Des Moines Public Schools (DMPS) AmeriCorps

AmeriCorps Literacy Tutoring to K-5th Grade Students Program at DMPS Elementary Schools

Short-Term Impact Study
Evaluation Report

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EXECUTIVE SUMMARY

In 2018-2019, Des Moines Public Schools (DMPS) served over 33,000 students in Des Moines, Iowa, a diverse, urban city of approximately 205,000 people. Over 73% of DMPS students were low-income qualifying free or reduced-price lunch, over 57% were minorities, over 19% were English Language Learners, and over 14% received Special Education services. According to the Annie E. Casey Foundation (2011), 16% of children who are not reading proficiently in 3rd grade drop out of school, compared to only 4% of their proficient peers. Long-term impacts of early reading difficulties can be devastating (Lane, 2014).

Recognizing the critical importance of reading and literacy skills for students' future success, DMPS set a district goal to achieve proficiency in reading among 100% of K-5 students. Unfortunately, the number of students who are not currently reading proficiently in K-5th grade within the DMPS district is high. For example, only 60.6% of DMPS 3rd grade students are proficient in reading. Similar proficiency rates for grades K-5 in literacy at DMPS elementary schools demonstrate the need for successful intervention to reach the 100% proficient goal. To address the disparity in proficiency rates, AmeriCorps members provided evidence-based Lexia Core5 Reading tutoring to K-5th students who were struggling to achieve or maintain proficiency during the 2018-2019 school year. All of the 38 DMPS elementary schools utilized Lexia Reading Core5, an evidence-based, personalized technology-based intervention adopted by DMPS to support academic instruction and student learning. The program goal was to place AmeriCorps members in 29 (76%) of the DMPS elementary schools during the 2018-2019 school year. Although some members left their positions, 17,651 separate intervention services were provided to 2,613 K-5 students at 20 DMPS schools.

To evaluate the efficacy of AmeriCorps intervention services and factors that potentially alter efficacious intervention delivery, the current study examined student outcomes regarding reading proficiency across multiple within-case and across-case comparisons. In attempts to isolate various components of potential influence at the individual and school levels, the current evaluation addressed a series of interrelated questions to determine whether AmeriCorps member service 1) impacted student reading proficiency and proficiency growth, 2) provided an added benefit to students in need of additional support, 3) provided an added benefit to schools that house AmeriCorps members, and 4) was influenced by differences in implementation fidelity within each member placement. Specific questions addressed and findings relevant to each question are presented below.

- Do students receiving AmeriCorps intervention services demonstrate growth in reading proficiency that differs from students who do not receive intervention services?

- Do students receiving AmeriCorps intervention services demonstrate reading proficiency growth that differs from same-grade students who do not receive intervention services but attend schools where AmeriCorps services are provided to other grades?

  Findings from comparisons between students who received AmeriCorps intervention support and students in the same grades, within the same schools, who did not receive intervention services, findings were generally consistent. As one might expect, students in need of services were generally performing poorly in relation to students who did not require services. Given that service provision was determined by decrements in reading proficiency within the Lexia Core 5 system, these findings are not surprising. However, in nearly all grades, students

receiving AmeriCorps services ***maintained growth*** in reading proficiency that was comparable to their peers who did not require intervention supports. These findings suggest that AmeriCorps service provides a ***positive benefit to students who receive services***. However, findings comparing students in schools served by AmeriCorps members across grades that were either served or not served by an AmeriCorps member did not reveal differential patterns of proficiency growth as a function of AmeriCorps member presence in the building versus actual service provision to students in a particular grade.

- Does reading proficiency growth differ as a function of intervention frequency among students who receive AmeriCorps intervention services?

- Do AmeriCorps services provide added benefits in schools with service members in comparison to non-AmeriCorps schools with the same existing services?

  Comparison of reading proficiency growth among students in schools where AmeriCorps members provided services and schools that did not have an AmeriCorps member indicated that ***reading proficiency growth was approximately consistent across schools***, whether the school had an AmeriCorps service member or not. Although these findings suggest little benefit to having an AmeriCorps member in the building, comparisons of students receiving support services with regard to amount of service received painted a different picture. In schools where AmeriCorps members provided support, the amount of support services was consistently related to reading proficiency growth. While the amount of service received is necessarily tied to proficiency decrements (those falling behind require more support), findings indicated that increases in intervention frequency reduced proficiency deficits among students who received support services. That is, although a student receiving 10 interventions would be expected to score lower on a proficiency assessment than a student receiving no interventions, that same student who received 10 interventions did not continue to fall further behind a student who received only 5 interventions. These findings suggest that ***AmeriCorps intervention services help to maintain reading proficiency growth among those students who require member support***.

- Does presence of an AmeriCorps member provide increased benefits to students through impact on variability in reading proficiency relative to students in buildings without AmeriCorps services?

- Does growth in reading proficiency differ as a function of whether students who are flagged for support by the Lexia Core5 program receive intervention services from AmeriCorps members?

  Findings were limited with regard to added benefits due to unavailable data regarding individual student need for support in non-AmeriCorps buildings and also by somewhat limited information about other services potentially available in all buildings. Generally, ***AmeriCorps member presence did account for small amounts of variance in students initial proficiency assessments***, but compelling evidence with regard to proficiency growth did not emerge.

- Do AmeriCorps member hours/intervention loads or methods used for identifying students in need of intervention differentially relate to reading proficiency growth?

- Does modality of intervention delivery differentially relate to growth in reading proficiency?

    Findings related to differential methods of identifying students in need of support services or differential modalities of delivering interventions consistently demonstrated that the ***efficacy of the AmeriCorps interventions did not differ across important differences in implementation***. Specifically, use of flagging or rostering demonstrated no consistent effects across grades with regard to altered reading proficiency growth, whereas delivery of intervention services in one-on-one or small group settings were generally equally efficacious. These findings do seem promising in that lack of influences allows for greater flexibility, a common theme among members, in how AmeriCorps members are able to best deliver intervention services to the students who need additional support.

Collectively, the findings in this evaluation point to evidence that ***AmeriCorps member service does provide a benefit to students who receive services in that those students do not continue to fall further behind their peers over the course of the academic year***. Specifically, parallel growth among those who did and did not receive AmeriCorps support, and decreased decrements in proficiency due to increase intervention experiences among those who did receive services ***clearly demonstrate that the services provided by AmeriCorps members are benefiting students***. Overwhelming evidence of added benefit to schools due to AmeriCorps service was less compelling due largely to limitations on school-level programming and support data and, more importantly, to relatively little variance in reading proficiency growth across buildings.

Feedback obtained from AmeriCorps members consistently indicated being isolated, unintegrated, or unrecognized by school staff. Members also indicated that they often found their position and responsibilities unclear in the eyes of school staff. As AmeriCorps members intend to continue service provisions in schools, it seems wise to ***clearly delineate what members are in the schools to do and to develop a better system to integrate members into the school culture early during their service tenure***.

AmeriCorps members also indicated ***a need for better training to feel more confident with the material and systems they are expected to use***. More structured training will also instill a greater degree of implementation fidelity aiding the disentanglement of member variability in service provision from efficacy of the services provided.

Subsequent efforts to evaluate the efficacy of AmeriCorps members' service using student outcomes would be wise to ***identify and collect data elements that account for extraneous sources of student-level variability***. Future evaluation efforts might continue to use contextual measures, but ***individual measures of socioeconomic and family dynamics factors would be much more informative with regard to prediction of individual assessment scores***. An increased emphasis on individual student indicators related to student outcomes would benefit future evaluation efforts regardless of whether quasi-experimental, matching, statistical control, or randomized designs are employed.

INTRODUCTION

Program Description

During the 2018-2019 school year, the *AmeriCorps Literacy Tutoring to K-5th Grade Students* program (hereinafter referred to as the program) in the Des Moines Public Schools (DMPS) focused on reading literacy. The purpose of the program was to provide at-risk K-5th grade students at the DMPS elementary schools with additional Lexia Reading Core5 scripted interventions delivered by AmeriCorps (AC) members aimed at accelerating these students' mastery of foundational literacy skills.

DMPS includes 38 elementary schools. While the program goal was to serve 29 (76%) elementary schools, the AmeriCorps members provided services to 21 (55%) elementary schools during the 2018-2019 school year. Two AC members left at the beginning of the school year. Their school assignments were not replaced. Although three other members left and their assignments were not filled, they provided partial services. Among schools that the AmeriCorps members served, 17 (85%) also received Title I funds. All of the 38 DMPS elementary schools utilized Lexia Reading Core5, an evidence-based, personalized technology-based intervention adopted by DMPS to support academic instruction and student learning.

Prior Research

In 2018-2019, Des Moines Public Schools (DMPS) served over 33,000 students in Des Moines, Iowa, a diverse, urban city of approximately 205,000 people. Over 73% of students were low-income (qualifying free or reduced-price Lunch), over 57% were minorities, over 19% were English Language Learners, and over 14% received Special Education services. According to the Annie E. Casey Foundation (2011), 16% of children who are not reading proficiently in 3rd grade drop out of school, compared to only 4% of their proficient peers. Long-term impacts of early reading difficulties can be devastating (Lane, 2014). Further, a combination of factors including high absenteeism, low achievement, and discipline problems predict whether a student will drop out of school. Students with greater levels of such risks are less likely to graduate from high school (Balfanz, Herzog, et al., 2007; Kurlaender, Reardon, et al., 2008).

The empirical evidence does not support the adage, "Just wait, they will catch up" (Foorman, et. al., 1997). Rather, intervening early is the key to helping struggling students before they fall too far behind (Haager, Klingner, & Vaughn, 2007). Research demonstrates that tutoring effectively improves students' growth in literacy. Pullen, Lane, and Monaghan (2010) argue that tutoring programs are promising interventions for struggling readers and appropriate for implementation by trained classroom volunteers. Evidence-based reading interventions (1) provide universal screening and quality instruction, (2) engage students in learning, and (3) facilitate student academic growth (Haager, Klingner, & Vaughn).
Lexia Core5 Reading is a 3-step personalized learning model that is student-centered and supports student independent work at their own pace to develop foundational reading skills (https://www.lexialearning.com/why-lexia/research-proven).

Problem Statement

Recognizing the critical importance of reading and literacy skills for students' future success, the DMPS district goal was to achieve proficiency in reading among 100% of K-5 students. Unfortunately, the number of students who were not reading proficiently in K-5th grade within the DMPS district was high. For example, only 60.6% of DMPS' 3rd grade students were proficient in reading. Similar proficiency rates for grades K-5 in literacy at DMPS elementary schools demonstrated the need for successful intervention to reach the 100% proficient goal. To address this disparity in proficiency rates 21 AmeriCorps members provided evidence-based Lexia Core5 Reading tutoring to K-5th students who were struggling to achieve or maintain proficiency during the 2018-2019 school year. Lexia Core5 Reading was aligned with classroom instruction and district and state standards.

Theory of Change

The program implementation guiding assumptions include:

- The AmeriCorps program recruits and engages members that provide sustainable connections to the DMPS schools for future years.
- The AmeriCorps members provide positive experiences when serving students and staff members in the DMPS schools.
- Students gain more confidence with reading after working with the AmeriCorps members (tutors).
- Students will demonstrate more growth than predicted growth outcomes/benchmarks because of the intervention support by the AmeriCorps members (tutors).

These assumptions undergird the program theory of change (see Appendix A) that provided the basis for this evaluation.

This report describes the evaluation of the DMPS AmeriCorps Literacy Tutoring to K-5th Grade Students program during the 2018-2019 school year of (09/01/2018 – 05/30/2019). The evaluation implementation activities were consistent with activities outlined in the evaluation plan provided August 30, 2018. The report first describes the evaluation purpose and main questions, design, ethical considerations, and limitations. The body of the report presents analytic findings specific to each evaluation question. The report concludes with interpretation of findings, remaining challenges/questions, and recommendations.

SHORT-TERM IMPACT EVALUATION STUDY

Purpose and Main Questions

Consistent with the evaluation plan the program evaluation examined two aims to assess (1) potential beneficial influences of the AmeriCorps members' services on students' individual academic growth and (2) added benefits to the school-student support system due to AmeriCorps members' services. Primary questions relevant to each of the evaluation aims included both student- and school-level outcomes, specifically:

At the student level

    (1) Does school year reading growth among students who receive AmeriCorps member intervention differ systematically from semester/school year reading growth among students who do not receive AmeriCorps intervention service?

    (2) Does school year reading growth among students differ systematically as a function of how much AmeriCorps service students receive?

At the school level

    (3) Do schools with AmeriCorps members providing services demonstrate higher student proficiency in reading and provide increased benefits to students in comparison to schools without AmeriCorps service members?

    (4) Do characteristics of AmeriCorps members or the modality of service delivery influence the effectiveness of member services on student literacy?

Although the primary evaluation questions were based on student outcomes at both the individual and school level, process-related data (i.e., formative evaluation) were also collected to assess and describe program implementation. These data were collected to inform decisions for potential improvements and to better support AmeriCorps members' experiences that ultimately relate to student learning. Specifically, AmeriCorps members were invited to share their perspectives about experiences providing tutoring to students and potential impacts on students

Evaluation Design

The evaluation design employed both within-case and across-case methods at both the student and school levels to assess influences of AmeriCorps members' services on student reading literacy. Within-case approaches examined literacy at the student level where growth across the single school year on the same literacy metrics assessed repeatedly (i.e., FAST or MAP) within each student served as the outcome of interest. In addition, focus on students within the same schools served as a within-case assessment of building-level proficiency as it related to AmeriCorps member service. Student proficiency was also examined across different students (groups of students) and across schools to assess added beneficial influences on student literacy related to AmeriCorps member service.

Given complexities involving the multiple academic services or interventions provided at DMPS schools during school hours, the ability of students to transition from needing service to not needing service and back, different methods of identifying students in need of service, as well as differences in service providers, modality of service provision, and general school characteristics, traditional comparison group designs were not possible. Rather, the evaluation design involved multiple comparisons that attempt to hold certain confounding influences constant within each comparison under the explicit understanding that no single comparison is optimal. Although each of the comparisons described below are confounded with some factor, or set of factors, (e.g., individual differences, school characteristics, AmeriCorps member characteristics, service modality, etc.), the complete set of comparisons attempts to assemble a body of compelling evidence that yields valid conclusions about the effectiveness and added benefit of the AmeriCorps member intervention services on student literacy.

Sample Description

The evaluation sample of students included 2,667 students in grades K-5 who attended schools with AmeriCorps members providing Lexia interventions and K-5 students in all other DMPS schools. Student rosters included 12 entries for students receiving Competent Private Instruction (CPI), who were excluded from the current evaluation study. Among students receiving AmeriCorps intervention services, 54 students experiencing 75 interventions (see Table 1) did not have a corresponding State ID for linkage to demographic and other data. These cases were also eliminated from analyses.

Table 1. Unidentified Students Receiving AC Interventions

School	ID	AC Contacts	School	ID	AC Contacts	School	ID	AC Contacts
Brubaker	1366	1	King	7467	2	Park Avenue	1944	1
Capitol View	8447	1		4404	2		9039	1
	1291	1		3282	1		6113	1
	8663	1		4785	1		1612	1
Findley	3960	3		7754	1		6612	1
	4476	2		8397	1	South Union	8587	3
	1488	2		4376	1		2057	2
	3376	1		4726	1		6905	2
	6758	1		4662	1		5745	1
	9530	1		6246	1		8341	1
	2064	1		7878	1	Stowe	4036	3
	8468	1		9565	1		6706	1
	7952	1	Moulton	4653	4		4384	1
Hillis	8577	2		3428	4		6229	1
	3409	1		3065	2		6642	1
Jackson	3073	1		4870	1		3274	1
Monroe	1227	2		8022	1		3144	1
Morris	8853	1	River Woods	7595	1	Wright	6135	1

Note: Student IDs are randomly generated numbers not linked to individual identity.

Of the remaining students receiving AC intervention services, 10 transferred during the academic year to another school where they also received AC services. To avoid double counting these students in analyses, the data record for the school in which these students received the majority of their AC intervention services was retained. In the event that number of interventions was equal across schools, the school at the end of the year was retained (see Table 2). The resulting sample of AC students included 17,651 interventions conducted with 2,613 individuals. Similar steps were taken to ensure demographic data was available for non-AC students, resulting in a comparison sample of 13,097 students in grades K-5 within 17 DMPS schools.

Table 2. Transfer Students Receiving Interventions

ID	School	AC Contacts	End Date	Retained
5076	School 1	2	10/16/18	
	School 2	2	02/01/19	Yes
8516	School 1	2	12/04/18	
	School 2	35	05/01/19	Yes
6882	School 1	1	02/04/19	
	School 2	4	05/14/19	Yes
9337	School 1	20	01/17/19	Yes
	School 2	20	01/17/19	
5701	School 1	2	10/08/18	
	School 2	13	05/08/19	Yes
1559	School 1	1	01/31/19	
	School 2	6	04/10/19	Yes
3355	School 1	6	12/07/19	Yes
	School 2	5	12/07/19	
3477	School 1	29	01/18/19	Yes
	School 2	6	04/26/19	
5362	School 1	16	02/20/19	Yes
	School 2	1	03/11/19	
	School 1	1	03/28/19	Yes
	School 2	4	05/24/19	
6503	School 1	1	12/17/18	
	School 2	1	02/06/19	Yes

Note: Student IDs are randomly generated and not linked to individual identity. School names omitted to prevent identification of transfer student.

Data Sources

Contextual Data

Although data were obtained for both students and buildings (see below), indices of socioeconomic conditions are not collected in the DMPS system. In order to account for potential influences due to socioeconomic factors, the evaluation design included contextual data obtained from the U. S. Census Bureau's American Community Survey (ACS). The ACS is an ongoing survey that collects various types of demographic information, including socioeconomic indices, for use at the block group level. The ACS design does not sample all residents of a particular area but does continually collect information within that area. Data are available each year and as estimates across multi-year periods. To avoid sparse block group data around schools in more industrialized (non-residential) blocks, single-year 2017 ACS estimates were aggregated to the census tract level, with tracts usually containing five block group areas. Each tract included the area surrounding only one DMPS building to reflect a 'school neighborhood' assessment of socioeconomic conditions.

Although not identical to other indices of neighborhood socioeconomic adversity and disadvantage, the measure created for use in the current evaluation included similar contextual-level constructs. Specifically, ACS estimates for the percentage of families below the poverty level, percentage of unemployed adults, percentage of adults with less than a high school education, percentage of families receiving public assistance, and percentage of single female-headed households were compiled. In addition, percentage of non-White population and per capita income were included to reflect racial diversity, and family income adjusted for family size. Preliminary analyses indicated moderate-to-high correlations among the ACS indicators. An exploratory factor analysis indicated that a single factor could account for 60% of the total variance in the ACS indicators across school neighborhoods. As

such, the ACS indicators were standardized and combined into a single Poverty and Disadvantage Index (PDI) that demonstrated adequate internal consistency (Cronbach's $\alpha = .91$). As evidence of validity, PDI scores at the census tract level accounted for 49% of the total variance in 2018 Iowa Reading Assessment scores when aggregated to the building level.

School-Level Data

Building-level data were provided by DMPS as part of the certified enrollment information collected each year. In addition to racial/ethnic decomposition, indices at the school level included percentage of students eligible for free or reduced lunch, percentage of students receiving special education services, and percentage of ELL students. To avoid small cell issues due to crossing ethnicities within schools by intervention status, race/ethnicity categories were essentially collapsed into a percentage of non-White students index. Preliminary analyses indicated reasonably consistent but relatively small relationships between state assessment scores and percentage of ELL, Special Education, and Free/Reduced Lunch students. Because ethnicity, at the school level, did not consistently related to assessment scores, the index was excluded from subsequent analyses.

