Investigating the relationship between pre-pandemic family engagement and student and school outcomes.

An analysis conducted by Learning Heroes and TNTP

October 2023



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In this study, we explore the extent to which schools with strong family engagement prior to the pandemic were better equipped to withstand the academic impacts of school disruptions, and how they did so.

STAGE 1: Establishing the case

Investigating the relationship between pre-pandemic family engagement and student and school outcomes. In this stage, we use publicly available data and **statistical models** to assess the association between pre-pandemic family engagement and multiple post-pandemic school outcomes after controlling for a range of differences in schools, students, and communities.

STAGE 2: Surfacing Successful Models

Revealing which family engagement policies, practices, and mindsets led to better-than-expected pandemic-era outcomes.

We will **qualitatively study** a sample of Illinois schools with strong pre-pandemic engagement and post-pandemic outcomes and compare them to schools that had weaker pre-pandemic engagement and post-pandemic outcomes to understand their pre-pandemic policies, practices, and mindsets.

STAGE 3: Improving Measurement

Developing and testing a new tool that can be used by educators, policymakers, and researchers to measure the strength of a school's family engagement efforts.

Using results from the Stage 1 and 2, and a separate review of existing measures and tools, we will **recommend an approach to measure** the strength of family engagement, and then implement this tool in a sample of schools to establish the relationships with specific practices and student outcomes.



Here, we will share results from our Stage 1 analysis.

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In **Stage 1**, we used publicly available data to explore the connection between pre-pandemic family engagement and a school's ability to better withstand disruption.

Key Input

Strength of Family Engagement

using the survey-based Involved Families score from the 5Essentials which is publicly available for all schools in Illinois.

Statistical Controls

School and Community Characteristics

-

using public data that captures differences across schools that are associated with outcomes, such as student demographic and census data.

Key Outcomes

Schoolwide Student-Based Measures

including student attendance, enrollment, achievement, growth, and survey-based perceptions.



The 5Essentials survey is a nationally renowned research tool that provides the unique opportunity to capture pre-pandemic levels of family engagement for thousands of schools across Illinois.

The family engagement experts we interviewed agreed that the 5Essentials survey and it's **Involved Families** measure provide a unique combination of data on family engagement that is **high quality** and **publicly available** for thousands of schools **spanning nearly a decade**.



The 5Essentials survey:

- is validated and based on rigorous, longitudinal research conducted by the Chicago Consortium on School Research
- measures five foundational supports that help explain why student achievement differs among schools
- has been in use across all public schools in Illinois since the 2012-2013 school year
- had an average response rate over 80% for both students and teachers in 2019

The **Involved Families** essential measures the extent to which all school staff develop strong relationships with families. It is based on survey responses from teachers that measure:

- Parent influence on decision making in schools
- Parent involvement in school
- Teacher-parent trust

Source: <u>5-essentials.org</u> and Hart, Holly, Christopher Young, Alicia Chen, Andrew Zou, and Elaine M Allensworth. "Supporting School Improvement: Early Findings from a Reexamination of the 5Essentials Survey," 2020. A key finding from this report is that "students in schools that were strong in at least three of the essential 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."



Illinois strongly reflects the diversity of the entire country.

The publicly available 5Essentials data is limited to public, K-12 schools in Illinois. Among all states, Illinois is most like the U.S. based on demographic characteristics*, such as:

- Race
- Age
- Household makeup
- Poverty Rate
- Educational Attainment



The average Illinois school is very similar to the national average across socioeconomic variables, for example:

- The average school in Illinois has 46% students of color, compared to 50% nationally
- The average school in Illinois has 17% students living in poverty, compared to 18% nationally.
- About 23% of schools in Illinois are in cities compared to 27% nationally, and 22% are in rural areas compared to 29% nationally.

*Source: Khalid, Asma. "The Perfect State Index: If Iowa, N.H. Are Too White to Go First, Then Who?" NPR, NPR, 30 Jan. 2016, www.npr.org/2016/01/29/464250335/the-perfect-state-index-if-iowa-n-h-are-too-white-to-go-first-then-who. Note: School averages for race and school locale are based on 2021-22 data from the National Center for Education Statistics (NCES) and the data for poverty rate is based on 2018-19 Model Estimates of Poverty in Schools (MEPS) from the Urban Institute's Education Data Portal.



We used publicly available school and community level data to examine the connection between pre-pandemic family engagement and a school's ability to better withstand disruption.

Key Input

Statistical Controls

School and Community

Characteristics

Strength of Engagement

Primary Specification 2019 Involved Families Score

Measures the extent to which all school staff develop strong relationships with families.

*Including a lagged version of the outcome allows us to

account for patterns and persistence over time in the outcome as well as unobserved factors that might affect the

outcome.

Inferential Controls

2019 outcome* Mean 4Essentials Score

Schools' Characteristics

Student enrollment

- Total enrollment
- % low income
- % by racial and ethnic group
- % students with a disability
- Mean class size School Types
- Elementary, Middle, High, other
- Magnet; Charter; Title 1 eligible indicators
- Locale city, suburb, rural, town School Modality in 2020-21

Community Characteristics

Tract - CDC Social Vulnerability Index Score Tract - Census self-response rate ZIP - Cohesiveness (friend clustering, support)

ZIP - Civic engagement (volunteering, # civic orgs)

School District - Size

County - Institutional Health

County - Community Health

Key Outcomes

Schoolwide Student- and Teacher-Based Measures

Engagement Outcomes

Student Attendance Rate Chronic Absenteeism Enrollment relative to 2018-19 Involved Families Score ELA Test Participation Math Test Participation

Learning Outcomes

Math Achievement Math Growth Percentiles ELA Achievement ELA Growth Percentiles

School Climate Outcomes

5Essentials Supportive Environment (i.e., student ratings of school climate) Teacher Retention



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Key Takeaways

Schools with stronger family engagement before the pandemic experienced better-than-expected attendance, achievement, and school climate outcomes post-pandemic.

For example, schools with strong family engagement pre-pandemic had chronic absenteeism rates postpandemic that were 6 percentage points lower than similar schools with weak family engagement.

For these outcomes, the importance of strong pre-pandemic family engagement was comparable to the importance of spending more time learning in-person versus remote.

For a similar school, being in the 90th instead of the 10th percentile in family engagement was associated with significant improvements in math and reading achievement in 2021-2022, similar to replacing over half of the prior school year with in-person instead of remote learning. Schools with stronger family engagement in the 2018-19 school year also had better rates of chronic absenteeism, attendance, and test participation in 2022. In contrast, schools that experienced additional days of in-person learning were not associated with improvements in chronic absenteeism, attendance, or test participation.

The powerful relationship between family engagement and student outcomes applied to a diverse range of schools.

Whether it's schools in low-income or high-income areas, from elementary to high schools, or in city or rural settings, strong family engagement in 2019 is consistently associated with better student engagement and learning outcomes in 2022.



To understand the unique effect of family engagement, we compared how different post-pandemic outcomes typically were for two schools *who were the same on all measured characteristics*.

For example, consider two schools that:





Had the **same** outcomes in 2018-2019 Served the **same** proportion of low-income students Served the **same** grade-levels Were located in the **same** type of community Among other similarities, but...

This school's **pre-pandemic family engagement is weak**, at the **10**th percentile. This school's **pre-pandemic family engagement is strong**, at the **90**th percentile.

How different were their post-pandemic outcomes?

Note: UChicago Impact administers the 5Essentials surveys and groups schools based on their 5Essentials scores: 1-20 is very weak, 21-40 is weak, 41-60 is neutral, 61-80 is strong, and 80-99 is very strong. For Involved Families, the 10th percentile score is 26 and part of the "weak" group while the 90th percentile score is 78 and part of the "strong" group. See 5-essentials.org/illinois/5e/2022 for more details.



While student engagement and learning outcomes declined overall during the pandemic, schools with strong family engagement experienced much smaller declines in chronic absenteeism and attendance

Typical change in attendance outcomes from the 2018-19 to 2021-22 school year by strength of family engagement



Compared to a typical school with weak family engagement, a **typical school with strong family engagement**:

Saw a rise in chronic absenteeism that was **39% smaller** which corresponded to 31 fewer chronically absent students.

Saw a decline in student attendance that was **25% smaller** which corresponded to about 800 fewer absences. That's equivalent to over \$45,000 of a typical school's budget.

*Note on calculation: For example, all else equal and on average, we expect a typical school in the 90th percentile of family engagement in 2019 to see a 9.7% rise in 2022 chronic absenteeism compared to a rise of 15.9% for a typical school in the 10th percentile of family engagement. This means that on average, a school with strong engagement rose 61% as much a school with weak engagement (9.7% / 15.9%) and that it's rise was 39% smaller (100% - 61%). A "typical" school has 500 students and had 180 school days in 2022. The typical school budget is approximately \$5,000,000. The 5Essentials Involved Families scores range from 1 to 99. "Weak" engagement is equivalent to the 10th percentile score (a score of 26) and "Strong" engagement is equivalent to the 90th percentile score (a score of 78).



... as well as in ELA and Math proficiency.

Typical change in proficiency from the 2018-19 to 2021-22 school year by strength of family engagement



Compared to a typical school with weak family engagement, a **typical school with strong family engagement**:

Saw a decline in ELA proficiency that was **27% smaller** which corresponded to 11 more students meeting ELA proficiency standards.

Saw a decline in Math proficiency that was **37% smaller** which corresponded to 14 more students meeting Math proficiency standards.

Note on calculation: For example, all else equal and on average, we expect a typical school in the 90th percentile of family engagement in 2019 to see a 6.2% decline in 2022 ELA proficiency compared to a decline of 8.5% for a typical school in the 10th percentile of family engagement. This means that on average, a school with strong engagement declined 73% as much a school with weak engagement (6.2% / 8.5%) and that it's rise was 27% smaller (100% - 73%). The 5Essentials Involved Families scores range from 1 to 99. "Weak" engagement is equivalent to the 10th percentile score (a score of 26) and "Strong" engagement is equivalent to the 90th percentile score (a score of 78).



Overall, a school's pre-pandemic family engagement was significantly and positively related to engagement, learning, and school climate outcomes post-pandemic, in 2021-2022.

Estimated difference on key student outcomes in 2022 between a typical school with weak and strong family engagement in 2019

	Difference	What this means for a typical school?
Chronic Absenteeism	-6.2%	31 fewer students were chronically absent
Student Attendance	+0.9%	About 800 fewer student absences
ELA Proficiency	+2.3%	11 more students meet ELA proficiency standards
Math Proficiency	+2.9%	14 more students meet Math proficiency standards
Student Ratings of School Climate	+1.8	Students feel their school is safer and more supported

Note: The 5Essentials Involved Families and supportive environment (i.e., Student Ratings of School Climate) scores range from 1 to 99. "Weak" engagement is equivalent to the 10th percentile Involved Families score (a score of 26) and "Strong" engagement is equivalent to the 90th percentile score (a score of 78). A "typical" school has 500 students and had 180 school days in 2022. To estimate the difference in outcomes associated with family engagement, we first fit a linear regression model to obtain a coefficient for Involved Families that quantifies its relationship to each outcome while accounting for school and community characteristics (see the appendix for more details on the statistical modelling framework). The estimated difference comes from multiplying the gap between 10th and 90th percentile Involved Families scores (78 - 26 = a 52-point difference) with each coefficient. For example, the Involved Families coefficient for chronic absenteeism is -.0012, so for each 1-point increase in Involved Families we expect chronic absenteeism to decrease by 0.12%. The estimated difference then, is 52 multiplied by -0.0012, resulting in a 6.2% difference.



Having a family engagement score at the 90th instead of 10th percentile had a relationship with 2021-2022 math and ELA achievement that was similar to replacing over half of the 2020-2021 school year with in-person learning instead of remote learning.

Consider a school in 2020-2021 that had:



I = 1 School Day in a 180-day year

The typical difference between schools with strong family engagement and weak family engagement was *equivalent to the effect on next year's proficiency rates* of having:

114 additional days of in-person learning instead of remote for **ELA**, and

114 more days of in-person learning was associated with a 2.3 percentage point increase in ELA proficiency

96 additional days of in-person learning instead of remote for **math**.



Note: These findings are associational and have been controlled for lagged proficiency rates as well as school and community characteristics. The benefits associated with in-person learning refer to the effect of learning in-person compared to hybrid and remote school modalities. The Involved Families scores range from 1 to 99. The 10th percentile is equivalent to an Involved Families score of 26 and the 90th percentile is equivalent to a score of 78. The percent of in person learning during the 2020-21 school year ranges from 0-100% with an average of 27%. We compare to the % of in-person learning during the 2020-21 school year ranges from 0-100% with an average of 27%. We compare to the % of in-person learning during the 2020-21 school year due to its documented influence on learning (for example, see: Fahle, Erin M., Thomas J. Kane, Tyler Patterson, Sean F. Reardon, Douglas O. Staiger, and Elizabeth A. Stuart. "School District and Community Factors Associated With Learning Loss During the COVID-19 Pandemic." https://cepr.harvard.edu/sites/hwpi.harvard.edu/files/cepr/files/explaining covid losses 5.23.pdf.)



A school's pre-pandemic family engagement was also related to better chronic absenteeism, attendance, and test participation outcomes in 2021-22 while the amount of in-person learning in 2020-21 was not.



% Difference from a 10th to 90th Percentile School

Note: The Involved Families scores range from 1 to 99. The 10th percentile is equivalent to an Involved Families score of 26 and the 90th percentile is equivalent to a score of 78. The percent of in person learning during the 2020-21 school year ranges from 0-100%. The 10th percentile is equivalent to 0% of in person learning and the 90th percentile is equivalent to 79% of in person learning during 2020-21.



Furthermore, a school's pre-pandemic family engagement was also more strongly related to chronic absenteeism than the percent of low-income students it serves.

Keeping all measured characteristics the same, the estimated difference in chronic absenteeism between . . .



% Difference from a 10th to 90th Percentile School

Note: The Involved Families scores range from 1 to 99. The 10th percentile is equivalent to an Involved Families score of 26 and the 90th percentile is equivalent to a score of 78. The percent of low-income students in a school ranges from 0-100%. The 10th percentile is equivalent to 15% low-income students and the 90th percentile is equivalent to 93% low-income students.



Compared to previous years, the importance of strong family engagement was magnified during the disruption brought by the pandemic for engagement outcomes like chronic absenteeism and student attendance.

For example, the difference from a school in the **10th** to the **90th** percentile in Involved Families during 2019 corresponds to a 0.9% increase in attendance in 2022. The same jump in 2016 corresponds to a 0.5% attendance increase in 2019.

Estimated difference on key student outcomes between a typical school with weak and strong family engagement



*Chronic absenteeism data was not available in 2016 so this value represents the relationship between 2018 family engagement and 2019 chronic absenteeism. The Involved Families scores range from 1 to 99. In 2022, the 10th percentile Involved Families score is 26 and the 90th percentile score is 78. In both 2016 and 2018, the 10th percentile score is 28 and the 90th percentile score is 80. Given data availability, the number of schools in the 2016-2019 and 2018-19 analysis is smaller than the 2019-2022 timeframe and the control variable sets differ slightly (see the appendix for more details). Across outcomes, the mean number of schools is 1,575, 1,755, and 3,143, respectively. For the 5Essentials Supportive Environment outcome (i.e., Student Ratings of School Climate), the difference from 2019 to 2022 is +1.8 points on a 99-point scale, and the difference from 2016 to 2019 is +0 points.



Across a diverse range of schools, strong family engagement in 2019 is consistently associated with chronic absenteeism in 2022.

% Difference from a 10th to 90th Percentile School on Involved Families

Whether it's schools in lowincome or high-income areas, from elementary to high schools, or in city or rural settings, those with strong family engagement in 2019 tended to have lower rates of chronic absenteeism in 2022.



Note: The Involved Families scores range from 1 to 99. The 10th percentile is equivalent to an Involved Families score of 26 and the 90th percentile is equivalent to a score of 78. Low poverty refers to the 25th percentile (28% low income), mid poverty is the 50th percentile (46%), and high poverty is the 75th percentile (69%). See the model results in the appendix for interactions on other outcomes.



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The next stages in this research project will surface practices and policies that built strong family engagement in schools that performed better than expected throughout the pandemic and help improve the way schools measure family engagement.

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Appendix:

Data Sources and Descriptions Modeling Approach Descriptive Statistics Models Output Robustness Checks Citations

Data Sources and Descriptions



All the data used in this study is publicly available at the following websites.

School Characteristics and Outcomes

- Total student enrollment, enrollment by student group, mean class size, school grade band, 5Essentials, and all outcomes: *Illinois State Board of Education* (isbe.net/ilreportcarddata)
- Magnet indicator, Charter indicator, Title 1 Eligible indicator, and school locale: National Center for Education Statistics Common Core of Data (nces.ed.gov/ccd/elsi)
- School Modality in 2020-2021: COVID-19 School Data Hub (www.covidschooldatahub.com/states/illinois) Note that the Illinois State Board of Education provided the data to the COVID-19 School Data Hub, who makes it publicly available.

