Supporting Neighborhood Schools from Pre-K through High School: Successes and Challenges of the North Lawndale Cluster Initiative

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Executive Summary

The North Lawndale Cluster Initiative (NLCI) sought to improve academic achievement and educational attainment in a cluster of neighborhood schools in Chicago from 2013–14 through 2018–19, providing funding for four elementary schools and their neighborhood high school to provide vertically-integrated services from pre-k through high school. This evaluation describes the changes in student outcomes that occurred in the years of the initiative. All outcomes improved, and many outcomes showed substantial improvements, although only pre-k attendance was significantly higher compared to matched schools that served similar students. The analysis assessed the impact of funding a vertical integration cluster strategy in one neighborhood and should not be taken as an assessment of the effectiveness of the schools overall, or of individual programs. The bulk of the funding was used to expand pre-k from half-day to full-day programs, which showed significantly more improvement over time, relative to comparison schools. Outcomes in the elementary, middle, and high school grades generally improved at a similar rate as other district schools serving similar students. Furthermore, as described in the report, the potential gains that NLCI schools could have realized were limited by high student mobility rates and variability in the size and composition of the student population from year-to-year at the high school level.

NLCI Overview

The NLCI began in the 2013–14 school year. The Academy for Urban School Leadership (AUSL), a nonprofit school management organization, received funding from a Chicago family foundation for a "vertical integration" cluster strategy to improve outcomes in neighborhood schools in the North Lawndale area. The NLCI aimed to advance a cohesive, high-quality school and student support system by coordinating and aligning resources, programs, and partnerships to support students from pre-k through high school graduation. The largest portion of the initiative funding went to support full-day pre-k classes in the four elementary schools. Other supports included: family and community engagement activities; professional development for teachers; academic and social-emotional supports for students; a middle-to-high-school transition program for eighth-graders; and partnerships with other nonprofits providing post-secondary transition supports. This study evaluates the NLCI from pre-initiative years (2011–12 and 2012–13) through six years of the initiative (2013–14 through 2018–19).

Key Findings

1. **Pre-k attendance improved significantly with the initiative, surpassing comparison schools and the district average.** The NLCI provided funding for elementary schools to offer full-day pre-k programs instead of partial-day programs. Prior research has suggested that partial-day pre-k presents several barriers to students' school attendance. In the year prior to the initiative, pre-k attendance was not significantly different from attendance at matched comparison schools; after the initiative, pre-k attendance was significantly higher. Pre-k attendance improved districtwide in Chicago Public Schools (CPS) but improved more at NLCI schools. As a result, students at NLCI schools entered kindergarten having spent significantly more time in pre-k than both previous students in NLCI elementary schools and also similar peers in the district. This study provides new, compelling evidence that expanding partial-day pre-k programs to full-day programs can help improve attendance.

2. **Attendance and school climate improved over time in elementary schools, matching or surpassing the district average, not significantly more than comparison schools.** NLCI schools received professional development around primary grade instruction in literacy and math, as well as City Year mentors to support student achievement and social-emotional supports for some groups of students. These were intended to improve students' performance in school, and to support a stronger school climate. Attendance in grades K-8 was lower than the district average in pre-initiative years and similar or higher than the district average by 2018–19, depending on grade level. NLCI middle grade students also reported stronger school engagement, school connectedness, and relationships with peers on the annual *5Essentials Surveys* during the initiative than in prior years. The differences in reports on school climate measures were close to statistical significance in the 2015–16 school year, but otherwise the NLCI schools were not significantly different from comparison schools in terms of attendance or school climate. Thus, the improvements in attendance and climate in the elementary grades cannot necessarily be attributed to the initiative; the improvements likely were also influenced by broader district initiatives to support schools similar to the NLCI schools.

3. **Test Scores in grades 2-8 improved along with the districtwide improvements.** Districtwide, test scores improved considerably over this period, such that scores at the end of the period were higher by one year's worth of learning in 2018–19 than in 2012–13. Test scores in NLCI schools improved during the years of the initiative at rates that were similar to improvements observed at the district as a whole. Thus, test scores improved considerably over this period, but the improvements in test scores cannot be attributed to the initiative. Additionally, test scores at NLCI schools continued to be lower than district averages.

4. **Students fared better in the transition to high school—reducing the gap with the district average but not closing it—and at similar rates as comparison schools.** The initiative included supports for navigating the high school choice process, which should have led

students to enroll in high schools where they were more likely to succeed. Districtwide, there were improvements in Freshman OnTrack rates, which often lead to higher performance when students transition from eighth to ninth grade. Eighth-grade graduates from NLCI schools did fare better in the transition to high school over time, with improving ninth-grade GPAs in their first year of high school. At the NLCI high school, first-time ninth-graders also were more likely to be on-track in their ninth-grade year. Differences in Freshman OnTrack rates relative to the district were smaller at the end of the initiative than the beginning but remained substantially lower than district averages. The NLCI Freshman OnTrack rates were not consistently higher than those at other schools serving similar populations of students, suggesting that the improvements largely resulted from other district efforts, rather than the initiative itself.

5. **High school outcomes improved but were lower than outcomes of similar students at other schools for many years.** At the NLCI high school, ninth-grade attendance and grades improved in the two most recent cohort years. However, until the final year of the evaluation (2017–18), attendance and grades were lower compared to students with similar backgrounds and eighth-grade achievement at other high schools. College enrollment rates among cohorts of graduates had declined considerably in the years just prior to the initiative and continued to be lower than other CPS high schools, in the first two years of the initiative. They improved in the 2015–16 school year and then declined again. In most of the NLCI years, students at the NLCI high school had lower ninth-grade attendance, ninth-grade GPAs, college enrollment rates, and college persistence rates than students with similar backgrounds at other CPS schools.

6. **Improvements occurred despite variable student enrollment and should be interpreted within the context of a district showing substantial improvements.** Overall, there were improvements in many of the student outcomes in the NLCI schools over time, although only pre-k attendance improved more at NLCI schools than at comparison schools. Districtwide, there were large improvements in many of the outcomes analyzed for this study, thus, the NLCI schools would have had to show exceptional improvements to demonstrate gains that were significantly higher than the district.

   We also do not know what would have happened in the absence of the initiative. It is possible that the schools would have shown a decline in achievement, or shown smaller improvements. As described in this report, the schools experienced very high rates of year-to-year mobility and the high school experienced large shifts in enrollment from year-to-year. These mobility rates were larger than those experienced by typical schools in the district and may have made it difficult for strategies and outcomes to build over time.

7. **As CPS district leadership thinks about supporting neighborhood schools, this evaluation highlights specific challenges.** Neighborhood schools serve any students who live in their attendance zone, taking in students at all times of the year. They have less certainty than other schools about who they will serve and how many students will enroll. One substantial

challenge is to develop the capacity for staff to be ready to serve a continually shifting population of students that may have different needs from one year to the next. Particularly for schools that historically have high student mobility rates, and where families have fewer economic resources for school engagement, it will be difficult to show strong performance ratings relative to schools that serve families with more resources. Low school performance ratings, in turn, signal to families that they should consider enrolling in schools outside of their neighborhood, which works against a cluster system model. The NLCI schools were able to show considerable improvements in some outcomes, but for outcomes that research has shown are often strongly associated with the economic backgrounds of students—test scores and college enrollment—the resources required to produce equitable outcomes are likely considerable.

Introduction

Chicago Public Schools (CPS) have shown considerable improvements in student achievement over the last 20 years, but concerns about unequal educational opportunities across different communities in the city continues to be a pressing issue. Just recently, in 2018, the district established the Office of Equity out of these concerns. Across the country, researchers have documented very high correlations between school performance levels and the economic backgrounds of the students served by the school. Chicago is no exception to this pattern, with the lowest-rated schools concentrated in the least-affluent areas of the city.[1] One strategy to address inequities in educational opportunity is to invest in schools in neighborhoods with the lowest income levels, providing additional funding to support evidence-based programs. This report provides a summative evaluation of one such effort, the North Lawndale Cluster Initiative (NLCI).

Local and federal policymakers have enacted numerous strategies over the past several decades to try to rapidly improve the performance of schools with low achievement. There are multiple models for doing this work. One strategy that has been recommended by experts on school turnaround is to use a cluster-based strategy. They note that school clusters can provide schools with more support than a single school turnaround, allowing schools to have authority over making decisions while receiving support and guidance from the network-level managing organization.[2]

Under the Obama administration, the U.S. Department of Education supported a neighborhood-based approach to offset the effects of growing up in poverty through "cradle to career" supports in Promise Neighborhoods. The strategy being studied here shares some elements with this approach, in that it provided funding for many of the same types of supports—early childhood supports; in-school tutoring in grades K-12; professional development for teachers; college and career mentorship; and high school and college application assistance—all for a specific neighborhood. There were differences between Promise Neighborhoods and the NLCI, too: Promise Neighborhoods were intended to encompass family and community supports external to schools, and were not focused on particular schools,[3] although, in practice, even the Promise Neighborhoods tended to focus mostly on in-school efforts.[4] The Promise Neighborhoods were funded just before and during the period of the NLCI, but there has been limited evidence on their effectiveness. The research that exists suggests mixed results in the first few years, and notes difficulties in obtaining data and tracking outcomes that might not be affected for at least 10 years,

[1] Chicago Public Schools (2019).
[2] Calkins, Williams, Belfieore, & Lash (2007).
[3] Hulsey et al. (2015).
[4] Bower & Rossi (2019).

as students move through supports at different ages, as well as issues with staff turnover and student mobility.[5]

The North Lawndale Cluster Initiative (NLCI)

The NLCI began in the 2013–14 school year. The Academy for Urban School Leadership (AUSL), a nonprofit school management organization that has a mission of transforming chronically low-performing schools, received funding for a "vertical integration" cluster strategy to turn around underperforming schools in the North Lawndale area. The NLCI aimed to advance a cohesive, high-quality school and student support system by coordinating and aligning resources, programs, and partnerships to support students from pre-k through high school graduation.

The initiative provided support for programs in four elementary schools (Dvorak School of Excellence, Herzl Elementary School, Johnson School of Excellence, and Chalmers School of Excellence) and one high school (Collins Academy High School). As shown in **Table 1**, the elementary schools chosen for the initiative historically had low test scores relative to the district, even as they showed improving performance over time, relative to the state standards. In 2013, about one-quarter of students in the NLCI schools met state standards, compared to about one-half of students in the district as a whole. Further information about the population of students at each of the schools is provided in the next chapter.

The largest portion of the initiative funding went to support full-day pre-k classes in the four elementary schools. Prior to the initiative, each of the elementary schools offered half-day pre-k programs. Research has suggested that partial-day pre-k presents several barriers to students' school attendance, and full-day pre-k offers many benefits.[6] The differential costs for offering full-day pre-k classes, rather than partial-day classes, ranged from $600,000 to over $1 million a year. In addition, the NLCI schools received $2 million over three years for an array of supports that included family and community engagement activities; professional development for teachers (including math and early literacy professional development through an external grant to the Erikson Institute); academic and social-emotional supports for students (the LAMP mentoring program and the UCAN educational support program); a middle-to-high-school transition program for eighth-graders; and partnerships with other nonprofits providing post-secondary transition supports. There was also funding of $120,000 a year to support City Year programming in schools, to make up for a reduction in district funds to cover those costs.

[5] Hulsey et al. (2015).
[6] Robin, Frede, & Barnett (2006); Lee, Burkam, Ready, Honigram, & Meisels (2006); Ehrlich et al. (2014).

Table 1. The NLCI Sought to Improve Academic Performance in a Cluster of Schools with Historically Low Test Scores Relative to the District as a Whole

Percent of students in 3rd-8th Grade meeting ISAT standards (Composite Score)

School Year	Chalmers	Johnson	Herzl	Dvorak	District
2000–01	9.7%	10.8%	16.4%	17.1%	23.4%
2001–02	8.3%	12.1%	18.1%	20.7%	25.5%
2002–03	10.5%	13.3%	15.9%	26.3%	26.6%
2003–04	14.7%	15.7%	17.6%	27.1%	29.4%
2004–05	10.9%	11.3%	19.4%	26.2%	29.8%
2005–06	18.2%	12.7%	26.0%	29.1%	37.4%
2006–07	16.4%	21.6%	28.9%	29.3%	39.6%
2007–08	17.1%	14.2%	32.2%	33.3%	39.6%
2008–09	13.2%	17.9%	24.6%	32.1%	42.0%
2009–10	19.7%	24.1%	17.4%	27.6%	44.8%
2010–11	24.0%	30.7%	18.4%	32.7%	48.7%
2011–12	25.3%	38.7%	16.2%	28.2%	50.7%
2012–13	28.2%	21.9%	25.3%	24.0%	52.5%

Note: Data represented here were sourced from Chicago Public Schools Assessment Reports: https://cps.edu/SchoolData/Pages/SchoolData.aspx.

By providing supports at all grade levels, the initiative aimed to boost the outcomes of all students in the NLCI schools. Often, successful programs fail to show long-term success, as initial gains fade out over time. By putting resources into programs for all grades, the vertical strategy provided the potential to reduce any fade-out in earlier gains. One hope for the NLCI was that it would provide a strong experience for students from pre-k through high school, with continual improvements observed in student outcomes as students moved through grades, having had more years of supports at earlier grades.

In this report, we examine the degree to which outcomes, from pre-k attendance to college persistence, changed over time at the NLCI schools. The supports provided at each grade level are described below and summarized in **Table 2**. The Appendix provides information about all of the outcome measures used in this study, each of which is also described briefly below.

The NLCI schools historically had lower academic performance levels than the district as a whole, as described in **Table 1**. This was the main reason the district contracted with AUSL to manage the schools,

and the initiative was started to provide extra supports—the goal was to boost achievement.[7] Therefore, besides showing how outcomes changed in the schools, we also show how outcomes improved relative to the district average. This shows whether the schools were catching up to the district average, which is relevant for district goals around equity. At the same time, comparing the outcomes of NLCI students to the district average does not tell us how well the NLCI schools and the supports of the initiative were serving students, since students' outcomes are influenced by factors outside of school. Therefore, we also conduct analyses that compare outcomes among students with similar background characteristics, and at schools that were similar to the NLCI schools prior to the initiative. For both the elementary schools and the high school, we answer three questions:

1. Were there improvements in student outcomes in NLCI schools in the years of the initiative?
2. If so, did student outcomes improve more in NLCI schools than in the district as a whole?
3. Were outcomes at NLCI schools significantly higher than at schools serving similar students?

Table 2. The Initiative Provided Supports from Pre-K through College Preparation

NLCI supports and corresponding outcomes

Grade Level:	**Pre-K**	**Elementary and Middle Grades**	**8th - 9th Grade**	**High School - College**
Supports:	• Full-day Pre-k	• Teacher professional development • City Year mentoring • Social-emotional supports	• City Year mentoring • High school transition • Advising	• City Year mentoring • Social-emotional supports • College counseling
Outcomes:	• Pre-k attendance	• Attendance • Reading and math scores • School climate	• 9th-grade course performance	• College enrollment and persistence rates

[7] https://www.chicagotribune.com/news/ct-xpm-2014-05-10-ct-privatization-schools-north-lawndale-20140510-story.html

Elementary School Outcomes

We begin by showing changes over time on an array of outcomes at the four elementary schools. The four elementary schools are studied as a group. We do not examine variation in outcomes between the four schools, as the goal of this evaluation was to determine the overall impact of the initiative. Each of the outcome measures is described below, with further information on the outcome measures and analytic methods provided in the Appendix.

Pre-K Attendance

The initiative provided considerable resources to transition from partial-day to full-day pre-k classes in the four NLCI elementary schools. Prior research suggests that supporting full-day pre-k programs has good potential to benefit student outcomes, especially among students starting with the lowest achievement levels. Full-day pre-k is associated with significantly higher test scores in math and literacy, relative to half-day pre-k.[8] Studies of full-day vs. half-day kindergarten also show that students have higher growth rates on a variety of academic skills.[9] Furthermore, interviews with pre-k parents suggest that attendance rates at pre-k are influenced by whether the program is a full-day program or a partial day program. It can be more difficult for families to get students to and from school in half-day programs, as parents need to leave work in the middle of the day. It can also seem like it is less worthwhile to go to school if there are competing priorities on that day, such as transportation difficulty, a sick sibling, or other commitments.[10] Pre-k attendance can seem unimportant, but it is predictive of students' learning gains in pre-k, their kindergarten readiness, their likelihood of reading at grade level when they reach the second grade, and their long-term educational attainment.[11] Investments in efforts to improve pre-k attendance may also improve equity in outcomes. Students who started pre-k furthest behind in terms of literacy skills are the most likely to be chronically absent, and absenteeism matters more for their academic growth than among students who started less far behind.[12]

Therefore, one key outcome for this study is pre-k attendance. Some students begin pre-k at the age of three, but many more attend pre-k at the age of four, so we examine attendance rates among pre-k students at four. We also look at the degree to which students entering kindergarten at the NLCI schools attended pre-k at any CPS school, and their attendance rates when they were in pre-k, as indicators of preparation for kindergarten.

