CONNECTING SOCIAL-EMOTIONAL DEVELOPMENT AND ACADEMIC INDICATORS ACROSS MULTIPLE YEARS

DECEMBER 2021

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EXECUTIVE SUMMARY

This report builds on the work conducted for a previous study, "Connecting Social-Emotional Development, Academic Achievement, and On-Track Outcomes: A Multi-District Study of Grades 3 to 10 Students Supported by City Year AmeriCorps Members." Released in May of 2020, that study explored the connections between students' social-emotional skills and various measures of their academic outcomes (attendance, course grades, and achievement tests).

Among the study's findings was that students' levels of social-emotional skills are not fixed points but, rather, vary over the course of time and are, therefore, malleable and open to improvement. Following that, another finding was that students' social-emotional skills are significantly related to their academic outcomes and are as strong a predictor of academics as is family background. Taken together, these two findings reaffirmed for researchers and practitioners that addressing students' social-emotional skills is a viable path to raising their academic outcomes.

This was further supported by additional evidence presented in the study that students who received greater amounts of social-emotional and academic support from City Year AmeriCorps members also had stronger social-emotional and academic outcomes. The more hours students spent working with a City Year AmeriCorps member, the less likely they were to struggle at the end of the year with social-emotional competencies such as self-awareness, decision making, goal-directed behavior, self-management, optimistic thinking, relationship skills, personal responsibility, and social awareness. The analyses also revealed that the more hours a student spent receiving support from a City Year AmeriCorps member in either English or math, the higher their outcomes were in the related subject, as well as their attendance rates. The findings emphasize that human-centered, relationship-focused, school-based interventions such as City Year's can be successful in developing students' social-emotional skills along with their academic outcomes (directly and indirectly through improved social-emotional skills).

The original study was made possible through data provided by City Year's network of schools. Of which two features make the results noteworthy. First, City Year partners primarily with systematically under-resourced schools in large urban school districts. Within those schools, the students who receive support as part of City Year's program, and for whom data was available, are those whom teachers have identified as needing additional support in one or more areas (math, English, attendance, and social-emotional). The sample, while not representative of the national population of schools and students, did serve as a purposive sample providing excellent representation of the types of schools and students that state and federal agencies typically identify as those in need of support in order to raise student outcomes. Therefore, the patterns highlighted in the original work between students' socio-emotional learning levels and their academic outcomes are likely to be representative of the students that public and non-profit organizations are most interested in supporting. Second, the sample was very large in scale, including data for over 38,000 students from 326 schools in 28 cities and spread across 20 different states. Students in the sample were in grades 3 through 9 covering the elementary, middle, and high school levels. Therefore, the sample made the study one of the largest to examine the relationship between students social-emotional skills and their academic outcomes while also providing results for key sub-population of critical interest.

This current study uses additional years of data from the City Year network to expand on the findings of the original study in the three following ways:

Using a second year of data from the 2018-19 school year, we tested to see if the results from the original study were replicable with a second sample. The findings, based on the second sample, are almost identical to the original in terms of the observed patterns and the size and significance of the relationships. Students' social-emotional skills are positively related to their academic outcomes in a manner that is both statistically significant and educationally substantial. Broad-scale student-level interventions such as City-Year's are also linked to stronger social emotional skills and academic outcomes for students. The fact that the results were replicated so

closely with a second sample of data, adds to the reliability of the original findings. That the second sample was also larger and more robust than the first also raises the external validity of the findings and their applicability to a wider range of students and settings.

II By combining the data sample from the original study (2017-18) with the additional data (2018-19), we examined how the established relationships operate beyond a one-year time frame. We found that students' SEL skills from one year (2017-18) were as strongly related to academic growth over a two-year time-period (2017-19) as they were to the growth over a one-year period. In terms of statistical significance, the nominal size of the relationship, as well as which sub-skills are relatively most important. In terms of City Year intervention, we found that the academic benefits last beyond the first year, and that exposure to the supports for more than one year may lead to even stronger social-emotional and academic impacts. Although these analyses of academic outcomes over a two-year period are based on small sub-samples, the results do provide additional exploratory evidence of the lasting relationship between students' SEL skills and their academic outcomes, and the further benefits of the City Year support program.

III Lastly, by including data on students' social-emotional skills from a third school year (2019-20), we were able to model a growth curve of students' SEL skills over time. We found that students' social-emotional levels (as measured by the DESSA adult rating instrument) experience a slow but steady increase over their school years, grades 3 to 10. Within this slow rate of growth over time are cyclical patterns that see students' social-emotional levels rising significantly from September to June before falling back over the summer months. Along the way, students also experience pronounced drops in their SEL skills at the start of middle school and again with high school as they transition to different and more challenging school settings. However, the largest finding from this set of analyses is that roughly half the variation in students' social-emotional scores was between timepoints. That is to say that there is as much difference between the social-emotional levels of the same student at two different timepoints, as there is between two different students. The patterns we observed in the growth of students' SEL skills over time and grade, while significant, are relatively small and explain only a small fraction of the rises and falls those students experience in their social-emotional levels. This last finding leaves us calling for an examination of the classroom environment and settings in which students find themselves, as well as of the relationships they have with their peers and teachers. Do these factors help to explain the large variation in students SEL outcomes, and do they play a part in determining if gains made in students' SEL skills are long-lasting?

INTRODUCTION

This report builds on the work conducted for a previous study, "Connecting Social-Emotional Development, Academic Achievement, and On-Track Outcomes: A Multi-District Study of Grades 3 to 10 Students Supported by City Year AmeriCorps Members." Released in May of 2020, that study explored the connections between students' social-emotional skills and measures of their academic outcomes (attendance, course grades, and achievement tests).

Among the study's findings was that students' levels of social-emotional skills are not fixed points, but do in fact vary over the course of time and are therefore malleable. Another is that students' social-emotional levels were significantly related to their academic outcomes and are as strong of a predictor of academics as family background. Taken together, these two findings reaffirmed for researchers and practitioners that addressing students' social-emotional skills is a viable path to raising their academic outcomes.

This was further supported by additional evidence presented in the study that students who received greater amounts of social-emotional and academic support from City Year AmeriCorps members also had stronger social-emotional and academic outcomes. Founded in 1988, City Year is an education non-profit that places a team of eight to fifteen diverse AmeriCorps members in chronically under-resourced urban elementary, middle, and high schools, where they serve full-time as near-peer tutors, mentors, and role models. AmeriCorps members partner with classroom teachers and school principals to employ a holistic and asset-based approach that integrates academics with social-emotional (SEAD) and places relationships at the center of the practice. There is an equal emphasis on social-emotional mindset and skill development, the creation of a positive whole-school learning environment, and directly supporting the progress of individual students.

The more hours students spent working with a City Year AmeriCorps member, the less likely they were to struggle with social-emotional competencies at the end of the year (controlling for start-of-year social-emotional levels). The analyses also revealed that the more hours a student spent receiving support from a City Year AmeriCorps member in either English or math, the higher their outcomes were in the related subject as well as their attendance rates. Lastly, the results found that the lower a student's prior level was, academic or social-emotional, the stronger the relationship between the City Year intervention and the student's spring outcomes. In other words, the students who began with the lowest attendance rates or course grades and those with the lowest social-emotional skills were the ones who benefited the most from receiving one-on-one support from an AmeriCorps member.

The findings suggest that human-centered, relationship-focused, school-based interventions such as City Year's can be successful in developing students' social-emotional skills along with their academic outcomes (directly, and indirectly through improved social-emotional skills). Moreover, these findings were drawn from a large multi-district sample across elementary, middle, and early high school grades. This suggests that they are not the result of extraordinary efforts in a unique setting, or limited to one particular age-band of students, but rather can occur on a wide-scale at a range of under-resourced schools within under-resourced school districts: the very populations where additional support is often focused. These results strengthened the call to action for educators and policymakers to support the expansion and integration of social-emotional development in schools across the nation.

The original study was made possible through data provided by City Year's network of schools. Two features of that network, and the data sample it provided, made the original study and its results noteworthy. First, City Year primarily partners with systematically under-resourced schools in large urban school districts. Within those schools, the students who receive support as part of City Year's program, and for whom data was available, are those whom teachers have identified as needing additional support in one or more areas (math, English,

attendance, social-emotional). Thus, the sample, while not representative of the national population of schools and students, did serve as a purposive sample providing excellent representation of the types of schools and students that state and federal agencies typically identify as those in need of support in order to raise student outcomes. Therefore, the patterns highlighted in the original work between students' socio-emotional learning levels and their academic outcomes are likely to be representative of the sub-populations that public and non-profit organizations are most interested in supporting. Second, the sample was very large in scale, including data for over 38,000 students from 326 schools in 28 cities and spread across 20 different states. Students in the sample were in grades 3 through 9 covering the elementary, middle and high school levels. The sample therefore made the study one of the largest to examine the relationship between students social-emotional skills and their academic outcomes, while also providing results geared perfectly towards a sub-population of key interest.

The current study seeks to build on the results of the original by using additional years of data from the City Year network to further examine and extend the findings in the three following ways:

I **To what extent do the correlations identified in the first phase of the research hold over multiple years?** By replicating the analyses from the original study with a second data sample for the 2018-19 school year, we test their reliability. As the second data sample is also larger and includes students from a wider range of backgrounds, the results will also add to the external validity of the original findings.

II **How does the relationship between social-emotional skills and academic outcomes operate over a longer time period? Which social-emotional skills are tied to short-term growth, and which are tied to long-term growth? And, how does the relationship between City Year intervention and student outcomes hold up over a longer timespan?** By combining the data sample from the original study (2017-18) with the additional data (2018-19), we examine how these relationships operate beyond a one-year time frame.

III **How do students' social-emotional skills develop over time?** By adding in data for a third year (2019-20; social-emotional data only, no academic outcome data), we will observe what trends and patterns emerge in students' social-emotional skills as they develop over time.

PART I: RE-TESTING THE ORIGINAL FINDINGS

The original study was based on data from schools that participated in the City Yea network during the 2017-18 school year. A year following the first study, City Year was able to provide access to data from the 2018-19 school year, allowing us to duplicate the analyses and see if the findings from the original study could be replicated. Data for the 2018-19 school year included information from 350 schools across 29 school districts. This number is comparable to the 28 districts and 326 schools included in the prior analyses of 2017-18 data. However, the 2018-19 sample includes data for 139,455 students in grades 3 through 10, substantially higher than the 38,131 students in the 2017-18 sample. The 2017-18 sample included only data for those students who appeared on a City Year Focus List during the school year. Focus Lists are the way in which teachers at City Year schools identify students who are in need of additional support in one or more areas (attendance, English, mathematics, social-emotional) and would most benefit from the additional support provided by an AmeriCorps member. For most City Year partner districts, the 2018-19 sample includes academic data (attendance rates, English and mathematic course grades) from all students, not only those identified as needing additional support. As such, the analyses below for 2018-19 data are based on much larger sample sizes as well as a more robust group of students.

Table 1 shows the underlying sample sizes from our various statistical models and compares them across the two samples/school years. For both samples, students' social-emotional skills were measured using the Devereux Students Strengths Assessment (DESSA) (LeBuffe et al., 2014). The DESSA is a standardized, observational, strengths-based assessment of student competencies with a norm-referenced behavior rating scale that includes information for eight separate social-emotional competency areas as well as an overall composite measure. Raw scores range from 28-72, while categorized tier scores range from 1-3 where a score of 1 signifies that the area is a student strength, 2 represents a typical student level, and 3 means it is an area in which a student requires support. Among the City Year network of schools, the DESSA was only administered to students who appeared on a Focus List and received personal support from City Year. As such, models evaluating the relationship between students' SEL skills and their academic outcomes could still only include students from one of the four Focus Lists. However, they were still based on samples roughly twice as large as 2017-18 since academic outcome data was available for all students and not just those on that subject specific Focus List. These models therefore include a larger sample than previous ones, which also includes students who did not originally struggle in the intended outcome area but that still focuses on students who struggled overall in one of the four outcome areas.

For models examining the relationship between time spent with a City Year AmeriCorps member and student academic outcomes, the sample sizes for analyses of 2018-19 are between 3 to 7 times larger than the prior 2017-18 analyses, as they are not limited to students with DESSA scores and can include any student with academic data (attendance and course grades). The result are samples that are not only much larger, but also include a much wider sample of students, not just those with the lowest initial attendance rates and course grades. While the inclusion of students who did not receive direct support from City Year is not the perfect counterfactual, it does provide some kind of a comparison group and allows us to re-test our original 2017-18 findings with a more robust and representative data sample. In essence, while previous findings compared only the changes in receiving 'more or less' amounts of intervention, the current analyses include a comparison to students who received no treatment. While biases certainly exist between students who were or were not identified for support, the inclusion of some comparison to null treatment improves the strength of these findings compared to past. For models examining the relationship between time spent with a City Year AmeriCorps member and students' SEL skills, the underlying sample is essentially the same size as that from 2017-18 analyses as it is dependent on students with DESSA scores.