AmeriCorps Member Data

AmeriCorps staff provided data related to service loads for each AmeriCorps member assigned to an AC service school. Primary information included the number of hours per week and months per year each member provided service. Information was also provided to index the specific grades AC members served within their assigned school. In addition, indicators were created to reflect whether members provided service in a one-on-one or group format and the primary method used (rosters vs. Lexia flagging) to identify students in need of AC member services. Finally, counts of the total number of interventions delivered and the total number of unique students served were also provided.

To gather contextual insights about the AmeriCorps tutoring program implementation, AmeriCorps members were asked to (1) describe methods to select students used at their schools (i.e., through Lexia flags and/or roster provided by school staff) and (2) share their experiences and perspectives as Lexia tutors regarding potential impacts on students learning to read. A short survey was developed and administered to the 2017-2018 AmeriCorps members as part of building the AmeriCorps program process evaluation capacity. Hence, for the purpose of this evaluation this survey was utilized to provide immediate feedback and to inform appropriate choices for potential improvements that could be made during the 2018-2019 school year and in the future. The survey consisted of five open-ended questions. The survey instrument is provided in Appendix B.

The survey was administered online via the Quatrics survey software platform during the second third of both the fall (October 2018) and spring (April 2019) semesters. At the beginning of the school year 21 members were recruited and assigned to the DMPS elementary schools. Two members left shortly after being assigned. One of these two member assignments was replaced. Three other members left later. The initial survey administered during the second third of the fall semester was sent to 18 members, with 16 members (89%) responding. At the second administration, close to the end of the school year, the 2018-2019 AmeriCorps cohort consisted of 17 members, all of whom completed the second survey.

Survey data were analyzed in an aggregate format employing data analysis methods described below. The generated results were presented in a briefing format (see Appendix C and Appendix D)

and shared with the AmeriCorps staff and members during their regular monthly meetings, utilizing the stakeholder participatory strategy (Mertens & Wilson, 2012). The intent was to engage the AmeriCorps members in making sense of their group overall perspectives, and to collectively reflect on potential solutions, strategies that could be used to address issues, and concerns shared individually when completing the survey. Consistent with the literature in stakeholder engagement in evaluation, it could be argued that the survey results discussion contributed to the AmeriCorps staff members' efforts to build a sense of community and gain appreciation of evaluation as the tool for improvement among the AmeriCorps members (Chen, 2015).

Student-Level and Outcomes Data

Student data were provided by DMPS for each individual ($N = 15,710$) in the evaluation study. Although some students were missing data for various measures (e.g., attendance, ELL status, etc.) the amount of missing data was relatively small. Demographic measures included race/ethnicity, gender, ELL status, IEP level, home language, Section 504 status, gifted and talented status, indices of behavior problems and attendance, as well as an indicator of 'at-risk' status. Preliminary analyses indicated expected small cells within grade in each school for many of the demographic measures. In addition to small cells for some indicators, others, including Title I reading services and Early Intervention Service status were not observed in the analysis sample. Preliminary analyses did not reveal consistent relationships between previous year assessment scores and ethnicity (non-White) or gender. Much more consistent moderate associations were observed between assessment scores and home language (English or not), free/reduced lunch eligibility, ELL status, IEP level, and attendance (days attended / days enrolled).

As shown in Table 3 below, AmeriCorps members intervened with substantial numbers of students in each grade. However, it is also clear that intervention efforts were more concentrated in the earlier grades with approximately 28% of all DMPS kindergarteners receiving intervention services but only approximately 6% of district 5th graders receiving AmeriCorps support.

Table 3. Conditions by Grade

Condition	Grade 2018-2019					
	Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade
Comparison Students	1896	2053	2064	2209	2343	2532
AmeriCorps Students	752	562	524	335	280	160

Primary student outcomes consisted of standardized reading assessments administered three times during the school year. For K-1st students, FAST assessments were administered in early fall (9/17-9/28), winter (01/22-2/01) and spring (5/06-5/17). Students in 2nd-5th grades completed MAP assessments at similar intervals in fall (9/04-9/14), winter (12/03-12/14) and the end of the academic year (4/22-5/03). Although the evaluation plan intended to supplement analyses of the FAST/MAP assessments, Iowa state assessment scores were not available before the timing of this report (expected release in mid-October 2019). In addition to assessment scores for outcomes analysis, DMPS also provided assessment scores for use as statistical controls. In April 2019, English Language Learners completed the English Language Proficiency Assessment for the 21st Century (ELPA21). Unfortunately, this assessment was only available for 3,161 students (20.1%) district wide (and

obviously related to ELL status), so ELPA21 scores were not used in subsequent analyses. Finally, where available, DMPS provided scores from the previous year for both the Iowa Reading Assessment and FAST/MAP assessments obtained at year-end. Scores on both measures were highly correlated with each other and highly correlated to MAP/FAST scores obtained in fall of 2018.

As shown in Table 4 below, current kindergarten students did not complete assessments the prior year, limiting the ability to include baseline proficiency in the analysis. Current 1st and 2nd graders did complete FAST assessments the previous spring. Similarly, current 3rd graders had completed a previous MAP assessment at the end of their 2nd grade year but had not yet completed the Iowa Reading Assessment. Finally, current 4th and 5th graders had completed both the MAP and Iowa Assessment the previous year. Consistent with the pattern of assessments available for statistical control, outcomes for current K-1st graders included scores on the FAST assessment, whereas students in 2nd-5th grade all completed MAP assessments during the 2018-2019 year.

Table 4. Assessments by Grade

Grade 2018-2019	FAST (S2018)	FAST (F2018)	FAST (W2019)	FAST (S2019)	IA Assessment (2018)	MAP (S2018)	MAP (F2018)	MAP (W2019)	MAP (S2019)
K		34.41 (2456)	51.51 (2469)	67.47 (2458)					
1st	67.95 (2341)	41.53 (2404)	56.57 (2423)	69.39 (2417)					
2nd	69.58 (2328)						169.61 (2403)	177.14 (2395)	184.49 (2407)
3rd						184.47 (2299)	180.69 (2368)	187.39 (2349)	191.71 (2356)
4th					180.79 (2344)	191.71 (2352)	190.60 (2428)	195.26 (2403)	198.97 (2416)
5th					199.14 (2412)	198.72 (2410)	198.03 (2497)	201.67 (2481)	204.17 (2498)

Note: Table values reflect overall means and (number) of students with assessment scores.

General Analytic Approach

Quantitative Methods

A first consideration with regard to analysis involved the differential patterns of assessments depict in Table 4. In addition to complications inherent in trying to establish comparable scales across grades, use, and availability of different assessments across the student cohorts presented analytic challenges. Rather than employing methods to standardize assessment scores across grades and including grade as a predictor (interaction effect) in analytic models, students within each grade were analyzed separately. In addition to reducing model complexity, such an approach allows for a more fine-grained examination of potential differential influences of AC member support across students at different proficiency development stages. As indicated above, preliminary analyses of contextual, school, and student characteristics revealed reasonably consistent relationships with assessment scores obtained the previous academic year. Attempts to match students via propensity or other matching methods were not generally successful due to small cells in some schools, relatively few observations with a

particular characteristic, and the need to match both within grade and within school (or schools that were matched pairs). For example, in the largest cohort of students that received AC intervention services (kindergarteners), cells in some schools fell below 10 students in either the intervention (e.g., Greenwood = 8; Stowe = 4) or comparison (e.g., Howe = 4; McKinley = 6) conditions. In the absence of successful matching opportunities, the general analysis, instead, included important factors as statistical controls.

The general modeling strategy remained consistent with the analysis plan proposed in that repeated assessments on the FAST/MAP were modeled as a function of time in a typical growth curve approach (see Appendix E). Based on preliminary findings regarding the trajectory of reading proficiency growth over time in a baseline model without statistical controls, the function of time was included as both a linear and quadratic effect. As fixed effects, these two components of time most appropriately captured growth as a linear increase that flattened out (reached asymptote) at year end. Due to the availability of only three assessments, the random components of the model allowed for only the intercept (starting point) and linear rate of change to vary across individuals. While the quadratic component was included in the models as a fixed effect (with corresponding interactions), the rate of quadratic change (flattening) was considered stable across individuals. At the school level, both intercepts and linear slopes were allowed to vary, while the quadratic component was not. Somewhat surprisingly, significant variability in the school-level intercept and slope was not always statistically significant. Although more complicated than necessary in some situations, inclusion of both random effects at the school-level did provide appropriate control for school-level nesting and was therefore retained. Finally, control variables at both the individual and school level were included based on preliminary findings. Once again, these control variables were not always statistically significant predictors of FAST/MAP growth, but they were consistently included in models to allow for consistent interpretation of findings across all modeling results.

Qualitative Methods

The qualitative data from the AmeriCorps member survey (i.e., members' responses to the survey four open-ended questions) were analyzed by identifying common themes and providing representative quotations (i.e., the members' verbatim statements) that support themes (Saldana & Omasta, 20187). While the AmeriCorps member survey design was qualitatively driven aimed at providing members with the opportunity to reflect on and describe their experiences as Lexia tutors at the beginning and at the end of the school year, the members' feedback about the methods to select students through Lexia flags and/or rosters provided by school staff, were summarized using frequencies.

RESULTS

Evaluation Question 1: (Does semester/academic year growth among students who receive AmeriCorps member intervention differ systematically from semester/academic year growth among students who do not receive AmeriCorps intervention service?

Evaluation Question 1A

Do students receiving AmeriCorps intervention services demonstrate growth in reading proficiency that differs from students who do not receive intervention services?

To address the first evaluation question, analyses were conducted comparing yearly growth of FAST/MAP scores across students who did or did not receive AmeriCorps intervention services. Importantly, students in the comparison group were limited to those students attending the same schools as students who received AmeriCorps services. As discussed above, matching methods proved difficult to implement with a high degree of accuracy and without extensive loss of cases (e.g., matching 7 interventions students to 80 non-intervention students), therefore, use of statistical controls was employed in attempts to mitigate influences due to baseline differences in proficiency between the two groups of students. Of primary interest in these analyses is whether the treatment indicator (Group) influences the growth intercept (fall 2018 score) or interacts with time to demonstrate differential rates of growth related to the need for AmeriCorps service Results are presented separately for each grade below.

Kindergarteners

Across the 21 AC schools, no intervention service was provided to kindergarten students in four buildings (Phillips, Willard, Windsor, or Wright). These schools were eliminated from analysis, resulting in 17 schools that included intervention cases. Across schools, approximately 725 students received interventions <u>and</u> had scores on the 2018-2019 FAST assessment; compared to approximately 470 students who did not receive AC intervention services in the same schools. In the absence of statistical controls via assessment scores from the prior year, baseline equivalence on the fall 2018 assessment was not tenable. Perhaps not surprisingly, because intervention services were already available prior to assessment, those students who received AC intervention services demonstrated significantly lower reading proficiency in early fall than those who would not require services (Cohen's $d = 0.51$). Interestingly, follow-up analyses indicated significantly baseline differences in only 7 of the 17 AC schools.

Among Kindergarteners, results revealed the expected linear effect of time and squared time indicating growth but flattening over the academic year. The significant effect of Group indicated a significantly lower average starting point (2.28 points) among students who received AC interventions throughout the year. AC students also finished the year in spring significantly lower (2.35 points) on average than did students who would not require intervention services. Although these findings might be expected, results did not indicate moderation of the linear and non-linear time components. Lack of group moderation of the time effects indicates that AC service is keeping the trajectory of growth among AC students consistent with non-AC students (see Figure 1 and Table 5). That is, students who need AC intervention service start and end the year with lower proficiency than those who do not need services, but students receiving services demonstrate proficiency growth that is comparable to other kindergarteners, suggesting that students receiving intervention services are not falling further behind their peers.

Figure 1. AC Contact vs. No Contact in AC Schools (K)
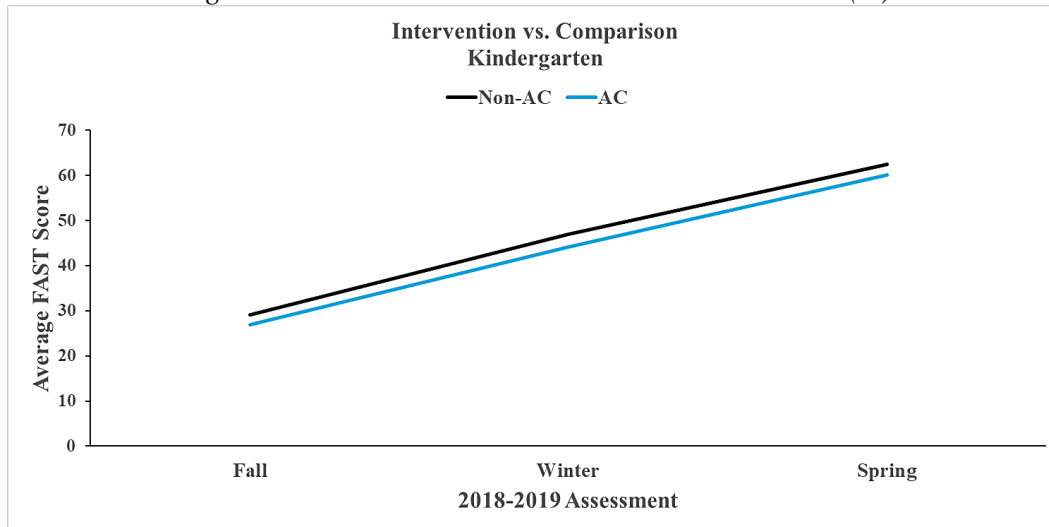
1st Graders

First grade students completed the FAST at the end of their kindergarten year. Analysis of baseline scores still indicated a significant difference between students who would receive AC services and those who would not, but the magnitude of the difference (Cohen's $d = 0.25$) suggested a smaller disparity in reading proficiency at the start of the current school year. Across the 21 AmeriCorps schools, two buildings (Phillips and Willard) did not provide intervention services to 1st grade students and were dropped from analysis. Results indicated a similar pattern of growth in that reading proficiency increased across the year reaching a plateau by year-end. As shown in Figure 2 (also see Table 5), students receiving AC intervention services started fall significantly lower (1.51 points) than did students who would not receive intervention services. Group membership interacted with the linear time component indicating that 1st graders who received intervention services demonstrated shallower growth in proficiency over the year in comparison to students who did not receive AmeriCorps services. The lower starting point in fall and slower growth over time culminated average proficiency levels that were significantly lower (5.02 points) among service recipients at the end of the school year.

Figure 2. AC Contact vs. No Contact in AC Schools (1st)
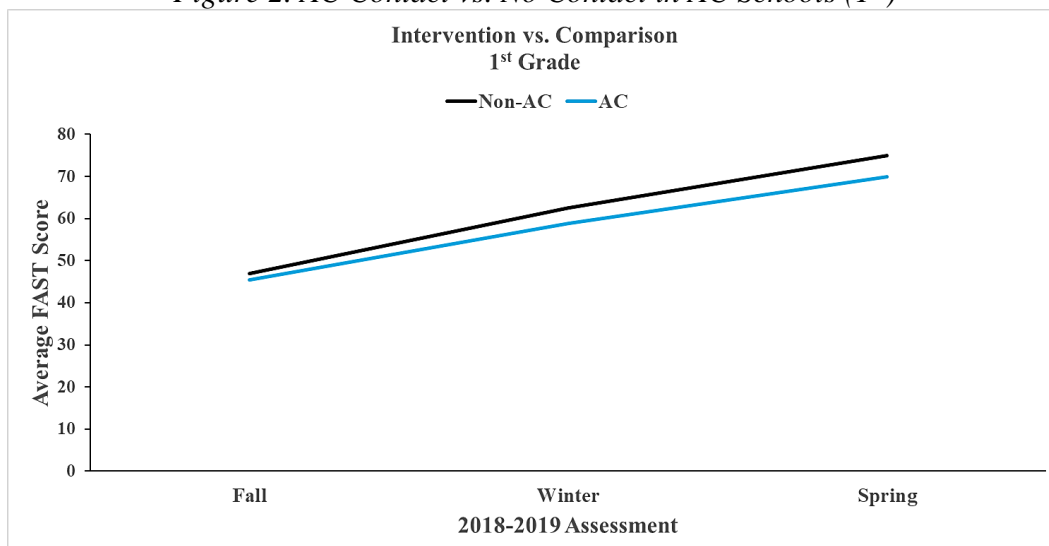
2nd Graders

Three AmeriCorps schools (Morris, Phillips, and Willard) did not provide intervention services to 2nd grade students and were dropped from analysis. Consistent with first grade students, 2nd graders demonstrated a small (Cohen's $d = 0.38$), but statistically significant decrement in reading proficiency on their previous year's FAST score. As shown in Figure 3 (also see Table 5), 2nd graders also started and ended the year with proficiency scores that were significantly lower (2.51 and 3.08 points, respectively) as a function of receiving AC intervention services. Interestingly, overall growth among 2nd grade students did not demonstrate a quadratic flattening. Consistent with findings from kindergarten students, group membership did not interact with time, indicating that those students who received AmeriCorps intervention services maintained reading proficiency growth comparable to their peers who received no intervention service.

Figure 3. AC Contact vs. No Contact in AC Schools (2nd)
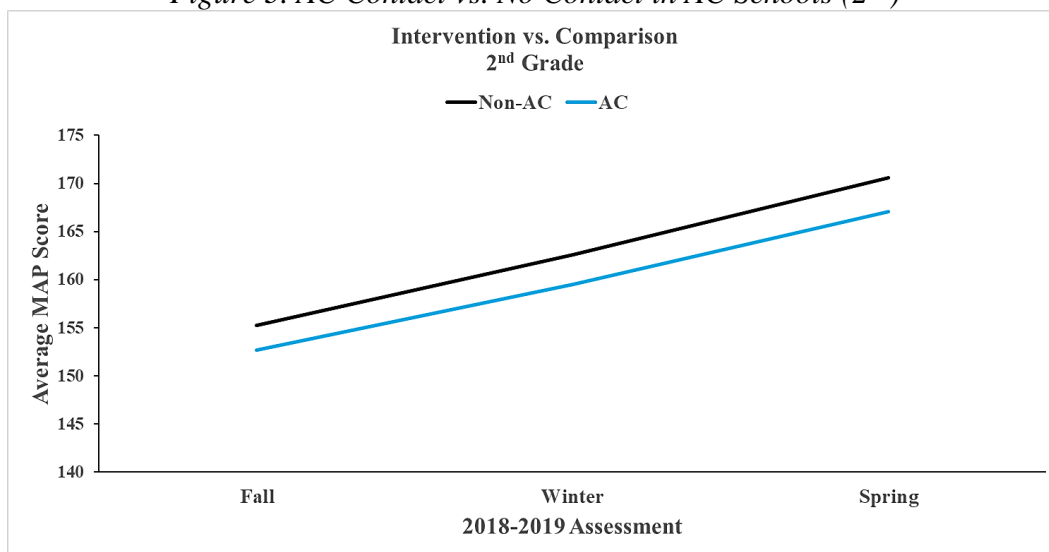
Table 5. AC Support vs. No Support within AC Schools (K-2nd)

Predictor	Kindergarten			1st Grade			2nd Grade		
	B	t	p	B	t	p	B	t	p
Intercept	29.19	7.59	< .001	46.88	7.35	< .001	155.23	15.50	< .001
FAST (S2018)				1.25	49.31	< .001	0.33	22.19	< .001
Time	18.77	29.90	< .001	17.30	20.58	< .001	6.99	9.96	< .001
Time^2	-1.07	-5.01	< .001	-1.64	-7.65	< .001	0.34	1.05	.29
Group	-2.28	-6.43	< .001	-1.51	-2.51	.01	-2.57	-3.07	.01
Time*Group	-1.07	-1.69	.09	-2.53	-3.11	.01	-0.48	-0.46	.65
Time^2*Group	0.52	1.89	.06	0.39	1.18	.24	0.01	0.02	.99
Home Language	-2.95	-7.14	< .001	-0.01	-0.02	.99	-3.84	-4.02	< .001
Free Lunch	-2.15	-4.99	< .001	-2.21	-2.76	.01	-3.74	-3.59	< .001
Reduced Lunch	-2.54	-4.18	< .001	-1.53	-1.46	.15	-3.38	-2.45	.01
ELL	1.36	5.69	< .001	0.80	2.44	.02	1.08	2.92	.01
Attendance	0.14	5.49	< .001	-0.06	-1.10	.27	0.17	2.29	.02
IEP Level	-0.91	-5.59	< .001	2.15	5.54	< .001	-3.31	-6.79	< .001
Poverty Index (ACS)	0.44	0.91	.38	-1.47	-2.73	.02	-1.57	-1.58	.16
% ELL (school)	0.03	0.55	.59	0.01	0.20	.84	-0.02	-0.25	.81
% Special Ed (school)	0.13	1.12	.29	-0.12	-0.85	.41	0.33	1.24	.25
% F/R Lunch (school)	-0.08	-1.73	.11	0.03	0.63	.54	-0.01	-0.02	.99

3rd Graders

Three schools (Brubaker, Jackson, and Willard) did not provide services to 3rd grade students and were eliminated from analysis. Consistent with student in earlier grades, those 3rd graders who would receive AC services demonstrated significantly lower levels of reading proficiency (Cohen's $d = 0.31$) at the end of their 2nd grade year, compared to students who would not require intervention services in the current year. Analysis results (see Table 6) indicated expected growth across time with both linear increase and nonlinear flattening over the school year. Students receiving AmeriCorps services both started and ended the year with reading proficiency levels that were significantly lower (2.48 and 2.92 points, respectively) on average, than their peers who did not require intervention services. However, receipt of service did not alter the growth trajectory, indicating that students who received services continued to progress at a rate similar to students who did not receive services (see Figure 4).

