2.4% of comparison students were retained in grade level. The average ELA standardized test score for the 2007 school year for the 21st CCLC students was 478.5 ($n=7,503$, $sd=139.68$) and 496.1 ($n=9,063$, $sd=142.02$) for matched non-21st CCLC students. The average math standardized test score for the 2007 school year for the 21st CCLC students was 483.6 ($n=7,503$, $sd=126.04$) and 501.2 ($n=9,070$, $sd=144.30$) for matched non-21st CCLC students.

The average grade level of students in the 2008 school year for the 21st CCLC students was 5.4 ($n=11,202$, $sd=1.42$) and 5.5 ($n=11,194$, $sd=1.66$) for matched non-21st CCLC students. The average days absent in 2008 for the 21st CCLC students was 5.9 ($n=11,174$, $sd=5.89$) and 7.1 ($n=11,066$, $sd=6.95$) for matched non-21st CCLC students. In 2008, 1.6% of 21st CCLC students and 2.6% of comparison students were retained in grade level. The average ELA standardized test score for the 2008 school year for the 21st CCLC students was 535.7 ($n=11,103$, $sd=139.68$) and 536.4 ($n=10,565$, $sd=154.28$) for matched non-21st CCLC students. The average math standardized test score for the 2008 school year for the 21st CCLC students was 540.2 ($n=11,109$, $sd=141.64$) and 540.9 ($n=10,570$, $sd=156.37$) for matched non-21st CCLC students.

The average grade level of students in the 2009 school year for the 21st CCLC students was 6.4 ($n=11,181$, $sd=1.43$) and 6.5 ($n=11,154$, $sd=1.66$) for matched non-21st CCLC students. The average days absent in the 2009 for the 21st CCLC students was 5.9 ($n=11,162$, $sd=6.08$) and 7.3 ($n=11,063$, $sd=7.3$) for matched non-21st CCLC students. In 2009, 3% of 21st CCLC students and 3.8% of comparison students were retained in grade level. The average ELA standardized test score for the 2009 school year for the 21st CCLC students was 600.4 ($n=10,083$, $sd=41.93$) and 601.4 ($n=9,325$, $sd=44.89$) for matched non-21st CCLC students. The average math standardized test score for the 2009 school year for the 21st CCLC students was 602.5 ($n=10,083$, $sd=37.42$) and 603.6 ($n=9,326$, $sd=40.42$) for matched non-21st CCLC students.

The average grade level of students in the 2010 school year for the 21st CCLC students was 7.3 ($n=10,943$, $sd=1.42$) and 7.5 ($n=10,754$, $sd=1.64$) for matched non-21st CCLC students. The average days absent in the 2010 for the 21st CCLC students was 6.5 ($n=11,118$, $sd=6.92$) and 7.4 ($n=11,023$, $sd=7.69$) for matched non-21st CCLC students. In 2010, 4.4% of 21st CCLC students and 5.3% of comparison students were retained in grade level. The average ELA standardized test score for the 2010 school year for the 21st CCLC students was 598.7 ($n=8,172$, $sd=45.74$) and 602.8 ($n=7,212$, $sd=47.9$) for matched non-21st CCLC students. The average math standardized test score for the 2010 school year for the 21st CCLC students was 601.7 ($n=8,170$, $sd=38.72$) and 604.1 ($n=7,210$, $sd=42.06$) for matched non-21st CCLC students.

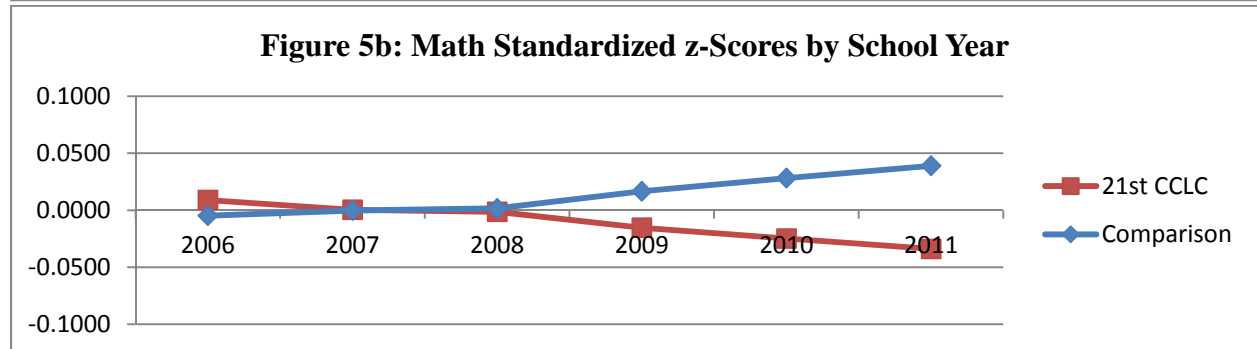
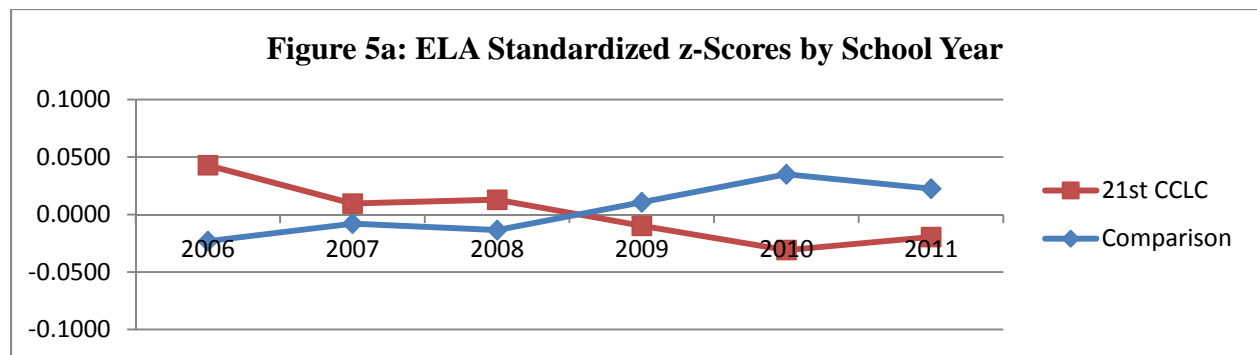
The average grade level of students in the 2011 school year for the 21st CCLC students was 8.3 ($n=10,653$, $sd=1.41$) and 8.4 ($n=10,256$, $sd=1.62$) for matched non-21st CCLC students. The average days absent in the 2011 for the 21st CCLC students was 6.5 ($n=11,069$, $sd=7.2$) and 7.3 ($n=10,967$, $sd=8.02$) for matched non-21st CCLC students. In 2011, 6.8% of 21st CCLC students and 6.5% of comparison students were retained in grade level. The average ELA standardized test score for the 2011 school year for the 21st CCLC students was 596.2 ($n=5,750$, $sd=45.84$) and 598.3 ($n=5,000$, $sd=48.57$) for matched non-21st CCLC students. The average math

standardized test score for the 2011 school year for the 21st CCLC students was 603.6 ($n=5,755$, $sd=38.79$) and 606.5 ($n=5,003$, $sd=42.26$) for matched non-21st CCLC students.