Community Characteristics

- **Social Vulnerability Index**: Centers for Disease Control and Prevention/ Agency for Toxic Substances and Disease Registry/ Geospatial Research, Analysis, and Services Program (atsdr.cdc.gov/placeandhealth/svi)
- **Census self-response rate**: *United States Census* (www2.census.gov/programssurveys/decennial/2020/data/tracking-response-rates/self-response-rates-map)
- Cohesiveness (friend clustering, support) and Civic engagement (volunteering, # civic orgs): Opportunity Insights Social Capital Atlas (data.humdata.org/dataset/social-capital-atlas)
- County-wide institutional health, community health, collective efficacy, and family unity: US Congress Joint Economic Committee, Social Capital Project (jec.senate.gov/public/index.cfm/republicans/socialcapitalproject)
- School district size: Illinois State Board of Education (isbe.net/ilreportcarddata)



Outcome Variables

Variable	Source	Description
Chronic Absenteeism	ISBE	"The number of chronically absent students, divided by the enrollment of the responsible school, multiplied by 100. Students are considered chronically absent as defined in Section 26-18 of the School Code. Medically homebound and hospitalized students are excluded from this calculation." Section 26-18 defines chronic absence as "absences that total 10% or more of school days of the most recent academic school year, including absences with and without valid cause, as defined in Section 26-2a of this Code, and out-of-school suspensions for an enrolled student."
Student Attendance Rate	ISBE	"A weighted measure of the number of days a student is present relative to the total number of potential attendance days."
ELA and Math Test Participation	ISBE	"The number and percentage of students that received valid scores on the state's required accountability assessments or its approved alternate assessment in the subject areas of ELA, math, and science. The percentage of participation is the count of students with valid scores, divided by the student enrollment, multiplied by 100."
English Language Arts (ELA) Proficiency	ISBE	"The percentage of students who are proficient (i.e., performance levels 4 and 5 on the Illinois Assessment of Readiness, performance levels 3 and 4 on DLM-AA, performance levels 3 and 4 on SAT in the subject area of ELA)."
Math Proficiency	ISBE	"The percentage of students who are proficient (i.e., performance levels 4 and 5 on IAR, performance levels 3 and 4 on DLM-AA, performance levels 3 and 4 on SAT) in the subject area of math."
5Essentials Supportive Environment Score (Student Ratings of School Climate)	ISBE	A "summary indicator that describes the school's performance" based on student surveys. The score is on a scale from 1-99 and measures the extent to which students believe a school is safe (students feel safe both in and around the school building, and while they travel to and from home), supportive (students and teachers share a high level of mutual trust and respect), and demanding (school expects all students to attend college and promotes college-readiness).



School Level Control Variables

Variable	Source	Description
5Essentials Involved Families Score	ISBE	A "summary indicator that describes the school's performance" based on teacher surveys. The score is on a scale from 1-99 and measures the extent to which all school staff develop strong relationships with families. More specifically, this score measures teacher perceptions of "Parent influence on decision making in schools", "Parent involvement in school", and "Teacher-parent trust."
Average 4Essentials Score	ISBE	In addition to Involved Families, the other 5Essentials are Ambitious Instruction, Collaborative Teachers, Effective Leaders, and Supportive Environment - four foundational supports that help explain why student achievement differs among schools. This variable is included to help control for the overall conditions of the school outside of family engagement. The score is on a scale from 1-99 and is the average of the available four Essentials values.
School Modality	COVID-19 School Data Hub	In-person means "fully in-person instruction 5 days a week for all or most students," hybrid means "a blend or combination of in-person and virtual instruction for all or the majority of students," and remote means "fully remote or distance learning for all or the majority of students." Each school has a value that indicates the percentage of students that participated in each type of learning model for the 2020-2021 school year.
Student Race and Ethnicity	NCES and ISBE	The race or ethnicity of a student is one of seven values: American Indian or Alaska Native, Asian, Black, Hispanic or Latinx, Multiracial (two or more races), Native Hawaiian or Pacific Islander, or White. NCES and ISBE Student Race and Ethnicity data is very highly correlated (r > .99), so we use both sources. The NCES data has fewer missing data, so we use NCES values first. In about 3% of cases, we then use ISBE data to fill in missing NCES data.
% Low-income students	ISBE	The percentage of students who "receive or live in households that receive Supplemental Nutrition Assistance Program or Temporary Assistance to Needy Families benefits; are classified as homeless, migrant, runaway, Head Start, or foster children; or live in a household where the household income meets the U.S. Department of Agriculture income guidelines to receive free or reduced-price meals."



School Level Control Variables

Variable	Source	Description
% Students with Disabilities	ISBE	The percentage of students "who were identified as having a disability through formal evaluations and met specific criteria as stated under the Individuals with Disabilities Education Act (IDEA) to be eligible for special education and related services by a team of individuals who developed an Individualized Education Program (IEP) It also includes students with a 504 Plan who are identified as students with a disability who have met specific criteria as stated under the Section 504 of the Rehabilitation Act of 1973 and are eligible to receive accommodations and related services in a general education setting."
Average Class Size	ISBE	"The number of students in a classroom, specifically either the number of students being taught by individual teachers in a classroom or the average number of students being taught by teachers in a school."
Log of Student Enrollment	ISBE	The log of the total number of students enrolled as of October 1st of the school year. Using the log of the enrollment allows our model to provide an estimate on the relationship between a 10% change in enrollment and the outcome.
Charter School Indicator	NCES	Indicator if school is a charter school, defined by NCES as a school "that provides free elementary and/or secondary education to eligible students under a specific charter granted by the state legislature or other appropriate authority."
Magnet School Indicator	NCES	Indicator if school is a magnet school, defined by NCES as a "school or program is a special school or program designed to: attract students of different racial/ethnic backgrounds for the purpose of reducing, preventing, or eliminating racial isolation; and/or to provide an academic or social focus on a particular theme (e.g., science/math, performing arts, gifted/talented, or foreign language)."



School Level Control Variables

Variable	Source	Description
Title 1 Eligible School Indicator	NCES	Indicator if a school is Title 1 Eligible, defined by NCES as "a school designated under appropriate state and federal regulations as being high poverty and eligible for participation in programs authorized by Title I of P.L. 107-110. A Title I eligible school is one in which the percentage of children from low-income families is at least as high as the percentage of children from low-income families served by the LEA as a whole or that the LEA has designated as Title I eligible because 35 percent or more of the children are from low-income families."
School Grade Band	ISBE	Indicator for whether the school is in an Elementary School, Middle School, or High School based on NCES definitions. Schools with a minimum grade level at or below 3 rd and a maximum grade level of 8 th are Elementary. Schools with a minimum grade level between 4 th and 7 th and a maximum grade level between 4 th and 9 th are Middle. Schools with a minimum grade level between 7 th and 12 th and a maximum grade level between 10 th and 12 th are High. Schools are classified as "Other" if they do not fit any of those criteria" – for example, a K-12 school – and they make up only 1.2% of the 2022 dataset.
School District Size	ISBE	Indicator for Large, Medium, and Small-sized school districts.
School Locale	NCES	Indicator for whether the school is in a City, Rural, Suburb, or Town locale. These categories are more general versions of the 12 available categories. According to NCES, "locales are assigned to schools based on their reported physical address location. Agencies may operate schools in more than one type of locale therefore an agency locale assignment reflects the dominant locale where most students are enrolled in school. The 12 locales include: City-Large (11), City-Midsize (12), City-Small (13), Suburb-Large (21), Suburb-Midsize (22), Suburb-Small (13), Town-Fringe (31), Town-Distant (32), Town-Remote (33), Rural-Fringe (41), Rural-Distant (42), Rural-Remote (43)."



Community Level Control Variables

Variable	Source	Description
Census Self-Response Rate	U.S. Census	"Self-response rates are calculated by dividing the number of self-responses collected online, by phone, and by mail by the number of mailable housing units in Self Response enumeration areas and the number of housing units in Update Leave enumeration areas and multiplying by 100. Only one response per housing unit is used to determine this rate." This rate is used as a proxy for trust in government*. Tract data joined to schools via the 'point-in- place' method. The data is from 2020.
Social Vulnerability Index	CDC/ATSDR	CDC's measure of social vulnerability, which "refers to the potential negative effects on communities caused by external stresses on human health. Such stresses include natural or human-caused disasters, or disease outbreaks. Reducing social vulnerability can decrease both human suffering and economic loss." Tract data joined to schools via the 'point-in-place' method. The data is from 2018 and 2020.
Cohesiveness - Support Ratio	Opportunity Insights	Based on Facebook data, the rate at which friend pairs share additional mutual friends in zip code. Zip code data joined to schools via the 'point-in-place' method. That data is from 2022.
Cohesiveness - Clustering	Opportunity Insights	Based on Facebook data, the rate at which two people in a zip code who are friends with the same person are friends with each other. Zip code data joined to schools via the 'point-in-place' method. That data is from 2022.
Density of Civic Organizations	Opportunity Insights	A measure of civic engagement based on Facebook data, the proportion of people who are members of civic groups. Zip code data joined to schools via the 'point-in-place' method. That data is from 2022.
Volunteering Rate	Opportunity Insights	A measure of civic engagement based on Facebook data, the number of civic organizations per 1000 people. Zip code data joined to schools via the 'point-in-place' method. That data is from 2022.

*For example, see: cepr.harvard.edu/sites/hwpi.harvard.edu/files/cepr/files/explaining_covid_losses_5.23.pdf Sources: www2.census.gov/programs-surveys/decennial/2020/data/tracking-response-rates/response-rate-map-faqs.pdf, and atsdr.cdc.gov/placeandhealth/svi/index.html and data.humdata.org/dataset/social-capital-atlas



Community Level Control Variables

Variable	Source	Description
Collective Efficacy Index	Social Capital Project	A measure of social capital based on violent crimes per 100,000. County data joined to schools via the 'point-in-place' method. The data is from 2008-2014.
Community Health Index	Social Capital Project	A composite measure of social capital based on the number of non-religious non-profit organizations per 1,000 (2015), the number of religious congregations per 1,000 (2010), and an "Informal Civil Society Sub-Index" that captures the share of 'people who volunteered (2015), attended a public meeting (2015), reported having worked with neighbors to fix/improve something (2015), served on a committee or as an officer (2013), attended a meeting where politics was discussed (2008), and took part in a demonstration in the past year (2008)'. County data joined to schools via the 'point-in-place' method.
Family Unity Index	Social Capital Project	A composite measure of social capital based on the share of births in past year to women who were unmarried, the share of women ages 35-44 who are currently married (and not separated), and the share of own children living in a single-parent family. County data joined to schools via the 'point-in-place' method. The data is from 2016.
Institutional Health Index	Social Capital Project	A composite measure of social capital based on mail-back response rates for the 2010 Census, 2012 and 2016 voting rates for citizens 18+ in presidential elections, and a "Confidence in Institutions Sub-Index" that captures the share of people who report "at least some confidence in corporations, in the media, and in public schools" (2013). County data joined to schools via the 'point-in-place' method.



Modeling Approach



We used publicly available school and community level data to model the connection between pre-pandemic family engagement and postpandemic outcomes.

 $Y_{it} = \beta_0 + \beta_1 * Involved_Families_{i,2019} + \beta_2 * Y_{i,2019} + \beta_3 * 4Essentials_{i,2019} + \mathbf{BS}_{i,t} + \epsilon_{it}$

OUTCOMES

t = 2022

Engagement Outcomes

Student Attendance Rate Chronic Absenteeism Enrollment relative to 2018-19 Involved Families Score Math/ELA Test Participation

Learning Outcomes

Math/ELA Proficiency Math/ELA Growth Percentiles

School Climate Outcomes

5Essentials Supportive Environment (i.e., student ratings of school climate) Teacher Retention

FAMILY ENGAGEMENT

This is our key variable of interest

Primary Specification 2019 Involved Families Score LAGGED OUTCOME

Controlling for outcome prior to pandemic controls for prepandemic differences between schools so we can focus on the extent to which family engagement is associated with better-thanexpected outcomes.

> Primary Specification 2019 outcome

KEY CONTROL VARIABLES

We control for other characteristics of schools that might be associated with the postpandemic outcome. These include:

Perceptions on Other 4 Essentials

Help to isolate the role of family engagement above and beyond other organizational characteristics of schools.

Schools' Characteristics

School measures of student poverty, race/ethnicity, disability, total enrollment, and mean class size; School types (elementary, middle, high; and magnet, charter, title 1 eligible); locale (city, suburb, etc.); School in-person modality in 2020-21

Community Characteristics

Tract (CDC Social Vulnerability, Census rates); Zip (Civic engagement & Cohesiveness); County (Institutional & community health) School District Size



In addition to our main model specification, we also examine the extent to which the relationship between family engagement and outcomes varied by school type, as well as how it differed from a fully pre-pandemic relationship.

To what extent does the relationship between family engagement and outcomes vary by school type?

For each outcome, we repeated the main model specification with interaction effects between the Involved Families Index and school percent FRL, school level (elementary, middle, high), and school locale (city, suburban, town, rural). We used three different models, each with a separate interaction effect.

To what extent does the relationship between family engagement and postpandemic outcomes differ from its pre-pandemic version?

We repeat all models with the 2018-2019 version of the outcomes and appropriately lagged controls. This allows us to measure the relationship between the Involved Families Index and outcomes in a purely pre-pandemic time.



We showcase the effect of family engagement by providing the estimated difference in the outcome for two schools who are a distance apart on the Involved Families Index that is equal to the difference between the 90th and 10th percentile.

Making sense of the 1-99 Involved Families Index

Though all models use the raw IRT-based Involved Families Index for each school, we don't believe the typical reader will easily know how to interpret a change of 1, 10, 20, ... etc. points on this scale.

Therefore, all model-based Involved Families Index results below are converted to the relationship associated with a change in index of 52 points, which represents moving from the 10^{th} percentile statewide on family engagement (IFE = 26) to the 90th percentile (IFE = 78).



We include over 3,000 schools in the primary models and use imputation to address small amounts of missing data.

Analytic sample

We include schools that appear in both the 2019 and 2022 Illinois Report Card dataset, are classified by NCES as "regular" schools (i.e., "a public elementary/secondary school providing instruction and education services that does not focus primarily on special education, vocational/technical education, or alternative education"), are K-12 schools, and are not virtual schools. In 2022, there are 3,841 schools in the raw data set and the filtered data set includes 3,720 schools - a loss of about 3% of schools.

Dealing with missing data

For any variable we can reasonably assume would be the same for almost all schools across time, we first impute using the "Last Observation Carried Forward" approach and then using the "Next Observation Carried Backward" approach. We imputed values this way for the following variables: school locale, school types (charter, magnet, title 1 eligible), school grade band, and school district size. For all other control variables with missing data, we used random forests imputation. We imputed values for the following variables using this approach: % Low-Income students, % Students with Disabilities, Race and Ethnicity, Average Class Size, Census Self-Response Rate, Density of Civic Organizations, and Volunteering Rate. Overall, there are a very small number of imputed values (see the descriptive statistics for details). The variable with the highest number of imputed values is % Low-Income students which has less than 2% imputed values (65 of 3,720).

For each model, only schools that have non-missing values for the outcome of interest and the control variables are included. Our sample size for each model, therefore, varies somewhat based on data availability. The imputed values are used directly in the model along with a set of binary variables that indicate if the original control variable was missing.



Descriptive Statistics


The tables in this section provide summary statistics for all control and outcome variables used in the statistical modeling for this study.

Most of the results presented in this study are based on the primary 'Pandemic-Related' model which explores the relationship between the Involved Families scores in 2019 with student outcomes in 2022. Consequently, the descriptive statistics below focus on the control variables used in this model, most of which were measured in 2022.

For numeric variables, each table in this section presents mean or average value, standard deviation, minimum value, and maximum value. For categorical variables, each table presents the proportion of schools in the dataset that fit into that category. The "Geography" value indicates the level at which the data is publicly available and used in this study.

Where we compare these findings to the 'Pre-Pandemic Relationship,' we require input variables from 2016 and 2018 with outcome variables in 2019. Accordingly, the tables in this section include summary statistics for the control and outcome variables included in the 'Pandemic-Related: 2019 to 2022' models, the 'Pre-Pandemic: 2016 to 2019' models, and the 'Pre-Pandemic: 2018 to 2019' models.

The final slide in this section includes the summary statistics for the outcome variables in 2019 and 2022.



