UCHICAGO Consortium
on School Research

Supporting School Improvement

Early Findings from a Reexamination of the *5Essentials* Survey

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ACKNOWLEDGEMENTS

Executive Summary

Why do students in some schools show more progress than others? Families, teachers, principals, district leaders, and state and federal policymakers have asked this question for decades as they pursue a high-quality public K–12 education for all students. For 20 years, the *5Essentials* Survey and its underlying conceptual framework, which articulates critical aspects of school climate and organization, have helped school communities unpack what may be contributing to—or holding back—growth in their students' outcomes.

This report updates the original design and validation of the *5Essentials* Survey, addressing questions about its present-day validity and use in schools and districts.

History and Context: *5Essentials* Survey and Framework

The *5Essentials* Survey and underlying framework originated in the 1990s as a tool for studying differential progress among schools at a time of historic school reform in Chicago.[1] Researchers at the University of Chicago Consortium on School Research (UChicago Consortium) examined whether having strength in five key areas of school organization explained why some schools improved student achievement and others did not. In consultation with other researchers, practitioners, policymakers, and community stakeholders, these researchers created a conceptual framework called the "Five Essential Supports for School Improvement." This framework identified five key elements, or "essential supports," of a school that influenced its students' learning: Effective Leaders, Collaborative Teachers, Involved Families, Supportive Environment, and Ambitious Instruction.[2] The *5Essentials* Survey captures the strength of each essential support through survey questions (also called items) completed by teachers[3] and students.[4] Underlying concepts that make up each essential, such as Instructional Leadership or Student-Teacher Trust, are captured using groups of items (called "measures"). The *5Essentials* Survey items, measures, and essentials are presented in **Figure 2 in the full report**, replicated on page 2.

A longitudinal validation study using 15 years of districtwide elementary school data (collected between 1991 and 2005) and 20 years of research provided evidence that these five essential supports of a school organization were the foundation of a school's ability to increase students' learning gains over time. This extensive work was published in the book, *Organizing Schools for Improvement: Lessons from Chicago* in 2010 and examined the relationship between *5Essentials* Survey results with elementary school test scores and attendance.[5] A key finding was that students in schools that were strong in at least three of the essential

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1 Throughout this report, we refer to the underlying framework as the "five essential supports" and the survey that was created based on this framework as the *5Essentials* Survey.

2 Authors originally used different terms for the five essential supports in early reports, referring to: school leadership, professional capacity, parent-community ties, student-centered learning climate, and instructional guidance.
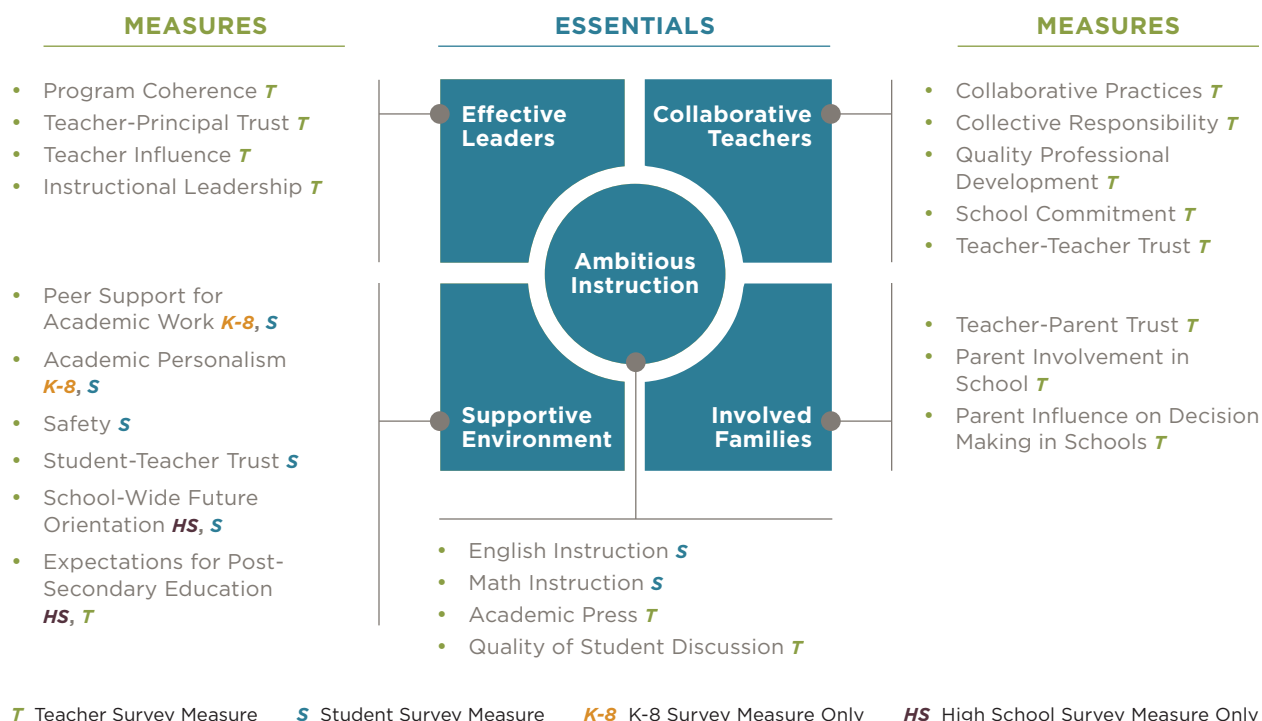
3 Some but not all of the survey questions completed by teachers are also completed by non-teaching staff in schools (e.g., teacher assistants, counselors, librarians, etc.).

4 While a parent survey is given in Chicago Public Schools (CPS), this survey is constructed and administered by CPS and is not part of the *5Essentials* Survey.

5 Bryk, Sebring, Allensworth, Luppescu, & Easton (2010).

FIGURE 1

The Five Essential Supports are Formed by 20 Separate Measures on the *5Essentials* Survey

MEASURES	ESSENTIALS	MEASURES

MEASURES

- Program Coherence *T*
- Teacher-Principal Trust *T*
- Teacher Influence *T*
- Instructional Leadership *T*

- Peer Support for Academic Work *K-8*, *S*
- Academic Personalism *K-8*, *S*
- Safety *S*
- Student-Teacher Trust *S*
- School-Wide Future Orientation *HS*, *S*
- Expectations for Post-Secondary Education *HS*, *T*

ESSENTIALS

Effective Leaders

Collaborative Teachers

Ambitious Instruction

Supportive Environment

Involved Families

- English Instruction *S*
- Math Instruction *S*
- Academic Press *T*
- Quality of Student Discussion *T*

MEASURES

- Collaborative Practices *T*
- Collective Responsibility *T*
- Quality Professional Development *T*
- School Commitment *T*
- Teacher-Teacher Trust *T*

- Teacher-Parent Trust *T*
- Parent Involvement in School *T*
- Parent Influence on Decision Making in Schools *T*

T Teacher Survey Measure *S* Student Survey Measure *K-8* K-8 Survey Measure Only *HS* High School Survey Measure Only

Note: Measures that comprise the Supportive Environment essential are different for elementary schools (Safety; Student-Teacher Trust; Peer Support for Academic Work; Academic Personalism) and high schools (Safety; Student-Teacher Trust; School-Wide Future Orientation; Expectations for Post-Secondary Education). Thus, each *5Essentials* Survey includes 20 measures, but there are 22 unique measures.

supports were up to 10 times more likely to experience substantial gains on both reading and math scores than students in schools that were weak in three or more of the supports.[6]

The current study provides an updated and expanded validation of the *5Essentials* Survey. This study adds an important additional outcome for elementary schools—students' GPAs—and, even more importantly, also assesses the validity of the *5Essentials* Survey in high schools. The high school analyses encompass a range of outcomes: test scores, attendance, GPAs, Freshman

OnTrack rates, and college enrollment. By revalidating the *5Essentials* Survey and expanding the validation to more grade levels and additional student outcomes, this study seeks to provide school leaders, teachers, researchers, and other education practitioners with a broad-based tool to guide their work building schools in which adults and children can learn and thrive.[7]

The *5Essentials* Survey in a Changing Education Landscape

While research shows that the environment students and staff experience in schools affects student learning,

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6 Schools were categorized as "strong" on an essential support if their survey score on that indicator fell in the top quartile of Chicago elementary schools. Schools ranked in the bottom quartile for an essential indicator were classified as "weak" on that essential support.

7 The purpose of this study, like other validation studies, is to examine the degree to which our measurement tool, the *5Essentials* Survey, does what it is intended to do. In this

case, we are assessing the extent to which teachers'/staff and students' reports about their school in one year predict improvement in outcomes in the subsequent year, and also whether growth in *5Essentials* Survey measures predicts improvement in outcomes in the concurrent year. All analyses controlled for prior student achievement. In the interest of transparency, this report aims to clearly articulate our findings for public consideration.

there are not many school climate tools and measurements available to educators and policymakers that are both validated and useful for identifying challenges in schools and guiding their work toward improvement. As one of the few validated instruments, the *5Essentials* Survey is one of the most widely-used tools to measure school climate. The *5Essentials* Survey has been administered in more than 6,000 schools across the country.[8]

Nonetheless, the *5Essentials* Survey was last validated in 2010 and there were some limitations of that study. The validation only examined elementary schools and three outcomes: reading test scores, math test scores, and attendance rates. And the data used for the validation are relatively old (1991–2005).

Since the *Organizing for School Improvement* validation study of the five essential supports, much has changed in education both nationally and in Chicago Public Schools (CPS). In addition to educational practice evolving during this period, accountability policies have become an influential part of the context of education, both in Chicago and across the country. Chicago principals of schools that initially and voluntarily participated in the biennial *5Essentials* Survey, between 1997 and 2009, were provided a confidential report of their results.[9] The survey evolved to become annual and web-based, and later—in 2014—it became part of the CPS accountability policy, comprising 5–10 percent of a school's quality rating. Today, in 2020, the *5Essentials* Survey is completed by CPS students in grades 4–12 and CPS teachers in grades pre-k–12, and reports of results are publicly available.[10, 11]

Changes like these in the administration and use of the survey could potentially strengthen or weaken the quality of the data and the degree to which the surveys accurately represent what is happening in schools. For example, increased attention to the importance of the *5Essentials* Survey could improve data quality by raising response and completion rates. Better data quality would increase the ability to statistically detect and measure a connection between survey outcomes and performance, strengthening the validity of the survey overall. On the other hand, because school ratings are consequential, there could be an incentive or pressure for schools to appear strong on the five essential supports. If respondents exaggerated their school's strengths when responding to the survey, it would compromise the ability of the survey to accurately assess schools' performance, and thereby also compromise the relationship between school organization and improvement in student outcomes. This would be interpreted as a lack of validity.

This study therefore seeks to understand the validity of the *5Essentials* Survey at the present stage of educational practice in both elementary and high schools, and under present conditions in CPS.

Key Findings from First Phase of this Study

Our findings indicate that *5Essentials* Survey measures continue to be predictive of school improvement in elementary schools, and are also predictive in high schools. Of the 22 survey measures, all were in some way positively and significantly associated with schools' improvement. At the same time, all measures were not associated with all outcomes.[12] For example, yearly attendance rates improved more at elementary schools that were strong on *5Essentials* Survey measures, such as Parent Involvement in School and

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8 Since 2011 many schools and districts have worked with UChicago Impact to take the *5Essentials* Survey and receive online reports. The UChicago Consortium and UChicago Impact are separate units within the University of Chicago Urban Educa-tion Institute (UEI). For more information on UEI, please visit https://uei.uchicago.edu/. For more information on UChicago Impact's *5Essentials* Survey administration, see https://www. uchicagoimpact.org/our-offerings/5essentials. Of note, the surveys have been available to the public from the UChicago Consortium since 1997, and have been the foundation of many other school climate instruments, including New York City's Framework for Great Schools; see https://www.schools. nyc.gov/about-us/vision-and-mission/ framework-for-great-schools for one example.

9 For an example report provided to participating schools from 1997 to 2009, see https://consortium.uchicago.edu/publica-tions/improving-chicagos-schools-millard-fillmore-school

10 For details about the *5Essentials* Survey, see https://www. 5-essentials.org/

11 Fourth- and fifth-grade students fully participated in *5Essentials* Surveys for the first time in 2020 and are therefore not included in analyses in this study.

12 Nearly all outcomes were positively related to at least one-half the survey measures. The exception is the outcome of college enrollment, which was positively and significantly related to less than one-half of the measures, when considering measure growth instead of measure strength. See p.38 for more details.

School Commitment, than at elementary schools that had average measure scores.[13] The difference between yearly growth in attendance rates in schools with strong vs. average measure scores was as much as an additional 0.48 percentage points in elementary school and an additional 3.55 percentage points in high school. Similarly, Freshman OnTrack rates improved by as much as 3.25 percentage points more in high schools with strong *5Essentials* Survey measures, such as Collective Responsibility and School-Wide Future Orientation, compared to schools with average measure scores.[14]

Additionally, we found:

- **Both 1) starting out the year with strength in *5Essentials* Survey measures and 2) improving on measures during the course of the year predicted improved student outcomes in schools.** Thus, schools that are working to improve in an area, e.g. Student-Teacher Trust or Teacher Influence, but have not yet reached a point of strength may still see improvements in their students' outcomes such as grades, tests, and attendance while they are growing their five essential supports.

- **The *5Essentials* Survey measures were positively and significantly related to growth in elementary test scores and attendance.** This is consistent with the outcomes of our first validation, published in *Organizing Schools for Improvement* in 2010.[15]

- **Elementary GPA also improved more in schools with strong *5Essentials* Survey measures.** This is a new finding and an important addition since students' grades are stronger predictors of their success in high school than test scores.[16] GPA growth was not part of the original validation study.

- **High school outcomes—attendance, test scores, GPA, Freshman OnTrack, and college enrollment— were positively and significantly related to *5Essentials* Survey measures.** This is the first study

that has incorporated all of these high school outcomes with all *5Essentials* Survey measures and it is an important contribution to school climate research and practice.

- ***5Essentials* Survey measures predicted improvement for schools that were strong compared to other schools, but also for schools compared to themselves in stronger vs. weaker years.** Our analyses looked at both schools compared to other schools, and schools compared to themselves over time. This finding suggests that the five essential supports do not just relate to differences between schools, but also to the changes in organizational strength in the same schools over time.

  These results suggest that the *5Essentials* Survey, and its underlying framework, continue to be meaningful indicators for schools working to improve student outcomes.

Next Steps: Second Phase of this Study

Our next steps will be to examine whether the *5Essentials* Survey measures relate to outcomes differently across different school contexts. These contexts include variations in student population (e.g., in terms of students' socioeconomic status, race/ethnicity, mobility, special education status) and also school characteristics, such as those with selective enrollment policies, or smaller enrollment.

And while the quality and robustness of the *5Essentials* Survey's statistical underpinnings are critically important to the value of this tool, so, too, are the experiences of people who interact with the survey in schools—as respondents, practitioners, and school leaders. Under-standing these experiences and the ways individuals' perceptions shape the dynamics of schools' engagement with the five essential supports represents another priority for this research. Thus, in addition to the second-phase technical validation described above, we are also exploring how CPS

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13 "Strong" is defined as one standard deviation above the average on a particular *5Essentials* Survey measure in the spring prior to the year in which we measure outcome improvement.

14 For example, a school with strong *5Essentials* Survey measures in the spring of 2016 saw a larger increase in their Freshman OnTrack rate (4 percentage points) between the spring 2016 and spring 2017 than schools that had average *5Essentials*

Survey measures. All analyses controlled for prior student achievement. Therefore, this is an improvement in the outcome greater than that which would have been expected based on students' prior performance.

15 Bryk et al. (2010).

16 Allensworth, Gwynne, Moore & de la Torre (2014).

personnel interact with the *5Essentials* Survey as a tool in school improvement through interviews with principals and teachers in elementary and high schools. This qualitative study is vital to understanding how the *5Essentials* Survey influences, and is influenced by, the enactment of policies and practices tied to school improvement and accountability. Furthermore, findings may shed light on opportunities for improving communication and reporting of the *5Essentials* Survey to more effectively support positive school outcomes.

Ultimately, we undertook this two-year study to ensure a strong research foundation for the *5Essentials* Survey and framework as a tool to guide educators, policymakers, researchers and families in their work creating supportive school environments. Findings from this work will guide ongoing improvements and additional study of both the five essentials framework and *5Essentials* Survey. Results from the second phase of this study will be available in early 2021.

Introduction

A strong school climate has been linked to many positive outcomes, including increased student achievement, fewer student absences, and higher rates of teacher retention.[1] Such findings have led to national legislation, via the Every Student Succeeds Act (ESSA), that includes the possible use of school climate measurement in assessing school quality.[2] Yet while research indicates that the environment students and staff experience in schools affects student learning, there are few valid and available tools that practitioners can use to inform and guide their school improvement efforts.

Because the *5Essentials* Survey is one of the only school climate surveys with extensive validation,[3] it has become one of the most widely-used education surveys across the country.[4] The *5Essentials* Survey and its underlying conceptual framework originated in the 1990s.[5] Researchers at the UChicago Consortium on School Research (UChicago Consortium) used the framework to ask, "did strength in five key areas of a school organization explain why some schools improved student achievement and others did not?" The answer, they found, was yes. The five essential supports framework, which was used to create the *5Essentials* Survey, identified five key elements, or "essential supports," of a school that influenced its students' learning: Effective Leaders, Collaborative Teachers, Involved Families, Supportive Environment, and Ambitious Instruction.[6]

This study provides an updated and expanded validation of the *5Essentials* Survey by adding an important additional outcome for elementary schools—students' GPAs—and, even more importantly, by assessing the validity of the *5Essentials* Survey in high schools. The high school analyses include a range of outcomes: test scores, attendance, GPAs, Freshman OnTrack rates, and college enrollment. By revalidating the *5Essentials* Survey and expanding the validation to more grade levels and student outcomes, this study seeks to provide school leaders, teachers, researchers, and other education practitioners the needed data to guide their work building schools in which adults and children can learn and thrive.

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[1] Sebastian, Allensworth, & Huang (2016); Klugman, Gordon, Sebring, & Sporte (2015); Allensworth, Ponisciak, & Mazzeo (2009); Kraft , Marinell & Yee (2016); Lenhoff & Pogodzinski, (2018); Voight & Hanson, (2017).

[2] See www.ed.gov/essa.

[3] Bryk et al. (2010). A measure is valid if it measures the construct or attribute it is designed to measure (such as Teacher-Teacher Trust) and it can be used for the purpose for which it is intended (such as predicting school improvement).

[4] Since 2011, many schools and districts have worked UChicago Impact to take the *5Essentials* Survey and receive online reports. The UChicago Consortium and UChicago Impact are separate units within the University of Chicago Urban Education Institute (UEI). For more information on UEI, please visit https://uei.uchicago.edu/. For more information on UChicago Impact's *5Essential* Survey administration, see https://www.uchicagoimpact.org/our-offerings/5essentials. Of note, the surveys have been available to the public from the UChicago Consortium since 1997, and have been the foundation of many other school climate instruments, including New York City's Framework for Great Schools; see https://www.schools.nyc.gov/about-us/vision-and-mission/framework-for-great-schools for one example.

[5] Throughout this report, we refer to the underlying framework as the "five essential supports" and the survey that was created based on this framework as the *5Essentials* Survey.

[6] Authors originally used different terms for the five essential supports in early reports; referring to: school leadership, professional capacity, parent-community ties, student-centered learning climate, and instructional guidance.

Development of Five Essential Supports Framework

In 1994, Chicago's education stakeholders sought to produce a guide for school improvement during a wave of historic districtwide reform. With input from the superintendent, principals, teachers, university professors, community activists, and parents, Consortium researchers took the primary role in crafting an initial conceptual framework to inform school improvement. After studying that framework with qualitative data, survey data, and administrative data from 1991–2005, an empirically-grounded framework emerged that school communities could use to guide their improvement efforts.[7]

The framework, still in use today, includes five key elements, or essential supports: Effective Leaders, Collaborative Teachers, Involved Families, Supportive Environment, and Ambitious Instruction (**see Figure 1**). Surveys ask teachers[8] and students how much they agree that the components of each essential are present in their school:

> **Effective Leaders** are "the driver for change" and school improvement is highly unlikely without a strong principal to build and maintain the other essentials.[9] Principals coordinate the work of the staff and school community toward a clear and coherent vision. Leadership is then assumed to influence the other four essentials.

> **Collaborative Teachers** are able and willing to trust and work together with their faculty and staff colleagues. This measure also encompasses teachers' assessment of the quality of ongoing professional development, and staff commitment to students, colleagues, and school.