Outcomes studied:

- Pre-k attendance rates among four-year-old pre-k students
- Any prior pre-k attendance among entering kindergarten cohorts

[8] Robin et al. (2006).
[9] Lee et al. (2006).
[10] Ehrlich et al. (2014).
[11] Berlinski, Galiani & Manacorda (2008); Ehrlich et al. (2014); Taylor, Gibbs, & Slate (2000).
[12] Ehrlich et al. (2014).

Attendance and Test Scores in Pre-K–Grade 2

Investments in pre-k might have further benefits as students move into kindergarten and the primary grades. Students who have higher attendance rates in pre-k tend to have higher attendance rates in kindergarten through second grade. Students with higher rates of pre-k attendance also begin kindergarten with stronger academic and social skills and have higher test scores when they get to second grade.[13] Attendance in elementary schools has also been shown to strongly predict learning and success when students get to high school.[14] The first year in which all NLCI schools had full-day pre-k classes was 2014–15. If they made expected progress in school, students in pre-k during the initiative years would have been in second grade in the 2017–18 school year. Therefore, we examine attendance in kindergarten, first grade, and second grade, as well as NWEA-MAP scores in second grade, since we might expect greater change in those grades as a result of full-day pre-k participation in earlier years.

Outcomes studied:

- Attendance in kindergarten, first grade, and second grade
- Second-grade test scores

Attendance, Test Scores, and Perceptions of School in Grades 3–8

In addition to expanding pre-k, the initiative included professional development for teachers, and coaching for students, to support achievement and student connection to school in the elementary and middle grade years. This included professional development for primary grade teachers around math and literacy through the Erikson Institute. Additionally, the NLCI schools had been partnering with City Year, which provided teams of AmeriCorps members to work with classroom teachers as student success coaches, supporting students' social, emotional, and academic development through tutoring, school-wide event planning, and afterschool programs. City Year has commissioned studies in Chicago and other cities showing that City Year partnerships have improved student attendance, test scores, and grades.[15] When the initiative was beginning, the schools were at risk for losing funding for City Year, and so the initiative provided funds to allow them to continue to partner. Research also highlights the need for supporting students' social-emotional needs, and coaching and mentoring students when they need help. The City Year mentors provide support to students and teachers that might help improve school connectedness and academic engagement.[16] In addition, the initiative included partnerships with several nonprofit organizations to provide mentorship to students in specific groups. These included the LAMP Amachi program, which provides caring adult mentors to children whose parents are incarcerated, and the

[13] Ehrlich et al. (2014).
[14] Allensworth, Gwynne, Moore, & de la Torre (2014a).
[15] Copeland & Raynor (2018); Chapin Hall (2017).
[16] Information about City Year approach, models, and training can be found at: https://www.cityyear.org/impact/unique-approach/

UCAN educational support program, which helps to engage youth in foster care to promote education and build positive social supports.

The professional development, City Year mentors, and social-emotional supports in schools were intended to support improvements in attendance and test scores, as well as students' perceptions of the school climate. Students in grades 6-8 take districtwide *5Essentials Surveys*, which provide information on their experiences in school, as described further in the Appendix.

Outcomes studied:

- Attendance in grades 3-8
- Scores in reading and math on the NWEA in grades 3-8
- Students' reports of school climate in grades 6-8,* including school connectedness, academic engagement, peer support, and peer relationships

  **surveys not administered to younger students*

Eighth-Grade Graduates' Success in High School

Students in CPS have many different options for high school, and about three-fourths of high school students attend a high school other than their attendance-area neighborhood high school.[17] There are substantial differences in ninth-grade performance among students who have the same performance in the middle grades, based on which high school they attend.[18] This suggests that students' decisions about where to attend high school matter for their academic success in high school. However, it is not always clear what the best school choice is for a student. Students at selective schools tend to have strong academic outcomes, but few students have access to selective schools, and research has shown that students' outcomes are sometimes better if they attend strong neighborhood schools or other academic programs.[19] Students have differential access to high schools based on their academic records and other factors, such as services they may need or access to transportation. They also have different preferences for the types of academic and extracurricular programs offered at different high schools. Therefore, what makes a school a good fit for one student may not be the same for another student. Navigating all of the information about schools and figuring out where a student is most likely to be successful can be challenging.[20]

Prior to the 2017-18 school year, the process for applying to high schools was complicated, with different application processes and deadlines for different schools. It could also be difficult to find information about different high schools, let alone make decisions about which high schools to attend. The NLCI

[17] Barrow & Sartain (2019).
[18] Allensworth et al. (2014a); Gottfried (2011).
[19] Allensworth, Moore, Sartain, & de la Torre (2016); Barrow, Sartain, & de la Torre (2018); Coca et al. (2012).
[20] See forthcoming Consortium brief, *Student Experience with the High School Choice Process in Chicago Public Schools*

supported programs were intended to help students navigate the high school choice and application process and be ready for the transition to high school.

If students were more likely to enroll in schools that were a better fit for them—based on their own backgrounds, interests and needs—we would expect to see higher ninth-grade outcomes. Therefore, we examine the ninth-grade GPAs of the eighth-graders who graduated from the four elementary schools, as an indicator of whether students' high school outcomes improved with better support through the decision-making process. We examine students' success in high school, rather than their rates of enrolling at particular types of schools, since there is no one clear type of high school that would be the best match for all students.

Outcomes studied:

- Ninth-grade GPAs among eighth-grade graduates

Analytic Methods: Elementary School Outcomes

For each outcome, we show the average across all four elementary schools, along with the district average. The NLCI and district averages are based on the population of students in NLCI schools and in the district, not on samples. Thus, all of the changes shown in the figures represent the actual changes that occurred, without sampling error. We also show outcomes in the year before the initiative, 2012–13, as a point of comparison. Data on some of the elementary school outcomes are only available beginning in the 2012–13 school year, so we can only show one year of pre-initiative data at the elementary school level.[21]

To make more rigorous assessments of whether outcomes improved more than would be expected at NLCI elementary schools, we used a propensity-score strategy, comparing schools that had the same characteristics as the NLCI schools prior to the initiative. The propensity scores were based on school characteristics two years prior to the start of the initiative (2011–12), described in detail in the Appendix, with schools that were most similar to the NLCI schools more heavily weighted in the statistical analyses than schools that were less similar. We show the unadjusted trends and the district average for comparison in the figures, while the estimates based on the propensity weights are provided in the tables following the figures, along with tests of statistical significance.

[21] The elementary grade assessment that covers the broadest range of years of this study is the NWEA. CPS first started administering the NWEA in the 2012–13 school year. Pre-k attendance is available in the 2011–12 school year, but to examine the pre-k attendance of kindergarten students, we need data from the prior year, which also restricts our analysis of that outcome to begin in 2012–13.

High School Outcomes

We examined a number of high school outcomes that might reasonably be expected to improve, given the ninth-grade transition supports, social-emotional supports, and college supports that were included in the initiative. The analyses were conducted with two types of cohorts: one at the beginning of high school and another at the end of high school.

Ninth-Grade Course Performance

First, we show the outcomes of cohorts of first-time ninth-graders. The ninth-grade transition supports and social-emotional supports were intended to help students perform better in their ninth-grade year. Prior research has shown that students' ninth-grade attendance, GPA, and Freshman OnTrack status are highly predictive of whether they eventually graduate, go to college, and persist in college.[22]

Outcomes studied:

- Ninth-grade GPAs
- Freshman OnTrack rates[23]
- Ninth-grade attendance

College Outcomes among Graduates

Even though most students in CPS intend to get at least a four-year college degree, there are many different potholes on the road to college, beyond academic preparation, that cause them never to get there—from navigating information about colleges, to the application process, financing college, and then adapting to the new challenges that arise with the college transition.[24] As with the high school choice process, there is also evidence that where students attend college makes a difference for whether they are likely to succeed once there. Students with similar backgrounds and high school achievement are more likely to graduate if they enroll in colleges with high institutional graduation rates, which are often more selective and highly-resourced colleges.[25] For this reason, college advisors will often encourage students to attend the most selective colleges that "match" their qualifications, which tend to have higher graduation rates. Students also consider many other factors about colleges, and look for places they consider a good fit for their interests, needs, and background. If effective, supports around the college search and enrollment process were intended to lead more students to be able to enroll in college and to enroll in colleges where they were likely to persist. Therefore, we examine college outcomes among cohorts of graduates from Collins Academy High School. We examine students' success enrolling and

[22] Allensworth & Easton (2007); Easton, Johnson & Sartain (2017).
[23] Freshman OnTrack status is an indicator of whether students made sufficient progress in the ninth grade to be likely to graduate high school in four years. A student is considered on-track if they failed no more than a semester of a core course (i.e., English, math, science, or social studies) and have sufficient credits to move into tenth grade.
[24] Roderick, Coca, & Nagaoka (2011).
[25] Allensworth & Clark (2019); Roderick, Holsapple, Clark, & Kelley-Kemple (2018); Roderick et al. (2011).

persisting in college, rather than their rates of enrolling at particular types of colleges, since the types of colleges that are a good fit and match differ by students' qualifications, interests and needs.

Outcomes studied:

- Enrollment at two-year or four-year colleges among Collins graduates
- Enrollment at four-year colleges among Collins graduates
- College persistence among Collins graduates who enrolled in a four-year college

Analytic Methods: High School Outcomes

Collins began the initiative in 2013–14. For each outcome that we studied, we show the performance of Collins students, starting with the 2011–12 school year, and in each subsequent year. This allows us to see student outcomes in the two years prior to the initiative; unlike the elementary school outcomes, data on the high school outcomes are available for many years prior to the initiative.

As with the analysis of elementary grade outcomes, we show the average outcomes in Collins, as well as the district as a whole. We also compare the outcomes of students at Collins to the outcomes of students with similar incoming characteristics at other CPS high schools. The Appendix contains further details on the analytic methods. In many years, Collins did not serve a large number of students. Therefore, the number of students at Collins included for the outcome analyses is very small for some of the years and some of the outcomes. For example, in some years, the analysis of college persistence rates is based on as few as 12 students. This limits our ability to attribute changes to the initiative vs. random variation or other changes occurring in the district. However, we can see whether the school effects for Collins become more positive over time, comparing years before and after the initiative. The school and district trends are based on the population of students at Collins, and in the district as a whole.

Context of the NLCI

During the years of the NLCI, there were many districtwide initiatives to improve achievement at all schools. CPS implemented a new teacher evaluation policy, based around observations and feedback of teachers' practices in the classroom.[26] They introduced new discipline policies that greatly reduced the use of suspensions.[27] They started investing more in pre-k programs throughout the city, particularly in neighborhoods with a large proportion of pre-k-aged children living in poverty, who were also experiencing low rates of pre-k enrollment.[28] They introduced a new accountability system that produced school quality ratings based on a wider variety of metrics than in the past and provided an overall summative rating to each school.[29] The district made investments in school leaders, and in professional development and resources around Common Core and Next Generation Science Standards.[30] The district also went through budget difficulties and leadership transitions. During this time period, students in CPS schools showed notable improvements in achievement and educational attainment, drawing national attention to the progress made in the district—with achievement gains that put the district at the 95th percentile and improvements in high school graduation rates that surpassed national gains.[31]

All of these changes can make it difficult to evaluate the effects of the NLCI; its schools would have been affected by changes that were occurring more broadly in the district. Because achievement improved districtwide, when we compare achievement at the NLCI schools to other schools in the district, we are comparing them to an ever-improving baseline. Reaching district goals around equity means schools that started out with lower achievement would need to show gains that were even larger than the district average to reach overall district outcome levels. Before considering whether schools in the initiative showed such sizable improvements, it is helpful to understand the broader context of the NLCI schools within the district.

North Lawndale Community

The community of North Lawndale experienced economic disinvestment from 1960–2010, with implications for school achievement today. North Lawndale is located on the West Side of Chicago and has been a predominantly Black community since the 1950s. Pre-1950, it was a largely Czech, then a Jewish, community, and considered an economically vibrant neighborhood in the city. The population of North Lawndale declined significantly between 1960 and 2010, dropping from 124,937 in 1960 to 35,912 in 2010. Redlining by banks, discrimination by the Federal Housing Authority, and predatory real estate and mortgage practices led to increasing segregation, declining rates of home ownership, and economic

[26] See http://consortium.uchicago.edu/teach-eval for more details.
[27] Stevens et al. (2015).
[28] Ehrlich et al. (2020).
[29] See CPS School Quality Rating Policy at https://cps.edu/Performance/Pages/Performancepolicy.aspx
[30] See CPS resources around the Common Core Standards at: https://cps.edu/commoncore/Pages/Commoncore.aspx
[31] Reardon & Hinze-Pifer (2017); Nagaoka, Seeskin, & Coca (2017).

exploitation of residents.[32] Changes in industry resulted in high rates of unemployment and building vacancies.[33] For example, International Harvester closed in 1969, Sears began closing in 1974, and most other industries closed by the 1980s. After several decades of economic disinvestment in North Lawndale, several efforts have been made in the last few decades to revitalize the area. The Steans Family Foundation has provided programs and grants for the areas beginning in the 1980s, and more recent efforts such as the North Lawndale Community Coordinating Council have tried to develop the area. Since 2010, the population has stabilized, staying at around 36,000.[34]

Table 3 shows the economic characteristics of the North Lawndale Community area census tracts, relative to other census tracts in Chicago. North Lawndale has higher residential stability than other neighborhoods, among both owners and renters. However, residents have low rates of house ownership, with only 24.6 percent of residents owning their own house, which puts them at the 17th percentile, relative to census tracts across the city. Many families in North Lawndale struggle economically, as shown through the median family income and the percentage of families below the poverty line. The median family income is $25,153, which is at the 8th percentile, relative to other census tracts in the city, and the percentage of families below the poverty line is 44.7 percent, at the 93rd percentile. Thus, income levels in North Lawndale are low relative to the rest of the city, while the poverty rate is high.

Table 3. Families in North Lawndale have High Residential Stability, but Low Rates of House Ownership and Income

North Lawndale Community Area Census Tract	Value	Percentile
Average number years tenancy per unit: owners	23.6	77
Average number years tenancy per unit: renters	10.4	77
Percent lived in same house in past year	85.4%	49
Percent who own their own house	24.6%	17
Median family income	$25,153	8
Percent below poverty line - families	44.7%	93

Note: Values are the average of the North Lawndale Community Area Census Tracts, weighted by population. Data come from the 2015 U.S. Census American Communities Survey. The percentiles are relative to all census tracts in the city.

The economic situation of families in North Lawndale has implications for the reported performance levels of schools that serve the community, and the efficacy of an initiative such as the NLCI. Numerous studies have shown that school performance metrics like test scores, attendance rates, and high school

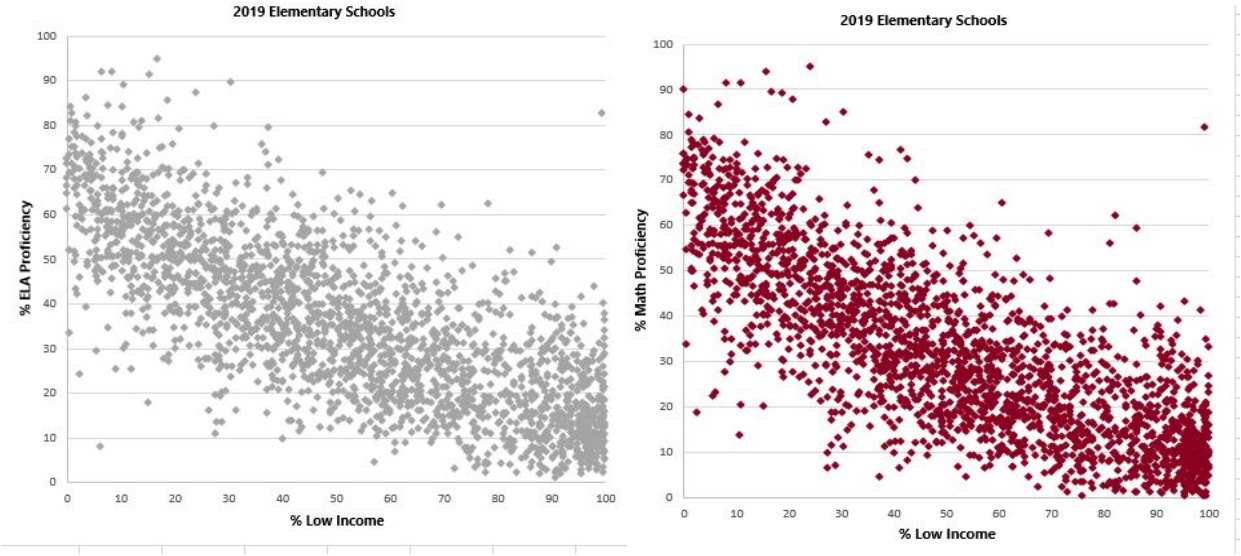
[32] Coates (2014).
[33] http://www.steansfamilyfoundation.org/lawndale_history.shtml
[34] https://www.cmap.illinois.gov/documents/10180/126764/North+Lawndale.pdf

graduation rates are strongly related to the economic backgrounds of students served by a school.[35] For example, an analysis based on 2019 data for schools in Illinois showed that at most schools serving very few low-income students, 70-80 percent of students met testing norms, while at schools that entirely served low-income students, it was rare for any schools to have 70 percent of students meeting norms (see Figure 1). Thus, the lowest-performing schools that served few low-income students had achievement that was still higher than most of the highest-performing schools serving many low-income students. Furthermore, that analysis did not take into account that the highest-performing schools for students of all backgrounds are those that admit students selectively, based on prior achievement.