Control Variables - 'Pandemic-Related: 2019 to 2022' Model

	Mean	SD	Min	Max	Prop	Geography
Lagged Outcome Variable						
Chronic Absenteeism in 2019	0.16	0.14	0.00	1.00	-	School
ELA Proficiency in 2019	0.35	0.18	0.00	0.97	-	School
ELA Test Participation in 2019	0.99	0.04	0.25	1.00	-	School
Math Proficiency in 2019	0.30	0.19	0.00	0.95	-	School
Math Test Participation in 2019	0.98	0.04	0.22	1.00	-	School
Student Attendance Rate in 2019	0.94	0.03	0.50	1.00	-	School
Supportive Environment Score in 2019	60.55	17.13	2.00	99.00	-	School
Five Essentials						
Average 4Essentials Score in 2019	54.81	13.37	9.00	99.00	-	School
Involved Families Score in 2019	51.56	19.56	2.00	99.00	-	School
School Modality						
% Hybrid Learning in 2020-21	0.28	0.22	0.00	1.00	-	School
% In-person Learning in 2020-21	0.27	0.30	0.00	1.00	2	School
Student Race and Ethnicity						
% American Indian or Alaska Native	0.00	0.01	0.00	0.22	-	School
% Asian	0.04	0.08	0.00	0.83	-	School
% Black	0.18	0.28	0.00	1.00	-	School
% Hispanic or Latinx	0.22	0.26	0.00	1.00	-	School
% Multiracial	0.04	0.03	0.00	0.34	-	School
% Native Hawaiian or Pacific Islander	0.00	0.00	0.00	0.06	-	School
Student Enrollment Characteristics						
% Low-Income Students	0.50	0.27	0.02	1.00	-	School
% Students with Disabilities	0.20	0.06	0.04	1.00	-	School
Average Class Size	20.07	4.48	2.00	33.30	-	School
Log of Student Enrollment in 2019	5.98	0.71	3.37	8.44	-	School
School Types						
Charter School	0.04	0.19	0.00	1.00	-	School
Magnet School	0.04	0.19	0.00	1.00	-	School
Title 1 Eligible School	0.84	0.36	0.00	1.00	-	School
School Grade Band						
Elementary School	-	2	-	-	0.622	School
High School	-	-	-	-	0.178	School
Middle School	-	-	-	-	0.188	School
Other School	-	-	-	-	0.012	School

	Mean	SD	Min	Max	Prop	Geography
School District Size						
Large District	-	-	-	-	0.619	District
Medium District	-	-	-	-	0.288	District
Small District	2	-	-	-	0.093	District
School Locale						
City	-	-	-	-	0.256	School
Rural	-	-	-	-	0.212	School
Suburb	-	-	-	-	0.410	School
Town	-	-	-	-	0.122	School
Community Characteristics						
Census Self-Response Rate	0.72	0.12	0.29	0.95	-	Census Tract
Social Vulnerability Index in 2020	0.46	0.28	0.00	1.00	-	Census Tract
Cohesiveness - Support Ratio	0.92	0.07	0.20	1.00	-	Zipcode
Density of Civic Organizations	0.01	0.01	0.00	0.08	-	Zipcode
Volunteering Rate	0.08	0.03	0.02	0.28	-	Zipcode
Collective Efficacy Index	-0.66	1.22	-7.06	1.17	-	County
Community Health Index	-0.62	0.39	-1.26	1.43	-	County
Family Unity Index	0.00	0.76	-3.51	1.94	-	County
Institutional Health Index	-0.25	0.31	-1.61	0.68	-	County
Imputation Flag						
% American Indian or Alaska Native	-	-	-	-	0.003	School
% Asian	-	-	-	-	0.002	School
% Low-Income Students	-	-	-	-	0.017	School
% Multiracial	-	-	-	-	0.001	School
% Students with Disabilities	-	-	-	-	0.012	School
Average Class Size	-	-	-	-	0.007	School
Title 1 Eligible School	-	-	-	-	0.002	School
Census Self-Response Rate	-	-	-	-	0.001	Census Tract
Density of Civic Organizations	-	-	-	-	0.030	Zipcode
Volunteering Rate	-	-	-	-	0.025	Zipcode

Note: The dataset for the 2019 to 2022 analysis includes 3,720 K-12 schools. Some variables represent a different number of schools due to variations in data availability.



Control Variables - 'Pre-Pandemic: 2016 to 2019' Model

	Mean	SD	Min	Max	Prop	Geography
Lagged Outcome Variable						
ELA Proficiency in 2016	0.35	0.18	0.00	1.00	-	School
ELA Test Participation in 2016	0.98	0.07	0.00	1.00	-	School
Math Proficiency in 2016	0.29	0.19	0.00	0.94	-	School
Math Test Participation in 2016	0.98	0.07	0.00	1.00	-	School
Student Attendance Rate in 2016	0.95	0.02	0.72	1.00	-	School
Supportive Environment Score in 2016	51.03	17.99	2.00	99.00	-	School
Five Essentials						
Average 4Essentials Score in 2016	51.45	15.47	9.50	99.00	-	School
Involved Families Score in 2016	53.42	19.84	2.00	99.00	-	School
Student Race and Ethnicity						
% American Indian or Alaska Native	0.00	0.00	0.00	0.10	-	School
% Asian	0.04	0.08	0.00	0.81	-	School
% Black	0.17	0.28	0.00	1.00	-	School
% Hispanic or Latinx	0.21	0.26	0.00	1.00	-	School
% Multiracial	0.04	0.03	0.00	0.29	-	School
% Native Hawaiian or Pacific Islander	0.00	0.00	0.00	0.05	-	School
Student Enrollment Characteristics						
% Low-Income Students	0.50	0.28	0.00	1.00	-	School
% Students with Disabilities	0.18	0.05	0.01	0.61	-	School
Average Class Size	21.18	4.58	2.00	34.60	-	School
Log of Student Enrollment in 2016	6.03	0.70	2.71	8.45	-	School
School Types						
Charter School	0.01	0.10	0.00	1.00	-	School
Magnet School	0.03	0.18	0.00	1.00	-	School
Title 1 Eligible School	0.87	0.34	0.00	1.00	-	School
School Grade Band						
Elementary School	-	-	-	-	0.627	School
High School	-	-	-	-	0.170	School
Middle School	-	-	-	-	0.192	School
Other School	-	-	-	-	0.011	School

	Mean	SD	Min	Max	Prop	Geography
School District Size						
Large District	-	-	-	-	0.610	District
Medium District	-	-	-	-	0.295	District
Small District	-	-	-	-	0.096	District
School Locale						
City	-	-	-	-	0.237	School
Rural	-	-	-	-	0.217	School
Suburb	-	-	-	-	0.420	School
Town	-	-	-	-	0.126	School
Community Characteristics						
Social Vulnerability Index in 2018	0.45	0.28	0.00	1.00	-	Census Tract
Cohesiveness - Support Ratio	0.92	0.07	0.39	1.00	-	Zipcode
Density of Civic Organizations	0.01	0.01	0.00	0.08	-	Zipcode
Volunteering Rate	0.08	0.03	0.02	0.28	-	Zipcode
Collective Efficacy Index	-0.63	1.23	-7.06	1.17	-	County
Community Health Index	-0.61	0.39	-1.26	1.43	-	County
Family Unity Index	0.01	0.77	-3.51	1.94	-	County
Institutional Health Index	-0.24	0.31	-1.61	0.68	-	County
mputation Flag						
Density of Civic Organizations	-	-	-	-	0.031	Zipcode
Volunteering Rate	-	-	-	-	0.026	Zipcode

Note: The dataset for the 2016 to 2019 analysis includes 3,601 K-12 schools. Some variables represent a different number of schools due to variations in data availability.



Control Variables - 'Pre-Pandemic: 2018 to 2019' Model

	Mean	SD	Min	Max	Prop	Geography
Lagged Outcome Variable						
Chronic Absenteeism in 2018	0.15	0.15	0.00	1.00	-	School
ELA Proficiency in 2018	0.35	0.19	0.00	0.99	-	School
ELA Test Participation in 2018	0.98	0.05	0.16	1.00	-	School
Math Proficiency in 2018	0.30	0.19	0.00	0.97	-	School
Math Test Participation in 2018	0.98	0.05	0.16	1.00	-	School
Student Attendance Rate in 2018	0.94	0.03	0.49	0.99	-	School
Supportive Environment Score in 2018	53.79	17.22	5.00	99.00	-	School
Five Essentials						
Average 4Essentials Score in 2018	53.11	15.18	7.50	97.00	-	School
Involved Families Score in 2018	53.75	19.36	3.00	99.00	-	School
Student Race and Ethnicity						
% American Indian or Alaska Native	0.00	0.00	0.00	0.10	-	School
% Asian	0.04	0.08	0.00	0.81	-	School
% Black	0.18	0.29	0.00	1.00	-	School
% Hispanic or Latinx	0.21	0.26	0.00	1.00	-	School
% Multiracial	0.04	0.03	0.00	0.29	-	School
% Native Hawaiian or Pacific Islander	0.00	0.00	0.00	0.05	-	School
Student Enrollment Characteristics						
% Low-Income Students	0.51	0.28	0.00	1.00	-	School
% Students with Disabilities	0.18	0.06	0.01	0.96	-	School
Average Class Size	21.19	4.74	2.00	34.60	-	School
Log of Student Enrollment in 2018	6.00	0.70	3.04	8.44	-	School
School Types						
Charter School	0.04	0.19	0.00	1.00	-	School
Magnet School	0.04	0.19	0.00	1.00	-	School
Title 1 Eligible School	0.85	0.36	0.00	1.00	-	School
School Grade Band						
Elementary School	-	-	-	-	0.621	School
High School	-	-	-	-	0.178	School
Middle School	-	-	-	-	0.189	School
Other School	-	-	-	-	0.012	School

	Mean	SD	Min	Max	Prop	Geography
School District Size						
Large District	-	-	-	-	0.618	District
Medium District	-	-	-	-	0.288	District
Small District	-	-	-	-	0.094	District
School Locale						
City	-	-	-	-	0.256	School
Rural	-	-	-	-	0.212	School
Suburb	-	-	-	-	0.409	School
Town	-	-	-	-	0.123	School
Community Characteristics						
Social Vulnerability Index in 2018	0.45	0.28	0.00	1.00	-	Census Tract
Cohesiveness - Support Ratio	0.92	0.07	0.20	1.00	-	Zipcode
Density of Civic Organizations	0.01	0.01	0.00	0.08	-	Zipcode
Volunteering Rate	0.08	0.03	0.02	0.28	-	Zipcode
Collective Efficacy Index	-0.66	1.22	-7.06	1.17	-	County
Community Health Index	-0.62	0.39	-1.26	1.43	-	County
Family Unity Index	0.00	0.76	-3.51	1.94	-	County
Institutional Health Index	-0.25	0.31	-1.61	0.68	-	County
mputation Flag						
Density of Civic Organizations	-	-	-	-	0.030	Zipcode
Volunteering Rate	-	-	-	-	0.025	Zipcode

Note: The dataset for the 2018 to 2019 analysis includes 3,708 K-12 schools. Some variables represent a different number of schools due to variations in data availability.



Outcomes in 2019 and 2022

Outcomes in 2019

	Mean	SD	Min	Max
Attendance and Engagement				
Chronic Absenteeism	0.16	0.14	0.00	1.00
ELA Test Participation	0.99	0.04	0.25	1.00
Math Test Participation	0.98	0.04	0.22	1.00
Student Attendance Rate	0.94	0.03	0.50	1.00
Achievement				
ELA Proficiency	0.35	0.18	0.00	0.97
Math Proficiency	0.30	0.19	0.00	0.95
School Climate				
5Essentials Supportive Environment	60.56	17.13	2.00	99.00

Note: The dataset for the 2018 to 2019 analysis includes 3,708 K-12 schools. Some variables represent a different number of schools due to variations in data availability.

Outcomes in 2022

	Mean	SD	Min	Max
Attendance and Engagement				
Chronic Absenteeism	0.29	0.17	0.03	0.99
ELA Test Participation	0.98	0.04	0.41	1.00
Math Test Participation	0.98	0.04	0.41	1.00
Student Attendance Rate	0.91	0.05	0.45	1.00
Achievement				
ELA Proficiency	0.28	0.18	0.00	0.95
Math Proficiency	0.24	0.18	0.00	0.95
School Climate				
5Essentials Supportive Environment	60.57	15.71	3.00	99.00

Note: The dataset for the 2019 to 2022 analysis includes 3,720 K-12 schools. Some variables represent a different number of schools due to variations in data availability.



Models Output

Pandemic-Related 2019 to 2022



The tables in this section provide the model output from the primary modeling approach that includes the Involved Families score from 2019 and the outcome from 2022.

Each table in this section presents both the "standardized" and "raw" coefficients. "Raw" refers to models that include each variable's original values – for example, Involved Families scores of 1 to 99. See the Descriptive Statistics appendix for each variable's raw scale. "Standardized" values have been put on a common scale to have a mean of 0 and standard deviation of 1 (a z-score) where the estimate represents the change in the outcome SDs that a one SD change in the variable is associated with. This allows us to compare the coefficients more directly to one another.

The p-value is the same for both models, and a p-value less than .05 suggests that the observed association between the corresponding variable and the outcome is statistically significant. This means it's unlikely we would see such an association by chance alone, assuming no actual relationship exists.ⁱ

The raw coefficients are used in the visuals that appear in the body of this deck. For example, for Chronic Absenteeism in 2022, the raw coefficient for Involved Families is -.0012. This means that, holding all other variables in the model constant, for each 1-point increase in Involved Families we expect chronic absenteeism to decrease by 0.12%. Accordingly, a 52-point increase (which is the difference between a 10th and 90th percentile school) is associated with a 6.2% drop in Chronic Absenteeism (52 * -.0012 = -.062).



Chronic Absenteeism in 2022

	Standa	ardized	Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
Lagged Outcome Variable					
Chronic Absenteeism in 2019	0.40	0.01	0.4779	0.0172	0.000
Five Essentials					
Average 4Essentials Score in 2019	0.00	0.01	0.0001	0.0002	0.721
Involved Families Score in 2019	-0.14	0.02	-0.0012	0.0001	0.000
School Modality (vs. % Remote Learning)					
% Hybrid Learning in 2020-21	-0.04	0.01	-0.0276	0.0108	0.011
% In-person Learning in 2020-21	0.00	0.02	0.0024	0.0098	0.808
Student Race and Ethnicity (vs. % White Stu	dents)				
% American Indian or Alaska Native	0.01	0.01	0.3093	0.2762	0.263
% Asian	-0.04	0.01	-0.0875	0.0235	0.000
% Black	0.16	0.02	0.0939	0.0139	0.000
% Hispanic or Latinx	0.07	0.02	0.0417	0.0134	0.002
% Multiracial	0.01	0.01	0.0331	0.0515	0.521
% Native Hawaiian or Pacific Islander	-0.01	0.01	-0.9606	0.6444	0.136
Student Enrollment Characteristics					
% Low-Income Students	0.12	0.02	0.0730	0.0129	0.000
% Students with Disabilities	0.05	0.01	0.1454	0.0301	0.000
Average Class Size	0.01	0.01	0.0004	0.0005	0.334
Log of Student Enrollment in 2019	-0.02	0.02	-0.0039	0.0036	0.278
School Types					
Charter School	0.09	0.06	0.0150	0.0102	0.141
Magnet School	-0.11	0.05	-0.0186	0.0082	0.024
Title 1 Eligible School	0.07	0.03	0.0114	0.0052	0.029
School Grade Band (vs. Elementary)					
High School	0.37	0.03	0.0627	0.0057	0.000
Middle School	0.00	0.03	-0.0006	0.0044	0.885
Other School	0.26	0.09	0.0432	0.0149	0.004
School District Size (vs. Large)					
Medium District	-0.05	0.03	-0.0086	0.0047	0.069
Small District	-0.18	0.05	-0.0310	0.0086	0.000

	Standardized		Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
School Locale (vs. City)					
Rural	-0.28	0.05	-0.0470	0.0082	0.000
Suburb	-0.36	0.03	-0.0606	0.0050	0.000
Town	-0.31	0.05	-0.0526	0.0082	0.000
Community Characteristics					
Census Self-Response Rate	-0.04	0.02	-0.0564	0.0219	0.010
Social Vulnerability Index in 2020	0.03	0.02	0.0195	0.0093	0.036
Cohesiveness - Support Ratio	-0.04	0.01	-0.0902	0.0310	0.004
Density of Civic Organizations	-0.02	0.01	-0.4451	0.2319	0.055
Volunteering Rate	-0.03	0.01	-0.1547	0.0601	0.010
Collective Efficacy Index	-0.08	0.02	-0.0104	0.0026	0.000
Community Health Index	0.01	0.01	0.0038	0.0063	0.544
Family Unity Index	0.02	0.02	0.0052	0.0043	0.226
Institutional Health Index	0.04	0.01	0.0204	0.0069	0.003
Imputation Flag					
% American Indian or Alaska Native	-0.08	0.33	-0.0137	0.0551	0.804
% Asian	0.38	0.42	0.0639	0.0700	0.361
% Low-Income Students	-0.06	0.09	-0.0106	0.0157	0.500
% Multiracial	-0.16	0.44	-0.0268	0.0740	0.718
% Students with Disabilities	0.23	0.24	0.0386	0.0399	0.333
Average Class Size	-0.07	0.14	-0.0111	0.0238	0.639
Title 1 Eligible School	0.29	0.29	0.0479	0.0495	0.333
Census Self-Response Rate	0.27	0.36	0.0447	0.0603	0.459
Density of Civic Organizations	0.26	0.22	0.0428	0.0362	0.236
Volunteering Rate	-0.06	0.22	-0.0102	0.0373	0.784
School District Size	-0.10	0.36	-0.0167	0.0608	0.783

Note: The model includes 3,212 schools. The adjusted R-squared value is 0.74



Note: Unless noted in the name of the variable, all school level data is from the 2021-2022 school year.

