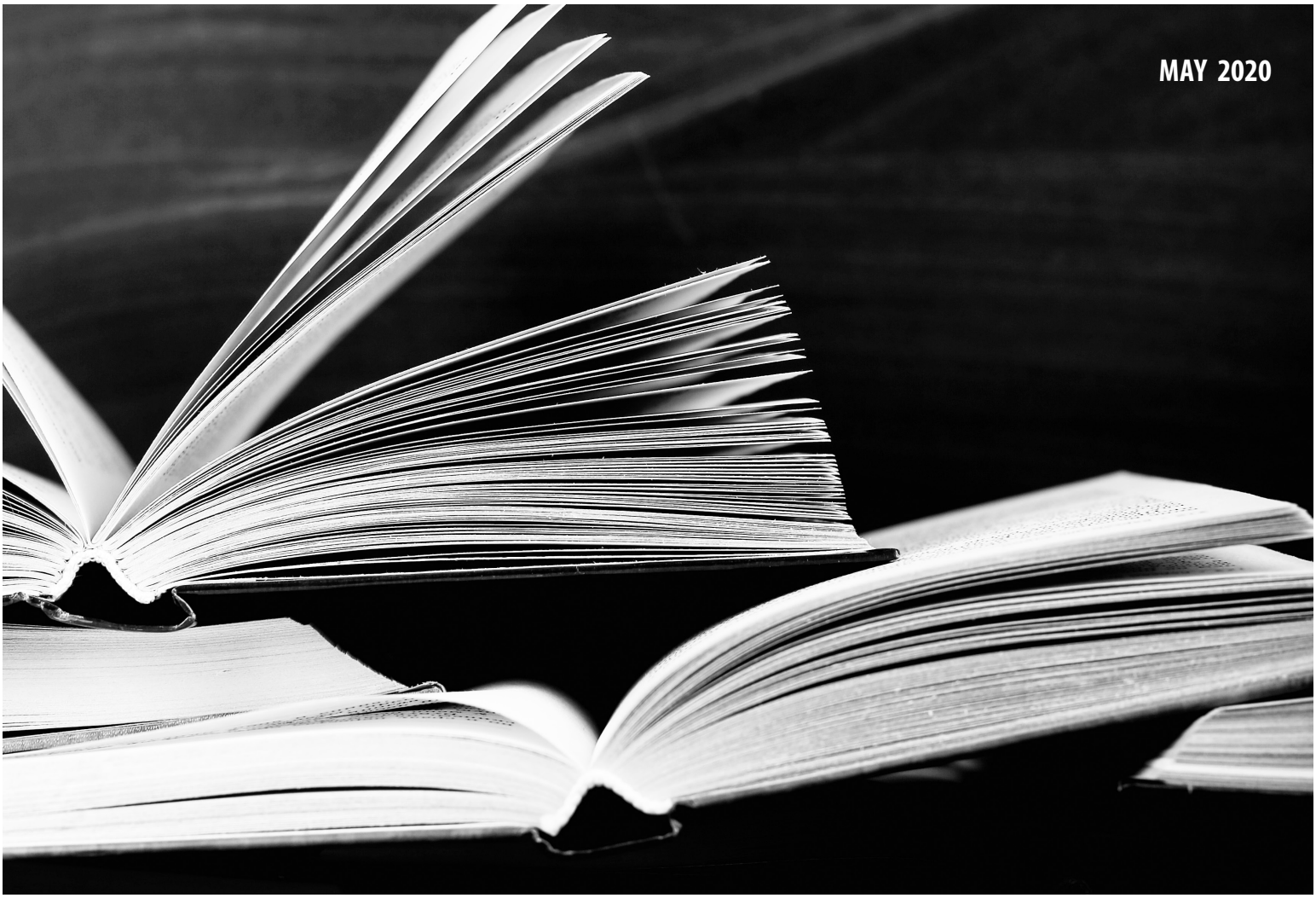
CONNECTING SOCIAL-EMOTIONAL DEVELOPMENT, ACADEMIC ACHIEVEMENT, AND ON-TRACK OUTCOMES:

A MULTI-DISTRICT STUDY OF GRADES 3 TO 10 STUDENTS SUPPORTED BY CITY YEAR AMERICORPS MEMBERS



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EXECUTIVE SUMMARY

There is a growing understanding that an integrated approach to social, emotional, and academic development provides the best path toward ensuring all students graduate from high school prepared for postsecondary and adult success. Recent findings from the Aspen Commission and the Science of Learning and Development Project show that social and emotional factors interact with cognitive actions to shape learning experiences.

Social-emotional learning concepts began to draw considerable interest in the field of education in the first decade of the 2000s, with much of the discussion centered around concepts of perseverance such as 'grit' and 'tenacity'. Reviews and meta-analyses of the many smaller studies conducted this decade and before indicate that increases in social-emotional skills can lead to improved academic outcomes.

The role social-emotional learning can play in educational advancement moved from individual school or school district efforts to more broad-based efforts in 2013 when the California Office to Reform Education (CORE) districts, a consortium of nine school districts in California that serve over one million students in more than 1,500 schools, decided to integrate measures of students' social-emotional skills directly into school accountability metrics. Many of the recent studies on the relationship between students' social-emotional skills and their academic outcomes have been based on the analyses of the CORE data. These studies continue to find evidence that strengthening social-emotional skills leads to improved attendance, behavior, and test scores amongst students; and further, that students' social-emotional skills can be influenced by the schools they attend.

With a few notable exceptions, including the CORE analyses, work done by the Collaborating Districts Initiative, and the recent national study of growth mindset, which have been based on large samples, most studies of social-emotional learning have been small in scale. They have also employed varying conceptualizations of what social-emotional skills are and a wide assortment of tools for measuring them, and different measures of academic outcomes. The following study is one of the first to examine the connections between social-emotional skills and multiple measures of education outcomes (attendance, course grades, and achievement tests) on a large scale, employing a multi-state and city, multi-grade (3 - 10) dataset that includes elementary, middle, and high schools. The main dataset includes 38,131 students in grades 3 through 10 , attending 326 schools in 28 cities spread across 20 different states. It also includes data from three different tools used to measure students' social-emotional skills: the Holistic Student Assessment (HSA), the Devereux Students Strengths Assessment (DESSA), and a measure of Growth Mindset (GMS).

There are two other unique features of this data set. All of the collected data is from students who attend schools with high poverty rates and who, through their attendance, behavior, or course grades, signaled that they were on course to fall off the path to high school graduation. As a result, all of the students in the data set received supports from City Year Americorps members, including tutoring, mentoring, and near-peer supportive relationships.

Thus, unlike the few other large-scale studies of the connection between social-emotional development and academic outcomes, this study is the first large-scale attempt to look at an effort to support the students most in need of additional supports to succeed in school with a human-centered, relationship-driven approach. Nearly all prior studies of social-emotional development and education outcomes have examined the impact of curricular approaches, a prescribed set of lessons or experiences, or the broader impact of a school's climate.

Using this unique dataset, available through City Year, we aim to further the evidence base regarding the link between social-emotional skills and academic outcomes.

City Year, an education non-profit founded in 1988, 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. City Year's Whole School Whole Child (WSWC) approach is informed by three decades of human development experience dedicated to cultivating lifelong dispositions for civic and community engagement. AmeriCorps members partner with class-

(continued on page 5)

KEY FINDINGS IN THE STUDY INCLUDE:

1

Students' levels of **SOCIAL-EMOTIONAL SKILLS ARE NOT FIXED POINTS** but do in fact vary over the course of time and schooling.

2

Results found **STATISTICALLY SIGNIFICANT AND CONSISTENT RELATIONSHIPS BETWEEN STUDENTS' SOCIAL-EMOTIONAL SKILLS AND THEIR ACADEMIC OUTCOMES**. The effects of moving students' SEL skills either from a Need for Instruction to a Typical level, or from a Typical level to an area of Strength, range from 0.08 to 0.42 in terms of effect sizes, with many ranging between one quarter to one third of a standard deviation (0.25-0.33). Effects of such sizes are considered to be large and substantial shifts in the context of comprehensive school reform and student achievement. To illustrate the magnitude of these impacts, multiple studies have estimated such effect sizes as the equivalent of an entire school year of academic achievement growth in mathematics or English for students in grades 3-10. Another method of translating the practical importance of effect sizes is the What Works Clearinghouse's "Improvement Index," which weighs effect sizes in the 0.25-0.33 range as equivalent to raising the average student by 10-13 percentile points. Further, a student who moves from an area of Strength to merely Typical, or from Typical to a Need for Instruction, is roughly twice as likely to be have low attendance, receive a low course grade, or receive a low test-score.

3

The findings affirm that **STUDENTS' SOCIAL-EMOTIONAL LEVELS ACCOUNT FOR A SUBSTANTIAL AMOUNT OF THE VARIATION IN THEIR ACADEMIC OUTCOMES**, an impact comparable to that of their family background. This tells researchers and practitioners that addressing students' social-emotional skills is a viable path to improving their academic outcomes.