Figure 4. AC Contact vs. No Contact in AC Schools (3rd)
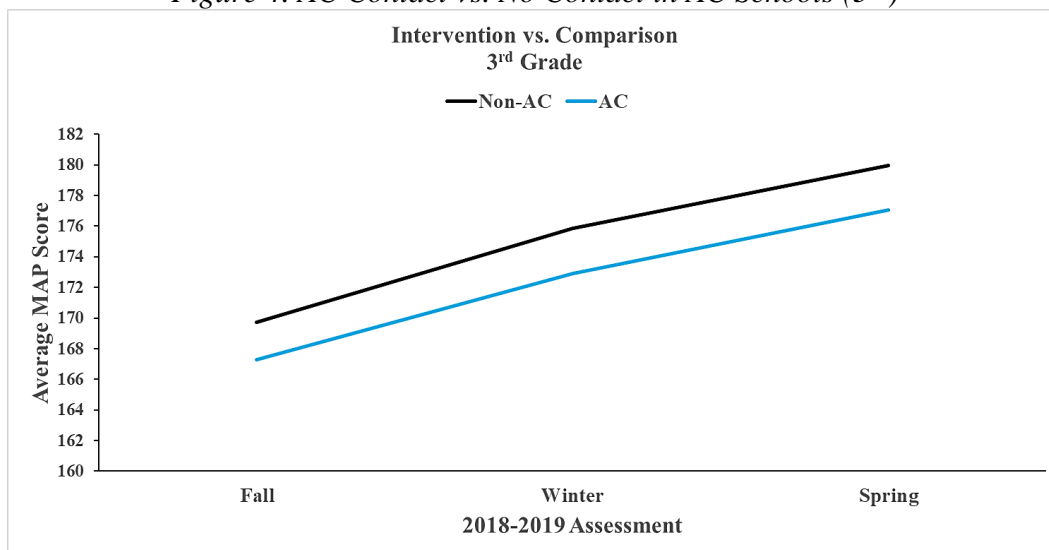
4th Graders

AmeriCorps services were not provided for 4th grade students in 7 schools (Brubaker, Findley, Howe, Jackson, Morris, Willard, and Wright) that were removed from analysis. Among 4th grade students, pervious-year MAP and Iowa assessment scores demonstrated significant, and moderate (Cohen's $d = 0.46$ and $d = 0.51$, respectively) decrements as a function of eventual AC service receipt. The consistent pattern of increasing and flattening growth was observed (see Table 6), as was a significant average difference (1.79 points) in fall MAP scores. However, interactions between group membership and the linear ($p < .05$) and nonlinear ($p = .07$) components of time (see Table 6) suggest differential growth in reading proficiency as a function of AC service receipt. Specifically, those students receiving intervention services gained significantly more (2.31 points per assessment) than did those students who did not receive services. Although the quadratic interaction suggests a more rapid flattening of growth among AC service recipients, students receiving services finished the year only slightly lower (0.73 points) than did those receiving no services. Importantly, as shown in Figure 5, the nonsignificant difference in spring suggests that, even though service receivers started the year lower than their peers, those who received AC intervention support caught up to their peers by year-end.

Figure 5. AC Contact vs. No Contact in AC Schools (4th)
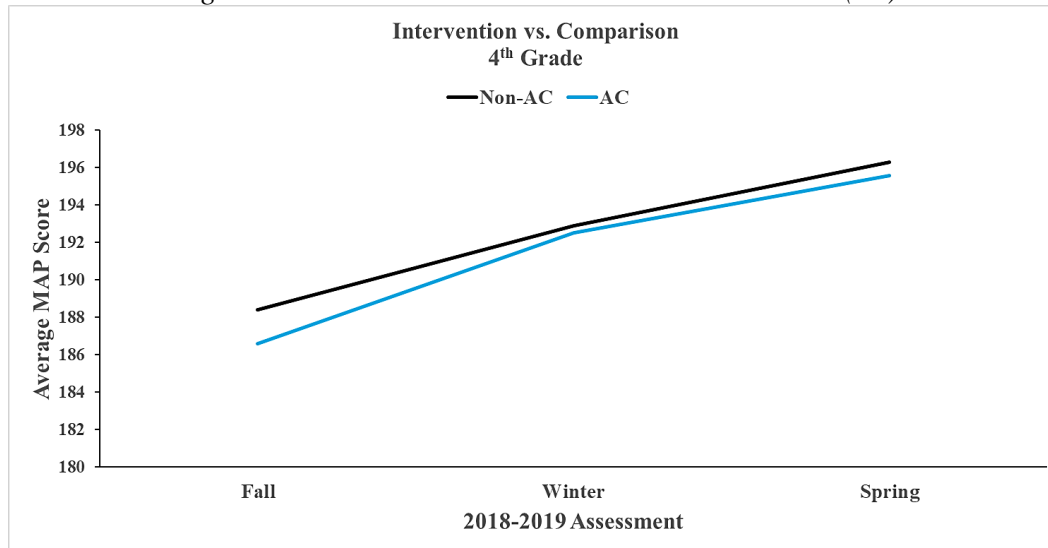
5th Graders

AmeriCorps intervention services were not provided to 5th grade students in 9 (Brubaker, Capitol View, Greenwood, Howe, Jackson, Morris, River Woods, Walnut Street, and Willard) of the 17 schools with AmeriCorps members. Within the remaining eight schools, the number of students that received AC intervention services was also small (approximately 145) in comparison to students in earlier grades. Consistent with 4th graders, 5th grade students scored significantly lower in reading proficiency at the end of the previous year on both the MAP and Iowa assessments (Cohen's $d = 0.47$ and $d = 0.48$, respectively). Among 5th grade students, only the linear effect of time was statistically significant, indicating continued growth across the academic year. Students receiving AmeriCorps services, once again, started the year significantly lower (2.11 points) than comparison students. Although the trajectories shown in Figure 6 seem to suggest differential growth due to AmeriCorps intervention status, lack of statistically significant interactions between group and time indicate that students who received intervention services did demonstrate growth that is comparable to students who did not receive intervention services over the academic year. Consistent with a lower starting point in fall and parallel growth across the school year, students who received AmeriCorps serviced did end the year with significantly lower (1.78 points) levels of reading proficiency than did their peers who did not receive AmeriCorps services.

Figure 6. AC Contact vs. No Contact in AC Schools (5th)
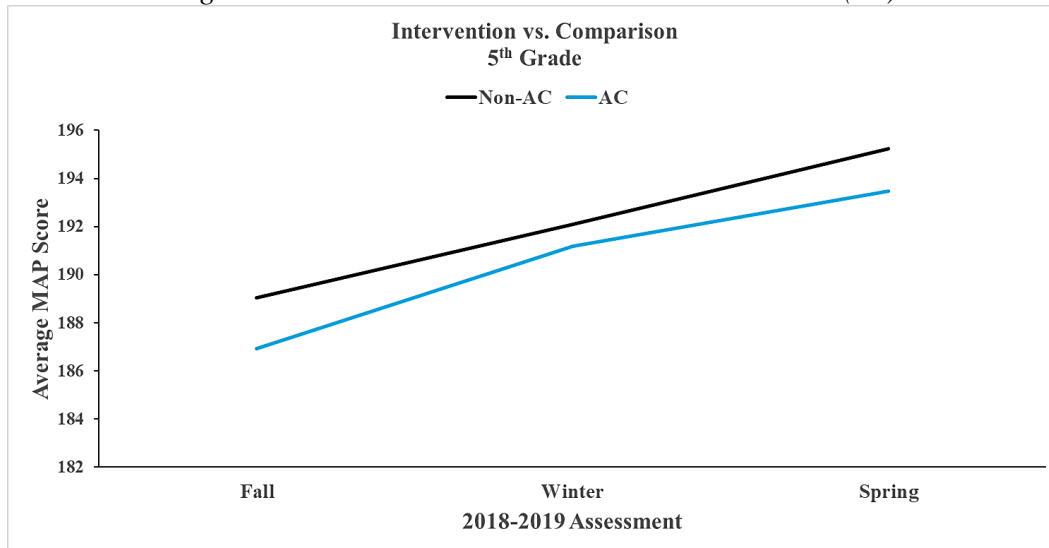
Table 6. AC Contact vs. No Exposure within AC Schools (3rd-5th)

Predictor	3rd Grade B	t	p	4th Grade B	t	p	5th Grade B	t	p
Intercept	169.75	24.16	< .001	188.41	33.57	< .001	189.04	25.65	< .001
FAST (S2018)	0.79	37.81	< .001	0.61	29.01	< .001	0.65	27.35	< .001
IA Assessment (2018)				0.16	11.59	< .001	0.12	10.09	< .001
Time	7.16	12.40	< .001	5.01	7.93	< .001	3.02	4.61	< .001
Time^2	-1.03	-4.26	< .001	-0.53	-2.03	.04	0.04	0.13	.89
Group	-2.48	-3.50	.01	-1.79	-2.90	.01	-2.11	-2.77	.01
Time*Group	-0.77	-0.82	.41	2.31	2.22	.03	2.23	1.62	.11
Time^2*Group	0.28	0.63	.53	-0.89	-1.83	.07	-1.03	-1.58	.11
Home Language	-1.84	-2.29	.02	-1.22	-1.92	.06	0.51	0.73	.47
Free Lunch	0.48	0.62	.54	-2.16	-3.47	< .001	-0.78	-1.11	.27
Reduced Lunch	-0.35	-0.34	.74	-2.24	-2.76	.01	-0.04	-0.04	.97
ELL	0.83	3.19	.01	0.84	4.01	< .001	0.16	0.67	.50
Attendance	0.09	1.73	.08	0.08	1.69	.09	0.04	0.77	.44
IEP Level	-2.97	-8.21	< .001	-1.68	-6.09	< .001	-1.37	-4.57	< .001
Poverty Index (ACS)	-0.10	-0.13	.90	-0.04	-0.07	.95	-0.21	-0.25	.81
% ELL (school)	-0.05	-0.67	.51	0.09	1.49	.17	-0.10	-1.48	.19
% Special Ed (school)	0.16	0.86	.41	0.31	1.92	.09	0.41	2.25	.06
% F/R Lunch (school)	0.03	0.36	.72	-0.12	-2.19	.05	0.03	0.34	.75

Evaluation Question 1A: General Findings

Although all grades demonstrated initial differences in reading proficiency, whether via fall FAST assessments for kindergarteners or via previous year MAP/IA assessment measures, the general pattern of findings with regard to AmeriCorps service provision was reasonably consistent across grades. Regardless of condition or grade, all students demonstrated yearly gain in reading proficiency scores. In most cases, the pattern of that gain reflected a linear increase that flattened out by year's end. Among kindergarteners, and students in 2nd, 4th, and 5th grades, the receipt of AmeriCorps intervention services did not alleviate initial decrements in reading proficiency but receipt of service did result in rates of growth that did not differ from students who did not receive AmeriCorps services. These findings suggest a maintenance effect in which initial lower performance does not decrease further over the course of the school year. In two grades, receipt of intervention services did alter the rate of growth in reading proficiency over time. However, the impacts appear to have occurred in different directions. Specifically, 1st grade students who received AmeriCorps services demonstrated a slowed rate of growth relative to their peers, whereas 3rd grade students who received intervention services appear to catch up to their peers by the end of the year with regard to reading proficiency.

Evaluation Question 1B

Do students receiving AmeriCorps intervention services demonstrate reading proficiency growth that differs from same-grade students who do not receive intervention services but attend schools where AmeriCorps services are provided to other grades?

To address Question 1B, analyses compared FAST/MAP growth among students who received AmeriCorps intervention services to FAST/MAP growth among same-grade students who attended an AC school but where services were not available in their grade. The comparison group was limited to students who attended schools with an AmeriCorps member assigned, but where the AC member did not provide services to a particular grade. For example, 1st grade students receiving AmeriCorps intervention services in AC schools were compared to 1st grade students in other AC schools where services were not provided to 1st grade students. Due to difficulties described above regarding matching methods, statistical controls were again employed to mitigate influences due to both individual- and building-level factors. Of primary interest in these analyses is whether the treatment indicator (Grade) influences the growth intercept (fall 2018 score) or interacts with time to demonstrate differential rates of growth related to the presence of an AmeriCorps service provider, in the absence of actual service provision. Results are presented separately for each grade below.

Kindergarteners

Across all AC schools, four buildings (Phillips, Willard, Windsor, and Wright) provided AC services but did not intervene with kindergarten students. Baseline reading proficiency among kindergartners based on fall 2018 FAST scores indicated approximate equivalence (Cohen's $d = 0.15$) among students in schools that provided services (approximately 1200) and students in schools that did not (approximately 220). As shown in Figure 7 below (also see Table 7), kindergarten students demonstrated significant linear growth over time that did not flatten by year-end. Actual provision of service by AmeriCorps members did not influence initial proficiency, the rate of proficiency growth, or final levels of proficiency at the end of the school year.

Figure 7. AC Service vs. No AC Service in AC Member Schools (K)
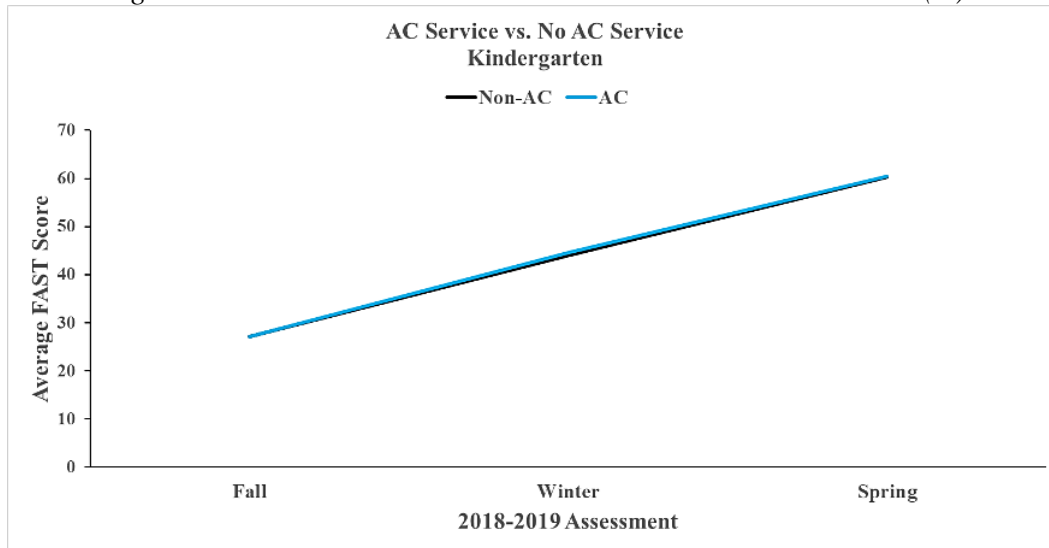
1st Graders

Among AC schools, two buildings (Phillips, Willard) provided AC services but did not intervene with 1st grade students. Students in schools providing intervention services (approximately 1260) did not differ (Cohen's $d = 0.07$) in average levels of reading proficiency from students (approximately 100) in AC schools that did not provide 1st grade intervention services based on spring FAST scores during the previous year. Although students receiving AC services started the year slightly lower (2.00 points) on average than did students in non-service schools, the difference was not statistically significant. Linear and nonlinear time effects indicated growth and leveling over the academic year. The marginal time by grade interaction suggests slightly slower growth among students receiving AC services in comparison to students in AC schools that did not provide service to 1st grade students. As shown in Figure 8 below (also see Table 7), the decreased growth among students in schools that provided services resulted in average reading proficiency levels that were significantly lower (9.01 points) than levels for students in AC schools that did not provide 1st grade interventions.

Figure 8. AC Service vs. No AC Service in AC Member Schools (1st)

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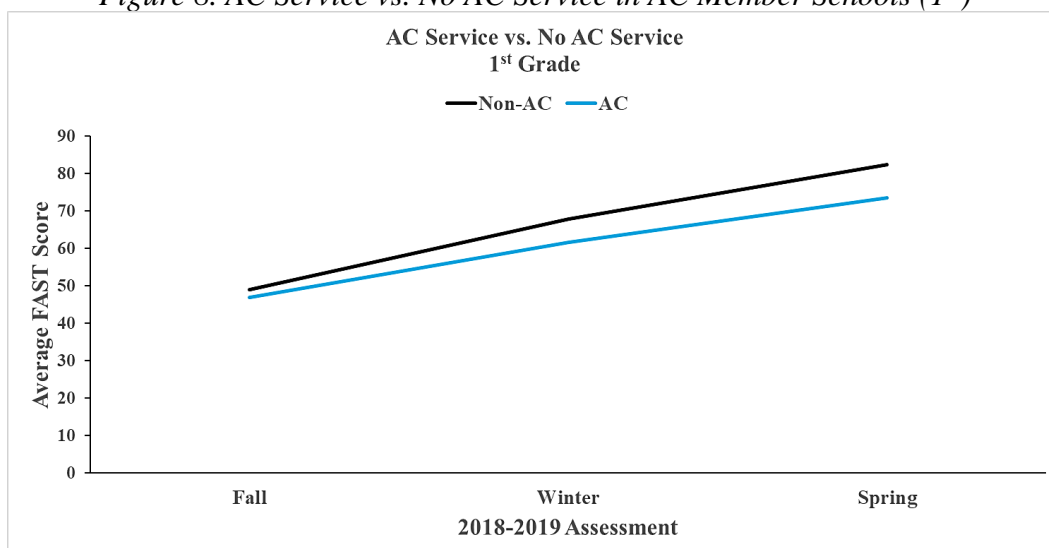
2nd Graders

    Three schools (Morris, Phillips, Willard) included an AmeriCorps member who did not provide intervention services with 2nd grade students. Average FAST scores in spring of 2018 were approximately equal (Cohen's $d = 0.10$) between 2nd graders who attended AC schools and received interventions and those attending AC schools without AC service in 2nd grade. In fall 2018, those receiving services did not differ in average MAP scores (-0.23 points) from those in AC schools without 2nd grade service. Only a linear effect of time was observed, indicating overall growth across the academic year. Lack of time by grade interactions (see Table 7) indicates that students receiving AC services progressed at a rate comparable to students in AC schools that did not provide 2nd grade services (see Figure 9). Approximately equal starting points, coupled with parallel growth resulted in nearly equivalent average MAP scores at year-end.