These differences are important to recognize because they indicate that our current educational systems produce inequitable educational outcomes based on family income. Even schools that are doing an exceptional job serving their students still may be perceived to be of low quality, based on publicly-reported statistics about average student achievement. As a society, we do not yet know what level and types of resources are needed to compensate for the considerable structural inequities that produce these patterns in schools.[36] For initiatives seeking to undo these patterns, the investments that are needed may be considerable, and they need to support practices that have the most leverage for producing change.

Figure 1. School Test Score Averages are Strongly Related to the Income of Families Served by the School

Percent of students meeting or exceeding ISAT standards by percentage low income among schools in Illinois



Note: School percent low income is correlated with ELA proficiency at -.77 and math proficiency at -.79, where zero is no relationship and -1.0 is perfectly related.

[35] Reardon (2011); Reardon (2019); Palardy (2013).
[36] National Academies of Sciences, Engineering, and Medicine (2017).

NLCI School Enrollment & Student Mobility

NLCI schools experienced high student mobility, but served similar students over time. The four NLCI elementary schools served students with similar backgrounds before and during the initiative (**see Table 4**). The total number of students in NLCI schools was somewhat higher during the initiative years than in the pre-initiative years, ranging from 1,767 students to 2,115 students. But the schools were almost evenly split between male and female students, and the racial composition of the schools was about 98 percent Black throughout the years. The percent of students receiving free or reduced-price lunch was around 98 percent and the percent of students identified as diverse learners was around 12 percent in all years. Students came from census block groups (areas of about one city block) where the average poverty rate was over a standard deviation above the mean. This means that the typical student lived in a census block group with poverty rates at about the 90th percentile, relative to other census block groups in the city.

Table 4. Characteristics of Students at NLCI Schools (Dvorak, Herzl, Johnson, and Chalmers) Stayed the Same both Before and During the NLCI

	School Year	Number of Students	Percent Male	Percent Black	Percent Free/Reduced-Price Lunch	Percent Diverse Learners	Average Neighborhood Poverty Level (Standardized)
Pre-NLCI Years:	2011–12	1,798	49.4%	98.1%	98.2%	12.2%	1.284
	2012–13	1,894	49.3%	98.1%	98.2%	12.1%	1.288
NLCI Years:	2013–14	2,036	49.4%	98.1%	98.2%	12.2%	1.292
	2014–15	1,917	49.4%	98.0%	98.2%	12.3%	1.292
	2015–16	2,115	49.7%	98.1%	98.1%	12.5%	1.284
	2016–17	2,070	49.6%	98.0%	98.1%	12.5%	1.296
	2017–18	1,906	49.6%	98.0%	98.1%	12.5%	1.304
	2018–19	1,767	49.6%	98.0%	98.1%	12.5%	1.316

Note: Neighborhood poverty level was calculated based on Census information about the census block on which each student lives. All neighborhoods across Chicago were standardized, such that zero represents the average neighborhood in Chicago and a change of +/- 1 represents a neighborhood above/below the average by 1 standard deviation.

While the characteristics of students in the NLCI remained similar over time, there was constant change in the individual students in the school, due to high rates of student mobility. Despite higher rates of housing stability in North Lawndale, schools in the initiative had less stable student enrollment than was typical in CPS. This was true before and during the NLCI years. For example, in each year from 2011 through 2016, NLCI elementary schools retained about 90 percent of their students, between September and May, and around 80 percent of their students from May to September (**see Table 5**). Combined, they

retained around 70 to 75 percent of their students from one year to the next. This means they lost 25 to 30 percent of their students each year, while new students entered from other schools. Most of the students who left transferred to other CPS schools. For example, of the NLCI students in fall 2015 who were no longer at their schools in fall 2016, 48 percent transferred to another neighborhood CPS school, 21 percent transferred to a CPS charter school, 5 percent transferred to a CPS magnet school, 19 percent moved outside of Chicago, and the rest transferred to other districts or private schools.

Some mobility is normal and expected. Nationwide, only about 55 percent of students are enrolled in the same school from kindergarten to third grade.[37] But at the NLCI schools, transfer rates were higher than average. Compared to other CPS schools, they were at about the 25th percentile in terms of within-year or year-to-year stability in student enrollment. In other words, 75 percent of CPS schools had more stable enrollment rates than schools in the NLCI. The more that the student population changes from year-to-year, the more effort that school staff, families, and students need to put into building new relationships.[38]

Table 5. Student Enrollment Was Less Stable in NLCI Schools than the Median CPS School

Stability rates of NLCI schools

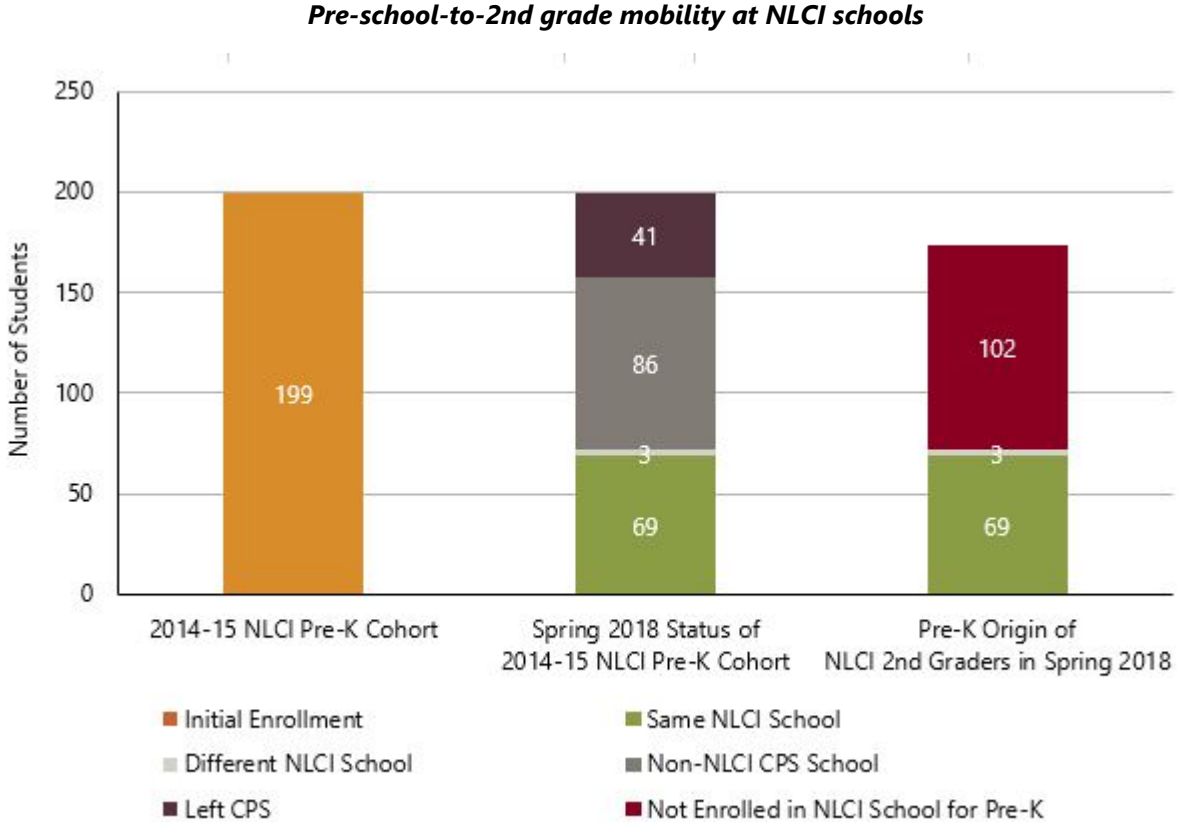
Year	2011	2012	2013	2014	2015	2016
September-May Stability						
Value	89.4%	90.0%	88.1%	85.0%	88.6%	89.3%
Percentile (within CPS)	24	27	24	14	26	29
May-September Stability						
Value	81.9%	80.3%	82.8%	79.5%	86.5%	82.4%
Percentile (within CPS)	27	22	21	11	40	24
September-September Stability						
Value	73.1%	73.6%	74.7%	68.9%	77.0%	74.8%
Percentile (within CPS)	25	26	29	14	34	29

Note: Values for September-May stability and September-September stability are the average across the four NLCI schools, weighted by initial September enrollment. September-September stability is the proportion of students in September that remained enrolled the following September. Values for May-September stability are the average across the four NLCI schools, weighted by May enrollment. May-September stability is the proportion of students in May that remained enrolled in September. Lower percentiles mean lower rates of stability relative to other CPS schools. A percentile of 24 means that approximately 24 percent of CPS schools have lower rates of stability and 76 percent of CPS schools have higher rates of stability.

[37] Burkam, Lee, & Dwyer (2009).
[38] Rumberger (2003).

Low stability rates have implications for the NLCI "vertical integration" cluster strategy to work as intended, with investments in pre-k having continued effects later in the elementary grades. Most students did not stay in the pipeline from lower grades to higher grades. As a result, only about one-third of the 2014–15 NLCI pre-k cohort (the first full-day pre-k cohort that existed at all four NLCI schools) was still enrolled at NLCI schools in second grade in 2017–18. As shown in **Figure 2**, 86 of the 199 NLCI pre-k students in 2014–15 were at other CPS schools by spring 2018, and 41 students had left the district. Among the 174 second-graders at NLCI schools in spring 2018, only 72 students had been at a NLCI school for pre-k, with 69 students at the same school for both pre-k and second grade. This high student mobility limits the positive impact that we may expect to see from the full-day pre-k program carrying over to second grade, the first year that students take the NWEA-MAP assessment in reading and math. If only one-third of the students remained, any benefits from the pre-k supports that persisted through second grade would be reduced by two-thirds when examining second-grade outcomes.

Figure 2. NLCI Schools Experienced High Rates of Mobility between Pre-K and Second Grade



Note: The first two bars are based on all students who enrolled in an NLCI pre-k at age four at the beginning of the 2014–15 school year. The third bar is based on all second-graders enrolled in an NLCI school in the spring of the 2017–18 school year.

Collins Academy High School Student Body

The background characteristics of students at Collins differed from those in the NLCI elementary schools. The student body at Collins was similar to the NLCI elementary schools in terms of racial composition and neighborhood poverty rates. However, a much larger percentage of high school students were identified as diverse learners: 20-30 percent of incoming ninth-graders were diverse learners during the initiative years, compared to 12-13 percent of students in the NLCI elementary schools in the same years. In some years, the incoming ninth-grade classes at Collins also had a larger proportion of male students than female students.

The background characteristics of students at Collins also changed considerably from one ninth-grade class to another during the years of the initiative, and were qualitatively different from those in the years prior to the initiative. As shown in **Table 6**, the number of students in the ninth-grade class varied from 63 students to 134 students during the initiative years, with large changes sometimes occurring from one year to the next.

The percentage of students identified as diverse learners grew over time, from about 15 percent in the year prior to the initiative to 30 percent in the 2017–18 school year **(see Table 6)**. Students entering the ninth grade at Collins during the initiative years had lower incoming math scores than in the pre-initiative years. Prior to the initiative, incoming students' math scores ranged from 0.18 to 0.43 standard deviations below the district average—these values mean the typical student in those years had math scores around the 33rd to 42nd percentile in the district. In the years after the initiative, incoming students' math scores ranged 0.58 to 0.72 standard deviations below the district average, which means the typical student had incoming scores that were at around the 25th percentile in the district. The two constant characteristics of the student body were the racial composition of the school, which was over 95 percent Black in each year, and the degree of poverty in students' neighborhoods. Like the NLCI elementary schools, students came from census block groups where the poverty rate was over one standard deviation above the mean, indicating high levels of poverty.

There were also considerable changes over time in the background characteristics of Collins's graduating classes, both in terms of the number of students and the percent identified as diverse learners (**see Table 7**). The graduating class ranged in size over the initiative years from 68 students in the first year to 45 students in the second year. The percentage of graduates identified as diverse learners was about one-quarter of the graduating class in the first year of the initiative, but only about 9 percent in the 2016–17 year. The graduating cohorts tended to be smaller than the ninth-grade cohorts and were comprised of a larger percentage of young women than young men. This occurred largely because young men were less likely to graduate from high school than young women. It is a pattern not only at Collins, but at most high schools in the district and across the country. While young men comprised about one-half or more of ninth-grade cohorts at Collins, young women made up close to two-thirds of the graduating classes in most years.

Table 6. Collins's First-Time Ninth-Grade Cohorts Varied in Size and Had Higher Percentages of Students Identified as Diverse Learners, Over Time

	School Year	Number of Freshmen	Percent Male	Percent Black	Percent Diverse Learners	Average Neighborhood Poverty Level (Standardized)	Average 8th-Grade Math Score (Standardized)
Pre-NLCI Years	2011-12	93	55.9%	97.8%	17.2%	1.14	-0.43
	2012-13	107	53.3%	98.1%	16.8%	1.10	-0.18
	2013-14	88	52.3%	100.0%	14.8%	1.25	-0.43
NLCI Years	2014-15	134	53.7%	97.0%	21.6%	1.13	-0.72
	2015-16	70	47.1%	100.0%	25.7%	1.16	-0.72
	2016-17	65	56.9%	100.0%	21.5%	1.15	-0.67
	2017-18	63	49.2%	95.2%	30.2%	1.27	-0.58

Note: Neighborhood poverty level was calculated based on Census information about the census block on which each student lived. All neighborhoods across Chicago were standardized, such that zero represents the average neighborhood in Chicago and a change of +/- 1 represents a neighborhood above/below the average by 1 standard deviation. Eighth-grade ISAT/NWEA math scores were standardized within each year such that zero represents the district average.

Table 7. Graduating Classes at Collins Tended to be Much Smaller than the Ninth-Grade Cohorts and had a Larger Percentage of Young Women

	School Year	Number of Graduates	Percent Female	Percent Black	Percent Diverse Learners	Average Neighborhood Poverty Level	Average 8th-Grade Math Score (Standardized)
Pre-NLCI Years	2010-11	84	61.4%	97.6%	8.4%	1.11	-0.12
	2011-12	79	44.3%	98.7%	19.0%	1.06	-0.34
	2012-13	72	51.4%	100.0%	19.4%	1.20	-0.42
NLCI Years	2013-14	68	58.8%	98.5%	23.5%	1.10	-0.54
	2014-15	45	66.7%	95.6%	11.1%	1.17	-0.37
	2015-16	64	60.9%	96.9%	17.2%	1.05	-0.26
	2016-17	46	63.0%	100.0%	8.7%	1.19	-0.12

Note: Neighborhood poverty level was calculated based on Census information about the census block group on which each student lives. All neighborhoods across Chicago were standardized, such that zero represents the average neighborhood in Chicago and a change of +/- 1 represents a neighborhood above/below the average by 1 standard deviation. Eighth-grade ISAT/NWEA math scores were standardized within each year such that zero represents the district average.

Elementary School Outcomes

Initiative support for the four elementary schools came in phases; two of the elementary schools received funding for full-day pre-k classes in the 2013–14 school year, while two others received support beginning in 2014–15. The initiative also provided programs to support students through mentorship by City Year volunteers and social-emotional programs. In addition, teachers received professional development around math and literacy instruction in some of the schools, which was intended to further improve student learning in those areas. These programs were intended to influence a number of student outcomes, including attendance, test scores, high school choice, and school climate.

For each outcome, we show the average for the NLCI schools as a whole, and for the district. These averages are based on the population of students in the NLCI schools and in the district; there is no margin of error. We then show the results of the statistical analyses that compare the outcomes at NLCI schools to the outcomes at matched comparison schools. They provide an estimate of whether outcomes at NLCI schools were higher or lower than outcomes among students at other CPS schools that were similar to the students from NLCI schools, which is a fairer and more meaningful comparison than the comparison to the district average. They include tests of statistical significance, which indicate whether the differences relative to similar students at similar schools are likely to occur by chance. Because of the small number of schools in the initiative, random differences could occur easily, so that there is little statistical power to find differences to be significant. Therefore, we discuss the substantive size of the difference, as well as whether it is statistically significant. (See the Appendix for details on the statistical models.)