4

Also, the **MORE HOURS STUDENTS SPENT WORKING WITH A CITY YEAR AMERICORPS MEMBER, THE LESS LIKELY THEY 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 their overall social-emotional skills was between .06 and .08. According to the WWC's improvement index, this is equivalent to moving the average student up 2-3 percentiles in the population's distribution of SEL skills.

5

The analyses revealed that **THE MORE HOURS A STUDENT SPENT RECEIVING SUPPORT FROM A CITY YEAR AMERICORPS MEMBER IN EITHER ENGLISH OR MATH, THE HIGHER WERE THE STUDENT OUTCOMES – IN NOT ONLY THE RELATED SUBJECT, BUT ALSO IN ATTENDANCE.** For students who received the median number of hours of support from a City Year AmeriCorps member for English or math, the related increase in their course grade would be 0.1, equivalent to one tenth of a grade level (A-F) and an effect size of 0.08-0.09. The effect can be translated to roughly 2-4 months of learning in academic achievement growth, and an improvement index gain of 3-4 percentiles. Further, the more hours a student received support in a subject, the less likely he or she was to be off-track either in that course or attendance at school. Students receiving the median amount of support from a City Year AmeriCorps member would also be 42% less likely to be off-track in English class (odds-ratio = 0.58) and one-third less likely to be off-track in math class (odds-ratio = 0.66).

6

Lastly, results found that **THE LOWER A STUDENT'S PRIOR ACADEMIC OR SOCIAL-EMOTIONAL LEVEL WAS, THE STRONGER THE RELATIONSHIP BETWEEN THE CITY YEAR INTERVENTION** and that student's spring outcomes. In other words, the students who began with the lowest attendance rates or course marks, 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.

room teachers and school principals to employ a holistic and positive approach that integrates the academic with the 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 progress of individual students. In 2018-19, 3,000 City Year AmeriCorps members served in 350 schools in 29 communities across the United States.

In addition to providing data from its network of schools that includes both student academic data and measures of students' social-emotional skills, City Year also provided some rough measures of its program's implementation and engagement with individual students. Using this information on the amount of time City Year AmeriCorps members spent with students, our study also examines whether more time with a City Year AmeriCorps member is associated with improved student outcomes, both academic and social-emotional. By exploring the organized effort to improve student outcomes through the City Year AmeriCorps program, the study aims to deepen our understanding of practitioners' abilities to both affect social-emotional skill development amongst students and improve their academic outcomes.

City Year primarily partners with systemically 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 we have data, are those that teachers have identified as struggling in one or more areas (math, English, attendance, behavior). Thus, the sample is not representative of the national population of schools and students; we cannot assume that any of the exploratory 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 needing support in order to raise student outcomes. Therefore, the patterns highlighted below between students' socio-emotional learning levels and academic outcomes are likely to be representative of the sub-populations that public and non-profit organizations are most interested in supporting. While the City Year data clearly focuses on specific sub-populations, its large sample size and its inclusion of both academic records and measures of social-emotional skills provides an excellent opportunity to examine evidence on the relationship between students' social-emotional development and their academic behaviors and outcomes.

In summary, the study's findings show a significant and substantial relationship between students' social-emotional skills and academic outcomes across grades 3 to 10 in multiple states and districts. Further, available implementation data for the City Year program suggests that human-centered, relationship-focused, school-based interventions can be successful on a wide scale in developing students' social-emotional skills, as well as their academic outcomes. The results show that the more time a student spent working directly with a City Year AmeriCorps member, the greater the student's social-emotional skills; students with stronger social-emotional outcomes obtained greater academic outcomes in terms of course grades, achievement tests, and predictive indicators of high school graduation. Taken together, these points further validate City Year's Whole School, Whole Child approach, show that human-centered, relationship-driven approaches to social-emotional development may be as, if not more, impactful than curricular or programmatic approaches. The results also support policymakers' efforts to adopt and support social-emotional development as a part of basic K-12 education. Not only are social-emotional outcomes important for students' educational success, but they are susceptible to change through the investment of school practitioners and community partners.

These findings, moreover, 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 at a range of high-needs schools within high-needs school districts: the very settings whose populations struggle the most and where support is typically focused. These results intensify the call to action for educators and policymakers to support the expansion and integration of social-emotional development in schools across the nation.

"THERE IS A GROWING UNDERSTANDING THAT AN INTEGRATED APPROACH TO SOCIAL, EMOTIONAL, AND ACADEMIC DEVELOPMENT PROVIDES THE BEST PATH TOWARDS ENSURING ALL STUDENTS CAN GRADUATE FROM HIGH SCHOOL PREPARED FOR POST-SECONDARY AND ADULT SUCCESS."

~ASPEN INSTITUTE, 2019

INTRODUCTION

"There is a growing understanding that an integrated approach to social, emotional, and academic development provides the best path towards ensuring all students can graduate from high school prepared for post-secondary and adult success" (Aspen Institute, 2019). This is supported by the science of learning, which shows that social and emotional factors interact with cognitive actions to shape learning experiences and outcomes (Immordino-Yang, Darling-Hammond, & Krone 2018). In short, social-emotional and environmental factors can either impede or enable the effort, focus, and time that learning requires (Cantor, et al., 2018).

These findings from the Aspen Commission and the Science of Learning and Development Project suggest that there is a connection between social-emotional outcomes and academic achievement, as traditionally measured by schools through course grades and standardized tests. A counter-argument is that social, emotional, and academic skills may all be important to adult success, but may operate independently of each other (Whitehurst, 2019). For example, interpersonal relations and perseverance can play substantial roles in enabling educational attainment without having a direct impact on achievement test scores.

Most existing studies on the relationship between students' social-emotional skills and their academic outcomes have focused on small samples of students and schools, and on a sub-set of grade levels. Moreover, they have mainly examined curricular or programmatic efforts to improve social-emotional outcomes in which students are taught a series of lessons or engaged in a planned set of activities. These studies have also employed varying conceptualizations of what social-emotional skills are and a wide assortment of education outcome measures (Hart et al. 2020). When the main effects of these studies are brought together in meta-analysis, we see evidence of a connection between social-emotional skills broadly defined and academic outcomes, but are not able to parse many details (Durlak, et al., 2011; Taylor, et al., 2017, Corcoran et al. 2018). Finally, when only studies based on high quality randomized control trials are examined, more mixed impacts are found (Jones et al. 2017).

Recently, a few studies have begun to look at the relationship between social-emotional development and academic outcomes on a larger scale across multiple school districts: most notably, the analyses of the California Office to Reform Education (CORE) data, the Collaborating Districts Initiative (AIR, 2015) and the national study of growth mindsets "(Yeager, Hanselman, Walton, et al., 2019).To date, much of the analysis of the CORE data conducted by the Policy Analysis for California Education (PACE) center and by Panorama Education have found evidence that stronger social-emotional skills are associated with improved attendance, better behavior, and higher test scores among students, and further, that students' social-emotional skills can be influenced by the schools they attend (West, 2016; West et al., 2016; West et al., 2018; Panorama, 2018, Claro & Loeb, 2019; Claro & Loeb, 2019b). The Collaborating Districts study found that the systemic implementation of SEL at the district level led to improvements in school climate, reductions in exclusionary discipline, and consistent improvements in student achievement across subjects.

Despite a wave of recent research to match the growing interest in SEL skill development, questions remain about which social and emotional skills are most critical to students' school success and life success; how best to measure the development of such skills; whether skill development can be affected by educators' efforts; and what types of educator actions are most impactful, for which types of social-emotional skills and outlooks? Empirical answers to whether, how, and which social-emotional skills operate to advance student academic success and how best to develop them are, in part, awaiting datasets of sufficient size and breadth to enable analysis of multiple factors and complex relationships across varied school environments.

This study is one of the first to examine the connections between social-emotional skills and measures of academic outcomes on a large scale, employing a multi-state and city, multi-grade dataset. The dataset includes data for 38,131 students in grades 3 through 10 attending 326 schools in 28 cities spread across 20 different states.

THE GROWING RELEVANCE OF SOCIAL-EMOTIONAL LEARNING IN THE FIELD OF EDUCATION

Long studied in the field of psychology, social-emotional learning (SEL) concepts began to draw considerable interest in the field of education in the first decade of the 2000s (Farrington, et. al., 2012). Much of the discussion centered around the works of psychologists Angela Duckworth and Carol Dweck indicating that SEL skills could be predictive of student outcomes; it initially focused largely on concepts of perseverance, such as 'grit' and 'tenacity' and growth mindset or the importance of believing that academic outcomes are not determined by fixed aptitudes but could be improved through effort (Dweck, 1999; Duckworth & Seligman, 2005; Dweck, 2006; Duckworth, et. al., 2007; Dweck, Walton, & Cohen, 2011). Reviews and meta-analyses of the many smaller studies conducted during this decade and before of largely curricular and programmatic efforts to improve social-emotional development indicated that: increases in social-emotional skills do lead to improved academic outcomes amongst students (Farrington, et. al., 2012), but just as importantly, interventions designed to increase students' SEL levels have the desired effect of increasing their course grade and achievement levels in tandem (Durlak, et. al., 2011).