> **Involved Families** have input in school decisions and support school staff.

> A **Supportive Environment** is safe, nurturing, stimulating, and focused on learning for all students.

> **Ambitious Instruction** challenges students through well-organized curricula.

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[7] Sebring, Allensworth, Bryk, Easton, & Luppescu (2006).
[8] Some but not all of the survey questions completed by teachers are also completed by non-teaching staff in schools (e.g., teacher assistants, counselors, librarians, etc.).
[9] Bryk et al. (2010).

FIGURE 1

A Framework of Five Essential Supports
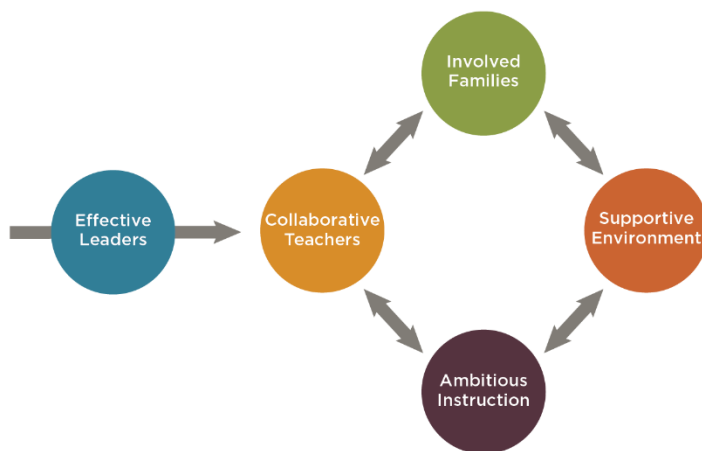
The *5Essentials* Survey captures the strength of each essential support through survey questions (also called items) completed by teachers[10] and students.[11] Underlying concepts that make up each essential, such as Instructional Leadership or Student-Teacher Trust, are captured using groups of items (called "measures"). **Figure 2** identifies the measures included in each essential support.

FIGURE 2

The Five Essential Supports are Formed by 20 Separate Measures on the *5Essentials* Survey

MEASURES

- Program Coherence *T*
- Teacher-Principal Trust *T*
- Teacher Influence *T*
- Instructional Leadership *T*

- Peer Support for Academic Work *K-8*, *S*
- Academic Personalism *K-8*, *S*
- Safety *S*
- Student-Teacher Trust *S*
- School-Wide Future Orientation *HS*, *S*
- Expectations for Post-Secondary Education *HS*, *T*

ESSENTIALS

Effective Leaders | Collaborative Teachers

Ambitious Instruction

Supportive Environment | Involved Families

- English Instruction *S*
- Math Instruction *S*
- Academic Press *T*
- Quality of Student Discussion *T*

MEASURES

- Collaborative Practices *T*
- Collective Responsibility *T*
- Quality Professional Development *T*
- School Commitment *T*
- Teacher-Teacher Trust *T*

- Teacher-Parent Trust *T*
- Parent Involvement in School *T*
- Parent Influence on Decision Making in Schools *T*

T Teacher Survey Measure   *S* Student Survey Measure   *K-8* K-8 Survey Measure Only   *HS* High School Survey Measure Only

Note: Measures that comprise the Supportive Environment essential are different for elementary schools (Safety; Student-Teacher Trust; Peer Support for Academic Work; Academic Personalism) and high schools (Safety; Student-Teacher Trust; School-Wide Future Orientation; Expectations for Post-Secondary Education). Thus, each *5Essentials* Survey includes 20 measures, but there are 22 unique measures.

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[10] Note that some (but not all) of the survey questions completed by teachers are also completed by non-teaching staff in schools (eg. teacher assistants, counselors, librarians, etc).
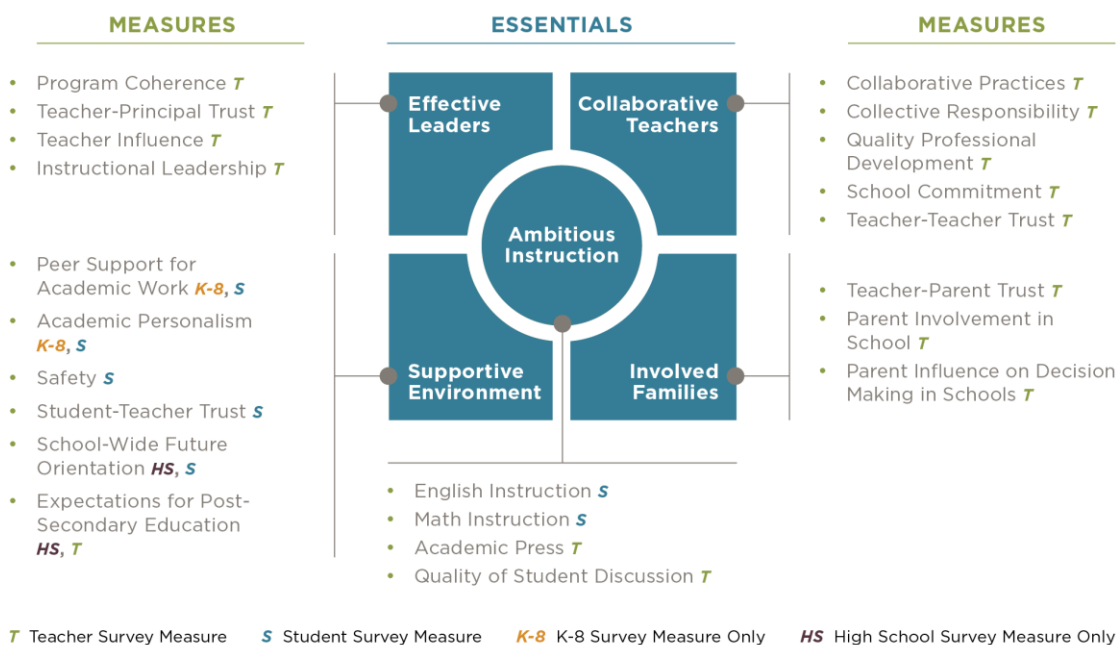
[11] While a parent survey is given in Chicago Public Schools (CPS), this survey is constructed and administered by CPS and is not part of the *5Essentials* Survey.

Original Validation of the Five Essential Supports Framework

Examining elementary schools over two periods, 1990–96 and 1997–2005, Consortium researchers investigated whether strength in the essential supports was associated with increased student learning gains, and also whether weaknesses in the essential supports were likewise associated with decreased or stagnant learning gains. Each of the five areas (leaders, teachers, families, environment, and instruction) were measured by multiple survey scales for teachers and students.[12] This work demonstrated that strength in these five key areas of the school organization were indeed essential for school improvement and validated the instrument with which these constructs were measured. In fact, schools that were strong in at least three of the five essential supports were 10 times more likely to improve students' reading and math gains, compared to schools that were weak in three to five supports. Few schools with consistently low scores across the five essential supports improved students' test score gains in either reading or math.[13]

Subsequent Research Linked the Five Essential Supports with Student and Teacher Outcomes

Beyond the original validation work, the UChicago Consortium has conducted research to continually refine survey measures and study their relationships with school outcomes. For example, one 2009 study found that teachers' survey reports effectively measured work conditions and predicted a school's ability to retain teachers. Teachers tended to stay in schools with principals that were strong instructional leaders who had established the trust of teachers, where there was strong trust and collaboration among teachers, and where teachers saw each other partners in school improvement. [14] A 2016 study evaluated how different aspects of effective leadership established the conditions for student growth, and found that achievement growth was higher in schools where principals leveraged teacher leadership to promote improvements in school climate.[15]

Consortium research on high schools, though short of the full longitudinal validation done for elementary schools, supports the importance of the essentials for schools at that level. A 2015 study of schools in CPS and across the state of Illinois found that strength in the essential supports was associated with improved high school attendance rates, higher graduation rates and higher average ACT scores.[16] Allensworth and Easton's work establishing the now widely-used Freshman OnTrack indicator assessed factors affecting high school students remaining on track and graduating from CPS. They found that many of the *5Essentials* Survey measures related to students performing better-than-expected in terms of GPAs,

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[12] While a parent survey is given in CPS, it is constructed and administered by CPS and is not part of the *5Essentials* Survey.
[13] Bryk et al. (2010). Schools were categorized as "strong" on an essential support if their survey score on that indicator fell in the top quartile of Chicago elementary schools. Schools ranked in the bottom quartile for an essential indicator were classified as "weak" on that essential supports.
[14] Allensworth et al. (2009).
[15] Sebastian et al. (2016).
[16] Klugman et al. (2015).

failures, and absence rates.[17] Other Consortium studies found that a college-going culture, assessed by a Supportive Environment measure in high schools, was the single most consistent predictor of student progress toward college enrollment and was also related to greater improvement in high school test scores and higher graduation rates.[18]

School Climate is Part of the Five Essential Supports

While in today's parlance the *5Essentials* Survey is often referred to as a "school climate survey," it is important to point out that the five essential supports encompass many aspects of school climate, while additionally addressing other important elements of schools' organization such as Effective Leaders, Collaborative Teachers, and Ambitious Instruction. School climate research has been beset by a wide variation in definitions and by variation in what is or is not included in that concept. However, while many school climate concepts are grouped into the Supportive Environment essential, others, such as the quality of relationships (among staff and between staff and families) are incorporated in other essentials (**see Figure 2 on p.8** for details). Given this, when we describe schools as being strong in the five essential supports, we will say they have strong organizations rather than strong climates.

A. Berkowitz, Moore, Astor, & Benbenishty (2017).

Additional Research Linked School Organization or Learning Climate with Student Outcomes

Over the past several decades, the body of research supporting the importance of school organization or climate for improving student outcomes has grown. For example, a research review of 78 studies found strong school climate has been demonstrated to reduce the negative effects socioeconomic status has on academic achievement[19] and help foster higher overall academic achievement and attendance rates.[20] A study of New York City middle schools found improvement in the areas of Leadership, High Academic Expectations, Teacher Relationships and Collaboration, and School Safety and Order reduced teacher turnover and improved English and math performance.[21] Examining chronic absenteeism in Detroit public schools, researchers found schools strong in the five essential supports had lower rates of chronic absenteeism after controlling for student demographics and grade level.[22] In San Francisco, where schools receiving school improvement grants modeled their school improvement plans around the framework of five essential supports, reforms resulted in narrowed achievement gaps, reduced absences, and improved

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[17] Allensworth & Easton (2005); Allensworth & Easton (2007).
[18] Roderick, Nagaoka, Coca, Moeller, Roddie, Gilliam, & Patton (2008); Allensworth, Correa, & Ponisciak (2008).
[19] Berkowitz et al. (2017).
[20] Cohen, Mccabe, Michelli, & Pickeral (2009).
[21] Kraft et al. (2016).
[22] Lenhoff & Pogodzinski (2018).

teacher retention.[23] A study of California CORE districts found social-emotional learning and climate survey scores were predictive of students' academic outcomes.[24] Recently in Spain, a strong school climate was found to be predictive of students' life satisfaction.[25]

These more recent studies have mainly focused on targeted areas of school climate or a small number of outcomes. Our rich longitudinal data set, and four elementary and five high school outcomes, combined with the breadth of measures in the *5Essentials* Survey, enables us to examine many important areas, including school climate, in one study. This provides a consistent lens through which to view the many different measures and outcomes, which is not possible with an array of existing studies that use different outcomes and methodologies.

The longitudinal data used in this study allow us to investigate different ways in which the *5Essentials* Survey measures may relate to changes in student outcomes. First, it may be having strength in a *5Essentials* Survey measure (such as Student-Teacher Trust) going into the school year that is important for improving student outcomes. In this case, we are looking at the "base strength" of a measure, assessed at the end of the prior school year. Second, it is also possible for schools to see outcomes improve the same year in which they are getting stronger on a *5Essentials* Survey measure. We call this "growth" in the measure. We will explore both strength and growth in *5Essentials* Survey measures using two different statistical models. The first model looks at whether it is necessary for schools to be strong in *5Essentials* Survey measures relative to the district to see outcomes improve (we define "strong" as one standard deviation above the average). This is the pooled regression model, which is similar to the original validation study. The second model compares schools to themselves over time and investigates whether schools also experience improvements in years when their *5Essentials* Survey performance is strong. This is a school fixed effect model. These models are explained in detail on p.14.

Updated Validation of the Five Essential Supports Framework

Since the validation work of *Organizing Schools for Improvement*, the pressures and scope of accountability have increased in Chicago, as well as in many areas of the country. The original period of this work, 1990–96, was a time in Chicago with very little focus on accountability policies.[26] At the end of the period, however, a new Chief Executive Officer was appointed to CPS and high-stakes testing began in Chicago. Surveys also began to get increased attention. Beginning in 1997, schools that voluntarily participated in the survey received individualized reports to be used for school improvement planning. These reports were originally shared only with principals who then used or shared the results as they thought fit, though CPS leadership did encourage the use of survey results and officially referred to the framework in school improvement plans. In 2011, the beginning of our study period, surveys and reports went online. This made sharing the results much easier and in 2013, CPS decided to make results available

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[23] Sun, Penner, & Loeb (2017).
[24] Hough, Kalogrides, & Loeb (2017).
[25] Lázaro-Visa, Palomera, Briones, Fernández-Fuertes, & Fernández-Rouco (2019).
[26] Analyses in Bryk et al. (2010) mainly focused on the period of 1990–96. It included a replication study using data from 1997–2005.

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to the public, allowing teachers and parents access to data that might previously have been wholly unavailable to them. The following year, in an effort to draw even more attention to the importance of schools' organizational strength, schools' *5Essentials* Survey results became part of CPS' accountability policy, accounting for 5-10 percent of a school's rating.

Changes in the administration and use of the survey could potentially either strengthen or weaken the quality of the data and the degree to which the surveys accurately represent what is happening in schools. For example, the increased attention to the importance of the *5Essentials* Survey could improve data quality by increasing response rates, thereby strengthening the connection between survey outcomes and performance as schools use the five essential supports to guide their improvement efforts. This would strengthen the validity of the survey overall. Or, because school ratings are consequential, there could be an incentive or pressure for schools to appear strong on the five essential supports. If respondents were exaggerating their school's strengths when responding to the survey, it would compromise the ability of the survey to truly detect schools' performance, and thereby also compromise our ability to measure the relationship between school organization and improvement in student outcomes. This would be interpreted as a lack of validity.

This Study

This study seeks to understand the validity of the *5Essentials* Survey at the present stage of educational practice in both elementary and high schools, and under present conditions in CPS. This report shares our methodology and results from our first phase of work in a two-year study. In this first phase, we examined the relationship of each of the 22 *5Essentials* Survey measures separately with student outcomes in both elementary and high school. Our analyses include administrative and survey data from 2011–18 in 535 elementary and 207 high schools.[27] Our results section provides findings organized by school level (elementary or high school) and outcome. With these first analyses, we provide direct evidence of the relationship between *5Essentials* Survey measures and improvement in student outcomes.

In our second phase of this study, we will further explore 1) the relationship between *5Essentials* Survey measures and student outcomes, and 2) the degree to which these relationships may differ depending on school contexts. These different school contexts include variations in student population (e.g., in terms of students' socioeconomic status, race/ethnicity, mobility, special education status, etc.) and also school characteristics, such as those with selective enrollment policies or smaller enrollment. In addition, we will qualitatively explore the experiences of school staff around the administration and use of the *5Essentials* Surveys in their schools and in the district.

Ultimately, we undertook this two-year study to ensure a strong research foundation for the *5Essentials* Survey and framework as a tool to guide educators, policymakers, researchers and families in their work creating supportive school environments. Findings from this work will guide ongoing improvements and additional study of both the five essentials framework and *5Essentials* Survey. Results from the second phase of this study will be available in early 2021.

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[27] These are the number of unique schools over the study period. Some schools opened and closed during this period. Closed schools are included for the years they were open. Charter schools were included in analyses where data were available. See Appendix A for more details.

Methods

Our analysis of the links between the *5Essentials* Survey measures and improvement in student-level outcomes involved several steps described in detail below. First, we recalibrated school *5Essentials* Survey measures to ensure they were similar over time. Second, we calculated change in student outcomes for each school in each year, relative to what would be expected based on the student population in the school in that year. Finally, we modeled the relationship between improvement in student outcomes and strength or growth in survey measures with a pooled regression model and a school fixed effect model.

Recalibration

The *5Essentials* Survey is comprised of 22 measures of school organization, grouped into five essential supports. The Rasch analysis method calculates measure parameters (e.g., the difficulty of each item in a measure) and uses that information to create the measure. By applying the same measure parameters to different survey samples, measures can be directly compared across different years. While the measures have been assessed for changes in reliability and updated with new content since they were originally developed, measure parameters have not been universally updated and some were created as long as 25 years ago. There have been many changes that could potentially affect the calibration of the survey measures, including changes in educational practices, district focus on accountability, or potential cohort differences in students and teachers such that the original item parameters do not fit the recent data as well as they fit the earlier data. Recalibrated parameters reflect the current era and enable the evaluation of measures' current statistical characteristics.

Recalibration required recreating all measures, based on only recent data (2014–19), to see if they still maintained expected levels of reliability and could still explain sufficient variance at the school level to be useful in differentiating schools. We found each of the measures had acceptable Rasch reliability, with the majority able to differentiate several strata of respondents (>0.80).[28] We also calculated the intraclass correlation coefficient (ICC) for schools and found that all of the measures explained sufficient variance at the school level to be useful in differentiating schools (ICC >0.05).[29]

Once individual respondents' Rasch scores were created, they were weighted by their precision (the inverse of their standard error) to calculate a precision weighted mean score for every school in every year. This method allowed respondents with response patterns that were more consistent with the construct to be weighed more highly. We then used these school measure scores to evaluate the relationship of each school's *5Essentials* Survey measures to that school's improvement in outcomes. Specifically, we included both a school's initial measure score at the end of the year prior to year in question (hereafter, "base strength") and the change in measure score over the year in question (hereafter, "growth") as predictors of outcome improvement.

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[28] Wright (1996).
[29] Hedberg & Hedges (2014).

Calculating Improvement in School Outcomes

For each of the school outcomes, we estimated the improvement for each school in each year, relative to their students' achievement outcome in the prior year, using hierarchical linear models (HLMs). A school's one-year outcome improvement was based on all valid CPS students who attended that school in that focus year and also had useable data on the outcome from the prior year, even if they were in a different school that year (see Appendix A for more details). Our objective was to calculate a school's change in outcome using the same students at time one (end of the prior year) and time two (end of focus year). This means that any changes in the student population (e.g., higher-performing students arriving or leaving the school) would not influence our measure of school improvement.

Additionally, when calculating improvement in each outcome through the HLMs, we controlled for schools' grade configurations, which could influence comparability between schools (e.g., schools with different grade levels) or over time (e.g., changes in the number of students in each grade in the school). For all outcomes, a prior achievement variable was included to account for expected differences in growth between students (e.g., average GPA or attendance for each student in the prior year). With these controls, we eliminated the differences between schools with different relative numbers of students in each grade level and with different incoming achievement levels. The product of this analysis was an empirical Bayes' estimate of how much schools' average student outcomes had improved beyond what could be attributed to prior student performance or the average expected change given their grade (included for academic grade, test score, and attendance outcomes). In statistical terms, the outcome for every student i was aggregated together for their school, j, and year, t, combination. The school's random effect in each year, u_{jt}, is the improvement in average student outcome not predicted by prior outcome or school composition.

$$Outcome_{i,jt} = \beta_{0j} + \beta_{1i} * Student\ Grade_i + \beta_{2i} * Prior\ Outcome_i, \beta_{0jt} = \gamma_{00} + u_{jt}$$

Regressing Outcome Improvement to School Organization Base Strength and Growth

In the original validation study, a type of pooled regression model was used to estimate the effects of school organization on aggregated change in value-added scores.[30] We adapted this model for a similar purpose, to address how well the school-level survey measures predicted a school's yearly improvement, averaged across the district. Improvement in each outcome for each school, j, in each year, t, was regressed on the growth in that school's *5Essentials* Survey measures and the school's previous year's *5Essentials* Survey measures. For each of the measures and outcomes evaluated, we tested whether base strength school measure scores or growth in school measure scores were significantly different than zero, whether positive or negative.

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[30] Bryk et al. (2010).

$$Improvement\ in\ Outcome_{jt} = \beta_0 + \beta_{1jt-1} Base\ Strength\ in\ Organization\ Measure +$$
$$\beta_{2jt} Growth\ in\ Organization\ Measure$$

In addition, we applied a school fixed effect model, which was identical to the pooled regression model except that it also included an intercept for each individual school. This model only captured the effect of survey measure scores on improvement in outcomes within schools, rather than differences between them. The purpose of this was to see if schools experience improvements in outcomes in years when their *5Essentials* Survey performance is stronger than usual for them (rather than stronger than other schools in the district).