Table 4: Average at Each Measurement Occasion						
School Year	2006	2007	2008	2009	2010	2011
21st CCLC (# of students)	3,569	7,571	11,204	11,204	11,204	11,204
Grade Level	4.2	4.8	5.4	6.4	7.5	8.3
Percent Retained in Grade Level	-	1.2%	1.6%	3.0%	4.4%	6.8%
Days Absent from School	5.0	5.6	5.9	5.9	6.5	6.5
<i>ELA Standardized Test Scale Score</i>	<i>415.6</i>	<i>478.6</i>	<i>535.7</i>	<i>600.4</i>	<i>598.6</i>	<i>596.2</i>
3 rd Grade	304.4	302.0	303.6	614.9	-	-
4 th Grade	399.5	397.0	397.7	597.9	568.2	-
5 th Grade	498.5	491.3	493.0	603.0	604.1	599.3
6 th Grade	595.8	584.9	590.9	585.7	584.7	577.6
7 th Grade	694.1	693.4	690.7	582.5	581.6	573.4
8 th Grade	-	793.7	790.1	578.9	569.5	575.4
<i>Math Standardized Test Scale Score</i>	<i>418.1</i>	<i>483.6</i>	<i>540.2</i>	<i>602.5</i>	<i>601.7</i>	<i>603.6</i>
3 rd Grade	302.4	299.9	299.8	595.6	-	-
4 th Grade	402.9	400.5	401.1	600.4	570.8	-
5 th Grade	502.3	498.9	499.9	595.5	595.5	596.0
6 th Grade	605.2	592.7	597.2	590.5	588.7	584.7
7 th Grade	704.1	701.1	698.0	588.4	584.1	581.7
8 th Grade	-	798.6	793.0	581.8	577.1	583.1
Comparison Group (# of students)	6,599	9,297	11,204	11,204	11,204	11,204
Grade Level	4.4	5.0	5.5	6.5	7.5	8.4
Days Absent from School	6.3	7.1	7.1	7.3	7.4	7.3
Percent Retained in Grade Level	-	2.4%	2.6%	3.8%	5.3%	6.5%
<i>ELA Standardized Test Scale Score</i>	<i>443.7</i>	<i>496.1</i>	<i>536.4</i>	<i>601.4</i>	<i>602.8</i>	<i>598.3</i>
3 rd Grade	303.3	302.2	302.4	602.8	-	-
4 th Grade	399.0	392.1	392.7	585.6	590.3	-
5 th Grade	497.3	485.2	483.6	592.3	595.6	551.1
6 th Grade	594.8	574.8	580.6	571.2	580.3	572.3
7 th Grade	696.4	683.4	677.8	567.7	576.2	568.8
8 th Grade	-	781.4	753.4	564.0	559.8	561.5
<i>Math Standardized Test Scale Score</i>	<i>447.5</i>	<i>501.2</i>	<i>540.9</i>	<i>603.6</i>	<i>604.1</i>	<i>606.5</i>
3 rd Grade	303.1	447.5	299.6	588.4	-	-
4 th Grade	402.6	447.5	396.8	587.3	586.1	-
5 th Grade	501.8	301.2	491.2	585.3	587.8	548.1
6 th Grade	603.5	396.9	585.9	578.2	582.1	580.3
7 th Grade	704.1	492.8	685.9	573.4	579.5	576.0
8 th Grade	-	582.9	756.4	566.0	564.7	571.0

As stated previously, the z-score for each observation was calculated by determining its distance in standard deviations from the mean for each grade level and school year. The resulting normalized data was then utilized to calculate the following average z-scores in each school year (See Table 5 and Figures 5a and 5b). Heretofore, the standardized values of the scale scores on the State standardized tests are referred to as the standardized z-score.

Table 5: Standardized Z-Scores at Each Measurement Occasion						
	2006	2007	2008	2009	2010	2011
21st CCLC (# of students)	3,569	7,503	11,103	10,083	8,172	5,750
ELA Average z-Score Value	0.0429	0.0095	0.0129	-0.0098	-0.0309	-0.0195
Math Average z-Score Value	0.0089	0.0004	-0.0015	-0.0153	-0.0248	-0.0339
Comparison Group (# of students)	6,599	9,063	10,565	9,325	7,211	5,000
ELA Average z-Score Value	-0.0232	-0.0079	-0.0135	0.0106	0.0350	0.0225
Math Average z-Score Value	-0.0048	-0.0003	0.0015	0.0166	0.0282	0.0390



The unconditional mean models for the ELA and Math standardized z-scores were calculated to examine individual variation in the outcome variable without regard to school year. These analyses suggest that 69.5% of the total variation in ELA z-scores and 69.9% of the total variation in Math z-scores was due to differences between individuals. Therefore, both of the outcome variables are relatively stable over time.

The unconditional linear growth model (Table 6 for both ELA and math) was calculated to estimate the average within-person initial status and rate of change over time for all students in

the study. The ELA model shows that the average estimated initial status (i.e. the baseline standardized scale score for ELA) of the sample is -0.027 ($S.E.=0.007$, $p<.0001$) and the estimated linear growth rate is 0.007 ($S.E.=0.002$, $p<.0001$). The math model shows that the average estimated initial status (i.e. the baseline standardized scale score for math) of the sample is -0.026 ($S.E.=0.005$, $p<.0001$) and the estimated linear growth rate is 0.007 ($S.E.=0.002$, $p<.0001$). Both models suggest that the standardized z-scores for students in the sample were not constant but increased over time; however, the rate of increase is relatively flat. The comparison of within-individual variations in initial status between the unconditional mean model and the unconditional linear model indicates that only 2.6% of the within-individual variation in ELA z-scores and 2.7% of the within-individual variation in math z-scores is associated with the linear rate of change. Furthermore, the correlation between the intercept and the linear growth parameter was negative for both ELA and Math, indicating that students with higher z-scores had a slower increase, whereas students with lower scores had a higher increase.

Effect	ELA Standardized Scale Score				Math Standardized Scale Score			
	Estimate (β)	<i>S.E.</i>	<i>t</i>	<i>p</i>	Estimate (β)	<i>S.E.</i>	<i>t</i>	<i>p</i>
Intercept	-0.027	0.007	-3.83	<0.0001	-0.026	0.005	-3.865	<0.0001
Year	0.007	0.002	4.22	<0.0001	0.007	0.002	4.527	<0.0001

Higher order change trajectories were tested to determine if the rate of growth accelerated or decelerated at differing points in time. As evidenced by the parameters without the effects of covariates in Table 7 (i.e., for linear and higher order terms for ELA and math), individual growth rate changes for overall students' standard ELA and math scores were almost identical. The overall standardized z-score for ELA and math increased in the beginning (linear growth of $\beta=0.063$ for ELA and $\beta=0.053$ for math) then began to decrease (quadratic growth of $\beta=-0.022$ for ELA and $\beta=-0.017$ for math); however the deceleration gradually diminished over time (cubic growth of $\beta=0.002$ for ELA and $\beta=0.002$ for math). The cubic model improved model fit over the basic linear growth model ($ELA \Delta BIC = 23.51$ and $Math \Delta BIC = 12.79$); therefore, the cubic growth curve parameters were retained in the analysis.