This era also say the development of a growing number of frameworks, to organize social-emotional skills into an integrated set of components. Most notably, the CASEL framework. (CASEL, 2019)

The intersection of social-emotional learning research and the wider adoption of social-emotional development in the field of education shifted and accelerated in 2013 when the CORE districts, a consortium of nine school districts in California that serve over one million students in more than 1,500 schools, decided to integrate measures of students' social-emotional skills directly into school accountability metrics. At that time, six of the CORE districts received a waiver from the U.S. Department of Education to include a non-achievement-based component in their school accountability metric. While this component is based largely on disciplinary incidents, attendance, and measures of school climate and culture, the districts also piloted a student survey to capture measurements of students' SEL skills, with an eye to eventually incorporating this as a component in their school accountability system. Designed in partnership with Transforming Education and Panorama Education, the SEL survey used in the CORE districts targeted four conceptual social-emotional areas: self-management; social awareness; self-efficacy; and growth mindset. Given the size of the CORE district's student population, the survey represented the first large-scale collection of social-emotional learning data. Efforts to more formerly integrated social-emotional development into educational practice, which began in the CORE districts and Illinois which was the first state to adopt state-wide SEL standards, has subsequently spread nationwide, with x states now having established state SEL standards.

A series of nationally representative surveys conducted on behalf of the Collaborative for Academic, Social, and Emotional Learning (CASEL) found that students, principals, and teachers all believe in the inherent value of social-emotional skills, recognize that these play a key role in supporting student achievement, and believe that SEL skills should be integrated into schooling through curriculum and accountability (Bridgeland, et. al., 2013; DePaoli, et. at., 2017; DePaoli, et. at., 2018; Atwell & Bridgeland, 2019). Despite their belief in the value of SEL skills and their desire to adopt them, principals and teachers also indicated in the survey that they wanted more evidence of the link between SEL skills and student outcomes, and more guidance on how to incorporate them into everyday school practices and teaching.

The current study seeks to address these questions by examining the connection between SEL development and a range of student academic outcomes, including course grades, test scores, and predictive indicators of

educational attainment, in elementary, middle and high schools (grade 3 to 10) across multiple states and school districts. It also explores the organized effort to improve SEL outcomes through the City Year AmeriCorps program and aims to deepen our understanding of practitioners' abilities to both affect SEL skill development in students and, in turn, improve their academic outcomes. A unique feature of this study, is that the SEL supports provided by City Year corps members, are not done primarily via the delivery of a curriculum or program, but rather a human-centered, relationship driven approach to provide customized skill development and at the right time supports consistently over the school year. As such it offers potentially a third way, along with curricular/programmatic approaches and efforts to integrate SEL into academic course instruction and classroom and school climates, to develop the social-emotional skills and outlooks we find are important to school success.

CITY YEAR'S WHOLE SCHOOL WHOLE CHILD APPROACH AND THEORY OF CHANGE

City Year, an education non-profit founded in 1988, places a team of eight to fifteen diverse AmeriCorps members in systemically under-resourced K-12 urban elementary, middle, and high schools, where they serve full-time as near-peer tutors, mentors, and role models. The AmeriCorps members partner with classroom teachers and school principals to employ a holistic and positive approach that integrates the academic with the social-emotional (SEAD) and places developmental relationships at the center of the practice. There is an equal emphasis on social-emotional mindset and skill development, the creation of a whole-school learning environment and directly supporting the progress of individual students. In 2018-19, 3,000 City Year AmeriCorps members served in 350 schools in 29 communities across the United States.

AmeriCorps members apply a consistent asset-based lens and purposefully promote authentic relationships, integrated academic and social-emotional growth, and increased student motivation and engagement. AS the critical mass of the AmeriCorps cohort uses research-based strategies and curricula to reinforce these conditions throughout the school day and after school, students are better able to make academic and social-emotional strides, reach responsible decisions, construct meaning from their experiences, reflect on their identity and learning, and feel a sense of safety and belonging.

One example of a theoretical framework that City Year AmeriCorps members use to maintain this positive developmental mindset and apply it to everyday practice is the Clover Model from the PEAR Institute. The Clover Model highlights four essential elements, or leaves, that people of all ages need in order to thrive, learn, and grow: Active Engagement, Assertiveness, Belonging, and Reflection. The model posits that, although there are key times during childhood and young adulthood for specialization across the four leaves, a person's development is dynamic and recursive over the lifespan. City Year AmeriCorps members apply this lens to student interactions, learning environment creation, academic and social-emotional instructional practices, and individual and group engagement. This positioning offers a consistent alternative way to interpret student behaviors and address the needs associated with them. For instance, instead of labeling fourth grade student Alice as "fidgety and unable to control her body," AmeriCorps member Dan could reframe Alice's behavior as indicative of her "having a strong need for active engagement." He would then change his pedagogical and interpersonal practice with her to include frequent physical breaks and lessons beginning with an active game or a walk and talk.

City Year's services are, by design, comprehensive. Not only do AmeriCorps members support small group instruction and provide whole-school events and after-school programs for all students, they also work regularly with and monitor performance for students on "focus lists."

These are students who are recommended by their teachers for intervention because they exhibit one or more "early-warning indicators" (Bruce, et al., 2011) that place them at increased risk of dropping out: low attendance, poor behavior/social-emotional skills, or course failure in English or mathematics. City Year measures its social-emotional development work using the Devereux Student Strengths Assessment (DESSA), a standardized, observational, strengths-based assessment of student competencies. City Year AmeriCorps members are also starting to administer the Holistic Student Assessment (HSA), a data-driven tool that captures students' perceptions of their own social-emotional growth, school experience, resiliencies, and engagement.

Guided by this data, City Year provides customized supports to ensure student and school success such as tutoring in academics or social-emotional skill development,

building relationships that help students stay engaged in class, organizing school-wide events that foster a positive culture and climate, and running after-school programs that both reinforce the core curriculum and expose students to expanded curricular options and potential career tracks.

City Year's Theory of Change assumes that these holistic, integrated services and intentional formative learning events, delivered in a positive and developmentally appropriate environment by near peers, lead to student identity formation, sense of agency, and durable skills.

IDENTITY FORMATION: Students develop a self-narrative about who they are as learners and leaders and the meaning they've gained from their experiences

AGENCY: Students believe in their ability to succeed, advocate for themselves, and become agents of change in their schools and communities

DURABLE SKILLS: Students develop durable and integrated social-emotional and academic skills, skills that fuel their identity formation and sense of agency and set the stage for more complex learning and career choices

City Year AmeriCorps members are key members of a network of caring adults in schools who are dedicated to ensuring students are prepared for college, career, and civic success. As students engage in experiences that help them construct a narrative about who they are and what their place is in their community, they also know that they matter, feel a sense of personal efficacy, and can confidently grow their foundational skills. Students are then equipped to access the grade-level core curriculum and are prepared to successfully graduate from high school and navigate college and career. By gaining confidence through skill acquisition, and self-assurance through learning and making meaning of their lived experiences in community and supported by a City Year AmeriCorps member, the aim is to better position students to succeed through an integrated development of their social, emotional, and academic competencies.

DATA SAMPLE

For this study, City Year provided access to data from the 2017-18 school year for 38,131 students from 326 schools across the nation. Students ranged from grades 3-10, and attended elementary, middle, and high schools in 28 school districts across 20 different states. As described above and seen in the descriptive statistics in Table 1, City Year primarily partners with schools in large urban school districts that predominantly serve students of color and students from low-income backgrounds[1]. Within those schools, the students who received support as part of City Year's program, and for whom we have data, are those that teachers identified as struggling in one or more areas (math, English, attendance, behavior) and requested that they be placed on a focus list. Thus, the sample is not representative of the national population of schools and students; we cannot assume that any of the exploratory results presented in this report will hold true for all students, or even students who attend schools City Year Partners with, however, since City Year works with the high schools with the lowest graduation rates and the elementary and middle schools that feed into them, this large sample of convenience is also a very functional one, representing the types of schools and students that state and federal agencies most typically identify as needing support to improve student outcomes. Therefore, the patterns found between students' socio-emotional development levels and academic outcomes are likely to be representative of the subpopulations that public and nonprofit organizations are most interested in supporting. While the city year data clearly focuses on specific sub-populations, its large sample size and its inclusion of both academic records and measures of social-emotional skills provide an excellent opportunity to examine evidence on the relationship between students' social-emotional development and their academic behaviors and outcomes.