Results

Key Findings

Across the 10 outcomes and 22 5Essentials Survey measures examined, each outcome was predicted by multiple measures, and each individual measure was a significant, positive predictor of multiple outcomes. Overall, the results validate the survey measures as predictors of school improvement. Furthermore, the results provide a new, useful way of describing the expected improvement in outcomes that schools are likely to see if they are strong and/or growing in the five essential supports.

Notably, all measures were not associated with all outcomes. But nearly all outcomes were positively related to at least one-half the *5Essentials* Survey measures.[31] For example, yearly attendance improved more at schools that were strong (one standard deviation above average scores) on survey measures, such as Quality of Student Discussion and Teacher-Parent Trust, than those that had average measure scores. This difference was as much as an additional 0.48 percentage points in attendance rates per year in elementary schools and an additional 3.55 percentage points in high schools. Similarly, Freshman OnTrack rates improved by as much as 3.25 percentage points more in high schools with strong *5Essentials* Survey measures, compared to schools with average measure scores.

Additionally, we found:

- **Both 1) starting out the year with strength in a measure and 2) improving on measures during the course of the year predicted improved student outcomes in schools.** Thus, schools that are working to improve in areas, such as Student-Teacher Trust or Teacher Influence, but have not yet reached a point of strength, can still see improvements in their students' outcomes such as GPAs, tests, and attendance.

- **As in the original study, the measures were positively and significantly related to growth in elementary test scores and attendance.** We found that our additional elementary outcome, GPA, also improved more in schools with strong scores on the *5Essentials* Survey.

- **High school outcomes—attendance, test scores, GPA, Freshman OnTrack, and college enrollment—were positively and significantly related to 5Essentials Survey measures in high school.** This study is the first to examine and establish associations between these five high school outcomes and all *5Essentials* Survey measures.

- ***5Essentials* Survey measures predicted improvement for schools that were strong compared to other schools, and also for schools compared to themselves in stronger vs. weaker years.** Our analyses looked both at schools compared to other schools and schools compared to themselves over time. Most *5Essentials* Survey measures were able to predict the years in which schools improved. This suggests that the *5Essentials* Survey measures

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[31] The exception is the outcome of college enrollment, which was positively and significantly related to less than one-half of the measures when considering measure growth instead of measure strength. See p.38 for more details.

do not just relate to differences between schools but also to the changes in organizational strength in the same school over time.

- These results suggest that the *5Essentials* Survey, and its underlying framework, continue to be useful and meaningful for schools working to improve student outcomes.

- **A handful of measures showed negative and significant relationships with certain outcomes.** Multiple student survey measures negatively predicted GPA, which may be consistent with research that shows greater academic challenges may lower grades while at the same time raising test scores.[32] Only two other measures had any significant negative associations. However, each was significantly negative in only two out of 40 total comparisons.

Detailed Results

In the following sections, more detailed results are presented by each outcome. We begin with the outcomes studied in the original validation work: elementary attendance and test scores. We then present work that constitutes new ground: elementary GPA and high school outcomes (attendance, test scores, GPA, Freshman OnTrack, and college enrollment).

In general, measures predicted a larger change in outcomes in the pooled regression model than the fixed effects model. This is to be expected, as the pooled regression model is a more liberal test, predicting all variation in growth that occurs in an outcome for every year equally. The fixed effect model is a more conservative estimate, in which schools that have maintained relatively consistent measure scores and outcome growth could actually lessen the estimated effects. This is because for those schools there is no variation and therefore no evidence that variation in measure scores relates to outcome growth.

We also observed that most outcome improvement was, in aggregate, better predicted by having strength in a measure coming into the school year, rather than by growing over the school year in question. For example, base strength in Student-Teacher Trust predicted improvement in college enrollment better than growth in Student-Teacher Trust.

For each outcome, we describe briefly how it is measured, provide high-level summary of findings, and then present four figures depicting measure-outcome relationships. These figures correspond to 1) the pooled regression model for having strength on measures and then growth on measures; then 2) the school fixed effect models for strength and growth.

How to Read Figures

Figures 3-12 are presented to illustrate the degree to which *5Essentials* Survey measures were related to improvement in student outcomes. Stronger relationships provide more evidence for the validity of the *5Essentials* Survey. The figures show a high-level picture of these relationships; details such as measure names and precise point values have been omitted to provide this larger view. Appendix B includes tables

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[32] Allensworth, Gwynne, Pareja, Sebastian, & Stevens (2014).

corresponding to each figure with measure names and exact, standardized coefficients. The figures in this section show the coefficients in original, non-standardized units for easier interpretation.

In each figure, there are four line graphs. The first two line graphs show results from the pooled regression model. The bottom two line graphs show results from the school fixed effects model. Each dot represents a *5Essentials* Survey measure. Transparent dots are measures that were not statistically significant in their relationship with the outcome.

Each figure is set up similarly, and presents results for each outcome studied. For example, looking at Figure 3, which examines the degree to which *5Essentials* Survey measures are related to improvements in elementary school attendance:

- The first line graph shows how much more the attendance rate improved **at schools that were strong in measures vs. schools that were average** (examining the measure base strength).[33] For example, the right-most dot at 0.48 percentage points is Student-Teacher Trust, part of the Supportive Environment essential. For schools with above average Student-Teacher Trust levels, their students' attendance rate improved 0.48 percentage points more than a school with average levels of Student-Teacher Trust.

- The second line graph shows how much more the attendance rate **improved at schools with high growth in measures vs. schools with average growth in measures**. The right-most dot at 0.51 percentage points is Program Coherence, part of the Effective Leaders essential. For schools with above average growth in Program Coherence, their students' attendance rate improved 0.51 percentage points more in a year than schools with average amounts of growth in Program Coherence.

- The third line graph **compares schools to themselves across years of higher or lower *5Essentials* Survey measure scores.** The dots show how much more the attendance rate improved in years when measures were strong vs. years when measures were average. The rightmost dot at 0.53 percentage points is the measure Parent Involvement in School, part of the Involved Families essential. For years with strong Parent Involvement in School, students' attendance rate improved 0.53 percentage points more than years when Parent Involvement in School was average.

- The fourth line graph **compares schools to themselves across years of higher or lower measure growth.** The dots show how much more the attendance rate improved in years when measure growth was strong vs. years when measure growth was average. The rightmost dot at 0.61 percentage points is the measure Parent Involvement in School, part of the Involved Families essential. For years with strong growth in Parent Involvement in School, students' attendance rate improved 0.61 percentage points more than years when growth in Parent Involvement in School was average.

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[33] Because attendance rate was modeled logistically, the percentage point values shown in this section were obtained by doing a conversion calculation from logit units to attendance percentage points *at the average school*. This is also true for the other logistic outcomes, Freshman OnTrack, and college enrollment.

Elementary Attendance

The attendance rate for each student was calculated as the number of days attended divided by the number of days enrolled for a school year.

Summary

Small amounts of variation in attendance at the elementary level left little remaining variation that could be explained by *5Essentials* Survey measures. The typical elementary school's attendance rate ranged from 3.92 percentage points lower than predicted by students' prior achievement to 2.24 percentage points higher than predicted by students' prior achievement. **Figure 3** provides a visualization of analysis results—the degree to which *5Essentials* Survey measures were related to improvement in this outcome. (See Tables B.2 and B.3 in Appendix B for pooled regression and school fixed effects model coefficients.)

Pooled Regression Model. The first model compared strengths and weaknesses across schools.

A. **Strength in Measures.** Despite the limitations, for nearly all measures, above average measure strength was positively and significantly related to attendance rate improvement. Schools that were strong on *5Essentials* Survey measures improved their attendance rate as much as 0.48 percentage points more than schools that were average on measures (**see Figure 3.A**).

B. **Growth in Measures.** For nearly all measures, above average measure growth was positively and significantly related to attendance rate improvement. Schools that grew more than average on *5Essentials* Survey measures improved their attendance rate as much as 0.51 percentage points more than schools that showed an average amount of change in measures (**see Figure 3.B**).

School Fixed Effects Model. The second model compared schools to themselves in stronger and weaker years and in years where their measures grew more or less.

C. **Strength in measures.** For nearly all measures, above average measure strength in a given year was positively and significantly related to attendance rate improvement. In years when their *5Essentials* Survey measures were strong, schools improved their attendance rate as much as 0.54 percentage points more than in years when measures were average (**see Figure 3.C**).

D. **Growth in measures.** For all measures, above average measure growth in a given year was positively and significantly related to attendance rate improvement. In years when schools grew in their *5Essentials* Survey measures, they improved their attendance rate as much as 0.61 percentage points more than in years when measures showed an average amount of change (**see Figure 3.D**).

Parent Involvement in School and School Commitment were among the measures that were positively and significantly related to attendance in both models.[34]

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[34] Examples of measures named here were among the top 10 most strongly-related measures across both the pooled and school fixed effects models, and for both measure strength and measure growth.

Figure 3. Elementary Attendance Rate Improvement (Percentage Points)

*A.   How much more did a **strong** school improve than an **average** school?*

*B.   How much more did a **growing** school improve than an **average** school?*

*C.   Compared to its usual improvement in this outcome, how much more did a school improve in years when it was **strong** on a 5Essentials Survey measure?*

*D. Compared to its usual improvement in this outcome, how much more did a school improve in years when it was **growing** in a 5Essentials Survey measure?*

Note:
- Each dot is a *5Essentials* Survey measure: Each dot indicates the predicted amount of improvement on elementary attendance rate (in percentage points) a school experienced for strength or growth in a particular measure. Transparent dots are measures that were not statistically significant in their relationship with attendance rate.
- Strong and average schools: When we refer to a "strong school" above, it means a school that was above the average (by 1 SD) on a particular measure. An "average school" is one that was average on the measure.
- Growing and average schools: When we refer to a "growing school" above, it means a school whose growth in a 5Essentials Survey measure was above the average (by 1 SD). An "average school" was showing an average amount of change on the measure. (Average growth was calculated by averaging annual growth across all years of our sample.)
- Analysis of elementary attendance included both charter and non-charter CPS schools.

Elementary Test Scores

Elementary test scores were taken from the NWEA exam administered to students in grades 2-8. However, for years in our analysis before 2013, the district administered the ISAT exam instead of the NWEA. ISAT scores were converted into NWEA points using a multiple imputation method (see Appendix A). Separate analyses were conducted for math and reading test scores.

Elementary Math Test Summary

Elementary math test results are given in NWEA scale points.[35] The typical elementary school's mean NWEA math scale score ranged from 3.10 points lower than predicted by students' prior achievement to 3.10 points higher than predicted by students' prior achievement. **Figure 4** provides a visualization of analysis results—the degree to which *5Essentials* Survey measures were related to improvement in this outcome. (See Tables B.4 and B.5 in Appendix B for pooled regression and school fixed effects model coefficients.)

Pooled Regression Model. The first model compared strengths and weaknesses across schools.

    A. **Strength in Measures.** For nearly all measures, above average measure strength was positively and significantly related to improvement in math scores. Schools that were strong on *5Essentials* Survey measures improved their math scores as much as 1.77 NWEA points more than schools that were average on measures (**see Figure 4.A**).

    B. **Growth in Measures.** For nearly all measures, above average measure growth was positively and significantly related to improvement in math scores . Schools that grew more than average on *5Essentials* Survey measures improved their math scores as much as 0.86 NWEA points more than schools that showed an average amount of change in measures (**see Figure 4.B**).

School Fixed Effects Model. The second model compared schools to themselves in stronger and weaker years and in years where their measures grew more or less.

    C. **Strength in Measures.** For all measures, above average measure strength in a given year was positively and significantly related to improvement in math scores . In years when their *5Essentials* Survey measures were strong, schools improved their math scores as much 1.22 NWEA points more than in years when measures were average (**see Figure 4.C**).

    D. **Growth in Measures.** For all measures, above average measure growth in a given year was positively and significantly related to improvement in math scores . In years when schools grew in their *5Essentials* Survey measures, they improved their math scores as much as 0.67 NWEA points more than in years when measures showed an average amount of change (**see Figure 4.D**).

Quality of Student Discussion and Teacher-Parent Trust were among the measures that were positively and significantly related to math scores in both models.[36]

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[35] Expected improvements in individual NWEA scores were based on what would be observed for a fifth-grader.
[36] Examples of measures named here were among the top 10 most strongly-related measures across both the pooled and school fixed effects models, and for both measure strength and measure growth.

Figure 4. Elementary Math Test Score Improvement (NWEA Points)

*A.   How much more did a **strong** school improve than an **average** school?*

*B.   How much more did a **growing** school improve than an **average** school?*

*C.   Compared to its usual improvement in this outcome, how much more did a school improve in years when it was **strong** on a 5Essentials Survey measure?*

D.
*Compared to its usual improvement in this outcome, how much more did a school improve in years when it was **growing** in a 5Essentials Survey measure?*

Note:
- Each dot is a *5Essentials* Survey measure: Each dot indicates the predicted amount of improvement on elementary math test scores (in NWEA points) a school experienced for strength or growth in a particular measure. Transparent dots are measures that were not statistically significant in their relationship with attendance rate.
- Strong and average schools: When we refer to a "strong school" above, it means a school that was above the average (by 1 SD) on a particular measure. An "average school" is one that was average on the measure.
- Growing and average schools: When we refer to a "growing school" above, it means a school whose growth in a 5Essentials Survey measure was above the average (by 1 SD). An "average school" was showing an average amount of change on the measure. (Average growth was calculated by averaging annual growth across all years of our sample.)
- Analysis of elementary math tests included both charter and non-charter CPS schools.

Elementary Reading Test Summary

Elementary Reading test results are given in NWEA scale points. The typical elementary school's mean NWEA reading scale score ranged from 1.94 points lower than predicted by students' prior achievement to 1.94 points higher than predicted by students' prior achievement. **Figure 5** provides a visualization of analysis results—the degree to which *5Essentials* Survey measures were related to improvement in this outcome. (See Tables B.6 and B.7 in Appendix B for pooled regression and school fixed effects model coefficients.)

Pooled Regression Model. The first model compared strengths and weaknesses across schools.

A. **Strength in measures.** For nearly all measures, above average measure strength was positively and significantly related to improvement in reading scores. Schools that were strong on *5Essentials* Survey measures improved their reading scores as much as 1.04 NWEA points more than schools that were average on measures (**see Figure 5.A**).

B. **Growth in measures.** For nearly all measures, above average measure growth was positively and significantly related to improvement in reading scores. Schools that grew more than average on *5Essentials* Survey measures improved their reading scores as much as 0.56 NWEA points more than schools that showed an average amount of change in measures (**see Figure 5.B**).

School Fixed Effects Model. The second model compared schools to themselves in stronger and weaker years and in years where their measures grew more or less.
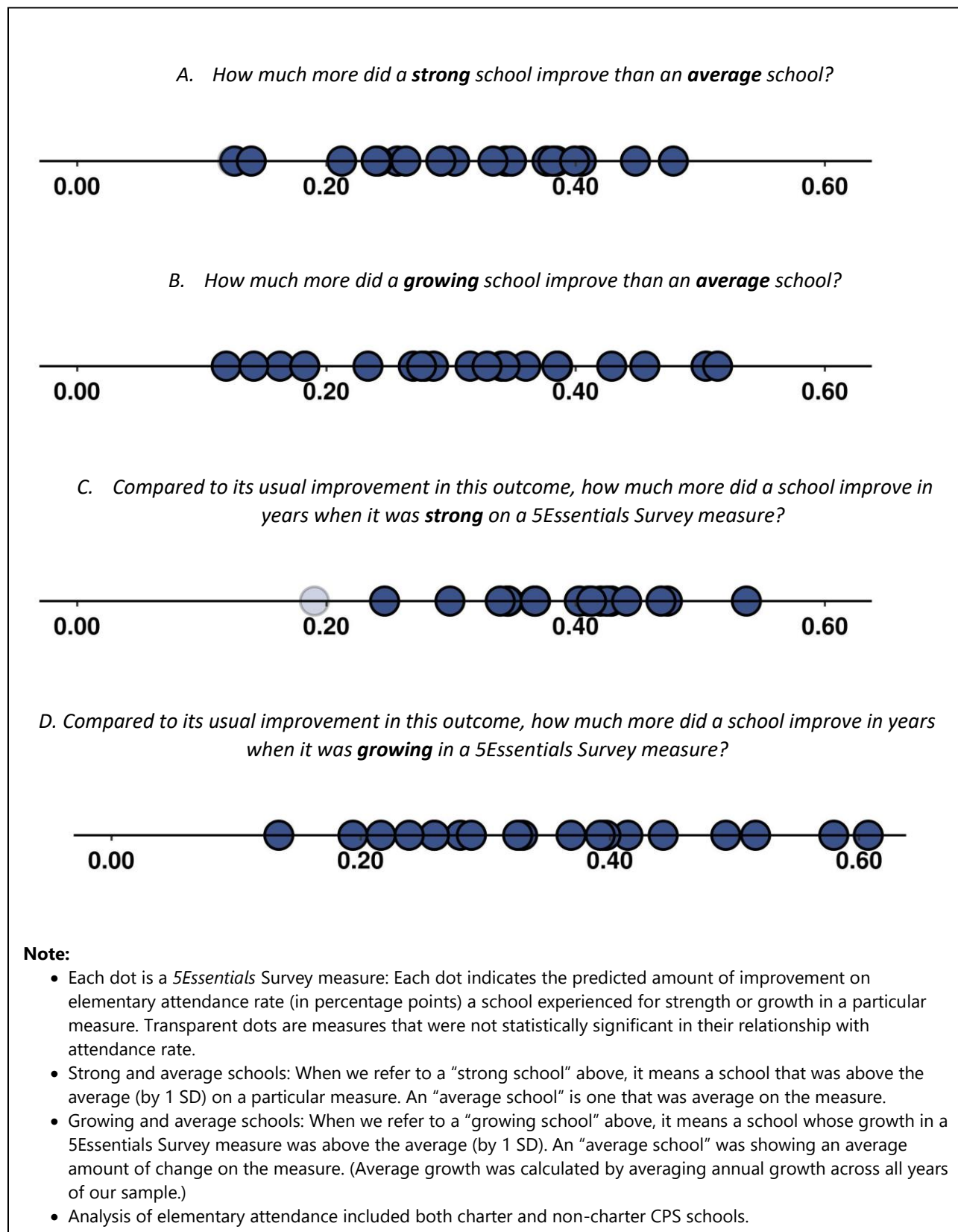
C. **Strength in measures.** For nearly all measures, above average measure strength in a given year was positively and significantly related to improvement in reading scores. In years where their *5Essentials* Survey measures were strong, schools improved their reading scores as much as 0.77 NWEA points more than in years when measures were average (**see Figure 5.C**).

D. **Growth in measures.** For all measures, above average measure growth in a given year was positively and significantly related to improvement in reading scores. In years where schools grew in their *5Essentials* Survey measures, they improved their reading scores as much as 0.48 NWEA points more than in years when measures showed an average amount of change (**see Figure 5.D**).

Quality of Student Discussion and Teacher-Parent Trust were among the measures that were positively and significantly related to reading scores in both models.[37]

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[37] Examples of measures named here were among the top 10 most strongly-related measures across both the pooled and school fixed effects models, and for both measure strength and measure growth.

Figure 5. Elementary Reading Test Score Improvement (NWEA Points)

A. How much more did a strong school improve than an average school?

B. How much more did a growing school improve than an average school?

C. Compared to its usual improvement in this outcome, how much more did a school improve in years when it was strong on a 5Essentials Survey measure?

D. Compared to its usual improvement in this outcome, how much more did a school improve in years when it was growing in a 5Essentials Survey measure?

Note:
- Each dot is a *5Essentials* Survey measure: Each dot indicates the predicted amount of improvement on elementary reading test scores (in NWEA points) a school experienced for strength or growth in a particular measure. Transparent dots are measures that were not statistically significant in their relationship with attendance rate.
- Strong and average schools: When we refer to a "strong school" above, it means a school that was above the average (by 1 SD) on a particular measure. An "average school" is one that was average on the measure.
- Growing and average schools: When we refer to a "growing school" above, it means a school whose growth in a 5Essentials Survey measure was above the average (by 1 SD). An "average school" was showing an average amount of change on the measure. (Average growth was calculated by averaging annual growth across all years of our sample.)
- Analysis of elementary reading tests included both charter and non-charter CPS schools.