Effect	ELA Standardized Scale Score				Math Standardized Scale Score			
	Estimate (β)	<i>S.E.</i>	<i>t</i>	<i>p</i>	Estimate (β)	<i>S.E.</i>	<i>t</i>	<i>p</i>
Intercept	-0.057	0.008	-6.89	<0.0001	-0.052	0.008	-6.48	<0.0001
Year	0.063	0.009	6.80	<0.0001	0.053	0.009	5.81	<0.0001
Year ²	-0.022	0.004	-5.12	<0.0001	-0.017	0.004	-4.04	<0.0001
Year ³	0.002	0.001	4.18	<0.0001	0.002	0.001	3.14	0.002

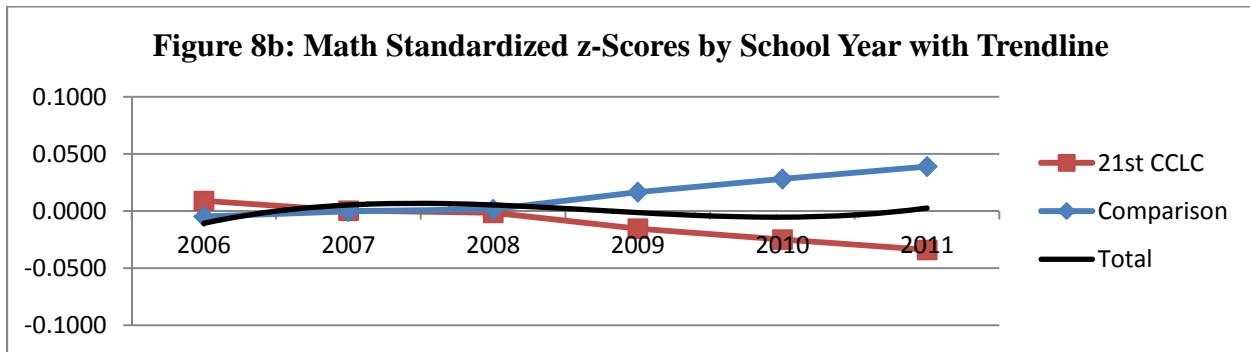
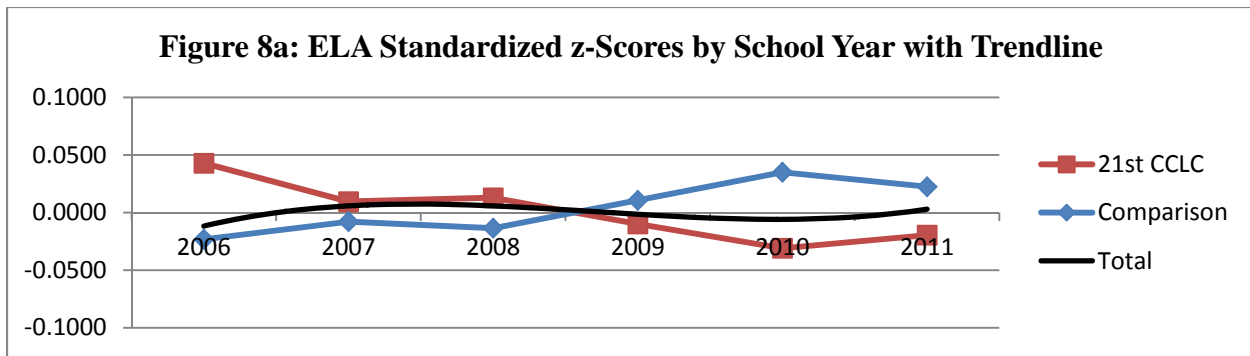
The analysis on group comparisons in growth rate changes allowed for the non-linear individual growth trajectory over time, while taking into account the effects of such possible predictors as year, gender, race, SEI, grade level, days absent from school, retained in grade level, locale, teacher-and-student ratio, and school-wide implementation of Title I services.

The significant effects of grade level ($\beta=-0.019, p<.0001$), race ($\beta=0.079, p<.0001$), SEI ($\beta=-0.32, p<.0001$), school-wide Title I ($\beta=-0.157, p<.0001$), and locale ($\beta=-0.007, p<.0001$) on initial status of students' standardized z-scores for ELA were taken into account. Overall, students' ELA standardized z-scores were also influenced by days absent from school ($\beta=-0.001, p<.0001$), whether they were retained in grade level ($\beta=-0.265, p<.0001$), and their gender ($\beta=-0.01, p<.0001$ for the cubic slope). Group is a significant predictor of the initial status of students' standardized z-score for ELA ($\beta=0.085, S.E.=0.017, p<.0001$) in that students in the 21st CCLC program had a higher average z-score in ELA during the initial study period than students in the comparison group. However, the overall trajectory of change for students is not influenced by whether or not they participated in the 21st CCLC program ($\beta=0.001, S.E.=0.001, p=.554$ for the cubic slope).

The significant effects of grade level ($\beta=-0.017, p<.0001$), race ($\beta=0.110, p<.0001$), gender ($\beta=-0.079, p<.0001$), SEI ($\beta=-0.284, p<.0001$), and school-wide Title I ($\beta=-0.156, p<.0001$) on initial status of students' standardized z-scores for Math were taken into account. Overall, students' Math standardized z-scores were also influenced by days absent from school ($\beta=-0.001, p<.0001$) and whether they were retained in grade level ($\beta=-0.233, p<.0001$). Group is not a significant predictor of the initial status of students' standardized z-score for ELA ($\beta=0.016, S.E.=0.017, p=.351$) in that students in the 21st CCLC program had similar average z-scores in math during the initial study period as students in the comparison group. Furthermore, the overall trajectory of change for students is not influenced by whether or not they participated in the 21st CCLC program ($\beta=-0.001, S.E.=0.001, p=.643$ for the cubic slope). (See Table 8.)

Therefore, although the trajectory of change for students in the 21st CCLC program appears to differ from the slope of the comparison group, the slope does not vary significantly from the mean slope identified in the model. (See Figures 8a and 8b.)

Table 8: Group Interaction on Higher Order Change Trajectories								
Effect	ELA Standardized Scale Score				Math Standardized Scale Score			
	Estimate (β)	S.E.	t	p	Estimate (β)	S.E.	t	p
StudyGroup	0.085	0.017	5.05	<0.0001	0.016	0.017	0.93	0.351
Year * StudyGroup	-0.025	0.019	-1.35	0.176	-0.010	0.020	-0.51	0.612
Year ² *StudyGroup	-0.003	0.009	-0.36	0.720	0.002	0.009	0.19	0.848
Year ³ *StudyGroup	0.001	0.001	0.59	0.554	-0.001	0.001	-0.46	0.643



As a final step, the 21st CCLC students' learning trajectories and the contribution of covariates to the rate of changes in standardized ELA and math z-scores were examined. In order to identify the effect of attendance in the program over time, variables representing the days present in the program, years that the student has attended the program, and service providing organization type (grouped into school-based and community/faith-based) were introduced into the model.

Data for these variables is 0 for 2006, as this is the baseline year for the study. In 2007, students who participated in the program were present for an average of 86.9 days ($n=3,761$, $sd=39.44$) and had participated in the program for an average of one year ($sd=0$). In 2008, students who participated were present for an average of 83.3 days ($n=5,623$, $sd=38.87$) and had participated in the program for an average of 1.3 years ($sd=0.46$). In 2009, students who participated were present for an average of 83.9 days ($n=5,345$, $sd=36.91$) and had participated in the program for an average of 1.4 years ($sd=0.63$). In 2010, students who participated were present for an average of 81.0 days ($n=2,366$, $sd=41.49$) and had participated in the program for an average of 2.4 years ($sd=0.62$). In 2011, students who participated were present for an average of 73.44 days ($n=888$, $sd=38.23$) and had participated in the program for an average of 3.1 years ($sd=0.78$). The average days present in the program remains relatively stable across years, with the average dropping slightly in later years, which corresponds to the drop in the number of students who attended the program in these years.