[1] The sites with which City Year partnered with for the 2017-18 school year are predominantly large urban city areas, including: Little Rock (AR); Los Angeles, Sacramento, San Jose (CA); Denver (CO); Washington (D.C.); Jacksonville, Miami, Orlando (FL); Chicago (IL); Kansas City (KS); Baton Rouge, New Orleans (LA); Detroit (MI); Columbia (MO); Manchester (NH); New York City (NY); Cleveland, Columbus (OH); Tulsa (OK); Philadelphia (PA); Providence (RI); Memphis (TN); Dallas, San Antonio (TX); and Seattle (WA).

TABLE 1 – SAMPLE DESCRIPTIVES FOR SCHOOLS AND DISTRICTS IN CITY YEAR DATA SET

	SCHOOLS	DISTRICTS
N	*326*	*51*
CHARTER	8%	-
ELEMENTARY	49%	-
MIDDLE	25%	-
HIGH	24%	-
OTHER/OVERLAPPING	2%	-
FREE/REDUCED LUNCH ELIGIBLE	88%	
ASIAN	3%	5%
HISPANIC	38%	28%
BLACK	50%	53%
WHITE	6%	13%
OTHER	3%	3%
SPECIAL EDUCATION	-	15%
ENGLISH-LANGUAGE-LEARNER	-	12%
AVERAGE ENROLLMENT	661	60,275
AVERAGE NUMBER OF SCHOOLS	-	102

Data obtained from 2016-17 Common Core of Data (CCD)

ACADEMIC OUTCOMES

Within the City Year data set, measures of students' academic outcomes include attendance rates (0-100%), English and math course grades (A-F; 0-4); and math and English achievement (raw test scores). 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 attendance purposes, students are considered on track if their attendance rates are at 90% or above, sliding if their attendance is between 80-89%, and off-track if their attendance rates are below 80%. For course outcomes, students are on track if their mark is a "C"or higher, sliding if their mark is a "D", and off track if they are failing the course. For achievement outcomes coding, each implementation site uses publisher's guidelines for the assessment employed to identify cut-of scores indicating students are below, at, or above grade level. For students' math and English achievement outcomes, the assessments given to students participating in City Year programs vary widely among schools, and even within grade levels in a single school. In some cases, sample sizes were too small to create standardized (or sample normed) scores for each test and grade level. Therefore, for achievement outcomes, we analyze only the ordinal measures where students were identified as on or off track.

For each outcome measure, a prior measure from either the prior school year or from the fall is used as a co-variate, helping to address any selection bias inherent in this purposive sampling of students by controlling for students' initial attendance and academic levels at the start of the year. One caveat to the dataset is that student outcome data is only available for students who were on that indicator's focus list in terms of City Year programming and support. Therefore, while the overall sample includes data for over 38,000 students, the analyses for each set of outcomes are smaller (Math – 15,187 total students; English – 18,923; Attendance – 9,517; Behavior/Social-Emotional – 11,979) and based largely on independent subsamples (only 364 students appear on all four focus lists).

SOCIAL-EMOTIONAL MEASURES

The primary measure of students' social-emotional learning (SEL) skills is their score on the Devereux Student Strengths Assessment (DESSA), which was administered to almost all students in the sample (30,043 students in fall, and 24,433 in winter/spring). The DESSA, a norm-referenced behavior rating scale, includes information for eight separate SEL competency areas as well as an overall composite measure (LeBuffe et al., 2014). Raw scores range from 28-72, while categorized 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. Thus, the higher a student scores in a DESSA category, the worse we would expect academic outcomes to be, if there is a relationship between SEL levels and academic outcomes.

The DESSA covers the social-emotional competency areas identified as most important by CASEL: self-awareness, self-management, social awareness, relationships, decision making, and responsibility, among others. With the exception of growth mindset, the DESSA competency areas also overlap with those found on the CORE assessments and CASEL surveys. 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 SEL measures are based on student self-assessments.

DEMOGRAPHICS

For the main City Year sample, no demographic data was available outside of gender, age, and English Language Learner (ELL) status; even these were only available for a sub-sample of school districts. Since gender and ELL status were available for so few students, and age correlates very highly with students' grade level, which is available for all students, no demographic measures are included in the analyses below as covariates. While the primary sample and analyses lack demographic data, a secondary sample from the 2018-19 school year for one school district alone included the key academic and SEL measures as well as demographic information such as ELL status, gender, race and age. Though not as robust a sample, analyses of this secondary data set, it enabled us to re-examine any variation in the relationship between SEL skills and academic outcomes, based upon students' demographic characteristics.

IMPLEMENTATION DATA

Through City Year's internal data collection efforts, some supplemental data on implementation is also available in three different formats. For students who were placed on the English, mathematics or behavior focus lists, implementation is measured in terms of the number of one-on-one hours of support they received from an AmeriCorps member. For students placed on a behavior for attendance focus list, records show the number of days they remained on those lists. Lastly, for students on the behavior focus list, records show the number of minutes they spent working with AmeriCorps members on specific SEL skills. None of these measures is ideal. The number of days a student spent on a focus list is as representative of their level of need as it is of the amount of support they received. The number of hours of direct one-on-one support from an AmeriCorps member does not capture the AmeriCorps members' involvement in students' regular classroom, after-school activities, or other school-wide aspects of the City Year program. However, these proximal measures of the amount of one-on-one time each student spent with a corps member, or dosage, allow us to tentatively explore the relationship between a key aspect of City Year's Whole School Whole Child approach and students' academic outcomes and social-emotional learning levels. In so doing, it may also provide insight into the impact of human-centered, relationship driven approach to improving SEL outcomes and enable comparisons with curricular and learning climate approaches.

COMPASS ACADEMY SUB-SAMPLE

Also available for analysis is a separate, supplementary data set that includes only students from a single school, Compass Academy in Denver, Colorado. While smaller in size, this sample allows to explore questions the larger data set cannot answer. These include testing the results of the larger study, with a data set which

a) enables , us to conduct longitudinal analyses, observing the measurement of students' academic out- comes and social-emotional skills over time,

b) add a wide range of demographic controls into the analyses, and

c) examine impacts of SEL development on academic outcomes using different measures of social-emotional skills and outlooks.

Compass Academy is a middle school serving students in 6th-8th grades that partners with both City Year and the Center for Social Organization of Schools (CSOS) at Johns Hopkins University. Although Compass is a part of the larger City Year network and is included in our primary analytic sample, the school's special partnership with City Year and CSOS involves a more in-depth collection of student data, providing a richer set of information based on more years of observation. The sample includes data for 6th graders in 2015-16, 6th and 7th graders in 2016-17, and 6th-8th graders in 2017-18: a total of 661 annual measurements for 338 unique students, 88 of whom were tracked longitudinally across all three years of middle school (97 students have data for two years, and another 203 students have only one year of observed data).

This outcome data includes students' attendance rates and math and English achievement scores on the Colorado annual state assessment (during the data collection period, a faithful replication of the PARCC assessment), including both pre- and post-measurements. The data set's also provides student demographics, including: race; special education status; English Language Learner status;

gifted status; and gender. While students' eligibility status for the federal Free/Reduced Lunch program is also available, it is missing for some students; almost all observed students were eligible (95%). Given the missing data and the near-total uniformity of the available data, it is not included in analyses below.

Measures of students' social-emotional skills, the Compass Academy data includes fall and winter Holistic Student Assessment (HSA) scores. Like the DESSA, the HSA is a norm-referenced rating scale that includes raw scores as well as tiered/category scores for 14 competency areas along with an overall composite measure (Allen et. al., 2017). The Compass Academy data also includes growth mindset (GMS) scores for only the 2017-18 school year. Growth mindset, based largely on the work of Carol Dweck (2006), captures a student's belief that abilities (intelligence or talent) are not predetermined but can change over time through effort and challenge. For Compass Academy, the concept was measured through students' responses to four questions (Appendix C), taken from the same survey that was administered to students in the CORE districts (Claro & Loeb, 2017). While the DESSA scores available in the larger City Year data set are based upon the observations of adult raters, both the HSA and GMS are based on student self-reports through surveys.

TABLE 2 – COMPARING GMS SCORES (RANGES 1-5) TO HSA PYRAMID SCORES (RANGES 1-3)

	GROWTH MINDSET	FALL HSA 2017-18	WINTER HSA 2017-18	SPRING HSA 2017-18
GROWTH MINDSET	1	.144*	.120	.190**
FALL HSA 2017-18	.144*	1	.614***	.522***
WINTER HSA 2017-18	.120	.614***	1	.619***
SPRING HSA 2017-18	.190**	.522***	.619***	1

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

RESEARCH QUESTIONS

This study takes advantage of the unique aspects of the datasets described above to extend the research base on social-emotional learning. Specifically, the hypotheses we wish to test are:

1) Are students' social-emotional learning skills significantly related to their academic outcomes and predictive indicators of school success? ? Do these relationships vary significantly across school districts or grade-level, for students who signal the need for additional support in high poverty environments?