As City Year primarily partners with schools in large urban school districts that predominantly serve students of color and students from low-income backgrounds, even

TABLE 1 – COMPARISON OF 2017-18 AND 2018-19 ANALYTIC SAMPLES

OUTCOME	YEAR	NUMBER OF STUDENTS	% ON SUBJECT-SPECIFIC FOCUS LIST	% ON ANY FOCUS LIST	MEAN / MEDIAN PRIOR OUTCOME
SEL SKILLS & ACADEMIC OUTCOMES					
ATTENDANCE RATE	2018	4,597	100%	100%	89% / 90%
	2019	12,635	45%	99%	92% / 95%
ENGLISH COURSE MARK	2018	6,641	98%	100%	2.1 / 2.0
	2019	11,122	67%	99%	2.1 / 2.0
MATH COURSE MARK	2018	6,305	98%	100%	2.0 / 2.0
	2019	10,838	62%	99%	2.0 / 2.0
CITY YEAR DOSAGE & STUDENT OUTCOMES					
ATTENDANCE RATE	2018	7,007	100%	100%	88% / 90%
	2019	49,375	17%	35%	92% / 96%
ENGLISH COURSE MARK	2018	11,397	97%	100%	2.1 / 2.0
	2019	38,237	32%	48%	2.3 / 2.0
MATH COURSE MARK	2018	9,877	94%	100%	2.0 / 2.0
	2019	38,173	25%	46%	2.2 / 2.0
DESSA COMPOSITE	2018	24,433	47%	100%	2.4 / 2.0
	2019	26,959	49%	98%	2.4 / 2.0

with a wider group of students, the sample is still more characteristic of disadvantaged students than compared to the national population of schools and students. This is evidenced in Table 1, as even in those analyses of City Year dosage and student academic outcomes that have much larger sample sizes, the mean and median student scores on prior academic outcomes are still quite low (attendance in the low 90's and typical course grades of 'C').

RELATIONSHIP OF SOCIAL-EMOTIONAL SKILLS TO STUDENT OUTCOMES

Analyses of the relationship between students' DESSA scores and their academic outcomes relied upon multi-level regression models to account for the nested nature of students within schools, and the schools themselves within districts. Multi-level modeling is similar to regression modeling but takes into account the fact that with nested data, students within the same school will have shared similar experiences and thus they will not be independent of each other, violating a statistical assumption of standard regression modeling (Snijders & Bosker, 1999; Bryk & Raudenbush, 2002). All models control for students' grade level as well as a prior measure of the given student outcome, which, as a covariate, helps to control for some of the selection bias inherent in our purposive sample of City Year schools and students.

In the following tables, the estimates being reported (model coefficients) represent the effect that moving one

tier/level on the DESSA domain has on the given student outcome. In all cases, moving up one tier on the DESSA means a student is struggling more in that area, moving either from a strength to a typical level, or from a typical level to a need for support. For student outcomes, raw attendance rates range from 0-100, and math and English raw grades range from 0-4 (F-A). Thus, for the raw outcomes, a negative relationship or coefficient in Table 2 means that when students struggle more on a SEL measure, their academic outcomes decline.

For both attendance rates and course mark outcomes, we also report the results of models predicting the odds of a student being 'off-track' in the given outcome.[1] These models were logistic models for binary outcomes where students were coded as '1' if they were off-track in the related academic outcome, and '0' if they were on-track or sliding. In the tables below, estimates from logistic models for off-track outcomes are odds-ratios that can be interpreted as the odds of being off-track for a student whose DESSA score increases by one-tier. Odds-ratios above 1.0 mean that a student is more likely to be academically off-track, while odds-ratios below 1.0 mean a student is less likely to be off-track.

Results for DESSA scores found statistically significant and consistent relationships between students' social-emotional skills, as recorded by the DESSA, and their academic outcomes. The results were highly significant across all outcomes and across all sub-score areas. The DESSA competency areas that more strongly relate to student outcomes are Personal Responsibility and Goal-Directed Behavior, followed by Self-Management and Decision Making. However, in general, the composite measure for the entire SEL scale is stronger than the individual competency domains (Table 2).

In terms of effect sizes, the impacts of moving up one tier on the DESSA range from 0.12 to 0.18 for attendance rates and between 0.22 and 0.38 for course grades. In general, effects between one quarter to one third of a standard deviation (0.25-0.33) are considered to be large and substantial shifts in the context of comprehensive school reform and student achievement (Borman, et. al., 2003; Dynarski, 2017). To put the magnitude of these effects in another context, multiple studies have equated such effect sizes as being the equivalent of an entire school year of learning in terms of academic achievement growth, for students in grades 3-10 in mathematics or English (Bloom, et. al., 2008; Hanushek, Woessmann, & Peterson, 2012; Lipsey, et. al. 2012). Another method of translating the practical importance of an intervention's effect is the What Works Clearinghouse's "Improvement Index" (U.S. Department of Education, 2014). The improvement index can be interpreted as the expected change in percentile rank for the average student if that student had received the intervention. Effect sizes in the 0.25-0.33 range would be equivalent to raising the average student 10-13 percentiles in a normal population. In terms of the probability of being ***off-track, a student who moves up one tier on the DESSA (from a Strength to merely Typical, or from Typical to a Need for Instruction) is two to three times as likely to be off-track in any of the academic outcomes (attendance, course grades).***

It is also worth noting that overall, including the composite measure of the DESSA, our statistical models explain on average 8% of the student-level variation in our student outcomes after having controlled for students' prior measures of the outcomes and their grade level. In comparison, students' prior measures on the outcomes and their grade levels controlled for on average 32% of the variation between students in academic outcomes. Similarly, research conducted by the developers of the DESSA found that its measures of students' social-emotional skills accounted for roughly 15-16% of the variation in students' math and reading achievement scores respectively, while family income, often considered a key determinant, accounted for only 8% (LeBuffe, et. al., 2014). ***These findings affirm that students' social-emotional levels account for a substantial amount of the variation in their academic outcomes, comparable in size to their family background, and lets researchers and practitioners know that addressing students' SEL skills is a viable path to raising their academic outcomes.***

In terms of when in the school year students' SEL skills were assessed, our results found that their winter/spring

[1] For each outcome, City Year staff also codes students into a three-tier measure of on-track status: "on-track,""sliding," or "off-track." For 2018-19, students were considered on-track if their attendance rates were at 90% or above, sliding if their attendance was between 80-89%, and off-track if their attendance rates were below 80%. For course outcomes, students were on-track if their mark was a "C" or higher, sliding if their mark was a "D", and off-track if they were failing the course. For 2018-19, off-track definitions varied for each school district, as each district was allowed to determine levels that best reflected their local student population, and which identified a proportion of students which best matched their goals and resources in terms of intervention programming.

TABLE 2 – DESSA MEASURES AND STUDENT ACADEMIC OUTCOMES

	ATTENDANCE		ENGLISH COURSE		MATH COURSE	
SEL MEASURE	RATE	OFF-TRACK	MARK	OFF-TRACK	MARK	OFF-TRACK
SELF-AWARENESS	-1.9*** (0.14)	1.8***	-0.3*** (-0.28)	2.5***	-0.3*** (-0.26)	2.0***
DECISION MAKING	-2.1*** (-0.15)	2.0***	-0.4*** (-0.30)	2.6***	-0.3*** (-0.29)	2.1***
GOAL-DIRECTED BEHAVIOR	-2.3*** (-0.17)	2.0***	-0.4*** (-0.37)	3.0***	-0.4*** (-0.34)	2.4***
SELF-MANAGEMENT	-1.9** (-0.14)	1.8***	-0.4*** (-0.32)	2.5***	-0.4*** (-0.29)	2.1***
OPTIMISTIC THINKING	-2.1*** (-0.15)	1.8***	-0.3*** (-0.27)	2.3***	-0.3*** (-0.28)	2.1***
RELATIONSHIP SKILLS	-1.8*** (-0.13)	1.7***	-0.3*** (-0.24)	2.2***	-0.3*** (0.22)	1.8***
PERSONAL RESPONSIBILITY	-2.4*** (-0.18)	2.1***	-0.5*** (-0.38)	3.1***	-0.4*** (-0.36)	2.6***
SOCIAL AWARENESS	-1.6*** (-0.12)	1.7***	-0.3*** (-0.23)	2.1***	-0.3*** (-0.22)	2.0***
COMPOSITE SCORE	-2.4*** (-0.18)	2.1***	-0.4*** (-0.33)	2.9***	-0.4*** (-0.34)	2.4***

. is significant at the 0.05 level; **. is significant at the 0.01 level; *. is significant at the 0.001 level (Effect Sizes in parentheses)*

DESSA scores were stronger in predicting end-of-year academic outcomes, than were fall DESSA scores. Both fall and spring/winter measures, cross-sectional measures taken at one point in time, were stronger and more significant predictors than was growth in SEL skills as measured by change in students' DESSA scores between the two time-points. This is supported by other recent research (Soland & Kuhfeld, 2021), which has found that students SEL scores at a given point in time, or their SEL 'status', have a more significant relationship to academic outcomes than do measures of students' SEL change, or growth, between two time points.

Relationships between DESSA scores and student outcomes were also consistent across grade levels, though the magnitude of the relationship between DESSA scores and student academic outcomes is slightly larger for 9th grade students than for students in grades 3-8. One explanation for this is that in 9th grade, when students encounter high school courses that include more challenging curriculum and greater expectations from their teachers, social-emotional skills such as self-management, decision making and personal responsibility are critical to keeping up with increased academic rigor and responsibilities like turning in assignments, taking notes and studying for tests.

THE CITY YEAR WHOLE SCHOOL WHOLE CHILD APPROACH AND STUDENT OUTCOMES

Having found further evidence of a positive and significant relationship between students' social-emotional skills and their academic outcomes, we then use the City Year data to test a second and related question. Knowing that SEL skills are tied to students' academic outcomes, it then becomes a matter of whether students' social-emotional skills can be influenced by their schools and teachers. City Year's program in schools is one that focuses on both students' academic performance as well as their social-emotional development, and we use some of the implementation data from their program to see if greater involvement with their program and its AmeriCorps members was associated with stronger outcomes for students.

Measurement data of each individual student's involvement with City Year and its AmeriCorps members comes in three forms. For students who were on the math, English, or social-emotional focus lists, staff were able to provide a more detailed record of the number of hours for which they received support from an AmeriCorps member as part of the City Year program. For students who were on the program's focus list for either attendance or social-emotional purposes, City Year staff captured the number of days those students spent on the intervention focus list. Lastly, and only for students who were on the social-emotional focus lists, City Year recorded the number of minutes students spent with AmeriCorps members working on specific social-emotional skills. In all formats, this implementation data captures only the individual or small group work of City Year AmeriCorps members with students. It does not reflect any indirect effects from whole classroom and whole school supports provided by City Year AmeriCorps members.

Multi-level models similar to those described in prior analyses were run, including the measures for City Year dosage. While some of the results/estimates in the tables below may seem very small in scale (running to several decimal places), that is because the dosage variables are measured in terms of days, hours and minutes. So, the effect of dosage on students' raw academic outcomes being reported is for the effect of 'one day', 'one hour' or 'one minute' only. The descriptive statistics for those measures of dosage (Table 3) show a wide range in terms of how much time students spent receiving one-on-one support from an AmeriCorps member. The median, or middle, amount of time spent working directly with an AmeriCorps member is 16 hours in math or English, and three hours for social-emotional support.