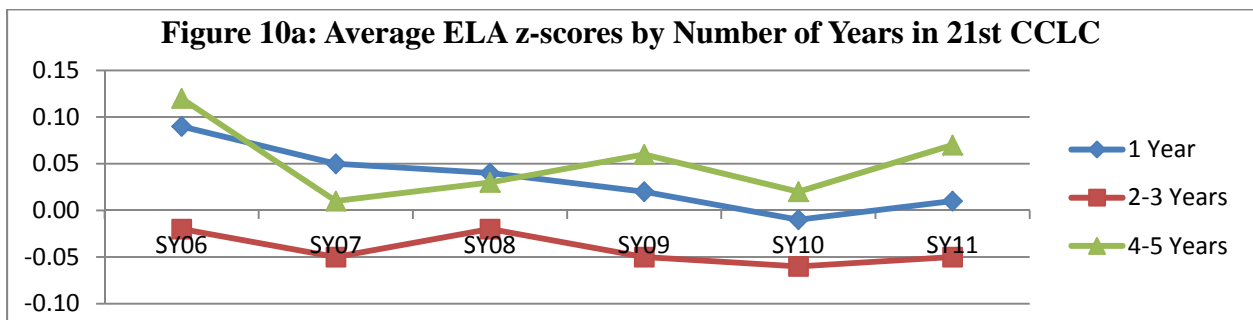
The type of organization that delivered programming for the 21st CCLC program was divided into two groups, clubs/community-based/faith-based organizations and schools. The majority of students in each year participated in programming that was provided at a school by the school administration (73.8% in 2007, 68% in 2008, 61.1% in 2009, 62.3% in 2010, and 69.9% in 2011).

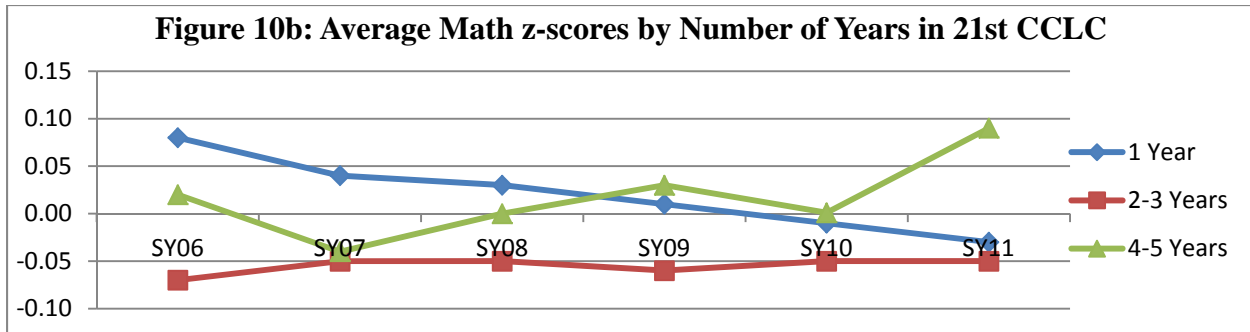
Table 9: 21st CCLC Program Specific Covariates by School Year

	2007	2008	2009	2010	2011
Number of Students	3,761	5,623	5,345	2,366	888
Days Present in Program	86.9	83.3	83.9	81.0	73.4
Years Attended Program	1.0	1.3	1.4	2.4	3.1
Community or Faith-Based Organizations	26.2%	32.0%	38.9%	37.7%	30.1%
School Administration	73.8%	68.0%	61.1%	62.3%	69.9%

Similarly to the previous analysis, the 21st CCLC students' standardized ELA z-scores increased in the beginning (linear growth of $\beta=0.046$, $S.E.=0.014$, $p=.001$) then began to decrease (quadratic growth of $\beta=-0.023$, $S.E.=0.006$, $p<.0001$); however the deceleration gradually diminished over time (cubic growth of $\beta=0.003$, $S.E.=0.001$, $p=.001$). The 21st CCLC students' standardized math z-scores increased in the beginning (linear growth of $\beta=0.047$, $S.E.=0.014$, $p=.001$) then began to decrease (quadratic growth of $\beta=-0.017$, $S.E.=0.006$, $p=.001$); however the deceleration gradually diminished over time (cubic growth of $\beta=0.002$, $S.E.=0.001$, $p=.037$).

Table 10 with the covariates' effects on the 21st CCLC students' individual growth rates for ELA and math reports that the number of days the student is present in the after school program has a significant contribution to the non-linear growth curve ($\beta=0.002$, $S.E.=0.0004$, $p<.0001$ for both ELA and math). The combination of the days present in the program and the number of years the student attended the program also significantly impacts individual growth rates; however the impact is not linear. In the initial growth period, students' rate of increase is negatively impacted by the combination ($\beta=-0.001$, $S.E.=0.0003$, $p<.01$ for both ELA and math); positively impacted by the combination during the deceleration ($\beta=0.0005$, $S.E.=0.0001$, $p<.0001$ for ELA and $\beta=0.0003$, $S.E.=0.0001$, $p<.0001$ for math); and negatively impacted in the final years ($\beta=-0.001$, $S.E.=0.0003$, $p<.01$ for both ELA and math). This relationship is best illustrated by viewing the differences in average ELA and math z-scores by groupings of years in the program (See Figures 10a and 10b). As can be seen in these graphs, there is a sharper incline in the average z-score for both ELA and math in the middle years and the scores are highest in the later years for students who participated in the program for four or five years, which is when their fourth or fifth year of attendance would have occurred. The negative correlation is likely due to the students who participated between 2 to 3 years having the lowest scores in the later years.