2) Is there any evidence that student involvement in an effort like City Year's Whole School Whole Child program, which takes a human-centered, relationship driven approach to build students' social-emotional and academic skills and keep them on track to school success, is related to stronger student outcomes (both social-emotional and academic)?

ANALYSIS

For our measure of social-emotional skills we first looked at students' scores across different time-points to see within each assessment if students' scores from the beginning of the school year to later in the school year were similar. Correlations between students' pre- and post-DESSA scores overall were 0.425. These correlations were consistent across elementary, middle and high school grade levels (Appendix Tables B.1-B.4). A correlation of 0.425 represents a medium level of correlation, short of approaching high levels in the 0.6-0.8 or higher range. That the measures of students' social-emotional skills are significantly related to each other is as expected. However, that the levels of the correlation is only in a middle range is in itself an important point, as it shows that students' levels of social-emotional skills are not fixed points but do in fact vary over the course of time and schooling. This matches the findings of a recent analysis of CORE data that compared to math and reading skills, students' social-emotional skills were much less stable over time and more susceptible to contextual factors, such as changes in classroom or school environment (Soland et. al, 2019).

Similar results are also found in the supplementary data set for Compass Academy students in grades 6-8. Correla-

tions between HSA scores taken at different time-points are highly correlated but with substantial variations for students between time-points (0.5-0.6). For the two SEL measures in the Compass data set, correlations between the growth mindset score and the HSA are also very low, ranging between 0.1-0.2. In this case, both measures are based upon student self-reports. The growth mindset survey, however, clearly captures a different SEL concept from those measured by the HSA, which focuses more on relationships, resiliencies, and academic and school engagement.

RELATIONSHIP OF SOCIAL-EMOTIONAL SKILLS TO STUDENT OUTCOMES

MAIN ANALYSES

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). Models using the Compass Academy data set are also multi-level (e.g. the DESSA models), but as opposed to observing students within schools, the Compass study analyses investigate students' academic outcomes longitudinally over time for given students. All models control for students' grade level as well as a prior measure of the focus 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. Estimations of SEL academic impacts that do not include prior measures of outcomes, moreover, have also been shown to produce over-estimates (Hart et. al. 2020)

In the tables below, the estimates reported (model coefficients) represent the effect that moving up one tier level on the DESSA or HSA domain has on the identified student outcome. In all cases, moving up one tier on either the DESSA or HSA means a student is struggling more in that area, moving either from a strength to a normative/typical level, or from a normative/typical level to a challenge/need for support. For student outcomes, raw attendance rates range from 0-100, and math and English raw grades range 0-4 (F-A). *Thus, with regard to raw outcomes, a negative relationship or coefficient in the table below means that when students struggle more on a SEL measure, their academic outcomes are lower.*

For achievement tests, raw scores are not reported, since different schools used many different tests (even within schools and grade levels) that sample sizes were too small to reliably standardize. While greater attention is typically paid to standardized test scores, research has shown that' course grades and attendance are often stronger predictors of students high school and postsecondary outcomes (Farrington et. al., 2012). However, for achievement scores, as well as for attendance rate and course performance outcomes, we were able to report the results of models predicting the odds of a student being 'off track' in the given outcome. 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 or HSA score worsens 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.

MAIN FINDINGS

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 3)[2].

[2] There was statistically significant variation in the relationship across school and districts, such that SEL measures had stronger ties to student outcomes in some schools and districts and weaker relationships in others. However, the variation was random and not linked to any known characteristics of schools and districts. Further, the variation was inconsistent across outcomes; particular schools or districts might have a stronger-than-average relationship between SEL measures and student attendance, but a weaker-than-average relationship between SEL measures and student course grades.

For raw outcomes, the impacts of moving up one tier on the DESSA range from 0.15 to 0.42 in terms of effect size, with many ranging between one quarter to one third of a standard deviation (0.25-0.33). In general, effects of such sizes 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 estimated such effect sizes as the equivalent of an entire school year 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 explained 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 are considered 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 twice as likely to be off track in any of the academic outcomes.

It is also worth noting that, including the composite measure of the DESSA in the statistical models accounts on average for 5% of the student-level variation in outcomes, after controlling for students' prior measures on these outcomes and their grade level. In comparison, students' prior measures on the outcomes and their grade levels accounted for an average 16% 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 the effect of their family background, and suggests that addressing students' SEL skills is a viable path to raising their academic outcomes.

With regard to the timing of students' SEL skills assessment, our results suggest that their winter/spring

EXAMINING THE ROLE OF STUDENT DEMOGRAPHICS

An additional sample of data was available from one school district for the 2018-19 school year, one year after the sample in our main analyses. While this sample is much smaller and less robust than our main sample, it included all the same student data with the addition of student demographic information. This allowed us to re-test the findings in our main sample, and additionally to examine whether relationships between students' SEL skills and academic outcomes varied by students' demographic backgrounds. Additionally controlling for gender, English-language learner, race, and overage-for-grade status in our statistical models, showed the relationship between SEL skills and academic outcomes remained statistically significant and positive, across outcomes and SEL skills. There was no consistent evidence that the relationship between SEL skills and academic outcomes differed between male and female students, by race, or for English-language learners. For overage students, SEL skills were even more strongly linked to their attendance at school than for students who were age appropriate for their grade (but not more strongly for course mark and achievement test outcomes). Results can be seen in Appendix tables D.1-D.4.

TABLE 3 – POST DESSA MEASURES AND STUDENT ACADEMIC OUTCOMES

	ATTENDANCE		ENGLISH COURSE		MATH COURSE		ENGLISH ACHIEVEMENT	MATH ACHIEVEMENT
SEL MEASURE	RATE	OFF-TRACK	GRADE	OFF-TRACK	GRADE	OFF-TRACK	OFF-TRACK	OFF-TRACK
SELF-AWARENESS	-2.5*** (0.21)	2.0***	-0.3*** (-0.25)	2.2***	-0.3*** (-0.28)	2.0***	1.5***	1.6***
DECISION MAKING	-2.7*** (-0.22)	2.0***	-0.4*** (-0.30)	2.4***	-0.4*** (-0.31)	2.0***	1.4***	1.5***
GOAL-DIRECTED BEHAVIOR	-2.4*** (-0.20)	1.9***	-0.4*** (-0.35)	2.4***	-0.4*** (-0.36)	2.6***	1.7***	1.9***
SELF-MANAGEMENT	-2.5** (-0.21)	1.8***	-0.4*** (-0.33)	2.4***	-0.4*** (-0.32)	2.3***	1.4***	1.9***
OPTIMISTIC	-2.1*** (-0.17)	1.7***	-0.3*** (-0.24)	2.1***	-0.3*** (-0.26)	1.9***	1.4***	1.5***
RELATIONSHIP SKILLS	-1.8*** (-0.15)	1.6***	-0.3*** (-0.21)	2.0***	-0.3*** (0.21)	1.7***	1.3***	1.5***
PERSONAL RESPONSIBILITY	-2.8*** (-0.23)	2.2***	-0.5*** (-0.40)	2.9***	-0.5*** (-0.42)	2.9***	1.4***	1.6***
SOCIAL AWARENESS	-2.3*** (-0.19)	1.8***	-0.3*** (-0.25)	1.9***	-0.3*** (-0.22)	1.9***	1.4***	1.4***
COMPOSITE SCORE	-2.8*** (-0.23)	2.1***	-0.4*** (-0.34)	2.6***	-0.4*** (-0.36)	2.6***	1.5***	1.8***

. 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 somewhat stronger in predicting end-of-year academic outcomes than were fall DESSA scores. Both fall and spring/winter measures, each of these 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 (Tables B.5-B.7). Relationships between DESSA levels 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 (Tables B.11-B.13). One explanation for this is that in 9th grade, when students encounter more challenging curriculum and higher teacher expectations, 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.