TABLE 3 – DESCRIPTIVE STATISTICS OF CITY YEAR DOSAGE

	N	MEAN	MEDIAN	STD. DEV.	Minimum	Maximum
ELA HOURS	20,977	16.3	15.6	11.3	0.017	124.67
MATH HOURS	16,498	16.3	15.6	10.9	0.033	101.50
SEL HOURS	11,952	3.9	2.5	4.6	0.017	65.67
SEL DAYS	27,660	254.8	254	70.5	1	530
ATTENDANCE DAYS	12,528	209.9	228	71.4	1	440
CRITICAL THINKING	11,952	8.9	0	33.1	0	570
DECISION MAKING	11,952	17.1	0	42.1	0	1,655
EMPATHY	11,952	5.9	0	21.9	0	695
GOAL DIRECTED BEHAVIOR	11,952	33.5	10	61.5	0	1,100
LEARNING INTEREST	11,952	9.5	0	42.0	0	916
OPTIMISTIC THINKING	11,952	14.2	0	31.9	0	675
PERSONAL RESPONSIBILITY	11,952	22.8	5	41.2	0	920
REFLECTION	11,952	22.3	0	56.7	0	1,105
RELATIONSHIP SKILLS	11,952	23.4	0	53.7	0	1,095
SELF-AWARENESS	11,952	18.6	0	41.1	0	811
SELF-MANAGEMENT	11,952	23.5	0	69.9	0	2,401
SOCIAL AWARENESS	11,952	12.0	0	29.9	0	585
TRUST	11,952	7.8	0	32.6	0	1,370

This analysis revealed that students who received more hours of support from an AmeriCorps member had higher attendance rates. For students who received the median number of hours of support from an AmeriCorps member for English, math, or social-emotional, the related increase in their attendance rates would be equivalent to

one percent, or roughly two days over a 180-day school year. ***Similarly, the more hours a student received support, the less likely they were to be off-track in attendance at school.*** Students receiving the median number of hours of support in English, math, and social-emotional, would be 22%, 28%, and 16% less likely to be off-track in attendance, respectively. Hours of support received from an AmeriCorps member were not consistently related to students' course grades.

TABLE 4 – CITY YEAR DOSAGE AND STUDENT OUTCOMES

	ATTENDANCE		ENGLISH COURSE		MATH COURSE	
	RATE	OFF-TRACK	MARK	OFF-TRACK	MARK	OFF-TRACK
ELA DOSAGE (HOURS)	0.05 ***	0.98 ***	0.000	0.99*	-0.002	1.00
MATH DOSAGE (HOURS)	0.06 ***	0.98 ***	-0.001	0.99	0.001	0.99
SEL DOSAGE (HOURS)	0.15 ***	.94 ***	-0.007	0.99	-0.015 ***	1.00
SEL DOSAGE (DAYS)	0.00	.99 **	-0.001 **	1.00	-0.001 ***	1.01 **
ATTENDANCE DOSAGE (DAYS)	0.01*	1.00	-0.001 ***	1.01 **	-0.001 ***	1.01 ***

. is significant at the 0.05 level; **. is significant at the 0.01 level; *. is significant at the 0.001 level*

In terms of the number of days spent on either social-emotional or attendance focus lists, we see that more days spent on the lists was not consistently related to attendance outcomes but was significantly associated with lower course outcomes and an increased odds of being off-track in those areas. This is likely because presence on a list is more a signifier of a student's need rather than a direct measure of implementation support provided, such as hours. The more days a student spent on a focus list, the greater was their need.

When looking at the relationship between dosage and students' social-emotional skills, a similar pattern is seen in terms of dosage measured by hours versus dosage measured by days on a focus list. ***The more hours students spent working with an AmeriCorps member, the less likely students were to struggle with the various social-emotional competencies at the end of the year (controlling for start-of-year social-emotional levels).*** For students who received the median number of hours support, the effects sizes on the composite measure of the DESSA would be .06, .06, and .04, respectively for English, math and social-emotional. According to the WWC's improvement index, this would be equivalent to moving the average student up 2 percentiles in the population's distribution of SEL skills. Thus, the more direct support they received, the stronger their social-emotional skills later in the school year (Table 5). In terms of the length of time

TABLE 5 – CITY YEAR DOSAGE AND DESSA OUTCOMES

DESSA DOMAIN	ELA HOURS	MATH HOURS	SEL HOURS	SEL DAYS	ATTENDANCE DAYS
SELF-AWARENESS	-0.0022 ***	-0.0022 ***	-0.0063 ***	0.0000	0.0000
DECISION MAKING	-0.0021 ***	-0.0027 ***	-0.0069 ***	0.0000	0.0001
GOAL-DIRECTED BEHAVIOR	-0.0022 ***	-0.0022 ***	-0.0072 ***	0.0000	0.0001*
SELF-MANAGEMENT	-0.0022 ***	-0.0016 **	-0.0048 ***	0.0000	0.0000
OPTIMISTIC THINKING	-0.0021 ***	-0.0020 ***	-0.0083 ***	-0.0001	0.0001
RELATIONSHIP SKILLS	-0.0022 ***	-0.0024 ***	-0.0078 ***	0.0000	0.0000
PERSONAL RESPONSIBILITY	-0.0017 ***	-0.0020 ***	-0.0057 ***	0.0000	0.0001*
SOCIAL AWARENESS	-0.0018 ***	-0.0025 ***	-0.0049 ***	0.0001	0.0000
COMPOSITE SCORE	-0.0023 ***	-0.0022 ***	-0.0078 ***	0.0000	0.0001

. is significant at the 0.05 level; **. is significant at the 0.01 level; *. is significant at the 0.001 level*

spent on a focus list, there was no consistent association between the days spent on either the social-emotional or attendance focus lists and social-emotional skill levels.

Further models, for both academic and SEL outcomes, tested for an interaction between the hours spent with an AmeriCorps member and students' initial starting points (their fall attendance rates and fall SEL levels). Results found that the lower a student's prior level was, academic or social-emotional, the stronger was the relationship between City Year intervention and students' spring outcomes. ***In other words, the students who began with the lowest attendance, and those with the lowest SEL skills, were the ones who benefited the most from receiving one-on-one support from an AmeriCorps member. There is also evidence that time spent with an AmeriCorps***

member for either English or social-emotional support was related to higher English course grades, primarily for those students who started off struggling the most in English.

The third and final source of implementation data, one that was only available for those students who had been on the program's focus list for social-emotional, captured the specific social-emotional skill which they had worked on during one-on-one sessions with an AmeriCorps member. For those students, the data measured the amount of time, in minutes, they had spent working on social-emotional skills, some of which overlapped directly with competency areas from the DESSA[2]. As seen in Table 6, the time spent working with AmeriCorps members on specific social-emotional skills was linked with improved attendance outcomes, but not consistently related to students' course outcomes. Time spent working on a given social-emotional skill was significantly related to improvements in those same competency areas, at least for those that were measured by the DESSA tool. Similarly, time spent working on individual social-emotional skills was also significantly related to improvements on students' composite DESSA scores (Table 7).

In summary, the available implementation data for the City Year program suggests that school-based interventions can be successful in developing students' social-emotional skills and increasing their connection to school. The data indicates that the more time a student spent working directly with a City Year AmeriCorps member the greater the student's social-emotional skills as measured by the DESSA, and students with stronger skills

TABLE 6 – CITY YEAR IMPLEMENTATION AREA AND STUDENT OUTCOMES

	ATTENDANCE		ENGLISH COURSE		MATH COURSE	
	RATE	OFF-TRACK	MARK	OFF-TRACK	MARK	OFF-TRACK
CRITICAL THINKING	0.01	1.00	-0.001	1.00	-0.001	0.99 *
DECISION MAKING	0.01	1.00	-0.002 *	1.00	-0.002*	1.00
EMPATHY	0.02 **	0.99	0.000	0.99	-0.002	1.00
GOAL DIRECTED BEHAVIOR	0.01 **	0.99 *	0.000	1.00	-0.001*	1.00
LEARNING INTEREST	0.01 **	1.00	0.001 ***	1.00	-0.001	1.00
OPTIMISTIC THINKING	0.01 **	0.99	0.000	1.00	-0.001	1.00
PERSONAL RESPONSIBILITY	0.01 *	0.99 *	-0.001*	1.00	-0.001 *	1.00
REFLECTION	0.01 ***	0.99 ***	0.000	1.00	-0.001 *	1.00
RELATIONSHIP SKILLS	0.01 **	0.99 *	0.000	1.00	0.000	1.00
SELF-AWARENESS	0.01 *	1.00	0.000	1.00	-0.001	1.00
SELF-MANAGEMENT	0.01 ***	0.99 ***	0.000	1.00	0.000	1.00
SOCIAL AWARENESS	0.02 ***	0.99 ***	-0.001	1.00	-0.001 *	1.00
TRUST	0.01 *	1.00	0.000	0.99 **	-0.003 *	1.00

. is significant at the 0.05 level; **. is significant at the 0.01 level; *. is significant at the 0.001 level*

TABLE 7 – CITY YEAR IMPLEMENTATION AREA AND STUDENT SEL MEASURES

	RELATED SUB-SCORE	DESSA COMPOSITE
CRITICAL THINKING	N/A	-0.0006***
DECISION MAKING	-0.0002*	-0.0003***
EMPATHY	N/A	-0.0010**
GOAL DIRECTED BEHAVIOR	-0.0004***	-0.0005***
LEARNING INTEREST	N/A	-0.0004***
OPTIMISTIC THINKING	-0.0005*	-0.0009***
PERSONAL RESPONSIBILITY	-0.0004***	-0.0005***
REFLECTION	N/A	-0.0005***
RELATIONSHIP SKILLS	-0.0005***	-0.0005***
SELF-AWARENESS	-0.0002	-0.0004*
SELF-MANAGEMENT	-0.0002*	-0.0000
SOCIAL AWARENESS	-0.0005*	-0.0007***
TRUST	N/A	-0.0004

. is significant at the 0.05 level; **. is significant at the 0.01 level; *. is significant at the 0.001 level*

[2] Some time was also spent working on skills beyond social-emotional ones, such as homework, geometry, and other enrichment activities.

obtained greater academic outcomes in terms of attendance and course grades, both predictive indicators of high school graduation. These findings, moreover, were found in a large multi-district sample across elementary, middle and early high school grades. This suggests that they are not the result of extraordinary efforts in an innovative and/or well-led district or limited to one particular age-band of students, but rather can occur at a range of under-resourced schools, within under-resourced school districts. These results increase the call to action for policy makers to support the development and integration of social-emotional skills within schools across the nation.

In comparison to the first study, the findings are almost identical in patterns, size, and significance. Students' social-emotional skills are positively related to their academic outcomes in a manner that is both statistically significant and educationally substantial. Additionally, broad-scale student-level interventions such as City Years can also have significant impacts on students' SEL skills, and through them on academic outcomes. That the results were replicated with a second sample of data, adds to the reliability of the findings. That they were replicated with a larger and more robust data sample also raises the external validity of the findings and their applicability to a wider range of students and settings.

PART II: SOCIAL EMOTIONAL SKILLS AND LONGER-TERM ACADEMIC GROWTH

The addition of data from the 2018-19 school year allowed us to re-test our original findings, which were based on 2017-18 data. By combining the two years of data into a single sample, it can allow us to further expand on the original set of findings by examining how students' social-emotional skills relate to their academic outcomes over a longer period of time. In the first study, we found that students' social-emotional skills were positively and significantly correlated to their academic outcomes when looking at students' academic outcomes over the course of one school year, from fall to spring. By combining the two years of data, we can see how students' social-emotional skills relate to changes in their academic outcomes over a period of two school years, from fall 2017 to spring 2019.

When looking at long-term academic growth, is the relationship to social-emotional skills the same, weaker, or stronger? Are the specific social emotional skills that were more strongly linked to academic growth within one school year, the same key drivers of growth over a longer period of time, or are other skills more strongly related to long-term growth versus short-term?

While the City Year data samples included over 38,000 students in the 2017-18 school year, and over 139,000 students for 2018-19, the number of students who appear in both data sets is 21,790 (or 57% of City Year students from the 2017-18 sample). Additionally, while those students who do appear in both years of data continued to benefit from City Year's whole-school supports, most did not experience one-on-one support from a City Year AmeriCorps member in both years, and thus do not have the required data for analysis. Some are missing DESSA scores (the measure of social-emotional levels), while others do not have academic outcome data in both years (attendance rates, or math and English course grades). When looking at those students with the needed data points, our analytic sample sizes are 1,271 students for models of attendance outcomes, 1,968 students for English course grades, and 1,821 for math course grades. Models include students' grade level in 2017-18, their prior outcome measures from

TABLE 8 - SOCIAL EMOTIONAL SKILLS (DESSA) & 1-YEAR ACADEMIC GAINS

DESSA DOMAIN	ATTENDANCE		ENGLISH COURSE		MATH COURSE	
	RATE	OFF-TRACK	MARK	OFF-TRACK	MARK	OFF-TRACK
SELF-AWARENESS	-2.7 .013*	2.0 .000***	-0.2 .000***	1.6 .019*	-0.3 .000***	1.7 .014*
DECISION MAKING	-2.4 .007**	1.8 .000***	-0.3 .000***	2.3 .000***	-0.4 .000***	1.9 .007**
GOAL-DIRECTED BEHAVIOR	-2.5 .001***	2.0 .000***	-0.3 .000***	2.7 .000***	-0.4 .000***	2.4 .000***
SELF-MANAGEMENT	-2.4 .008**	2.0 .000***	-0.3 .000***	2.2 .000***	-0.4 .000***	2.3 .000***
OPTIMISTIC THINKING	-1.9 .017*	1.7 .001***	-0.2 .000***	1.9 .001***	-0.3 .000***	1.8 .004**
RELATIONSHIP SKILLS	-1.8 .037*	1.8 .000***	-0.2 .000***	1.8 .000***	-0.3 .000***	1.5 .034*
PERSONAL RESPONSIBILITY	-2.6 .001***	2.0 .000***	-0.4 .000***	2.7 .000***	-0.5 .000***	2.6 .000***
SOCIAL AWARENESS	-1.7 .087	1.6 .002***	-0.2 .000***	1.9 .002**	-0.3 .000***	1.8 .000***
COMPOSITE SCORE	-2.6 .008**	2.0 .000***	-0.3 .000***	2.3 .000***	-0.4 .000***	2.3 .000***

. is significant at the 0.05 level; **. is significant at the 0.01 level; *. is significant at the 0.001 level*

fall 2017, and their DESSA scores from the spring of 2018 as a measure of their social-emotional skills. Samples for these analyses include only those students with outcome data in both years so that when comparing the relationship of social-emotional skills to academic growth over one and then two years, it is being compared for the same set of students.