Figure 9. AC Service vs. No AC Service in AC Member Schools (2nd)
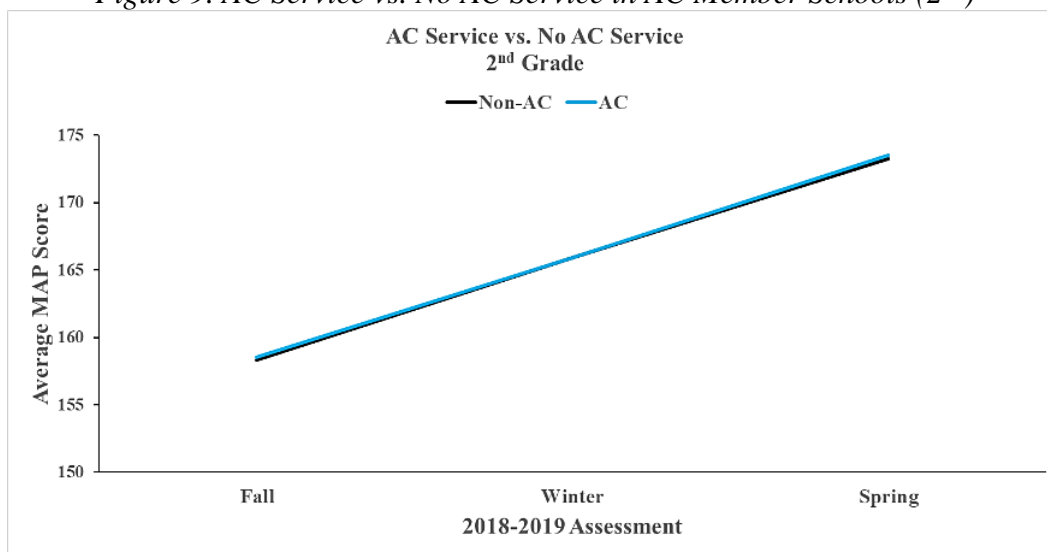
Table 7. AC Contact by Grade in Schools with AC Members (K-2)

Predictor	Kindergarten			1st Grade			2nd Grade		
	B	t	p	B	t	p	B	t	p
Intercept	27.06	7.54	< .001	49.30	7.85	< .001	158.33	19.94	< .001
FAST (S2018)				1.28	52.28	< .001	0.36	31.23	< .001
Time	17.38	17.23	< .001	21.09	8.77	< .001	7.77	6.98	< .001
Time^2	-0.39	-1.24	.22	-2.18	-3.77	< .001	-0.15	-0.31	.75
Grade	0.11	0.14	.89	-2.00	-1.47	.16	0.23	0.13	.90
Time*Grade	0.76	0.68	.50	-4.91	-1.95	.06	-0.50	-0.41	.68
Time^2*Grade	-0.38	-1.17	.24	0.70	1.17	.24	0.25	0.49	.62
Home Language	-3.16	-7.97	< .001	-0.23	-0.33	.74	-4.11	-5.42	< .001
Free Lunch	-2.41	-6.24	< .001	-2.00	-2.62	.01	-3.81	-4.75	< .001
Reduced Lunch	-2.82	-5.21	< .001	-1.35	-1.32	.19	-3.81	-3.66	< .001
ELL	1.54	6.55	< .001	0.74	2.32	.02	1.01	3.41	< .001
Attendance	0.14	5.81	< .001	-0.07	-1.30	.19	0.19	3.28	.01
IEP Level	-0.76	-5.01	< .001	2.20	5.86	< .001	-2.74	-7.21	< .001
Poverty Index (ACS)	0.55	1.15	.27	-1.64	-3.11	.01	-1.22	-1.32	.21
% ELL (school)	0.01	0.20	.84	0.01	0.11	.92	-0.10	-1.04	.32
% Special Ed (school)	0.17	1.37	.19	-0.11	-0.76	.46	0.07	0.28	.79
% F/R Lunch (school)	-0.08	-1.72	.11	0.03	0.64	.53	-0.01	-0.06	.95

Note: Grade reflects a dichotomous predictor of whether AC members provided service (1) or not (0) in each grade level.

3rd Graders

   Three schools (Brubaker, Jackson, Willard) provided AmeriCorps services but did not intervene with 3rd grade students. Third grade students did not differ in average MAP scores at the end of 2018 (Cohen's $d = 0.07$). Students in AC schools who received intervention services began the year slightly, but not significantly, lower (0.82 points) than students in AC schools that did not provide 3rd grade services. The significant linear effect of time indicated growth across the academic year. Absence of a linear time by grade interaction (see Table 8) indicated approximately equal growth between students receiving AC services and students in schools where services were not provided in 3rd grade. The marginal quadratic time by grade interaction suggests a slightly greater degree of slowing in growth among students receiving services (see Figure 10), but average MAP scores did not differ at the end of the school year.

Figure 10. AC Service vs. No AC Service in AC Member Schools (3rd)
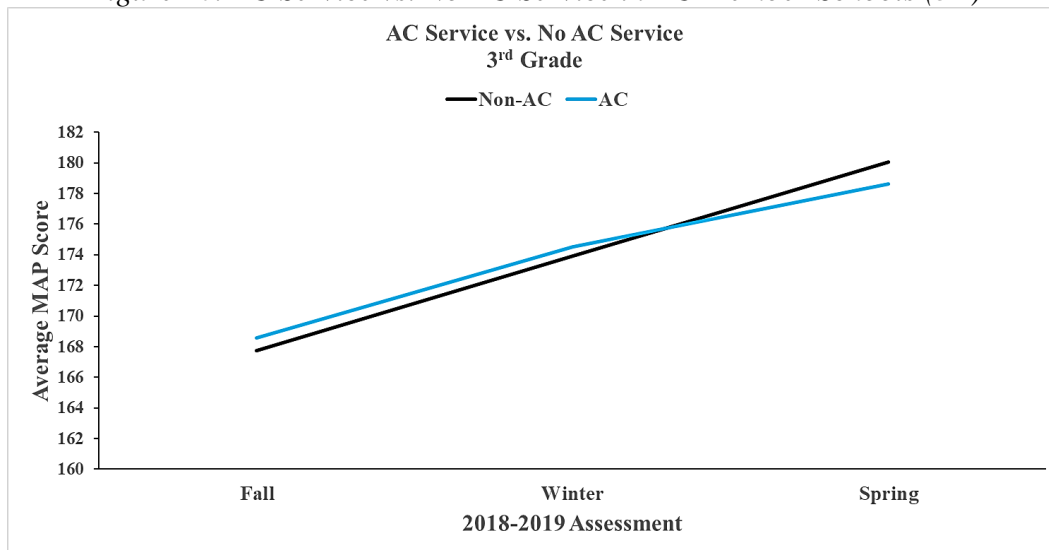
4th Graders

   Seven schools (Brubaker, Findley, Howe, Jackson, Morris, Willard, and Wright) provided AmeriCorps services but did not intervene with 4TH grade students. Average reading scores on both the MAP (Cohen's $d = 0.07$) and IA Assessment (Cohen's $d = 0.01$) in spring 2018 did not differ between students receiving intervention services and students in non-service AC schools. A linear effect of time indicated growth over the academic year with only a slight flattening by year's end. Neither of the time by service interactions were significant (see Table 8), indicating parallel growth between those who received services and those who did not. However, as shown in Figure 11, students in AC schools that received intervention services did finish the year marginally lower (-2.32 points) than did students in AC schools that did not provide services in 4th grade.

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Figure 11. AC Service vs. No AC Service in AC Member Schools (4th)
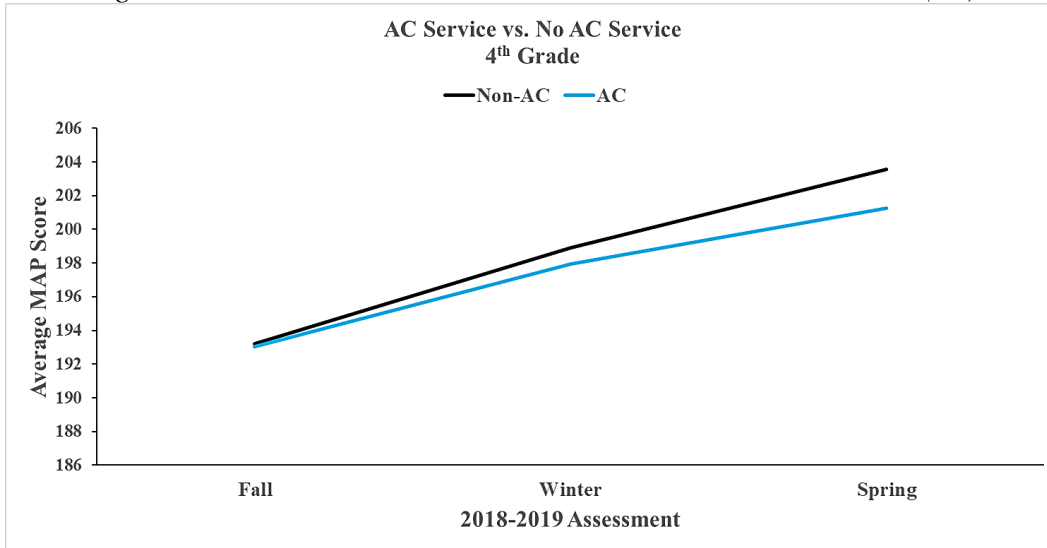
5th Graders

Eight schools (Brubaker, Greenwood, Howe, Jackson, Morris, River Woods, Walnut, Willard) provided AmeriCorps services but did not intervene with 5th grade students. Average scores on both Iowa and MAP assessments were nearly identical in spring 2018 (Cohen's $d = 0.06$ and $d = 0.04$, respectively). Students in AC schools that provided services to 5th grade started the year slightly (-0.82 points), but not significantly lower than students in AC schools without 5th grade services. Consistent with earlier grades, significant linear growth and slight flattening over the course of the year was observed (see Table 8). Once again, results indicated no time by service interactions indicating approximately parallel growth across 5th students who did receive AC services and those who did not receive services in schools where AC members were present. Consistent with equal starting points and parallel growth, Figure 12 shows that 5th grade students in AC schools that provided services finished the year only slightly lower (-0.95 points) on average than did students in AC schools where no services were provided in 5th grade.

Figure 12. AC Service vs. No AC Service in AC Member Schools (5th)

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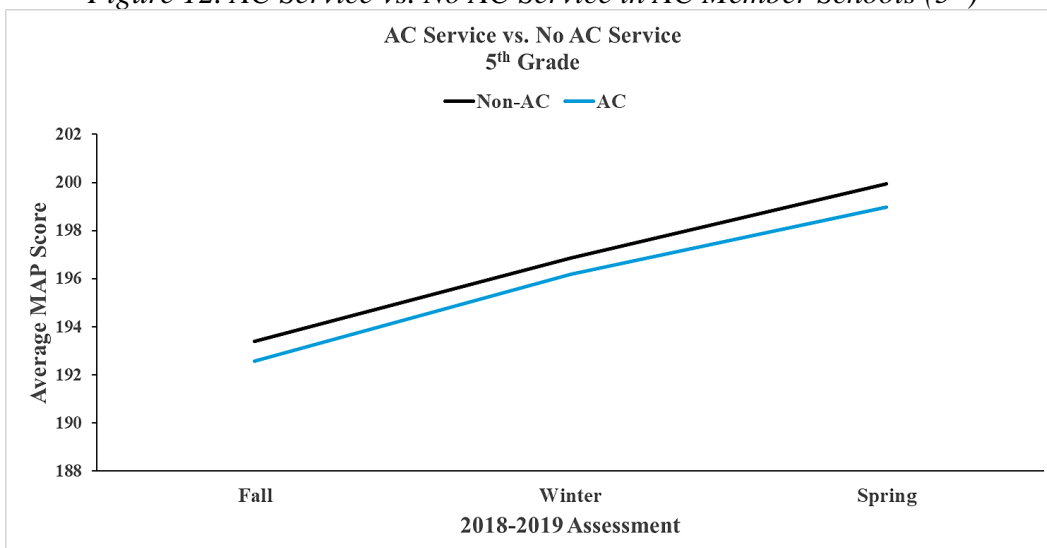
Table 8. AC Contact by Grade in Schools with AC Members (3rd-5th)

Predictor	3rd Grade			4th Grade			5th Grade		
	B	t	p	B	t	p	B	t	p
Intercept	167.75	25.77	< .001	193.21	36.40	< .001	193.39	35.74	< .001
MAP (S2018)	0.78	41.21	< .001	0.63	34.62	< .001	0.62	35.28	< .001
IA Assessment (2018)				0.16	13.23	< .001	0.13	14.20	< .001
Time	6.23	5.69	< .001	6.20	8.28	< .001	3.69	5.55	< .001
Time^2	-0.04	-0.09	.93	-0.51	-1.66	.10	-0.21	-0.75	.45
Grade	0.82	0.68	.51	-0.17	-0.22	.83	-0.81	-0.86	.41
Time*Grade	0.68	0.57	.57	-0.53	-0.58	.56	0.35	0.40	.69
Time^2*Grade	-0.90	-1.86	.06	-0.27	-0.72	.47	-0.21	-0.57	.57
Home Language	-2.01	-2.71	.01	-1.45	-2.70	.01	-0.52	-0.99	.33
Free Lunch	-0.33	-0.47	.64	-1.37	-2.70	.01	-0.90	-1.77	.08
Reduced Lunch	-0.89	-0.97	.33	-1.12	-1.70	.09	-0.31	-0.47	.64
ELL	0.96	4.00	< .001	0.68	3.84	< .001	0.51	3.01	.01
Attendance	0.11	2.22	.03	0.05	1.27	.20	0.04	0.95	.34
IEP Level	-2.86	-8.69	< .001	-1.76	-7.91	< .001	-1.70	-8.03	< .001
Poverty Index (ACS)	-0.08	-0.12	.90	-0.43	-0.81	.43	-0.36	-0.55	.59
% ELL (school)	-0.05	-0.76	.46	0.12	2.14	.05	-0.01	-0.04	.97
% Special Ed (school)	0.12	0.69	.50	0.14	1.03	.32	0.19	1.09	.29
% F/R Lunch (school)	0.03	0.68	.68	-0.14	-2.79	.01	-0.01	-0.23	.82

Note: Grade reflects a dichotomous predictor of whether AC members provided service (1) or not (0) in each grade level.

Evaluation Question 1B: General Findings

Across grades, results were generally consistent with regard to whether AC member service influences reading proficiency relative to AC member presence. In kindergarten, 2nd, 3rd, and 5th grade, students receiving AC intervention services demonstrated growth parallel to students in the same grades who did not receive AC services, even though an AmeriCorps member was present in the building. Although not statistically significant for 4th graders, both 1st and 4th graders who received AmeriCorps intervention services demonstrated decreased growth relative to same-grade students in schools where an AC member was present, but did not provide services in those grades. Collectively, these findings suggest that actual service provision does not result in differential growth (for most grades) relative to the mere presence of an AmeriCorps member providing services to other grades in the building. One possible explanation for the lack of findings specific to intervention delivery involves the process/mechanism by which AC members are assigned to work with grades in particular schools. For example, students in a particular school might be in need of intervention support in certain grades, while students in other grades in the same school do not demonstrate need for services. Unfortunately, information relative to grade assignment or service allocation within buildings was not available for this evaluation.

Evaluation Question 2: Does semester/academic year growth among students differ systematically as a function of how much AmeriCorps service students receive?

Evaluation Question 2A

Does reading proficiency growth differ as a function of intervention frequency among students who receive AmeriCorps intervention services?

To address Question 2A, analyses were limited only to students within AC schools, and only to students who received at least one intervention service within each grade. Number of interventions received ranged from a single occurrence to 115 sessions ($M = 6.77$, $SD = 11.35$). Due to the severe skew in the number of interventions received, counts were transformed (natural log) for analysis. Primary focus in these analyses involved the influence of the number of interventions (INT in Table 9) as a predictor of initial reading proficiency in fall 2018, as well as a moderator of the growth trajectory components (time and time squared). Influences due to the number of interventions would reflect differential starting points or altered growth in reading proficiency as a function of increasing frequency of intervention contact.

Kindergartners

Among kindergarteners, growth in reading proficiency over time followed the expected linear increase and flattening pattern consistent with previous findings. The number of AC interventions experienced did relate negatively to the first FAST assessment in fall 2018, such that each additional intervention received corresponded to lower average FAST scores. Number of AC interventions also interacted with both the linear and non-linear components of time but in opposite signs (see Table 9). As the number of interventions increased, linear growth slowed but quadratic growth increased resulting in a 'catch-up' effect. Although students receiving multiple interventions finished the year with significantly lower average FAST scores relative to students receiving only a single intervention, the difference in spring 2019 FAST scores decreased as students received more AC intervention support (see Figure 13).

Figure 13. Growth by Number of AC Interventions Received (K)

Growth by AC Interventions
Kindergarten

— 1 Intervention — 5 Interventions — 10 Interventions — 20 Interventions

Average FAST Score (y-axis: 0, 10, 20, 30, 40, 50, 60, 70, 80)

x-axis: Fall, Winter, Spring
2018-2019 Assessment
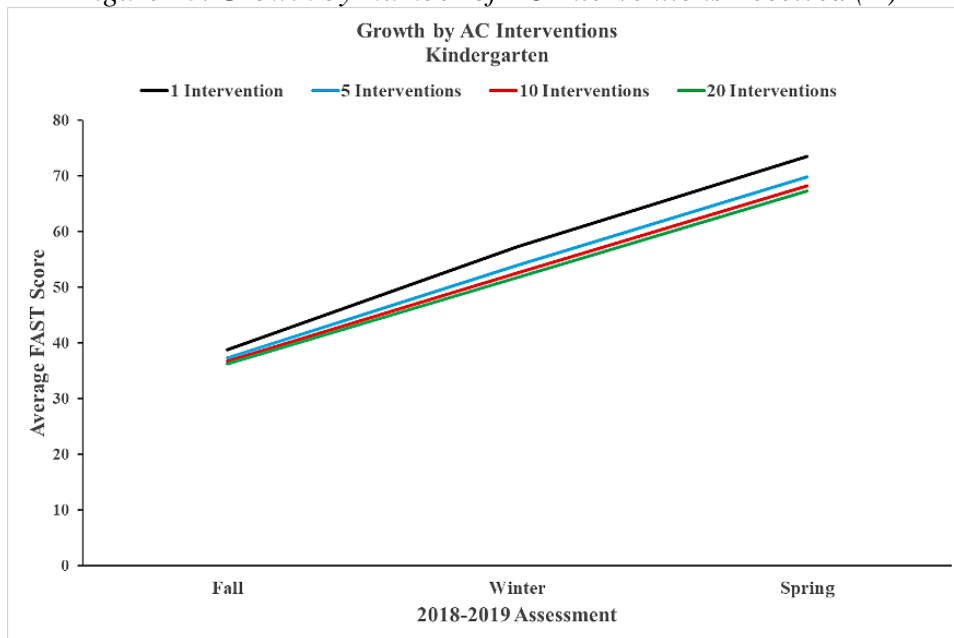
1st Graders

Results among 1st graders were reasonably consistent with regard to growth over time. Once again, the number of AC interventions related negatively to fall 2018 FAST scores. Although the interaction between time and number of interventions received suggested a similar catching up pattern (see Figure 14), neither the linear nor the quadratic interaction achieved statistical significance (see Table 9). Finally, the number of interventions received did continue to relate negatively and significantly to average FAST scores in spring 2019, such that those receiving more interventions finished the year lower on average than did students receiving fewer interventions.