EXPLORATORY/SUPPLEMENTAL ANALYSIS

In the supplementary Compass data set, the HSA measures of SEL based on student self-reports have significant correlations to student outcomes, though these are not as strong or as consistent as the DESSA adult rating measures in the larger City Year data set. Again, mid-year or winter scores are more strongly related to end of year outcomes than are fall scores (results for fall scores can be seen in Appendix Table B.19), and cross-sectional measures of SEL skills are stronger than measures of growth between the fall and winter time-points. Examining the relationships between the various HSA competency areas and student outcomes reveals that the relationship to test scores is almost singularly driven by the Academic Motivation sub-category, a finding that is similar to other research on the HSA which has found that Academic Motivation was the competency area most related to students' academic outcomes as measured by course grades (Allen et. al.,

TABLE 4 – WINTER HSA AND GROWTH MINDSET MEASURES AND STUDENT ACADEMIC OUTCOMES, COMPASS ACADEMY

		ELA			MATH		
	ATTENDANCE RATE	SCALE SCORE	PERFORMANCE LEVEL	GROWTH PERCENTILE	SCALE SCORE	PERFORMANCE LEVEL	GROWTH PERCENTILE
ACTION ORIENTATION	-0.5	-1.3	0.0	-1.3	0.9	0.0	0.1
EMOTIONAL CONTROL	0.2	-1.6	-0.1	-1.9	-2.1	-0.1	-4.1*
ASSERTIVENESS	-0.7	-1.8	-0.1*	-1.9	1.6	0.0	0.5
TRUST	-1.0*	-0.6	0.0	-2.5	0.5	0.0	-0.4
EMPATHY	-1.8***	-2.9*	-0.1	-3.7*	-1.6	0.0	-3.0
REFLECTION	-1.3**	-2.5	-0.1	-2.7	-2.1	-0.1	-3.7
OPTIMISM	-1.6***	-1.5	-0.1	-1.7	-0.7	0.0	-1.1
RELATIONSHIP WITH PEERS	-1.6**	-1.5	0.0	-1.2	-1.7	-0.1	-2.1
RELATIONSHIP WITH ADULTS	-0.7	0.4	0.0	0.9	-1.7	-0.1*	-4.1*
LEARNING INTEREST	-1.3**	-2.8	-0.1	-4.1*	-0.9	-0.1	-0.9
CRITICAL THINKING	-0.9*	-2.8	-0.1	-3.9*	-2.5	-0.1	-4.2*
PERSEVERANCE	-1.1*	-1.7	-0.1	-2.3	-2.4	-0.1*	-4.1
ACADEMIC MOTIVATION	-1.5***	-6.1***	-0.2**	-6.2**	-5.9***	-0.2***	-10.7***
SCHOOL BONDING	-0.9*	-1.9	-0.1	-3.4	-1.5	-0.1	-3.6
PYRAMID	-0.8*	-3.1**	-0.1***	-3.9**	-2.4*	-0.1**	-3.5*
FALL-WINTER PYRAMID GROWTH	-0.2	-1.6	0.0	-2.2	0.9	0.0	1.2
GROWTH MINDSET	0.0	-3.4*	-0.1*	-4.3*	-6.6***	-0.2***	-6.2**

. is significant at the 0.05 level; **. is significant at the 0.01 level; *. is significant at the 0.001 level*
Models for sub-scores based on 2016-17 and 2017-18 data only

2019). Students' attendance rates are also significantly related to several competency areas on the HSA. Growth mindset scores also show a significant correlation to student achievement test scores, especially in mathematics confirming the findings of a recent PACE study conducted with CORE data (Claro & Loeb, 2019b).

THE CITY YEAR WHOLE SCHOOL WHOLE CHILD APPROACH AND STUDENT OUTCOMES

Having found evidence of a positive and significant relationship between students' social-emotional skills and their academic outcomes, we use the City Year data to test a second and related question. Given that SEL skills are tied to students' academic outcomes, can students' social-emotional skills be influenced by their schools and teachers? City Year's program in schools focuses on both students' academic performance and social-emotional development; implementation data from its program can be used to explore whether greater involvement with the program and the AmeriCorps members was associated with stronger outcomes for students.

Measurement data of each student's involvement with City Year and the AmeriCorps members takes three forms. For students on the math, English, or behavior focus lists, staff provided a detailed record of the number of

TABLE 5 – DESCRIPTIVE STATISTICS OF CITY YEAR DOSAGE

	N*	MEAN	MEDIAN	STD. DEV.	MINIMUM	MAXIMUM
ELA HOURS	19,432	17.6	16.3	10.5	0.083	158.25
MATH HOURS	15,808	17.3	16.1	11.3	0.083	145.17
BEHAVIOR HOURS	9,246	4.4	3.2	4.5	0.067	63.33
BEHAVIOR DAYS	12,362	228.5	229	61.9	1	412
ATTENDANCE DAYS	9,727	220.9	221	65.9	3	424
CRITICAL THINKING	9,690	1.7	0	11.5	0	330
DECISION MAKING	9,690	24.0	0	53.1	0	1,840
EMPATHY	9,690	6.6	0	24.8	0	420
GOAL DIRECTED BEHAVIOR	9,690	47.5	20	74.7	0	945
LEARNING INTEREST	9,690	12.9	0	45.9	0	1,020
OPTIMISTIC THINKING	9,690	16.0	0	34.5	0	745
PERSONAL RESPONSIBILITY	9,690	24.4	10	40.4	0	465
REFLECTION	9,690	28.4	0	61.2	0	957
RELATIONSHIP SKILLS	9,690	28.6	0	61.5	0	820
SELF-AWARENESS	9,690	17.1	0	32.6	0	465
SELF-MANAGEMENT	9,690	19.5	0	37.7	0	618
SOCIAL AWARENESS	9,690	12.1	0	30.8	0	570
TRUST	9,690	10.8	0	45.7	0	1,400

** Many students who received treatment according to the dosage measures, were not on the intervention 'watch' lists.*

hours each student received support from an AmeriCorps member as part of the City Year program. For students on the focus list for either attendance or behavior, City Year staff captured the number of *days* each student spent on the focus list. Finally, and only for students who were on the behavioral 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 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 may seem very small in scale (to several decimal places), that is because the dosage variables are measured in terms of hours, days and minutes. So, the effect of dosage on students' raw academic outcomes being reported is for the effect of 'one hour', 'one day' or 'one minute' only. The descriptive statistics for those measures of dosage (Table 5) 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 behavioral support. All of these dosage measures have substantial standard deviations, indicating considerable variation in the amount of time different students, spent with City Year corps members.

The first relationship examined is between City Year corps member dosage and educational outcomes. If there is no relationship between time spent with a City Year corps

members and student on education outcomes (achievement, on-track rates etc.), then it is unlikely we will find a relationship between City Year dosage, social-emotional development and education outcomes.

This analysis revealed that the more hours a student spent receiving support from an AmeriCorps member in either English or math, the higher were the student outcomes, not only in the target subject, but also in attendance. Similarly, the more hours a student received support in a subject, the less likely they were to be off track, in either that course or attendance. For students who received the median number of hours of support from an AmeriCorps member for English or math, the related increase in their course grade would be 0.1, equivalent to one tenth of a grade level (A-F) and an effect size of 0.08-0.09. This is the same increase in course grades as that found by a recent randomized study on the impact of a growth mindset intervention, conducted by the National Study of Learning Mindsets (Yeager, Hanselman, Walton, et al., 2019). The effect can be translated to roughly 2-4 months of learning in academic achievement growth (Lipsey, et. al. 2012), and an improvement index gain of 3-4 percentiles. Students receiving the median amount of support from an AmeriCorps member would also be 42% less likely to be off-track in English class (odds-ratio = 0.58) and one-third less likely to be off-track in math class (odds-ratio = 0.66). The strong relationship between dosage and off-track rates, indicates that the City Year supports may be most impactful on the students most likely to fall off the path to high school graduation.

The relationship between time spent working one on one or in small groups on math and English skills on attendance, could result through several mechanism. It could be, that students who feel better about their academic skills are more likely attend regular or less likely to miss days, because they do want to reprimanded for not having done an assignment or called out for not knowing something or being able to perform in class. Alternatively, or in conjunction, the strong relationships formed with City Year corps members, through one on one work in Math or English, could have spill over effects on attendance, as students know there is an adult at the school, who cares about them and is there to help them succeed, and whom they trust, which in turn propels them to attend more frequently (Balfanz and Byrnes 2018).

For students receiving support for behavioral reasons, there was no behavioral or disciplinary outcome to link directly to support. For these students, there was no association between hours spent with an AmeriCorps member and attendance at school, Compared to math and English, the average dosage of CY corps member time, is limited, three hours verse 16 hours. Thus, the dosage itself may not have been sufficient to establish the strength and type of relationship needed to impact attendance. In terms of the number of days spent on either behavioral or attendance focus lists, we see a similar result in that the number of days spent on the lists was significantly associated with lower course and achievement outcomes and an increased odds of being off track in those areas.