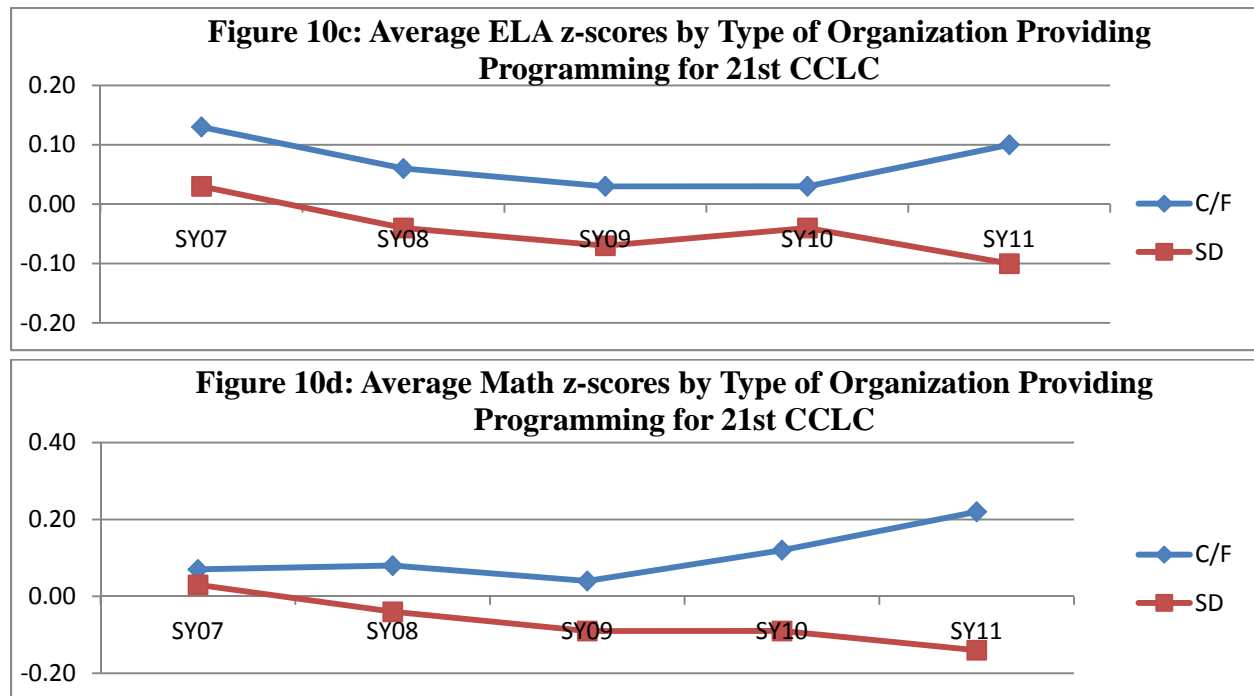




Gender, race, SEI, days absent from school, being retained in a grade level, and the type of service providing organization are all statistically significant contributors of the non-linear individual growth changes. Being a female ($\beta=-0.291$, $S.E.=0.018$, $p<.0001$ for ELA and $\beta=-0.065$, $S.E.=0.018$, $p<.0001$ for math) and being above the poverty line ($\beta=-0.299$, $S.E.=0.023$, $p<.0001$ for ELA and $\beta=-0.261$, $S.E.=0.024$, $p<.0001$ for math) contributed to a faster rate of growth changes than otherwise. Meanwhile, being a minority ($\beta=0.265$, $S.E.=0.023$, $p<.0001$ for ELA and $\beta=0.333$, $S.E.=0.024$, $p<.0001$ for math), having more absence from school ($\beta=-0.003$, $S.E.=0.0006$, $p<.0001$ for ELA and $\beta=-0.002$, $S.E.=0.0005$, $p<.0001$ for math), and being retained in grade level ($\beta=-0.324$, $S.E.=0.049$, $p<.0001$ for ELA and $\beta=-0.311$, $S.E.=0.047$, $p<.0001$ for math) showed a statistically significant slower rate of changes than otherwise. Among the contributors, students who were retained in grade level had the sharpest rate of deceleration.

Table 10: Estimates of Covariates' Effects for 21 st CCLC Only								
Effect	ELA Standardized Scale Score				Math Standardized Scale Score			
	Estimate (β)	S.E.	t	p	Estimate (β)	S.E.	t	p
DaysPresinASP	0.002	0.0004	4.60	<0.0001	0.002	0.0004	5.64	<0.0001
Year*YearsinASP *DaysPresinASP	-0.001	0.0003	-3.85	<0.0001	-0.001	0.0003	-2.97	0.003
Year ² *YearsinASP *DaysPresinASP	0.0005	0.0001	3.63	<0.0001	0.0003	0.0001	2.44	0.015
Year ³ *YearsinASP *DaysPresinASP	-0.0001	0.0002	-3.32	0.001	-0.0004	0.00002	-1.99	0.047
Days Absent	-0.003	0.0006	-4.74	<0.0001	-0.002	0.0005	-4.81	<0.0001
Gender	-0.291	0.018	-16.59	<0.0001	-0.065	0.018	-3.58	<0.0001
Race	0.265	0.023	11.29	<0.0001	0.333	0.024	13.75	<0.0001
Socio Economic	-0.299	0.023	-12.78	<0.0001	-0.261	0.024	-10.79	<0.0001
Retained in Grade	-0.324	0.049	-6.68	<0.0001	-0.311	0.047	-6.68	<0.0001
Service Org Type	-0.070	0.017	-4.04	<0.0001	-0.087	0.018	-4.98	<0.0001

Attending a program provided by a community or faith based organization contributed to a faster rate of growth than attending a program provided by the school ($\beta=-0.070$, $S.E.=0.017$, $p<.0001$ for ELA and $\beta=-0.087$, $S.E.=0.018$, $p<.0001$ for math). This relationship is best illustrated by viewing the differences in average ELA and math z-scores by type of service providing organization (See Figures 10c and 10d). As can be seen in these graphs, the average z-score for both ELA and math are highest in the later years for students who participated in programming being provided by community-based organizations, clubs, and faith based organizations.



Achievement on High School Assessment Program Tests

The South Carolina High School Assessment Program (HSAP) test, also known as the Exit Exam, includes sections for both ELA and math that must be passed before the student may graduate high school with a state diploma. Of the 2,681 21st CCLC students who took both the math and ELA HSAP tests, students who passed both tests were more likely to be female ($n=908$, 33.9%; $\chi^2=15.95$, $df=1$, $p<.0001$). Of the 5,259 comparison students who took both the math and ELA HSAP tests, students who passed both tests were also more likely to be female ($n=2,018$, 51.2%; $\chi^2=39.73$, $df=1$, $p<.0001$).

21st CCLC students who were White ($n=344$, 12.8% passed compared to $n=119$, 4.4% who did not pass) or Hispanic ($n=44$, 1.6% passed compared to $n=12$, 0.4% who did not pass) were more likely to have passed both tests ($\chi^2=29.02$, $df=3$, $p<.0001$) than 21st CCLC students who were Black ($n=1,329$, 49.6% passed compared to $n=805$, 30% who did not pass). This is also true of the comparison group (White: 762, 14.5% passed compared to $n=179$, 3.4% who did not pass;

Hispanic: 142, 2.7% passed compared to n=54, 1% who did not pass; Black: 2,775, 52.8% passed compared to n=1,263, 24% who did not pass; $\chi^2=56.08, df=3, p<.0001$.

21st CCLC students who were above the poverty line (socioeconomic indicator) were more likely to pass both tests ($n=409, 15.3%; \chi^2=18.87, df=1, p<.0001$), even though the percentage of students who were below the poverty line is higher ($n=1,327, 49.5%$). This is also true of the comparison group (*Above the Poverty Line: 852, 16.2%; Below the Poverty Line: 2,888, 54.9%; $\chi^2=77.71, df=1, p<.0001$*).

Of all 7,940 students who took the HSAP tests, those who attended a school where Title I services were not implemented school-wide were more likely to pass both tests ($n=693, 7.3%$), even though the percentage of students who attended a school with school-wide Title I implementation is higher ($n=4,783, 61.9%$). This is true for both the 21st CCLC students ($\chi^2=4.34, df=1, p=.037$) and the comparison group ($\chi^2=19.92, df=1, p<.0001$).