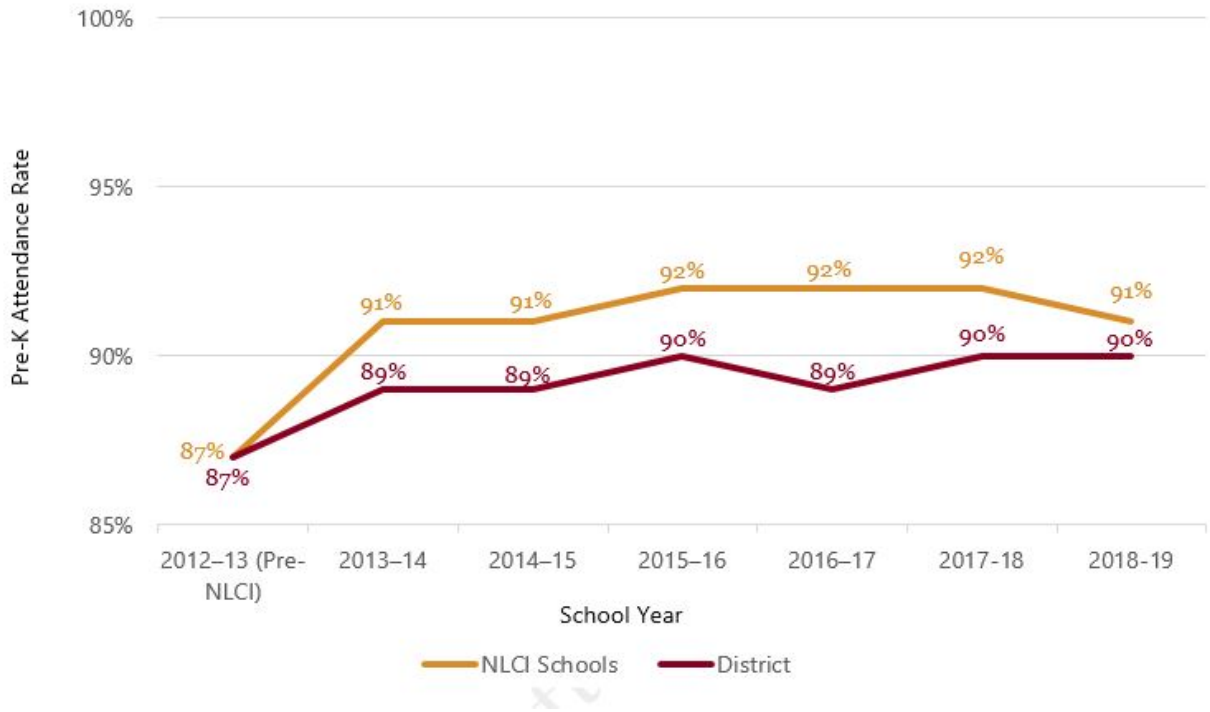
Pre-K Attendance

Pre-k Attendance Improved Over Time in NLCI Schools

In 2012–13, elementary schools that would eventually join the NLCI had average pre-k attendance rates of 87 percent, which was similar to the district average (**see Figure 3**). In the first year of the initiative, when two of the NLCI schools expanded to full-day pre-k, pre-k attendance rates at the NLCI schools increased to 91 percent. Pre-k attendance rates also improved districtwide that year, but not as much as in NLCI schools. Attendance rates at NLCI schools remained at 91 percent in the second year of the initiative, when all four schools received funding for full-day pre-k programs. They improved to 92 percent in the third year of the initiative and remained at 92 percent for two more years. Pre-k attendance rates improved districtwide during this period, but NLCI pre-k attendance remained higher throughout the years of the initiative. However, pre-k attendance at NLCI schools declined to 91 percent in 2018–19, while it did not decline districtwide.

Figure 3. NLCI Pre-K Attendance Increased the First Year of the Initiative and Remained Higher than the District Average

Pre-k attendance rates among four-year-olds at NLCI schools and districtwide



Note: Percentages are based on all students who enrolled in an NLCI pre-k school or CPS pre-k school at age four in the fall of each year.

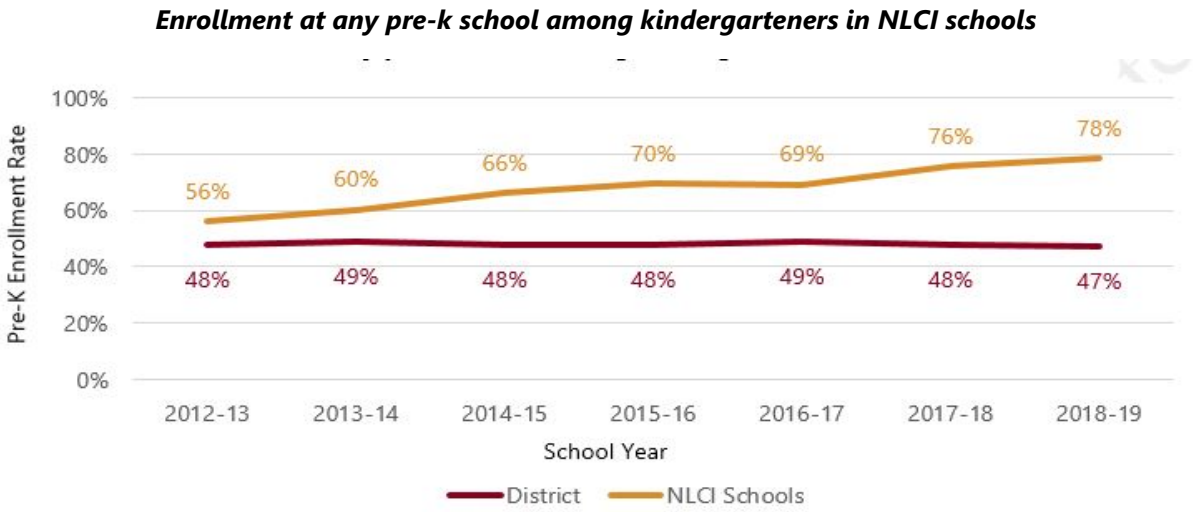
Higher attendance rates in pre-k are associated with better kindergarten readiness, and a higher likelihood of regular attendance when students get to kindergarten and the primary grades.[39] However, not all students who attended kindergarten in NLCI schools attended pre-k in an NLCI school, and some students entering kindergarten did not attend pre-k at all in CPS. Therefore, we also looked to see whether students entering kindergarten in NLCI schools spent more time in pre-k in the prior year after the initiative than before the initiative.

The overall percentage of entering kindergarteners in NLCI schools who had attended any pre-k in CPS increased over time, from 56 percent in 2012–13 to 78 percent in 2018–19 (**see Figure 4**). The amount of pre-k that those students experienced was also greater over time, as there were improvements over time in the pre-k attendance rates of entering classes of kindergarten students at NLCI schools (**see Figure 5**). Kindergarteners entering the NLCI elementary schools in 2012–13 had average attendance rates in pre-k of 85 percent. This rate gradually improved over time, reaching 92 percent in 2018–19. These improvements were larger than those observed in the district as a whole. Thus, students entering

[39] Ehrlich et al. (2014).

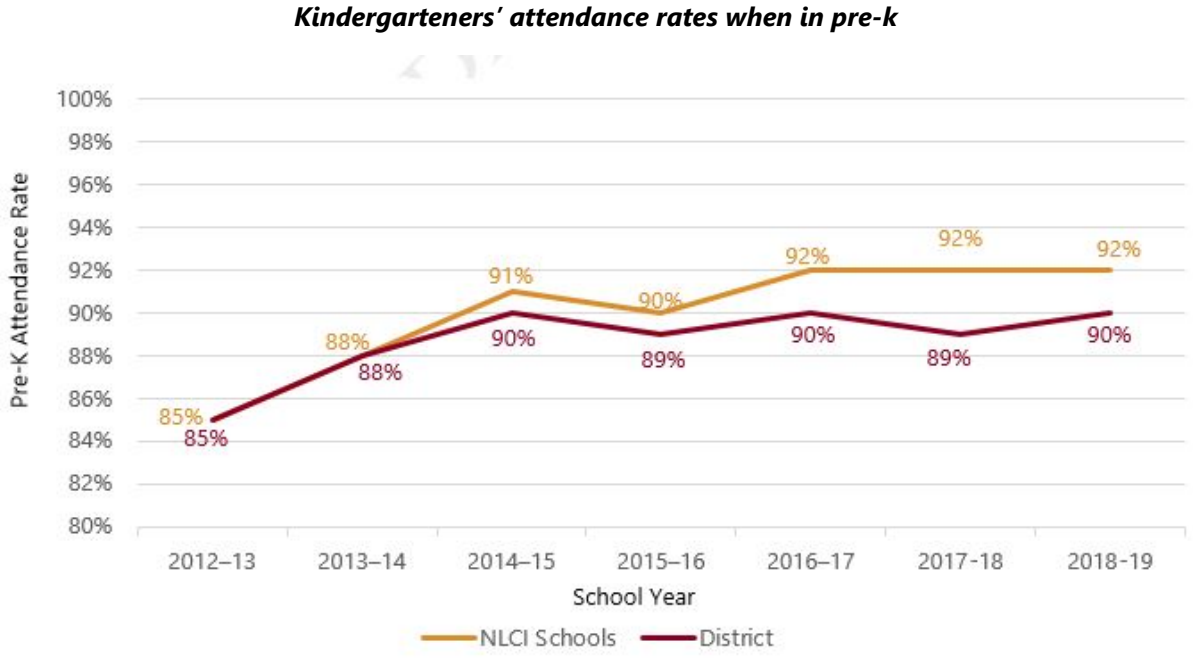
kindergarten at NLCI schools were increasingly likely to have attended CPS pre-k, and to have had higher attendance rates while in pre-k.

Figure 4. An Increasing Proportion of Kindergarteners in NLCI Schools Had Attended a CPS Pre-K



Note: Percentages are based on all students who enrolled in kindergarten in an NLCI or CPS school in the fall of each year.

Figure 5. Kindergarteners' Pre-K Attendance Rates Gradually Improved Over Time



Note: These figures are based on all students who enrolled in kindergarten in an NLCI or other CPS school in the fall of each year who also attended a CPS pre-k school in the prior year.

Pre-k Attendance was Significantly Higher than Comparison Schools

In the year prior to the initiative (2012–13), pre-k attendance rates at NLCI schools were not different from pre-k attendance rates at comparison schools; the coefficient representing the difference was close to zero (-0.9) and not significant (**see Table 8**). In the first year of the initiative, when two of the NLCI schools started offering full-day pre-k, attendance rates were higher in NLCI schools than in comparison schools by 3.8 percentage points, but the difference was not statistically significant. In the second year of the initiative, the pre-k attendance rates of NLCI schools remained about the same as in the prior year (about 91 percent), but pre-k attendance rates in matched comparison schools declined. Thus, the difference in attendance rates in that year relative to matched comparison schools was larger (5.5 percentage points) and statistically significant. Pre-k attendance rates in NLCI schools improved the following year and were about 4 percentage points higher than at comparison schools through the 2017–18 school year, a difference that was statistically significant despite the small number of schools in the initiative.[40]

The combination of more students enrolling in pre-k in NLCI schools, and higher attendance rates among students enrolled in pre-k, meant that students entered kindergarten having spent more time in pre-k in later years, relative to earlier years. From 2014–15 forward, NLCI kindergarteners began school with significantly higher pre-k attendance than their comparison group peers in each subsequent year. If we only compare students who attended pre-k, we see that NLCI kindergarteners had higher attendance rates in pre-k than kindergarteners at comparison schools who had attended pre-k, by 3.7-5.2 percentage points (**see Table 8**).The last two columns in **Table 8** compare overall time in a CPS pre-k among students entering kindergarten, where students who did not attend a CPS pre-k have a value of zero. Including students who did not enroll at all in a CPS preschool, the differences in the average percent of time in a CPS pre-k school among kindergarteners was considerably higher in the initiative years, by as much as 24 percentage points in the 2017–18 school year. Because students could have attended pre-k outside of CPS, this is likely an overestimate of the total effect on any pre-k attendance. The true effect is in-between the middle and last columns, but both show a large and significant effect of being at an NLCI school.

[40] These were the conclusions of models run with data that did not include the 2018–19 school year. Adding data from the most recent school year resulted in changes in the coefficients and significance levels in past years due to changes in the relationships of the covariates with the outcome over time, as described in the Appendix. As it would not be appropriate to evaluate schools in earlier years based on the relationships observed among covariates in later years, we do not include 2018–19 data in the models summarized here, but the coefficients are available in the Appendix. The estimates of pre-k attendance rates among kindergarten cohorts remain statistically significant even with the addition of 2018–19 data.

Table 8. Pre-K Attendance Rates Were Significantly Higher than Comparison Schools

Coefficients from propensity-weight models with demographic controls and year fixed effects

	Pre-K Attendance at Age 4		Pre-K Attendance at Age 4 among Kindergarten Cohorts		Pre-K Attendance at Age 4 among Kindergarten Cohorts (No Pre-K = 0% Attendance)	
School Year	**NLCI Average**	**NLCI vs. Comparison Difference (in percentile points)**	**NLCI Average**	**NLCI vs. Comparison Difference (in percentile points)**	**NLCI Average**	**NLCI vs. Comparison Difference (in percentile points)**
2012–13	86.9%	-0.9	85.3%	3.7	47.9%	15.3*
2013–14	91.1%	3.8	87.6%	3.4	52.7%	13.0
2014–15	90.5%	5.5*	91.3%	5.2**	60.4%	18.4**
2015–16	91.8%	4.3*	90.1%	3.7*	62.7%	20.2**
2016–17	92.0%	4.5*	92.1%	4.5***	63.7%	18.0**
2017–18	92.0%	4.3*	92.3%	4.4**	69.7%	23.7***

Note: Asterisks indicate the estimate of the difference relative to comparison schools is statistically different from zero (*<0.05; **<0.01; ***<0.001). Coefficients come from hierarchical linear models with students nested within schools, controlling for year fixed effects, whether the school was managed by AUSL, and student background (i.e., gender, race, ethnicity, neighborhood poverty, disability status), with propensity weights applied based on school characteristics in the 2011–12 school year.

Attendance in Grades K-8

Attendance Rates in Grades K-8 Caught Up to District Averages, and Surpassed Them in Some Grades

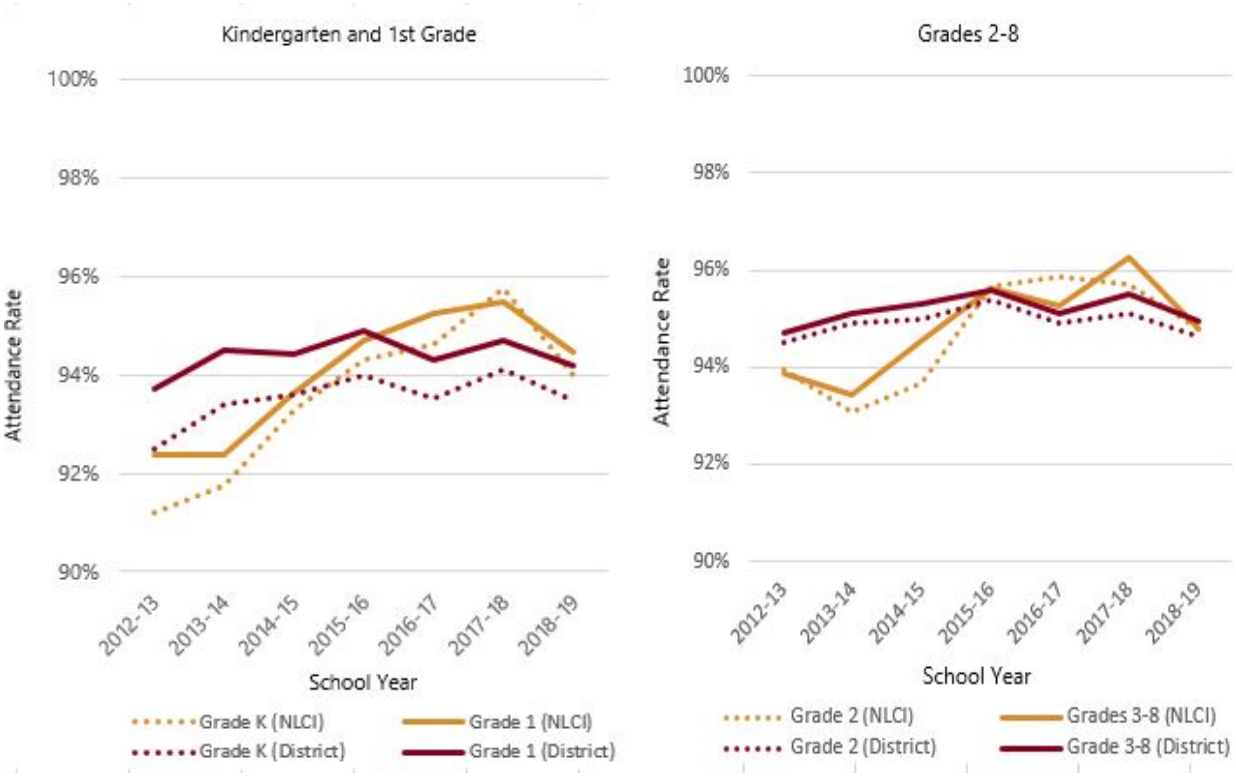
From 2012–13 through 2014–15, attendance rates in grades K-8 were lower in NLCI schools than the district averages (**see Figure 6**). Attendance rates in the NLCI schools improved in all grade levels beginning in the second year of the initiative (2014–15) and continued to improve or hold steady through the 2017–18 school year. Attendance also improved districtwide, but the improvements were larger at NLCI schools than in the district as a whole. As a result, while NLCI schools started out with lower attendance than the district average, their attendance rates were similar to the district average, or slightly higher than the district average, from the 2015–16 school year forward. Overall, the increases in attendance rates at NLCI schools and comparison schools during this time period ranged from 3-5 percentage points. This may sound small, but attendance is a metric where 90 percent is chronically

absent and 100 percent is perfect. A 3-percentage-point gain is an increase of more than a standard deviation.[41]

Increases in attendance in the elementary grades were largest in kindergarten and first grade. At the beginning of the period, attendance rates were much lower in kindergarten and first grade than the other grade levels, as well as in comparison to the district averages. Over time those differences narrowed so attendance at the NLCI schools was not strongly defined by students' grade level, as it had been in prior years.