TABLE 6 – CITY YEAR DOSAGE AND STUDENT OUTCOMES

	ATTENDANCE		ENGLISH COURSE		MATH COURSE		ENGLISH ACHIEVEMENT	MATH ACHIEVEMENT
	RATE	OFF-TRACK	GRADE	OFF-TRACK	GRADE	OFF-TRACK	OFF-TRACK	OFF-TRACK
ELA DOSAGE (HOURS)	0.05***	0.98***	0.006**	0.97***	0.001	0.99*	0.99	1.00
MATH DOSAGE (HOURS)	0.08***	0.98***	0.000	1.00	0.007***	0.97***	1.01***	0.99
BEHAVIOR DOSAGE (HOURS)	0.07	.098	-0.015**	1.03	-0.011*	1.03*	1.01	1.01
BEHAVIOR DOSAGE (DAYS)	0.00	1.00	-0.001***	1.01**	-0.001***	1.01***	1.01***	1.01***
ATTENDANCE DOSAGE (DAYS)	0.01**	0.99***	-0.001***	1.01***	-0.001***	1.01***	1.00	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 DOSAGE AND DESSA OUTCOMES

DESSA DOMAIN	ELA HOURS	MATH HOURS	BEHAVIOR HOURS	BEHAVIOR DAYS	ATTENDANCE DAYS
SELF-AWARENESS	-0.0032***	-0.0019**	-0.0121***	-0.0001	0.0002***
DECISION MAKING	-0.0028***	-0.0025***	-0.0098***	0.0001	0.0002***
GOAL-DIRECTED BEHAVIOR	-0.0026***	-0.0019***	-0.0109***	0.0000	0.0002***
SELF-MANAGEMENT	-0.0031***	-0.0018**	-0.0079***	0.0001	0.0002***
OPTIMISTIC	-0.0022***	-0.0017**	-0.0136***	-0.0001	0.0002***
RELATIONSHIP SKILLS	-0.0028***	-0.0021*	-0.0153***	-0.0001	0.0002***
PERSONAL RESPONSIBILITY	-0.0030***	-0.0017*	-0.0072***	0.0000	0.0002***
SOCIAL AWARENESS	-0.0024***	-0.0029***	-0.0066***	0.0001*	0.0001*
COMPOSITE SCORE	-0.0028***	-0.0023***	-0.0138***	-0.0001	0.0002***

However, days spent on the attendance focus list, was positively and significantly associated with the directly related outcome of attendance rates. For students who received the median number of days of support from an AmeriCorps member for attendance, the related increase in their attendance rate would have been 2.2% (effect size = 0.17), or roughly four days of school a year, while they would be 41% less likely to be off track in attendance (odds-ratio = 0.59).

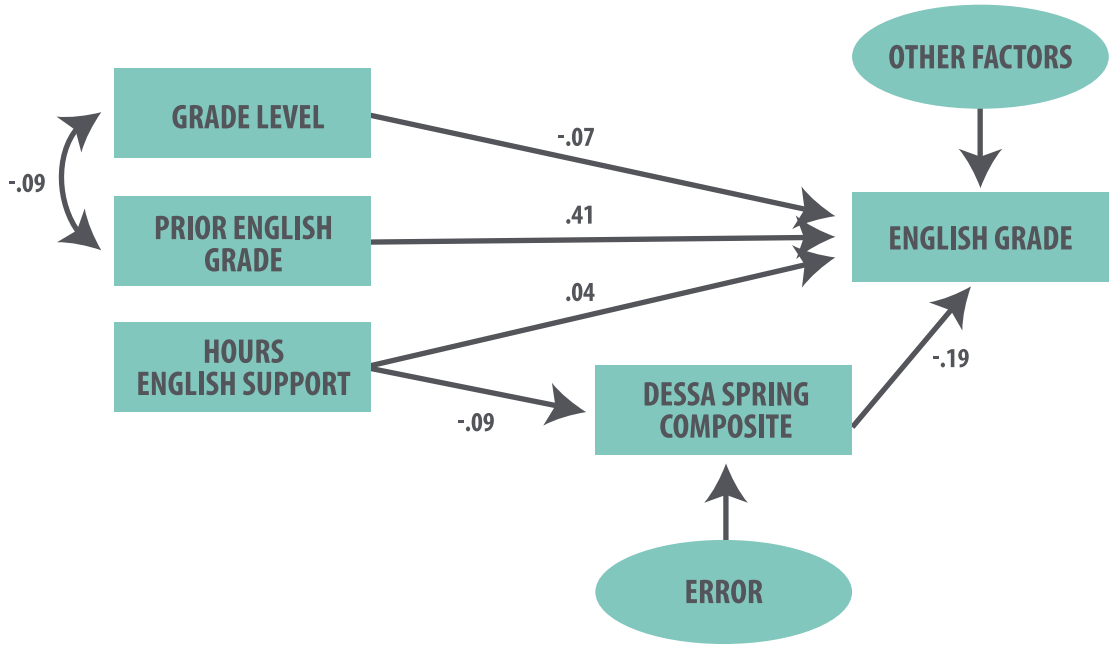
Thus, for academic outcomes, we see a direct and positive link between City Year support in Math, English, and Attendance, and those student outcomes. Students receiving support in Math and English were then also connected to better secondary outcomes in their attendance at school. However, we also see that students receiving support for either Behavioral or Attendance reasons were connected to lower course and achievement outcomes. It may be that those students determined to be in need of Behavioral or Attendance support were also struggling in Math and English, and therefore pre-selected with lower course marks and achievement scores but received no direct support in those areas.

Having examined the relationship between City Year corps member dosage and academic and on-track outcomes, we next looked at the relationship between dosage and students' social-emotional skills. *These analyses found the more hours students spent working with a City Year 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 .08, .06, and .08, respectively for English, math and behavior. According to the WWC's improvement index, this would be equivalent to moving the average student up 2-3 percentiles in the population's distribution of SEL skills. Thus, the more direct, holistic support they received from a City Year AmeriCorps member for math, English, or behavior, the stronger their social-emotional skills later in the school year (Table 7). In regard to the length of time spent on a focus list, there was no association between the days spent on the behavior list and social-emotional skills, while more days spent on the attendance focus list was significantly associated with lower social-emotional levels. These findings, could reflect that more time on the attendance or behavior focus list does not necessarily imply greater dosage. In fact, they could signal students for whom interventions and supports are not working as more days on the focus list translates to more days of students demonstrating attendance or behavior challenges.

2018 - 19 SCHOOL DISTRICT DATA

Where the main study sample included academic outcome data only for those students who were engaged directly with City Year, the additional sample of data from the following year for one school district includes academic outcome data for all students in the six district schools working with City Year. This allowed us to do follow-up analyses for all students, not just those who received one-on-one intervention. While the inclusion of students who did not receive direct support from City Year is not the perfect counterfactual, it does provide a comparison group and allows us to re-test our original findings showing a relationship between the number of hours spent with an AmeriCorps member and students' academic outcomes. The results of the follow-up analyses match those of the original study, confirming them and establishing a consistent pattern of results – students who spend more hours working with AmeriCorps members on English and math, had higher end-of-year outcomes in those subjects (course grades and test scores), along with higher attendance rates. Using the student demographic information available in this additional sample, there is also no consistent evidence that the relationship between hours spent with an AmeriCorps member and students' academic or SEL outcomes varies by gender, race, English-language learner or overage-status. These results can be seen in Appendix tables D.5-D.15.

FIGURE 1 – PATH DIAGRAM OF CITY YEAR EFFECT



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 (fall attendance rates, course marks, and SEL levels). Results found that the lower a student's initial level was, for academic or social-emotional indicators, the stronger was the relationship between City Year intervention and students' spring outcomes (Appendix Tables B.21-B.22). *In other words, the students who began with the lowest attendance rates or course marks, and those with the lowest SEL skills, were the ones who benefited the most from receiving one-on-one support from an AmeriCorps member.*

With strong relationships established between City Year Corps member dosage or time spent with students and both academic and social-emotional outcomes, as well social-emotional development and academic performance the final question looked at is how do all these pieces fit together. To explore this, we combined the two sets of regression models in a structural equation model (SEM; Bollen, 1989; Long, 1983; Mueller, 1996), using the AMOS software package and its maximum likelihood method of estimation (Arbuckle, 2005). The path diagram from the model for students' English course marks can be seen in Figure 1 and visually displays the multiple effects of hours of additional support by an AmeriCorps members on students' English grades as well as on their social-emotional skills as measured by the composite score of the DESSA[3].

Additional support from City Year was a highly significant predictor of both, with a direct effect on students' English marks of .04 (effect size), and an indirect effect on grades of .02 through its effect on the DESSA (or social-emotional development), for a total effect of .06. The results of a model for students' math course marks were similar, as support from City Year was a highly significant predictor of

[3] According to several indices of fit that provide a means for determining if a model is a good fit or not (Gerbing & Anderson, 1993), our path model is a good fit to our sample and the observed data, and a close approximation to the true model. The path model in Figure 1 has a Goodness of Fit Index (GFI) of 0.98, and Adjusted Goodness of Fit Index (AGFI) of 0.92, a Normed Fit Index (NFI) of 0.84, and a Comparative Fit Index (CFI) of 0.84. For all the above indices, a statistic of 1.0 represents a perfect fit of the model to the data, and as rules of thumb a model must at least meet a standard of 0.90 to be considered an acceptable fit, and at or above 0.95 to be considered a good fit. For Math, the index measures were 0.98 (GFI), 0.92 (AGFI), 0.86 (NFI), and 0.86 (CFI).