Student Attendance in 2022

	Standa	ardized	Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
Lagged Outcome Variable					
Student Attendance Rate in 2019	0.60	0.01	0.9033	0.0180	0.000
Five Essentials					
Average 4Essentials Score in 2019	-0.01	0.01	0.0000	0.0000	0.521
Involved Families Score in 2019	0.07	0.01	0.0002	0.0000	0.000
School Modality (vs. % Remote Learning)					
% Hybrid Learning in 2020-21	0.04	0.01	0.0078	0.0027	0.004
% In-person Learning in 2020-21	0.00	0.02	-0.0007	0.0025	0.764
Student Race and Ethnicity (vs. % White Stu	dents)				
% American Indian or Alaska Native	0.00	0.01	-0.0392	0.0699	0.575
% Asian	0.03	0.01	0.0170	0.0059	0.004
% Black	-0.11	0.02	-0.0178	0.0035	0.000
% Hispanic or Latinx	-0.03	0.02	-0.0062	0.0034	0.064
% Multiracial	0.02	0.01	0.0227	0.0130	0.081
% Native Hawaiian or Pacific Islander	0.01	0.01	0.2190	0.1612	0.174
Student Enrollment Characteristics					
% Low-Income Students	-0.05	0.02	-0.0093	0.0032	0.004
% Students with Disabilities	-0.06	0.01	-0.0524	0.0075	0.000
Average Class Size	-0.01	0.01	-0.0001	0.0001	0.202
Log of Student Enrollment in 2019	0.02	0.01	0.0015	0.0009	0.085
School Types					
Charter School	-0.07	0.05	-0.0034	0.0025	0.177
Magnet School	0.07	0.04	0.0034	0.0021	0.099
Title 1 Eligible School	-0.03	0.03	-0.0012	0.0013	0.348
School Grade Band (vs. Elementary)					
High School	-0.36	0.03	-0.0174	0.0014	0.000
Middle School	-0.01	0.02	-0.0005	0.0011	0.676
Other School	-0.29	0.08	-0.0139	0.0037	0.000
School District Size (vs. Large)					
Medium District	0.07	0.02	0.0032	0.0012	0.008
Small District	0.21	0.04	0.0100	0.0021	0.000

	Standa	ardized	Ra	w		
	Estimate	Std Error	Estimate	Std Error	P-value	
School Locale (vs. City)						
Rural	0.30	0.04	0.0146	0.0021	0.000	
Suburb	0.34	0.03	0.0166	0.0013	0.000	
Town	0.32	0.04	0.0154	0.0021	0.000	
Community Characteristics						
Census Self-Response Rate	0.05	0.01	0.0206	0.0055	0.000	
Social Vulnerability Index in 2020	-0.01	0.01	-0.0024	0.0023	0.311	
Cohesiveness - Support Ratio	0.02	0.01	0.0152	0.0078	0.051	
Density of Civic Organizations	0.02	0.01	0.0965	0.0581	0.097	
Volunteering Rate	0.02	0.01	0.0255	0.0151	0.091	
Collective Efficacy Index	0.07	0.02	0.0026	0.0007	0.000	
Community Health Index	0.00	0.01	-0.0005	0.0016	0.760	
Family Unity Index	-0.03	0.02	-0.0022	0.0011	0.046	
Institutional Health Index	-0.03	0.01	-0.0046	0.0017	0.008	
Imputation Flag						
% American Indian or Alaska Native	0.76	0.28	0.0367	0.0137	0.007	
% Asian	-1.41	0.35	-0.0680	0.0168	0.000	
% Low-Income Students	-0.04	0.07	-0.0020	0.0036	0.587	
% Multiracial	-0.99	0.35	-0.0478	0.0168	0.004	
% Students with Disabilities	0.41	0.15	0.0199	0.0072	0.006	
Average Class Size	-0.09	0.13	-0.0043	0.0060	0.474	
Title 1 Eligible School	-0.03	0.23	-0.0014	0.0109	0.900	
Census Self-Response Rate	0.00	0.32	-0.0002	0.0153	0.991	
Density of Civic Organizations	-0.30	0.18	-0.0144	0.0086	0.092	
Volunteering Rate	0.19	0.18	0.0091	0.0089	0.302	
School District Size	-0.07	0.32	-0.0033	0.0154	0.830	



ELA Test Participation in 2022

	Standa	ardized	Raw			
	Estimate	Std Error	Estimate	Std Error	P-value	
Lagged Outcome Variable						
ELA Test Participation in 2019	0.40	0.01	0.4337	0.0142	0.000	
Five Essentials						
Average 4Essentials Score in 2019	-0.02	0.02	-0.0001	0.0001	0.305	
Involved Families Score in 2019	0.09	0.02	0.0002	0.0000	0.000	
School Modality (vs. % Remote Learning)						
% Hybrid Learning in 2020-21	0.00	0.02	0.0006	0.0037	0.878	
% In-person Learning in 2020-21	-0.04	0.02	-0.0063	0.0034	0.065	
Student Race and Ethnicity (vs. % White Stu	dents)					
% American Indian or Alaska Native	0.00	0.01	0.0024	0.0959	0.980	
% Asian	-0.02	0.02	-0.0088	0.0082	0.280	
% Black	-0.07	0.03	-0.0102	0.0048	0.033	
% Hispanic or Latinx	-0.04	0.03	-0.0072	0.0047	0.121	
% Multiracial	-0.03	0.01	-0.0349	0.0178	0.050	
% Native Hawaiian or Pacific Islander	-0.01	0.01	-0.1871	0.2435	0.442	
Student Enrollment Characteristics						
% Low-Income Students	-0.06	0.03	-0.0091	0.0044	0.042	
% Students with Disabilities	-0.06	0.01	-0.0449	0.0103	0.000	
Average Class Size	0.06	0.02	0.0006	0.0002	0.000	
Log of Student Enrollment in 2019	0.01	0.02	0.0005	0.0012	0.663	
School Types						
Charter School	-0.17	0.08	-0.0072	0.0033	0.029	
Magnet School	0.12	0.07	0.0053	0.0028	0.058	
Title 1 Eligible School	0.05	0.04	0.0023	0.0018	0.207	
School Grade Band (vs. Elementary)						
High School	-0.68	0.04	-0.0292	0.0017	0.000	
Middle School	-0.17	0.03	-0.0075	0.0015	0.000	
Other School	-0.17	0.12	-0.0073	0.0050	0.142	
School District Size (vs. Large)						
Medium District	0.02	0.04	0.0011	0.0017	0.524	
Small District	0.07	0.07	0.0031	0.0029	0.285	

	Standardized		Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
School Locale (vs. City)					
Rural	0.29	0.07	0.0126	0.0028	0.000
Suburb	0.20	0.04	0.0085	0.0017	0.000
Town	0.27	0.07	0.0118	0.0029	0.000
Community Characteristics					
Census Self-Response Rate	0.01	0.02	0.0031	0.0074	0.678
Social Vulnerability Index in 2020	0.01	0.02	0.0008	0.0032	0.793
Cohesiveness - Support Ratio	0.05	0.02	0.0280	0.0108	0.009
Density of Civic Organizations	-0.01	0.01	-0.0342	0.0788	0.664
Volunteering Rate	-0.02	0.02	-0.0241	0.0207	0.246
Collective Efficacy Index	-0.05	0.03	-0.0017	0.0009	0.068
Community Health Index	0.01	0.02	0.0014	0.0022	0.533
Family Unity Index	0.07	0.03	0.0037	0.0015	0.013
Institutional Health Index	-0.02	0.02	-0.0030	0.0024	0.211
Imputation Flag					
% American Indian or Alaska Native	-0.10	0.44	-0.0043	0.0189	0.820
% Asian	-0.41	0.56	-0.0177	0.0240	0.461
% Low-Income Students	-0.20	0.12	-0.0085	0.0050	0.090
% Multiracial	1.05	0.59	0.0451	0.0253	0.075
% Students with Disabilities	0.27	0.24	0.0116	0.0103	0.259
Average Class Size	-0.20	0.21	-0.0084	0.0089	0.342
Title 1 Eligible School	0.02	0.34	0.0010	0.0147	0.944
Census Self-Response Rate	0.35	0.48	0.0152	0.0207	0.463
Density of Civic Organizations	0.24	0.27	0.0102	0.0117	0.380
Volunteering Rate	-0.34	0.28	-0.0146	0.0120	0.226
School District Size	-0.43	0.48	-0.0187	0.0208	0.369



Math Test Participation in 2022

	Standa	ardized	Raw			
	Estimate	Std Error	Estimate	Std Error	P-value	
Lagged Outcome Variable						
Math Test Participation in 2019	0.40	0.01	0.4320	0.0142	0.000	
Five Essentials						
Average 4Essentials Score in 2019	-0.01	0.02	0.0000	0.0001	0.610	
Involved Families Score in 2019	0.09	0.02	0.0002	0.0001	0.000	
School Modality (vs. % Remote Learning)						
% Hybrid Learning in 2020-21	0.00	0.02	-0.0006	0.0039	0.881	
% In-person Learning in 2020-21	-0.05	0.02	-0.0073	0.0035	0.039	
Student Race and Ethnicity (vs. % White Stud	dents)					
% American Indian or Alaska Native	0.00	0.01	-0.0367	0.0995	0.712	
% Asian	-0.03	0.02	-0.0138	0.0085	0.105	
% Black	-0.08	0.03	-0.0128	0.0050	0.010	
% Hispanic or Latinx	-0.05	0.03	-0.0076	0.0048	0.118	
% Multiracial	-0.02	0.01	-0.0317	0.0185	0.087	
% Native Hawaiian or Pacific Islander	-0.01	0.01	-0.1588	0.2528	0.530	
Student Enrollment Characteristics						
% Low-Income Students	-0.05	0.03	-0.0085	0.0046	0.065	
% Students with Disabilities	-0.07	0.01	-0.0497	0.0107	0.000	
Average Class Size	0.06	0.02	0.0006	0.0002	0.001	
Log of Student Enrollment in 2019	0.00	0.02	0.0000	0.0013	0.991	
School Types						
Charter School	-0.17	0.08	-0.0073	0.0034	0.032	
Magnet School	0.12	0.07	0.0052	0.0029	0.074	
Title 1 Eligible School	0.07	0.04	0.0029	0.0019	0.121	
School Grade Band (vs. Elementary)						
High School	-0.65	0.04	-0.0289	0.0017	0.000	
Middle School	-0.18	0.04	-0.0081	0.0016	0.000	
Other School	-0.18	0.12	-0.0079	0.0052	0.127	
School District Size (vs. Large)						
Medium District	0.02	0.04	0.0009	0.0017	0.618	
Small District	0.06	0.07	0.0025	0.0030	0.398	

	Standardized		Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
School Locale (vs. City)					
Rural	0.31	0.07	0.0139	0.0029	0.000
Suburb	0.22	0.04	0.0095	0.0018	0.000
Town	0.29	0.07	0.0130	0.0030	0.000
Community Characteristics					
Census Self-Response Rate	0.02	0.02	0.0065	0.0077	0.404
Social Vulnerability Index in 2020	0.01	0.02	0.0013	0.0033	0.689
Cohesiveness - Support Ratio	0.04	0.02	0.0262	0.0112	0.019
Density of Civic Organizations	0.00	0.01	-0.0025	0.0818	0.976
Volunteering Rate	-0.01	0.02	-0.0189	0.0215	0.380
Collective Efficacy Index	-0.06	0.03	-0.0022	0.0009	0.020
Community Health Index	0.01	0.02	0.0016	0.0023	0.484
Family Unity Index	0.08	0.03	0.0048	0.0016	0.002
Institutional Health Index	-0.03	0.02	-0.0037	0.0025	0.135
Imputation Flag					
% American Indian or Alaska Native	-0.12	0.44	-0.0052	0.0196	0.792
% Asian	-0.47	0.56	-0.0209	0.0249	0.401
% Low-Income Students	-0.20	0.12	-0.0088	0.0052	0.089
% Multiracial	1.17	0.60	0.0515	0.0263	0.050
% Students with Disabilities	0.24	0.24	0.0106	0.0107	0.320
Average Class Size	-0.14	0.21	-0.0063	0.0092	0.490
Title 1 Eligible School	-0.07	0.35	-0.0031	0.0153	0.839
Census Self-Response Rate	0.41	0.49	0.0183	0.0215	0.393
Density of Civic Organizations	0.25	0.27	0.0109	0.0121	0.370
Volunteering Rate	-0.29	0.28	-0.0129	0.0125	0.303
School District Size	-0.51	0.49	-0.0226	0.0216	0.296



ELA Proficiency in 2022

	Standa	ardized	Raw			
	Estimate	Std Error	Estimate	Std Error	P-value	
Lagged Outcome Variable						
ELA Proficiency in 2019	0.68	0.01	0.6520	0.0129	0.000	
Five Essentials						
Average 4Essentials Score in 2019	-0.01	0.01	-0.0001	0.0002	0.556	
Involved Families Score in 2019	0.05	0.01	0.0004	0.0001	0.001	
School Modality (vs. % Remote Learning)						
% Hybrid Learning in 2020-21	0.03	0.01	0.0206	0.0092	0.026	
% In-person Learning in 2020-21	0.06	0.01	0.0356	0.0084	0.000	
Student Race and Ethnicity (vs. % White Stud	dents)					
% American Indian or Alaska Native	-0.02	0.01	-0.6033	0.2375	0.011	
% Asian	0.05	0.01	0.1121	0.0203	0.000	
% Black	-0.06	0.02	-0.0386	0.0121	0.001	
% Hispanic or Latinx	-0.06	0.02	-0.0400	0.0117	0.001	
% Multiracial	0.00	0.01	-0.0061	0.0441	0.891	
% Native Hawaiian or Pacific Islander	0.01	0.01	0.6936	0.6021	0.249	
Student Enrollment Characteristics						
% Low-Income Students	-0.12	0.02	-0.0755	0.0113	0.000	
% Students with Disabilities	-0.02	0.01	-0.0675	0.0255	0.008	
Average Class Size	-0.04	0.01	-0.0015	0.0004	0.000	
Log of Student Enrollment in 2019	0.03	0.01	0.0076	0.0031	0.013	
School Types						
Charter School	-0.10	0.05	-0.0180	0.0081	0.027	
Magnet School	0.11	0.04	0.0194	0.0070	0.006	
Title 1 Eligible School	-0.10	0.03	-0.0169	0.0044	0.000	
School Grade Band (vs. Elementary)						
High School	-0.13	0.02	-0.0224	0.0042	0.000	
Middle School	-0.07	0.02	-0.0131	0.0037	0.000	
Other School	-0.06	0.07	-0.0110	0.0123	0.373	
School District Size (vs. Large)						
Medium District	-0.01	0.02	-0.0021	0.0042	0.612	
Small District	-0.08	0.04	-0.0138	0.0072	0.054	

	Standardized		Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
School Locale (vs. City)					
Rural	-0.11	0.04	-0.0198	0.0070	0.005
Suburb	-0.02	0.02	-0.0032	0.0043	0.451
Town	-0.06	0.04	-0.0100	0.0071	0.159
Community Characteristics					
Census Self-Response Rate	-0.02	0.01	-0.0296	0.0184	0.108
Social Vulnerability Index in 2020	0.00	0.01	0.0028	0.0080	0.724
Cohesiveness - Support Ratio	0.00	0.01	-0.0095	0.0265	0.721
Density of Civic Organizations	0.01	0.01	0.1597	0.1950	0.413
Volunteering Rate	0.02	0.01	0.1168	0.0513	0.023
Collective Efficacy Index	-0.02	0.02	-0.0033	0.0023	0.139
Community Health Index	-0.03	0.01	-0.0141	0.0054	0.008
Family Unity Index	0.00	0.02	-0.0003	0.0037	0.926
Institutional Health Index	0.01	0.01	0.0083	0.0059	0.156
Imputation Flag					
% American Indian or Alaska Native	0.28	0.26	0.0504	0.0467	0.280
% Asian	-0.22	0.33	-0.0390	0.0593	0.510
% Low-Income Students	0.39	0.07	0.0690	0.0124	0.000
% Multiracial	-0.32	0.35	-0.0573	0.0626	0.360
% Students with Disabilities	-0.12	0.14	-0.0218	0.0254	0.391
Average Class Size	0.09	0.12	0.0156	0.0219	0.476
Title 1 Eligible School	-0.39	0.21	-0.0693	0.0364	0.057
Census Self-Response Rate	-0.22	0.29	-0.0393	0.0511	0.442
Density of Civic Organizations	0.32	0.16	0.0559	0.0288	0.052
Volunteering Rate	-0.19	0.17	-0.0341	0.0298	0.252
School District Size	-0.31	0.29	-0.0550	0.0515	0.286