Figure 6. Attendance Improved Over Time at NLCI Schools

Average attendance rates at NLCI and district schools in grades K-8



Note: Percentages are based on all students enrolled in an NLCI or CPS school in grades K-8 in the fall of each year. The NLCI averages are weighted by school size.

[41] In the 2012–13 school year, the standard deviation of elementary school attendance rates was 2.56 percent.

Attendance Rates in Grades K-8 Were Not Significantly Different than Matched Comparison Schools

While attendance improved in NLCI schools, attendance rates in the elementary schools were not significantly higher than in the comparison schools either before or after the initiative (**see Table 9**). There were improvements in attendance at schools similar to NLCI schools during the same time period. Therefore, it is difficult to say whether the improvements occurred as a result of the initiative, or other changes occurring in the district.

Table 9. Attendance Rates in Grades K-8 Were Not Significantly Higher at NLCI than Comparison Schools

Coefficients from propensity-weight models with demographic controls and year fixed effects

	Kindergarten		1st Grade	
School Year	**NLCI Average**	**NLCI vs. Comparison Difference**	**NLCI Average**	**NLCI vs. Comparison Difference**
2012–13	0.912	0.012	0.924	-0.007
2013–14	0.917	-0.014	0.924	-0.020
2014–15	0.933	-0.001	0.937	-0.002
2015–16	0.943	-0.005	0.947	-0.004
2016–17	0.946	0.005	0.952	0.008
2017–18	0.958	0.003	0.955	0.006
2018–19	0.940	-.001	0.944	-0.001
	2nd Grade		**Grade 3-8**	
2012–13	0.939	0.002	0.939	-0.014
2013–14	0.931	-0.015	0.934	-0.021*
2014–15	0.937	-0.009	0.945	-0.005
2015–16	0.956	0.002	0.956	-0.003
2016–17	0.959	0.009	0.953	-0.002
2017–18	0.957	0.004	0.963	0.004
2018–19	0.948	0.001	0.948	-0.004

Note: Asterisks indicate the estimate of the difference relative to comparison schools is statistically different from zero, p*<0.05. Coefficients come from hierarchical linear models with students nested within schools, controlling for year fixed effects, whether the school was managed by AUSL, and student background (i.e., gender, race, ethnicity, neighborhood poverty, disability status), with propensity weights applied based on school characteristics in the 2011–12 school year.

Test Scores in Grades 2-8

Elementary Students' Test Scores Improved Over Time

Designers of the initiative hoped that improvements in pre-k attendance would eventually lead to improvements in achievement test scores in the elementary grades, since students would begin kindergarten better prepared for school. Full-day pre-k was available at all four NLCI schools in 2014–15, so those students would be in second grade in 2017–18 (if they were not held back), which is the first grade at which CPS students take the NWEA-MAP assessment in reading and math. Thus, the only improvement we might expect to see in NWEA scores as a result of the full-day pre-k funding would be in second-grade scores in 2017–18 and 2018–19. Therefore, we separate out second-grade test scores to examine change over time at NLCI schools when examining achievement. We might also expect to see improvements in math and reading scores in earlier years at other grades from the investments in teacher professional development.

As shown in **Figure 7** and **Table 10**, NWEA scores in reading and math gradually improved in NLCI schools over the years of the initiative. In the second grade, slight improvements began in the 2013–14 school year, and scores either improved or remained steady for each of the following years through the 2017–18 school year. The size of the improvements was not greater in the last two years than in prior years, and second-grade scores even declined slightly in the 2018–19 school year. Thus, there is little indication that improvements in pre-k attendance subsequently benefitted second-grade test scores three years later.

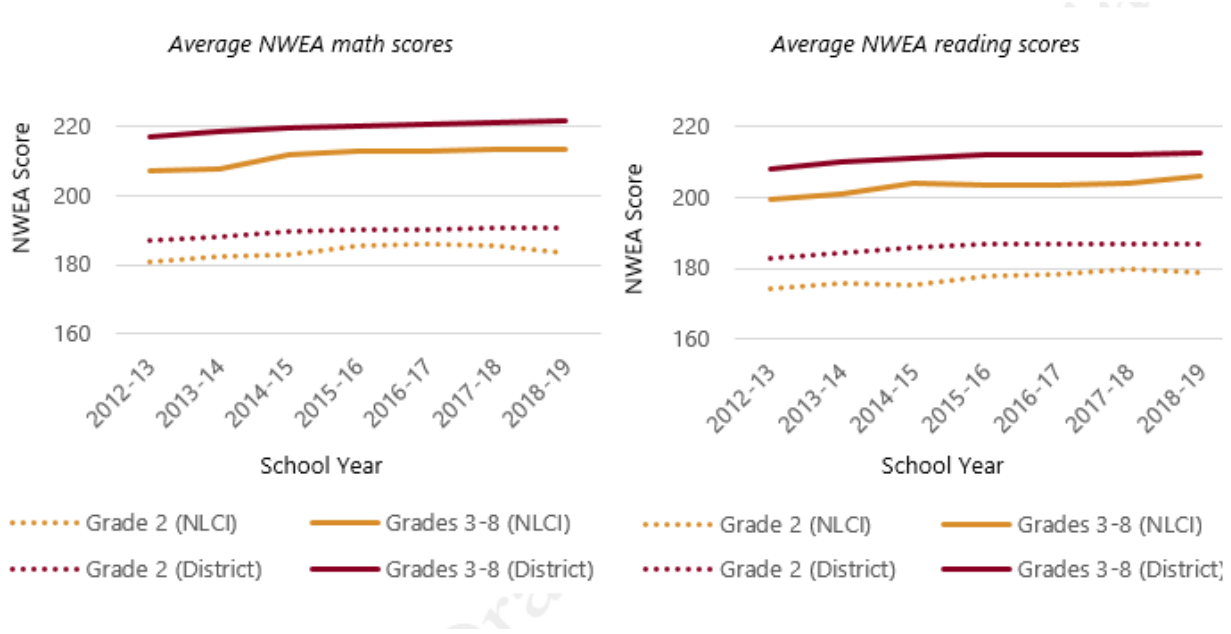
NWEA reading and math scores in grades 3-8 also improved over time in the NLCI schools. Math scores in grades 3-8 improved in the 2014–15 school year, and then remained fairly steady, while reading scores improved gradually over time. The improvements were fairly sizable: in grades 3-8, math scores were about 0.4 standard deviations higher in 2018–19 than in 2012–13, and in reading, scores were 0.32 standard deviations higher. In general, across the country, student achievement improves by less than 0.40 standard deviations over the course of an academic year.[42] Thus, these gains suggest that students at NLCI schools were achieving an extra year's worth of learning by the end of the period, relative to their achievement in earlier years.

[42] Bloom, Hill, Black, & Lipsey (2008).

Elementary Students' Test Scores Were Not Significantly Different than Comparison Schools in Any Year

Table 10 also shows the degree to which average test scores in NLCI schools were different from those of comparison schools. The differences are generally small, and none are statistically significant. In addition to comparing average scores, we also examined the yearly gains students made on NWEA scores, testing whether the size of the gains was larger at the NLCI schools than at comparison schools (**see Table 11**). These were also similar between NLCI schools and the comparison group. In almost all years after the initiative started (2013–14), there were no significant differences in test score gains between NLCI schools and the comparison group. For this analysis, we examined each grade level separately, resulting in many different grade-by-year combinations. NLCI schools and the comparison group differed in their gains only in about 6 percent of instances; these were rare and seemed to be random.

Figure 7. NWEA Math and Reading Scores Increased Districtwide and in NLCI Schools



Note: Test score averages are based on all students enrolled in an NLCI or CPS school in grades 2-8 in the spring of each year.

Table 10. NWEA-MAP Math and Reading Scores Were Not Significantly Different in NLCI and Comparison Schools

NWEA scores, second to eighth grade

Math				
	2nd-Grade		Grades 3-8	
School Year	**NLCI Average NWEA score**	**NLCI vs. Comparison Difference Estimate**	**NLCI Average NWEA Score**	**NLCI vs. Comparison Difference Estimate**
2012–13	180.7	-0.6	207.1	-2.2
2013–14	182.4	1.1	207.7	-3.4
2014–15	183.0	-1.0	212.0	-1.9
2015–16	185.6	-0.1	212.7	-2.3
2016–17	185.8	0.1	212.9	-2.0
2017–18	185.7	0.4	213.2	-2.1
2018–19	183.4	-1.9	213.6	-2.1
Reading				
2012–13	174.6	-0.8	199.7	-0.8
2013–14	175.9	-0.2	201.0	-1.6
2014–15	175.4	-3.2	204.2	-0.4
2015–16	178.0	-2.9	203.7	-2.1
2016–17	178.4	-2.4	203.8	-2.5
2017–18	180.0	0.7	204.2	-1.6
2018–19	178.8	-1.1	205.9	-0.6

Note: None of the differences with comparison schools were significantly different from zero. NLCI comparison coefficients come from hierarchical linear models with students nested within schools, controlling for year fixed effects, grade level, whether the school was managed by AUSL, and student background (i.e., gender, race, ethnicity, neighborhood poverty, disability status), with propensity weights applied based on school characteristics in the 2011–12 school year.

Table 11. NWEA-MAP Test Score Gains Were Not Significantly Different between NLCI and Comparison Schools in Most Grades and Years

Differences in NWEA gains at NLCI schools relative to district average gains for similar students at similar schools by grade and school year

Math						
Difference in NWEA Gains Relative to District Average						
School Year	**3rd-Grade**	**4th-Grade**	**5th-Grade**	**6th-Grade**	**7th-Grade**	**8th-Grade**
2013-14	-2.435	0.0786	1.746	0.64	-1.821	-4.441
2014-15	2.009	1.901	1.603	1.851	0.151	0.478
2015-16	-0.924	-0.0226	0.827	1.925	-0.594	1.672
2016-17	-1.748	1.824	0.774	-3.438	-0.599	1.864
2017-18	-2.536	1.742	1.609	-1.329	-0.131	-4.527**
2018-19	-0.798	-0.127	-3.044	-0.379	-1.769	-0.435
Reading						
Difference in NWEA Gains Relative to District Average						
School Year	**3rd-Grade**	**4th-Grade**	**5th-Grade**	**6th-Grade**	**7th-Grade**	**8th-Grade**
2013-14	-3.094	0.901	1.012	-1.143	-0.735	-2.52
2014-15	2.928	4.648**	0.466	-1.565	0.006	1.299
2015-16	-0.686	1.386	-1.136	-0.836	-0.403	-2.304
2016-17	-1.831	2.957	-1.234	-2.594	-1.98	-0.951
2017-18	-1.671	-0.003	1.732	2.537	0.734	-0.923
2018-19	0.451	1.285	0.506	0.949	-1.371	-0.855

Note: The differences are on the original NWEA score point scale. Positive differences indicate higher gains for NLCI schools; negative difference indicate lower gains for NLCI schools. Asterisk(s) indicate the estimate is statistically different from zero (*<0.05; **<0.01; ***<0.001). Coefficients come from hierarchical linear models with students nested within schools, controlling for year fixed effects, whether the school was managed by AUSL, and student background (i.e., gender, race, ethnicity, neighborhood poverty, disability status), with propensity weights applied based on school characteristics in the 2011–12 school year.

Eighth-Grade Graduates' High School Performance

The initiative included supports to facilitate students' transition from eighth to ninth grade, including guidance on how to select and enroll in a high school within Chicago's system of school choice. Thus, to evaluate the NLCI, we wanted to use some indication of the quality of the transition from eighth to ninth grade for students who graduated from NLCI elementary schools. The "vertical" design of the initiative initially assumed students would graduate from the elementary schools and then enroll in the NLCI high school. However, it became clear after talking with adults and students in the NLCI schools, that many didnot consider the NLCI high school (Collins) to be the best option for all students. Students, families, and adults in the elementary schools who were advising students considered many different factors when choosing a high school, including but not limited to the performance ratings of the school. For some students, the neighborhood proximity of the NLCI high school made it a strong consideration, while others looked elsewhere. For many students, different academic and extracurricular programs made other schools more attractive alternatives.

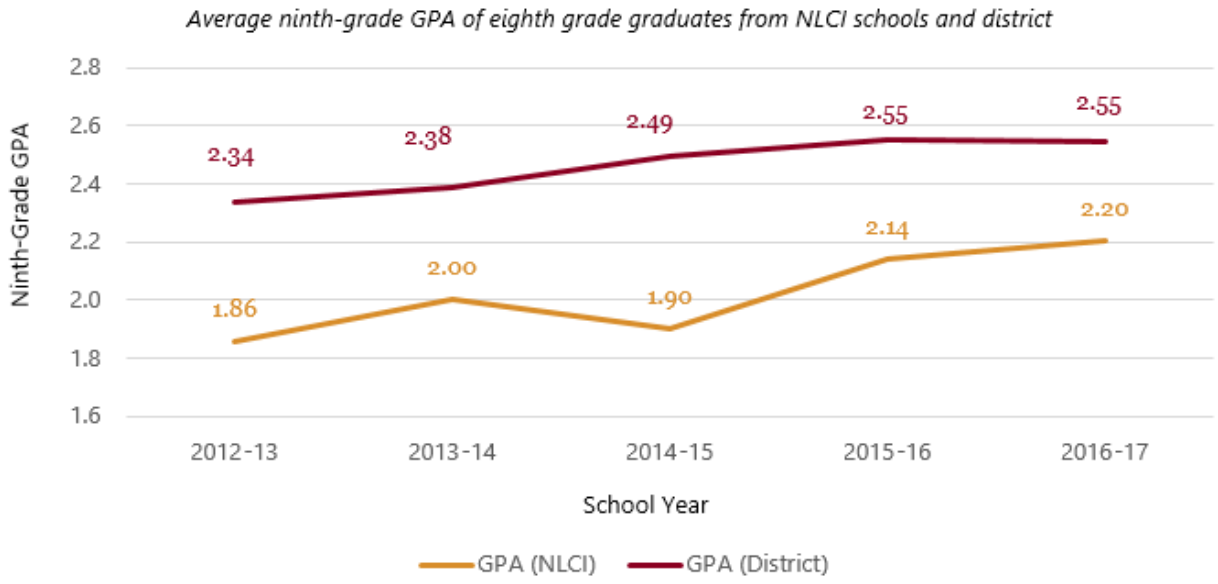
Because the characteristics that determine the best "fit" of a high school differs by students, we decided to examine how students performed in their first year of high school to evaluate the high school transition supports that were part of the initiative. To do this, we used students' ninth-grade GPAs the year after they completed eighth grade in an NLCI school, as a measure of the success of the transition supports. The reasoning was that if eighth-grade graduates were making better choices for themselves, we should see that they had stronger course performance in their first year of high school than previous cohorts of eighth-grade graduates at NLCI elementary schools, or similar students at matched comparison schools.

NLCI Eighth-Grade Graduates Showed Improved High School GPAs over Time

NLCI graduates' ninth-grade GPAs improved over time, from 1.86 for the 2012–13 graduating cohort to 2.20 for the 2016–17 graduating cohort (**see Figure 8 and Table 12**). The increase in average GPA of 0.34 GPA points means that in later NLCI cohorts, the average student started out high school with a solid C average, rather than a C-/D+ average. While this may sound like a small difference, prior research has shown that students with a D+ ninth-grade GPA are 20 percentage points less likely to graduate high school than students with a solid C GPA.[43] Ninth-grade GPAs also improved across the district during this period, by 0.21 GPA points. While ninth-grade GPAs improved more among NLCI school eighth-grade graduates, they remained considerably below the district average in all years.

[43] Allensworth & Easton (2007).

Figure 8. Ninth-Grade GPAs Gradually Increased for NLCI Eighth-Grade Graduating Cohorts



Note: Years represent the eighth-grade year at NLCI elementary schools. Ninth-grade GPAs are calculated from the following year. The numbers are based on all eighth-grade graduates from NLCI or CPS schools who enrolled in ninth grade in the district the following year.