Figure 14. Growth by Number of AC Interventions Received (1st)

Growth by AC Interventions
1st Grade

— 1 Intervention — 5 Interventions — 10 Interventions — 20 Interventions

Average FAST Score (y-axis: 0, 10, 20, 30, 40, 50, 60, 70)

x-axis: Fall, Winter, Spring
2018-2019 Assessment
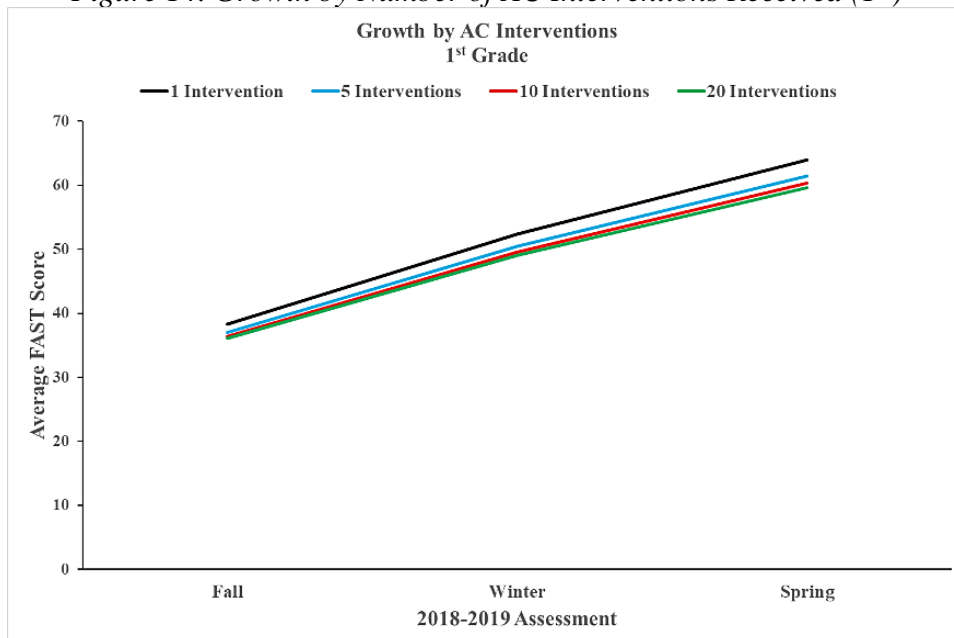
2nd Graders

Growth in reading proficiency among 2nd graders only demonstrated a linear increase over time without a significant flattening at the end of the year. Number of interventions received related negatively to MAP scores at the beginning of the year. Although neither of the time by intervention count interactions was statistically significant (see Table 9), the effect estimates (i.e., negative linear interaction and positive quadratic interaction) were consistent with a maintenance pattern (see Figure 15), such that greater invention appears to reduce proficiency disparities. Although those students receiving multiple interventions appear to be maintaining, average MAP scores at the end of the year were significantly lower among those receiving greater intervention support.

Figure 15. Growth by Number of AC Interventions Received (2nd)
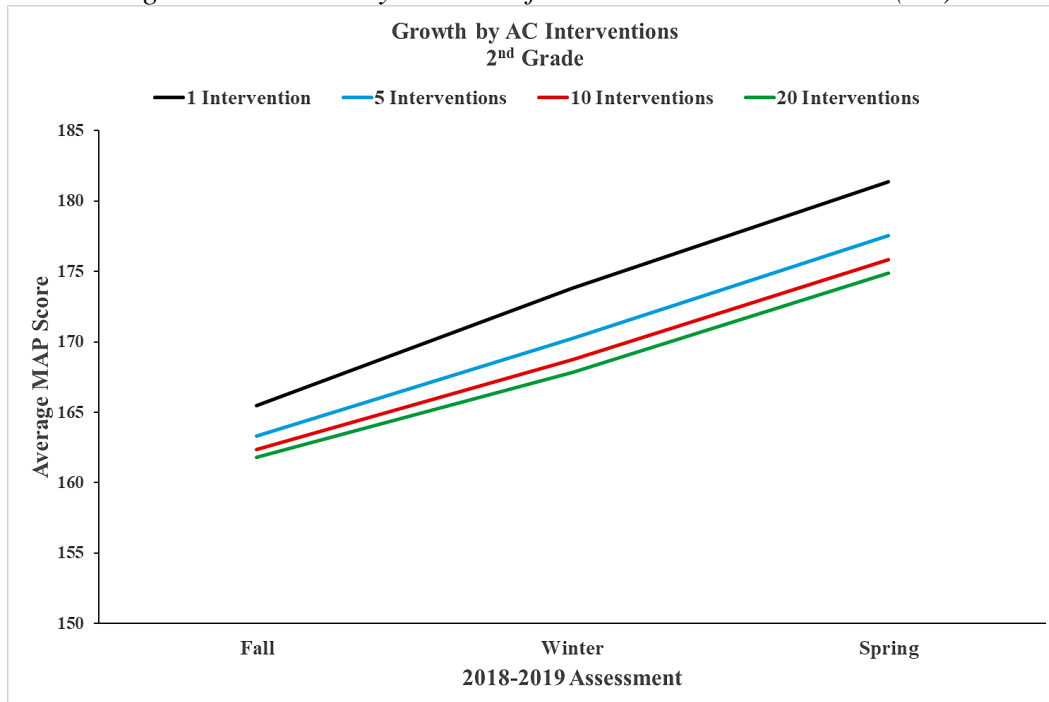
Table 9. Growth by Number of AC Interventions Received (K-2)

Predictor	Kindergarten			1st Grade			2nd Grade		
	B	t	p	B	t	p	B	t	p
Intercept	38.81	9.73	<.001	38.27	8.17	<.001	165.50	24.10	<.001
FAST (S2018)				1.13	30.27	<.001	0.35	16.99	<.001
Time	19.68	24.89	<.001	15.44	13.69	<.001	8.74	8.10	<.001
Time^2	-1.15	-3.94	<.001	-1.31	-3.17	.01	-0.40	-0.80	.42
INT	-0.91	-4.51	<.001	-0.82	-2.08	.04	-1.37	-2.65	.01
Time*INT	-1.59	-4.06	<.001	-0.45	-0.76	.45	-1.18	-1.72	.09
Time^2*INT	0.45	2.54	.01	0.04	0.15	.88	0.33	1.03	.31
Home Language	-2.46	-4.72	<.001	-0.72	-0.72	.47	-3.80	-3.22	.01
Free Lunch	-2.85	-5.25	<.001	-1.14	-0.96	.34	-2.21	-1.53	.13
Reduced Lunch	-3.02	-4.10	<.001	-1.53	-0.94	.34	-1.84	-1.03	.30
ELL	1.27	3.77	<.001	0.67	1.44	.15	0.99	1.89	.06
Attendance	0.10	3.27	.01	-0.06	-0.68	.49	0.17	1.83	.07
IEP Level	-0.28	-1.19	.23	1.87	2.95	.01	-2.87	-5.01	<.001
Poverty Index (ACS)	-0.22	-0.36	.73	-1.71	-2.45	.03	-3.69	-3.34	.01
% ELL (school)	0.04	0.61	.55	0.05	0.68	.51	0.04	0.42	.68
% Special Ed (school)	0.21	1.41	.18	-0.06	-0.38	.71	-0.06	-0.27	.80
% F/R Lunch (school)	-0.06	-1.03	.32	0.01	0.15	.88	0.06	0.62	.55

Note: INT is the natural log transformation of the number of AC interventions received during the year.

3rd Graders

Results for 3rd graders were strikingly consistent with those for younger students, in that the growth in reading proficiency increased and leveled out during the year. Number of interventions received corresponded with lower average MAP scores in fall 2018. Once again, the interactions with time were not statistically significant (see Table 10) but the signs of the coefficients were consistent with the maintenance pattern discussed above (see Figure 16). Although patterns do suggest some recovery with greater intervention service, average MAP scores were still significantly lower at the end of the year among students who continued to receive AC support.

Figure 16. Growth by Number of AC Interventions Received (3rd)
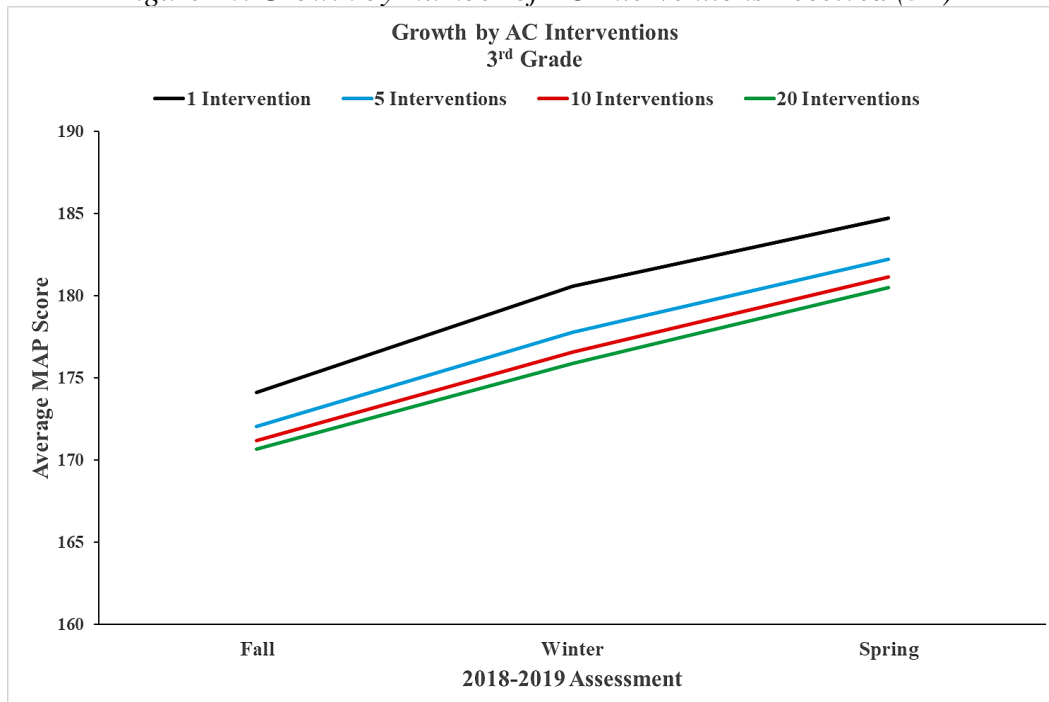
4th Graders

Among 4th graders, the trajectory of growth in MAP scores was consistent with previous findings. However, the number of interventions received did not relate to average MAP scores early in the school year. Once again, the interactions with time were consistent with maintenance effects but not statistically significant (see Table 10). The marginally significant interaction between the number of interventions received and the linear component of time suggests a larger disparity in MAP scores at the end of the year. As shown in Figure 17, this marginal interaction did result in a small, but statistically significant, difference in average MAP scores on the spring 2019 assessment (see Figure 17).

Figure 17. Growth by Number of AC Interventions Received (4th)
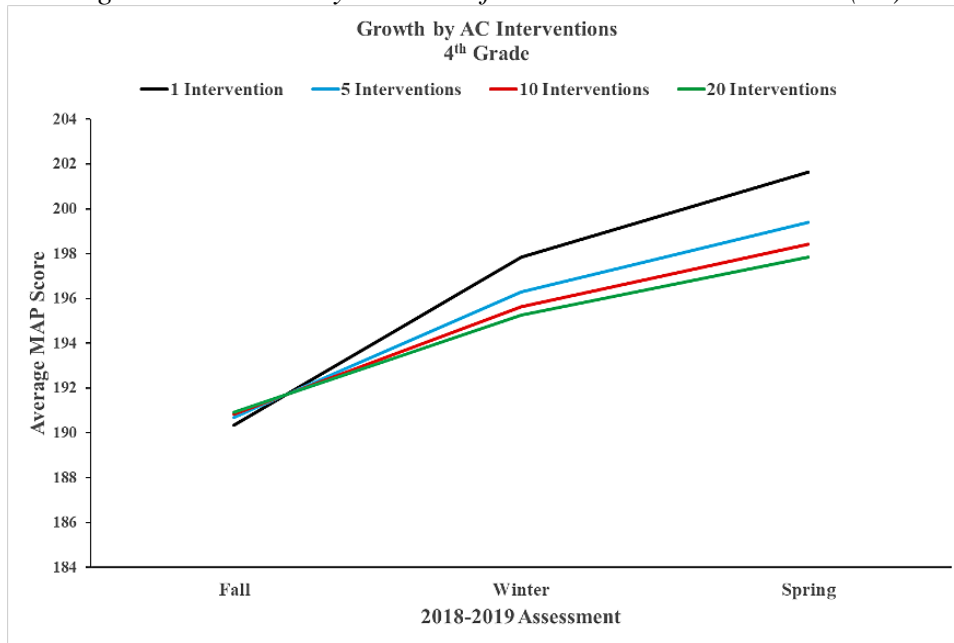
5th Graders

Students in 5th grade demonstrated only a linear growth component over time. Neither the number of interventions received, nor the interactions with time were statistically significant (see Table 10). Although Figure 18 appears consistent with the pattern of maintenance seen in the earlier grades, the coefficients related to the interaction terms suggest a reversed pattern. Specifically, the positive interaction with time suggests a steeper rate of growth per number of interventions received, while the negative quadratic interaction suggests a faster flattening in growth as the number of interventions increases. Importantly, the average difference in MAP scores at the end of the year as a function of increased intervention contact was statistically significant but the magnitude of the difference at year-end appears to be reducing as a function of AC supports provided (see Figure 18).

Figure 18. Growth by Number of AC Interventions Received (5th)
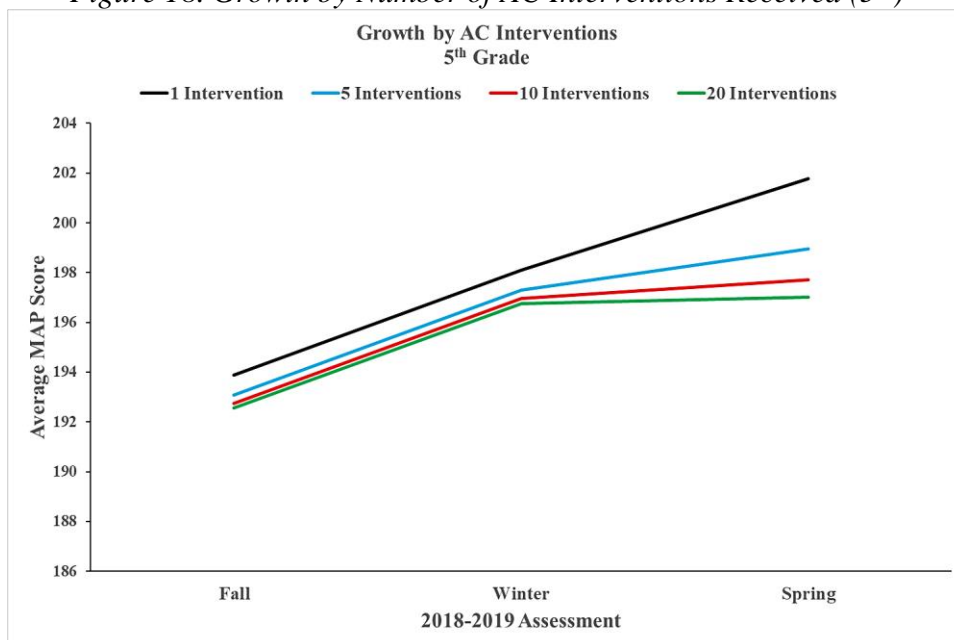
Table 10. Growth by Number of AC Interventions Received (3rd-5th)

| Predictor	3rd Grade			4th Grade			5th Grade		
	B	t	p	B	t	p	B	t	p
Intercept	174.12	24.70	< .001	190.33	32.33	< .001	193.87	17.40	< .001
MAP (S2018)	0.66	16.02	< .001	0.58	14.16	< .001	0.62	10.52	< .001
IA Assessment (2018)				0.20	6.66	< .001	0.11	2.71	.01
Time	7.67	6.32	< .001	9.38	6.90	< .001	4.51	2.34	.02
Time^2	-1.18	-2.13	.03	-1.86	-2.93	.01	-0.28	-0.33	.74
INT	-1.27	-2.00	.05	0.22	0.41	.69	-0.49	-0.55	.59
Time*INT	-0.80	-1.16	.25	-1.54	-1.86	.06	0.62	0.51	.61
Time^2*INT	0.32	1.02	.31	0.37	0.95	.34	-0.63	-1.11	.27
Home Language	-1.46	-1.01	.31	-1.08	-0.87	.38	2.14	1.11	.27
Free Lunch	2.92	1.88	.06	-3.53	-2.58	.01	-1.36	-0.69	.49
Reduced Lunch	0.15	0.07	.94	-4.07	-2.28	.02	-0.49	-0.20	.84
ELL	0.93	1.83	.07	0.72	1.44	.15	-1.15	-1.05	.30
Attendance	0.09	0.83	.41	0.07	0.78	.44	0.12	0.91	.36
IEP Level	-4.60	-6.27	< .001	-1.77	-3.27	.01	-0.31	-0.38	.71
Poverty Index (ACS)	-2.14	-1.85	.09	-1.65	-1.82	.09	-2.98	-1.78	.13
% ELL (school)	-0.09	-0.81	.44	0.16	2.12	.06	-0.02	-0.17	.88
% Special Ed (school)	0.30	1.18	.27	0.10	0.50	.63	0.23	0.50	.64
% F/R Lunch (school)	0.02	0.15	.89	-0.11	-1.35	.20	-0.07	-0.51	.64

Note: INT is the natural log transformation of the number of AC interventions received during the year.

Evaluation Question 2A: General Findings

In each of the earlier grades (K – 3rd), the number of AmeriCorps interventions received related significantly to initial levels of reading proficiency in fall 2018. This finding is not terribly surprising in that intervention services were being provided for students before the fall assessment. Interestingly, the number of interventions received did not relate to fall assessment scores for students in the later grades (4th and 5th). Although not consistently statistically significant, interactions between the number of interventions received and time were also very similar across K-4 students. In each grade, the number of interventions related negatively with time, but positively with the quadratic component of time, suggesting a pattern in with greater intervention contact appears to reduce disparity in reading proficiency. Importantly, greater intervention frequency was consistently related to lower reading proficiency at year-end, but the magnitude of the difference in proficiency scores appears to shrink slightly as a function of continued intervention service. Contrary to this general pattern, 5th grade students demonstrated reversed relationships between service frequency and growth, such that increase intervention contact appears to continue flattening the trajectory of reading proficiency growth.

Evaluation Question 2B

Do AmeriCorps services provide added benefits in schools with service members in comparison to non-AmeriCorps schools with the same existing services?

A first step in addressing Question 2B involved identifying schools that were as similar as possible with the exception of an AmeriCorps member. Information provided regarding services/initiatives in non-AmeriCorps schools were limited to indicators of Title I funding and whether the school was a School for Rigor. All of the DMPS schools were Schools of Rigor and the majority were Title I funded. Importantly, data provided by DMPS indicated that no students within schools were receiving Title I reading support. Finally, as indicated earlier, all DMPS schools were using the Lexia Core5 program during the 2018-2019 year. Due to somewhat limited information regarding other reading-related supports at non-AmeriCorps schools, schools were matched on indices that attempted to equate specific building composition factors as well as neighborhood poverty and disadvantage. Because of the small number of schools, school characteristics described above were combined to obtain Mahalanobis distances reflecting an aggregate distance of each school from the 'middle' of all schools. Mahalanobis distance and PDI scores based on ACS data (see above), were used to propensity score match pairs of schools where one school provided AmeriCorps services and the other did not.