Math Proficiency in 2022

	Standardized		Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
Lagged Outcome Variable					
Math Proficiency in 2019	0.66	0.01	0.6335	0.0124	0.000
Five Essentials					
Average 4Essentials Score in 2019	-0.03	0.01	-0.0004	0.0001	0.005
Involved Families Score in 2019	0.06	0.01	0.0006	0.0001	0.000
School Modality (vs. % Remote Learning)					
% Hybrid Learning in 2020-21	0.03	0.01	0.0245	0.0084	0.004
% In-person Learning in 2020-21	0.09	0.01	0.0537	0.0077	0.000
Student Race and Ethnicity (vs. % White Stu	dents)				
% American Indian or Alaska Native	-0.01	0.01	-0.2678	0.2170	0.217
% Asian	0.06	0.01	0.1314	0.0189	0.000
% Black	-0.09	0.02	-0.0559	0.0110	0.000
% Hispanic or Latinx	-0.10	0.02	-0.0716	0.0107	0.000
% Multiracial	-0.02	0.01	-0.0913	0.0403	0.023
% Native Hawaiian or Pacific Islander	0.01	0.01	0.5407	0.5500	0.326
Student Enrollment Characteristics					
% Low-Income Students	-0.11	0.02	-0.0714	0.0104	0.000
% Students with Disabilities	0.00	0.01	-0.0144	0.0233	0.536
Average Class Size	-0.02	0.01	-0.0010	0.0004	0.010
Log of Student Enrollment in 2019	0.02	0.01	0.0053	0.0028	0.057
School Types					
Charter School	-0.17	0.04	-0.0311	0.0074	0.000
Magnet School	0.04	0.04	0.0070	0.0064	0.275
Title 1 Eligible School	-0.10	0.02	-0.0176	0.0041	0.000
School Grade Band (vs. Elementary)					
High School	-0.05	0.02	-0.0093	0.0038	0.015
Middle School	-0.09	0.02	-0.0160	0.0034	0.000
Other School	-0.11	0.06	-0.0198	0.0113	0.079
School District Size (vs. Large)					
Medium District	-0.04	0.02	-0.0077	0.0038	0.044
Small District	-0.15	0.04	-0.0264	0.0066	0.000

	Standardized		Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
School Locale (vs. City)					
Rural	-0.05	0.04	-0.0089	0.0064	0.164
Suburb	0.04	0.02	0.0076	0.0039	0.054
Town	-0.03	0.04	-0.0051	0.0065	0.430
Community Characteristics					
Census Self-Response Rate	-0.02	0.01	-0.0341	0.0168	0.042
Social Vulnerability Index in 2020	0.00	0.01	-0.0015	0.0073	0.839
Cohesiveness - Support Ratio	-0.01	0.01	-0.0152	0.0242	0.530
Density of Civic Organizations	0.01	0.01	0.2074	0.1784	0.245
Volunteering Rate	0.01	0.01	0.0702	0.0468	0.134
Collective Efficacy Index	-0.03	0.01	-0.0043	0.0021	0.038
Community Health Index	-0.03	0.01	-0.0134	0.0049	0.006
Family Unity Index	0.02	0.01	0.0048	0.0034	0.160
Institutional Health Index	0.00	0.01	-0.0017	0.0054	0.757
Imputation Flag					
% American Indian or Alaska Native	-0.11	0.23	-0.0203	0.0427	0.633
% Asian	-0.11	0.30	-0.0204	0.0542	0.706
% Low-Income Students	0.41	0.06	0.0740	0.0114	0.000
% Multiracial	0.04	0.32	0.0066	0.0572	0.909
% Students with Disabilities	-0.10	0.13	-0.0182	0.0232	0.434
Average Class Size	0.09	0.11	0.0170	0.0200	0.394
Title 1 Eligible School	-0.14	0.18	-0.0248	0.0333	0.457
Census Self-Response Rate	-0.14	0.26	-0.0259	0.0467	0.580
Density of Civic Organizations	-0.18	0.15	-0.0328	0.0263	0.213
Volunteering Rate	0.21	0.15	0.0375	0.0272	0.168
School District Size	-0.24	0.26	-0.0441	0.0471	0.349



Five Essentials Supportive Environment in 2022

	Standardized		Raw			
	Estimate	Std Error	Estimate	Std Error	P-value	
Lagged Outcome Variable						
Supportive Environment Score in 2019	0.53	0.02	0.4819	0.0200	0.000	
Five Essentials						
Average 4Essentials Score in 2019	-0.02	0.03	-0.0257	0.0334	0.442	
Involved Families Score in 2019	0.04	0.02	0.0346	0.0195	0.076	
School Modality (vs. % Remote Learning)						
% Hybrid Learning in 2020-21	-0.02	0.02	-1.4291	1.3469	0.289	
% In-person Learning in 2020-21	0.01	0.02	0.6573	1.2324	0.594	
Student Race and Ethnicity (vs. % White Stud	lents)					
% American Indian or Alaska Native	-0.03	0.01	-79.2640	33.2774	0.017	
% Asian	0.06	0.02	11.0196	2.9368	0.000	
% Black	-0.18	0.03	-9.8317	1.7170	0.000	
% Hispanic or Latinx	-0.08	0.03	-4.6593	1.6594	0.005	
% Multiracial	-0.05	0.01	-22.5590	6.4877	0.001	
% Native Hawaiian or Pacific Islander	0.04	0.01	275.6788	84.8015	0.001	
Student Enrollment Characteristics						
% Low-Income Students	-0.05	0.03	-2.6753	1.6179	0.098	
% Students with Disabilities	0.00	0.01	0.4256	3.7210	0.909	
Average Class Size	-0.06	0.02	-0.1959	0.0595	0.001	
Log of Student Enrollment in 2019	-0.05	0.02	-1.0594	0.4432	0.017	
School Types						
Charter School	0.30	0.08	4.7665	1.1904	0.000	
Magnet School	0.11	0.06	1.6570	1.0040	0.099	
Title 1 Eligible School	0.00	0.04	-0.0155	0.6372	0.981	
School Grade Band (vs. Elementary)						
High School	-0.44	0.04	-6.9781	0.5986	0.000	
Middle School	-0.28	0.04	-4.4668	0.6143	0.000	
Other School	-0.38	0.11	-5.9265	1.7132	0.001	
School District Size (vs. Large)						
Medium District	-0.10	0.04	-1.5316	0.6165	0.013	
Small District	-0.16	0.07	-2.5147	1.0487	0.017	

	Standardized		Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
School Locale (vs. City)					
Rural	0.06	0.06	0.9079	1.0122	0.370
Suburb	0.17	0.04	2.7010	0.6284	0.000
Town	0.10	0.07	1.5744	1.0435	0.131
Community Characteristics					
Census Self-Response Rate	0.03	0.02	4.3102	2.6784	0.108
Social Vulnerability Index in 2020	-0.03	0.02	-1.8288	1.1497	0.112
Cohesiveness - Support Ratio	0.00	0.02	-0.8161	3.8437	0.832
Density of Civic Organizations	0.02	0.01	44.2052	28.4193	0.120
Volunteering Rate	0.00	0.02	-1.6626	7.5877	0.827
Collective Efficacy Index	-0.05	0.03	-0.6671	0.3290	0.043
Community Health Index	-0.02	0.02	-0.9715	0.7789	0.212
Family Unity Index	0.03	0.03	0.6417	0.5441	0.238
Institutional Health Index	0.01	0.02	0.5618	0.8572	0.512
Imputation Flag					
% American Indian or Alaska Native	-0.43	0.42	-6.7028	6.5614	0.307
% Asian	-0.25	0.59	-3.8758	9.3176	0.677
% Low-Income Students	0.25	0.11	3.8564	1.7457	0.027
% Multiracial	0.70	0.59	11.0536	9.2906	0.234
% Students with Disabilities	-0.03	0.23	-0.4530	3.5422	0.898
Average Class Size	-0.05	0.23	-0.7773	3.5483	0.827
Title 1 Eligible School	-0.28	0.32	-4.3853	5.0528	0.386
Census Self-Response Rate	-0.22	0.64	-3.5004	10.0190	0.727
Density of Civic Organizations	-0.23	0.28	-3.6428	4.3605	0.404
Volunteering Rate	0.20	0.29	3.1661	4.5097	0.483
School District Size	0.31	0.64	4.8374	10.0360	0.630



Models Output School Type Interaction Effects



The tables in this section provide the output from models that add an interaction term to the primary modeling approach to capture variation by school type in the relationship between Involved Families in 2019 with student outcomes in 2022.

To explore how the relationship between Involved Families and student outcomes may differ by school grade band, school locale, and the percent of low-income students in a school, we add an interaction term to the primary model. We separately fit a model for each school type variable - for example, for school grade band, we add the interaction term (*Involved Families*_{i,2019} * *School Grade Band*_{i,2022}).

Each table contains the same information as in the previous appendix section for the interaction terms for each school type and for each outcome. The estimate for the interaction term indicates how much the association between Involved Families and the outcome differs for each school type category in comparison to the reference category. For example, for school grade band, the estimate indicates how this association differs for High Schools, Middle Schools, or Other Schools, compared to Elementary Schools. A p-value less than .05 suggests that the observed difference is statistically significant, meaning it's unlikely we would see such a difference by chance alone.



Interaction Model Output

Chronic Absenteeism in 2022

	Standardized		Raw				
	Estimate	Std Error	Estimate	Std Error	P-value		
Interaction Model 1: School Grade Band (vs. Elementary)							
Involved Families × High School	0.02	0.03	0.0002	0.0002	0.399		
Involved Families × Middle School	-0.01	0.02	-0.0001	0.0002	0.642		
Involved Families × Other School	-0.24	0.12	-0.0021	0.0010	0.046		
Interaction Model 2: School Locale (vs. City)							
Involved Families × Rural	0.00	0.03	0.0000	0.0003	0.910		
Involved Families × Suburb	0.09	0.02	0.0008	0.0002	0.000		
Involved Families × Town	-0.02	0.04	-0.0001	0.0003	0.683		
Interaction Model 3: Percent Low-income Stu	idents						
Involved Families × % Low-Income Students	0.05	0.01	0.0014	0.0003	0.000		

ELA Test Participation in 2022

	Standardized		Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
Interaction Model 1: School Grade Band (vs.	Elementary)				
Involved Families × High School	0.29	0.04	0.0006	0.0001	0.000
Involved Families × Middle School	0.01	0.03	0.0000	0.0001	0.746
Involved Families × Other School	0.09	0.16	0.0002	0.0003	0.570
Interaction Model 2: School Locale (vs. City)					
Involved Families × Rural	-0.14	0.04	-0.0003	0.0001	0.001
Involved Families × Suburb	-0.14	0.03	-0.0003	0.0001	0.000
Involved Families × Town	-0.10	0.06	-0.0002	0.0001	0.086
Interaction Model 3: Percent Low-income Str	udents				
Involved Families × % Low-Income Students	0.04	0.01	0.0003	0.0001	0.007

Student Attendance Rate in 2022

	Standa	ardized	Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
Interaction Model 1: School Grade Band (vs. E	lementary)				
Involved Families × High School	0.01	0.02	0.0000	0.0001	0.578
Involved Families × Middle School	0.00	0.02	0.0000	0.0001	0.947
Involved Families × Other School	0.28	0.11	0.0007	0.0003	0.009
Interaction Model 2: School Locale (vs. City)					
Involved Families × Rural	-0.03	0.03	-0.0001	0.0001	0.266
Involved Families × Suburb	-0.09	0.02	-0.0002	0.0001	0.000
Involved Families × Town	-0.03	0.04	-0.0001	0.0001	0.350
Interaction Model 3: Percent Low-income Stu	dents				
Involved Families × % Low-Income Students	-0.03	0.01	-0.0003	0.0001	0.000

Math Test Participation in 2022

	Standa	ardized	Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
Interaction Model 1: School Grade Band (vs. 8	Elementary)				
Involved Families × High School	0.29	0.04	0.0007	0.0001	0.000
Involved Families × Middle School	0.02	0.03	0.0001	0.0001	0.502
Involved Families × Other School	0.06	0.16	0.0001	0.0004	0.715
Interaction Model 2: School Locale (vs. City)					
Involved Families × Rural	-0.13	0.04	-0.0003	0.0001	0.003
Involved Families × Suburb	-0.13	0.03	-0.0003	0.0001	0.000
Involved Families × Town	-0.10	0.06	-0.0002	0.0001	0.081
Interaction Model 3: Percent Low-income Stu	idents				
Involved Families × % Low-Income Students	0.03	0.01	0.0003	0.0001	0.016



Interaction Model Output

ELA Proficiency in 2022

	Standardized		Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
Interaction Model 1: School Grade Band (vs. 8	Elementary)				
Involved Families × High School	0.01	0.02	0.0000	0.0002	0.817
Involved Families × Middle School	0.01	0.02	0.0001	0.0002	0.737
Involved Families × Other School	-0.07	0.10	-0.0006	0.0009	0.478
Interaction Model 2: School Locale (vs. City)					
Involved Families × Rural	-0.01	0.03	-0.0001	0.0002	0.597
Involved Families × Suburb	0.04	0.02	0.0004	0.0002	0.033
Involved Families × Town	-0.03	0.03	-0.0003	0.0003	0.321
Interaction Model 3: Percent Low-income Stu	idents				
Involved Families × % Low-Income Students	-0.07	0.01	-0.0024	0.0003	0.000

5Essentials Supportive Environment in 2022

	Standardized		Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
Interaction Model 1: School Grade Band (vs. E	lementary)				
Involved Families × High School	0.14	0.04	0.1153	0.0290	0.000
Involved Families × Middle School	0.14	0.03	0.1119	0.0260	0.000
Involved Families × Other School	0.02	0.15	0.0124	0.1193	0.918
Interaction Model 2: School Locale (vs. City)					
Involved Families × Rural	0.10	0.04	0.0786	0.0343	0.022
Involved Families × Suburb	0.05	0.03	0.0374	0.0243	0.124
Involved Families × Town	0.04	0.06	0.0360	0.0450	0.424
Interaction Model 3: Percent Low-income Stu	dents				
Involved Families × % Low-Income Students	-0.06	0.01	-0.1762	0.0381	0.000

Math Proficiency in 2022

	Standardized		Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
Interaction Model 1: School Grade Band (vs. E	lementary)				
Involved Families × High School	0.01	0.02	0.0001	0.0002	0.683
Involved Families × Middle School	-0.01	0.02	-0.0001	0.0002	0.508
Involved Families × Other School	0.02	0.09	0.0002	0.0008	0.850
Interaction Model 2: School Locale (vs. City)					
Involved Families × Rural	-0.02	0.02	-0.0002	0.0002	0.346
Involved Families × Suburb	0.03	0.02	0.0003	0.0002	0.092
Involved Families × Town	-0.01	0.03	-0.0001	0.0003	0.820
Interaction Model 3: Percent Low-income Stu	dents				
Involved Families × % Low-Income Students	-0.08	0.01	-0.0027	0.0002	0.000



Models Output

Pre-pandemic 2016 to 2019



The tables in this section provide the model output from the primary modeling approach that includes the Involved Families score from 2016* and the outcome from 2019.

This section looks at the size of the relationship between family engagement and future outcomes in years completely before the pandemic. To mimic the time differential from our main analysis, we look at 2019 outcomes and 2016* family engagement.

Each table in this section presents both the "standardized" and "raw" coefficients. "Raw" refers to models that include each variable's original values – for example, Involved Families scores of 1 to 99. See the Descriptive Statistics appendix for each variable's raw scale. "Standardized" values have been put on a common scale to have a mean of 0 and standard deviation of 1 (a z-score) so that the coefficients can be directly compared to one another. The p-value is the same for both models, and a p-value less than .05 suggests that the observed association between the corresponding variable and the outcome is statistically significant. This means it's unlikely we would see such an association by chance alone, assuming no actual relationship exists.ⁱ

The raw coefficients are used in the visuals that appear in the body of this deck. For example, for Student Attendance in 2019, the raw coefficient for Involved Families is .0001. This means that, holding all other variables in the model constant, for each 1-point increase in Involved Families we expect student attendance to increase by 0.01%. Accordingly, a 52-point increase (which is the difference between a 10th and 90th percentile school) is associated with a .5% increase in Student Attendance (52 *.0001 =.0052).

*Chronic absenteeism data was not available in 2016, so for this outcome only we model the relationship between 2018 family engagement and 2019 chronic absenteeism. ⁱ Source: James, Gareth, et al. *An Introduction to Statistical Learning: With Applications in R*. Springer, 2022.