Ninth-Grade GPAs among NLCI Eighth-Grade Graduates Were Not Significantly Different than the Comparison Group in Any Year

Average ninth-grade GPAs among graduates of NLCI schools were similar to those at comparison schools in every year (see Table 12). There were some years in which ninth-grade GPAs at Collins differed by as much as 0.22 GPA points from those of similar students at other high schools, but the pattern was not consistent; they were higher than in some years and lower in others. Thus, while there were improvements over time in eighth-grade graduates' performance in high school, we do not have evidence that this was due to the supports from the initiative vs. other changes occurring in the district over time.

Table 12. NLCI Eighth-Grade Graduates' Ninth-Grade GPAs Were Not Significantly Different from Comparison Schools

8th-Grade School Year	9th-Grade School Year	Average 9th-grade GPA for NLCI 8th-grade graduates	NLCI vs. Comparison Difference Estimate
2012–13	2013-14	1.86	-0.22
2013–14	2014-15	2.00	0.15
2014–15	2015-16	1.90	-0.07
2015–16	2016-17	2.14	0.00
2016–17	2017-18	2.20	0.11

Note: Coefficients come from hierarchical linear models with students nested within schools, controlling for year fixed effects, whether the school was managed by AUSL, and student background (i.e., gender, race, ethnicity, neighborhood poverty, disability status), with propensity weights applied based on school characteristics in the 2011–12 school year. NLCI school averages were not significantly different than comparison schools in any year.

Perceptions of School Climate in Grades 6-8

The initiative included programs to support students' social-emotional development, including specific supports for students in foster care and students whose parents were incarcerated. The continuation of City Year mentors also provided classroom-based support to help students succeed in school. These supports could have helped students to feel more supported, engaged and connected in school and with school peers. To discern whether these NLCI supports led to changes in school climate, we examined students' responses on the annual 5Essentials Surveys taken by students in the middle and high school grades across the district. About 80 percent of students take the surveys in each year.[44] For information about the questions that are used to measure different aspects of school climate, see the Appendix.

Students' Perceptions of the Environment at NLCI Elementary Schools Improved in Some Years

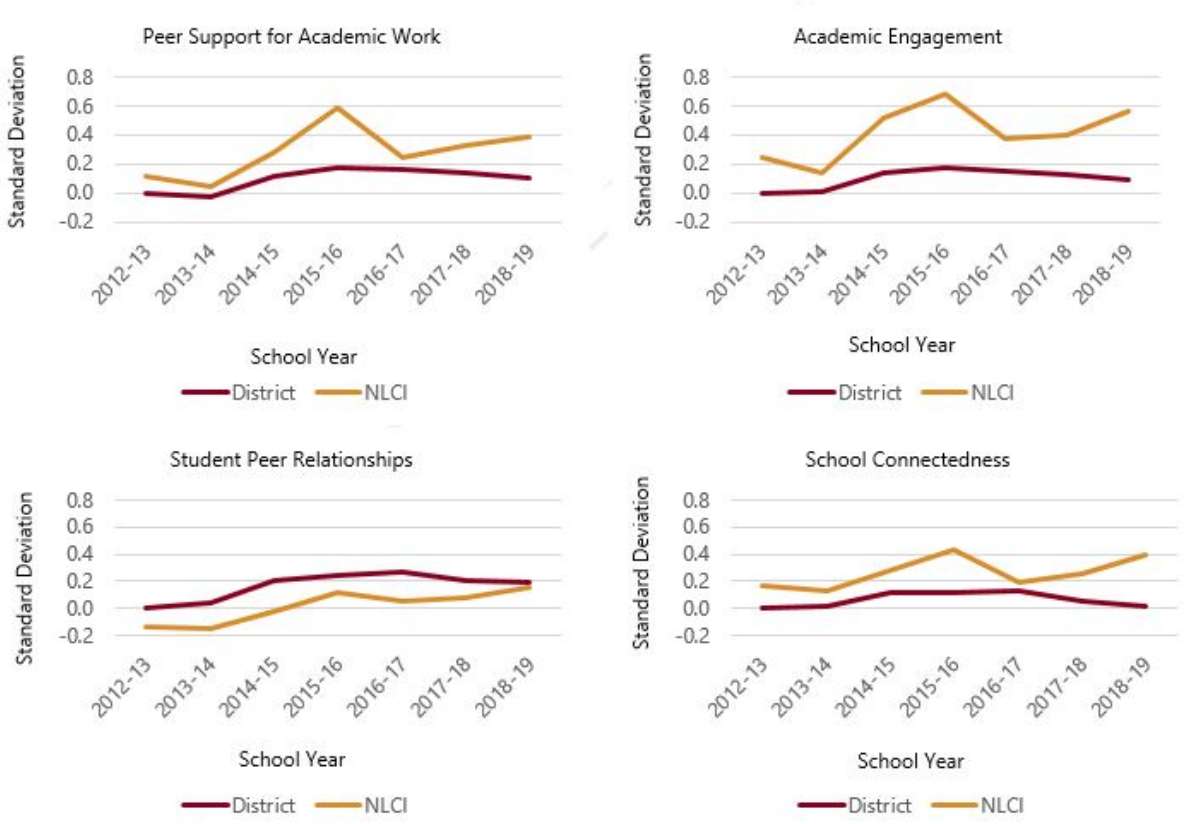
Students at NLCI schools reported feeling more engaged in their classes in later years than at the beginning of the study period (**see Figure 9 and Table 13**). They also reported having more positive relationships with peers and peer support for academic work in their schools. There were particularly large improvements in students' reports about school climate in the 2015–16 year, although it was not sustained, and then again in the 2018–19 school year. In some years of the initiative, students' perception

[44] Most students take the surveys during a set time while they are at school. There is considerable evidence that student surveys provide valid assessments of students' perceptions of school climate. For example, Chicago students' reports of climate in their school explain differences in student outcomes among schools serving students with similar backgrounds (e.g., Allensworth & Easton, 2007), are correlated with teacher reports on similar constructs (Steinberg, Allensworth, & Johnson, 2011), and are predictive of students' grades and test gains (Allensworth et al. 2014b).

of the environment declined relative to the year before, or remained the same. The most consistent improvements were in student-peer relationships and in academic engagement, which were 0.4 standard deviations higher in 2018–19 than in 2012–13. In both of these areas, NLCI elementary schools showed consistently higher reports from 2015–16 forward, relative to student reports in 2012–13 and 2013–14. Overall, students at NLCI schools reported considerably better perceptions of their school environment by the end of the study period, relative to the beginning. There were also districtwide improvements in students' perceptions of school climate in some of these years, but the improvements were larger in the NLCI schools.

Figure 9. Student Perceptions of School Climate at NLCI Elementary Schools Improved

School climate measures, in standard deviation units



Note: Data come from the annual 5Essentials surveys. Measures are standardized based on all survey takers in CPS in the 2012–13 school year. Averages are based on students enrolled in an NLCI or CPS schools in grades 6-8 in the spring of each year who participated in the surveys. District response rates ranged from 79 percent to 85 percent.

School Climate Measures Were Higher than in Comparison NLCI schools in Particular Years, but Not Significantly Higher

There were not statistically significant differences in school climate in NLCI schools than in matched comparison schools in any year (**see Table 13**), although in 2015–16 the differences with the comparison group approached statistical significance ($p<0.10$). At the same time, the differences in NLCI schools relative to the comparison group in 2015–16 and in 2018–19 were sizable, with a difference of 0.378 standard deviations in students' reports of academic engagement, and a difference of 0.476 standard deviations in school connectedness in 2018–19. In this case, we are concerned that there was not enough statistical power, and the small number of cases prevented these fairly sizable differences from reaching a level of statistical significance.

Table 2. Student Perceptions of School Climate at NLCI Elementary Schools Were Better Than at Comparison Schools, but Did Not Reach Statistical Significance

	Peer Support for Academic Work		**Academic Engagement**		**Student Peer Relationships**		**School Connectedness**	
School Year	**NLCI Average**	**NLCI vs. Comparison Difference Estimate**	**NLCI Average**	**NLCI vs. Comparison Difference Estimate**	**NLCI Average**	**NLCI vs. Comparison Difference Estimate**	**NLCI Average**	**NLCI vs. Comparison Difference Estimate**
2012–13	1.808	**-0.011**	1.943	**-0.025**	0.216	**-0.070**	1.557	**-0.053**
2013–14	1.682	**-0.081**	1.788	**-0.043**	0.205	**0.011**	1.476	**-0.077**
2014–15	2.099	**-0.016**	2.362	**0.317**	0.340	**-0.088**	1.831	**0.153**
2015–16	2.638	**0.418**	2.611	**0.454**	0.497	**0.059**	2.155	**0.401**
2016–17	2.035	**-0.238**	2.152	**-0.056**	0.429	**-0.151**	1.611	**-0.391**
2017–18	2.186	**-0.089**	2.179	**0.066**	0.460	**-0.067**	1.754	**0.018**
2018–19	2.297	**0.173**	2.433	**0.378**	0.533	**0.081**	2.081	**0.476**
Standardized Scores								
2012–13	0.114		0.242		-0.140		0.162	
2013–14	0.043		0.141		-0.150		0.126	
2014–15	0.280		0.516		-0.025		0.288	
2015–16	0.587		0.680		0.120		0.436	
2016–17	0.244		0.379		0.057		0.187	
2017–18	0.330		0.396		0.085		0.253	
2018–19	0.393		0.563		0.152		0.402	

Note: Data come from the annual 5Essentials Surveys. Measure scores in the top half of the table are reported in a logit scale, so scores from different measures cannot be directly compared. For the bottom half of the table, measure scores have been standardized using the mean and standard deviation from 2012–13. This allows comparison across measures and years. Coefficients come from hierarchical linear models with students nested within schools, controlling for year fixed effects, whether the school was managed by AUSL, and student background (i.e., gender, race, ethnicity,neighborhood poverty, disability status), with propensity weights applied based on school characteristics in the 2011–12 school year.

High School Outcomes

The NLCI provided social-emotional supports and college advising supports for ninth-graders' transition to Collins Academy High School. The supports were intended to improve students' academic performance in ninth grade, as well as in the post-secondary outcomes of graduates from Collins. We begin by examining outcomes among cohorts of first-time ninth-graders, and then show outcomes for cohorts of graduating seniors.

For each outcome, we show the performance of students at Collins relative to students across the district. These averages are based on the population of students in the school and the district; there is no margin of error. Because the background characteristics of students at Collins changed considerably from year to year (see Chapter 2 for details), the overall trends in outcomes tell us how students at Collins performed over time, but they do not provide much information on whether Collins produced stronger outcomes. We would expect changes in average performance to occur simply due to the changes in the backgrounds of students in the ninth grade and graduating cohorts. Therefore, comparisons to students with similar backgrounds at other CPS schools is particularly important for judging the performance of Collins over time. For each outcome, we conducted statistical analyses of whether outcomes were significantly different for students at Collins than for students at other schools in CPS who had similar characteristics to students at Collins. Because there were few students in many of the ninth-grade and graduating cohorts at Collins, the tests of statistical significance should be interpreted with caution; the statistical power was too low to be able to find many differences to be significant. Therefore, we focus on the substantive size of the differences more than the significance levels.

Outcomes among First-Time Ninth-Graders

The ninth-grade year is a critical time for establishing students' success in high school. Students' ninth-grade attendance, Freshman OnTrack status, and ninth-grade GPA are highly predictive of their final high school GPA, and their likelihood of graduating high school and enrolling in college.[45] The City Year volunteers that supported students' academic performance in their classes, as well as programs that supported specific students' social-emotional development, were NLCI-provided resources that could have helped students perform better in their classes in their first year of high school.

[45] Easton et al. (2017); Allensworth & Easton (2007).

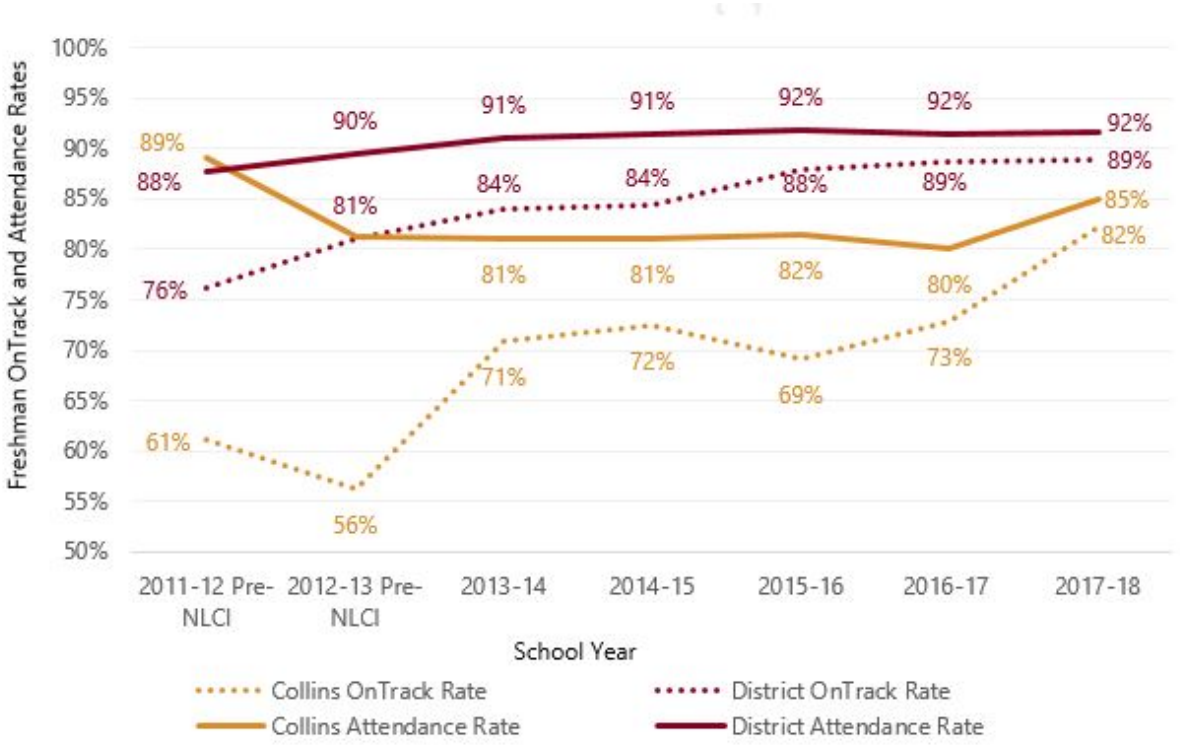
Freshman OnTrack Rates Improved over Time; Other Ninth-Grade Outcomes Showed Little Change

First-time ninth-grade cohorts at Collins showed improving Freshman OnTrack rates over the years of the initiative (**see Figure 10 and Table 14**). There was a considerable increase in Freshman OnTrack rates in the 2013–14 school year that was sustained. In the two years prior to the initiative, Freshman OnTrack rates were around 60 percent, and for the first several years of the initiative they were around 70 percent. There was another large increase in 2017–18, when the Freshman OnTrack rate increased to 82 percent. District Freshman OnTrack rates improved at the same time, but the difference between Collins and the district average narrowed from 15 percentage points to 7 percentage points.

The attendance and GPAs of ninth-grade cohorts were not better in post-initiative years than in pre-initiative years. In the 2017–18 school year, all ninth-grade outcomes were higher than in the previous years of the initiative (**see Table 14**).

Figure 10. Collins's Freshman OnTrack Rates Improved Considerably over Time

Freshman OnTrack and attendance rates



Note: Percentages are based on all first-time ninth-grade students at Collins or other district high schools in the fall of each year.

Freshman Outcomes at Collins Were Lower Than Similar Students at Other Schools

In almost all years, both before and after the initiative, Collins students had lower ninth-grade outcomes than similar students at other CPS schools (**see Table 14**). Collins had lower Freshman OnTrack and attendance rates than at other schools serving similar students, and students' ninth-grade GPAs were also lower by as much as 0.3 GPA points. In many of these years, the differences were substantively large, but they were not statistically significant given the small number of students enrolled in Collins. In 2017–18, outcomes improved in Collins, and Freshman OnTrack rates and GPAs were similar to students with similar backgrounds at other CPS schools.

Table 14. Ninth-Grade Outcomes of First-Time Ninth-Grade Cohorts at Collins

		Percent of 9th-Graders On-Track		Average 9th-Grade Attendance		Average 9th-Grade GPA	
	School Year	Actual	Difference from Expected	Actual	Difference from Expected	Actual	Difference from Expected
Pre-NLCI	**2011–12**	61.1%	-7.2%	89.1%	5.1%***	2.03	0.08
	2012–13	56.2%	-17.9%	81.2%	-4.7%	1.78	-0.28
Post-NLCI	**2013–14**	**70.9%**	**-6.7%**	**81.1%**	**-6.3%**	**1.99**	**-0.07**
	2014–15	**72.4%**	-4.7%	**81.0%**	**-6.7%**	**1.79**	**-0.19**
	2015–16	**69.1%**	**-7.4%**	**81.5%**	**-6.3%**	**1.79**	**-0.21**
	2016–17	**72.9%**	**-5.7%**	**80.1%**	**-7.4%**	**1.84**	**-0.30**
	2017–18	**82.3%**	**+1.3%**	**84.9%**	**-2.6%**	**2.14**	**-0.03**

Note: "Difference from Expected" represents Collins's school-level random effect from the hierarchical model that adjusts for student demographics and baseline achievement level—this provides a comparison to students with similar backgrounds at other CPS schools (see the Appendix for more detail). Asterisk(s) indicate the estimate is statistically different from zero (*<0.05; **<0.01; ***<0.001). Because of the small number of students in the sample, there is little statistical power for finding a significant difference.