Tables 8 and 9 show the results of our models. Table 8 shows the relationship between students' SEL skills and their academic outcomes in the spring of the 2017-18 school year. This represents a replication of the analyses done in the prior report, with the exception that they are replicated here with a much smaller sample of students, those with data points across two school years. The results for one-year academic growth are the same as those found in the original study. Students' SEL skills are significantly correlated to their academic outcomes. The stronger a students' SEL skills are, the better are their academic outcomes in spring, having controlled for their starting point in fall. DESSA scores range from 1-3, where a value of '1' means that the SEL domain is a "Strength" for the students, a score of '2' means the students' SEL level is "Typical", and a score of '3' means that the student "Needs Instruction" in that area. Therefore, the higher a students' DESSA score, the lower their spring academic outcome, and thus the negative relationship displayed in the tables below. Similar to the results of the first report, we again see that Personal Responsibility and Goal-Directed Behavior are the sub-skills that have the strongest relationship to academic outcomes followed by Self-Management and Decision Making.

When looking at Table 9, which shows the results for models looking at academic outcomes at the end of the second school year, we find almost identical results. ***The relationship between students' SEL skills and their academic outcomes over two-years of growth are the same as with change over one-year. The relationships are similar in terms of statistical significance, the nominal size of the relationship, as well as which sub-skills are relatively most important.*** Students whose DESSA social-emotional skills were one level lower, had attendance rates that were on average 2-3 percentage points lower, course grades

TABLE 9 - SOCIAL EMOTIONAL SKILLS (DESSA) & 2-YEAR ACADEMIC GAINS

DESSA DOMAIN	ATTENDANCE		ENGLISH COURSE		MATH COURSE	
	RATE	OFF-TRACK	MARK	OFF-TRACK	MARK	OFF-TRACK
SELF-AWARENESS	-2.4 .024*	1.9 .000***	-0.2 .000***	1.4 .038*	-0.3 .000***	1.6 .001***
DECISION MAKING	-2.8 .000***	2.0 .000***	-0.2 .000***	1.4 .059	-0.3 .000***	1.9 .000***
GOAL-DIRECTED BEHAVIOR	-2.5 .003**	1.7 .000***	-0.3 .000***	1.6 .027*	-0.3 .000***	1.8 .000***
SELF-MANAGEMENT	-2.8 .000***	1.9 .000***	-0.3 .000***	1.5 .007**	-0.4 .000***	2.3 .000***
OPTIMISTIC THINKING	-2.2 .017*	1.8 .000***	-0.2 .000***	1.4 .019*	-0.3 .000***	1.9 .000***
RELATIONSHIP SKILLS	-2.1 .003**	1.7 .000***	-0.2 .000***	1.3 .123	-0.3 .000***	1.6 .000***
PERSONAL RESPONSIBILITY	-2.8 .001***	1.8 .000***	-0.3 .000***	1.5 .006**	-0.4 .000***	1.9 .000***
SOCIAL AWARENESS	-1.7 .008**	1.6 .000***	-0.2 .002**	1.2 .422	-0.2 .009**	1.6 .002**
COMPOSITE SCORE	-2.7 .000***	1.8 .000***	-0.3 .000***	1.6 .004**	-0.4 .000***	2.1 .000***

. is significant at the 0.05 level; **. is significant at the 0.01 level; *. is significant at the 0.001 level*

that were 0.3-0.4 points lower (on a 0-4 scale), and were roughly twice as likely to be "off-track" in attendance or their English and math classes.

Our original goal for this analysis of the relationship between students' SEL skills and their long-term academic growth was to examine the relationship over a three-year period, ending with the 2019-20 school year. Unfortunately, the COVID-19 pandemic curtailed the 2019-20 school year, bringing it to a premature close in March of 2020. The sudden ending of the school year meant that academic outcome data for the 2019-20 school year was not available to City Year, thus limiting our analysis to looking at academic growth over a two-year period. In reality, this represents more of a 'medium-term' growth. It is possible that the relationship between students' SEL skills and long-term growth as measure over a four-year time period (such as all of high school) might differ. ***However, based on the available data, we find that the original relationship we found between students' SEL skills and their academic growth over a one-year period looks exactly the same when looking instead at students' growth over a two-year period of time. When looking at students' academic outcomes after controlling for where they had started two years earlier, those students with stronger social-emotional skills, particularly in regard to Personal Responsibility and Goal-Directed Behavior, had higher attendance rates and course grades.***

Also, similar to the results of the original study, 'change' or 'growth' in students' social-emotional skills over the course of a school year was not significantly related to growth in their academic outcomes over a two-year period. While their SEL levels at a specific point in time (i.e., spring 2018) were significantly related to their academic outcomes and changes therein, when we measure the change in students' SEL skills from fall 2017 to spring 2018, those changes in SEL levels were not significantly correlated to the corresponding changes in students' academic outcomes from fall 2017 to spring 2019. A finding consistent with other recent research (Soland & Kuhfeld, 2021), which has found that students SEL scores at a given point in time, or their SEL 'status', have a more significant relationship to academic outcomes than do measures of students' SEL change, or growth, between two time points.

CITY YEAR SUPPORTS ACROSS TWO YEARS

Aside from depicting the strong relationship between students' social-emotional skills and their academic outcomes, the original study also found that the student supports offered as part of the City Year program were positively and significantly linked to higher levels of both academic and social-emotional outcomes amongst students. The more hours students spent working with a City Year AmeriCorps member, the less likely they were to struggle in the various social-emotional competencies at the end of the year (controlling for start-of-year social-emotional levels). The analyses also revealed that the more hours a student spent receiving support from a City Year AmeriCorps member in either English or math, the higher were their course grades in that related subject, as well as their attendance rates.

TABLE 10 - CITY YEAR DOSAGE - DESCRIPTIVE STATISTICS

	N	MEAN	MEDIAN	STD. DEV.	MIN	MAX
	ONE YEAR OF TREATMENT					
ELA DOSAGE (HOURS)	8,047	16.74	16.03	8.37	.08	116.42
MATH DOSAGE (HOURS)	7,177	17.23	16.00	12.13	.08	145.17
SEL DOSAGE (HOURS)	4,667	4.31	3.25	4.19	.08	40.93
SEL DOSAGE (DAYS)	4,969	226	228	58.67	1	320
ATTENDANCE DOSAGE (DAYS)	4,122	219	214	58.99	4	320
	TWO YEARS OF TREATMENT					
ELA DOSAGE (HOURS)	3,451	33.47	31.80	15.61	1.53	145.17
MATH DOSAGE (HOURS)	2,144	32.45	32.00	13.94	1.78	116.52
SEL DOSAGE (HOURS)	895	9.56	7.22	8.22	0.42	64.50
SEL DOSAGE (DAYS)	2,187	490	494	91.75	106	749
ATTENDANCE DOSAGE (DAYS)	1,027	434	436	93.96	109	625

. is significant at the 0.05 level; **. is significant at the 0.01 level; *. is significant at the 0.001 level*

The addition of a second year of student data allows us to further explore the City Year related findings in two new ways. First, for those students who received City Year supports in the first year only, does the positive relationship we had previously found between supports and outcomes last when examining outcomes over a longer time-period, after two school years? Second, we can look at the relationship between City Year supports and outcomes for students who received supports in both years, 2017-18 and 2018-19. For students who received supports for two years running, is the relationship the same, or stronger?

These analyses of the relationship between City Year student supports and academic and social-emotional outcomes are very exploratory in nature. One limiting factor is that they are based on very small sample sizes. The analyses of the original study, as well as those based on only 2018-19 data where the original findings were re-tested, were based on tens of thousands of cases. The analyses below examining City Year supports and student outcomes after two years are based on only several hundred cases, with those cases being spread across many different schools and school districts. As stated above, most students who receive support from City Year do not do so again the following year. In addition, many do not have the required SEL measures or academic data across both years. When the samples are reduced to those students who have academic outcome data (attendance rates, English and math course grades) in both years, as well as DESSA measures of their SEL levels in both years, and treatment measures (time spent with an AmeriCorps member) in one or both years, the analyses are reduced to only a few hundred students.

A further limiting factor is that the analytic samples examining City Year supports do not include a comparison group of any kind. All students in the analyses are students who were identified needing additional supports and targeted for treatment. Thus, the results have shown that receiving more treatment is beneficial for struggling kids, as compared to struggling kids who received less support, but not in comparison to regular students in the wider population who received no support.

Table 11 examines the relationship between City Year supports and student academic outcomes for students who received support in 2017-18 (but not again in 2018-19). The results of the original study found that students who received more support in either mathematics or English tended to have higher course grades in those subjects at the end of the year, as well as higher attendance rates. Students who had been identified as in need of support for attendance issues had also been linked to higher attendance rates.

When replicating those analyses with a subsample of those students for whom we had outcome data after two years, we find that the support received in English was still linked to significantly higher English course grades one year after having received that initial support. In the original study, a student who received the median amount of support from a City Year AmeriCorps member for English had on average course grades that were 0.1 mark points higher (effect size of 0.8-0.9) in the spring of 2018. When looking at students' English grades one year later, the results were almost identical with students who received the median amount of support in English having course grades that were on average 0.1 mark points higher (effect size of 0.7) in the spring of 2019.

Likewise, students who had received more attendance support in 2017-18 still had higher attendance rates at the end of the 2018-19 school year. In the original study, students who'd spent the median number of days on City Year's attendance Focus List in 2017-18 finished the school year with attendance rates that were roughly 2.2% percentage points higher (ES = 0.17). By the end of 2018-19, such students had attendance rates that were

TABLE 11 - CITY YEAR DOSAGE AND ACADEMIC OUTCOMES AFTER 2 YEARS

STUDENTS WITH YEAR 1 OF DOSAGE

	ATTENDANCE		ENGLISH COURSE		MATH COURSE	
	RATE	OFF-TRACK	MARK	OFF-TRACK	MARK	OFF-TRACK
ELA DOSAGE (HOURS)	0.13 .001***	0.96 .041*	0.005 .002***	0.99 .795	-0.004 .244	1.01 .721
MATH DOSAGE (HOURS)	0.04 .272	0.98 .298	0.002 .003**	0.99 .520	-0.001 .668	0.99 .014*
SEL DOSAGE (HOURS)	0.11 .683	1.02 .695	0.032 .022*	0.98 .748	-0.019 .258	1.03 .468
SEL DOSAGE (DAYS)	-0.02 .212	1.01 .015*	0.000 .669	1.01 .656	-0.001 .016*	1.01 .212
ATTENDANCE DOSAGE (DAYS)	0.02 .045*	0.99 .250	-0.001 .498	1.01 .168	-0.001 .323	1.00 .820

. is significant at the 0.05 level; **. is significant at the 0.01 level; *. is significant at the 0.001 level*

3.3% percentage points higher (ES = 0.37). ***For mathematics, higher levels of support received in 2017-18 were not still related to higher math course grades one year later in 2018-19, but students who'd received the median amount of support in math were still 8% less likely to be 'off-track' in math class one year later (compared to 34% less likely after one year, as found in the original study). For both math and social-emotional, support received in 2017-18 was significantly related to higher English course grades one year later.*** Support received in English in 2017-18 was also significantly related to higher attendance rates at the end of the 2018-19 school year. ***Overall, the results suggest that students who received support from City Year during the 2017-18 school year (in English, math, or attendance) continued to benefit from that support one year further on, as per their academic outcomes in the 2018-19 school year.***

While the amount of support students received from City Year in 2017-18 was significantly related to stronger social-emotional skills at the end of that school year, it was not significantly related to students' SEL skills one-year later in spring of 2019. While different types of student support received in the first year were significantly related to various social-emotional sub-skills (Table 12), such findings were not wide-spread or consistent, and there were no significant relationships between the different types of support received in 2017-18 and students' overall (composite) SEL levels as measured by the DESSA at the end of the 2018-19 school year.