Chronic Absenteeism in 2019*

	Standardized		Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
Lagged Outcome Variable					
Chronic Absenteeism in 2018	0.63	0.02	0.6007	0.0155	0.000
Five Essentials					
Average 4Essentials Score in 2018	0.00	0.02	0.0000	0.0002	0.936
Involved Families Score in 2018	-0.09	0.02	-0.0006	0.0002	0.000
Student Race and Ethnicity (vs. % White Stud	dents)				
% American Indian or Alaska Native	0.01	0.01	0.3938	0.4298	0.360
% Asian	0.03	0.01	0.0522	0.0248	0.035
% Black	0.15	0.03	0.0736	0.0139	0.000
% Hispanic or Latinx	0.06	0.03	0.0301	0.0139	0.031
% Multiracial	0.05	0.01	0.2263	0.0635	0.000
% Native Hawaiian or Pacific Islander	0.01	0.01	0.5450	0.7285	0.455
Student Enrollment Characteristics					
% Low-Income Students	0.10	0.03	0.0517	0.0146	0.000
% Students with Disabilities	0.07	0.01	0.1863	0.0351	0.000
Average Class Size	-0.01	0.02	-0.0003	0.0005	0.585
Log of Student Enrollment in 2018	-0.05	0.02	-0.0106	0.0041	0.010
School Types					
Charter School	-0.37	0.07	-0.0520	0.0095	0.000
Magnet School	-0.13	0.05	-0.0189	0.0075	0.012
Title 1 Eligible School	-0.10	0.04	-0.0138	0.0060	0.023
School Grade Band (vs. Elementary)					
High School	0.80	0.04	0.1126	0.0062	0.000
Middle School	0.20	0.04	0.0275	0.0054	0.000
Other School	0.51	0.11	0.0723	0.0155	0.000
School District Size (vs. Large)					
Medium District	0.04	0.04	0.0057	0.0061	0.351
Small District	-0.16	0.08	-0.0219	0.0115	0.056

	Standa	ardized	Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
School Locale (vs. City)					
Rural	-0.22	0.07	-0.0309	0.0097	0.002
Suburb	-0.07	0.04	-0.0104	0.0056	0.063
Town	-0.24	0.07	-0.0336	0.0097	0.001
Community Characteristics					
Social Vulnerability Index in 2018	0.03	0.02	0.0171	0.0096	0.076
Cohesiveness - Support Ratio	0.01	0.02	0.0206	0.0315	0.513
Density of Civic Organizations	-0.01	0.02	-0.2474	0.2611	0.344
Volunteering Rate	0.02	0.02	0.0807	0.0707	0.254
Collective Efficacy Index	0.04	0.03	0.0042	0.0036	0.238
Community Health Index	0.05	0.02	0.0178	0.0078	0.022
Family Unity Index	0.00	0.03	-0.0004	0.0052	0.944
Institutional Health Index	-0.01	0.02	-0.0033	0.0096	0.733
Imputation Flag					
Density of Civic Organizations	0.55	0.37	0.0766	0.0525	0.145
Volunteering Rate	-0.72	0.38	-0.1013	0.0539	0.060

Note: The model includes 1,867 schools. The adjusted R-squared value is 0.77

*Chronic absenteeism data was not available in 2016 so this value represents the relationship between 2018 family engagement and 2019 chronic absenteeism.





Student Attendance in 2019

	Standa	Standardized		Raw	
	Estimate	Std Error	Estimate	Std Error	P-value
Lagged Outcome Variable					
Student Attendance Rate in 2016	0.67	0.02	0.7681	0.0181	0.000
Five Essentials					
Average 4Essentials Score in 2016	-0.02	0.02	0.0000	0.0000	0.272
Involved Families Score in 2016	0.08	0.02	0.0001	0.0000	0.002
Student Race and Ethnicity (vs. % White Stud	dents)				
% American Indian or Alaska Native	-0.02	0.01	-0.1079	0.0754	0.153
% Asian	-0.02	0.01	-0.0061	0.0043	0.158
% Black	-0.04	0.03	-0.0033	0.0024	0.177
% Hispanic or Latinx	0.01	0.03	0.0007	0.0025	0.769
% Multiracial	-0.08	0.01	-0.0579	0.0105	0.000
% Native Hawaiian or Pacific Islander	0.03	0.01	0.2798	0.1298	0.031
Student Enrollment Characteristics					
% Low-Income Students	-0.13	0.03	-0.0110	0.0026	0.000
% Students with Disabilities	-0.06	0.01	-0.0280	0.0064	0.000
Average Class Size	-0.03	0.02	-0.0001	0.0001	0.128
Log of Student Enrollment in 2016	0.00	0.02	0.0001	0.0007	0.936
School Types					
Charter School	0.14	0.11	0.0033	0.0025	0.185
Magnet School	0.02	0.06	0.0004	0.0013	0.752
Title 1 Eligible School	0.05	0.05	0.0013	0.0012	0.289
School Grade Band (vs. Elementary)					
High School	-0.60	0.05	-0.0140	0.0012	0.000
Middle School	-0.14	0.04	-0.0033	0.0010	0.001
Other School	-0.46	0.15	-0.0108	0.0036	0.003
School District Size (vs. Large)					
Medium District	-0.02	0.04	-0.0005	0.0010	0.604
Small District	-0.04	0.09	-0.0009	0.0021	0.664

	Standa	ardized	Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
School Locale (vs. City)					
Rural	0.13	0.07	0.0030	0.0017	0.079
Suburb	0.07	0.04	0.0016	0.0009	0.084
Town	0.17	0.07	0.0039	0.0017	0.020
Community Characteristics					
Social Vulnerability Index in 2018	-0.01	0.02	-0.0009	0.0017	0.581
Cohesiveness - Support Ratio	-0.04	0.02	-0.0127	0.0060	0.035
Density of Civic Organizations	-0.03	0.02	-0.0866	0.0467	0.064
Volunteering Rate	0.02	0.02	0.0161	0.0122	0.189
Collective Efficacy Index	0.10	0.03	0.0019	0.0006	0.001
Community Health Index	0.04	0.02	0.0021	0.0014	0.134
Family Unity Index	0.01	0.03	0.0002	0.0009	0.833
Institutional Health Index	-0.08	0.02	-0.0062	0.0015	0.000
Imputation Flag					
Density of Civic Organizations	-0.16	0.28	-0.0037	0.0065	0.568
Volunteering Rate	0.28	0.30	0.0065	0.0070	0.353

Note: The model includes 1,724 schools. The adjusted R-squared value is 0.78



Note: Unless noted in the name of the variable, all school level data is from the 2018-19 school year.

ELA Test Participation in 2019

	Standa	ardized	Ra	W	
	Estimate	Std Error	Estimate	Std Error	P-value
Lagged Outcome Variable					
ELA Test Participation in 2016	0.48	0.02	0.2466	0.0125	0.000
Five Essentials					
Average 4Essentials Score in 2016	0.17	0.04	0.0004	0.0001	0.000
Involved Families Score in 2016	-0.18	0.05	-0.0003	0.0001	0.001
Student Race and Ethnicity (vs. % White Stud	lents)				
% American Indian or Alaska Native	0.00	0.03	-0.0383	0.2345	0.870
% Asian	0.06	0.03	0.0278	0.0138	0.044
% Black	-0.07	0.06	-0.0088	0.0077	0.254
% Hispanic or Latinx	0.05	0.06	0.0061	0.0078	0.438
% Multiracial	-0.02	0.03	-0.0213	0.0328	0.517
% Native Hawaiian or Pacific Islander	-0.01	0.03	-0.2081	0.4022	0.605
Student Enrollment Characteristics					
% Low-Income Students	0.14	0.07	0.0167	0.0082	0.041
% Students with Disabilities	-0.18	0.03	-0.1115	0.0193	0.000
Average Class Size	0.00	0.04	0.0000	0.0003	0.939
Log of Student Enrollment in 2016	-0.04	0.05	-0.0021	0.0023	0.366
School Types					
Charter School	-0.41	0.23	-0.0139	0.0079	0.078
Magnet School	0.38	0.12	0.0130	0.0041	0.001
Title 1 Eligible School	-0.03	0.11	-0.0012	0.0038	0.762
School Grade Band (vs. Elementary)					
High School	-0.35	0.09	-0.0119	0.0032	0.000
Middle School	-0.15	0.09	-0.0050	0.0030	0.092
Other School	-0.07	0.33	-0.0023	0.0115	0.838
School District Size (vs. Large)					
Medium District	-0.02	0.10	-0.0007	0.0034	0.835
Small District	-0.15	0.19	-0.0050	0.0065	0.440

	Standa	ardized	Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
School Locale (vs. City)					
Rural	0.22	0.15	0.0074	0.0053	0.164
Suburb	0.20	0.09	0.0068	0.0030	0.021
Town	0.25	0.15	0.0087	0.0053	0.099
Community Characteristics					
Social Vulnerability Index in 2018	-0.07	0.04	-0.0092	0.0053	0.080
Cohesiveness - Support Ratio	0.06	0.04	0.0298	0.0188	0.113
Density of Civic Organizations	0.01	0.03	0.0394	0.1465	0.788
Volunteering Rate	0.07	0.04	0.0709	0.0381	0.063
Collective Efficacy Index	0.01	0.06	0.0003	0.0018	0.880
Community Health Index	0.05	0.05	0.0044	0.0045	0.334
Family Unity Index	0.05	0.06	0.0023	0.0027	0.386
Institutional Health Index	0.01	0.04	0.0011	0.0047	0.818
Imputation Flag					
Density of Civic Organizations	0.09	0.58	0.0032	0.0200	0.874
Volunteering Rate	-0.11	0.63	-0.0038	0.0215	0.858



Math Test Participation in 2019

	Standa	Standardized		Raw	
	Estimate	Std Error	Estimate	Std Error	P-value
Lagged Outcome Variable					
Math Test Participation in 2016	0.49	0.03	0.2396	0.0129	0.000
Five Essentials					
Average 4Essentials Score in 2016	0.19	0.05	0.0004	0.0001	0.000
Involved Families Score in 2016	-0.20	0.05	-0.0004	0.0001	0.000
Student Race and Ethnicity (vs. % White Stud	dents)				
% American Indian or Alaska Native	0.00	0.03	-0.0354	0.2517	0.888
% Asian	0.07	0.03	0.0326	0.0148	0.028
% Black	-0.09	0.06	-0.0124	0.0083	0.134
% Hispanic or Latinx	0.03	0.06	0.0046	0.0084	0.581
% Multiracial	-0.02	0.03	-0.0268	0.0353	0.448
% Native Hawaiian or Pacific Islander	-0.01	0.03	-0.2348	0.4323	0.587
Student Enrollment Characteristics					
% Low-Income Students	0.13	0.07	0.0170	0.0087	0.052
% Students with Disabilities	-0.16	0.03	-0.1053	0.0207	0.000
Average Class Size	0.01	0.04	0.0000	0.0003	0.889
Log of Student Enrollment in 2016	-0.03	0.05	-0.0015	0.0025	0.536
School Types					
Charter School	-0.49	0.23	-0.0177	0.0085	0.037
Magnet School	0.42	0.12	0.0152	0.0044	0.001
Title 1 Eligible School	-0.04	0.11	-0.0014	0.0041	0.740
School Grade Band (vs. Elementary)					
High School	-0.28	0.10	-0.0100	0.0034	0.004
Middle School	-0.16	0.09	-0.0057	0.0032	0.072
Other School	-0.07	0.34	-0.0027	0.0123	0.827
School District Size (vs. Large)					
Medium District	0.01	0.10	0.0003	0.0036	0.939
Small District	-0.07	0.19	-0.0026	0.0070	0.706

	Standardized		Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
School Locale (vs. City)					
Rural	0.18	0.16	0.0064	0.0057	0.261
Suburb	0.23	0.09	0.0083	0.0032	0.009
Town	0.23	0.16	0.0085	0.0057	0.135
Community Characteristics					
Social Vulnerability Index in 2018	-0.07	0.04	-0.0087	0.0057	0.126
Cohesiveness - Support Ratio	0.05	0.04	0.0269	0.0202	0.183
Density of Civic Organizations	0.02	0.04	0.0982	0.1573	0.533
Volunteering Rate	0.05	0.04	0.0490	0.0409	0.230
Collective Efficacy Index	0.03	0.07	0.0010	0.0019	0.604
Community Health Index	0.04	0.05	0.0039	0.0048	0.421
Family Unity Index	0.02	0.06	0.0011	0.0029	0.696
Institutional Health Index	0.02	0.04	0.0025	0.0051	0.617
Imputation Flag					
Density of Civic Organizations	0.18	0.68	0.0065	0.0247	0.794
Volunteering Rate	-0.20	0.72	-0.0071	0.0261	0.785



ELA Proficiency in 2019

	Standa	Standardized		Raw	
	Estimate	Std Error	Estimate	Std Error	P-value
Lagged Outcome Variable					
ELA Proficiency in 2016	0.56	0.02	0.5668	0.0204	0.000
Five Essentials					
Average 4Essentials Score in 2016	0.02	0.02	0.0002	0.0002	0.298
Involved Families Score in 2016	0.06	0.02	0.0006	0.0002	0.004
Student Race and Ethnicity (vs. % White Stud	dents)				
% American Indian or Alaska Native	-0.02	0.01	-1.0270	0.5125	0.045
% Asian	-0.01	0.01	-0.0290	0.0304	0.340
% Black	-0.13	0.03	-0.0858	0.0171	0.000
% Hispanic or Latinx	-0.09	0.02	-0.0667	0.0172	0.000
% Multiracial	-0.02	0.01	-0.1015	0.0717	0.157
% Native Hawaiian or Pacific Islander	0.02	0.01	1.2950	0.8774	0.140
Student Enrollment Characteristics					
% Low-Income Students	-0.16	0.03	-0.1077	0.0186	0.000
% Students with Disabilities	-0.05	0.01	-0.1797	0.0425	0.000
Average Class Size	0.03	0.02	0.0012	0.0006	0.050
Log of Student Enrollment in 2016	0.03	0.02	0.0091	0.0051	0.073
School Types					
Charter School	0.03	0.09	0.0056	0.0172	0.745
Magnet School	0.19	0.05	0.0349	0.0090	0.000
Title 1 Eligible School	-0.07	0.05	-0.0136	0.0083	0.103
School Grade Band (vs. Elementary)					
High School	-0.22	0.04	-0.0407	0.0068	0.000
Middle School	0.09	0.04	0.0170	0.0065	0.009
Other School	-0.14	0.14	-0.0261	0.0251	0.298
School District Size (vs. Large)					
Medium District	-0.02	0.04	-0.0031	0.0074	0.679
Small District	0.03	0.08	0.0060	0.0142	0.674

	Standa	ardized	Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
School Locale (vs. City)					
Rural	0.10	0.06	0.0176	0.0116	0.128
Suburb	0.13	0.04	0.0238	0.0064	0.000
Town	0.16	0.06	0.0294	0.0115	0.011
Community Characteristics					
Social Vulnerability Index in 2018	-0.02	0.02	-0.0108	0.0115	0.350
Cohesiveness - Support Ratio	-0.01	0.02	-0.0311	0.0414	0.452
Density of Civic Organizations	0.02	0.01	0.3962	0.3198	0.215
Volunteering Rate	-0.02	0.02	-0.1064	0.0831	0.201
Collective Efficacy Index	-0.03	0.03	-0.0040	0.0039	0.301
Community Health Index	0.00	0.02	0.0021	0.0099	0.829
Family Unity Index	0.04	0.02	0.0101	0.0059	0.086
Institutional Health Index	-0.02	0.02	-0.0139	0.0103	0.180
Imputation Flag					
Density of Civic Organizations	-0.36	0.24	-0.0660	0.0439	0.133
Volunteering Rate	0.41	0.26	0.0751	0.0471	0.111



Math Proficiency in 2019

	Standa	Standardized		Raw	
	Estimate	Std Error	Estimate	Std Error	P-value
Lagged Outcome Variable					
Math Proficiency in 2016	0.63	0.02	0.6308	0.0180	0.000
Five Essentials					
Average 4Essentials Score in 2016	0.02	0.02	0.0002	0.0002	0.264
Involved Families Score in 2016	0.05	0.02	0.0005	0.0002	0.003
Student Race and Ethnicity (vs. % White Stud	dents)				
% American Indian or Alaska Native	-0.02	0.01	-0.8727	0.4367	0.046
% Asian	0.04	0.01	0.0878	0.0263	0.001
% Black	-0.11	0.02	-0.0758	0.0146	0.000
% Hispanic or Latinx	-0.08	0.02	-0.0567	0.0146	0.000
% Multiracial	0.00	0.01	0.0262	0.0616	0.670
% Native Hawaiian or Pacific Islander	0.01	0.01	0.7993	0.7503	0.287
Student Enrollment Characteristics					
% Low-Income Students	-0.14	0.02	-0.0946	0.0158	0.000
% Students with Disabilities	-0.05	0.01	-0.1580	0.0362	0.000
Average Class Size	0.01	0.01	0.0004	0.0005	0.420
Log of Student Enrollment in 2016	0.05	0.02	0.0146	0.0043	0.001
School Types					
Charter School	-0.03	0.08	-0.0057	0.0147	0.697
Magnet School	0.14	0.04	0.0258	0.0077	0.001
Title 1 Eligible School	-0.09	0.04	-0.0159	0.0071	0.026
School Grade Band (vs. Elementary)					
High School	0.04	0.03	0.0078	0.0062	0.204
Middle School	-0.13	0.03	-0.0240	0.0055	0.000
Other School	0.06	0.11	0.0122	0.0214	0.569
School District Size (vs. Large)					
Medium District	-0.01	0.03	-0.0026	0.0063	0.680
Small District	0.09	0.07	0.0169	0.0122	0.167