College Outcomes

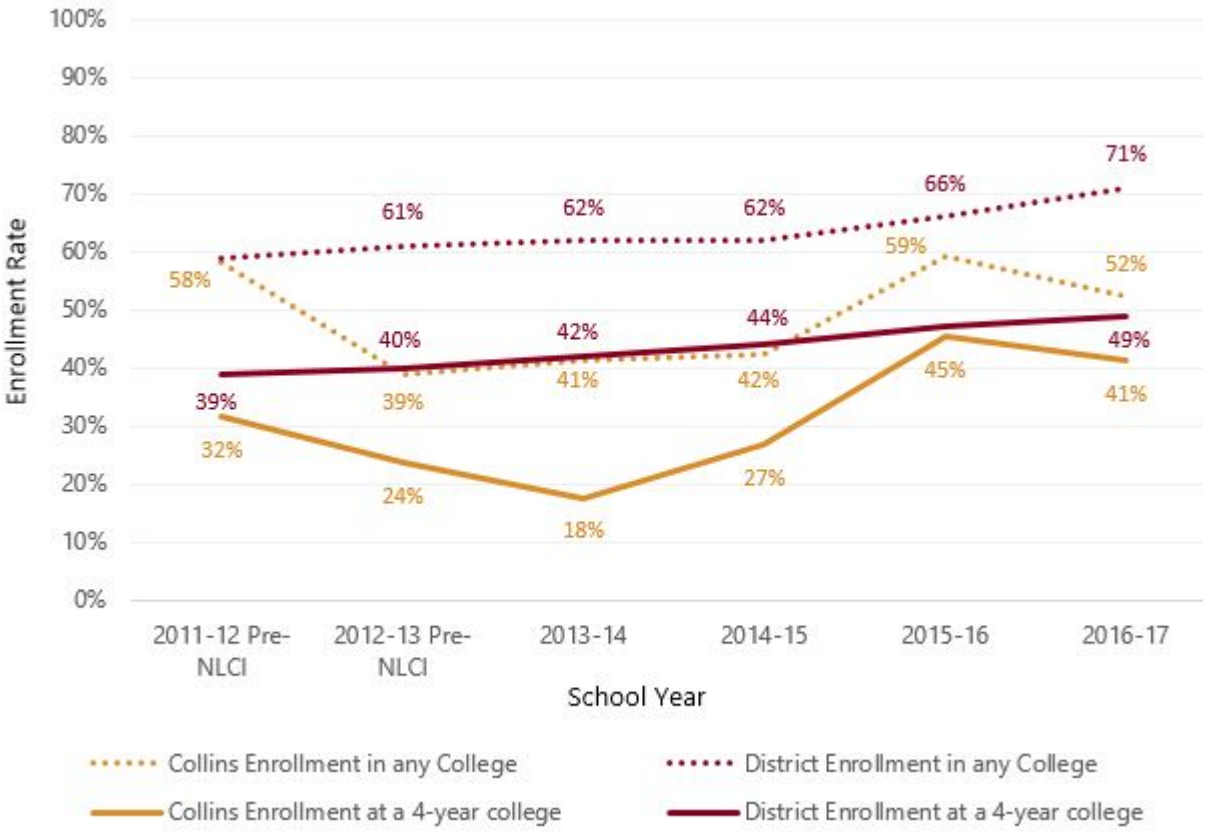
The initiative included supports for Collins students as they navigated the college search and application process, so that they would be more likely to enroll in college, and persist in the college in which they enrolled. As with analyses of ninth-grade cohorts, the background characteristics of graduating seniors at Collins varied considerably from year-to-year, making it important to compare outcomes to similar students at other schools. The school averages presented here represent the population of high school graduates in Collins in each year, so there is no sampling error. Comparisons to similar students include tests of statistical significance, but as noted in Chapter 2, in some years the number of student data on which the college outcomes averages are based were small, so there is little statistical power to find differences to be statistically significant. Therefore, we highlight the substantive size of the differences, as well as whether they were statistically significant.

College Enrollment Rates Recovered from Declines that Occurred Immediately Prior to the Initiative; College Persistence Rates Remained Low

In the years immediately prior to the NLCI initiative, college enrollment rates were declining, with Collins's graduates' enrollment in any college falling from 58 percent among 2012 graduates to 39 percent among 2013 graduates (**see Figure 11 and Table 15**). Although not shown here, they were even higher in 2010–11, suggesting a considerable decline in college outcomes over several years prior to the initiative. They remained low for the first two years of the initiative, with just more than 40 percent of graduates attending any college in the fall after graduating high school. They increased in the third and fourth years of the initiative, so that more than one-half of Collins's graduates enrolled in college in the 2015–16 and 2016–17 school years. Changes in the enrollment rate in any college were largely driven by changes in enrollment in four-year colleges. Enrollment rates in four-year colleges declined during the years just prior to the initiative through the first year of the initiative, 2013–14. They increased in each subsequent year, with over 40 percent of graduates entering a four-year college in the 2015–16 and 2016–17 school years.

College persistence rates among Collins graduates who went to a four-year college fell considerably at the same time that four-year college enrollment declined. Persistence rates were especially low among graduates from the classes of 2012–13 and 2013–14. They improved among students who graduated from Collins in 2014–15 and 2015–16, but only about one-third or less of the Collins students who entered college persisted for at least two years.

Figure 11. Collins Graduates' College Enrollment Rates Improved, but Remained Below the District Average



Note: Percentages are based on all high school graduates from Collins or the district in each year who enrolled in college the fall after high school graduation.

College Outcomes were lower for NLCI Students than Students in Comparison Schools in Most Years

College enrollment rates at Collins were substantively lower than enrollment rates of similar students at other schools in most years, although the differences did not reach a level of statistical significance. Two years prior to the initiative, four-year college enrollment rates at Collins were slightly higher than the four-year college enrollment rates of similar students at other CPS high schools. They declined in the year before the initiative and were lower compared to similar students in other schools for several years, until improving to be slightly higher than similar students in 2015–16. During the years of the initiative, college enrollment rates, and enrollment rates at four-year colleges, were only higher than those of comparable graduates at other CPS schools among graduates in the 2015–16 school year.

In all years, college persistence rates were lower for Collins graduates than for students from other CPS schools with similar backgrounds. The differences were not significant in any year because there were so

few students who enrolled in a four-year college in each year that there was little statistical power. For example, there were 45 graduating seniors in the Collins class of 2014–15, and 27 percent of them enrolled in a four-year college, which means the four-year college persistence rate for that year is based on 12 students. However, across all of the years, the college persistence rates of students from Collins were lower than the college persistence rates of students who had similar characteristics as Collins graduates but graduated from other CPS high schools.

Table 15. Post-Secondary Outcomes of Collins Graduating Classes Were Lower Compared to Students with Similar Backgrounds at Other CPS Schools in Most Years

		Percent Enrolling in Any College		Percent Enrolling in 4-Year College		Percent Persisting First 2 Years in 4-Year College	
	Graduating Year	**Actual**	**Difference from Expected**	**Actual**	**Difference from Expected**	**Actual**	**Difference from Expected**
Pre-NLCI	**2011–12**	58.2%	+1.7%	31.6%	+0.8%	40.0%	-1.5%
	2012–13	38.9%	-9.4%	23.6%	-3.1%	23.5%	-6.6%
NLCI Years	**2013–14**	41.2%	-4.6%	17.6%	-5.3%	<10%	-11.8%
	2014–15	42.2%	-5.6%	26.7%	-4.0%	33.3%	-1.0%
	2015–16	59.4%	+1.1%	45.3%	+4.2%	27.6%	-8.2%
	2016–17	52.2%	-6.7%	41.3%	-0.5%	N/A	N/A

Note: "Difference from Expected," which is on percentage point scale, represents Collins's school-level random effect from the hierarchical model that adjusts for student demographics and baseline achievement level—this provides a comparison to students with similar backgrounds at other CPS schools (see the Appendix for more details). Asterisk(s) indicate the estimate is statistically different from zero (*<0.05; **<0.01; ***<0.001). The actual persistence rate for 2013–14 is obscured because it is close to zero and has the potential to breach confidentiality if displayed.

Interpretive Summary

School performance levels are strongly related to the economic context of the families they serve—families with more economic resources are able to invest in education in ways that produce inequitable outcomes. Changing these patterns so that schools serving students from neighborhoods with fewer economic resources have equivalent outcomes to schools serving students from more affluent neighborhoods is a policy challenge that has not yet been met. The NLCI aimed to improve student outcomes in five low-performing schools in one neighborhood by providing resources for additional supports across grade levels, spanning from pre-k through college choice, creating a continuum of supports for students as they moved from one grade to another. The hope was that this would lead to continual improvement in student outcomes as students would move through grades having received ever-increasing years of additional supports—high school supports building on elementary grade supports, building on pre-k supports.

The NLCI schools did show considerable gains on all of the student outcomes studied, but only the substantial improvements in pre-k attendance could be attributed with confidence to the initiative. The schools also improved more than the district in terms of elementary attendance rates, school climate, and the success of eighth-grade graduates when they transitioned to high school. There were improvements in test scores and high school outcomes, but they remained below district averages, and did not improve more than other schools in the district.

NLCI schools showed considerable improvements in student outcomes—but it would be difficult to outpace the gains being made districtwide. Over this period of time, the district implemented a number of new policies and supports, with funding often prioritized for schools with similar student populations and performance levels as the NLCI schools. Thus, the NLCI supplemented broader changes occurring in the district. Over this time period, CPS increased funding for social-emotional programs, supports for trauma, and restorative justice programs as an alternative to suspending students. The district implemented trainings in math, English, and science instruction around the Common Core and Next Generation Science Standards, with math instruction prioritized in schools like those serving NLCI students. They introduced a new teacher evaluation system that provided more concrete feedback on educational practice. And many schools across the city also received support from programs to support the high school choice process, and mentorship programs such as City Year. As a result, many schools in Chicago showed improving student outcomes. With the exception of pre-k attendance rates, we cannot attribute the gains that were made in NLCI schools to the initiative. We can say that districtwide changes, along with the investments from the initiative, together led to improved outcomes for students.

Whether the improvements in the NLCI schools were mostly a result of district policies, the efforts of the school management organization, or the initiative, there were substantial improvements in many outcomes. The NLCI schools served students from lower-income neighborhoods than average for CPS,

and attendance rates tend to be correlated with income, but attendance rates in NLCI pre-k schools surpassed those of the CPS average in the first year of the initiative and remained higher for the following years. Attendance rates in grades K-2 started out lower and were the same or higher than the district subsequently. This matters considerably, as attendance is a stronger predictor of success in high school than test scores.[46] Middle grade students in NLCI schools also reported much stronger school climate over time, surpassing district averages in terms of engagement, connectedness and peer support for academic work, and approaching the district average in terms of student peer relationships. Thus, elementary and middle grade students were increasingly engaged in school and felt more positive about their relationships with other students and adults in their schools. The location of the schools did not change, and the backgrounds of students in the NLCI elementary schools were very similar from year-to-year. Students were more engaged and positive about school relative to students with similar backgrounds who were in the schools in prior years and compared to other students in the district who lived in more affluent neighborhoods, on average.

Test scores also rose considerably in the NLCI schools, but they did not increase more than the district as a whole. Prior studies of school turnaround have likewise shown that intensive interventions can lead to significant improvements in schools with prior low performance, but even with significant improvement, large differences often remain relative to average district schools.[47] Over this time period, the annual gains in CPS test scores were estimated to be at about the 95th percentile among districts nationwide.[48] The large improvements in the district overall meant NLCI schools would have to show truly exceptional gains (i.e., higher than gains at the 95th percentile) to be significantly higher than the other schools.

Long-term benefits from vertically-integrated supports are attenuated by mobility and take time to accrue. Ultimately, only a small proportion of students experienced continuous supports across grade levels as a result of the initiative. Even when there were improvements in outcomes at all of the grade levels, the gains could only build from one year to the next to the extent that students continued on in NLCI schools from one year to the next. It takes many years to see a combined effect from programs that target different grade levels, as it takes time for students to progress from one grade to another. When many students transfer to other schools in the course of progressing across grades, while new students transfer in, the potential impact of the supports at earlier grades on outcomes in the later grades is decreased proportionately.

Issues around mobility and changing populations of students in the schools are intertwined with district policies around school choice; there is an inherent tension between goals for supporting neighborhood schools in all communities and promoting opportunities for students to attend schools that are higher rated than their community school. NLCI schools were lower performing than many other schools that families might consider, in part, because the school ratings are strongly defined by average test scores, which are strongly related to the economic status of families. The district encourages families to choose

[46] Allensworth et al. (2014a).
[47] de la Torre et al. (2013).
[48] Reardon & Hinze-Pifer (2017).

schools that are high-performing, and families want their students to go to high-performing schools that might offer them more educational opportunities. Yet, if families choose schools consistent with the district goals around school choice, there is less stability for neighborhood schools, especially those in neighborhoods with the fewest resources.

These issues are particularly salient when supporting students around the high school choice process. A neighborhood cluster model assumes that students will move from a cluster elementary school to a cluster high school. But for school staff advising students about where to attend high school, there is not always incentive to support a stable feeder pattern, since they are also trying to encourage students to attend high-performing high schools. Thus, multiple initiatives with similar goals to improve educational opportunities for students in the most economically disinvested communities can end up conflicting with each other.

NLCI turnaround strategies are intended to provide the funding to support schools in neighborhoods with chronically low performance to make up for inequitable opportunities that result from long-standing structural inequalities associated with race and income. Two million dollars in extra funding a year—which is approximately the level of funding from this initiative, and in the Promise Neighborhoods funded by the U.S. Department of Education—is a substantial investment, but it is less than 5 percent of the operating budget for five schools. How much extra funding is sufficient to compensate for the substantial differences in resources that families and communities in different parts of the city are able to invest in education, if opportunities are really to be equitable in all neighborhoods? Taking on the challenge of improving neighborhood schools that are chronically low performing to reduce inequalities with district averages requires planning for mobility and a potentially shifting population of students, along with supports to make up for the considerable inequities in family resources.

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Appendix. Data and Analysis Strategies

Data on Student Outcomes

Data on student outcomes come from students' administrative records, through a data sharing agreement with Chicago Public Schools (CPS). Data on neighborhood characteristics come from the 2015 U.S. Census. Each of the variables examined in this report is described below, followed by a table that provides the number of students that were included in the analyses.

Pre-k Attendance among Four-Year-Old Pre-K Students

The pre-k attendance analyses used all students in pre-k at age four. A pre-k attendance rate is equal to the number of days a student was marked as present, divided by the number of days that student was enrolled during that school year.

Table A.1. Number of Pre-K Students in Analysis of Pre-K Attendance

School Year	NLCI Schools	District
2012–13	99	15,915
2013–14	153	14,921
2014–15	187	14,280
2015–16	190	13,951
2016–17	204	12,967
2017–18	179	12,240
2018–19	173	12,420

Prior Pre-K attendance among Entering Kindergarten Cohorts

Kindergarten cohorts include all first-time students in kindergarten. The proportion of kindergarten students who attended a CPS pre-k school is simply the proportion with a record of pre-k attendance among all students who are first-time kindergarten students. The pre-k attendance rate is equal to the number of days a student was marked as present, divided by the number of days that student was enrolled during that school year. One analysis only examines entering kindergarteners with pre-k attendance records the year prior, while others included all kindergarten students, as described in the main text.

Table A.2. Number of Kindergarten Students in Analyses on Prior Pre-K Enrollment

	Number of Kindergarten Students		Number of Kindergarten Students with Records of Pre-K Enrollment in CPS	
School Year	**NLCI Schools**	**District**	**NLCI Schools**	**District**
2012–13	219	32,214	123	15,409
2013–14	211	31,543	127	14,564
2014–15	201	30,167	133	14,409
2015–16	214	28,754	149	13,695
2016–17	185	27,183	128	13,333
2017–18	188	25,934	142	12,452
2018–19	162	25,117	127	11,823

Attendance in K-8

Attendance was examined separately for students in each grade from K-2, and with students in grades 3-8 together. Attendance rate is equal to the number of days a student was marked as present, divided by the number of days that student was enrolled during that school year.