The previous validation study documented in *Organizing Schools for Improvement* examined reading and math test scores and attendance.[38] The following outcomes have not been previously studied in relation to all *5Essentials* Survey measures, though various Consortium reports have analyzed the relationships of these outcomes with some specific, individual measures.[39]

Elementary GPA

The GPA for each elementary student was calculated on a four-point scale by averaging grades received for all standards across all subject areas. Note that charter school students were excluded from this analysis due to grade data limitations; see Appendix A for details.

Summary

The typical elementary school's mean GPA ranged from 0.16 points lower than predicted by students' prior achievement to 0.16 points higher than predicted by students' prior achievement. **Figure 6** provides a visualization of analysis results—the degree to which *5Essentials* Survey measures were related to improvement in this outcome. (See Tables B.8 and B.9 in Appendix B for pooled regression and school fixed effects model coefficients.)

Pooled Regression Model. The first model compared strengths and weaknesses across schools.

A. **Strength in measures.** For more than one-half of all measures, above average measure strength was positively and significantly related to GPA improvement. Schools that were strong on *5Essentials* Survey measures improved their average GPA as much as 0.09 points more than schools that were average on measures (**see Figure 6.A**). However, there were five measures which were negatively related to GPA. Schools which were strong in Academic Press, Math Instruction, Academic Personalism, and English Instruction showed less GPA improvement. See Table B.8 in Appendix B for details.

B. **Growth in measures.** For more than one-half of all measures, above average measure growth was positively and significantly related to GPA improvement. Schools that grew more than average on *5Essentials* Survey measures improved their average GPA as much as 0.03 points more than schools that showed an average amount of change in measures (**see Figure 6.B**). However, there were a small number of measures which were negatively related to GPA. Schools which were growing in Math Instruction, Academic Personalism, and English Instruction showed less GPA improvement. See Table B.8 in Appendix B for details.

School Fixed Effects Model. The second model compared schools to themselves in stronger and weaker years and in years where their measures grew more or less.

C. **Strength in measures.** For nearly all measures, above average measure strength in a given year was positively and significantly related to GPA improvement. In years where their *5Essentials* Survey measures were strong, schools improved their average GPA as much as 0.04 points more than in years when measures were average (**see Figure 6.C**).

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[38] Bryk et al. (2010).
[39] Roderick, Coca, & Nagaoka (2011); Easton, Ponisciak, & Luppescu (2008); Allensworth & Easton (2007).

D. **Growth in measures.** For nearly all measures, above average measure growth in a given year was positively and significantly related to GPA improvement. In years where schools grew in their *5Essentials* Survey measures, they improved their average GPA as much as 0.02 points more than in years when measures showed an average amount of change (**see Figure 6.D**).
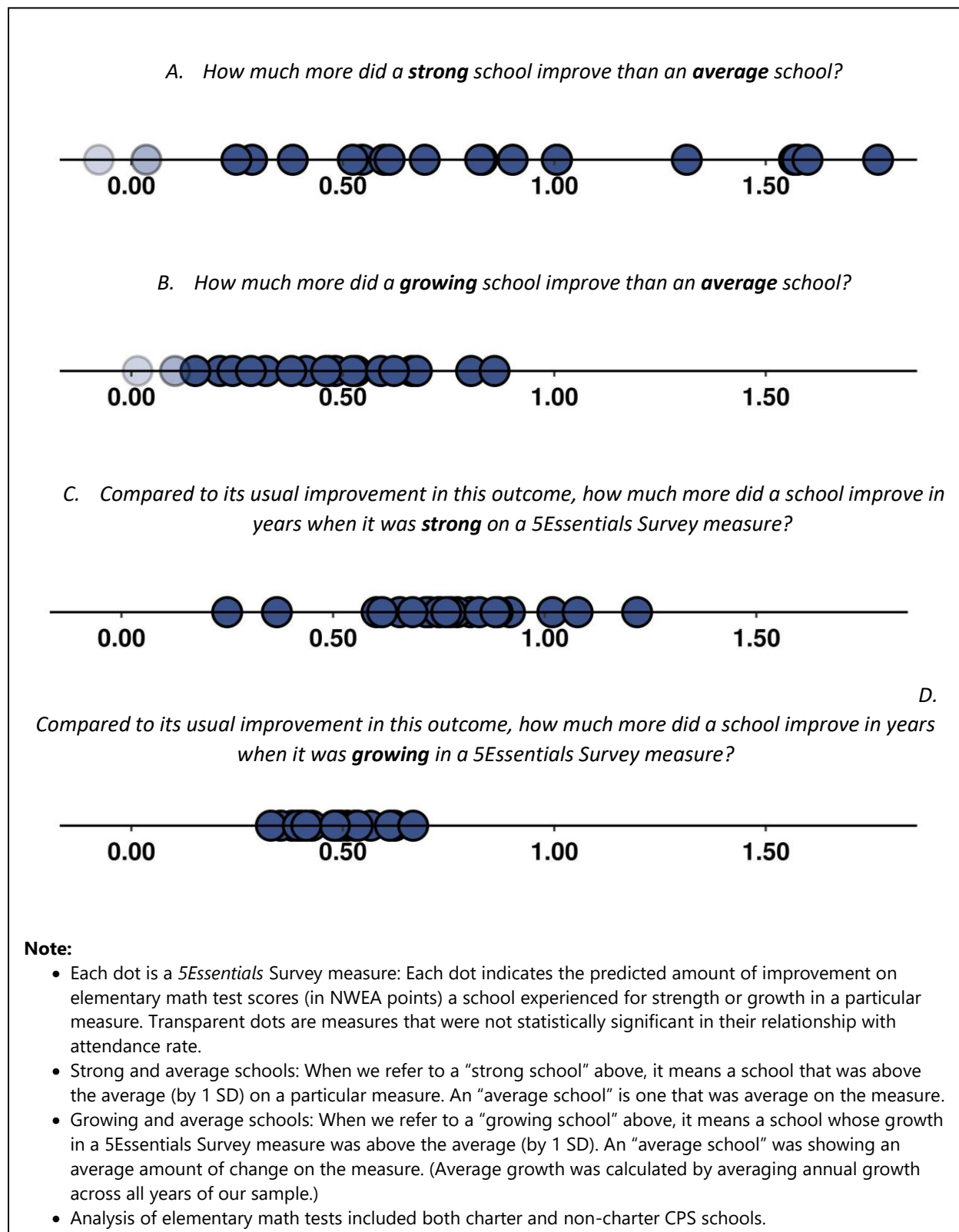
Quality of Student Discussion and Parent Involvement in School were among the measures that were positively and significantly related to elementary GPA across both models.[40]

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[40] Examples of measures named here were among the top 10 most strongly-related measures across both the pooled and school fixed effects models, and for both measure strength and measure growth.

Figure 6. Elementary GPA Improvement (4-Point Scale)

*A. How much more did a **strong** school improve than an **average** school?*

*B. How much more did a **growing** school improve than an **average** school?*

*C. Compared to its usual improvement in this outcome, how much more did a school improve in years when it was **strong** on a 5Essentials Survey measure?*

*D. Compared to its usual improvement in this outcome, how much more did a school improve in years when it was **growing** in a 5Essentials Survey measure?*

Note:
- Each dot is a *5Essentials* Survey measure: Each dot indicates the predicted amount of improvement on elementary GPA (in 4-point scale) a school experienced for strength or growth in a particular measure. Transparent dots are measures that were not statistically significant in their relationship with attendance rate.
- Strong and average schools: When we refer to a "strong school" above, it means a school that was above the average (by 1 SD) on a particular measure. An "average school" is one that was average on the measure.
- Growing and average schools: When we refer to a "growing school" above, it means a school whose growth in a 5Essentials Survey measure was above the average (by 1 SD). An "average school" was showing an average amount of change on the measure. (Average growth was calculated by averaging annual growth across all years of our sample.)
- Analysis of elementary GPA did not include charter schools. Many CPS charter schools use different student data systems. Creating linkages across these systems is difficult, and our data archive currently does not include records of charter school students' course performance.

High School Attendance

The attendance rate for each student was calculated as the number of days attended divided by the number of days enrolled for a school year.

Summary

Compared to elementary schools, high schools had larger amounts of variation in attendance growth that could be explained by *5Essentials* Survey measures. The typical high school's attendance rate ranged from 14.47 percentage points lower than predicted by students' prior achievement to 6.87 percentage points higher than predicted by students' prior achievement. **Figure 7** provides a visualization of analysis results—the degree to which *5Essentials* Survey measures were related to improvement in this outcome. (See Tables B.10 and B.11 in Appendix B for pooled regression and school fixed effects model coefficients.)

Pooled Regression Model. The first model compared strengths and weaknesses across schools.

A. **Strength in measures.** For nearly all measures, above average measure strength was positively and significantly related to attendance rate improvement. Schools that were strong on *5Essentials* Survey measures improved their attendance rate as much as 3.55 percentage points more than schools that were average on measures (**see Figure 7.A**).

B. **Growth in measures.** For more than one-half of all measures, above average measure growth was positively and significantly related to attendance rate improvement. Schools that grew more than average on *5Essentials* Survey measures improved their attendance rate as 1.44 percentage points more than schools that showed an average amount of change in measures (**see Figure 7.B**).

School Fixed Effects Model. The second model compared schools to themselves in stronger and weaker years and in years where their measures grew more or less.

A. **Strength in measures.** For seven of the 20 measures, above average measure strength in a given year was positively and significantly related to attendance rate improvement. In years when their *5Essentials* Survey measures were strong, schools improved their attendance rate as much 2.14 percentage points more than in years when measures were average (**see Figure 7.C**).

B. **Growth in measures.** For one-half of all measures, above average measure growth in a given year was positively and significantly related to attendance rate improvement. In years when schools grew in their *5Essentials* Survey measures, they improved their attendance rate as much as 1.36 percentage points more than in years when measures showed an average amount of change (**see Figure 7.D**).

School-Wide Future Orientation and Expectations for Post-secondary Education were among the measures that were positively and significantly related to improvement in attendance rate across both models.[41]

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[41] Examples of measures named here were among the top 10 most strongly-related measures across both the pooled and school fixed effects models, and for both measure strength and measure growth.

Figure 7. High School Attendance Rate Improvement (Percentage Points)

*A. How much more did a **strong** school improve than an **average** school?*

*B. How much more did a **growing** school improve than an **average** school?*

*C. Compared to its usual improvement in this outcome, how much more did a school improve in years when it was **strong** on a 5Essentials Survey measure?*

*D. Compared to its usual improvement in this outcome, how much more will a school improve in years when it was **growing** in a 5Essentials Survey measure*

Note:
- Each dot is a *5Essentials* Survey measure: Each dot indicates the predicted amount of improvement on high school attendance rate (in percentage points) a school experienced for strength or growth in a particular measure. Transparent dots are measures that were not statistically significant in their relationship with attendance rate.
- Strong and average schools: When we refer to a "strong school" above, it means a school that was above the average (by 1 SD) on a particular measure. An "average school" is one that was average on the measure.
- Growing and average schools: When we refer to a "growing school" above, it means a school whose growth in a 5Essentials Survey measure was above the average (by 1 SD). An "average school" was showing an average amount of change on the measure. (Average growth was calculated by averaging annual growth across all years of our sample.)
- Analysis of elementary attendance included both charter and non-charter CPS schools.

High School Test Scores

High school test scores were taken from the SAT exam, which is administered to eleventh-grade students. Because CPS switched from using ACT to SAT in the 2016–17 school year, ACT scores from before 2017 were converted into SAT scale points using concordance tables.

High School Math Test Summary

High school math test scores are provided in SAT scale points. The typical high school's mean SAT math scale score ranged from 37 points lower than predicted by students' prior achievement to 38 points higher than predicted by students' prior achievement. **Figure 8** provides a visualization of analysis results—the degree to which *5Essentials* Survey measures were related to improvement in this outcome. (See Tables B.12 and B.13 in Appendix B for pooled regression and school fixed effects model coefficients.)

Pooled Regression Model. The first model compared strengths and weaknesses across schools.

A. **Strength in measures.** For nearly all measures, above average measure strength was positively and significantly related to improved math test scores. Schools that were strong on *5Essentials* Survey measures improved their math scores as much as 28 SAT points more than schools that were average on measures (**see Figure 8.A**).

B. **Growth in measures.** For more than one-half of all measures, above average measure growth was positively and significantly related to improved math test scores. Schools that grew more than average on *5Essentials* Survey measures improved their math scores as much as 10 SAT points more than schools that showed an average amount of change in measures (**see Figure 8.B**).

School Fixed Effects Model. The second model compared schools to themselves in stronger and weaker years and in years where their measures grew more or less.
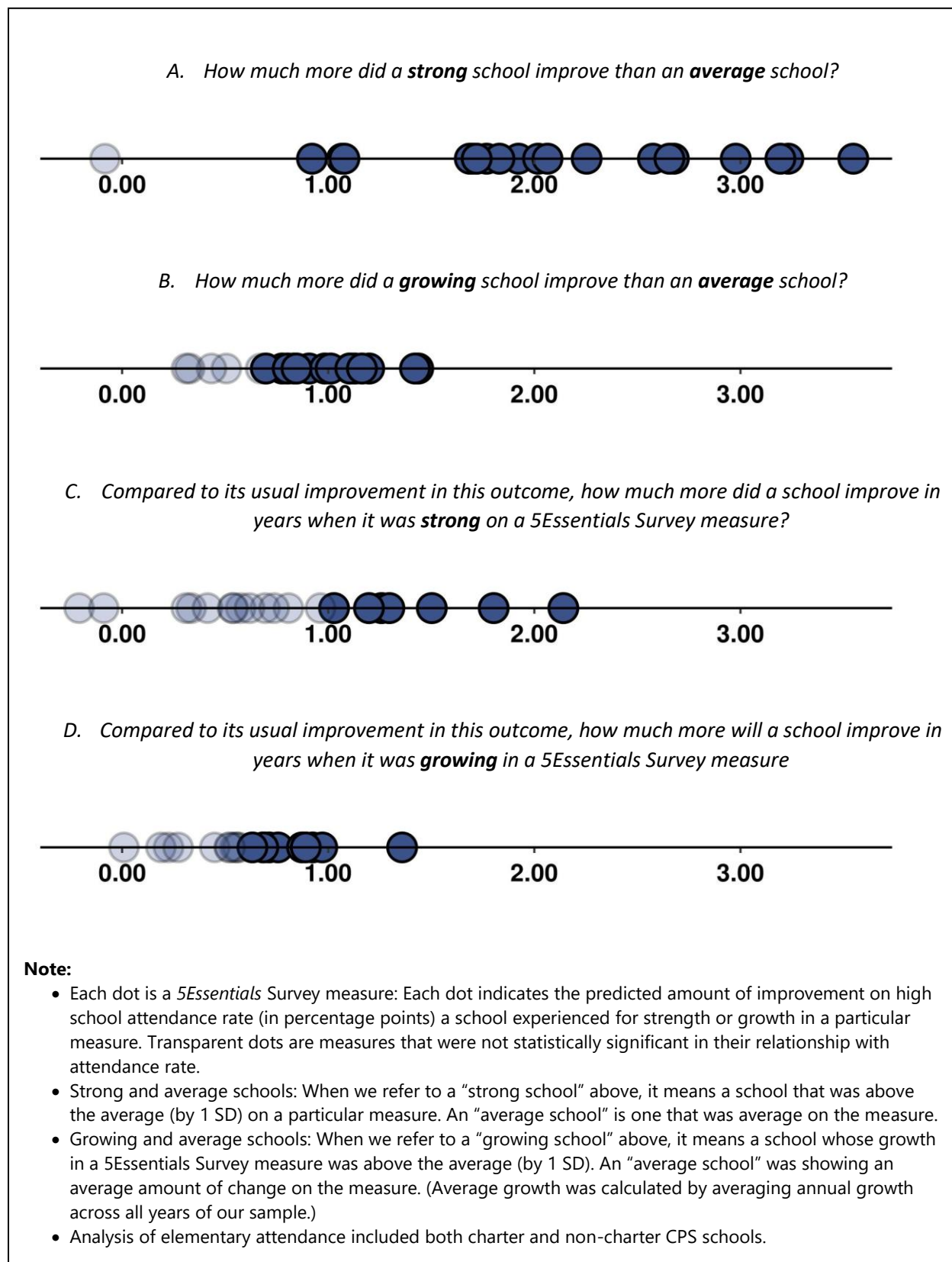
A. **Strength in measures.** For nearly all measures, above average measure strength in a given year was positively and significantly related to improved math test scores. In years when their *5Essentials* Survey measures were strong, schools improved their math scores as much 13 SAT points more than in years when measures were average (**see Figure 8.C**).

B. **Growth in measures.** For eight of the 20 measures, above average measure growth in a given year was positively and significantly related to improved math test scores. In years when schools grew in their *5Essentials* Survey measures, they improved their math scores as much as 6 SAT points more than in years when measures showed an average amount of change (**see Figure 8.D**).

Quality of Student Discussion and Teacher-Parent Trust were among the measures that were positively and significantly related to improved math scores in both models.[42]

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[42] Examples of measures named here were among the top 10 most strongly-related measures across both the pooled and school fixed effects models, and for both measure strength and measure growth.

Figure 8. High School Math Test Score Improvement (SAT Points)

A. *How much more did a **strong** school improve than an **average** school?*

B. *How much more did a **growing** school improve than an **average** school?*

C. *Compared to its usual improvement in this outcome, how much more did a school improve in years when it was **strong** on a 5Essentials Survey measure?*

D. *Compared to its usual improvement in this outcome, how much more did a school improve in years when it was **growing** in a 5Essentials Survey measure?*

Note:
- Each dot is a *5Essentials* Survey measure: Each dot indicates the predicted amount of improvement on high school math test scores (in SAT points) a school experienced for strength or growth in a particular measure. Transparent dots are measures that were not statistically significant in their relationship with attendance rate.
- Strong and average schools: When we refer to a "strong school" above, it means a school that was above the average (by 1 SD) on a particular measure. An "average school" is one that was average on the measure.
- Growing and average schools: When we refer to a "growing school" above, it means a school whose growth in a 5Essentials Survey measure was above the average (by 1 SD). An "average school" was showing an average amount of change on the measure. (Average growth was calculated by averaging annual growth across all years of our sample.)
- Analysis of SAT math scores included both charter and non-charter CPS schools.

High School Reading Test Summary

High school reading test scores are provided in SAT points. The typical high school's mean SAT reading scale score ranged from 33 points lower than predicted by students' prior achievement to 33 points higher than predicted by students' prior achievement. **Figure 9** provides a visualization of analysis results—the degree to which *5Essentials* Survey measures were related to improvement in this outcome. (See Tables B.14 and B.15 in Appendix B for pooled regression and school fixed effects model coefficients.)

Pooled Regression Model. The first model compared strengths and weaknesses across schools.

A. **Strength in measures.** For nearly all measures, above average measure strength was positively and significantly related to improved reading test scores. Schools that were strong on *5Essentials* Survey measures improved their reading scores as much as 25 SAT points more than schools that were average on measures (**see Figure 9.A**).

B. **Growth in measures.** For more than one-half of all measures, above average measure growth was positively and significantly related to improved reading test scores. Schools that grew more than average on *5Essentials* Survey measures improved their reading scores as much as 8 SAT points more than schools that showed an average amount of change in measures (**see Figure 9.B**).

School Fixed Effects Model. The second model compared schools to themselves in stronger and weaker years and in years where their measures grew more or less.

C. **Strength in measures.** For nearly all measures, above average measure strength in a given year was positively and significantly related to improved reading test scores. In years where their *5Essentials* Survey measures were strong, schools improved their reading scores as much as 8 SAT points more than in years when measures were average (**see Figure 9.C**).