Table 11: Demographics of Students Who took both HSAP Tests

	21 st CCLC Students		Matched Comparison Students	
	Passed Both	Did not Pass Both	Passed Both	Did not Pass Both
Total	1,736	945	3,740	1,519
Female	33.9%	15.6%	38.4%	12.8%
Male	30.9%	19.7%	32.7%	16.1%
Black	49.6%	30.0%	52.8%	24.0%
White	12.8%	4.4%	14.5%	3.4%
Hispanic	1.6%	0.4%	2.7%	1.0%
Other	0.7%	0.3%	1.2%	0.4%
SEI (Yes)	49.5%	29.5%	54.9%	25.4%
SEI (No)	15.3%	5.8%	16.2%	3.5%
Title 1	60.3%	33.5%	62.8%	26.2%
Not Title 1	4.5%	1.7%	8.7%	2.2%

The average baseline ELA standardized test score of the 21st CCLC students who passed the HSAP test was 551.12 ($n=1,731, sd=68.47$) and was 623.89 ($n=3,740, sd=95.13$) for matched non-21st CCLC students. An independent samples t-test shows a significant difference between baseline ELA standardized scores of the 21st CCLC students and the matched non-21st CCLC students ($t=-28.58, df=5,469, p<0.001$), meaning that students in the 21st CCLC group had significantly lower baseline ELA scores than did the comparison group.

The average baseline math standardized test score of the 21st CCLC students who passed the HSAP test was 558.56 ($n=1,731, sd=68.97$) and was 629.88 ($n=3,740, sd=94.37$) for matched

non-21st CCLC students. An independent samples t-test shows a significant difference between baseline math standardized scores of the 21st CCLC students and the matched non-21st CCLC students ($t=-28.16$, $df=5,469$, $p<0.001$), meaning that students in the 21st CCLC group had significantly lower baseline ELA scores than did the comparison group.

The average number of attempts to receive a passing score on both of the HSAP tests for the 21st CCLC students who passed the test was 2.15 ($n=1,736$, $sd=.56$) and was 2.33 ($n=3,740$, $sd=.98$) for matched non-21st CCLC students. An independent samples t-test shows a significant difference between the average number of attempts to receive a passing score on the HSAP for the 21st CCLC students and the matched non-21st CCLC students ($t=-7.26$, $df=5,474$, $p<0.001$). The average number of days absent from school for the 21st CCLC students who passed the test was 4.9 ($n=1,732$, $sd=4.23$) and was 6.27 ($n=3,726$, $sd=5.6$) for matched non-21st CCLC students. An independent samples t-test shows a significant difference between the average number of days absent from school for the 21st CCLC students and the matched non-21st CCLC students ($t=-9.04$, $df=5,456$, $p<0.000$).

The average number of times retained in a grade level of the 21st CCLC students who passed the test was 0.20 ($n=1,736$, $sd=.46$) and was 0.25 ($n=3,740$, $sd=0.55$) for matched non-21st CCLC students. An independent samples t-test shows a significant difference between the average number of times retained in a grade level of the 21st CCLC students and the matched non-21st CCLC students ($t=-3.26$, $df=5,474$, $p<0.001$).

The average pupil to teacher ratio for the feeder schools of the 21st CCLC students who passed the test was 10.36 ($n=1,736$, $sd=2.27$) and was 10.84 ($n=3,740$, $sd=2.19$) for matched non-21st CCLC students. An independent samples t-test shows a significant difference between the average pupil to teacher ratio for the feeder schools of the 21st CCLC students and the matched non-21st CCLC students ($t=-0.48$, $df=5,474$, $p<0.000$).

Table 12: Average Value of Covariants				
	21 st CCLC Students		Matched Comparison Students	
	Passed Both	Did Not Pass Both	Passed Both	Did Not Pass Both
Baseline ELA PACT Score	551.12	502.56	623.89	549.17
Baseline Math PACT Score	558.56	510.07	629.88	554.24
Number of HSAP Attempts	2.15	2.62	2.33	3.16
Days Absent from School	4.9	7.45	6.27	10.15
Number of Times Retained	0.2	0.57	0.25	0.66
Student to teacher Ratio	10.36	10.35	10.83	10.81

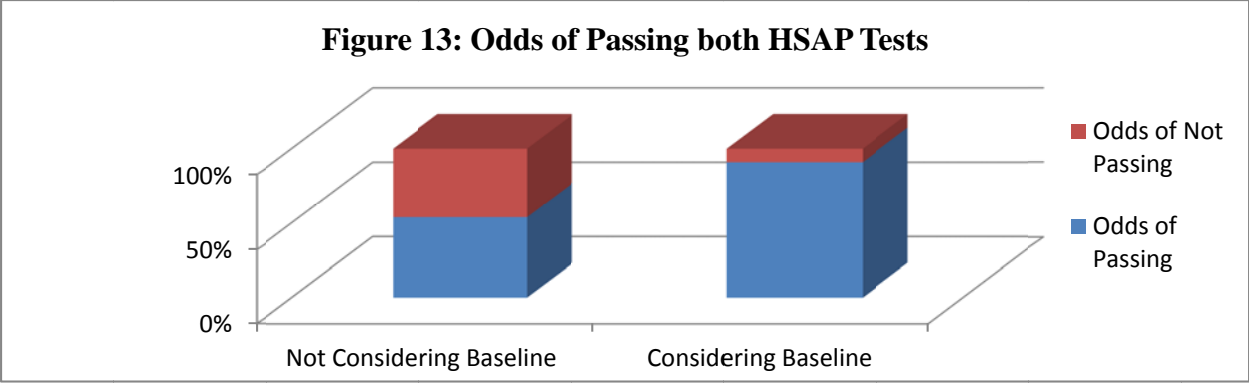
The difference between the 21st CCLC group and the comparison group with respect to the passing rates of both HSAP tests while holding constant the effects of the covariates is shown in the first step of the analysis (Equation A). This difference is represented in the analysis by the

odds ratio, or the predicted likelihood, that students in each group will pass both HSAP tests if no intervention occurred. In the second step, students' baseline scores (i.e., the State standardized test scores achieved before the study period) are introduced into the initial model (from step 1) to estimate the likelihood that students would pass both HSAP tests while taking into account their academic achievement prior to the study period (Equation B). The changes in likelihood (odds ratio, or OR) of the 21st CCLC group passing the HSAP tests explains how much the 21st CCLC program helped students in the program to pass the tests.

Binary logistic regression results (model likelihood ratio $\chi^2 = 1245.31$, $df=11$, $p<.001$) show that without taking into account where the students started from academically (Equation A), the 21st group is less likely than the comparison group to pass both HSAP tests ($OR=0.538$, $\beta=-0.620$, $S.E.=0.058$, $p<.001$). Including the students' standardized test scores prior to the study period into the model increased the predicted likelihood that 21st CCLC students would pass both HSAP tests by 37 percentage points ($OR=0.909$, $\beta=-0.095$, $S.E.=0.064$, $p=.135$). Furthermore, when the students' academic achievement prior to the study period is taken into account, the hypothesis that there is not a difference between the 21st CCLC group and the comparison group cannot be rejected ($p=.135$). Therefore, the 21st CCLC program may improve the odds of students who had low academic achievement at the beginning of the study period passing both HSAP tests. It is also important that the 21st CCLC students who passed both tests did so in an average of 2.15 attempts ($n=1,736$, $SD=.56$) whereas the comparison group passed both tests in an average of 2.33 attempts ($n=3,740$, $SD=.98$), meaning that the 21st CCLC students passed both HSAP tests in significantly fewer attempts ($t=-8.76$, $df=5247.28$, $p<0.001$).