Table 11 provides propensity and distance information for each AmeriCorps school and corresponding matched non-AmeriCorps school for those buildings that could be closely matched. As shown in Table 12, matched buildings did not differ on the PDI or Mahalanobis distance measure, as expected, based on the propensity matching criteria. However, matched schools also did not differ in average school-level scores on the MAP, FAST, or Iowa assessments obtained for students in the prior academic year. Although based on limited service information, these results suggest that the matching approach did result in building pairs that were approximately comparable with regard to the primary student outcomes of interest. Of primary interest in the analyses reported below is whether AmeriCorps services at the building level (AC in Table 13) relate to initial levels of reading proficiency or moderate the growth in reading proficiency over time in relation to initial proficiency and growth in matched buildings that do not have an AmeriCorps member in the building. In all analyses, if AmeriCorps services were not provided within the target grade, both the AmeriCorps school and its matched non-AmeriCorps school were eliminated from the analysis.

Table 11. Matching AC and Non-AC Schools

AmeriCorps Schools				Matched Non-AmeriCorps Schools		
School	Propensity Score	Mahalanobis Distance		School	Propensity Score	Mahalanobis Distance
Brubaker	.530	6.343		Perkins	.503	5.456
Findley	.654	8.322		Hubbell	.606	4.796
Jackson	.762	6.481		Studebaker	.773	5.306
King	.623	14.050		Garton	.583	8.093
Morris	.669	3.325		Cattell	.644	8.636
River Woods	.704	8.483		Lovejoy	.746	4.741
South Union	.749	4.274		Carver	.741	10.774
Walnut	.248	18.916		Edmunds	.233	26.403
Willard	.359	16.938		Pleasant Hill	.341	9.941
Windsor	.468	6.548		Jefferson	.444	7.903
Wright	.358	12.149		Hanawalt	.383	6.629

Table 12. Baseline Equivalence across Matched Schools

Variable	AmeriCorps Schools		Non-AmeriCorps Schools		F	p
	M	SD	M	SD		
ACS Poverty and Disorder Index	0.13	0.80	-0.08	1.12	0.26	.61
Mahalanobis Distance	9.6	5.17	8.98	6.14	0.07	.80
Mean IA Assessment Score (2018)	188.16	7.20	192.11	11.64	0.92	.35
Mean MAP Assessment Score (S2018)	191.53	4.78	192.55	5.50	0.22	.65
Mean FAST Assessment Score (S2018)	69.18	4.59	68.82	4.48	0.04	.86

Kindergartners

Among kindergarteners, average FAST scores did not differ significantly across AC and non-AC schools. Linear and quadratic effects of time indicated growth that flattened out over the academic year. Lack of a significant linear time by AC interaction indicated approximately equal growth over the year but a statistically significant quadratic interaction with AC status suggests greater slowing of growth within the AC schools (see Table 13). Importantly, as shown in Figure 19, even with greater decline in growth over time, kindergarten students in AC schools did not differ significantly (-0.23 points) in average FAST scores from kindergarteners in non-AC schools.

Figure 19. AC Schools vs. Non-AC Schools (K)

AC Service vs. No AC Service
Kindergarten

--- Non-AC --- AC
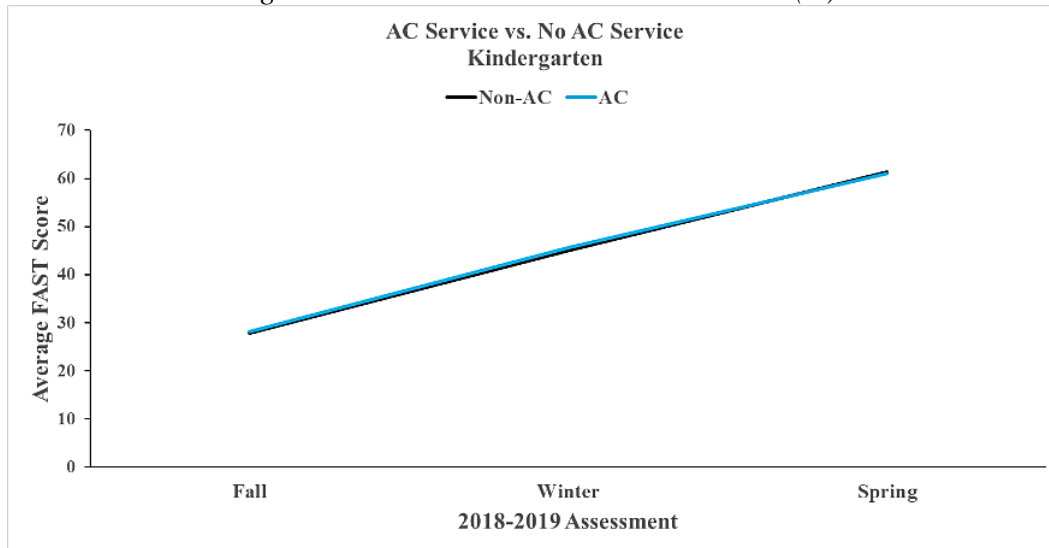
1st Graders

Average FAST scores also did not differ at the beginning of the year between students in AC schools and students in Non-AC schools among 1st graders. Consistent with the general growth trajectory observed earlier, linear and nonlinear effects indicated growth and leveling off over the academic year. Lack of a linear by AC status interaction indicated parallel growth over time but the significant nonlinear time by AC status interaction suggests more rapid flattening of growth among 1st graders in AC schools (see Table 13). More rapid flattening did correspond with slightly lower (3.73 points) average FAST scores at the end of the year among students in AC schools (see Figure 20), but the difference was not statistically significant.

Figure 20. AC Schools vs. Non-AC Schools (1st)

AC Service vs. No AC Service
1st Grade

--- Non-AC --- AC

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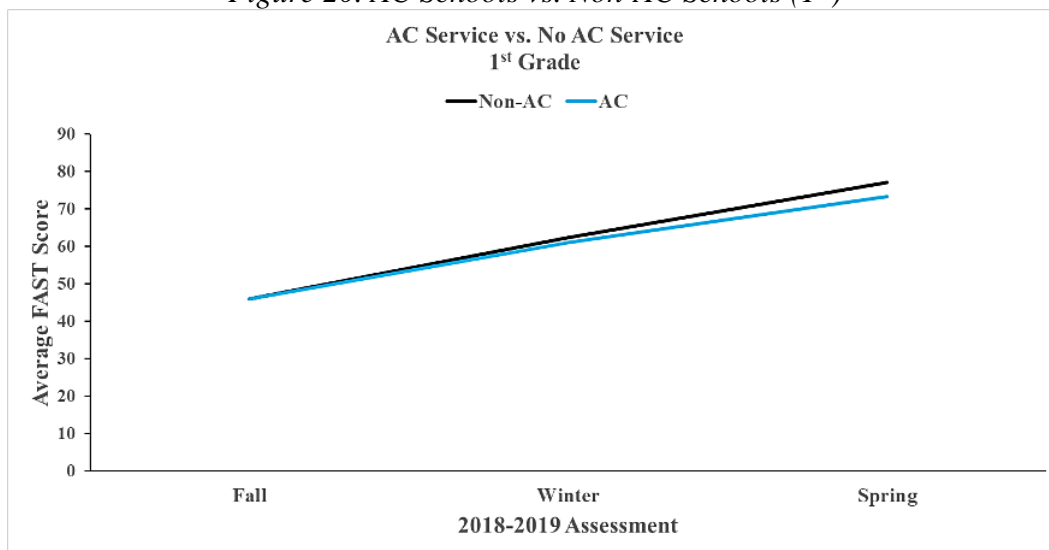
2nd Graders

Second grade students did not differ in average MAP assessment scores at the beginning of the year. Linear time effects indicated growth over the year but no evidence of flattening in the absence of a quadratic time component (see Table 13). Neither of the time by AC status interactions were significant, indicating nearly identical growth trajectories in MAP scores across AC and Non-AC schools. As shown in Figure 21, consistent with approximately equal starting points and nearly identical growth, average MAP scores at year-end did not differ between students in AC schools and those in non-AC schools.

Figure 21. AC Schools vs. Non-AC Schools (2nd)
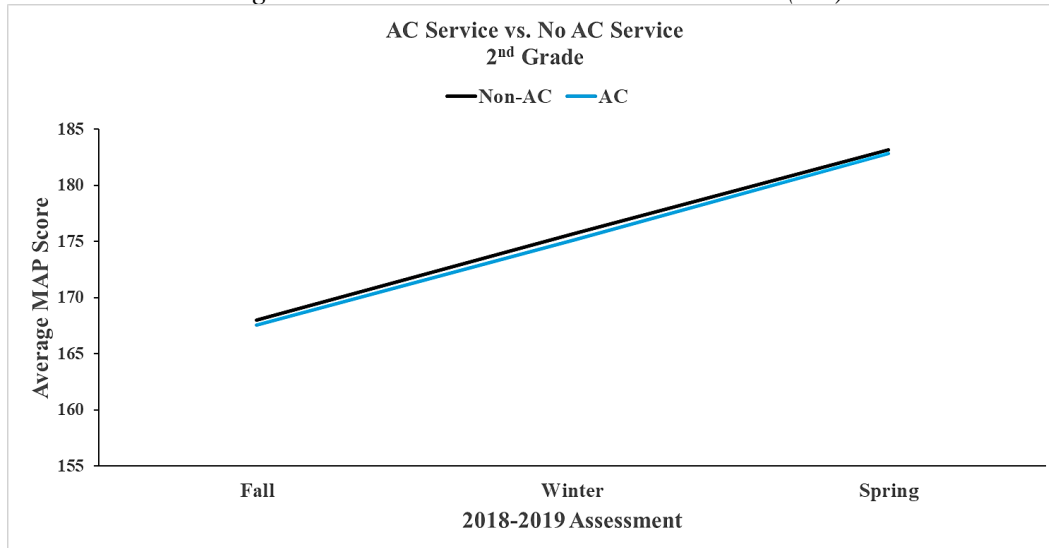
Table 13. AC Service vs. No AC Service in Matched Schools (K-2nd)

Predictor	Kindergarten			1st Grade			2nd Grade		
	B	t	p	B	t	p	B	t	p
Intercept	27.89	8.46	< .001	46.04	7.02	< .001	168.03	24.07	< .001
FAST (S2018)				1.31	55.65	< .001	0.37	33.58	< .001
Time	17.47	34.41	< .001	17.04	18.70	< .001	7.76	12.78	< .001
Time^2	-0.39	-2.30	.02	-0.74	-3.29	.01	-0.09	-0.36	.72
AC	0.25	0.36	.72	-0.05	-0.05	.96	-0.48	-0.32	.75
Time*AC	1.16	1.63	.11	-0.47	-0.36	.72	-0.23	-0.27	.79
Time^2*AC	-0.70	-3.02	.01	-0.69	-2.19	.03	0.15	0.42	.67
Home Language	-2.87	-7.13	< .001	-0.59	-0.83	0.41	-4.59	-6.19	< .001
Free Lunch	-2.82	-7.91	< .001	-1.93	-2.84	.01	-3.92	-5.64	< .001
Reduced Lunch	-3.14	-5.92	< .001	-1.08	-1.15	.25	-3.14	-3.33	< .001
ELL	1.30	4.98	< .001	0.94	2.88	.01	1.35	4.74	< .001
Attendance	0.15	5.49	< .001	-0.02	-0.40	.69	0.10	1.72	.09
IEP Level	-0.80	-4.76	< .001	2.74	7.51	< .001	-1.74	-4.94	< .001
Poverty Index (ACS)	1.24	2.35	.03	-0.42	-0.49	0.63	0.26	0.23	.82
% ELL (school)	-0.09	-1.92	.07	-0.07	-0.84	0.42	-0.09	-0.83	.42
% Special Ed (school)	0.08	0.64	.53	-0.13	-0.63	0.54	0.10	0.37	.72
% F/R Lunch (school)	-0.05	-1.25	.23	0.02	0.28	0.78	-0.02	-0.24	.82

3rd Graders

Although not statistically significant, 3rd grade students in AC schools started the year with slightly higher (1.18 points) average MAP scores than did students in non-AC schools. Linear and nonlinear effects of time indicate the typical growth and leveling off pattern over the academic year. Interactions between AC status and both components of time suggest differential effects (see Table 14). First, the linear interaction with AC status indicates a significantly slower rate of growth among students in AC schools, relative to students in Non-AC schools. However, the nonlinear interaction with AC status indicates that 3rd grade students in AC schools do not level off as fast as do students in Non-AC schools. As shown in Figure 22, this decrease in the rate at which growth slows overcomes the slower rate of growth over time, such that 3rd grade students in AC schools finish the year with slightly, but not significantly, higher average (0.50 points) MAP scores than students in Non-AC schools.

Figure 22. AC Schools vs. Non-AC Schools (3rd)
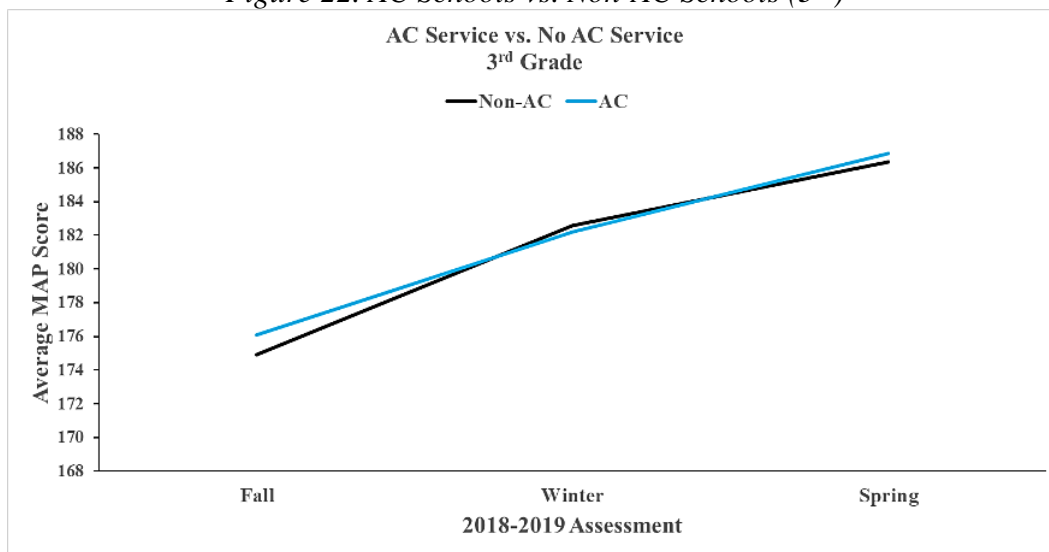
4th Graders

Among 4th grade students, average MAP scores at the beginning of the year did not differ across AC and Non-AC schools. Linear and quadratic time effects demonstrate growth and leveling off over the academic year. Neither time component interacted with AC status (see Table 14) indicating nearly identical growth trajectories over time culminating in approximately equal (1.06 point difference) average MAP scores by the end of the year. Although not statistically significant, 4th grade students in AC schools demonstrated slightly higher average MAP scores than did students in Non-AC schools at the end of the school year.

Figure 23. AC Schools vs. Non-AC Schools (4th)

Figure 23. AC Schools vs. Non-AC Schools (4th)
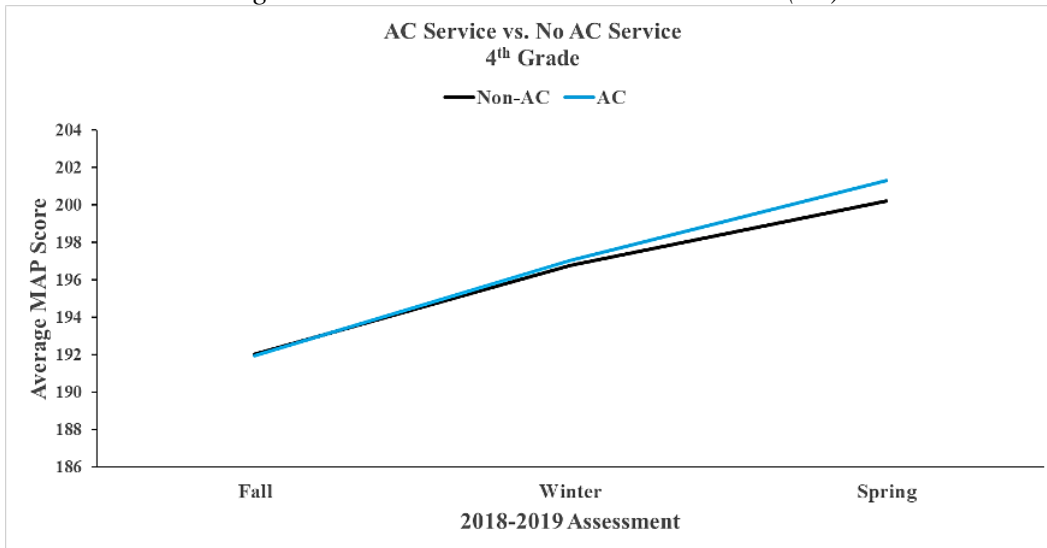
5th Graders

Fifth grade students in AC schools started the year with slightly, but not significantly lower average (1.33 points) MAP scores than did students in Non-AC schools. Time effects indicated linear growth but no significant slowing over the year. Interactions between time components and AC status mirrored those observed among 3rd graders in that the linear growth in MAP scores was slower for 5th grade students in AC schools than 5th grade students in Non-AC schools. However, the marginally significant quadratic interaction reflected less reduction in growth among students in the AC schools (see Table 14). This reduced slowing, as shown in Figure 24, resulted in AC students still scoring lower on average (3.22 points) at year-end than Non-AC students, but the difference was not statistically significant.