D. **Growth in measures.** For nearly all measures, above average measure growth in a given year was positively and significantly related to improved reading test scores. In years where schools grew in their *5Essentials* Survey measures, they improved their reading scores as much as 3 SAT points more than in years when measures showed an average amount of change (**see Figure 9.D**).
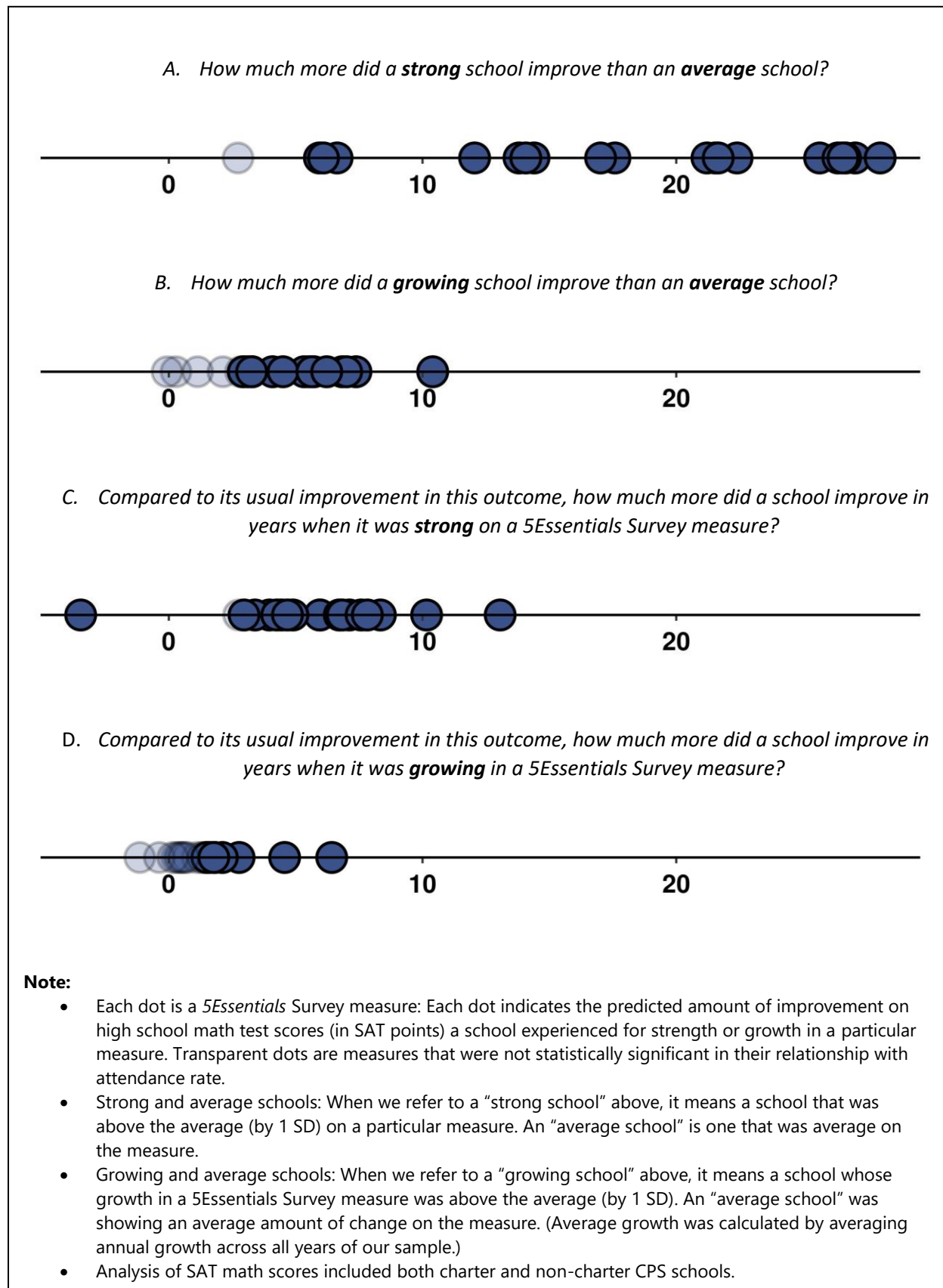
Quality of Student Discussion and Teacher-Parent Trust were among the measures that were positively and significantly related to reading scores in both models.[43]

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[43] Examples of measures named here were among the top 10 most strongly-related measures across both the pooled and school fixed effects models, and for both measure strength and measure growth.

Figure 9. High School Reading Test Score Improvement (SAT points)

*A. How much more did a **strong** school improve than an **average** school?*

*B. How much more did a **growing** school improve than an **average** school?*

*C. Compared to its usual improvement in this outcome, how much more did a school improve in years when it was **strong** on a 5Essentials Survey measure?*

*D. Compared to its usual improvement in this outcome, how much more did a school improve in years when it was **growing** in a 5Essentials Survey measure?*

Note:
- Each dot is a *5Essentials* Survey measure: Each dot indicates the predicted amount of improvement on high school reading test scores (in SAT points) a school experienced for strength or growth in a particular measure. Transparent dots are measures that were not statistically significant in their relationship with attendance rate.
- Strong and average schools: When we refer to a "strong school" above, it means a school that was above the average (by 1 SD) on a particular measure. An "average school" is one that was average on the measure.
- Growing and average schools: When we refer to a "growing school" above, it means a school whose growth in a 5Essentials Survey measure was above the average (by 1 SD). An "average school" was showing an average amount of change on the measure. (Average growth was calculated by averaging annual growth across all years of our sample.)
- Analysis of SAT reading scores included both charter and non-charter CPS schools.

High School GPA

The GPA for each student was calculated on a four-point scale by averaging the grades received in a school year, weighted by course credit amount. Note that charter school students were excluded from this analysis due to grade data limitations; see Appendix A for details.

Summary

The typical high school's mean GPA ranged from 0.13 points lower than predicted by students' prior achievement to 0.13 points higher than predicted by students' prior achievement. **Figure 10** provides a visualization of analysis results—the degree to which *5Essentials* Survey measures were related to improvement in this outcome. (See Tables B.16 and B.17 in Appendix B for pooled regression and school fixed effects model coefficients.)

Pooled Regression Model. The first model compared strengths and weaknesses across schools.

A. **Strength in measures.** For nearly all measures, above average measure strength was positively and significantly related to GPA improvement. Schools that were strong on *5Essentials* Survey measures improved their average GPA as much as 0.05 points more than schools that were average on measures (**see Figure 10.A**).

B. **Growth in measures.** For nearly all measures, above average measure growth was positively and significantly related to GPA improvement. Schools that grew more than average on *5Essentials* Survey measures improved their average GPA as much as 0.03 points more than schools that showed an average amount of change in measures (**see Figure 10.B**).

School Fixed Effects Model. The second model compared schools to themselves in stronger and weaker years and in years where their measures grew more or less.
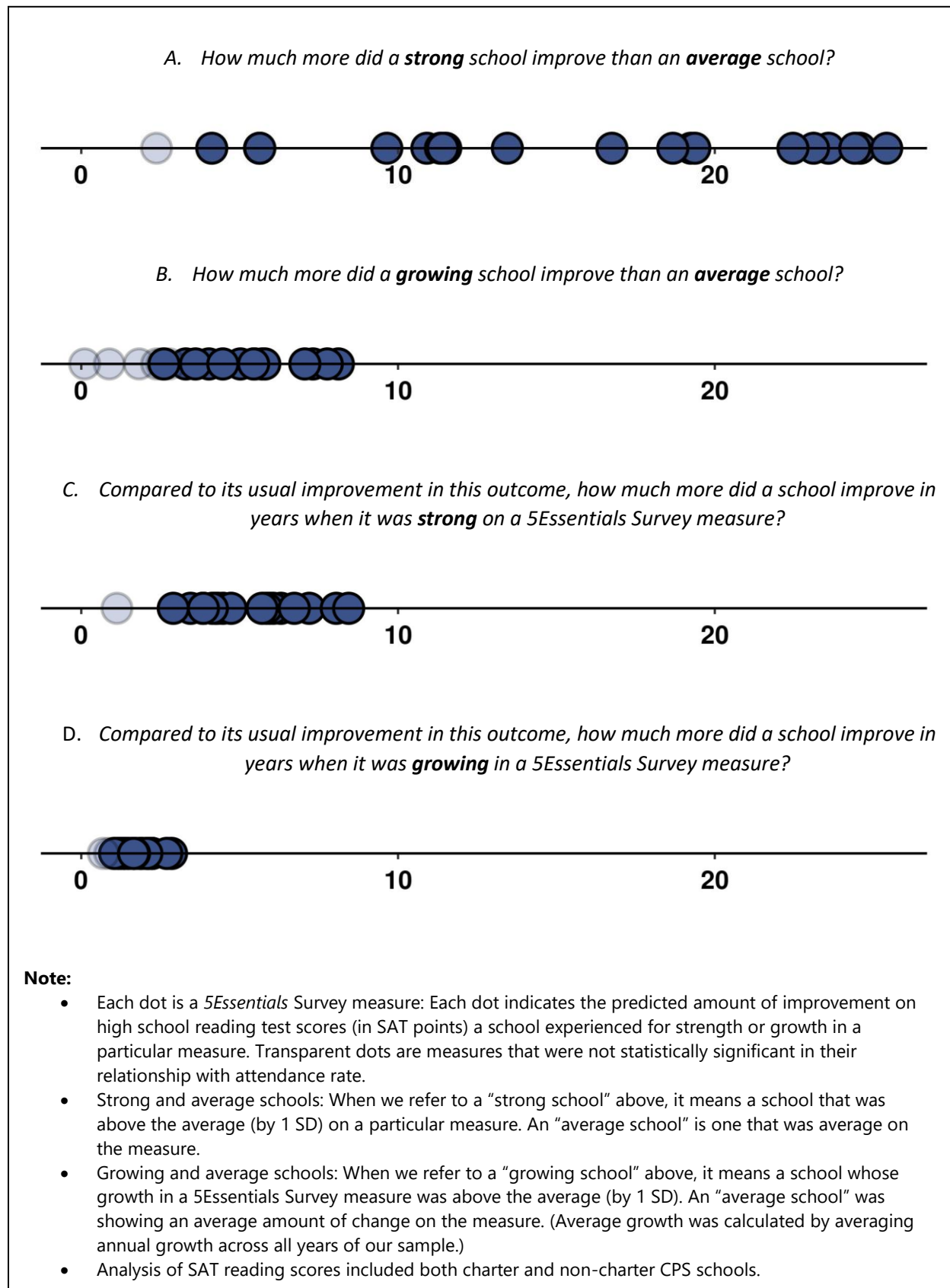
C. **Strength in measures.** For one-half of all measures, above average measure strength in a given year was positively and significantly related to GPA improvement. In years where their *5Essentials* Survey measures were strong, schools improved their average GPA as much as 0.03 points more than in years when measures were average (**see Figure 10.C**).

D. **Growth in measures.** For nine of the 20 measures, above average measure growth in a given year was positively and significantly related to GPA improvement. In years where schools grew in their *5Essentials* Survey measures, they improved their average GPA as much as 0.02 points more than in years when measures showed an average amount of change (**see Figure 10.D**).

Student-Teacher Trust and School-Wide Future Orientation were among the measures that were positively and significantly related to high school GPA in both models.[44]

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[44] Examples of measures named here were among the top 10 most strongly-related measures across both the pooled and school fixed effects models, and for both measure strength and measure growth.

Figure 10. High School GPA Improvement (4-Point Scale)

A. *How much more did a **strong** school improve than an **average** school?*

B. *How much more did a **growing** school improve than an **average** school?*

C. *Compared to its usual improvement in this outcome, how much more did a school improve in years when it was **strong** on a 5Essentials Survey measure?*

D. *Compared to its usual improvement in this outcome, how much more did a school improve in years when it was **growing** in a 5Essentials Survey measure?*

Note:
- Each dot is a *5Essentials* Survey measure: Each dot indicates the predicted amount of improvement on high school GPA (in 4-point scale) a school experienced for strength or growth in a particular measure. Transparent dots are measures that were not statistically significant in their relationship with attendance rate.
- Strong and average schools: When we refer to a "strong school" above, it means a school that was above the average (by 1 SD) on a particular measure. An "average school" is one that was average on the measure.
- Growing and average schools: When we refer to a "growing school" above, it means a school whose growth in a 5Essentials Survey measure was above the average (by 1 SD). An "average school" was showing an average amount of change on the measure. (Average growth was calculated by averaging annual growth across all years of our sample.)
- Analysis of high school GPA did not include charter schools. Many CPS charter schools use different student data systems. Creating linkages across these systems is difficult, and our data archive currently does not include records of charter school students' course performance.

Freshman OnTrack

The Freshman OnTrack indicator is a strong predictor of high school graduation.[45] A Chicago ninth-grader is considered to be on-track if they meet two criteria by the end of the year: 1) earning at least five course credits and 2) failing no more than one semester of a core course. By averaging the on-track status for all freshman students, each school was assigned a Freshman OnTrack rate for each school year. Charter school students were excluded from this analysis due to grade data limitations; see Appendix A for details.

Summary

The typical high school's Freshman OnTrack rate ranged from 2.70 percentage points lower than predicted by students' prior achievement to 5.34 percentage points higher than predicted by students' prior achievement. **Figure 11** provides a visualization of analysis results—the degree to which *5Essentials* Survey measures were related to improvement in this outcome. (See Tables B.18 and B.19 in Appendix B for pooled regression and school fixed effects model coefficients.)

Pooled Regression Model. The first model compared strengths and weaknesses across schools.

A. **Strength in measures.** For more than one-half of all measures, above average measure strength was positively and significantly related to higher Freshman OnTrack rate. Schools that were strong on *5Essentials* Survey measures improved their Freshman OnTrack rate as much as 3.25 percentage points more than schools that were average on measures (**see Figure 11.A**).

B. **Growth in measures.** For more than one-half of all measures, above average measure growth was positively and significantly related to higher Freshman OnTrack rate. Schools that grew more than average on *5Essentials* Survey measures improved their Freshman OnTrack rate as 1.45 percentage points more than schools that showed an average amount of change in measures (**see Figure 11.B**).

School Fixed Effects Model. The second model compared schools to themselves in stronger and weaker years and in years where their measures grew more or less.

C. **Strength in measures.** For nearly all measures, above average measure strength in a given year was positively and significantly related to higher Freshman OnTrack rate. In years when their *5Essentials* Survey measures were strong, schools improved their Freshman OnTrack rate as much 4.06 percentage points more than in years when their measures were average (**see Figure 11.C**).

D. **Growth in measures.** For more than one-half of all measures, above average measure growth in a given year was positively and significantly related to higher Freshman OnTrack rate. In years when schools grew in their *5Essentials* Survey measures, they improved their Freshman OnTrack rate as much as 1.41 percentage points more than in years when *5Essentials* Survey measures showed an average amount of change (**see Figure 11.D**).

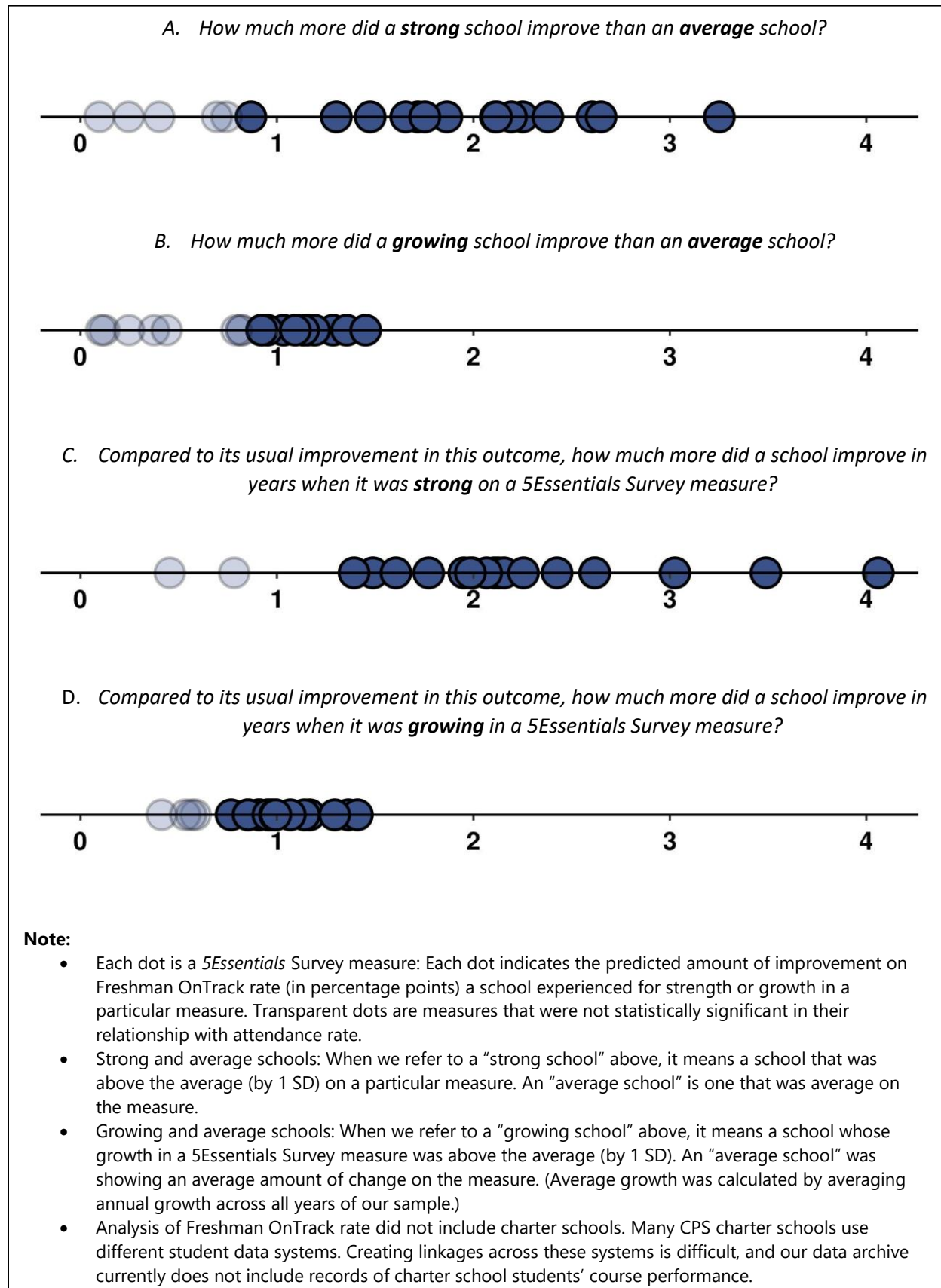Collective Responsibility and School-Wide Future Orientation were among the measures that were positively and significantly related to on-track rate in both models.[46]

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[45] Allensworth & Easton (2005); Nagaoka & Seeskin (2019).
[46] Examples of measures named here were among the top 10 most strongly-related measures across both the pooled and school fixed effects models, and for both measure strength and measure growth.

Figure 11. High School Freshman OnTrack Rate Improvement (Percentage Points)

*A. How much more did a **strong** school improve than an **average** school?*

*B. How much more did a **growing** school improve than an **average** school?*

*C. Compared to its usual improvement in this outcome, how much more did a school improve in years when it was **strong** on a 5Essentials Survey measure?*

D. *Compared to its usual improvement in this outcome, how much more did a school improve in years when it was **growing** in a 5Essentials Survey measure?*

Note:
- Each dot is a *5Essentials* Survey measure: Each dot indicates the predicted amount of improvement on Freshman OnTrack rate (in percentage points) a school experienced for strength or growth in a particular measure. Transparent dots are measures that were not statistically significant in their relationship with attendance rate.
- Strong and average schools: When we refer to a "strong school" above, it means a school that was above the average (by 1 SD) on a particular measure. An "average school" is one that was average on the measure.
- Growing and average schools: When we refer to a "growing school" above, it means a school whose growth in a 5Essentials Survey measure was above the average (by 1 SD). An "average school" was showing an average amount of change on the measure. (Average growth was calculated by averaging annual growth across all years of our sample.)
- Analysis of Freshman OnTrack rate did not include charter schools. Many CPS charter schools use different student data systems. Creating linkages across these systems is difficult, and our data archive currently does not include records of charter school students' course performance.

College Enrollment

College enrollment status was based on whether students enrolled immediately in the fall after high school graduation. Both two-year and four-year institutions were included. Only students who graduated high school were considered; each school's college enrollment rate was the proportion of graduating seniors who enrolled in the fall.

Summary

The typical high school's college enrollment rate ranged from 3.65 percentage points lower than predicted by students' prior achievement to 6.20 percentage points higher than predicted by students' prior achievement. **Figure 12** provides a visualization of analysis results—the degree to which *5Essentials* Survey measures were related to improvement in this outcome. (See Tables B.20 and B.21 in Appendix B for pooled regression and school fixed effects model coefficients.) Predicting improvement in college enrollment was relatively difficult compared to other outcomes, perhaps unsurprisingly given that it reflects a smaller subset of students (those who have graduated) and due to the non-scholastic factors in college enrollment (e.g., family and financial considerations).

Pooled Regression Model. The first model compared strengths and weaknesses across schools.

A. **Strength in measures.** For more than one-half of all measures, above average measure strength was positively and significantly related to improved college enrollment rate. Schools that were strong on *5Essentials* Survey measures improved their college enrollment rate as much as 9.21 percentage points more than schools that were average on measures (**see Figure 12.A**).

B. **Growth in measures.** For six of the 20 measures, above average measure growth was positively and significantly related to improved college enrollment rate. Schools that grew more than average on *5Essentials* Survey measures improved their college enrollment rate 2.83 percentage points more than schools that showed an average amount of change on measures (**see Figure 12.B**).