Table 13: Variables in Each Equation

	Variables in Equation A					Variables in Equation B				
	B	S.E.	df	Sig.	OR	B	S.E.	df	Sig.	OR
Study Group (21stCCLC)	-.620	.058	1	<.0001	.538	-.095	.064	1	.135	.909
Title I (Not School-Wide)	.260	.107	1	.015	1.297	.143	.116	1	.215	1.154
Gender (Female)	.286	.055	1	<.0001	1.331	.222	.060	1	<.0001	1.249
Race (White)			3	<.0001				3	<.0001	
Race (Black)	-.529	.080	1	<.0001	.589	-.457	.087	1	<.0001	.633
Race (Hispanic)	-.338	.171	1	.048	.713	-.311	.183	1	.090	.733
Race (Other)	-.376	.250	1	.133	.687	-.283	.271	1	.296	.753
SEI (Not Indicated)	.346	.077	1	<.0001	1.413	.202	.082	1	.014	1.223
Pupil : Teacher Ratio	-.043	.013	1	.001	.958	-.004	.014	1	.769	.996
Days Absent from School	-.065	.005	1	<.0001	.937	-.068	.005	1	<.0001	.935
HSAP Total Attempts	-.351	.022	1	<.0001	.704	-.565	.027	1	<.0001	.568
Retained # of Times	-.607	.045	1	<.0001	.545	-.752	.049	1	<.0001	.472
First ELA PACT Score	-	-	-	-	-	.002	.001	1	.164	1.002
First Math PACT Score	-	-	-	-	-	.009	.001	1	<.0001	1.009
Constant	3.314	.187	1	<.0001	27.497	-2.693	.285	1	<.0001	.068



The final step in the analysis is to identify factors which may contribute to increasing the odds for 21st CCLC students to pass the tests. This is done by calculating the binary logistic regression model for only 21st CCLC students, controlling for the effects of school characteristics and baseline academic achievement, and determining which factors are positively or negatively associated to the likelihood of passing both HSAP tests. Number of attempts for the HSAP tests is negatively associated ($\beta=-0.897$, $S.E.=0.068$, $p<.01$), meaning that a student who has fewer attempts has a greater likelihood of passing both tests. Number of times the student was retained in a grade level is also negatively associated ($\beta=-0.925$, $S.E.=0.089$, $p<.01$), meaning that a student who has fewer retentions has a greater likelihood of passing both tests. Average number of days absent from school is negatively associated ($\beta=-0.071$, $S.E.=0.010$, $p<.01$), meaning that a student with fewer days absent from school has a greater likelihood to pass both tests. Female students are 1.2 times ($\beta=0.194$, $S.E.=0.098$, $p<.05$) more likely than male students to pass the tests while holding other effects constant. White students are 1.47 times ($\beta=-0.387$, $S.E.=0.145$, $p<.0$) more likely than Black students to pass the tests while holding other effects constant. There does not appear to be an effect from socioeconomic status ($\beta=0.20$, $S.E.=0.131$, $p=.879$) or number of years spent in the after school program ($\beta=-0.001$, $S.E.=0.001$, $p=.108$).

Attendance in the 21st CCLC Program During High School

Of the 191 active 21st CCLC sites in the 2010-2011 school year, there were 27 (14.14%) that served high school students. Of the 27 sites who served high school students, two served less than 50% of the students they proposed to serve regularly, eight served 50 -75% of the students they proposed to serve regularly, eight served 75-100% of the students they proposed to serve regularly, and nine sites served more than 100% of the students they proposed to serve regularly.

Of the 27 active 21st CCLC sites in the 2010-2011 school year, there were 16 (59.26%) that served a mixture of grade levels including high school. Of these 16 sites none served less than 50% of the students they proposed to serve regularly, five served 50 -75% of the students they proposed to serve regularly, four served 75-100% of the students they proposed to serve

regularly, and seven sites served more than 100% of the students they proposed to serve regularly. These sites proposed to serve between 20-140 students regularly.

Of the 27 active 21st CCLC sites in the 2010-2011 school year, there were 11 (40.7%) that served only high school students. Of these 16 sites two served less than 50% of the students they proposed to serve regularly, three served 50 -75% of the students they proposed to serve regularly, three served 75-100% of the students they proposed to serve regularly, and three sites served more than 100% of the students they proposed to serve regularly. These sites proposed to serve between 30-150 students regularly.

The sites that reached 100% of the students they proposed served at least 1.5 times as many students in order to meet 100% proposed regular attendees. It seems to be difficult for high school programs to consistently serve their students compared to the programs serving lower grade levels. This may be why most of the sites that served high school students were more likely to reach their proposed served when they served other grade levels as well.

The three sites which serve only high school students that reached 100% or more of their proposed regular attendees integrated extracurricular activities and/or required attendance from certain students which may have boosted their attendance rates. Others had difficulty reaching as few as 30 regular attendees.

Analysis of Dropout Rates

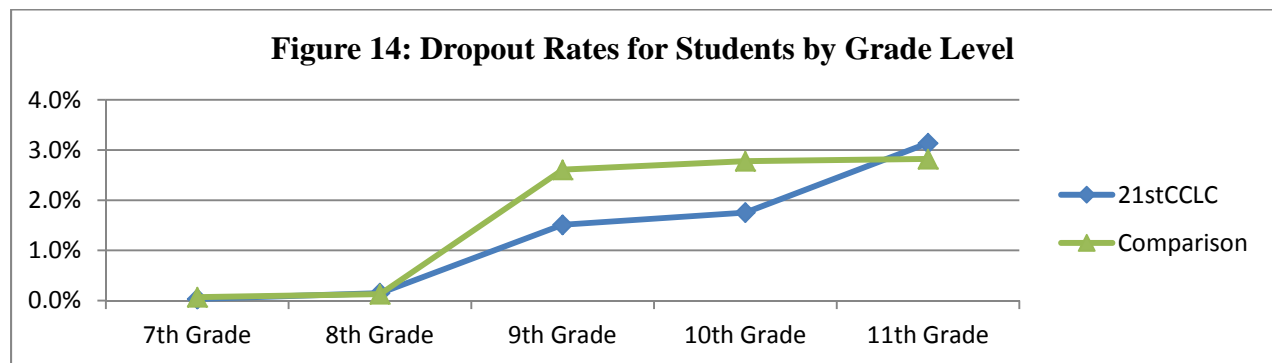
At the end of the 2011 school year, 12,057 students who participated in the 21st CCLC program had reached 7th grade. Of these, four (0.0%) dropped out prior to the beginning of the next school year. Of the 8,788 students who participated in the 21st CCLC program who had reached 8th grade, 13 (0.1%) dropped out prior to the beginning of the next school year. Of the 5,630 21st CCLC students who had reached 9th grade, 85 (1.5%) dropped out prior to the beginning of the next school year. Of the 2,681 21st CCLC students who had reached 10th grade, 47 (1.8%) dropped out prior to the beginning of the next school year. Of the 957 21st CCLC students who had reached 11th grade, 30 (3.1%) dropped out prior to the beginning of the next school year. Overall, 18,329 different students who participated in the 21st CCLC program reached the 7th, 8th, 9th, 10th, or 11th grades. Of these, 179 (1.0%) dropped out.