	Standa	ardized	Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
School Locale (vs. City)					
Rural	0.02	0.05	0.0045	0.0099	0.646
Suburb	0.14	0.03	0.0269	0.0055	0.000
Town	0.08	0.05	0.0159	0.0098	0.106
Community Characteristics					
Social Vulnerability Index in 2018	-0.01	0.01	-0.0074	0.0098	0.449
Cohesiveness - Support Ratio	0.00	0.01	0.0030	0.0351	0.931
Density of Civic Organizations	0.02	0.01	0.4427	0.2732	0.105
Volunteering Rate	-0.02	0.01	-0.1097	0.0709	0.122
Collective Efficacy Index	-0.02	0.02	-0.0025	0.0033	0.446
Community Health Index	-0.01	0.02	-0.0047	0.0084	0.577
Family Unity Index	0.02	0.02	0.0055	0.0050	0.271
Institutional Health Index	-0.01	0.01	-0.0034	0.0088	0.699
Imputation Flag					
Density of Civic Organizations	-0.24	0.23	-0.0458	0.0429	0.286
Volunteering Rate	0.30	0.24	0.0560	0.0453	0.217



Five Essentials Supportive Environment in 2019

	Standa	Standardized		Raw	
	Estimate	Std Error	Estimate	Std Error	P-value
Lagged Outcome Variable					
Supportive Environment Score in 2016	0.51	0.05	0.4863	0.0438	0.000
Five Essentials					
Average 4Essentials Score in 2016	-0.01	0.07	-0.0067	0.0757	0.929
Involved Families Score in 2016	0.00	0.05	-0.0039	0.0447	0.930
Student Race and Ethnicity (vs. % White Stud	lents)				
% American Indian or Alaska Native	0.02	0.03	69.3638	107.1674	0.518
% Asian	0.08	0.03	16.3187	6.8612	0.018
% Black	-0.03	0.06	-2.0184	3.9365	0.608
% Hispanic or Latinx	-0.07	0.06	-4.9244	4.0406	0.223
% Multiracial	-0.05	0.03	-24.2624	17.3936	0.163
% Native Hawaiian or Pacific Islander	0.00	0.02	-20.0919	163.7085	0.902
Student Enrollment Characteristics					
% Low-Income Students	-0.06	0.06	-3.4585	3.8967	0.375
% Students with Disabilities	-0.04	0.03	-11.7031	8.7168	0.180
Average Class Size	-0.05	0.04	-0.1910	0.1319	0.148
Log of Student Enrollment in 2016	-0.13	0.04	-3.1173	1.0359	0.003
School Types					
Charter School	0.02	0.19	0.3293	3.1682	0.917
Magnet School	-0.15	0.09	-2.5028	1.6021	0.119
Title 1 Eligible School	0.10	0.11	1.7890	1.8340	0.330
School Grade Band (vs. Elementary)					
High School	0.03	0.08	0.4560	1.3083	0.727
Middle School	-0.32	0.09	-5.5527	1.4854	0.000
Other School	-0.14	0.26	-2.4404	4.4619	0.585
School District Size (vs. Large)					
Medium District	-0.13	0.10	-2.2421	1.7642	0.204
Small District	-0.39	0.18	-6.7129	3.0372	0.027

	Standa	ardized	Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
School Locale (vs. City)					
Rural	0.17	0.16	2.8447	2.7661	0.304
Suburb	0.33	0.09	5.5654	1.4540	0.000
Town	0.17	0.16	2.8979	2.7629	0.294
Community Characteristics					
Social Vulnerability Index in 2018	-0.05	0.04	-3.0742	2.4047	0.201
Cohesiveness - Support Ratio	0.07	0.04	17.9163	8.7344	0.040
Density of Civic Organizations	-0.01	0.04	-22.6843	79.6701	0.776
Volunteering Rate	-0.04	0.04	-21.3888	18.2420	0.241
Collective Efficacy Index	0.01	0.06	0.1743	0.8947	0.846
Community Health Index	-0.05	0.05	-2.2903	2.2820	0.316
Family Unity Index	0.03	0.06	0.7021	1.3431	0.601
Institutional Health Index	-0.02	0.04	-0.8639	2.4060	0.720
Imputation Flag					
Density of Civic Organizations	0.36	0.50	6.1565	8.4666	0.467
Volunteering Rate	-0.16	0.54	-2.7056	9.2112	0.769



Robustness Checks



To explore the sensitivity or robustness of our findings, we changed our modeling approach so that the dependent variable is the change in the outcome from 2019 to 2022 ($Y_{it} - Y_{i,2019}$) and the 2019 or lagged outcome is removed from the control variables.

The tables in this section provide the same model output as in previous model output tables but from this alternative modeling approach.

The results suggest that, for this model specification, pre-pandemic family engagement is positively and significantly associated with attendance and engagement outcomes. However, we also find that pre-pandemic family engagement is not significantly associated with student achievement in Math and ELA.

These results provide additional evidence that family engagement in 2019 is related to better attendance and engagement outcomes in 2022. These results are robust.

At the same time, the results from this secondary model specification suggest that, since there is not a relationship between family engagement in 2019 and the change in learning outcomes from 2019 to 2022, the relationship observed in the primary model may depend on accounting for where each school started on each outcome in 2019 and/or model choice. Though we still prefer our primary model for theoretical reasons, these results are not quite as robust to model specification as the results using attendance and engagement outcomes. We encourage further research using achievement-based outcomes, especially research that looks at student's actual test scores rather than the simpler and binary proficiency rates.



Chronic Absenteeism, change from 2019 to 2022

	Standa	Standardized		Raw	
	Estimate	Std Error	Estimate	Std Error	P-value
Five Essentials					
Average 4Essentials Score in 2019	0.02	0.02	0.0001	0.0002	0.456
Involved Families Score in 2019	-0.08	0.03	-0.0004	0.0002	0.006
School Modality (vs. % Remote Learning)					
% Hybrid Learning in 2020-21	-0.06	0.02	-0.0320	0.0120	0.008
% In-person Learning in 2020-21	-0.03	0.03	-0.0100	0.0108	0.355
Student Race and Ethnicity (vs. % White Stu	dents)				
% American Indian or Alaska Native	0.00	0.01	0.0724	0.3052	0.813
% Asian	-0.10	0.02	-0.1285	0.0260	0.000
% Black	0.08	0.04	0.0316	0.0152	0.038
% Hispanic or Latinx	0.07	0.04	0.0312	0.0148	0.035
% Multiracial	-0.03	0.02	-0.1046	0.0568	0.066
% Native Hawaiian or Pacific Islander	-0.03	0.02	-1.5928	0.7146	0.026
Student Enrollment Characteristics					
% Low-Income Students	0.07	0.04	0.0277	0.0142	0.051
% Students with Disabilities	0.01	0.02	0.0186	0.0331	0.573
Average Class Size	0.01	0.02	0.0002	0.0005	0.638
Log of Student Enrollment in 2019	-0.02	0.03	-0.0025	0.0040	0.524
School Types					
Charter School	0.41	0.10	0.0460	0.0116	0.000
Magnet School	0.03	0.08	0.0033	0.0092	0.718
Title 1 Eligible School	0.09	0.05	0.0103	0.0058	0.074
School Grade Band (vs. Elementary)					
High School	-0.16	0.05	-0.0180	0.0054	0.001
Middle School	-0.12	0.04	-0.0132	0.0048	0.006
Other School	0.03	0.15	0.0035	0.0165	0.833
School District Size (vs. Large)					
Medium District	0.00	0.05	0.0004	0.0052	0.938
Small District	-0.20	0.09	-0.0220	0.0096	0.021

		Standa	rdized	p.		
		Standardized		Kuw		
		Estimate	Std Error	Estimate	Std Error	P-value
Scl	hool Locale (vs. City)					
	Rural	-0.25	0.08	-0.0272	0.0090	0.002
	Suburb	-0.46	0.05	-0.0512	0.0056	0.000
	Town	-0.32	0.08	-0.0351	0.0090	0.000
Co	mmunity Characteristics					
	Census Self-Response Rate	0.02	0.03	0.0157	0.0240	0.513
	Social Vulnerability Index in 2020	0.05	0.03	0.0215	0.0103	0.037
	Cohesiveness - Support Ratio	-0.10	0.02	-0.1482	0.0352	0.000
	Density of Civic Organizations	-0.03	0.02	-0.4673	0.2565	0.069
	Volunteering Rate	-0.04	0.02	-0.1377	0.0667	0.039
	Collective Efficacy Index	-0.09	0.03	-0.0084	0.0029	0.003
	Community Health Index	0.04	0.02	0.0105	0.0069	0.130
	Family Unity Index	0.07	0.03	0.0097	0.0048	0.043
	Institutional Health Index	0.02	0.02	0.0063	0.0076	0.409
lm	putation Flag					
	% American Indian or Alaska Native	-0.87	0.55	-0.0963	0.0609	0.114
	% Asian	1.52	0.70	0.1685	0.0773	0.029
	% Low-Income Students	-0.13	0.16	-0.0149	0.0174	0.391
	% Multiracial	0.15	0.74	0.0162	0.0817	0.843
	% Students with Disabilities	0.36	0.40	0.0395	0.0441	0.370
	Average Class Size	-0.19	0.24	-0.0213	0.0263	0.416
	Title 1 Eligible School	0.32	0.49	0.0354	0.0548	0.518
	Census Self-Response Rate	0.33	0.60	0.0366	0.0667	0.583
	Density of Civic Organizations	0.25	0.36	0.0276	0.0400	0.490
	Volunteering Rate	0.07	0.37	0.0081	0.0412	0.844
	School District Size	-0.43	0.61	-0.0475	0.0672	0.479

Note: The model includes 3,197 schools. The adjusted R-squared value is 0.27

Note: Unless noted in the name of the variable, all school level data is from the 2021-22 school year. Schools with chronic absenteeism values of 0% (n = 2) and 100% (n = 13) in 2019 are dropped because schools with a value of 0% in 2019 were only able to move up in 2022, and schools with a value of 100% were limited to moving down in 2022. Also, when we remove these schools from the primary model, the output is nearly unchanged.



Student Attendance, change from 2019 to 2022

	Standa	Standardized		Raw	
	Estimate	Std Error	Estimate	Std Error	P-value
Five Essentials					
Average 4Essentials Score in 2019	-0.01	0.02	0.0000	0.0000	0.626
Involved Families Score in 2019	0.09	0.02	0.0001	0.0000	0.000
School Modality (vs. % Remote Learning)					
% Hybrid Learning in 2020-21	0.06	0.02	0.0078	0.0027	0.004
% In-person Learning in 2020-21	0.00	0.03	-0.0003	0.0025	0.890
Student Race and Ethnicity (vs. % White Stu	dents)				
% American Indian or Alaska Native	-0.01	0.01	-0.0285	0.0702	0.685
% Asian	0.05	0.02	0.0181	0.0059	0.002
% Black	-0.16	0.03	-0.0164	0.0035	0.000
% Hispanic or Latinx	-0.05	0.03	-0.0057	0.0034	0.090
% Multiracial	0.03	0.02	0.0270	0.0130	0.038
% Native Hawaiian or Pacific Islander	0.02	0.01	0.2350	0.1619	0.147
Student Enrollment Characteristics					
% Low-Income Students	-0.08	0.03	-0.0083	0.0032	0.010
% Students with Disabilities	-0.10	0.02	-0.0463	0.0074	0.000
Average Class Size	-0.03	0.02	-0.0002	0.0001	0.114
Log of Student Enrollment in 2019	0.03	0.02	0.0013	0.0009	0.163
School Types					
Charter School	-0.08	0.09	-0.0023	0.0025	0.360
Magnet School	0.11	0.07	0.0030	0.0021	0.144
Title 1 Eligible School	-0.05	0.05	-0.0014	0.0013	0.290
School Grade Band (vs. Elementary)					
High School	-0.49	0.04	-0.0140	0.0012	0.000
Middle School	0.00	0.04	0.0000	0.0011	0.989
Other School	-0.46	0.13	-0.0132	0.0037	0.000
School District Size (vs. Large)					
Medium District	0.09	0.04	0.0027	0.0012	0.025
Small District	0.33	0.07	0.0093	0.0021	0.000

				_		
		Standardized		Raw		
		Estimate	Std Error	Estimate	Std Error	P-value
Sc	hool Locale (vs. City)					
	Rural	0.49	0.07	0.0138	0.0021	0.000
	Suburb	0.58	0.04	0.0163	0.0013	0.000
	Town	0.53	0.07	0.0149	0.0021	0.000
Co	mmunity Characteristics					
	Census Self-Response Rate	0.08	0.02	0.0182	0.0055	0.001
	Social Vulnerability Index in 2020	-0.03	0.02	-0.0027	0.0023	0.249
	Cohesiveness - Support Ratio	0.03	0.02	0.0132	0.0078	0.091
	Density of Civic Organizations	0.03	0.02	0.1052	0.0584	0.071
	Volunteering Rate	0.03	0.02	0.0252	0.0152	0.096
	Collective Efficacy Index	0.11	0.03	0.0026	0.0007	0.000
	Community Health Index	-0.01	0.02	-0.0010	0.0016	0.543
	Family Unity Index	-0.06	0.03	-0.0024	0.0011	0.030
	Institutional Health Index	-0.04	0.02	-0.0042	0.0017	0.016
lm	putation Flag					
	% American Indian or Alaska Native	1.37	0.48	0.0390	0.0137	0.005
	% Asian	-2.46	0.59	-0.0699	0.0169	0.000
	% Low-Income Students	-0.06	0.13	-0.0016	0.0036	0.663
	% Multiracial	-1.78	0.59	-0.0507	0.0168	0.003
	% Students with Disabilities	0.76	0.25	0.0215	0.0072	0.003
	Average Class Size	-0.13	0.21	-0.0038	0.0060	0.528
	Title 1 Eligible School	-0.03	0.39	-0.0008	0.0109	0.942
	Census Self-Response Rate	0.01	0.54	0.0002	0.0154	0.988
	Density of Civic Organizations	-0.52	0.30	-0.0149	0.0086	0.084
	Volunteering Rate	0.33	0.31	0.0093	0.0089	0.297
	School District Size	-0.12	0.54	-0.0035	0.0155	0.823



ELA Test Participation, change from 2019 to 2022

	Standa	Standardized		Raw	
	Estimate	Std Error	Estimate	Std Error	P-value
Five Essentials					
Average 4Essentials Score in 2019	-0.07	0.03	-0.0002	0.0001	0.010
Involved Families Score in 2019	0.13	0.03	0.0003	0.0001	0.000
School Modality (vs. % Remote Learning)					
% Hybrid Learning in 2020-21	-0.03	0.03	-0.0044	0.0046	0.334
% In-person Learning in 2020-21	-0.08	0.03	-0.0100	0.0042	0.017
Student Race and Ethnicity (vs. % White Stu	dents)				
% American Indian or Alaska Native	0.00	0.02	0.0184	0.1179	0.876
% Asian	-0.06	0.02	-0.0271	0.0100	0.007
% Black	-0.07	0.05	-0.0093	0.0059	0.115
% Hispanic or Latinx	-0.09	0.04	-0.0123	0.0057	0.032
% Multiracial	-0.01	0.02	-0.0153	0.0219	0.486
% Native Hawaiian or Pacific Islander	-0.01	0.02	-0.1226	0.2994	0.682
Student Enrollment Characteristics					
% Low-Income Students	-0.13	0.04	-0.0174	0.0055	0.002
% Students with Disabilities	0.00	0.02	0.0004	0.0126	0.976
Average Class Size	0.05	0.02	0.0004	0.0002	0.032
Log of Student Enrollment in 2019	-0.02	0.03	-0.0009	0.0015	0.572
School Types					
Charter School	-0.20	0.11	-0.0074	0.0040	0.067
Magnet School	0.08	0.09	0.0029	0.0035	0.405
Title 1 Eligible School	0.00	0.06	0.0000	0.0022	0.987
School Grade Band (vs. Elementary)					
High School	-0.46	0.06	-0.0171	0.0020	0.000
Middle School	-0.12	0.05	-0.0045	0.0018	0.015
Other School	0.05	0.17	0.0019	0.0061	0.756
School District Size (vs. Large)					
Medium District	0.00	0.06	0.0002	0.0021	0.934
Small District	0.03	0.10	0.0010	0.0036	0.769

	Standardized		Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
School Locale (vs. City)					
Rural	0.14	0.09	0.0052	0.0035	0.134
Suburb	0.06	0.06	0.0021	0.0021	0.327
Town	0.20	0.10	0.0072	0.0035	0.040
Community Characteristics					
Census Self-Response Rate	-0.04	0.03	-0.0113	0.0091	0.219
Social Vulnerability Index in 2020	0.01	0.03	0.0017	0.0040	0.661
Cohesiveness - Support Ratio	-0.03	0.03	-0.0149	0.0132	0.258
Density of Civic Organizations	-0.02	0.02	-0.0887	0.0969	0.360
Volunteering Rate	-0.04	0.02	-0.0377	0.0255	0.140
Collective Efficacy Index	-0.05	0.04	-0.0015	0.0011	0.170
Community Health Index	0.00	0.03	0.0000	0.0027	0.994
Family Unity Index	0.06	0.04	0.0030	0.0018	0.097
Institutional Health Index	-0.04	0.02	-0.0045	0.0029	0.123
Imputation Flag					
% American Indian or Alaska Native	0.10	0.63	0.0035	0.0232	0.881
% Asian	-0.56	0.80	-0.0207	0.0295	0.483
% Low-Income Students	-0.14	0.17	-0.0051	0.0062	0.403
% Multiracial	0.59	0.85	0.0216	0.0312	0.487
% Students with Disabilities	0.27	0.34	0.0100	0.0126	0.429
Average Class Size	-0.23	0.30	-0.0086	0.0109	0.429
Title 1 Eligible School	-0.06	0.49	-0.0023	0.0181	0.898
Census Self-Response Rate	0.77	0.69	0.0284	0.0254	0.264
Density of Civic Organizations	0.29	0.39	0.0105	0.0143	0.463
Volunteering Rate	-0.39	0.40	-0.0143	0.0148	0.335
School District Size	-0.33	0.70	-0.0122	0.0256	0.633