Table 13 examines the relationship between City Year support received and academic outcomes for those students who received support across both school years, 2017-18 and 2018-19. As with the results of the first study, we find that greater support in math and English is linked to higher course grades in those subjects as well as to higher attendance rates. Students who received the median amount of support in English over the two-year period had English grades that were on average 0.1 mark points higher in spring of 2019 (ES = 0.07), similar in size to the one-year finding in the original study of 0.1 (ES = 0.08). In math, students who received the median amount of support over the two-year period had math course grades that were on average 0.2 mark points higher in 2019 (ES = 0.21), larger than the one-year finding in the original study of 0.1 (ES = 0.09). Students who received more support in either English or math also had higher attendance rates in spring 2019, by 1.4 and 3.6 percentage points respectively. The difference in attendance rates was statistically significant for students who received support in mathematics, and borderline significant for those students

TABLE 12 - CITY YEAR DOSAGE AND DESSA OUTCOMES AFTER 2 YEARS

STUDENTS WITH YEAR 1 OF DOSAGE

DESSA DOMAIN	ELA HOURS	MATH HOURS	SEL HOURS	SEL DAYS	ATTENDANCE DAYS
SELF-AWARENESS	0.0000	-0.0032	-0.0053**	-0.0005	0.0001
DECISION MAKING	0.0001	-0.0034	-0.0014	-0.0006*	0.0001
GOAL-DIRECTED BEHAVIOR	-0.0018	-0.0019	0.0001	-0.0007*	0.0004
SELF-MANAGEMENT	-0.0009	-0.0019	-0.0001	-0.0004	-0.0003
OPTIMISTIC THINKING	0.0015	0.0000	-0.0027	-0.0008	0.0005
RELATIONSHIP SKILLS	-0.0017	-0.0050*	-0.0026	-0.0008	0.0004
PERSONAL RESPONSIBILITY	-0.0013	-0.0036	-0.0054	-0.0004	-0.0004
SOCIAL AWARENESS	-0.0025	-0.0025	0.0002	-0.0006	0.0000
COMPOSITE SCORE	-0.0012	-0.0023	-0.0039	-0.0006	0.0002

. is significant at the 0.05 level; **. is significant at the 0.01 level; *. is significant at the 0.001 level*

TABLE 13 - CITY YEAR DOSAGE AND ACADEMIC OUTCOMES AFTER 2 YEARS

STUDENTS WITH 2 YEARS OF DOSAGE

	ATTENDANCE		ENGLISH COURSE		MATH COURSE	
	RATE	OFF-TRACK	MARK	OFF-TRACK	MARK	OFF-TRACK
ELA DOSAGE (HOURS)	0.05 .056	0.98 .284	0.002 .020*	1.00 .920	0.004 .007**	0.98 .017*
MATH DOSAGE (HOURS)	0.11 .020*	0.97 .111	0.004 .245	0.98 .000***	0.007 .047*	0.97 .019*
SEL DOSAGE (HOURS)	0.07 .618	0.97 .598	0.027 .042*	0.99 .726	0.032 .042*	0.86 .002**
SEL DOSAGE (DAYS)	-0.01 .507	0.99 .807	0.001 .361	0.99 .784	0.000 .380	1.00 .853
ATTENDANCE DOSAGE (DAYS)	0.01 .168	0.99 .722	-0.001 .388	0.99 .189	0.000 .664	0.99 .156

. is significant at the 0.05 level; **. is significant at the 0.01 level; *. is significant at the 0.001 level*

who received support in English (P-value = .056). Neither social-emotional nor attendance support, as measured by days on the City Year Focus List, were related to students' academic outcomes. ***However, social-emotional support, when measured by the amount of time that students spent working with a City Year AmeriCorps member, was significantly related to higher math and English course grades.*** While the results do not exactly replicate those found for one-year treatment in the original study, they are similar in that they find positive and significant links between student academic outcomes and greater levels of City Year support provided.

For students' social-emotional skills, the relationship to City Year support after two-years of exposure is also similar to what we saw in the original report for one-year of support (Table 14). ***When measured in time spent working with a City Year AmeriCorps member, the relationship is highly significant and students who receive more support also tend to exhibit stronger social-emotional skills.*** When measured in terms of days spent on a City Year Focus List, the relationship is inconsistent. For students who spent the median number of hours working with a City Year AmeriCorps member in English, math, or social-emotional, the related improvement in their overall social-emotional skills as per the composite measure of the DESSA, would be 0.14, 0.33, and 0.11 respectively in terms of effect sizes, as compared to the 0.06 to 0.08 effect sizes found in the original study.

Despite being based on small samples, and not representative of the wider student population, the results do serve as exploratory evidence of the positive impacts of City Year support. ***They build upon the findings of the original study by suggesting first, that the academic impacts of City Year support last beyond short-term outcomes, and second, that when students are exposed to the supportive relationships provided by City Year AmeriCorps members for more than one year the additional time and development may lead to even stronger social-emotional and academic impacts.***

TABLE 14 - CITY YEAR DOSAGE AND DESSA OUTCOMES AFTER 2 YEARS

STUDENTS WITH 2 YEARS OF DOSAGE

DESSA DOMAIN	ELA HOURS	MATH HOURS	SEL HOURS	SEL DAYS	ATTENDANCE DAYS
SELF-AWARENESS	-0.0024***	-0.0050**	-0.0093***	-0.0001	-0.0002
DECISION MAKING	-0.0023**	-0.0063***	-0.0061*	-0.0005***	0.0000
GOAL-DIRECTED BEHAVIOR	-0.0021***	-0.0055***	-0.0100**	-0.0002	-0.0001
SELF-MANAGEMENT	-0.0025***	-0.0054***	-0.0068***	-0.0005*	-0.0002
OPTIMISTIC THINKING	-0.0025***	-0.0049***	-0.0030	-0.0003	0.0000
RELATIONSHIP SKILLS	-0.0038***	-0.0086***	-0.0031	-0.0002	-0.0005
PERSONAL RESPONSIBILITY	-0.0018*	-0.0058***	-0.0085***	-0.0003	0.0001
SOCIAL AWARENESS	-0.0020**	-0.0081***	-0.0032	0.0000	-0.0001
COMPOSITE SCORE	-0.0025***	-0.0058**	-0.0090***	-0.0003*	-0.0001

. is significant at the 0.05 level; **. is significant at the 0.01 level; *. is significant at the 0.001 level*

PART III: GROWTH OF SOCIAL-EMOTIONAL SKILLS OVER TIME IN ELEMENTARY AND SECONDARY SCHOOL STUDENTS

The prior work done as part of the original study (Balfanz & Byrnes, 2020), and replicated in the above findings, has shown a significant and substantial relationship between students' social-emotional levels and their academic outcomes. These analyses also found that City Year's Whole School and Whole Child approach, measured as the amount of time spent by students working directly with a City Year AmeriCorps member was linked to higher social-emotional and academic outcomes among students. Both sets of analyses were based on large and diverse samples of elementary and secondary students, with recent data from City Year's network of schools, including information for tens of thousands of students in grades 3-10 from over 300 schools across the country. These findings add to a growing number of studies that have found evidence that students' social-emotional skills are not only related to their long-term academic outcomes, but that they can also be changed and influenced by interventions (Farrington et al., 2012; Yeager & Walton, 2011; Durlak et. al., 2011).

Knowing that students' social-emotional levels are strongly related to their academic outcomes and that they can be influenced by practitioners, raises a further set of questions. How do students' social-emotional levels develop over time? Which factors influences them the most? Is it the student's own background individual characteristics? The school and classroom settings? Or are their social-emotional states more idiosyncratic and influenced more by daily and short-term events? Are students' social emotional levels stable over time, or rather in constant flux?

As more states and districts invest in and encourage the development of students' social-emotional skills, educators and policymakers need to understand how social-emotional skills typically vary across time, students, and contexts. A normative understanding of what social-emotional skills should look like across grade levels and student subgroups is needed by educators in order to better determine when and where students may be in need of additional supports or social-emotional development opportunities. A clear understanding of what factors most influence them is also essential to determine what particular types of interventions or supports are needed and most likely to be successful.

Building upon the findings to date, we are able to include a third year of data from City Year's network of schools in order to map out trends and changes in students' social-emotional skills over the course of three years, and grade levels ranging from elementary to high school. While data from the 2019-20 school year did not include end-of-year academic data for students, all of the students receiving City Year support that year were assessed at least once, if not more frequently, using the DESSA instrument for assessing their social-emotional skills. With three years of data, we are able to examine some of the above questions by seeing if students SEL skills do in fact change over time, and, if so, what this looks like over time, across grade levels, and during the course of a school year. We are also able to gauge how much of the change in students' SEL skills over time is related to their own individual backgrounds as compared to school-level factors, or even more 'in the moment' factors that lead their social-emotional levels to vary from one time point to another based on their immediately surrounding context and settings.

RESEARCH ON SOCIAL-EMOTIONAL DEVELOPMENT

Historically, studies on the development of students' social-emotional skills have concentrated on early childhood or elementary school and tended to focus on only one specific skill or conceptual measure (West, 2020; Ross & Tolan, 2018; Durlak, 2011). However, more recently, studies covering a wider age range and a wider set of social-emotional measures have come out based on data from the California Office to Reform Education (CORE) school districts, a consortium of nine school districts serving over one million students in more than 1,500 schools. Follow-

ing a decade of increased research into and adaptation by schools of social-emotional learning measures, the CORE districts in 2013 decided to integrate measures of students' social-emotional skills directly into their school accountability metrics. The CORE districts adopted a student survey that sought to capture measurements of students' social-emotional skills, specifically targeting four conceptual areas: self-management; social awareness; self-efficacy; and growth mindset.

Using the CORE data, Soland (2019) examined those four social-emotional measures in students over the course of three school years, 2014–15 through 2016–17. Their data sample included over 33,000 students from third to eleventh grade from 54 schools. They found that variation in students' social-emotional levels was split essentially 50/50, with half of the variation being due to the constant traits and characteristics of the student, and the other half being due to the occasional and time-specific factors (such as mood or motivation in a given moment, or contextual aspects such as changing teachers or classroom peers between school years). Compared to their cognitive levels, students' social-emotional levels were more volatile than their mathematic and reading achievement scores, which tend to be more stable over time, with students' scores at one time point being much more highly related to their scores and prior points in time. Their results also found that only a small proportion of the variation in students' social-emotional levels, between 1-15%, was linked to school-level factors. This last finding was similar to that of West (West, et al., 2018), who looked at changes in mean social-emotional scores in the CORE districts across two school years and found that little of the variance was due to difference between schools.

Using the CORE data, West (2020) looked at data for nearly 400,000 grade 4-12 students over the 2014-15 and 2015-16 school years. In looking at the growth and development of students' social-emotional levels over time, they found that students' self-efficacy, social awareness, and self-management all decline after grade 6, while only their growth mindset continue to increase. This study of multiple social-emotional skills for students across many grade levels and over a two-year period, builds on a wider set of past research that, taken together, has produced conflicting results in terms of the trends in students' social-emotional levels as they age, with some studies showing increases over time and others showing decreases (Rubin et al., 2005; Ryan, 2001; Wigfield et al., 2006; Pintrich & Zusho, 2002; Anderman et al., 1999; Pajares & Valiante, 1999; Schunk & Meece, 2006; Schunk & Pajares, 2002; Urdan & Midgley, 2003; Duckworth et al., 2010; West et al., 2016).

Both sets of the above findings have important implications for how to assess students' social-emotional levels and foster their development. If students' social-emotional levels are highly sensitive to the day-to-day changes in their context or environment, that would put an emphasis on the daily student-teacher interactions that shift over time. Whether students' social-emotional levels increase or decrease normatively as they progress through K-12 education is also key to judging what levels represent a drop or below expected value and signify a need for action and support.

DATA SAMPLE

In seeking to further answer such questions and obtain a clearer picture of the growth and development of students' social-emotional levels, we were able to make continued use of the data from the City Year program's network of schools and, in particular, the data they collect on students' social-emotional skills using the DESSA. The eight social-emotional competency areas covered by the DESSA, include: self-awareness; decision making; goal-directed behavior; self-management; optimistic thinking; relationship skills; personal responsibility; and social awareness. With the exception of growth mindset, the DESSA competency areas overlap with those found on the CORE assessments. A key difference between the DESSA and the social-emotional measures employed by CORE is that the DESSA is administered by adults who observe the students, while the CORE measures are based on student self-assessments. While City Year also measures students' social-emotional skills through the Holistic Student Assessment – a student self-report tool – HSA data was available from too few school districts in the City Year network (only one district in 2018-19) to model over time.