School Fixed Effects Model. The second model compared schools to themselves in stronger and weaker years and in years where their measures grew more or less.
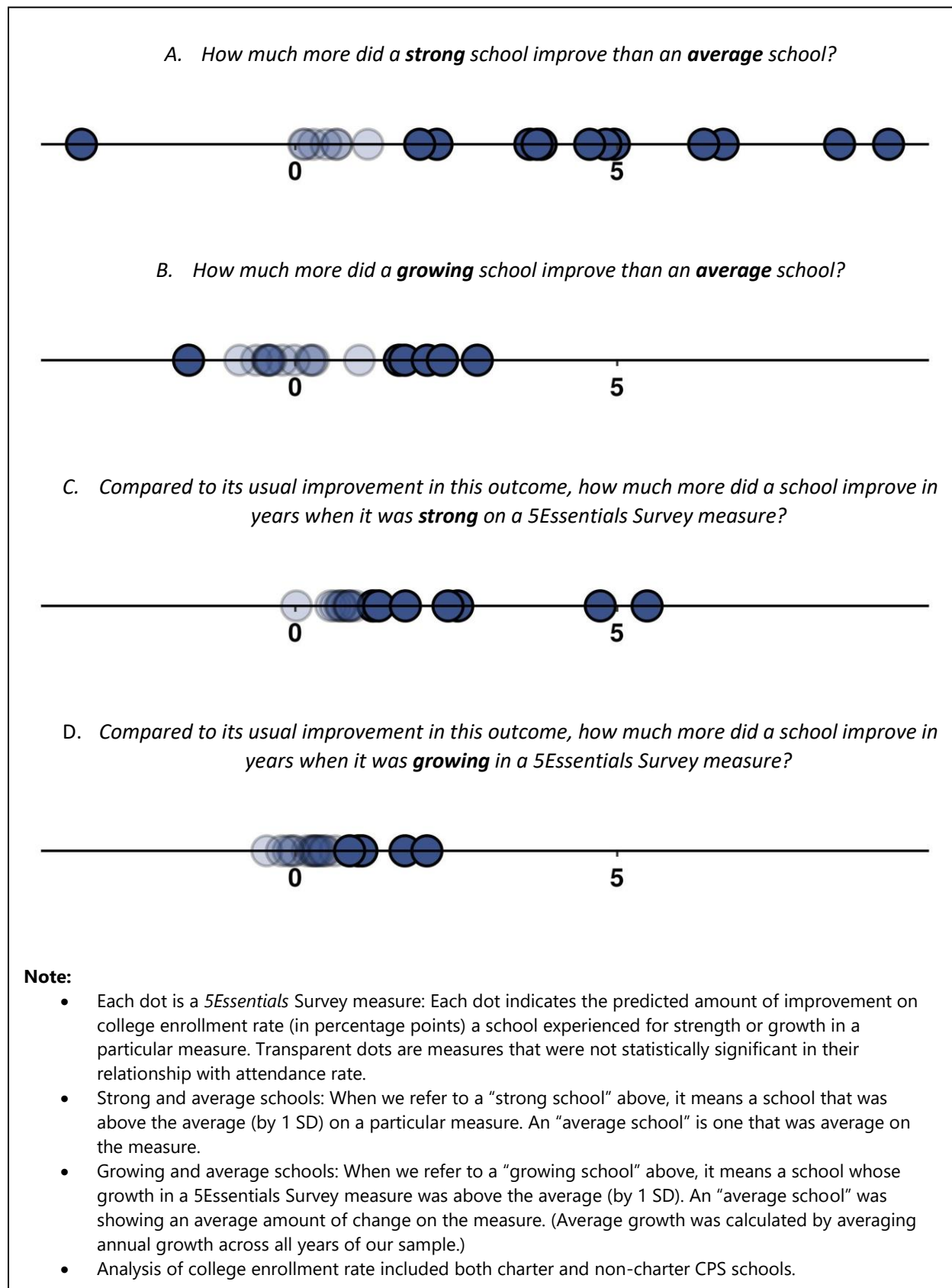
C. **Strength in measures.** For six of the 20 measures, above average measure strength in a given year was positively and significantly related to improved college enrollment rate. In years when their *5Essentials* Survey measures were strong, schools improved their college enrollment rate as much 5.46 percentage points more than in years when measures were average (**see Figure 12.C**).

D. **Growth in measures.** For four of the 20 measures, above average measure growth in a given year was positively and significantly related to improved college enrollment rate. These were parent influence on Decision Making in Schools, Teacher Influence, Parent Involvement in School, and Student-Teacher Trust. In years when schools grew in their *5Essentials* Survey measures, they improved their college enrollment rate as much as 2.04 percentage points more than in years when measures showed an average amount of change (**see Figure 12.D**).

Parent Involvement in School was positively and significantly related to college enrollment across both models and in terms of both measure strength and measure growth.[47]

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[47] Examples of measures named here were among the top four most strongly-related measures across both the pooled and school fixed effects models, and for both measure strength and measure growth.

Figure 12. High School College Enrollment Rate Improvement (Percentage Points)

*A. How much more did a **strong** school improve than an **average** school?*

*B. How much more did a **growing** school improve than an **average** school?*

*C. Compared to its usual improvement in this outcome, how much more did a school improve in years when it was **strong** on a 5Essentials Survey measure?*

*D. Compared to its usual improvement in this outcome, how much more did a school improve in years when it was **growing** in a 5Essentials Survey measure?*

Note:
- Each dot is a *5Essentials* Survey measure: Each dot indicates the predicted amount of improvement on college enrollment rate (in percentage points) a school experienced for strength or growth in a particular measure. Transparent dots are measures that were not statistically significant in their relationship with attendance rate.
- Strong and average schools: When we refer to a "strong school" above, it means a school that was above the average (by 1 SD) on a particular measure. An "average school" is one that was average on the measure.
- Growing and average schools: When we refer to a "growing school" above, it means a school whose growth in a 5Essentials Survey measure was above the average (by 1 SD). An "average school" was showing an average amount of change on the measure. (Average growth was calculated by averaging annual growth across all years of our sample.)
- Analysis of college enrollment rate included both charter and non-charter CPS schools.

Conclusion

The *5Essentials* Survey was developed to measure a school's organizational strength as part of a research effort to understand why some schools improved and others did not. Original development and validation work from 1991–2005 established that the five essentials—Effective Leaders, Collaborative Teachers, Involved Families, Supportive Environment, and Ambitious Instruction—formed the foundation from which schools could successfully launch an improvement agenda. Since then, research on school climate and culture has similarly shown many benefits to a positive school environment for students and teachers. However, the most recent data in the 2010 *5Essentials* Survey validation study was from 2005, and much has changed since then.[48] An updated and expanded validation was needed to determine how well survey results predict students' academic outcomes and school performance today.

The current study examined the validity of the *5Essentials* Survey from 2011–18 using districtwide CPS survey data. For the 535 elementary schools in this study, we examined the connection between *5Essentials* Survey measures and three outcomes: test scores, attendance, and GPA. For the 207 high schools in this study, we examined the connection between *5Essentials* Survey measures and five outcomes: test scores, attendance, GPA, Freshman OnTrack, and college enrollment.[49]

Our findings indicate that 5Essentials Survey measures continue to be predictive of school improvement at the elementary level, and are also predictive at the high school level. Of the 22 survey measures, all were in some way positively and significantly associated with schools' improvement. At the same time, all measures were not associated with all outcomes.[50] For example, yearly attendance rates improved more at elementary schools that were strong on *5Essentials* Survey measures, such as Parent Involvement in School and School Commitment, than at elementary schools that had average measure scores.[51] The difference between yearly growth in attendance rates in schools with strong vs. average measure scores was as much as an additional 0.48 percentage points in elementary school and an additional 3.55 percentage points in high school. Similarly, Freshman OnTrack rates improved by as much as 3.25 percentage points more in high schools with strong *5Essentials* Survey measures, such as Collective Responsibility and School-Wide Future Orientation, compared to schools with average measure scores.

Additionally, we found:

- **Both 1) starting out the year with strength in a *5Essentials* Survey measure and 2) improving on measures during the course of the year predicted improved student**

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[48] Bryk et al. (2010).

[49] These are the number of unique schools over the study period. Some schools opened and closed during this period. Closed schools are included for the years they were open. Charter schools were included in analyses where data was available. See Appendix A for more details.

[50] Nearly all outcomes were positively related to at least one-half the survey measures. The exception is the outcome of college enrollment, which was positively and significantly related to less than one-half of the measures when considering measure growth instead of measure strength. See p.38 for more details.

[51] "Strong" is defined as one standard deviation above the average on a particular *5Essentials* Survey measure in the spring prior to the year in which we measure outcome improvement.

outcomes in schools. Thus, schools that are working to improve in areas, such as Student-Teacher Trust or Teacher Influence, but have not yet reached a point of strength can still see improvements in their students' outcomes such as grades, tests, and attendance while they are growing their five essential supports.

- **The *5Essentials* Survey measures were positively and significantly related to growth in elementary test scores and attendance.** This is consistent with the outcomes of our first validation study.[52]

- **Elementary GPA also improved more in schools with strong *5Essentials* Survey measures.** This is a new finding and an important addition since students' grades are stronger predictors of their success in high school than test scores. GPA growth was not part of the original validation study.

- **High school outcomes—attendance, test scores, GPA, Freshman OnTrack, and college enrollment—were positively and significantly related to *5Essentials* Survey measures.** This is the first study that has incorporated all of these high school outcomes with all *5Essentials* Survey measures and is an important contribution to school climate research and practice.

- ***5Essentials* Survey measures predicted improvement for schools that were strong compared to other schools but also for schools compared to themselves in stronger vs. weaker years.** Our analyses looked both at schools compared to other schools and schools compared to themselves over time. This suggests that the *5Essentials* Survey do not just relate to differences between schools, but also to the changes in organizational strength in the same schools over time.

These results suggest that the *5Essentials* Survey, and its underlying framework, continue to be meaningful indicators for schools working to improve student outcomes.

Given our findings that the measures in the *5Essentials* Survey are valid and reliable for Chicago schools overall, our next steps will be to examine whether the measures relate to outcomes differently across different school contexts. These contexts include variations in student population (e.g., in terms of students' socioeconomic status, race/ethnicity, mobility, special education status, etc.) and also school characteristics, such as those with selective enrollment policies or smaller enrollment.

And while the quality and robustness of the *5Essentials* Survey's statistical underpinnings are critically important to the value of this tool, so, too, are the experiences of people who interact with the survey in schools—as respondents, practitioners, and school leaders. Understanding these experiences and the ways individuals' perceptions shape the dynamics of schools' engagement with the five essential supports represents another priority for this research. Thus, in addition to the second-phase technical validation described above, we are also exploring how CPS personnel interact with the *5Essentials* Survey as a tool in school improvement through interviews with principals and teachers in elementary and high schools. This qualitative study is vital to understanding how the *5Essentials* Survey influences, and is influenced by, the enactment of policies and practices tied to school improvement and accountability. Furthermore, findings

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[52] Bryk et al. (2010).

may shed light on opportunities for improving communication and reporting of the *5Essentials* Survey to more effectively support positive school outcomes.

Ultimately, we undertook this two-year study to ensure a strong research foundation for the *5Essentials* Survey and framework as a tool to guide educators, policymakers, researchers and families in their work creating supportive school environments. Findings from this work will guide ongoing improvements and additional study of both the five essentials framework and *5Essentials* Survey. Results from the second phase of this study will be available in early 2021.

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Appendix A: Data & Methods

Survey Measures

Data used to measure the five essential supports are based on annual student and teacher surveys (the *5Essentials* Survey) administered in the spring of 2011–18 to all schools in CPS.[53] These surveys were administered online. Response rates for each year are shown in Table A.1.

Table A.1. 5Essentials Survey Response Rates, Across CPS

School Year	Number of Student Survey Respondents	Number of Teacher Survey Respondents	Student Survey Response Rate	Teacher Survey Response Rate
2011–12	143,803	15,823	73.50%	65.40%
2012–13	149,309	19,441	77.00%	81.10%
2013–14	149,156	18,844	78.80%	80.90%
2014–15	152,724	19,908	79.50%	80.70%
2015–16	157,628	24,145	83.00%	83.20%
2016–17	153,102	23,185	82.20%	80.90%
2017–18	149,334	22,691	81.40%	79.90%

Note: The total number of potential teacher respondents increased in 2015–16 when teacher assistants/paraprofessionals began to be included in teacher survey response pools for some *5Essentials* Survey measures, such as school commitment and program coherence.

Each *5Essentials* Survey measure is composed of a number of survey items. Items are combined into measures through Rasch analysis, using the BIGSTEPS program. The item and step difficulties are used in the scoring of individual-level measures and producing standard errors in all survey years. By anchoring the measures in a particular year, researchers can make comparisons over time. Thus, a score on a measure will have the same meaning regardless of the year in which the survey was taken.

A school's score on a *5Essentials* Survey measure is calculated using precision-weighted means. First, the weighted average (also called "precision-weighted mean") of the individual measure scores was generated for each school (wtavgA). The weight is the precision (the inverse of the standard error). The measure scores of students with missing survey responses or extremely unusual response patterns are not very precise and are thus given less weight relative to the weight given to scores of other individuals when generating the school level score.

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[53] Some but not all of the survey questions completed by teachers are also completed by non-teaching staff in schools (e.g., teacher assistants, counselors, librarians, etc.).

Table A.2 lists and describes the measures that compose each of the essentials on the *5Essentials* Survey with their Rasch reliability.

Table A.2. 5Essentials Survey Measure Descriptions and Reliabilities

Ambitious Instruction

Measure	Description	Survey Type	Reliability
English Instruction	Students interact with course material and one another to build and apply critical reading and writing skills.	Student	0.83
Math Instruction	Students interact with course material and one another to build and apply knowledge in their math classes.	Student	0.77
Academic Press	Teachers expect students to do their best and to meet academic demands.	Student	0.83
Quality of Student Discussion	Students participate in classroom discussions that build their critical thinking skills.	Teacher	0.73

Collaborative Teachers

Measure	Description	Survey Type	Reliability
Collaborative Practices	Teachers observe each other's practice and work together to review assessment data and develop instructional strategies.	Teacher	0.83
Collective Responsibility	Teachers share a strong sense of responsibility for student development, school improvement, and professional growth.	Teacher	0.89
Quality Professional Development	Professional development is rigorous and focused on student learning.	Teacher	0.87
School Commitment	Teachers are deeply committed to the school.	Teacher	0.83
Teacher-Teacher Trust	Teachers are supportive and respectful of one another, personally and professionally.	Teacher	0.85

Effective Leaders

Measure	Description	Survey Type	Reliability
Instructional Leadership	The school leadership team sets high standards for teaching and student learning.	Teacher	0.86
Program Coherence	School programs are coordinated and consistent with its goals for student learning.	Teacher	0.81
Teacher Influence	Teachers have influence in a broad range of decisions regarding school policies and practices.	Teacher	0.85
Teacher-Principal Trust	Teachers and principals share a high level of mutual trust and respect.	Teacher	0.88

Table A.2. 5Essentials Survey Measure Descriptions and Reliabilities, con't

Involved Families

Measure Name	Measure Description	Survey Type	Reliability
Parent Influence on Decision Making in Schools	The school has created opportunities for parents to participate in developing academic programs and influencing school curricula.	Teacher	0.89
Parent Involvement in School	Parents are active participants in their child's schooling.	Teacher	0.88
Teacher-Parent Trust	Teachers and parents are partners in improving student learning.	Teacher	0.88

Supportive Environment

Measure Name	Measure Description	Survey Type	Reliability
Peer Support for Academic Work	Students demonstrate behaviors that lead to academic achievement.	Student	0.88
Academic Personalism	Teachers connect with students in the classroom and support them in achieving academic goals.	Student	0.82
Safety	Students feel safe both in and around the school building, and while they travel to and from home.	Student	0.79
School-Wide Future Orientation	The school engages all students in planning for life after graduation.	Student	0.83
Student-Teacher Trust	Students and teachers share a high level of mutual trust and respect.	Student	0.83
Expectations for Postsecondary Education	The school expects all students to attend college and promotes college-readiness.	Teacher	0.83

Student and School Data

Administrative data from CPS includes student demographics, test scores, course grades, attendance, high school graduation, and college enrollment information. These data are shared with the UChicago Consortium through its Master Research Services Agreement with the district. See Table A.3 for a description of the outcomes used in this report.

Assignment of Students to Schools

Since students can change schools during the year, some decisions were made regarding which students to count for what schools. We began with students listed on the spring roster file for a school, because surveys are taken in the spring. We counted these students for this school if they had been enrolled there for at least 45 days. We excluded preschool and ungraded special education students, since most outcomes of interest did not have available data for these students. Furthermore, alternative schools, options schools, academic preparatory center schools, and special-education specialization schools were excluded from the study due to their unique circumstances and difficulty of comparison to other schools.

Table A.3. Descriptions of School Outcome Variables

Elementary or High School	Outcome Variable	Description
Elementary & High School	Attendance	Attendance rates were calculated by dividing the number of days present by the number of days enrolled.
Elementary & High School	GPA	GPA was calculated on a four-point scale by averaging grade markings from all courses. For high school students, course grades were weighted by credit amount. *Charter schools were excluded from GPA analysis. Many CPS charter schools use different student data systems. Creating linkages across these systems is difficult, and our data archive currently does not include records of charter school students' course performance.*
Elementary	Test Scores	From 2011–14, students in grades 3-8 took the ISAT reading and math tests. From 2013–19, students in grades 2-8 took the NWEA reading and math tests. We used a multiple imputation model to calculate NWEA scores for students who took the ISAT and not the NWEA, so that test scores were comparable across all years. More details on the multiple imputation model are described in the next section.
High School	Freshman OnTrack	Freshman OnTrack is an indicator variable which the UChicago Consortium has found to be strongly predictive of high school graduation. A student is considered on-track when they have no more than one semester failure in a core course (math, English, social studies, or science), and have accumulated the credits necessary to progress to tenth grade. An OnTrack student is assigned a 1; otherwise, students are assigned a 0. *Charter schools are excluded from analyses of Freshman OnTrack, because grades data is necessary to calculate Freshman OnTrack. Many CPS charter schools use different student data systems. Creating linkages across these systems is difficult, and our data archive currently does not include records of charter school students' course performance.*
High School	College enrollment	Out of twelfth-grade students who graduated high school, the college enrollment variable is assigned as 1 if the student immediately enrolled in a two- or four-year institution. Otherwise, the student is assigned 0 for this dummy variable.
High School	Test Scores	Only eleventh-grade test scores were used because testing in other high school grades was inconsistent across the analysis time period. From 2011–16, all CPS eleventh-grade students took the ACT exam, while from 2017–18 eleventh-grade students took the SAT exam. We used a concordance table to convert ACT scores into the SAT point scale, creating reading and math test score variables applicable for all years of analysis.

Multiple Imputation Description

In order to account for the differences in the tests given within CPS year over year, we carried out a multiple imputation which used all information about each students' test scores, and all correlations between test scores, to arrive at an accurate estimate of the students' scores on every test's scale. Specifically, all records for every student with elementary test data were included in the multiple imputation, including both concurrent test data (e.g., if a student was administered two different tests in the same year/grade level) and consecutive test information. Student scores were imputed for all missing cells from all available information that could be correlated with the missing cells.

Missing data can be imputed provided that there is a sufficiently strong correlation or correlations to other data that is known about the student, and provided that there are coexisting data between two variables. For our purposes, we are able to link both consecutive data (e.g., from the same students who took different tests in different years) and concurrent data (e.g., from those years in which some students received two different tests in the same year). Provided there is a strong enough correlation and relationship between the data (i.e., that knowing something about a student on one test provides you with some ability to predict how the student will do in different years and on other tests), imputation can be a useful tool.

Our specific approach was to use multiple imputation across all possible combinations of test and grade. Multiple imputation creates several (in our case five) simulated data sets, based on the correlations that exist between all variables that exist for an individual. These data sets incorporate random noise and differ from conventional conversion table type approaches to combining disparate tests. The multiple data sets are useful because their multiple plausible values for all cases when combined can provide a more robust and realistic solution than simple imputation, which assumes a more deterministic relationship between scores (e.g., if two students both score the same value on a non-missing test, and it is the only informative item to predict a missing value, then those students will have identical scores on the second test). Following imputation, all simulated data sets are submitted to the same process that complete data would be simultaneously. Finally, when all the data sets have been analyzed, a final analysis combines the results of these imputations and analyzes according to rubin's rules, which weights each solution according to its standard error and also provides a standard error estimate of the combined analytic coefficients, which can also be interpreted in the exact same way as can data sets that do not have a substantial portion of missing data.