At the end of the 2011 school year, 45,795 students who attended the same schools during the 2007, 2008, or 2009 school years but who did not participate in the 21st CCLC program had reached 7th grade. Of these, 31 (0.1%) dropped out prior to the beginning of the next school year. Of the 45,131 students comparison group students who had reached 8th grade, 58 (0.1%) dropped out prior to the beginning of the next school year. Of the 34,836 comparison group students who had reached 9th grade, 908 (2.6%) dropped out prior to the beginning of the next school year. Of the 21,277 comparison group students who had reached 10th grade, 591 (2.8%)

dropped out prior to the beginning of the next school year. Of the 11,238 comparison group students who had reached 11th grade, 317 (2.8%) dropped out prior to the beginning of the next school year. Overall, 62,370 different students who attended the same schools during the 2007, 2008, or 2009 school years but who did not participate in the 21st CCLC program had reached the 7th, 8th, 9th, 10th, or 11th grades. Of these, 1,905 (3.1%) dropped out.

Overall, the difference in the total dropout rate for 21st CCLC students is significantly lower than what would be expected if there were no program impact ($\chi^2 = 247,000$, $df=1$, $p < .0001$). This difference appears to be the most profound in the 9th and 10th grade years, where 1.5% of 21st CCLC students dropped out in the 9th grade and 1.8% dropped out in the 10th grade, compared to 2.6% and 2.8% of comparison group students, respectively.

Table 14: Dropout Rates for Students by Grade Level						
	21stCCLC			Comparison		
	# Dropped Out	# Reached Grade Level	Dropout Rate	# Dropped Out	# Reached Grade Level	Dropout Rate
7th Grade	4	12,057	0.0%	31	45,795	0.1%
8th Grade	13	8,788	0.1%	58	45,131	0.1%
9th Grade	85	5,630	1.5%	908	34,836	2.6%
10th Grade	47	2,681	1.8%	591	21,277	2.8%
11th Grade	30	957	3.1%	317	11,238	2.8%
Total	179	18,329	1.0%	1,905	62,370	3.1%



DISCUSSION AND CONCLUSIONS

1. How are students' learning trajectories impacted by the 21st CCLC program over time?

The study analyzed differences in students' learning trajectories by comparing the 21st CCLC students to a group of students from the same schools with similar demographics and baseline performance levels. The data was stratified in order to allow the analysis to determine if the program changed students' trajectories from what would have otherwise occurred had there been no program offered. Overall, the learning trajectory for all students, as measured by the z-score value of the students' scale score on the state standardized tests, have an initial incline followed by a slight decline and an eventual flattening out of scores. The 21st CCLC program as a whole does not appear to affect the overall trajectory of students' achievement on the state standardized test.

2. Does attendance at 21st CCLC learning centers improve performance on state and local standards in core academic subjects when students who attend 21st CCLC programs are compared to similar students who do not attend?

Improved performance on state and local standards in core academic subjects was measured by determining if participating in the 21st CCLC program improved the students' odds of passing both HSAP tests. If baseline academic achievement is not taken into consideration, 21st CCLC students are less likely to pass both HSAP tests. However, if the baseline test scores are taken into account, the 21st CCLC students become just as likely to pass the HSAP test as the comparison students. This indicates that the program may help to improve the odds that under-performing students will pass both tests.

When the test score and HSAP analysis are taken together, there appears to be conflicting information. On the one hand, 21st CCLC students do not experience as steep an incline as the comparison students. However, in the final years of testing, these students have roughly the same test scores. Once these students reach high school, and most likely are not attending a 21st CCLC program, they appear to be just as likely to pass the HSAP test as students who do not attend.

When compared to other students in the same schools, students who participate in the 21st CCLC program have a much lower dropout rate, particularly in the 9th and 10th grade years; however, there is little difference in the dropout rate in the 11th grade.

Due to the smaller number of programs serving high school students, as well as inconsistent and low attendance rates for high school aged students in the 21st CCLC programs, effects of the program on the HSAP test and dropout rates rely heavily on students' participation in elementary and middle school. Most social programs have a diminishing effect over time,

and the results of this study are inconclusive as to whether the program is having a lasting effect into high school.

3. Are there differences in outcome effects depending upon the amount of time students actually attend the 21st CCLC program?

The combination of the number of days that the student participated in the 21st CCLC program and the number of years that they participated has a significant contribution to the test score trajectory. However, the contribution is not linear. There is a sharper incline in the average z-score for both ELA and math in the middle years and the scores are highest in the later years for students who participated in the program for four or five years, which is when their fourth or fifth year of attendance would have occurred. Larger numbers of days that the student attended the program in a particular year has a positive impact on these trajectories. The number of years that students participated in the program had no effect on the odds of passing the HSAP tests.

Only a small percentage (2.9%) of 21st CCLC students included in the trajectory analysis participated in the program for four or five years. More than half of 21st CCLC students only participated for one year (55.4%). Therefore, while it appears that more attendance in the program will improve students' achievement on standardized tests over time, the effect is hindered by the limited number of students remaining in the program over time.

4. Are there differences in outcome effects among students in different demographic groups attending the 21st CCLC program?

Being a female contributed to a faster rate of growth in test scores and increased the likelihood that the 21st CCLC student would pass both HSAP tests. 21st CCLC students who are minorities have slower rates of growth and are less likely to pass both HSAP tests. Being above the poverty line contributed to a faster rate of growth in test scores and contributes to the overall likelihood of all students to pass both HSAP tests.

The 21st CCLC program as a whole has traditionally targeted students in minority groups who are below the poverty line and these demographic groups are more heavily represented in the program than other demographic group (In 2011, 81.72% of students served were minorities and 89.4% of students served received free or reduced lunch). Therefore, it appears that the program is targeting the appropriate demographic in those respects.

5. Are there differences in outcome effects among students in different grade levels attending the 21st CCLC program?

Grade level had a significant impact on the initial status of growth trajectory for all students; however there was little variation by grade level over time. Grade level of participation in the

21st CCLC was not a significant contributor to changes in test scores over time or to the likelihood of passing the HSAP test.

Students who were retained in grade level had significantly lower increases and greater declines in growth trajectories and were much less likely to pass the HSAP.

6. Are there differences by service providing organization?

Although it was not included in the final research questions, the type of organization that provided the 21st CCLC programming was included as a covariate that had the potential to impact the outcomes of 21st CCLC students. It was discovered that the type of organization had a significant impact on students' growth trajectories. Students who participated in programming provided by community based organizations, clubs, or faith-based organizations had greater improvements in test scores than did students who participated in programming provided by the public school administrations.

IMPLICATIONS FOR FURTHER RESEARCH

1. Analysis should be conducted again when six years of data are available for the PASS test. Further studies should target programs that have operated for multiple years, with and without 21st CCLC funding, in order to increase the number of students in the study who participate for more than three years.
2. Further research should be conducted with existing 21st CCLC programs that serve high school students on HSAP passage rates and dropout rates to identify ways to attract and effectively serve older students. The interaction between the 21st CCLC program and other funding streams that serve these same students in high school should be considered.
3. Analysis should be conducted when more of the 21st CCLC students have reached graduation age, in order to permit analysis of graduation rates and a more comprehensive analysis of drop-out rates.
4. Differences between the programming provided by community based, clubs, and faith-based organizations and school administered programs should be further researched.

IMPLICATIONS FOR STATE POLICY

3. Efforts should be made to support programs in retaining struggling students in the program for multiple years.
4. Additional support should be provided to existing 21st CCLC programs that serve high school students and funding be targeted to programs that would serve older students at risk for dropping out.