As noted in Parts I and II, City Year partners primarily with systemically under-resourced schools found in large urban school districts. Within those schools, the students whose social-emotional levels were assessed, and who thus appear in our analyses, are limited to those students who struggled in attendance, social-emotional, or course marks, thereby signaling a need for support and involvement in City Year's program, including tutoring, mentoring, and near-peer supportive relationships from City Year AmeriCorps members. Thus, as with prior analyses, our

data sample is not representative of the national population of schools and students, and we cannot assume that the results presented in this report will hold true for all students. However, because City Year works with the high schools with the lowest graduation rates and the elementary and middle schools that feed into them, the sample is very representative of the types of schools and students that state and federal agencies most typically identify as in need of support. Therefore, the patterns highlighted below in students' social-emotional growth are likely to be representative of the students that public and non-profit organizations are most interested in supporting.

The sample of data provided by City Year is also especially large in scope. Combining data across three school years (2017-18 through 2019-20), it includes 261,545 observations of students' social-emotional levels, from 74,287 unique students in grades 3-10, attending 408 schools across 29 cities in 21 states. It therefore covers growth over three school years for students across all K-12 levels (elementary, middle, and high) and from all geographic regions of the country.

Another strength of the data sample is that while most studies are only able to observe one or two measurements per students (pre and post), the City Year sample includes multiple measurements per year of students' social-emotional levels. Within any specific school year, 25% of students had only one DESSA score, and the most frequent case was students with two DESSA scores. However, nearly half the sample (44%) had between 3-7 observations over the course of an individual school year, with a remaining 2% of the sample having 8 or more observations. The maximum number of observed DESSA scores within one school year was 14. Across all three school years, 22% of students had only one observed DESSA score, while half the sample (49%) had between 2-4 observed scores. Another quarter of the sample (24%) had between 5-8 observed scores, while 5% of students in the sample had 9 or more scores. The maximum number of observed DESSA scores across all three school years was 21. Of the 74,287 unique students, 83% had measurements in only one school year, 15% had observations across two school years, while another 2% had DESSA scores for all three school years. Thus, a unique feature of this data set is its measurement of social-emotional levels for the same students across multiple years of school, and within each year over multiple time points throughout the school year.

TABLE 15 - MEASUREMENT OF SOCIAL-EMOTIONAL LEVELS FOR THE SAME STUDENTS ACROSS MULTIPLE YEARS OF SCHOOL

OBSERVATIONS	OVERALL	PER INDIVIDUAL SCHOOL YEAR
1	22%	25%
2	25%	30%
3	14%	14%
4	10%	8%
5	8%	7%
6	8%	9%
7	6%	5%
8	3%	2%
9	2%	<1%
10	1%	<1%
11	1%	<1%
12	<1%	<1%
13	<1%	<1%
14	<1%	<1%
15	<1%	
16	<1%	
17	<1%	
18	<1%	
19	<1%	
20	<1%	
21	<1%	

ANALYTIC METHODS

We used 3-Level multi-level models (Snijders & Bosker, 1999; Bryk & Raudenbush, 2002) to measure the growth in students' social-emotional levels over this three-year period from the 2017-18 to 2019-20 school year. Our models explicitly model an individual's growth in social-emotional levels over time at Level-1, nested within different students at Level-2, themselves nested within different schools at Level-3. The use of multi-level modeling is ideal for samples such as ours where the data is clustered, as it accounts for the interdependence of observations taken over time from the same students. Such auto-correlation

violates the statistical assumptions of traditional regression modeling and is common to time-series designs.

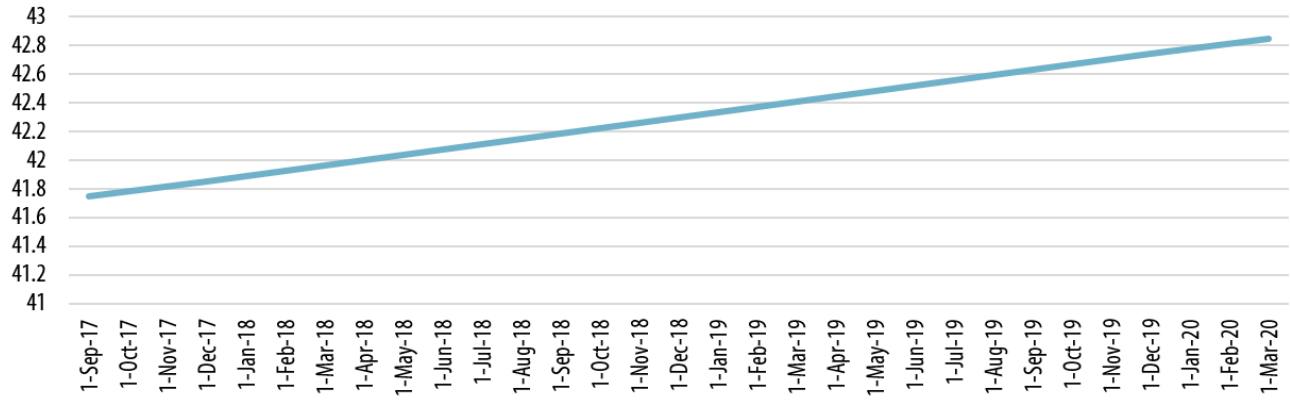
Multi-level modeling is also perfect for the modeling of growth curves as they are more flexible to deal with unbalanced data structures, such as longitudinal data where some or even all individuals are measured at different sets of time points, or repeated measures data with fixed measurement occasions where the data for some or all individuals is incomplete (Snijders & Bosker, 1999; Bryk & Raudenbush, 2002). In other words, with multi-level modeling, both the spacing among the observations and the number of observations per person may vary. It is not a problem if some individuals contribute only one observation, or at only some time points, as each observation contributes to the measurement of the overall growth curve and the estimation of a model of social-emotional development for the population as a whole. Thus, the use of multi-level modeling in combination with the robust City Year sample is more fit for studying individual growth than most studies of change that rely on less adequate designs that collect data at only two time points.

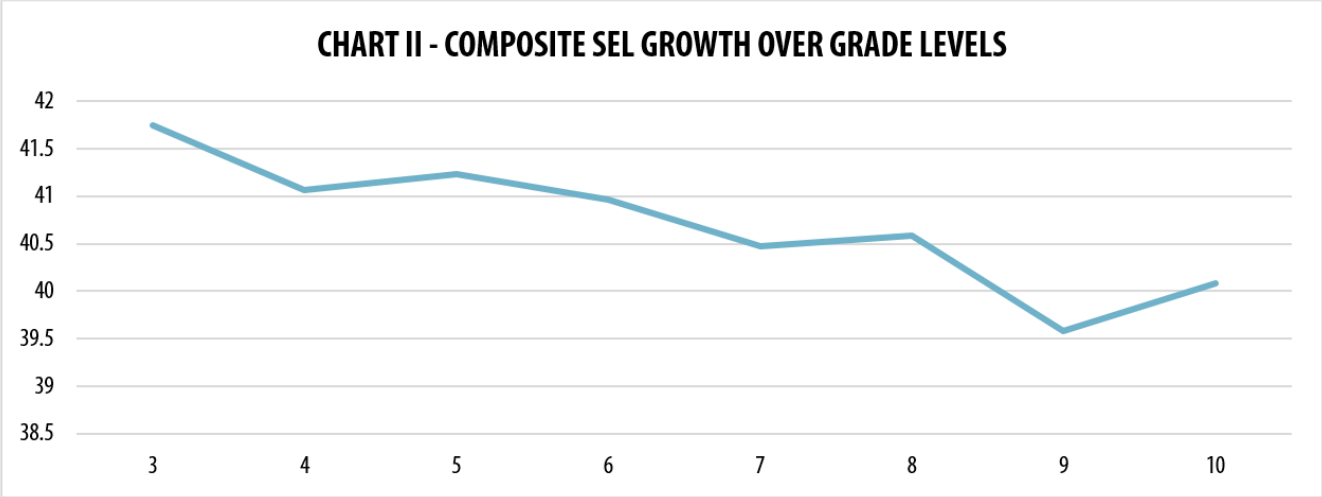
What the following analyses lack, is the inclusion of other covariates such as student background characteristics and demographics, or survey information at each measurement time point. Such additional information might hint at possible explanations for differences in social-emotional levels between different students or suggest causes for changes in social-emotional levels of the same student over time. However, the information we do have does let us lay out a detailed model of social-emotional growth over time, as we are able to accurately measure the timing of each observation including the number of days that passed between each measurement, the time of the year in which each observation was taken (month), and the grade level of each student at the time of measurement.

EMPTY MODEL

Before including measures for time in our model, we first ran an empty model, looking at students' social-emotional levels without controlling for any other factors. This allowed us to gauge how much of the variation in students' social-emotional levels was linked to time related factors (Level 1), as opposed to student related factors (Level 2), or school factors (Level 3). ***Based on our large sample, 43% of the variation in students' social-emotional levels lies between time points, while 51% of the variation is between students, and about 7% is between schools.*** So, roughly half of the variation is between time points and the other half between students. Put another way, there is as much difference between the social-emotional levels of the same student at two different time points, as there is between two different students. This confirms previous findings that student's social-emotional levels change a lot over time and are not as stable as cognitive factors such as mathematics and reading achievement (Soland, et. al. 2019). The results also confirm that very little of the change in students' social-emotional levels is tied to school level factors (Soland, et. al. 2019; West, et. al., 2018). That nearly half of all variation in students' social-emotional levels is connected to time specific, or 'in the moment', events and contexts is itself a very important finding. ***If scores for the same student are not stable over time, but rather vary a great deal going up and down, then any efforts to raise students' social-emotional skills***

CHART I - COMPOSITE SEL GROWTH OVER TIME/DAYS





would need to focus as much on the situational contexts (such as the events and interactions at home and during the day at school) as they would on the students' prior history and background characteristics.

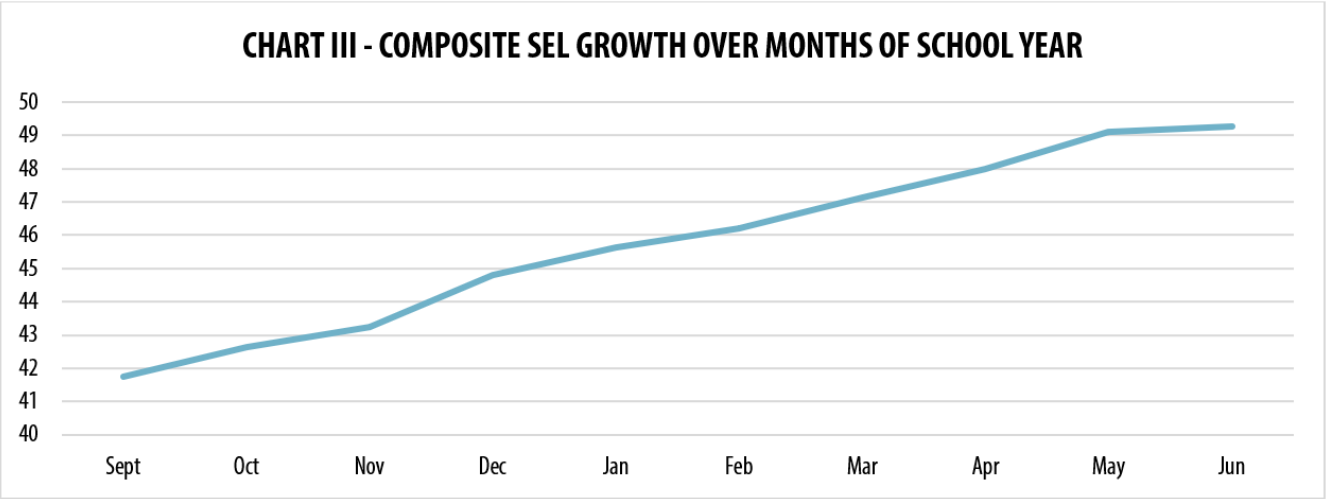
TIME

We measured time as the number of days that passed between each student's DESSA assessment, as each assessment included the date on which the DESSA had been administered. Time, in growth over days, proved to be statistically significant, but accounted for only 3% of the variation in students' social-emotional levels between time points. For the composite DESSA measure (our measure of a student's overall social-emotional level), a student's raw score grew on average 0.4 points per year. For specific social-emotional skills, the rate of growth was only half as large for the areas of Goal-Directed Behavior, Self-Management, Optimistic Thinking, and Personal Responsibility, but 50% larger for Relationship Skills. For all areas the rate of growth was statistically significant. However, considering that raw scores on the DESSA range on a scale from 28 to 72, the growth is not particularly large, and equates to an effect size of 0.05. Thus, students' social-emotional levels do grow over time, but the rate of growth is quite small. ***While the relationship is statistically significant, it remains small in terms of the magnitude of the relationship.***

GRADE LEVEL

Students' social-emotional levels decrease significantly in later grades, though the relationship is not linear. ***Students' social-emotional levels do not decrease with each successive grade progression, but rather experience significant drops as they transition to the various stages of elementary, middle, and high school.*** As compared to 3rd grade (the first grade for which we have observed measurements), students' social-emotional levels drop by roughly half a point in grades 4-6 with the difference being just statistically significant. Students' social-emotional levels are roughly 1 point lower in grades 7 and 8, and roughly 2 points lower in grades 9 and 10, both differences being highly significant as compared to grade 3 levels. Though statistically significant, the relationship between social-emotional and grade level is nominally small. It explains only 0.1% of the variation in students' social-emotional levels between time points. When considered against a scale range from 28-72, the changes at different grade levels are equivalent to effect sizes of .07 in the later elementary grades, .13 by middle school, and .21 in high school. When looking at specific social-emotional skills, the drops are somewhat smaller in the areas of Self-awareness, Self-Management, Optimistic Thinking, and Social-Awareness (for which they are only significantly different from grade 3 by high school), but somewhat larger for Goal-Directed Behavior and Relationship Skills. However, in all areas, the drops follow the pattern of becoming larger as students move from the elementary grades, to middle school, and then high school.