Analysis Time Frame

Data from the 2010–11 school year were used as the first year of baseline data for measuring outcome improvement. The first measurement of one-year improvement was therefore from 2010–11 to 2011–12. The last measurement of one-year improvement was from 2016–17 to 2017–18.

Prior Achievement Variables

For the outcomes of attendance, GPA, and elementary test scores, a student's score from the previous school year was used as a control for prior achievement (e.g., a student's GPA in 2014–15 was used as the

prior achievement variable for their GPA in 2015–16). For the outcomes of Freshman OnTrack, college enrollment, and high school test scores, we used other variables to account for prior achievement since these are not recurring, annual outcomes. The variables are described in Table A.4. Eighth-grade test score was used as a prior achievement variable for high school test scores, because eighth grade is the latest year in which CPS students take a high-stakes standardized exam before they reach the SAT (or ACT) in eleventh grade. Eighth-grade GPA was used as the prior achievement variable for Freshman OnTrack since the Freshman OnTrack metric is based on a student's grades. High school test score was used as a prior achievement variable for College Enrollment because SAT and ACT scores are used in the college admissions process. SAT and ACT scores were chosen over a GPA variable because grades data from charter schools were unavailable.[54]

Table A.4. Descriptions of Prior Achievement Variables

Outcome	Control Variable for Prior Achievement
High School Test Score	8th-grade test score percentile (NWEA or ISAT)
Freshman OnTrack	8th-grade GPA
College Enrollment	11th-grade SAT (or ACT)

For a student to be included in analysis, they must have a baseline data point. This requires that the student was in a CPS school in the baseline year and that they had an available data point for that outcome. When finding a data point to use as the baseline outcome, students only have to be in a CPS school. They do not have to be in the same school as their outcome year and they do not need to have been enrolled in the baseline school for 45 days. This means students that transferred into CPS in the outcome year are not included in the analysis for their first year of being in CPS.

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[54] Many CPS charter schools use different student data systems. Creating linkages across these systems is difficult, and our data archive currently does not include records of charter school students' course performance.

Models

The equations used to estimate the relationship of survey measures to unexpected growth in outcomes are described here.

In the first stage, a multilevel model is used to estimate each school's unexpected growth.[55] Specifically, the outcome score for every individual student, *i*, is regressed on that student's prior outcome score and, where applicable that student's grade. The proportion of the change in outcomes that is not explained by these variables is aggregated to the school level, and adjusted using a random effect, u_{jt}

Stage 1

$$Outcome_{i,jt} = \beta_{0j} + \beta_{1i} * Student\ Grade_i + \beta_{2i} * Prior\ Outcome_i, \beta_{0jt} = \gamma_{00} + u_{jt}$$

In the second stage, the school level random effects for each outcome[56] are regressed on that same school's measure scores, both their prior year's measure score and their growth in measure score over the current year.

Stage 2

$$Growth\ in\ Outcome_{\ jt} = \beta_0 + \beta_{1jt-1} * Measure_{jt} + \beta_{2jt} * Growth\ in\ Measure$$

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[55] The outcomes of elementary attendance, high school attendance, high school Freshman OnTrack rate, and high school college enrollment rate were modelled logistically: the outcome value was either 0 or 1.
[56] Because the outcomes of elementary attendance, high school attendance, high school Freshman OnTrack rate, and high school college enrollment rate were modelled logistically in Stage 1, the Stage 2 coefficients are predicting the Growth in Outcome variable in logit units instead of linear units.

Appendix B: Full Results

Model (Stage 1) Intraclass Correlations

Table B.1 shows intraclass correlations between schools and their improvement in each outcome from the Stage 1 model, as described in Appendix A. Differences between schools explained the stated percentage of variation in the outcome. For example, only 3.62 percent of variability in elementary attendance was explained by differences between schools (with the remaining 96.38 percent explained by differences between individual students, regardless of which school they attended).

Table B.1. Model (Stage 1) Intraclass Correlations

School Level	Outcome	Variation explained at the school level
Elementary	Attendance	3.62%
	Reading Test Scores	5.28%
	Math Test Scores	9.11%
	GPAs	13.47%
High School	Attendance	15.72%
	Reading Test Scores	27.97%
	Math Test Scores	32.44%
	GPAs	5.16%
	% Freshmen OnTrack	17.79%
	College Enrollment	12.89%

Model (Stage 2) Coefficients

Next, we describe the full results of the Stage 2 model as described in the Methods section on p,13. Coefficients are shown in standardized units and are listed by outcome.

Elementary Attendance

Table B.2. Pooled, Logistic Regression Model of *5Essentials* Survey Measures Predicting Elementary School Attendance Rate

Measure Name	Baseline Measure Strength		Growth in Measure	
	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	0.1316***	0.0198	0.0524**	0.0198
English Instruction	0.1137***	0.0197	0.0440*	0.0197
Math Instruction	0.1297***	0.0197	0.0602**	0.0197
Quality of Student Discussion	0.1684***	0.0213	0.1713***	0.0213
Collaborative Practices	0.0460*	0.0213	0.1440***	0.0213
Collective Responsibility	0.1437***	0.0209	0.1267***	0.0209
Quality Professional Development	0.0973***	0.0210	0.1948***	0.0210
School Commitment	0.1494***	0.0201	0.1438***	0.0201
Teacher-Teacher Trust	0.0883***	0.0209	0.0858***	0.0209
Instructional Leadership	0.0946***	0.0214	0.1609***	0.0214
Program Coherence	0.0889***	0.0206	0.1279***	0.0206
Teacher Influence	0.0814**	0.0286	0.1402***	0.0286
Teacher-Principal Trust	0.0509*	0.0210	0.0996***	0.0210
Parent Influence on Decision Making in Schools	0.0482	0.0272	0.1124***	0.0272
Parent Involvement in School	0.1427***	0.0211	0.1912***	0.0211
Teacher-Parent Trust	0.1239***	0.0204	0.1221***	0.0204
Academic Personalism	0.1095***	0.0204	0.0677***	0.0204
Peer Support for Academic Work	0.1428***	0.0203	0.1045***	0.0203
Safety	0.1537***	0.0194	0.1186***	0.0194
Student-Teacher Trust	0.1832***	0.0201	0.1035***	0.0201

Note: Asterisks denote *** p<0.001, ** p<0.01, * p<0.05. Units have been standardized.

Table B.3. School Fixed Effects, Logistic Regression Model of *5Essentials* Survey Measures Predicting Elementary School Attendance Rate

Measure Name	Baseline Measure Strength		Growth in Measure	
	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	0.1306***	0.0240	0.0496**	0.0187
English Instruction	0.1810***	0.0245	0.0804***	0.0187
Math Instruction	0.1528***	0.0233	0.0719***	0.0184
Quality of Student Discussion	0.1282***	0.0261	0.1663***	0.0199
Collaborative Practices	0.1107***	0.0270	0.1863***	0.0206
Collective Responsibility	0.1575***	0.0267	0.1476***	0.0199
Quality Professional Development	0.1372***	0.0251	0.2213***	0.0195
School Commitment	0.1658***	0.0312	0.1467***	0.0197
Teacher-Teacher Trust	0.1370***	0.0267	0.1210***	0.0198
Instructional Leadership	0.1537***	0.0277	0.1958***	0.0207
Program Coherence	0.1369***	0.0260	0.1555***	0.0192
Teacher Influence	0.0728	0.0575	0.1271***	0.0324
Teacher-Principal Trust	0.0909***	0.0271	0.1068***	0.0199
Parent Influence on Decision Making in Schools	0.1695***	0.0446	0.1578***	0.0273
Parent Involvement in School	0.2042***	0.0329	0.2327***	0.0211
Teacher-Parent Trust	0.1262***	0.0288	0.1375***	0.0196
Academic Personalism	0.1631***	0.0265	0.0969***	0.0200
Peer Support for Academic Work	0.1304***	0.0245	0.1050***	0.0193
Safety	0.1792***	0.0312	0.1243***	0.0190
Student-Teacher Trust	0.1569***	0.0266	0.0891***	0.0196

Note: Asterisks denote *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Units have been standardized.

Elementary Test Scores

Math Scores

Table B.4. Pooled Regression Model of *5Essentials* Survey Measures Predicting Elementary School Math Test Scores

Measure Name	Baseline Measure Strength		Growth in Measure	
	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	0.1246***	0.0199	0.0781***	0.0202
English Instruction	-0.0251	0.0199	0.0048	0.0200
Math Instruction	0.0810***	0.0200	0.0494*	0.0199
Quality of Student Discussion	0.5202***	0.0193	0.2838***	0.0195
Collaborative Practices	0.0935***	0.0216	0.0686**	0.0215
Collective Responsibility	0.3295***	0.0203	0.1741***	0.0203
Quality Professional Development	0.1719***	0.0211	0.1357***	0.0211
School Commitment	0.4300***	0.0189	0.2210***	0.0189
Teacher-Teacher Trust	0.2700***	0.0206	0.1238***	0.0206
Instructional Leadership	0.1958***	0.0214	0.1524***	0.0214
Program Coherence	0.2954***	0.0201	0.1578***	0.0202
Teacher Influence	0.3787***	0.0270	0.2499***	0.0270
Teacher-Principal Trust	0.2272***	0.0207	0.1508***	0.0208
Parent Influence on Decision Making in Schools	0.3093***	0.0263	0.1948***	0.0264
Parent Involvement in School	0.5762***	0.0187	0.2621***	0.0187
Teacher-Parent Trust	0.5240***	0.0183	0.2035***	0.0184
Academic Personalism	0.0115	0.0206	0.0336	0.0208
Peer Support for Academic Work	0.1783***	0.0205	0.1039***	0.0203
Safety	0.5115***	0.0173	0.1925***	0.0175
Student-Teacher Trust	0.1993***	0.0203	0.0923***	0.0203

Note: Asterisks denote *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Units have been standardized.

Table B.5. School Fixed Effects Regression Model of *5Essentials* Survey Measures Predicting Elementary School Math Test Scores

Measure Name	Baseline Measure Strength		Growth in Measure	
	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	0.2539***	0.0217	0.1603***	0.0176
English Instruction	0.1966***	0.0226	0.1240***	0.0174
Math Instruction	0.2145***	0.0213	0.1308***	0.0167
Quality of Student Discussion	0.3364***	0.0233	0.2202***	0.0178
Collaborative Practices	0.2357***	0.0258	0.1602***	0.0194
Collective Responsibility	0.3005***	0.0245	0.1852***	0.0182
Quality Professional Development	0.2775***	0.0235	0.2007***	0.0181
School Commitment	0.2911***	0.0289	0.1753***	0.0181
Teacher-Teacher Trust	0.2892***	0.0246	0.1575***	0.0181
Instructional Leadership	0.2697***	0.0261	0.2036***	0.0194
Program Coherence	0.2599***	0.0242	0.1625***	0.0177
Teacher Influence	0.1382**	0.0507	0.1329***	0.0286
Teacher-Principal Trust	0.2017***	0.0251	0.1397***	0.0184
Parent Influence on Decision Making in Schools	0.0931*	0.0392	0.1229***	0.0241
Parent Involvement in School	0.3976***	0.0309	0.2007***	0.0198
Teacher-Parent Trust	0.3532***	0.0263	0.1569***	0.0179
Academic Personalism	0.2450***	0.0241	0.1731***	0.0185
Peer Support for Academic Work	0.2375***	0.0222	0.1668***	0.0175
Safety	0.2505***	0.0291	0.1285***	0.0180
Student-Teacher Trust	0.2245***	0.0246	0.1350***	0.0184

Note: Asterisks denote *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Units have been standardized.

Reading Scores

Table B.6. Pooled Regression Model of *5Essentials* Survey Measures Predicting Elementary School Reading Test Scores

Measure Name	Baseline Measure Strength		Growth in Measure	
	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	0.1347***	0.0199	0.0714***	0.0200
English Instruction	0.0038	0.0199	-0.0137	0.0200
Math Instruction	0.0910***	0.0199	0.0252	0.0199
Quality of Student Discussion	0.4983***	0.0197	0.2961***	0.0198
Collaborative Practices	0.0864***	0.0214	0.1294***	0.0214
Collective Responsibility	0.3140***	0.0204	0.1716***	0.0211
Quality Professional Development	0.1734***	0.0210	0.1782***	0.0210
School Commitment	0.3917***	0.0194	0.2177***	0.0191
Teacher-Teacher Trust	0.2457***	0.0206	0.1293***	0.0208
Instructional Leadership	0.1845***	0.0215	0.1754***	0.0214
Program Coherence	0.2692***	0.0202	0.1796***	0.0205
Teacher Influence	0.3091***	0.0275	0.2393***	0.0276
Teacher-Principal Trust	0.2084***	0.0209	0.1437***	0.0209
Parent Influence on Decision Making in Schools	0.2872***	0.0264	0.2129***	0.0264
Parent Involvement in School	0.5424***	0.0190	0.2882***	0.0194
Teacher-Parent Trust	0.5104***	0.0185	0.2338***	0.0185
Academic Personalism	0.0204	0.0205	0.0471*	0.0205
Peer Support for Academic Work	0.1622***	0.0203	0.0845***	0.0204
Safety	0.4758***	0.0176	0.2123***	0.0179
Student-Teacher Trust	0.1742***	0.0202	0.0739***	0.0202

Note: Asterisks denote *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Units have been standardized.

Table B.7. School Fixed Effects Regression Model of *5Essentials* Survey Measures Predicting Elementary School Reading Test Scores

Measure Name	Baseline Measure Strength		Growth in Measure	
	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	0.2502***	0.0242	0.1394***	0.0190
English Instruction	0.1905***	0.0257	0.0811***	0.0194
Math Instruction	0.2010***	0.0236	0.0865***	0.0186
Quality of Student Discussion	0.3349***	0.0264	0.2371***	0.0205
Collaborative Practices	0.2186***	0.0280	0.2159***	0.0213
Collective Responsibility	0.2548***	0.0277	0.1655***	0.0212
Quality Professional Development	0.2569***	0.0263	0.2286***	0.0203
School Commitment	0.2400***	0.0322	0.1651***	0.0206
Teacher-Teacher Trust	0.2393***	0.0279	0.1455***	0.0209
Instructional Leadership	0.2358***	0.0287	0.2082***	0.0213
Program Coherence	0.2136***	0.0270	0.1700***	0.0202
Teacher Influence	0.0185	0.0611	0.1266***	0.0345
Teacher-Principal Trust	0.1690***	0.0281	0.1231***	0.0206
Parent Influence on Decision Making in Schools	0.0212	0.0465	0.1273***	0.0285
Parent Involvement in School	0.4019***	0.0351	0.2478***	0.0226
Teacher-Parent Trust	0.3624***	0.0298	0.1951***	0.0202
Academic Personalism	0.2270***	0.0270	0.1664***	0.0202
Peer Support for Academic Work	0.2138***	0.0249	0.1355***	0.0194
Safety	0.2461***	0.0314	0.1484***	0.0194
Student-Teacher Trust	0.2170***	0.0271	0.1122***	0.0199

Note: Asterisks denote *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Units have been standardized.

Elementary GPA

Table B.8. Pooled Regression Model of *5Essentials* Survey Measures Predicting Elementary School GPA

Measure Name	Baseline Measure Strength		Growth in Measure	
	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	-0.0686***	0.0208	-0.0335	0.0208
English Instruction	-0.1800***	0.0204	-0.0878***	0.0204
Math Instruction	-0.0850***	0.0207	-0.0529*	0.0207
Quality of Student Discussion	0.4747***	0.0208	0.2184***	0.0208
Collaborative Practices	0.0271	0.0226	-0.0069	0.0226
Collective Responsibility	0.2261***	0.0218	0.0880***	0.0218
Quality Professional Development	0.0773***	0.0224	0.0522*	0.0224
School Commitment	0.3762***	0.0201	0.1833***	0.0201
Teacher-Teacher Trust	0.1864***	0.0218	0.0703**	0.0218
Instructional Leadership	0.0573*	0.0226	0.0479*	0.0226
Program Coherence	0.1732***	0.0215	0.1029***	0.0215
Teacher Influence	0.3167***	0.0292	0.1599***	0.0292
Teacher-Principal Trust	0.1506***	0.0218	0.0882***	0.0218
Parent Influence on Decision Making in Schools	0.2462***	0.0284	0.1426***	0.0284
Parent Involvement in School	0.5554***	0.0197	0.2211***	0.0197
Teacher-Parent Trust	0.5009***	0.0193	0.1884***	0.0193
Academic Personalism	-0.1203***	0.0212	-0.0585**	0.0212
Peer Support for Academic Work	0.0814***	0.0213	0.0601**	0.0213
Safety	0.4557***	0.0186	0.1416***	0.0186
Student-Teacher Trust	0.1117***	0.0213	0.0424*	0.0213

Note: Asterisks denote *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Units have been standardized.

Table B.9. School Fixed Effects Regression Model of *5Essentials* Survey Measures Predicting Elementary School GPA

Measure Name	Baseline Measure Strength		Growth in Measure	
	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	0.1594***	0.0220	0.0929***	0.0170
English Instruction	0.1044***	0.0226	0.0655***	0.0171
Math Instruction	0.1315***	0.0213	0.0712***	0.0168
Quality of Student Discussion	0.2439***	0.0238	0.1248***	0.0184
Collaborative Practices	0.0999***	0.0253	0.0367	0.0197
Collective Responsibility	0.1846***	0.0246	0.0947***	0.0186
Quality Professional Development	0.1708***	0.0233	0.1075***	0.0186
School Commitment	0.1330***	0.0285	0.0963***	0.0184
Teacher-Teacher Trust	0.1601***	0.0247	0.0785***	0.0185
Instructional Leadership	0.1031***	0.0259	0.0750***	0.0194
Program Coherence	0.1510***	0.0240	0.1060***	0.0178
Teacher Influence	0.0154	0.0530	0.0259	0.0310
Teacher-Principal Trust	0.0974***	0.0252	0.0656***	0.0185
Parent Influence on Decision Making in Schools	-0.0325	0.0405	0.0352	0.0266
Parent Involvement in School	0.2471***	0.0314	0.1007***	0.0201
Teacher-Parent Trust	0.2473***	0.0266	0.0968***	0.0181
Academic Personalism	0.1549***	0.0245	0.0994***	0.0184
Peer Support for Academic Work	0.1848***	0.0222	0.1447***	0.0175
Safety	0.1403***	0.0289	0.0633***	0.0175
Student-Teacher Trust	0.1323***	0.0239	0.0882***	0.0179

Note: Asterisks denote *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. Units have been standardized.

High School Attendance

Table B.10. Pooled, Logistic Regression Model of *5Essentials* Survey Measures Predicting High School Attendance Rate

Measure Name	Baseline Measure Strength		Growth in Measure	
	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	0.3220***	0.0356	0.1172**	0.0356
English Instruction	0.2034***	0.0359	0.0959**	0.0359
Math Instruction	0.2324***	0.0437	0.1400**	0.0437
Quality of Student Discussion	0.3447***	0.0358	0.1331***	0.0358
Collaborative Practices	0.1235**	0.0385	0.0571	0.0385
Collective Responsibility	0.3382***	0.0355	0.1291***	0.0355
Quality Professional Development	0.1066**	0.0389	0.0893*	0.0389
School Commitment	0.2462***	0.0360	0.0800*	0.0360
Teacher-Teacher Trust	0.2523***	0.0372	0.0976**	0.0372
Instructional Leadership	0.1252**	0.0394	0.1045**	0.0394
Program Coherence	0.2131***	0.0383	0.1142**	0.0383
Teacher Influence	0.2493***	0.0497	0.0948	0.0497
Teacher-Principal Trust	0.2212***	0.0388	0.0925*	0.0388
Parent Influence on Decision Making in Schools	-0.0115	0.0500	0.0615	0.0500
Parent Involvement in School	0.3937***	0.0377	0.1361***	0.0377
Teacher-Parent Trust	0.4153***	0.0344	0.1706***	0.0344
Expectations for Postsecondary Education	0.4965***	0.0329	0.1777***	0.0329
Safety	0.2770***	0.0347	0.0368	0.0347
School-Wide Future Orientation	0.4189***	0.0344	0.1356***	0.0344
Student-Teacher Trust	0.2059***	0.0362	0.0351	0.0362

Note: Asterisks denote *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Units have been standardized.