Figure 24. AC Schools vs. Non-AC Schools (5th)

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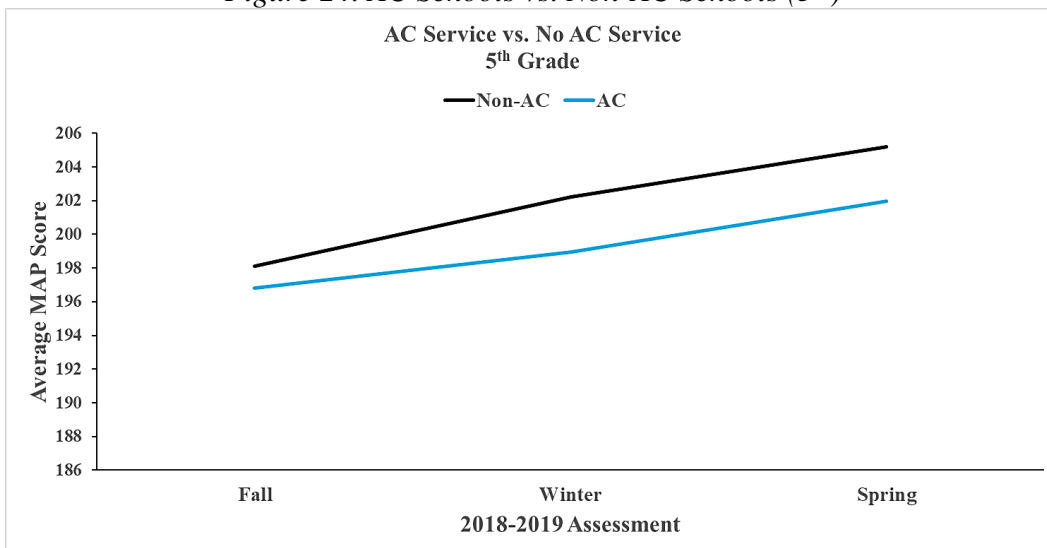
Table 14. AC Service vs. No AC Service in Matched Schools (3rd-5th)

Predictor	3rd Grade			4th Grade			5th Grade		
	B	t	p	B	t	p	B	t	p
Intercept	174.94	29.08	<.001	192.04	39.23	<.001	198.13	27.73	<.001
MAP (S2018)	0.75	41.90	<.001	0.61	34.22	<.001	0.60	22.46	<.001
IA Assessment (2018)				0.16	14.20	<.001	0.13	10.43	<.001
Time	9.67	15.32	<.001	5.40	9.38	<.001	4.69	5.43	<.001
Time^2	-1.97	-7.73	<.001	-0.65	-2.60	.01	-0.58	-1.59	.11
AC	1.18	1.14	.27	-0.08	-0.09	.93	-1.33	-1.00	.37
Time*AC	-2.80	-3.06	.01	0.08	0.10	.92	-2.97	-2.33	.02
Time^2*AC	1.23	3.31	.01	0.25	0.70	.48	1.01	1.87	.06
Home Language	-1.10	-1.58	.11	-1.00	-1.94	.05	-1.08	-1.49	.14
Free Lunch	-1.45	-2.26	.02	-0.91	-1.95	.05	-1.24	-1.83	.07
Reduced Lunch	-2.56	-3.03	.01	0.01	0.01	.99	0.06	0.07	.94
ELL	0.75	3.46	<.001	0.38	2.27	.02	0.44	1.96	.05
Attendance	0.10	2.01	.05	0.01	0.19	.85	0.01	0.12	.90
IEP Level	-3.60	-11.73	<.001	-1.89	-8.51	<.001	-1.43	-4.42	<.001
Poverty Index (ACS)	-0.50	-0.58	.57	-0.53	-0.69	.50	-0.21	-0.16	.88
% ELL (school)	0.02	0.29	.78	0.04	0.59	.56	-0.10	-1.08	.33
% Special Ed (school)	-0.02	-0.10	.92	0.19	1.07	.30	0.26	1.29	.26
% F/R Lunch (school)	-0.04	-0.58	.57	-0.05	-0.87	.39	0.03	0.27	.80

Evaluation Question 2B: General Findings

The general pattern of results presented above is consistent in both the lack of relationships between AC member status and reading proficiency at both the beginning of the year and over time. In cases where AC member presence was related to proficiency growth, the relationship involved the quadratic component of time indicating a more rapid decline in linear growth among students in AC schools. Even though students in some grades demonstrated this slowing of growth, average levels of reading proficiency did not differ significantly across AC and non-AC schools in any grade. Although speculative, results for students in 3rd and 4th grade suggest possible gains among students in schools served by AmeriCorps members, relative to their peers in non-AmeriCorps schools. In the absence of compelling statistical support, clear evidence of an additive benefit of AmeriCorps member presence is not available. However, it is important to note that schools largely drive the selection process of AmeriCorps. Specifically, of the 11 non-AmeriCorps matched schools in the previous analyses, almost half ($n = 5$; 45.5%) indicated no interest in having an AmeriCorps member in the building. In the absence of additional information, a possible reason for lack of apparent additive benefits of member presence could reflect the use of alternative supports at non-AmeriCorps schools that could not be used in the matching process.

Evaluation Question 3: Do schools with AmeriCorps members providing services demonstrate higher student proficiency and provide increased benefits to students in comparison to schools without AmeriCorps service providers?

Evaluation Question 3A

Does presence of an AmeriCorps member provide increased benefits to students through impact on variability in reading proficiency relative to students in buildings without AmeriCorps services?

To examine whether presence of an AmeriCorps member impacted variability in student reading proficiency growth, a school-level model was estimated within each grade. Because the presence of a single AmeriCorps member reflects a school-level characteristic, only building level covariates were included in the model. Student assessments on either the FAST (K and 1st) or the MAP (grades 3-5) were modeled with a linear growth curve. The student-level model excluded the quadratic effect for time for simplicity, but also because only the intercept and linear growth terms were allowed to vary across schools. Building-level covariates included total enrollment, Title I funding, percentage of Asian, African American, Hispanic/Latino, Native American, Mixed Race, and Pacific Islander students, as well as percentage of ELL and special education students, and the percentage of students eligible for free/reduced lunch. Other possible controls, including use of Lexia Core 5 and identification as a school for rigor were constants across the DMPS schools. Analyses were conducted within grade level and only included AmeriCorps schools serving the corresponding grade. Comparison schools reflected all non-AmeriCorps schools but, again, only included students in the corresponding grade within each analysis.

The baseline model included the growth model with random components for intercepts and linear slopes at both the student and building level. The comparison model added both the main effect of AC Member presence (i.e., prediction of the growth intercept), and the interaction between AC Member presence and linear time (i.e., prediction of the growth slope). Because interest centered on building-level influences, no student-level covariates or controls were included in the models. As such, reductions in variability were not expected for the student-level intercept and slope. Given that most of

the variability in growth occurred at the student level, most reductions in growth parameter variance at the student level were zero or negative (essentially zero), consistent with the exclusion of student-level variables (Singer & Willett, 2003; Kreft & de Leeuw, 1998; Snijders & Bosker, 1999).

As shown in Table 15, formal deviance tests did not indicate significant reductions in variance at the school-level due to presence of an AmeriCorps member within each corresponding grade. However, in some cases, member presence did correspond to either a marginal model improvement or a non-trivial reduction in growth variability between schools. Aside from the anomalous results among 4th grade students, AC member presence corresponded with approximately a 4% reduction in intercept variance (i.e., FAST or MAP scores in fall 2019) across buildings. Slope variances were not so consistent with relatively little influence in most grades, with the exception of larger reductions in building-level variability in grades 1 and 3.

Table 15. Variance Reduction due to AC Member Presence

Grade	School Model		School Model +AC Presence		χ^2	p	Variance Reduction (%)	
	Intercept Variance	Slope Variance	Intercept Variance	Slope Variance			Intercept Variance	Slope Variance
Kindergarten	0.589	1.542	.564	1.536	1.10	.58	4.24	0.37
1st Grade	3.273	7.150	3.134	6.018	5.20	.07	4.23	15.83
2nd Grade	2.473	0.716	2.376	0.709	2.50	.29	3.93	0.87
3rd Grade	0.732	0.848	0.817	0.695	4.50	.11	0.00	17.99
4th Grade	0.661	1.077	0.210	1.063	2.80	.25	68.23	1.24
5th Grade	1.299	0.705	1.227	0.703	0.70	.70	5.54	0.30

Note: Maximum Likelihood (ML) estimation. Deviance chi-squares evaluated on two degrees of freedom.

Evaluation Question 3A: General Findings

Findings revealed suggestive evidence that availability of AmeriCorps services did slightly reduce building-level variability in reading proficiency; however, such influences were generally limited to the initial assessments obtained in fall 2018. Consistent with potential issues involving other available services described in the general findings above, it is possible that the impact of AmeriCorps member presence is muted due to alternative supports available in other non-AmeriCorps schools. In addition, and perhaps more importantly, results from the specific analyses for Evaluation Question 3A and findings from the previous analyses presented above are consistent in terms of variability in the growth of reading proficiency. Although the general modeling strategy consistently included random components for the intercept and linear slope at the building level, these components were not always statistically significant. While there was non-zero variability at the school level in most analyses, the bulk of variance in reading proficiency growth clearly occurs at the individual level. That is, variation in starting points and growth occurs largely between individual students, with substantially less variability occurring across schools. As such, the findings directly above might be expected if individual student growth is facilitated and maintained by different support services within school buildings.

Evaluation Question 3B

Does growth in reading proficiency differ as a function of whether students who are flagged for support by the Lexia Core5 program receive intervention services from AmeriCorps members?

This comparison intended to compare reading proficiency growth among students flagged by Lexia who received intervention services in AmeriCorps schools and students flagged by Lexia who did not receive intervention services in AmeriCorps schools. Of primary importance, this set of planned comparisons would equate students on the need for intervention services using the same metric which would then allow a rigorous comparison of whether AmeriCorps intervention was successful in comparison to students at non-AmeriCorps schools at the same level of support need. Although the Lexia Core5 program was in use within all DMPS schools, flagging data were not available for use in this evaluation.

Evaluation Question 4: Do characteristics of AmeriCorps members or the modality of service delivery influence the effectiveness of services?

Evaluation Question 4A

Do AmeriCorps member hours/intervention loads or methods used for identifying students in need of intervention differentially relate to reading proficiency growth?

AmeriCorps member hours only varied in blocks of 20, 30, 35, and 40 with relatively few members working more than 30 hours per week. Although not entirely consistent across all placements, members who worked more hours generally did so across a larger number of grades. For example, only one 20-hour member (~12%) served all six grades whereas three 40-hour members (75%) did so. Similar disparities exist with regard to hours of service in that individual members might provide far fewer or far more interventions than other members at the same hourly commitment. For example, one 35-hour member provided more than 1200 interventions while another 35-hour member provided fewer than 400. While this disparity could indicate quicker or more prolonged intervention, it could also reflect duration of assignment at a particular school. Alternatively, differential intervention loads could reflect greater intervention frequency with fewer students relative to delivering fewer interventions to a larger group of students. Given the difficulties inherent in disentangling service time, service breadth, and service volume, analysis focused only possible impacts of intervention efficacy due to use of different identification methods.

Although most AmeriCorps members indicated using some combination of identification methods, either relying on rosters or relying on flagging within the Lexia program, AmeriCorps staff provided information about the most commonly used method where available. Among the 21 DMPS schools that included an AmeriCorps member, primary identification method was not available for four buildings (Monroe, Walnut, Willard, or Windsor). Of the remaining 17 schools, most (10; 58.8%) relied primarily on Lexia Flagging, with fewer (7; 41.2%) relying primarily on roster identification for intervention services. Of primary interest in these analyses is whether identification method (Method in Table 16) influences initial levels of reading proficiency in fall 2018 or growth in reading proficiency across the school year. Findings indicating differences in proficiency or differences in proficiency growth would suggest that primary identification method is an important factor to consider in terms of intervention efficacy.

Across the earlier grades (K-2nd), AmeriCorps members relied primarily on Lexia flagging (approximately 66% vs. 34%) to identify students in need of intervention services. As shown in Table 16, identification method was not statistically significantly related to initial levels of reading proficiency or growth in reading proficiency over time. At the end of the school year, differences in average reading proficiency were not statistically significant but also mixed. Specifically, average reading proficiency among kindergartners at the end of the year was slightly (3.89 points) higher if students were identified via flagging. Alternatively, average reading proficiency was slightly higher (2.94 points) among 1st graders if identification relied primarily on rosters. Among 2nd graders, no apparent difference in reading proficiency was observed across flagging and roster identification methods.

Table 16. Intervention Efficacy by Identification Method (K-2)

Predictor	Kindergarten			1st Grade			2nd Grade		
	B	t	p	B	t	p	B	t	p
Intercept	35.24	6.57	< .001	39.89	7.39	.01	172.14	13.23	< .001
FAST (S2018)				1.12	27.48	< .001	0.36	16.93	< .001
Time	16.48	15.69	< .001	15.65	12.89	< .001	8.29	6.09	< .001
Time^2	-0.39	-1.25	.21	-1.12	-2.70	.01	-0.73	-1.23	.22
Method	1.25	1.60	.16	0.74	0.70	.52	-0.60	-0.25	.81
Time*Method	1.60	1.25	.22	-1.90	-1.24	.22	-1.31	-0.80	.43
Time^2*Method	-0.12	-0.30	.76	0.03	0.06	.95	1.03	1.44	.15
Home Language	-2.74	-5.03	< .001	-0.81	-0.76	.45	-3.69	-2.92	.01
Free Lunch	-2.72	-4.73	< .001	-2.04	-1.62	.11	-2.26	-1.41	.16
Reduced Lunch	-3.02	-3.87	< .001	-1.74	-1.01	.31	-1.89	-0.96	.34
ELL	1.41	4.07	< .001	0.67	1.39	.17	1.11	1.91	.06
Attendance	0.12	3.81	< .001	-0.11	-1.30	.20	0.16	1.71	.09
IEP Level	-0.11	-0.48	.63	1.91	2.85	.01	-2.53	-4.24	< .001
Poverty Index (ACS)	0.72	0.86	.42	-0.81	-0.93	.40	-1.74	-0.74	.49
% ELL (school)	-0.01	-0.13	.90	-0.01	-0.12	.90	-0.08	-0.43	.68
% Special Ed (school)	0.23	1.61	.14	-0.06	-0.39	.72	0.01	0.02	.99
% F/R Lunch (school)	-0.04	-0.53	.60	0.03	0.42	.71	-0.01	-0.08	.94

Note: Method reflects whether students were identified by rosters (0) or flagged by Lexia (1).

In later grades (3rd-5th), results were generally consistent. Although average levels of reading proficiency at the beginning of the year did not differ significantly as a function of identification method, the negative association across grades (see Table 17) suggests that students identified primarily by Lexia flagging were scoring lower than were students identified via rosters in fall 2018. Consistent with the lack of statistically significant associations, identification method did not interact with time, indicating that growth in reading proficiency across the school year did not differ whether identification relied on flagging or roster methods. Importantly, results in each grade revealed no significant differences in average reading proficiency at the end of the school year as a function of identification method.

Table 17. Intervention Efficacy by Identification Method (3rd-5th)

Predictor	3rd Grade			4th Grade			5th Grade		
	B	t	p	B	t	p	B	t	p
Intercept	155.88	14.97	< .001	181.59	27.08	< .001	177.51	9.36	< .001
MAP (S2018)	0.69	16.55	< .001	0.60	14.21	< .001	0.60	8.58	< .001
IA Assessment (2018)				0.20	6.17	< .001	0.13	2.84	.01
Time	5.67	4.18	< .001	8.33	5.28	< .001	2.63	1.33	.19
Time^2	-0.24	-0.39	.70	-2.07	-3.00	.01	0.19	0.22	.83
Method	-2.69	-1.23	.23	-1.87	-1.64	.10	-3.81	-1.11	.27
Time*Method	1.86	1.09	.28	-0.37	-0.18	.86	4.53	1.59	.12
Time^2*Method	-0.82	-1.04	.30	0.71	0.80	.43	-2.38	-1.89	.06
Home Language	-1.46	-0.97	.33	-0.98	-0.77	.44	2.33	0.96	.34
Free Lunch	2.82	1.74	.08	-4.30	-2.98	.01	-0.53	-0.21	.83
Reduced Lunch	-0.38	-0.17	.86	-4.86	-2.63	.01	-0.35	-0.12	.91
ELL	0.72	1.36	.18	0.80	1.60	.11	-1.01	-0.74	.46
Attendance	0.12	1.00	.32	0.08	0.90	.37	0.12	0.77	.44
IEP Level	-4.30	-5.68	< .001	-1.50	-2.66	.01	-0.40	-0.44	.66
Poverty Index (ACS)	-3.89	-2.21	.03	-0.98	-0.88	.38	-1.70	-0.58	.56
% ELL (school)	-0.03	-0.16	.88	0.10	1.04	.30	-0.25	-0.72	.48
% Special Ed (school)	0.17	0.62	.53	0.25	1.44	.16	0.73	0.91	.37
% F/R Lunch (school)	0.25	1.71	.09	0.01	0.12	.91	0.13	0.13	.57

Note: Method reflects whether students were identified by rosters (0) or flagged by Lexia (1).

Evaluation Question 4A: General Findings

With the exception of a suggestive relationship between lower initial reading proficiency among students identified vial Lexia flagging in grades 3-5, findings were generally consistent with regard to identification methods. Students across grades did not differ in rate of growth or average levels of reading proficiency at the end of the year, suggesting that use of Lexia flagging or rosters for intervention identification is equally efficacious. While the results point to no differences based on identification method, it is important to consider that most AmeriCorps members did indicate using some combination of both approaches. In addition, survey responses by AmeriCorps members (see Appendix D) indicate that use of both identification methods actually increased by the end of the academic year. Unfortunately, data available for this evaluation only included the primary identification method used by each AmeriCorps member. Though speculative, it is possible that meaningful differences could emerge if finer delineation were possible to isolate AmeriCorps members who relied solely on rosters or solely on Lexia flagging. Of course, the lack of findings could also be reflective of accurate identification of students in need of intervention support via both Lexia flagging and rosters. As AmeriCorps members indicated in the AmeriCorps survey (see Appendix C), most of the students who end up on rosters are also flagged by the Lexia system.

Evaluation Question 4B

Does modality of intervention delivery differentially relate to growth in reading proficiency?

To examine potential differences in intervention efficacy as a function of whether students received services in single or group formats, AmeriCorps staff provided information corresponding to each AC member. Of primary interest is whether interventions occurred in one-to-one or small group settings. While each AmeriCorps member likely engaged in both modes of intervention delivery, the primary mode of delivery was indexed. Across 20 AmeriCorps schools for which intervention data were available, the majority of intervention delivery ($n = 13$; 65% of schools) occurred in small groups. As a preliminary step in the analysis, intervention modality was crossed with identification method (see directly above) to avoid singularities that would yield redundant findings. In grades K-2 phi coefficients were generally small (.29 - .50) indicating that use of one identification methodology was not consistently redundant with mode of intervention delivery. Although identification method and delivery mode were not singular, all of the group delivery interventions among kindergartners occurred with AmeriCorps members who relied primarily on flagging for identification.

As shown in Table 18, results across the earlier grades were somewhat mixed with regard to delivery modality influences. Delivery method was not significantly related to initial levels of reading proficiency in fall 2018 for students in any of the three grades. A significant interaction between delivery method and time was observed among kindergarteners indicating slower linear growth in proficiency if interventions were primarily delivered in small group settings. Although not statistically significant, the estimate of the delivery method by time interaction was consistent among 1st graders, suggesting a similar potential decrease in intervention efficacy due to delivery method. The single interaction between delivery method and the quadratic component of time among 1st graders suggests a recovery of the slight decrease in linear growth across the school year. Although delivery method did relate to components of growth in reading proficiency in some cases, no significant differences in average reading proficiency were observed at the end of the year across students who received individual or group-based intervention services.

Table 18. Intervention Efficacy by Delivery Method (K-2)

Predictor	Kindergarten			1st Grade			2nd Grade		
	B	t	p	B	t	p	B	t	p
Intercept	35.84	7.33	< .001	36.63	8.11	< .001	163.72	19.80	< .001
FAST (S2018)				1.14	30.54	< .001	0.36	17.88	< .001
Time	19.40	19.46	< .001	16.19	12.33	< .001	6.68	5.46	< .001
Time^2	-0.74	-2.61	.01	-2.06	-4.83	< .001	0.24	0.45	.66
Delivery	-0.59	-0.54	.60	1.07	0.94	.38	-1.62	-0.75	.48
Time*Delivery	-2.75	-2.24	.03	-2.18	-1.35	.18	0.95	0.64	.53
Time^2*Delivery	0.31	0.86	.39	1.20	2.30	.02	-0.37	-0.55	.58
Home Language	-2.60	-4.93	< .001	-0.47	-0.47	.64	-3.96	-3.30	.01
Free Lunch	-2.84	-5.14	< .001	-1.48	-1.24	.21	-2.66	-1.81	.07
Reduced Lunch	-3.09	-4.12	< .001	-1.65	-1.01	.31	-2.44	-1.35	.18
ELL	1.38	4.02	< .001	0.61	1.31	.19	1.07	2.01	.05
Attendance	0.11	3.68	< .001	-0.06	-0.71	.48	0.13	1.40	.16
IEP Level	-0.16	-0.69	.49	1.90	2.96	.01	-2.64	-4.55	< .001
Poverty Index (ACS)	-0.10	-0.13	.90	-1.18	-2.04	.07	-3.05	-2.42	.04
% ELL (school)	0.06	0.73	.48	0.02	0.36	.73	0.01	0.02	.99
% Special Ed (school)	0.28	1.60	.14	-0.15	-1.09	.33	0.03	0.09	.93
% F/R Lunch (school)	-0.05	-0.71	.49	0.03	0.42	.71	0.08	0.60	.57

Note: Delivery reflects whether students received AC interventions one-on-one (0) or in small groups (1).