It can be noted in the patterns, that students seem to have a slight rebound in grades 8 and 10, suggesting that while students experience a drop as they enter higher levels of



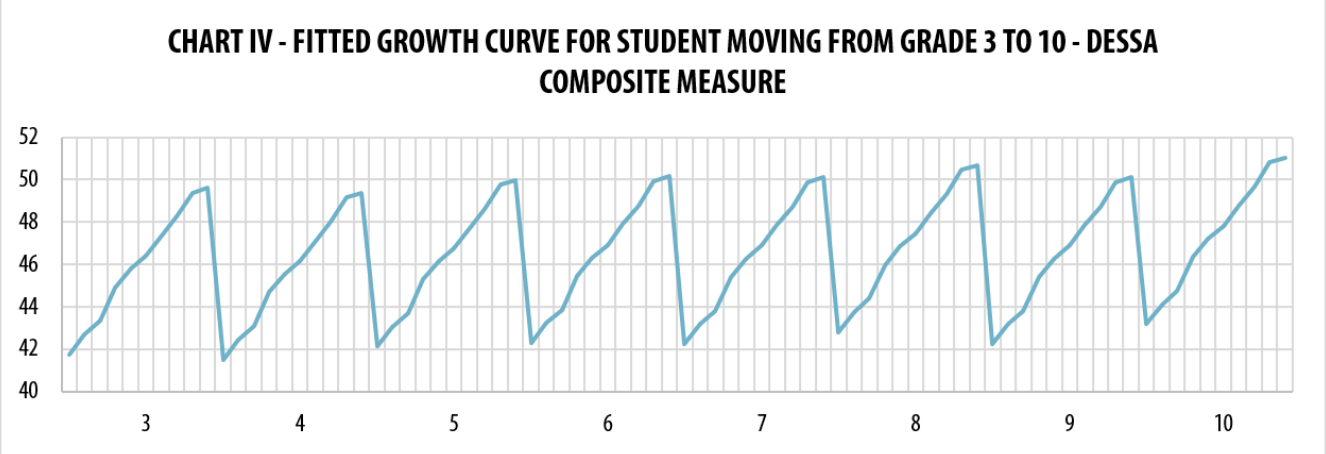
schooling, they also recover somewhat after the first year, perhaps after making some adjustments to their new environments and demands. This evidence of transitional road bumps supports past research that students struggle in the new environments and contexts of middle and high school which may not accommodate the changes they experience as they develop in early adolescence (Eccles & Midgley, 1991). The drops in social-emotional levels that they experience entering middle and high school may also pertain to transitioning to more difficult and demanding stages of schooling (Farrington, et. al., 2012).

MONTH

The largest predictor of students' social-emotional levels in our model, was the month in which they had taken the DESSA assessment. Month of the year explained roughly 15% of the variation in a student's scores over time, and the pattern of growth was a cyclical one in which students' social-emotional levels rose steadily over the course of the school year. Students' Composite DESSA scores rise on average by 7.5 points from September to June, equivalent to an extremely large effect size of 0.83. The relationship is similar in size and pattern across all eight social-emotional sub-domains. Student social-emotional levels are categorized as representing a 'Need for Instruction' when they fall between raw scores of 28 and 40, as 'Typical' between 41 and 59, and as a 'Strength' between 60 and 72. Therefore, an increase of 7.5 covers roughly half the distance between one tier and the next.

COMBINED GROWTH CURVE

Chart IV presents a fitted growth curve of the average student's social-emotional levels, based on our model combining the effects of growth over time, month of the school year, and the student's grade level at the time. The single element of the growth curve that stands out the



most is the cyclical pattern of the school year calendar by which students' social-emotional levels rise from a low point in September to a high point in June, resetting each year. Beyond this annual cycle, students' social emotional levels continue on a general and slow march upwards, rising very slowly over time. This can be seen by comparing either the peaks from each annual cycle, or the troughs (low point) of each cycle, as both rise slightly from one year to the next. ***The exceptions are grades 4, 7, and 9, where the average student's September scores are slightly lower than the previous year's as they make a transition to a different school setting.*** When all three factors are weighted against each other, students experience a very slight and modest growth in their social-emotional levels over time. In our model, the average student ends up 1.4 points higher at the end of grade 10 than they were at the end of grade 3 (ES = 0.16).

As a sensitivity test, the above model was re-tested based on a reduced sample that included only those students with data in two or more school years. One concern is that students of specific backgrounds and particular characteristics enter and exit the sample in a non-random manner at various grade levels. An example would be if the highest achieving students in our sample were to systematically leave the public school system at the transition from 8th grade to high school. The threat can be partially addressed by seeing if the results hold up when analyzed only for those students who remain in the system across multiple school years (West, et. al., 2020).

When re-tested with such a sub-sample, the above relationships all maintain their statistical significance along with the same overall patterns. Some differences are that the drops in social-emotional levels in higher grade levels are larger, such that students' social-emotional levels are roughly one point lower in grades 4-6 than in grade 3, two points lower in middle grades (7-8), and three points lower by high school (grades 9 and 10). The overall rate of growth in students' social-emotional levels is roughly 50% higher with students' scores increasing by roughly 0.62 points per year on the DESSA composite measure, as opposed to the 0.43 rate of growth in our main analysis. Lastly, the rate of growth on a monthly basis during the school year is somewhat smaller with the reduced sample, though the difference is minor (with the monthly increases shrinking by less than 10%).

LIMITATIONS

There are several limitations to these analyses that bear consideration in interpreting the results. ***The primary concern lies with the method of adult observation used for measuring students' social-emotional levels, and whether this introduces bias into the data.*** Most studies that measure students' social-emotional levels do so using student self-reports, which have their own validity concerns (Duckworth & Yeager, 2015) (West, 2016). However, our results are largely similar to those of other ***studies, in the finding that students' social-emotional levels vary substantially from one time point to another (Soland, et. al., 2019), that very little of the variation is tied to school-level factors (Soland, et. al., 2019; West, et. al. ,2018) and that they experience drops at the transitions to middle and high school (West, et. al., 2020). This helps to triangulate the evidence through different sources and methodologies and gives us some reassurance against the threat of bias.***

However, there is a specific concern regarding our finding that students' social-emotional levels experience a cyclical pattern over the course of the school year, a finding new to the field of research. The concern is that students' social-emotional levels might be increasing over school year months as the adult rater/observer gets to know the students and becomes familiar with them. As part of the City Year program, students' DESSA ratings are completed by City Year AmeriCorps members who spend the entire school year in the same schools, working with the students, providing them with support, and getting to know them better. Any future attempt to replicate this finding of students' social-emotional levels rising over the course of the school year would require the assessments to be completed by random or alternative adult observers. It is also possible that for our sample of students, their social-emotional levels are rising precisely because they are receiving support from City Year AmeriCorps members as part of the City Year program, which prior work has shown is related to higher social-emotional levels amongst students (Balfanz & Byrnes, 2020).

Another limitation of these analyses is the lack of other covariates for inclusion in our statistical models, factors such as students' background characteristics or demographics, or survey data at each time point capturing their moods or events around those occasions. Such additional information would help explain what causes an individual

student's DESSA scores to vary so much from one time point to the next, or help to explain the differences in social-emotional levels between one student and another. Such work with more detailed explanations is left for follow-up studies that might capture more information on the individual students and the time-specific conditions around each measurement of their social-emotional levels.

Along these same lines, a major limitation of these analyses is our inability to address the classroom/teacher level and how much these factors influence students' social-emotional levels and growth. Given how little school-level factors seem to contribute, combined with how much variation seems to happen between time points (within a given student), it isn't likely that teacher- or classroom-level factors would explain a lot. However, the close relationships between teachers and students could also be key influencers and moderators of those day-to-day and occasion-specific events that cause students' SEL levels to fluctuate up and down. Prior research suggests that teachers have an influence on the gains that students make on social-emotional measures between two time points (Blazar, 2018; Blazar & Kraft, 2017), finding that teachers produce estimated effects on their students' self-reported behavior in class, self-efficacy in math, and happiness in class that are similar in magnitude to effects on math test scores. Our first study, replicated in Part I of this report, also found that time spent receiving support from a City Year AmeriCorps member had an effect on students' social-emotional levels. The question remains as to how large a factor these teacher/mentor relationships are, and also how much of the variation in students' scores between time points they account for. A key step for the next phase of this work will be to make the connection between the student and school level, grouping students by their classroom or teacher, and including measure on classroom environment and teacher relationships.

DISCUSSION

The unique data set upon which the above analyses are based provides an excellent base for modeling changes in students' social-emotional levels over time. The data includes students across the elementary, middle, and high school levels. It is also quite large, including over 70,000 students from 21 different states across every geographic region in the nation. Another distinguishing characteristic is that unlike most studies that have only two outcome measurements per student (pre and post), in the City Year data sample many students have multiple observations per school year, with some having up to 14 measurements in a single year, and up 21 measurements across the three school years observed. That the sample is also a purposive one of under-resourced urban schools and students in need of additional support means that it is also representative of those schools and students typically targeted for supports and interventions by practitioners.

While past research into the trends of students' social-emotional levels over time has presented conflicting evidence, our findings can in some way help to ramify those differences. In assessing students' social-emotional levels over several grade levels as well as several years of schooling, our findings help to bring an understanding that students' social-emotional skills may in fact both increase and decrease over time, in different ways. Over the long-term, we find that students' social-emotional levels experience a slow but constant increase over and across school years. However, they do also experience drops, or declines, particularly at the start of middle school and again with high school as they transition to different and more challenging school settings. Our finding that students' social-emotional levels also experience a cyclical pattern within the course of each school year, rising from September to June, is new and requires replication in future studies. However, whether this finding bears true in future research, or proves to be an artifact of our method of measurement, it is independent from our other findings that students' social-emotional levels grow steadily over time, while experiencing setbacks at the start of middle and high school. It bears repeating that in our study, both the steady increase of students' social-emotional levels over time and the drops in middle and high school were both small in magnitude despite being statistically significant.