Math Test Participation, change from 2019 to 2022

	Standa	tandardized Raw		w	
	Estimate	Std Error	Estimate	Std Error	P-value
Five Essentials					
Average 4Essentials Score in 2019	-0.06	0.03	-0.0002	0.0001	0.020
Involved Families Score in 2019	0.14	0.03	0.0003	0.0001	0.000
School Modality (vs. % Remote Learning)					
% Hybrid Learning in 2020-21	-0.03	0.03	-0.0054	0.0048	0.259
% In-person Learning in 2020-21	-0.09	0.03	-0.0111	0.0044	0.011
Student Race and Ethnicity (vs. % White Stu	dents)				
% American Indian or Alaska Native	0.00	0.02	-0.0182	0.1225	0.882
% Asian	-0.07	0.02	-0.0347	0.0104	0.001
% Black	-0.08	0.05	-0.0107	0.0061	0.079
% Hispanic or Latinx	-0.08	0.04	-0.0120	0.0060	0.044
% Multiracial	-0.01	0.02	-0.0117	0.0228	0.607
% Native Hawaiian or Pacific Islander	0.00	0.02	-0.0269	0.3111	0.931
Student Enrollment Characteristics					
% Low-Income Students	-0.12	0.04	-0.0173	0.0057	0.002
% Students with Disabilities	0.00	0.02	-0.0029	0.0131	0.823
Average Class Size	0.05	0.02	0.0004	0.0002	0.065
Log of Student Enrollment in 2019	-0.03	0.03	-0.0015	0.0016	0.341
School Types					
Charter School	-0.23	0.11	-0.0086	0.0042	0.041
Magnet School	0.06	0.09	0.0021	0.0036	0.550
Title 1 Eligible School	0.01	0.06	0.0004	0.0023	0.867
School Grade Band (vs. Elementary)					
High School	-0.46	0.06	-0.0174	0.0021	0.000
Middle School	-0.13	0.05	-0.0048	0.0019	0.012
Other School	0.02	0.17	0.0009	0.0064	0.890
School District Size (vs. Large)					
Medium District	0.00	0.06	-0.0001	0.0022	0.946
Small District	0.00	0.10	0.0002	0.0037	0.961

	Standardized		Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
School Locale (vs. City)					
Rural	0.17	0.09	0.0064	0.0036	0.076
Suburb	0.06	0.06	0.0024	0.0022	0.275
Town	0.22	0.10	0.0085	0.0037	0.021
Community Characteristics					
Census Self-Response Rate	-0.03	0.03	-0.0098	0.0095	0.303
Social Vulnerability Index in 2020	0.01	0.03	0.0018	0.0041	0.660
Cohesiveness - Support Ratio	-0.04	0.03	-0.0201	0.0137	0.142
Density of Civic Organizations	-0.01	0.02	-0.0574	0.1007	0.569
Volunteering Rate	-0.02	0.02	-0.0274	0.0265	0.302
Collective Efficacy Index	-0.07	0.04	-0.0022	0.0012	0.056
Community Health Index	0.00	0.03	0.0002	0.0028	0.952
Family Unity Index	0.09	0.04	0.0044	0.0019	0.022
Institutional Health Index	-0.05	0.02	-0.0056	0.0030	0.064
Imputation Flag					
% American Indian or Alaska Native	0.09	0.63	0.0035	0.0241	0.885
% Asian	-0.68	0.80	-0.0261	0.0306	0.394
% Low-Income Students	-0.15	0.17	-0.0057	0.0064	0.371
% Multiracial	0.67	0.85	0.0256	0.0324	0.429
% Students with Disabilities	0.22	0.34	0.0084	0.0131	0.523
Average Class Size	-0.16	0.30	-0.0063	0.0113	0.577
Title 1 Eligible School	-0.23	0.49	-0.0089	0.0188	0.638
Census Self-Response Rate	0.99	0.69	0.0378	0.0264	0.153
Density of Civic Organizations	0.28	0.39	0.0107	0.0149	0.474
Volunteering Rate	-0.30	0.40	-0.0114	0.0154	0.458
School District Size	-0.42	0.70	-0.0161	0.0266	0.546



ELA Proficiency, change from 2019 to 2022

	Standa	Standardized		Raw	
	Estimate	Std Error	Estimate	Std Error	P-value
Five Essentials					
Average 4Essentials Score in 2019	-0.07	0.03	-0.0004	0.0002	0.012
Involved Families Score in 2019	-0.05	0.03	-0.0002	0.0001	0.103
School Modality (vs. % Remote Learning)					
% Hybrid Learning in 2020-21	0.08	0.03	0.0299	0.0103	0.004
% In-person Learning in 2020-21	0.14	0.03	0.0370	0.0094	0.000
Student Race and Ethnicity (vs. % White Stu	idents)				
% American Indian or Alaska Native	-0.01	0.02	-0.2139	0.2634	0.417
% Asian	0.05	0.02	0.0504	0.0224	0.025
% Black	0.10	0.05	0.0295	0.0131	0.025
% Hispanic or Latinx	0.05	0.04	0.0159	0.0128	0.215
% Multiracial	0.00	0.02	0.0073	0.0490	0.882
% Native Hawaiian or Pacific Islander	0.01	0.02	0.3286	0.6687	0.623
Student Enrollment Characteristics					
% Low-Income Students	-0.02	0.04	-0.0055	0.0122	0.655
% Students with Disabilities	0.00	0.02	0.0067	0.0282	0.812
Average Class Size	-0.10	0.02	-0.0018	0.0005	0.000
Log of Student Enrollment in 2019	0.02	0.03	0.0028	0.0034	0.411
School Types					
Charter School	-0.25	0.11	-0.0203	0.0090	0.024
Magnet School	-0.05	0.09	-0.0040	0.0077	0.602
Title 1 Eligible School	-0.11	0.06	-0.0090	0.0049	0.067
School Grade Band (vs. Elementary)					
High School	-0.02	0.06	-0.0017	0.0045	0.712
Middle School	-0.34	0.05	-0.0274	0.0041	0.000
Other School	-0.01	0.17	-0.0012	0.0137	0.931
School District Size (vs. Large)					
Medium District	-0.13	0.06	-0.0106	0.0046	0.021
Small District	-0.27	0.10	-0.0222	0.0080	0.005

	Standardized		Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
School Locale (vs. City)					
Rural	-0.22	0.09	-0.0176	0.0078	0.024
Suburb	-0.11	0.06	-0.0091	0.0048	0.057
Town	-0.18	0.10	-0.0145	0.0079	0.066
Community Characteristics					
Census Self-Response Rate	-0.08	0.03	-0.0537	0.0204	0.009
Social Vulnerability Index in 2020	0.02	0.03	0.0072	0.0089	0.419
Cohesiveness - Support Ratio	0.01	0.03	0.0159	0.0294	0.588
Density of Civic Organizations	-0.01	0.02	-0.1270	0.2163	0.557
Volunteering Rate	0.06	0.02	0.1360	0.0570	0.017
Collective Efficacy Index	0.04	0.04	0.0027	0.0025	0.277
Community Health Index	-0.05	0.03	-0.0108	0.0060	0.071
Family Unity Index	-0.08	0.04	-0.0083	0.0041	0.043
Institutional Health Index	0.05	0.02	0.0121	0.0065	0.062
Imputation Flag					
% American Indian or Alaska Native	0.69	0.63	0.0563	0.0519	0.278
% Asian	-0.37	0.80	-0.0305	0.0658	0.643
% Low-Income Students	0.48	0.17	0.0392	0.0137	0.004
% Multiracial	-0.51	0.85	-0.0415	0.0696	0.551
% Students with Disabilities	-0.31	0.34	-0.0257	0.0282	0.362
Average Class Size	0.05	0.30	0.0037	0.0243	0.879
Title 1 Eligible School	-0.82	0.49	-0.0671	0.0405	0.097
Census Self-Response Rate	-0.54	0.69	-0.0443	0.0568	0.436
Density of Civic Organizations	0.97	0.39	0.0796	0.0320	0.013
Volunteering Rate	-0.70	0.40	-0.0572	0.0330	0.084
School District Size	-0.55	0.70	-0.0452	0.0572	0.430



Math Proficiency, change from 2019 to 2022

	Standa	Standardized		aw		
	Estimate	Std Error	Estimate	Std Error	P-value	
Five Essentials						
Average 4Essentials Score in 2019	-0.13	0.03	-0.0007	0.0002	0.000	
Involved Families Score in 2019	-0.03	0.03	-0.0001	0.0001	0.296	
School Modality (vs. % Remote Learning)						
% Hybrid Learning in 2020-21	0.08	0.03	0.0283	0.0096	0.003	
% In-person Learning in 2020-21	0.21	0.03	0.0531	0.0087	0.000	
Student Race and Ethnicity (vs. % White Stu	dents)					
% American Indian or Alaska Native	0.01	0.02	0.1355	0.2451	0.580	
% Asian	0.01	0.02	0.0068	0.0209	0.743	
% Black	0.04	0.04	0.0096	0.0122	0.430	
% Hispanic or Latinx	-0.08	0.04	-0.0230	0.0119	0.054	
% Multiracial	-0.05	0.02	-0.1044	0.0455	0.022	
% Native Hawaiian or Pacific Islander	0.01	0.02	0.3852	0.6222	0.536	
Student Enrollment Characteristics						
% Low-Income Students	0.03	0.04	0.0080	0.0114	0.479	
% Students with Disabilities	0.03	0.02	0.0430	0.0262	0.101	
Average Class Size	-0.09	0.02	-0.0016	0.0004	0.000	
Log of Student Enrollment in 2019	0.00	0.03	-0.0004	0.0032	0.910	
School Types						
Charter School	-0.48	0.11	-0.0373	0.0084	0.000	
Magnet School	-0.25	0.09	-0.0193	0.0072	0.007	
Title 1 Eligible School	-0.05	0.06	-0.0042	0.0046	0.363	
School Grade Band (vs. Elementary)						
High School	0.16	0.05	0.0123	0.0042	0.004	
Middle School	-0.03	0.05	-0.0025	0.0038	0.514	
Other School	-0.06	0.16	-0.0049	0.0127	0.703	
School District Size (vs. Large)						
Medium District	-0.12	0.06	-0.0089	0.0043	0.039	
Small District	-0.33	0.10	-0.0254	0.0074	0.001	

	Standardized		Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
School Locale (vs. City)					
Rural	-0.01	0.09	-0.0006	0.0072	0.930
Suburb	0.00	0.06	0.0002	0.0044	0.972
Town	-0.07	0.09	-0.0057	0.0073	0.437
Community Characteristics					
Census Self-Response Rate	-0.07	0.03	-0.0480	0.0190	0.012
Social Vulnerability Index in 2020	0.02	0.03	0.0050	0.0082	0.543
Cohesiveness - Support Ratio	-0.02	0.03	-0.0181	0.0274	0.508
Density of Civic Organizations	-0.02	0.02	-0.1771	0.2013	0.379
Volunteering Rate	0.03	0.02	0.0764	0.0530	0.150
Collective Efficacy Index	0.02	0.04	0.0012	0.0023	0.611
Community Health Index	-0.04	0.03	-0.0071	0.0055	0.198
Family Unity Index	-0.03	0.04	-0.0027	0.0038	0.485
Institutional Health Index	-0.01	0.02	-0.0027	0.0061	0.653
Imputation Flag					
% American Indian or Alaska Native	-0.21	0.62	-0.0161	0.0483	0.739
% Asian	-0.29	0.79	-0.0227	0.0613	0.711
% Low-Income Students	0.36	0.17	0.0275	0.0128	0.032
% Multiracial	0.28	0.84	0.0214	0.0648	0.741
% Students with Disabilities	-0.26	0.34	-0.0199	0.0263	0.449
Average Class Size	0.00	0.29	0.0004	0.0226	0.987
Title 1 Eligible School	-0.19	0.49	-0.0144	0.0377	0.703
Census Self-Response Rate	-0.36	0.68	-0.0278	0.0529	0.599
Density of Civic Organizations	-0.46	0.39	-0.0359	0.0298	0.229
Volunteering Rate	0.50	0.40	0.0383	0.0308	0.213
School District Size	-0.57	0.69	-0.0440	0.0532	0.408



Five Essentials Supportive Environment, change from 2019 to 2022

	Standa	Standardized		Raw	
	Estimate	Std Error	Estimate	Std Error	P-value
Five Essentials					
Average 4Essentials Score in 2019	-0.68	0.03	-0.6456	0.0259	0.000
Involved Families Score in 2019	0.34	0.03	0.2227	0.0202	0.000
School Modality (vs. % Remote Learning)					
% Hybrid Learning in 2020-21	-0.03	0.03	-1.9612	1.4980	0.191
% In-person Learning in 2020-21	-0.02	0.03	-0.9452	1.3691	0.490
Student Race and Ethnicity (vs. % White Stu	dents)				
% American Indian or Alaska Native	-0.04	0.02	-89.8321	37.0106	0.015
% Asian	0.04	0.02	5.9030	3.2591	0.070
% Black	-0.19	0.04	-8.5181	1.9089	0.000
% Hispanic or Latinx	-0.12	0.04	-5.8023	1.8451	0.002
% Multiracial	-0.06	0.02	-22.9477	7.2160	0.001
% Native Hawaiian or Pacific Islander	0.05	0.02	258.0657	94.3189	0.006
Student Enrollment Characteristics					
% Low-Income Students	0.09	0.04	4.0793	1.7761	0.022
% Students with Disabilities	-0.01	0.02	-1.3829	4.1380	0.738
Average Class Size	-0.08	0.02	-0.2217	0.0662	0.001
Log of Student Enrollment in 2019	-0.04	0.03	-0.6968	0.4927	0.157
School Types					
Charter School	0.30	0.10	3.8041	1.3234	0.004
Magnet School	0.11	0.09	1.3590	1.1167	0.224
Title 1 Eligible School	0.01	0.06	0.1783	0.7086	0.801
School Grade Band (vs. Elementary)					
High School	-0.35	0.05	-4.4256	0.6567	0.000
Middle School	0.29	0.05	3.7266	0.5862	0.000
Other School	-0.21	0.15	-2.5938	1.9002	0.172
School District Size (vs. Large)					
Medium District	-0.09	0.05	-1.1493	0.6855	0.094
Small District	-0.04	0.09	-0.5453	1.1634	0.639

	Standardized		Raw		
	Estimate	Std Error	Estimate	Std Error	P-value
School Locale (vs. City)					
Rural	-0.05	0.09	-0.6365	1.1239	0.571
Suburb	-0.02	0.05	-0.3156	0.6869	0.646
Town	0.03	0.09	0.4026	1.1595	0.728
Community Characteristics					
Census Self-Response Rate	-0.01	0.03	-0.7708	2.9712	0.795
Social Vulnerability Index in 2020	-0.02	0.03	-0.7199	1.2779	0.573
Cohesiveness - Support Ratio	-0.04	0.02	-7.5761	4.2654	0.076
Density of Civic Organizations	0.00	0.02	6.2199	31.5679	0.844
Volunteering Rate	-0.01	0.02	-1.8861	8.4395	0.823
Collective Efficacy Index	-0.03	0.04	-0.3376	0.3657	0.356
Community Health Index	-0.03	0.03	-1.0238	0.8663	0.237
Family Unity Index	-0.01	0.04	-0.2349	0.6041	0.697
Institutional Health Index	0.03	0.02	1.1669	0.9531	0.221
Imputation Flag					
% American Indian or Alaska Native	-0.85	0.58	-10.6920	7.2960	0.143
% Asian	0.27	0.82	3.4109	10.3590	0.742
% Low-Income Students	0.03	0.15	0.3172	1.9358	0.870
% Multiracial	0.92	0.82	11.6077	10.3336	0.261
% Students with Disabilities	-0.08	0.31	-0.9797	3.9399	0.804
Average Class Size	-0.25	0.31	-3.2012	3.9453	0.417
Title 1 Eligible School	-0.31	0.44	-3.8894	5.6200	0.489
Census Self-Response Rate	-0.15	0.88	-1.9372	11.1436	0.862
Density of Civic Organizations	-0.48	0.38	-6.0797	4.8489	0.210
Volunteering Rate	0.40	0.40	5.1155	5.0153	0.308
School District Size	0.38	0.88	4.7801	11.1627	0.669


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