Table A.3. Number of Students in Attendance Analyses

	Number of Kindergarten Students		Number of 1st-Grade Students		Number of 2nd-Grade Students		Number of 3rd-8th Grade Students	
School Year	**NLCI Schools**	**District**	**NLCI Schools**	**District**	**NLCI Schools**	**District**	**NLCI Schools**	**District**
2012–13	109	30,032	79	29,894	86	29,177	503	167,650
2013–14	151	29,678	164	30,806	108	29,321	779	165,666
2014–15	200	28,395	189	30,125	200	30,110	996	163,551
2015–16	213	26,947	220	28,703	204	29,271	1137	162,736
2016–17	185	25,407	195	26,931	203	27,693	1143	159,329
2017–18	188	24,294	168	25,268	187	26,147	1041	155,827
2018–19	162	23,287	166	24,188	147	24,528	995	152,697

Test Scores in Grades 2-8

Test scores were examined separately for students in second grade, and with students in grades 3-8 together. In some of the analyses, NWEA scores were standardized within each year by grade such that zero represents the district average.

Table A.4. Number of Students in Test Score Analyses

	Math				Reading			
	Number of 2nd-Grade Students		Number of 3rd-8th Grade Students		Number of 2nd-Grade Students		Number of 3rd-8th Grade Students	
School Year	**NLCI Schools**	**District**	**NLCI Schools**	**District**	**NLCI Schools**	**District**	**NLCI Schools**	**District**
2012–13	79	24,885	462	150,018	79	24,267	457	148,050
2013–14	95	26,352	722	155,741	95	26,170	716	155,558
2014–15	184	27,695	937	154,066	185	27,372	936	153,680
2015–16	191	26,557	1,058	153,756	190	26,089	1,058	153,083
2016–17	181	25,319	1,067	150,567	182	24,795	1,071	149,893
2017–18	168	23,741	963	147,370	166	23,280	972	146,620
2018–19	131	22,579	922	144,764	133	22,068	928	144,260

Students' Reports of School Climate

Survey data comes from the 5Essentials Surveys administered to CPS students in grades 6-8, teachers, and parents, on a yearly basis. The four measures and their items from the survey used in the report are listed in **Table A.6**. The measures scores are standardized based on the district mean from the 2012–13 school year. **Table A.7** lists the survey response rates for the district and each NLCI school by year. Students were included in the analyses if they participated in the survey and answered the questions in the survey bank for a specific survey measure.

Table A.5. Number of Students in School Climate Analyses

	Academic Engagement		Peer Support for Academic Work		School Connectedness		Student Peer Relationships	
School Year	**NLCI Schools**	**District**	**NLCI Schools**	**District**	**NLCI Schools**	**District**	**NLCI Schools**	**District**
2012–13	175	64,466	178	65,263	184	65,713	185	65,795
2013–14	274	65,010	274	65,748	275	65,998	278	66,094
2014–15	293	64,595	305	65,573	328	66,140	329	66,043
2015–16	347	64,326	355	65,227	361	65,741	361	65,629
2016–17	346	62,255	352	63,011	349	63,448	351	63,255
2017–18	288	60,026	303	61,100	324	61,994	321	61,732
2018–19	320	59,282	332	60,430	345	61,608	342	61,281

Table A.6. Items in Survey Measures Related to Student Engagement

Measure	Item
School Connectedness	How much do you agree with the following statements about your school: • I feel like a real part of my school • People here notice when I'm good at something • Other students in my school take my opinions seriously • People at this school are friendly to me • I'm included in lots of activities at school
Academic Engagement	How much do you agree with the following statements about your class: • The topics we are studying are interesting and challenging • I am usually bored in class • I usually look forward to this class • I work hard to do my best in this class • Sometimes I get so interested in my work I don't want to stop • I often count the minutes until class ends
Peer Support for Academic Work*	How many of the students in your class: • Think doing homework is important • Feel it is important to pay attention in class • Feel it is important to come to school every day • Try hard to get good grades
Student Peer Relationships	How much do you agree with the following statements about students in your school/class? Most students in my school/class: • Don't really care about each other • Like to put others down • Help each other learn • Just look out for themselves • Don't get along together very well • Treat each other with respect

Note: CPS students from grades 6-12 are surveyed annually in spring. Students report their level of endorsement of each item (e.g., "Strongly Agree"). These item responses are then analyzed through Rasch IRT model to produce measure scores. Measure scores are reported in logit scale, so scores from different measures cannot be directly compared. *Asked only for students in grades 6-8.

Table A.7. Survey Response Rates by School Year

School Year	District	Collins	NLCI: All Elementary	Chalmers	Dvorak	Herzl	Johnson
2011-12	79%	71%	81%	97%	77%	54%	95%
2012-13	82%	57%	74%	83%	55%	77%	80%
2013-14	84%	75%	76%	86%	64%	78%	75%
2014-15	83%	73%	72%	91%	82%	57%	59%
2015-16	85%	76%	72%	76%	95%	60%	58%
2016-17	85%	91%	69%	53%	94%	74%	54%

Note: "NLCI: All Elementary" refers to the four NLCI elementary schools combined (i.e., Chalmers, Dvorak, Herzl, and Johnson, treated as one group).

Ninth-Grade GPAs among Eighth-Grade Graduates

To measure the outcomes of students' high school choice decisions, we examine ninth-grade GPAs among cohorts of eighth-grade graduates. Students are included in the analyses if they graduated from eighth grade at a CPS school and stayed enrolled in ninth grade in CPS through the end of the ninth-grade year. Students who attended a CPS charter high school are not included, as we do not have access to course transcript data for charter schools in all years. GPA is the average grade received by each student on a four-point scale in their ninth-grade year, weighted evenly by each course attempted.

Table A.8. Number of Eighth-Grade Graduates in Ninth-Grade GPA Analyses

8th-Grade School Year	9th-Grade School Year	NLCI Schools	District
2012–13	2013–14	45	17,521
2013–14	2014–15	80	17,717
2014–15	2015–16	94	16,602
2015–16	2016–17	90	15,925
2016–17	2017–18	99	16,152

Freshman OnTrack Rates, Attendance, and GPAs among Ninth-Graders

Analyses of ninth-grade outcomes include all students who were first-time ninth-graders in a regular CPS school. Charter schools are not included, as we do not have access to student transcripts in all years for charter schools. Freshman OnTrack rate is the proportion of first-time ninth-graders who have earned five or more full-year course credits and failed no more than one semester of a core course by the end of

ninth grade.[49] Attendance rate is equal to the number of days a student was marked as present, divided by the number of days that student was enrolled during that school year. GPA is the average grade received by each student on a four-point scale in their core courses (i.e., English, math, science, and social studies), weighted evenly by each core course attempted.

Table A.9. Number of Ninth-Graders with Freshman OnTrack Rate, Attendance Rate, and GPA Analyses

	Freshman OnTrack Rate		Attendance Rate		GPA	
School Year	**Collins**	**District**	**Collins**	**District**	**Collins**	**District**
2011–12	81	19,100	83	19,438	83	19,232
2012–13	100	17,956	101	18,288	98	18,064
2013–14	81	17,557	83	17,890	81	17,677
2014–15	124	17,852	124	18,193	122	17,942
2015–16	65	16,672	67	16,994	67	16,773
2016–17	53	16,314	58	16,608	54	16,389
2017–18	57	16,800	58	17,119	58	16,888

College enrollment and college persistence rate among high school graduates

Students who graduate from a CPS high school are included in the analyses of post-secondary outcomes. College enrollment rate is the proportion of high school graduates who enrolled in a post-secondary institution in the fall following high school graduation. College enrollment, persistence, and graduation rates are based on data from the National Student Clearinghouse.[50] College persistence rate is the proportion of four-year college enrollees who enrolled immediately after high school graduation and have been continuously enrolled in one or more four-year institutions for four semesters.[51]

[49] Nagaoka & Seeskin (2018).
[50] Nagaoka & Seeskin (2018).
[51] Nagaoka & Seeskin (2018).

Table A.10. Number of High School Graduates with College Enrollment and Persistence Rate Analyses

	College Enrollment Rate		College Persistence Rate	
School Year	**Collins**	**District**	**Collins**	**District**
2011–12	74	12,447	24	3,995
2012–13	68	12,007	16	3,708
2013–14	60	11,830	12	3,812
2014–15	42	11,334	11	3,852
2015–16	64	11,284	29	4,183
2016–17	37	10,495	15	3,999

Modeling Elementary School Outcomes

Our goal was to know the effects of the NLCI on student achievement. To provide the most rigorous assessment possible, given the rollout of the initiative, we used a propensity-score matching technique. We created propensity weights based on school characteristics in 2011–12, to find schools that matched to the NLCI schools on racial/ethnic composition, socioeconomic variables, school mobility, and average achievement (attendance, GPA, test scores) two years prior to the initiative. We then checked for baseline equivalence in the outcome variables in the years prior to NLCI funding (2012–13), and found that the comparison schools were not significantly different from the NLCI schools on the student outcome measures prior to the initiative. The propensity weight method compares NLCI schools to all other schools in the district, but weights the contribution of other schools to the district mean based on how similar they were to the NLCI schools in 2011–12 using the propensity scores. Schools that are very dissimilar have weights close to zero and do not contribute to the comparison, while schools that are very similar have weights that are close to one.

We recognized that there would be insufficient power to discern small effects of the NLCI, but that the methods would produce accurate estimates of the improvements that occurred in NLCI schools. However, they would not be generalizable to a larger population as initiative effects unless they were large enough to reach a level of statistical significance ($p<0.05$). In the end, almost all of the tests that were insignificant also proved to be substantively close to zero or negative. Thus, we feel confident saying NLCI schools did not outperform comparison schools for those tests that did not reach a level of statistical significance. The one exception is with student reports of school climate, which we note in the body of the report.

We used hierarchical linear models (HLM), with students nested within schools, to conduct statistical tests of whether student outcomes were higher at the NLCI schools than the comparison schools in each year, applying propensity weights at the school level. At the student level, we included control variables for student characteristics in the models (gender, race/ethnicity, neighborhood poverty level, disability status,

and grade level) to adjust for any changes in student population in the schools over time. Our modeling strategy can be summarized as follows:

1. Identify each elementary schools' probability of being an NLCI school (i.e., propensity score), based on school characteristics two years prior to funding (2011–12) including racial/ethnic composition, socioeconomic variables, school mobility, and average achievement (attendance, GPA, test scores);
2. Examine outcomes in the year prior to funding (2012–13), applying the propensity weights, to make sure the comparisons are equivalent; and
3. Get effect estimates from hierarchical models with all years stacked, students within schools, applying propensity weights, and controlling for student demographics (gender, race/ethnicity, neighborhood poverty level, disability status, and grade level):[52]

Level 1

Outcome = B0 (2012-13) + B1 (2013-14) + B2 (2014-15) + B3 (2015-16) + B4 (2016-17) + B5(2017-18) + B6 (2018-19) + B7 (1st year AUSL) + B8 (later year AUSL) + ΣBx (Student Demographics) + r

Level 2

B0 = G00 + G01 (D_ever_cluster) + u0

B1 = G10 + G11 (D_ever_cluster) + u1

B2 = G20 + G21 (D_ever_cluster) + u2

B3 = G30 + G31 (D_ever_cluster) + u3

B4 = G40 + G41 (D_ever_cluster) + u4

B5 = G50 + G51 (D_ever_cluster) + u5

B6 = G60 + G61 (D_ever_cluster) + u6

D_ever_cluster is a dummy variable indicating whether a school was in the NLCI. The coefficients of interest are G01, G11, G21, G31, G41, G51, and G61, which each represent the difference between NLCI vs. comparison school among students with similar characteristics. Note that we decided not to impose linearity on change over time. Instead, we had a dummy variable for each year, separately estimating the difference from comparison schools in that given year. We did this because a linear trend did not seem to fit the data well for all outcomes.

Equivalence of models with outcomes over time: The analyses were conducted at three time periods during the latter course of the evaluation: first, with data through 2016–17, then adding data from 2017–18, then adding data from 2018–19. With each addition of more years of data, there is the

[52] Since we expected different patterns between pre-k, kindergarten, first grade, and second grade, we fitted a separate model for each of these grade levels; grades 3-8 were fit altogether because we expected these grade levels to be similar in their overall patterns.

possibility that the relationships of the covariates with the outcomes could change over time. This means that the relationships discerned in earlier years could seem to change retroactively. In addition, the applicability of the propensity scores developed with data from the 2011–12 school becomes increasingly questionable as more time passes, and schools that were similar potentially become more dissimilar over time. Therefore, each time we added another year of data, we examined whether the size and significance of the relationships with the outcomes changed.

In most cases, there was little change. However, in the case of four-year-old pre-k attendance, the addition of data from 2018–19 did change the relationships observed in earlier years in the earlier models. Beginning in the 2014–15 school year, the district increased the number of full-day pre-k options available to students, intentionally placing programs in neighborhoods where students were predominantly low-income and where there was available space in schools to expand programs. Thus, there have been increasing investments in full-day pre-k slots at schools in neighborhoods similar to North Lawndale, and preferences for enrollment slots for students with backgrounds similar to those of NLCI students over time. In the figure in the main text, we rely on the outcomes from the models that do not include the 2018–19 data, as we think including the most recent year of data distorts the results in earlier years. **Table A.11** shows the results from models that include data from different years. While the NLCI schools continue to show higher attendance than the comparison schools, the differences in prior years become smaller and non-significant when data from the most recent school year is added.

Table A.11. Alternative Model Results for Four-Year-Old Pre-K Attendance Rates

		Model Using Data through 2016–17	Model Using Data through 2017–18	Model Using Data through 2018–19
School Year	**NLCI Average**	**NLCI vs. Comparison Difference**	**NLCI vs. Comparison Difference**	**NLCI vs. Comparison Difference**
2012–13	0.869	-0.007	-0.009	-0.021
2013–14	0.911	0.036	0.038	0.036
2014–15	0.905	0.053*	0.055*	0.045
2015–16	0.918	0.039*	0.043*	0.031
2016–17	0.920	0.041	0.045*	0.032
2017–18	0.920		0.043*	0.030
2018–19	0.906			0.020

Note: Asterisks indicate the estimate of the difference relative to comparison schools is statistically different from zero (*<0.05; **<0.01; ***<0.001). Coefficients come from hierarchical linear models with students nested within schools, controlling for year fixed effects, whether the school was managed by AUSL, and student background (i.e., gender, race, ethnicity, neighborhood poverty, disability status), with propensity weights applied based on school characteristics in the 2011–12 school year.

Modeling NWEA Test Score Gains

To compare NWEA test score gains between NLCI elementary schools and the comparison group, we used the same modeling strategy as above, except the following:

- Test score gains are not equivalent at all points of the scale. Thus, our models control for students' baseline ability (i.e., their prior-year test scores at level 1). To do this, we classified students' prior-year test scores into deciles and controlled the indicator variable for each decile;
- Since NWEA was first administered in 2013, prior-year NWEA data does not exist for 2012–13 and we had to exclude 2012–13 from modeling; and
- For more efficient estimation, we chose to fit a separate model for each of grades 3-8. Test score gains can vary by grade level and test form (by year), and this improved the precision of the tests for each grade.

Modeling High School Outcomes

Since there was only one high school in the NLCI (Collins), we cannot apply the elementary school modeling strategy to examine Collins students' performance. Hence, we employed a different modeling strategy. Controlling for student backgrounds (gender, race, ethnicity, neighborhood poverty level, and disability status), we used hierarchical linear models, with students nested within schools, to produce a school level residual (random effect) for each school in the district in each year. The school-level residuals showed the degree to which outcomes at each high school were different from the average school in the district, controlling for the backgrounds of students served at the school. We examined whether Collins's random effect was different from zero to indicate whether Collins students did significantly better or worse than their peers of similar backgrounds.

Outcomes of interest included Freshman OnTrack status of first-time ninth-grade cohorts and college enrollment of graduating classes. For estimation purposes, we chose to fit a separate model for each school year of interest. Hence, the model is specified as follows:

Level 1

Outcome = B_0 + B_1 (Student's 8th-Grade Test Score[53]) + ΣB_x (Student Demographics[54]) + r

Level 2

$B_0 = G_{00} + u_0$

The statistic of interest is u_0, which is the random effect of each school. We used each school's posterior variance.

[53] We used standardized ISAT/NWEA math test scores.
[54] These include gender, race/ethnicity, neighborhood poverty level, and disability status.

Authors Bios

Elaine M. Allensworth is the Lewis-Sebring Director of the UChicago Consortium, where she has conducted research on educational policy and practice for the last 20 years. She works with policymakers and practitioners to bridge research and practice, serving on panels, policy commissions, and working groups at the local, state and national level. She has been the principal investigator on research grants from funders such as the Institute of Education Sciences, the National Science Foundation, and the Bill and Melinda Gates Foundation. Her research has provided insight into the factors influencing students' educational attainment, the effectiveness of school leadership and school improvement. She holds a PhD in Sociology from Michigan State University, and was once a high school Spanish and science teacher.

Andrew Zou was a Research Analyst at the UChicago Consortium at the time this research was conducted. His work included expanding the five essential supports to early childhood education and analyzing the teacher evaluation system in Chicago. Andrew's previous experiences include working as an intern at Advance Illinois, an education policy advocacy organization, researching teacher shortage in Illinois. There, he also had the opportunity to attend congressional hearings and contact lawmakers to support the approval of the state's education budget. In addition, Andrew interned at Russell Investments, conducting competitive analyses on different types of defined contribution plans.

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