The largest finding from this study, both in terms of magnitude and in terms of possible impact on policy, is the finding that roughly half the variation in students' social-emotional scores was between time points. Again, this is to say that there is as much difference between the social-emotional levels of the same student at two different time points, as there is between two different students. ***This can be taken as a sign that students' social-emotional levels are influenced by aspects of environment and context that shift over time, such as relationships with teachers or peers, and that future interventions geared towards improving students' social-emotional***

levels should pay focus to these factors. The corollary is that if students' social-emotional levels are so volatile and unstable, then how are interventions to make lasting changes with students? Work with a student may raise their social-emotional levels in the short term, but how to ensure that those changes are lasting? ***They would probably require long-term changes in classroom and daily practices that provide constant reinforcement to the occasional encounters and supports.***

This last and key finding supports a model such as the City Year Whole School Whole Child approach, in which City Year AmeriCorps members support students with one-on-one and 'in the moment' interactions, while whole school efforts focus on day-in day-out classroom practices to provide constant and long-term support to students' social-emotional development. The Whole School Whole Child approach includes targeted and fairly brief activities that the students participate in, which are often developed carefully by the City Year AmeriCorps member, and that our prior analyses of City Year data found were significantly related to higher social-emotional levels amongst students (Balfanz & Byrnes, 2020). At the same time, the City Year model is equally focused on improvements in day-to-day contextual factors, such as interactions among students, teachers, and administrators that affect social-emotional development. Hough, Marsh, and McKibben (2018) found that CORE schools with above-average social-emotional scores placed emphasis on day-to-day aspects of classroom environment and student-teacher interactions designed to foster social-emotional development. Another recent study of a social-emotional intervention found that a small-scale intervention geared towards individual students was able to have a significant and substantial effect on their mindsets as well as on their course grades, but that the impacts were only sustained in schools where the classroom- and school-level contexts were similarly supportive of the intervention's goals (Yeager, et. al., 2019).

IMPLICATIONS

Taken together, the series of analyses we have been able to conduct on City Year data sets involving tens of thousands of students, in hundreds of schools that serve high poverty students across the nation in grades 3 to 10, both help begin to bring into focus how we should approach students' social-emotional development in school, in particular in low-income environments, and illuminate areas where more investigation is needed. Our initial analysis of the City Year multi-district data set, based upon 2017-18 data, led to two important findings. First, it demonstrated that large differences in a student's social-emotional outcomes are linked to academic consequences. Students who have demonstrated some struggle with schooling in the past either through their prior grades, their behaviors, or their attendance, but demonstrate substantially greater social-emotional skills, tend to improve their grades and test scores, and attend school more often over time as compared to similar students with lower levels of social-emotional competence. It is also clear, that social-emotional levels are malleable. The more time students who had struggled in the past spent with a City Year AmeriCorps member, the better their social-emotional outcomes, their grades, and their attendance. Moreover, the impact of working with a City Year AmeriCorps member was greatest for students who started with the lowest social-emotional and academic outcomes.

The most recent set of analyses focused on how social-emotional development and its relationship to academic outcomes varied over time. Taken together they show how social-emotional development operates in a fundamentally different way than academic development in large part because social-emotional development appears to be highly variable across time. Unlike academic achievement, which tends to steadily improve over time, with initial difference between students remaining relatively stable, a big finding from the City Year data set (which aligns with recent analysis of the CORE data set) is that the difference in social-emotional outcomes for an individual measured at two different time points can be as great as the differences found between two students measured at the same time. In short, students' social-emotional development goes up and down over time. This suggests that, much more so than academic outcomes, social-emotional outcomes are highly influenced by what is happening in a student's life, and their interactions with teachers, peers, parents and others at a given moment. It also indicates, if this finding holds up with further investigation, that school-based efforts to improve social-emotional outcomes will need to include a means, such as City Year AmeriCorps members, by which to be responsive to students "in-the moment" social-emotional needs, as well as a way to enable supportive teacher-to-student, and student-to-student interactions. Insights on how to do this might be found in the school connectedness literature, which shows the importance of students having a) an adult at the school who they believe knows and cares about them as a person, b) a supportive peer group, c) involvement in pro-social activities they see as meaningful, and d) a school climate that welcomes them for who they are, creating a sense of belonging, and the emerging work on creating equitable and supportive classroom environments.

Because of the size of the data set, the multiple grade levels involved (3-10), and having data over a three-year period, it was possible to identify some broad contours of how social-emotional skills develop over time. Between 3rd and 10th grade social-emotional skills do grow, but slowly and at a low rate. The growth is not linear, there are clear dips as students enter the middle grades and then high school, followed by some rebounding in 8th and 10th grade. Thus, while on average, a 10th grader will have a higher level of social emotional development than a 3rd grader, the difference is not huge, and over shorter intervals, the magnitude of grade-to-grade change, is very small compared to the magnitude of variation within individuals between two different time periods. In other words, on a given day it is not hard to find a fourth grader with higher social-emotional outcomes than an eighth grader or to find two months later that they have reversed their standings.

It does seem to be the case that, even with significant individual variation over time, large differences in social-emotional outcomes and their relationship to academic

outcomes are stable at least from one year to the next. Having low, medium, or high levels of social-emotional development in one year was predictive of better academic outcomes both in that year and the following year. This suggests that school actions and efforts that can bring about substantial social-emotional development, enough to move a student from low to medium or medium to high, do have at least some staying power, even in the face of significant up and down variation within students related to "in the moment" circumstances.

A final implication of the City Year data set analyses is that along with the findings from analysis of the CORE district data set, they indicate that growth or change in social-emotional development is going to be very difficult to measure over the time increments or in the manner we have become use to with academic achievement. Both the City Year and CORE district analyses found that status measures of social-emotional development were associated with academic outcomes, but growth or change measures between two points in time were not. Part of this could be that you need big differences in social-emotional outcomes to have academic impacts and that, in general, the year or less time periods with which we like to measure the impact of educational activities, typically has not afforded the time and effort needed to bring about big gains in social-emotional outcomes. Part of it could also be that the "in the moment" influences of social-emotional outcomes (recent interactions with teachers, peers, and parents, etc.) are by their nature highly variable, present at one data collection point but not the next, and that the magnitude of their impact is sufficient to swamp the magnitude of any shifts in more stable underlying social-emotional skill developments over the course of a year.

Altogether, this suggests, we are still very much at the beginning of the journey to understand how social-emotional development drives academic outcomes, how school conditions and actions drive social-emotional development, and how to measure and understand the impact of different solutions. Evidence that learning is both social and emotional, and that social-emotional development is malleable and can be influenced by experiences in school, opens the door to a new set of tools and approaches to improve student learning and well-being. Now we have to figure out how best to use them. In the next phase of our research, we hope to start by looking more deeply at the role and impact of City Year AmeriCorps members and the extent to which they engage, enable, or facilitate, positive developmental relationships, stronger classroom environments, direct instruction in social-emotional development, and "in the moment" supports, and the extent to which these lead to more students with big improvements in social-emotional and academic outcomes. Much of this work will center on qualitative methods such as interviews and focus groups, in order to better understand how the relationships that have been identified work, and how they can be supported to improve student outcomes.

REFERENCES

Balfanz, R. & Byrnes, V. (2020). Connecting Social-Emotional Development, Academic Achievement, and On-Track Outcomes: A Multi-District Study of Grades 3 to 10 Students Supported by City Year AmeriCorps Members. Baltimore, MD: Everyone Graduates Center, Johns Hopkins University.

Borman, G. D., Hewes, G. M., Overman, L. T., & Brown, S. (2003). Comprehensive school reform and achievement: A meta-analysis. Review of Educational Research, 73(2), 125-230. https://doi.org/10.3102/00346543073002125.

Blazar, D. (2018). Validating teacher effects on students' attitudes and behaviors: Evidence from random assignment of teachers to students. Education Finance and Policy, 13(3), 281–309. doi:10.1162/edfp_a_00251.

Blazar, D., & Kraft, M. A. (2017). Teacher and teaching effects on students' attitudes and behaviors. Educational Evaluation and Policy Analysis, 39(1), 146–170. doi:10.3102/0162373716670260.

Bloom, H. S., Hill, C. J., Black, A. B., & Lipsey, M. W. (2008). Performance trajectories and performance gaps as achievement effect-size benchmarks for educational interventions. Journal of Research on Educational Effectiveness, 1(4), 289–328. https://doi.org/10.1080/19345740802400072.

Bryk, A. S. & Raudenbush, S. W. (2002). Hierarchical Linear Models. Newbury Park, CA: Sage Publications, Inc.

Duckworth, A. L., & Yeager, D. (2015). Measurement matters: Assessing personal qualities other than cognitive ability for educational purposes. Educational Researcher, 44(4), 237–251. doi:10.3102/0013189X15584327.

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. Child Development, 82(1), 405–432. doi:10.1111/j.1467-8624.2010. 01564.x.

Dweck, C., Walton, G. M., & Cohen, G. L. (2011). Academic tenacity: Mindset and skills that promote long-term learning. Seattle, WA: Bill & Melinda Gates Foundation.

Dynarski, S. M. (2017, August 10). For better learning in college lectures, lay down the laptop and pick up a pen. The Brookings Institution. https://www.brookings.edu/research/for-better-learning-in-college-lectures-lay-down-the-laptop-and-pick-up-a-pen/.

Eccles, J.S., Lord, S., and Midgley, C. (1991) What are we doing to early adolescents? The impact of educational contexts on early adolescents. American Journal of Education, 99(4), 521-542.

Farrington, C. A., Roderick, M., Allensworth, E., Nagaoka, J., Keyes, T. S., Johnson, D. W., & Beechum, N. O. (2012). Teaching adolescents to become learners: The role of noncognitive factors in shaping school performance – A critical literature review. Chicago, IL: Chicago Consortium on School Research, University of Chicago.

Hanushek, E. A., Woessmann, L., & Peterson, P. E. (2012). Is the US catching up? International and state trends in student achievement. Education Next, 12(4), 25-33. https://www.educationnext.org/is-the-us-catching-up/.

Hough, H., Marsh, J., & McKibben, S. (2018). Enacting social-emotional learning: Lessons from "outlier schools" in California's CORE districts. Stanford, CA: Policy Analysis for California Education (PACE).

LeBuffe, P.A., Shapiro, V.B., & Naglieri, J.A. (2014). Devereux Student Strengths Assessment (DESSA): A Measure of Social-Emotional Competencies of Children in Kindergarten through Eighth Grade. Charlotte, NC: Aperture Education.

Lipsey, M.W., Puzio, K., Yun, C., Hebert, M.A., Steinka-Fry, K., Cole, M.W., Roberts, M., Anthony, K.S., Busick, M.D. (2012). Translating the statistical representation of the effects of education interventions into more readily interpretable forms (NCSER 2013-3000). Washington, DC: National Center for Special Education Research, U.S. Department of Education. http://ies.ed.gov/ncser/.

Snijders, T. A. B. & Bosker, R. J. (1999). Multilevel Analysis. Thousand Oaks, CA: Sage Publications, Inc.

Soland, J., Kuhfeld, M., Wolk, E. & Bi, S. (2019). Examining the State-Trait Composition of Social-Emotional Learning Constructs: Implications for Practice, Policy, and Evaluation. Journal of Research on Educational Effectiveness, 12:3, 550-577, DOI: 10.1080/19345747.2019.1615158.

Soland J, & Kuhfeld M. (2021). Identifying students who are off-track academically at the start of secondary school: The role of social-emotional learning trajectories. British Journal of Educational Psychology, (October 2021), 29:e12463. DOI: 10.1111/bjep.12463.

U.S. Department of Education, Institute of Education Sciences. (2014). What Works Clearinghouse: Procedures and standards handbook version 3.0.

West, M. R., Kraft, M. A., Finn, A. S., Martin, R. E., Duckworth, A. L., Gabrieli, C. F. O., & Gabrieli, J. D. E. (2016). Promise and paradox: Measuring non-cognitive traits of students and the impact of schooling. Educational Evaluation and Policy Analysis, 38(1), 148–170.

West, M. R., Pier, L., Fricke, H., Hough, H., Loeb, S., Meyer, R. H., & Rice, A. B. (2018). Trends in student social-emotional learning: Evidence from the CORE districts. Policy Analysis for California Education (PACE).

West, M. R., Pier, L., Fricke, H., Hough, H., Loeb, S., Meyer, R. H., & Rice, A. B. (2020). Trends in student social-emotional learning: Evidence From the First Large-Scale Panel Student Survey. Education Evaluation and Policy Analysis, Vol. 42, No. 2, pp. 279-303. DOI: 10.3102/0162373720912236 https://doi.org/10.3102%2F0162373720912236.

Yeager, D. S., & Walton, G. M. (2011). Social-psychological interventions in education: They're not magic. Review of Educational Research, 81(2), 267–301. doi:10.3102/0034654311405999.

Yeager, D.S., Hanselman, P., Walton, G.M. et al. A national experiment reveals where a growth mindset improves achievement. Nature 573, 364–369 (2019). https://doi.org/10.1038/s41586-019-1466-y.

ACKNOWLEDGMENTS

This report is based on research funded by (or in part by) the Bill & Melinda Gates Foundation. The findings and conclusions contained within are those of the authors and do not necessarily reflect positions or policies of the Bill & Melinda Gates Foundation.

We would like to acknowledge the efforts of the staff at City Year in providing the data used for conducting this research, as well as thank them for their continued support throughout the project in working with that data and in providing more information about how City Year's program is implemented in schools throughout the nation.

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