Table B.11. School Fixed Effects, Logistic Regression Model of *5Essentials* Survey Measures Predicting High School Attendance Rate

Measure Name	Baseline Measure Strength		Growth in Measure	
	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	0.0926	0.0516	0.0866*	0.0343
English Instruction	0.0792	0.0477	0.1065**	0.0325
Math Instruction	0.0653	0.0551	0.0641	0.0446
Quality of Student Discussion	0.0632	0.0540	0.0525	0.0344
Collaborative Practices	0.1470**	0.0537	0.0780*	0.0371
Collective Responsibility	0.1529**	0.0547	0.0820*	0.0346
Quality Professional Development	0.0351	0.0454	0.0784*	0.0354
School Commitment	0.1196*	0.0606	0.0591	0.0358
Teacher-Teacher Trust	0.1404**	0.0509	0.0722*	0.0357
Instructional Leadership	0.0377	0.0453	0.0620	0.0363
Program Coherence	0.0610	0.0488	0.0634	0.0359
Teacher Influence	0.3236***	0.0893	0.1977***	0.0525
Teacher-Principal Trust	0.0707	0.0486	0.0306	0.0369
Parent Influence on Decision Making in Schools	-0.0288	0.0772	0.0316	0.0488
Parent Involvement in School	-0.0101	0.0693	0.0010	0.0405
Teacher-Parent Trust	0.1117	0.0615	0.1010**	0.0354
Expectations for Postsecondary Education	0.1886**	0.0672	0.1088**	0.0335
Safety	0.0467	0.0710	0.0210	0.0337
School-Wide Future Orientation	0.2166***	0.0583	0.1122***	0.0336
Student-Teacher Trust	0.0844	0.0506	0.0592	0.0332

Note: Asterisks denote *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Units have been standardized.

High School Test Scores

Math Scores

Table B.12. Pooled Regression Model of *5Essentials* Survey Measures Predicting High School Math Test Scores

Measure Name	Baseline Measure Strength		Growth in Measure	
	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	0.5765***	0.0316	0.1471***	0.0316
English Instruction	0.5543***	0.0318	0.1425***	0.0318
Math Instruction	0.4380***	0.0423	0.2677***	0.0423
Quality of Student Discussion	0.6838***	0.0295	0.1753***	0.0295
Collaborative Practices	0.0701	0.0392	0.0073	0.0392
Collective Responsibility	0.4519***	0.0340	0.0843*	0.0340
Quality Professional Development	0.1566***	0.0389	-0.0018	0.0389
School Commitment	0.5450***	0.0321	0.1371***	0.0321
Teacher-Teacher Trust	0.3097***	0.0368	0.0754*	0.0368
Instructional Leadership	0.1701***	0.0396	0.0291	0.0396
Program Coherence	0.3698***	0.0368	0.0803*	0.0368
Teacher Influence	0.3546***	0.0486	0.0725	0.0486
Teacher-Principal Trust	0.3615***	0.0377	0.1449***	0.0377
Parent Influence on Decision Making in Schools	0.1508**	0.0501	0.0541	0.0501
Parent Involvement in School	0.6559***	0.0327	0.1886***	0.0327
Teacher-Parent Trust	0.6824***	0.0292	0.1800***	0.0292
Expectations for Postsecondary Education	0.7179***	0.0277	0.1593***	0.0277
Safety	0.6967***	0.0271	0.1052***	0.0271
School-Wide Future Orientation	0.6788***	0.0289	0.1158***	0.0289
Student-Teacher Trust	0.5574***	0.0318	0.0840**	0.0318

Note: Asterisks denote *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Units have been standardized.

Table B.13. School Fixed Effects Regression Model of *5Essentials* Survey Measures Predicting High School Math Test Scores

Measure Name	Baseline Measure Strength		Growth in Measure	
	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	0.1143***	0.0268	0.0153	0.0173
English Instruction	0.1534***	0.0243	0.0713***	0.0163
Math Instruction	0.2146***	0.0272	0.1653***	0.0220
Quality of Student Discussion	0.2605***	0.0264	0.0541**	0.0168
Collaborative Practices	-0.0893**	0.0276	-0.0295	0.0189
Collective Responsibility	0.1019***	0.0282	0.0077	0.0177
Quality Professional Development	0.1256***	0.0228	0.0287	0.0177
School Commitment	0.1734***	0.0308	0.0407*	0.0178
Teacher-Teacher Trust	0.0762**	0.0263	0.0149	0.0183
Instructional Leadership	0.0869***	0.0228	0.0116	0.0182
Program Coherence	0.1528***	0.0242	0.0465**	0.0176
Teacher Influence	0.0706	0.0560	0.0108	0.0330
Teacher-Principal Trust	0.1201***	0.0246	0.0385*	0.0185
Parent Influence on Decision Making in Schools	0.3319***	0.0468	0.1160***	0.0288
Parent Involvement in School	0.1718***	0.0355	0.0347	0.0207
Teacher-Parent Trust	0.1756***	0.0311	0.0340	0.0178
Expectations for Postsecondary Education	0.2003***	0.0354	0.0039	0.0176
Safety	0.1832***	0.0364	0.0193	0.0169
School-Wide Future Orientation	0.1094***	0.0304	-0.0096	0.0172
Student-Teacher Trust	0.1950***	0.0250	0.0456**	0.0164

Note: Asterisks denote *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Units have been standardized.

Reading Scores

Table B.14. Pooled Regression Model of *5Essentials* Survey Measures Predicting High School Reading Test Scores

Measure Name	Baseline Measure Strength		Growth in Measure	
	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	0.5831***	0.0315	0.1720***	0.0315
English Instruction	0.5792***	0.0311	0.1212***	0.0311
Math Instruction	0.3413***	0.0434	0.1648***	0.0434
Quality of Student Discussion	0.6951***	0.0292	0.2199***	0.0292
Collaborative Practices	0.0715	0.0392	0.0266	0.0392
Collective Responsibility	0.4048***	0.0348	0.0993**	0.0348
Quality Professional Development	0.1240**	0.0391	0.0032	0.0391
School Commitment	0.5623***	0.0318	0.1744***	0.0318
Teacher-Teacher Trust	0.2904***	0.0371	0.0717	0.0371
Instructional Leadership	0.1695***	0.0397	0.0551	0.0397
Program Coherence	0.3462***	0.0372	0.1085**	0.0372
Teacher Influence	0.3336***	0.0489	0.0850	0.0489
Teacher-Principal Trust	0.3436***	0.0380	0.1639***	0.0380
Parent Influence on Decision Making in Schools	0.1710***	0.0500	0.0774	0.0500
Parent Involvement in School	0.7080***	0.0313	0.2436***	0.0313
Teacher-Parent Trust	0.7343***	0.0277	0.2335***	0.0277
Expectations for Postsecondary Education	0.7641***	0.0263	0.2121***	0.0263
Safety	0.7404***	0.0258	0.1513***	0.0258
School-Wide Future Orientation	0.6763***	0.0291	0.1345***	0.0291
Student-Teacher Trust	0.5042***	0.0329	0.0786*	0.0329

Note: Asterisks denote *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Units have been standardized.

Table B.15. School Fixed Effects Regression Model of *5Essentials* Survey Measures Predicting High School Reading Test Scores

	Baseline Measure Strength		Growth in Measure	
Measure Name	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	0.1423***	0.0216	0.0447**	0.0139
English Instruction	0.1156***	0.0199	0.0379**	0.0134
Math Instruction	0.1269***	0.0227	0.0668***	0.0184
Quality of Student Discussion	0.2420***	0.0214	0.0812***	0.0137
Collaborative Practices	0.0339	0.0227	0.0269	0.0156
Collective Responsibility	0.1346***	0.0230	0.0406**	0.0144
Quality Professional Development	0.1246***	0.0186	0.0409**	0.0145
School Commitment	0.1825***	0.0251	0.0674***	0.0145
Teacher-Teacher Trust	0.0874***	0.0216	0.0209	0.0150
Instructional Leadership	0.1039***	0.0188	0.0354*	0.0149
Program Coherence	0.1293***	0.0199	0.0647***	0.0145
Teacher Influence	0.1301**	0.0428	0.0579*	0.0252
Teacher-Principal Trust	0.1161***	0.0202	0.0507***	0.0152
Parent Influence on Decision Making in Schools	0.2184***	0.0361	0.0865***	0.0223
Parent Involvement in School	0.1785***	0.0279	0.0631***	0.0163
Teacher-Parent Trust	0.2022***	0.0250	0.0623***	0.0143
Expectations for Postsecondary Education	0.2537***	0.0282	0.0496***	0.0140
Safety	0.1897***	0.0294	0.0563***	0.0136
School-Wide Future Orientation	0.1760***	0.0242	0.0317*	0.0137
Student-Teacher Trust	0.1719***	0.0202	0.0499***	0.0133

Note: Asterisks denote *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Units have been standardized.

High School GPA

Table B.16. Pooled Regression Model of *5Essentials* Survey Measures Predicting High School GPA

Measure Name	Baseline Measure Strength		Growth in Measure	
	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	0.2443***	0.0425	0.1249**	0.0425
English Instruction	0.2775***	0.0414	0.1233**	0.0414
Math Instruction	0.2538***	0.0520	0.0899	0.0520
Quality of Student Discussion	0.2917***	0.0428	0.0912*	0.0428
Collaborative Practices	-0.0946*	0.0469	-0.0163	0.0469
Collective Responsibility	0.1886***	0.0433	0.1320**	0.0433
Quality Professional Development	0.1365**	0.0456	0.1241**	0.0456
School Commitment	0.2520***	0.0418	0.1445***	0.0418
Teacher-Teacher Trust	0.1701***	0.0443	0.1321**	0.0443
Instructional Leadership	0.1737***	0.0458	0.1052*	0.0458
Program Coherence	0.1687***	0.0446	0.0868	0.0446
Teacher Influence	0.1796**	0.0616	0.1710**	0.0616
Teacher-Principal Trust	0.2146***	0.0449	0.1272**	0.0449
Parent Influence on Decision Making in Schools	0.2461***	0.0582	0.2165***	0.0582
Parent Involvement in School	0.2760***	0.0470	0.1563***	0.0470
Teacher-Parent Trust	0.3559***	0.0415	0.1700***	0.0415
Expectations for Postsecondary Education	0.2905***	0.0419	0.0924*	0.0419
Safety	0.3260***	0.0404	0.1258**	0.0404
School-Wide Future Orientation	0.3538***	0.0413	0.2365***	0.0413
Student-Teacher Trust	0.3335***	0.0412	0.2184***	0.0412

Note: Asterisks denote *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Units have been standardized.

Table B.17. School Fixed Effects Regression Model of *5Essentials* Survey Measures Predicting High School School GPA

Measure Name	Baseline Measure Strength		Growth in Measure	
	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	0.1294*	0.0578	0.0967*	0.0404
English Instruction	0.1657**	0.0560	0.1020**	0.0386
Math Instruction	0.2057**	0.0627	0.0569	0.0527
Quality of Student Discussion	0.2347***	0.0639	0.0776	0.0421
Collaborative Practices	-0.0396	0.0587	0.0191	0.0452
Collective Responsibility	0.1012	0.0567	0.0994*	0.0416
Quality Professional Development	0.1389*	0.0546	0.1307**	0.0430
School Commitment	0.0822	0.0749	0.0792	0.0429
Teacher-Teacher Trust	0.1066	0.0589	0.0878*	0.0429
Instructional Leadership	0.1095*	0.0552	0.0866*	0.0433
Program Coherence	0.0990	0.0571	0.0803	0.0428
Teacher Influence	-0.0428	0.1176	0.0780	0.0703
Teacher-Principal Trust	0.0749	0.0605	0.0492	0.0443
Parent Influence on Decision Making in Schools	-0.1141	0.0992	0.0887	0.0611
Parent Involvement in School	0.0329	0.0782	0.0323	0.0490
Teacher-Parent Trust	0.1658*	0.0753	0.1021*	0.0433
Expectations for Postsecondary Education	0.1404	0.0770	0.0484	0.0424
Safety	0.1772*	0.0847	0.0769	0.0393
School-Wide Future Orientation	0.1741**	0.0647	0.1759***	0.0402
Student-Teacher Trust	0.2015***	0.0572	0.1792***	0.0391

Note: Asterisks denote *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Units have been standardized.

High School Freshman OnTrack

Table B.18. Pooled Regression Model of *5Essentials* Survey Measures Predicting High School Freshman OnTrack

Measure Name	Baseline Measure Strength		Growth in Measure	
	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	0.1665***	0.0427	0.0804	0.0427
English Instruction	0.0854*	0.0427	0.0807	0.0427
Math Instruction	0.3426***	0.0517	0.1351**	0.0517
Quality of Student Discussion	0.0726	0.0434	0.0238	0.0434
Collaborative Practices	0.0093	0.0468	0.0117	0.0468
Collective Responsibility	0.2682***	0.0427	0.1275**	0.0427
Quality Professional Development	0.2141***	0.0450	0.1121*	0.0450
School Commitment	0.0237	0.0424	0.0362	0.0424
Teacher-Teacher Trust	0.1759***	0.0441	0.1078*	0.0441
Instructional Leadership	0.2285***	0.0450	0.0902*	0.0450
Program Coherence	0.2229***	0.0439	0.1017*	0.0439
Teacher Influence	0.1855**	0.0606	0.1227*	0.0606
Teacher-Principal Trust	0.1291**	0.0451	0.0425	0.0451
Parent Influence on Decision Making in Schools	0.2025***	0.0579	0.1212*	0.0579
Parent Involvement in School	0.1495**	0.0476	0.1198*	0.0476
Teacher-Parent Trust	0.2150***	0.0423	0.0907*	0.0423
Expectations for Postsecondary Education	0.0677	0.0424	0.0101	0.0424
Safety	0.0390	0.0414	0.0938*	0.0414
School-Wide Future Orientation	0.2741***	0.0418	0.1452***	0.0418
Student-Teacher Trust	0.2442***	0.0414	0.0780	0.0414

Note: Asterisks denote *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Units have been standardized.

Table B.19. School Fixed Effects Regression Model of *5Essentials* Survey Measures Predicting High School Freshman OnTrack

Measure Name	Baseline Measure Strength		Growth in Measure	
	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	0.1979***	0.0485	0.0839*	0.0334
English Instruction	0.1391**	0.0465	0.0894**	0.0325
Math Instruction	0.2145***	0.0515	0.0402	0.0438
Quality of Student Discussion	0.3155***	0.0500	0.0938**	0.0332
Collaborative Practices	0.1485**	0.0471	0.0894*	0.0368
Collective Responsibility	0.2160***	0.0455	0.1154***	0.0334
Quality Professional Development	0.2093***	0.0432	0.1052**	0.0347
School Commitment	0.2482***	0.0608	0.0941**	0.0344
Teacher-Teacher Trust	0.2005***	0.0470	0.0972**	0.0346
Instructional Leadership	0.2009***	0.0437	0.0748*	0.0346
Program Coherence	0.2188***	0.0448	0.0957**	0.0343
Teacher Influence	0.0824	0.0909	0.0614	0.0566
Teacher-Principal Trust	0.1780***	0.0474	0.0548	0.0356
Parent Influence on Decision Making in Schools	0.0475	0.0797	0.0558	0.0487
Parent Involvement in School	0.2336***	0.0582	0.1145**	0.0368
Teacher-Parent Trust	0.3689***	0.0591	0.1403***	0.0343
Expectations for Postsecondary Education	0.4367***	0.0665	0.1282***	0.0331
Safety	0.1612*	0.0715	0.0840**	0.0321
School-Wide Future Orientation	0.2705***	0.0529	0.1360***	0.0331
Student-Teacher Trust	0.2706***	0.0493	0.0982**	0.0325

Note: Asterisks denote *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Units have been standardized

High School College Enrollment

Table B.20. Pooled Regression Model of *5Essentials* Survey Measures Predicting High School College Enrollment

Measure Name	Baseline Measure Strength		Growth in Measure	
	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	0.4483***	0.0349	0.1126**	0.0349
English Instruction	0.3235***	0.0372	0.0165	0.0372
Math Instruction	0.2552***	0.0455	0.1072*	0.0455
Quality of Student Discussion	0.3182***	0.0381	0.0685	0.0381
Collaborative Practices	0.3416***	0.0389	0.1563***	0.0389
Collective Responsibility	0.0759	0.0396	-0.0137	0.0396
Quality Professional Development	0.0188	0.0410	-0.0581	0.0410
School Commitment	0.1303***	0.0389	-0.0285	0.0389
Teacher-Teacher Trust	0.0086	0.0403	-0.0255	0.0403
Instructional Leadership	0.0446	0.0427	-0.0297	0.0427
Program Coherence	0.0100	0.0406	-0.0407	0.0406
Teacher Influence	0.1377*	0.0555	-0.0275	0.0555
Teacher-Principal Trust	0.0320	0.0420	-0.0274	0.0420
Parent Influence on Decision Making in Schools	0.2233***	0.0530	0.0136	0.0530
Parent Involvement in School	0.5709***	0.0354	0.1868***	0.0354
Teacher-Parent Trust	0.4393***	0.0355	0.1399***	0.0355
Expectations for Postsecondary Education	0.6425***	0.0309	0.1551***	0.0309
Safety	0.0424	0.0376	-0.0011	0.0376
School-Wide Future Orientation	0.2506***	0.0376	0.0187	0.0376
Student-Teacher Trust	-0.2183***	0.0375	-0.1092**	0.0375

Note: Asterisks denote *** p<0.001, ** p<0.01, * p<0.05. Units have been standardized. Analysis of college enrollment rate included both charter and non-charter CPS schools.

Table B.21. School Fixed Effects Regression Model of *5Essentials* Survey Measures Predicting High School College Enrollment

Measure Name	Baseline Measure Strength		Growth in Measure	
	Coefficient	Standard Error	Coefficient	Standard Error
Academic Press	0.0409	0.0381	0.0217	0.0218
English Instruction	0.0528	0.0373	0.0168	0.0222
Math Instruction	0.0479	0.0375	0.0650*	0.0283
Quality of Student Discussion	0.1639***	0.0376	0.0327	0.0234
Collaborative Practices	0.0011	0.0406	0.0201	0.0254
Collective Responsibility	0.0813*	0.0385	0.0266	0.0236
Quality Professional Development	0.0370	0.0307	-0.0298	0.0234
School Commitment	0.0816*	0.0404	-0.0011	0.0235
Teacher-Teacher Trust	0.0569	0.0371	0.0299	0.0243
Instructional Leadership	0.0499	0.0321	-0.0031	0.0249
Program Coherence	0.0625	0.0327	0.0123	0.0233
Teacher Influence	0.2988***	0.0786	0.1064*	0.0439
Teacher-Principal Trust	0.0570	0.0327	-0.0075	0.0244
Parent Influence on Decision Making in Schools	0.3370***	0.0641	0.1246***	0.0340
Parent Involvement in School	0.1666***	0.0503	0.0680**	0.0257
Teacher-Parent Trust	0.0859	0.0451	0.0241	0.0238
Expectations for Postsecondary Education	0.1158*	0.0488	-0.0146	0.0235
Safety	0.0459	0.0532	0.0406	0.0217
School-Wide Future Orientation	0.0548	0.0430	0.0193	0.0220
Student-Teacher Trust	0.0857*	0.0392	0.0558*	0.0216

Note: Asterisks denote *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Units have been standardized. Analysis of college enrollment rate included both charter and non-charter CPS schools.

ABOUT THE AUTHORS

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CHRISTOPHER YOUNG As a Psychometrician at the UChicago Consortium, Chris helps to create informative survey items and to refine the quantitative feedback provided to practitioners so that it is accurate and useful. Chris also provides support across Urban Education Institute by advising researchers about applying analysis techniques and providing an accurate interpretation of results for their particular audience. Chris's background is in developmental psychology, a field where he has published on how to identify skills and choose among competing theories of cognition by comparing statistical models. Prior to joining the UChicago Consortium, he helped to develop an assessment system that pre-kindergarten teachers used to measure and improve their students' proficiencies in mathematical and literacy skills through play. Chris focuses on using data to understand change over time. He hopes to build tools that measure and promote healthy schools and that help students to grow beyond expectations of past trends.

ALICIA CHEN As Survey Coordinator at the UChicago Consortium, Alicia develops content for the *5Essentials* and *Early Education Essentials* Surveys. She is interested in describing the ways that school environments affect students' learning and outcomes, and using survey data to provide insights for school leaders and stakeholders. Using statistical methods and quantitative data analysis, Alicia assists Consortium research in its goals of improving education outcomes in Chicago.

ANDREW ZOU As a Research Analyst, Andrew supports the work of Consortium researchers as they design and implement studies. He also contributes to the organization's capacity to conduct highly rigorous quantitative research on the Chicago Public Schools. Andrew currently works on expanding the five essential supports to early childhood education and evaluating the trauma responsive educational practices program in Chicago. Andrew's past 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 has interned at Russell Investments, conducting competitive analyses on different types of defined contribution plans.

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