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

TABLE 8 – CITY YEAR IMPLEMENTATION AREA AND STUDENT OUTCOMES

	ATTENDANCE		ENGLISH COURSE		MATH COURSE		ENGLISH ACHIEVEMENT		MATH ACHIEVEMENT	
	RATE	OFF-TRACK	GRADE	OFF-TRACK	GRADE	OFF-TRACK	RAW	OFF-TRACK	RAW	OFF-TRACK
CRITICAL THINKING	0.06	0.99	0.001	1.00	-0.002***	1.00	-0.02	1.01**	0.08	0.99***
DECISION MAKING	0.00	1.00	-0.001	1.00	-0.001	1.00	0.06	1.00	0.00	1.00
EMPATHY	0.00	1.00	-0.002	1.01**	0.001	1.00	-0.11	1.00	0.03	1.00
GOAL DIRECTED BEHAVIOR	0.00	1.00	-0.001**	1.01**	0.000	1.00	0.03	1.00	0.02	1.00
LEARNING INTEREST	0.01	1.00	0.000	1.00	0.000	1.00	0.11	1.00	-0.06	1.00
OPTIMISTIC THINKING	0.01	1.00	-0.001	1.00	0.000	1.00	0.10	0.99*	-0.09	1.00
PERSONAL RESPONSIBILITY	0.00	1.00	-0.001*	1.00	-0.001	1.01*	0.00	1.00	0.01	1.00
REFLECTION	0.01	1.00	-0.001***	1.01***	-0.001*	1.01***	-0.02	1.00	-0.02	1.00
RELATIONSHIP SKILLS	0.01	1.00	0.000	1.00	-0.001	1.01*	-0.02	1.00	0.00	1.00
SELF-AWARENESS	0.00	1.00	-0.001	1.00	**	1.01**	0.01	1.00	-0.03	1.00
SELF-MANAGEMENT	0.00	1.00	-0.002	1.00	-0.001	1.01*	-0.09	1.00	-0.03	1.00
SOCIAL AWARENESS	0.01	1.00	-0.001	1.00	-0.001	1.01	-0.02	1.00	-0.09	1.00
TRUST	0.01	0.99*	0.000	1.01*	-0.002*	1.00	0.02	1.00	-0.13	1.00

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

both students' math grades and their spring DESSA Composite score, with a direct effect on students' math grades of .03 (ES) and an indirect effect of .03, for a total effect of .06. In translated terms, the total effects are equivalent to 1-3 months of learning in terms of achievement growth and a gain of 1-2 percentiles as per the improvement index.

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 behavior, examined the specific social-emotional skill 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[4]. As seen in Table 8 below, the time spent working with AmeriCorps members on specific social-emotional skills was not consistently related to students' academic outcomes. However, time spent working on a given social-emotional skill was statistically linked to improvements in that same competency area, 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 9). That more time working on specific social-emotional skills was related to improvement in those skills, but not academic outcomes, again may reflect the relatively small amounts of City Year corps member time devoted to this particular part of their holistic support. With the exception of goal directed behavior, where mean dosage was 45 minutes, the mean

TABLE 9 – CITY YEAR IMPLEMENTATION AREA AND STUDENT SEL MEASURES

	RELATED SUB-SCORE	DESSA COMPOSITE
CRITICAL THINKING	N/A	-0.0005
DECISION MAKING	0.0000	-0.0001
EMPATHY	N/A	-0.0011***
GOAL DIRECTED BEHAVIOR	-0.0005***	-0.0006***
LEARNING INTEREST	N/A	-0.0008***
OPTIMISTIC THINKING	-0.0006**	-0.0009***
PERSONAL RESPONSIBILITY	-0.0002	-0.0007***
REFLECTION	N/A	-0.0005***
RELATIONSHIP SKILLS	-0.0006***	-0.0006***
SELF-AWARENESS	-0.0008***	-0.0010***
SELF-MANAGEMENT	-0.0002	-0.0006**
SOCIAL AWARENESS	-0.0007***	-0.0012***
TRUST	N/A	-0.0005**

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

dosage levels for all the other social-emotional skills was under 30 minutes, and in some case, only 10 minutes. A key question for further study then, is would increased dosage in developing specific social-emotional skills lead to relationship with academic outcomes.

CONCLUSION

In summary, the available implementation data for the City Year program suggests that school-based interventions can be effective in developing students' social-emotional skills. 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; students with stronger social-emotional skills obtained greater academic outcomes in terms of course grades, achievement tests, and improvements in predictive indicators of high school graduation. These findings, moreover, were drawn from a large multi-district sample including 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 high-needs schools, in high-needs school districts.

The strong associations found between spending more one on one or small group time with a City Year Corps member, receiving math or English supports through City Year's whole child approach, with its stress on establishing positive developmental relationships between the Corps member and student, and both academic and social emotional outcomes provides insight into how the connection between social emotional development and academic outcomes occurs. The overall findings suggest, that the combination of building positive development relationships, while working on improving students math or English skills, is building social-emotional skills that are beneficial in themselves, but also have an impact on the student's academic outcomes, over and above those resulting from the direct work to improve them. Moreover, these interactions done over a long enough period of time over the course of school year (a median of 16 hours of interaction) has stronger impacts on the relationship between social-emotional development and academic outcomes, then shorter focused attempts to more directly improve key social-emotional skills.

LIMITATIONS, COMPLEXITIES, AND NEXT STEPS

There are several limitations and complexities associated with this analysis and findings. First, there are the inherent measurement challenges regarding social-emotional skill development. Both adult ratings of student behaviors, as done in the DESSA in the main City Year sample, and student self-reports, used by the Holistic Student Assessment and growth mindset measures employed in the supplemental Compass Academy data, have biases and limitations. In addition, social-emotional development is not typically a linear or even process and this, along with compounding measurement error, may explain why growth measures did not have the same consistent and significant relationship with academic outcomes as point-in-time status measures did.

A second set of limitations and complexities stems from the nature of the City Year data sets. City Year only collected social-emotional and academic behavior data (attendance, behavior, and course performance and academic achievement measures) for students on its focus lists. To be on a City Year focus list, students had to signal some level of challenge or distress at school. They had to have

low attendance, behavioral infractions, or struggles with their courses or academic assessments. Some students were selected for focus lists based on teacher observation of struggle or need for additional support. Thus, while the sample represents the very students for whom the quest to find effective interventions and supports is the most intense and needed, it is not a representative sample of all students or even all students attending high-need schools. In addition, the students in the sample are those who could be expected to receive additional supports beyond those typically provided to all students. In this light, the City Year sample represents a large, multi-district, multi-grade sample of the connection between SEL and academic outcomes among students receiving extra supports in these dimensions. The education field is rife with interventions that do not work at scale; at some level, most students who attend systematically under-resourced schools are taking part in some form of intervention or another. Thus, the mere fact that the sample represents students receiving interventions does not make it unique nor more likely to engineer a connection between SEL skills and academic outcomes. In interpreting the findings, it is important to keep in mind that it is a sample of students being directly supported in the outcomes being measured (though at some level the same can be said of many advantaged students).

Finally, it is important to know that the adults doing the ratings on the DESSA scales are the City Year AmeriCorps members. Knowing the students and their academic performance in school could lead to corresponding ratings of their social-emotional skills. However, the fact that fall DESSA scores were also significantly and consistently correlated to students' end-of-year academic outcomes makes this theory less plausible. Additionally, research on the DESSA has found that raters accounted for only 16% of the variation in students' DESSA scores, and less when the raters where trained properly in its administration (Shapiro et. al., 2016). Thus, raters' influence on students' DESSA scores are unlikely to create a substantial bias in the results of this study's large-scale analyses, which include thousands of students from hundreds of schools across the country.

The findings reported here lead us to several immediate areas for further research. The first is: given that we have found that one level of improvement on the DESSA is associated with up to a year is worth of achievement growth, what are effective ways of raising students' social emotional skills? Specifically, research should examine what strategies and practices are most effective at raising students' SEL levels, perhaps through A/B testing. A second follow-up question is: how does the overall school environment contribute to students' social-emotional skill development? We will seek to better understand the connection between the overall school climate and settings in which SEL supports are provided, and students' SEL skill development and aligned improvement in academic outcomes, through analysis of school climate data, district data, City Year dosage data, City Year practice mapping data, and school conditions. A third question for future research is: how do students' SEL skills develop over time, and how does their relationship to academic outcomes operate over time? Using longitudinal data sets for several consecutive years, we would like to study how students' SEL skills become fluent and stable over time, and whether specific skills are associated with either shorter or longer term effects on academic outcomes. All of these anticipated research areas could probably best be explored with a mixed methods approach, including both qualitative and quantitative methods. In either these proposed studies, or others, it would also be desirable to confirm the findings of this initial study and observation tools, but using a more conclusive form of counterfactual. This would primarily entail including districts, schools, and students who have no involvement with City Year, and involve the administration of the DESSA by non-AmeriCorps members to measure students' SEL skills.

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