Influences on reading proficiency and growth in proficiency due to modality of intervention delivery were not observed among students in 3rd or 4th grade (see Table 19). Delivery of interventions via one-on-one or small group modes did not relate to initial levels of reading proficiency in fall 2018, linear/nonlinear growth in reading proficiency over time, or final levels of reading proficiency in spring 2019 for students in these grades. Results regarding initial levels of reading proficiency were consistent among 5th grade students. However, intervention delivery mode did interact with both the linear ($p = .06$) and nonlinear ($p = .01$) components of time. The negative interaction with the linear component of time indicates that 5th grade students who received intervention services in small groups demonstrated slower proficiency growth in comparison to 5th grade students who received one-on-one intervention services. The positive interaction with the nonlinear component of time indicates that those 5th graders who received interventions in group settings were actually more likely to accelerate proficiency growth across the school year, such that no average difference in reading proficiency remained at year-end between students receiving interventions under different delivery modalities.

Table 19. Intervention Efficacy by Delivery Method (3rd-5th)

Predictor	3rd Grade			4th Grade			5th Grade		
	B	t	p	B	t	p	B	t	p
Intercept	166.92	23.27	< .001	188.94	34.58	< .001	191.47	24.97	< .001
MAP (S2018)	0.68	16.63	< .001	0.59	14.14	< .001	0.62	10.47	< .001
IA Assessment (2018)				0.24	6.68	< .001	0.11	2.77	.01
Time	6.66	5.38	< .001	7.62	5.24	< .001	9.26	3.72	< .001
Time^2	-0.60	-1.07	.29	-1.34	-2.01	.05	-3.51	-3.08	.01
Delivery	0.44	0.23	.83	1.04	0.75	.46	-0.17	-0.10	.92
Time*Delivery	-0.11	-0.07	.95	-0.17	-0.09	.93	-5.39	-1.87	.06
Time^2*Delivery	-0.24	-0.33	.74	-0.11	-0.13	.90	3.31	2.53	.01
Home Language	-1.75	-1.20	.23	-1.33	-1.09	.28	2.12	1.10	.28
Free Lunch	3.08	1.96	.05	-3.59	-2.62	.01	-1.39	-0.71	.48
Reduced Lunch	0.37	0.18	.86	-4.06	-2.27	.02	-0.41	-0.17	.87
ELL	1.07	2.07	.04	0.84	1.72	.09	-1.09	-1.01	.32
Attendance	0.10	0.87	.39	0.06	0.68	.50	0.15	1.14	.26
IEP Level	-4.30	-5.81	< .001	-1.88	-3.52	< .001	-0.29	-0.35	.72
Poverty Index (ACS)	-1.07	-0.86	.41	-1.36	-1.36	.18	-2.77	-2.20	.03
% ELL (school)	-0.15	-1.20	.26	0.14	1.77	.08	-0.03	-0.29	.77
% Special Ed (school)	0.35	1.17	.29	0.06	0.25	.80	0.15	0.48	.63
% F/R Lunch (school)	0.08	0.72	.49	-0.09	-1.06	.29	-0.03	-0.33	.74

Note: Delivery reflects whether students received AC interventions one-on-one (0) or in small groups (1).

Evaluation Question 4B: General Findings

Delivery modality did not demonstrate consistent statistically reliable relationships with reading proficiency. Across grades, students receiving AmeriCorps interventions in one-on-one settings did not differ in initial reading proficiency, growth in reading proficiency, or reading proficiency at the end of the school year. Results did reveal suggestive evidence that the youngest students (K and 1st grade) and the older students (5th graders) might benefit more from individualized intervention delivery in terms of linear growth. However, it is important to balance small potential gains from providing one-on-one interventions with these students against the findings that mode of intervention delivery does not appear to relate to differences in year-end reading proficiency. While individualized delivery might be beneficial in terms of faster proficiency growth, intervention delivery in small group settings does not result in detrimental effects on overall proficiency development. Interestingly, AmeriCorps members were split in their responses (see Appendices C and D) about the impacts on learning of using either modality, with some members stressing the importance of one-on-one attention that teachers cannot provide, while other members stressed the importance of interactive learning provided in small group settings.

CONCLUSIONS

The first evaluation question sought to determine whether AmeriCorps member services impacted student growth in reading proficiency across the academic year. In comparisons between students who received AmeriCorps intervention support and students in the same grades, within the same schools, who did not receive intervention services, findings were generally consistent. As one might expect, students in need of services were generally performing poorly in relation to students who did not require services. Given that service provision was determined by decrements in reading proficiency within the Lexia Core 5 system, these findings are not surprising. However, in nearly all grades, students receiving AmeriCorps services maintained growth in reading proficiency that was comparable to their peers who did not require intervention supports. These findings suggest that AmeriCorps service provides a positive benefit to students who *receive services*. However, findings comparing students in schools served by AmeriCorps members across grades that were either served or not served by an AmeriCorps member did not reveal differential patterns of proficiency growth as a function of AmeriCorps member presence in the building versus actual service provision to students in a particular grade.

The second evaluation question addressed whether the amount of AmeriCorps service received related to differential reading proficiency growth. An obvious comparison to address this question focused on comparison reading proficiency growth among students in schools where AmeriCorps members provided services (service > 0) and schools that did not have an AmeriCorps member (service = 0). Findings were generally consistent in that reading proficiency growth was approximately consistent across schools, whether the school had an AmeriCorps service member or not. Although these findings suggest little benefit to having an AmeriCorps member in the building, comparisons of students receiving support services with regard to amount of service received painted a different picture. In schools where AmeriCorps members provided support, the amount of support services was consistently related to reading proficiency growth. While the amount of service received is necessarily tied to proficiency decrements (those falling behind require more support), findings indicated that increases in intervention frequency reduced proficiency deficits among students who received support services. That is, although a student receiving 10 interventions would be expected to score lower on a proficiency assessment than a student receiving no interventions, that same student who received 10 interventions did not continue to fall further behind a student who received only 5 interventions. These findings point strongly to efficacy of AmeriCorps interventions at *maintaining* reading proficiency growth among those students who require member support.

The third evaluation question intended to examine whether AmeriCorps service member presence resulted in an added benefit to students/schools in comparison to schools that did not have an AmeriCorps member. Findings were limited with regard to added benefits due to unavailable data regarding individual student need for support in non-AmeriCorps buildings and also by somewhat limited information about other services potentially available in all buildings. Generally, results were consistent in that AmeriCorps member presence did account for small amounts of variance in students initial proficiency assessments, but compelling evidence with regard to proficiency growth did not emerge.

The final evaluation question focused on potential moderators of intervention efficacy that might result from characteristics of the AmeriCorps member or variability in how the AmeriCorps members provided service in their respective buildings. Member characteristics were limited to workloads, intervention counts, and other factors that were largely difficult to isolate. Findings related to differential methods of identifying students in need of support services or differential modalities of delivering interventions consistently demonstrated that the efficacy of the AmeriCorps interventions did not differ across important differences in implementation. Specifically, use of flagging or rostering demonstrated no consistent effects across grades with regard to altered reading proficiency growth, whereas delivery of intervention services in one-on-one or small group settings were generally equally efficacious. These findings do seem promising in that lack of influences allows for greater flexibility, a common theme among members, in how AmeriCorps members are able to best deliver intervention services to the students who need additional support.

Collectively, the findings in this evaluation point to evidence that AmeriCorps member service does provide a benefit to students who receive services in that those students do not continue to fall further behind their peers over the course of the academic year. Specifically, parallel growth among those who did and did not receive AmeriCorps support, and decreased decrements in proficiency due to increase intervention experiences among those who did receive services clearly demonstrate that the services provided by AmeriCorps members are benefiting students. Overwhelming evidence of added benefit to schools due to AmeriCorps service was less compelling due largely to limitations on school-level programming and support data and, more importantly, to relatively little variance in reading proficiency growth across buildings.

Limitations

As described in the evaluation design section above, the inability to cleanly delineate intervention and comparison groups was known prior to conducting the evaluation. Although the evaluation plan aimed to account for this limitation by conducting multiple different comparisons to isolate potential confounding factors, additional unforeseen challenges did arise during the evaluation; these additional challenges reflect the bulk of limitations that will be discussed.

A primary limitation with regard to student data involved access to Lexia flagging of students in schools that did not include AmeriCorps members. Planned as a comparison of interest in the evaluation (see 3B above), this comparison would have provided useful information for equating students across AmeriCorps and Non-AmeriCorps schools with regard to their potential need for intervention services. In addition, availability of such data would have provided an index of student need on a consistent metric that could have been employed at both the individual student and school/building level.

A second important limitation centers on the ability to disentangle the assignment of AmeriCorps members from demonstrated student need. For example, an AmeriCorps member may be vital for providing services to 3rd grade students in one school but an AmeriCorps member in another school may be more needed in a different grade. Without some index of how determinations are made to distribute AmeriCorps member service loads within schools, it remains unclear whether students in grades without service do not have access to services because they are generally not needed (i.e., 3rd graders in School A are all progressing).

A final major limitation involves fidelity of AmeriCorps service use and availability of alternative services within schools. The current evaluation did not have strong data related to implementation fidelity (identification method and delivery mode, aside), and there was virtually no data available with regard to competing/complementing services in either AmeriCorps or non-AmeriCorps schools. Based on comments obtained from AmeriCorps members (see Appendix D), individual classrooms varied in their use of the Lexia Core 5 program (some did not use it at all). In some assignments, AmeriCorps members were often serving a different function (e.g., behavioral interventionists) than intended. Finally, members acknowledge occasional difficulty in locating their intervention (flagged) students because those students were already involved in other (non-AmeriCorps) intervention supports. These fidelity concerns are not inherently the responsibility of AmeriCorps members but such variability almost certainly impacts the efficacy of intervention services at the classroom/building level. Without consistent indicators of the degree to which AmeriCorps members are dealing with these external issues, influences on student outcomes cannot be separated out to isolate AmeriCorps intervention service versus other services versus other duties.

Ethical Considerations

Dr. Abraham and Dr. Polush, independent evaluation and research consultants (the authors of this report), conducted this evaluation. Dr. Abraham and Dr. Polush completed training in the protection of human research participants through the Collaborative Institutional Training Initiative (CITI). A Data Sharing Agreement enacted July 9, 2019 between DMPS and the two consultants governed use and sharing of student assessment and demographic data for the purpose of this evaluation.

All student assessment and demographic data were provided by DMPS staff authorized to access student information stored in the district infinite campus (IC) system and/or the AmeriCorps project-specific database. Specifically, DMPS staff (1) de-identified students' personal information to ensure privacy and (2) made data required for the purpose of the evaluation available via a secured Box site created for the project evaluation only and jointly maintained by DMPS AmeriCorps staff members and the evaluator-contractors. Student identification numbers linked by the DMPS staff members involved in this project evaluation for matching subsequent AmeriCorps student and member data sets necessary for the repeated measures design of this evaluation.

AmeriCorps members' participation in the online survey was voluntary. Prior to survey administration the evaluator (Dr. Polush) attended the AC members' regular meeting and explained the survey, its purpose, voluntary participation, confidentiality, access to the survey data/responses, and potential sensitive issues. The evaluator also answered questions. Responses from members who participated in the survey administered at the beginning and at the end of the 2018-2019 school year were kept confidential. Only the DMPS AmeriCorps staff members and the two evaluator-consultants had access to the survey raw data. The survey results were presented in aggregate form so that no personal information was identifiable. Finally, throughout the conduct of the evaluation, the evaluators referred to the best practices outlined by the National Center for Education Statistics SLDS in Technical Brief 3, "Statistical Methods for Protecting Personally identifiable Information in Aggregate Reporting" (http://nces.ed.gov/pubs2011/2011603.pdf) to minimize, to the greatest extent possible, any risk that individuals could be identified.

RECOMMENDATIONS

Recommendations for moving forward based on the findings of this evaluation are complicated to some degree by a plan to replace the Lexia Core 5 system with another system, FAST BRIDGE, in DMPS schools during the 2020-2021 year. Although this evaluation focused on the benefits of AmeriCorps members providing structured interventions, those interventions were connected to the Lexia system, the corresponding curriculum, and the methods Lexia provided to monitor proficiency progress. Without further knowledge of capabilities for monitoring and intervening through use of the FAST BRIDGE system, addressing future actions based on the current Lexia system seems of little utility. Rather, the recommendations discussed below are intended to be broad enough to adapt to a new system and also specific to future evaluation efforts to examine efficacy of AmeriCorps member service, regardless of the specific intervention system in place at that time.

Feedback obtained from AmeriCorps members (see Appendices C and D) consistently indicated that there were difficulties with uptake at the start of the school year. In many cases, members indicated being isolated, unintegrated, or unrecognized by school staff. Connected to weak integration in the school building, members indicated that they often found their position/responsibilities unclear in the eyes of school staff. For example, one member explicitly noted that initial duties to get students and teachers set up in Lexia continued long into the academic year, taking time away from providing interventions. As AmeriCorps members intend to continue service provisions in schools, it seems wise to clearly delineate what members are there to do and to develop a better system to integrate members into the school culture early during their service tenure.

AmeriCorps members also indicated a desire for better training in the Lexia system prior to performing intervention services. This need for training likely transcends specific systems but does reflect a need among AmeriCorps members to feel more confident with the material they are expected to use. In addition to bolstering confidence/efficacy, more structured training in the relevant student service system will also instill a greater degree of implementation fidelity, as members would no longer feel the need to figure things out on their own. This collateral improvement in implementation fidelity would also start to disentangle individual member variability in service provision from efficacy of the services provided, one aspect that was difficult to do in the current evaluation.

Perhaps the most prominent finding in this intervention was that most of the variability in reading proficiency and reading proficiency growth occurred across individual students; not across different schools. Because of such substantial individual variability, subsequent efforts to evaluate the efficacy of AmeriCorps members' service using student outcomes would be wise to identify and collect data elements that account for those extraneous sources of variability. Although the current evaluation employed covariates in all analyses to attempt to statistically control for individual-level influences on proficiency, student-level data were limited to demographic information collected as part of the state reporting system. The current evaluation intended to include information about socioeconomic context beyond free/reduced lunch status (the only SES-relevant index collected through state reporting) and this information did relate to variability in student scores. Although future evaluation efforts might continue to use contextual measures, individual (family-level) measures would be much more informative with regard to prediction of individual assessment scores. An increased emphasis on individual student indicators related to student outcomes would benefit future evaluation efforts regardless of whether quasi-experimental, matching, statistical control, or randomized designs are employed.

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APPENDICES

Appendix A: Theory of Change

IF			THEN
Schools engage with AmeriCorps; implement the Lexia Core5 Reading program for tutoring by AmeriCorps members; hire highly qualified members, and provide them with adequate training	AmeriCorps assigns members to schools in need and facilitates those members' integration	AmeriCorps members provide additional Lexia Core5 Reading scripted lessons (interventions) to students who are struggling or below proficiency benchmarks	Students in AmeriCorps School will: • Improve their reading foundational skills • Demonstrate increased reading/literacy proficiency AmeriCorps Schools will: • Better meet support needs struggling students • Demonstrate higher reading proficiency than non-AC schools

Appendix B: AmeriCorps Member Survey

Introduction

Greetings! Please share with us your reflective thoughts on your experiences serving as the DMPS AmeriCorps Lexia Tutor at the beginning of this 2018 fall semester by completing this brief survey.

This survey includes one multiple choice question and five open-ended questions. It should take approximately 30 minutes to complete.

Your participation in this survey is voluntary. Your responses will be kept confidential.

We will summarize survey responses in an aggregate format. That means that your and other AmeriCorps Lexia Tutors' feedback will be combined so that no personal information will be identifiable.

We appreciate in advance your time and insights!
Please complete this brief survey by [date] at the end of the day.

Questions

Q1: How were your students selected for tutoring sessions? (Please select ONE option.)
- Students selected only through Lexia flags:
Please explain your process of student selection in more detail.
- Students selected only through roster provided by school staff
Please explain your process of student selection in more detail.
- Students selected through both Lexia flags and roster
Please indicate your percentages of use of each method to select students, for example, 30% roster and 70% Lexia flag.

Q2 How is your service as a Lexia tutor most impactful to students? (Please describe.)

Q3: What have been the most challenging experiences as a Lexia tutor thus far (i.e. during the beginning of this 2018 Fall Semester)? (Please describe.)

Q4: How have you dealt with these challenges? (Please describe.)

Q5: Please use this space to provide additional insights that could help the DMPS staff better understand your service to our students as a Lexia Tutor and make improvements. Thanks much in advance.
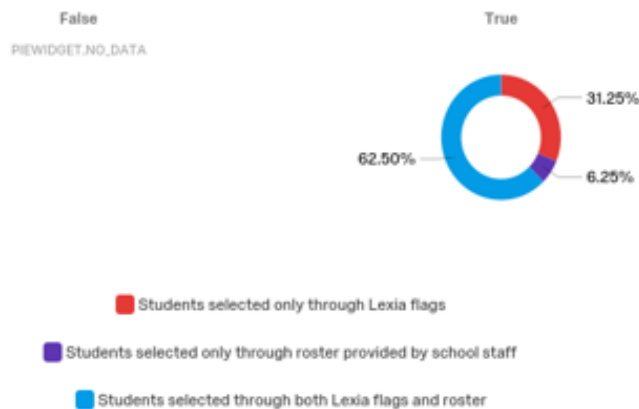
Appendix C: AmeriCorps Member Survey Results (October 2018)

This document presents the results from the AmeriCorps Member Lexia Beginning of the School Year survey conducted from October 24 -26, 2018. A total of 16 (89%) of the AmeriCorps members completed the survey. The purpose of the survey was to learn about the members' initial experiences serving as DMPS AmeriCorps Lexia tutors. The members were asked one multiple choice and five open ended questions that focused on methods (i.e., through roster provided by school staff and/or Lexia flags, including percentage of each use when both methods are used) and processes related to student selections; and members' reflections on their service potential value to students, and challenges and ways to address those. Members were invited to share their additional insights.

▪ *How were your students selected for tutoring sessions?* (*Figure 1*)

➢ **31% (5 members):** Through Lexia Flags
➢ **6% (1 member):** Through Roster provided by school staff
➢ **63% (10 members):** Through both Lexia Flags and Roster

Figure 1: Methods used to select students for tutoring

False   True

PIEWIDGET.NO_DATA

31.25%

62.50%

6.25%

🟥 Students selected only through Lexia flags

🟪 Students selected only through roster provided by school staff

🟦 Students selected through both Lexia flags and roster

The majority of members have been using both methods to select students for tutoring.

> o *Please indicate your percentage of use of each method to select students (for example, 30% Roster and 70% Lexia Flags)*

While the percentages of use of each method across members varied, nine out of 10 who reported using both methods to select students associated the highest percentage (from 90% to 60%) with Lexia Flags. These members also stated that the variation in using each method depends on grade level. Most students on roster are also Flagged. Student mobility and time seem to be the contributing factors related to frequency of using each method. For example, some members used more Lexia Flags at the beginning of the year. Now it is 50% for both.

While the majority of members have been using both methods to select students for tutoring, it appears that Lexia Flags is used predominantly.

▪ *Please explain your process of student selection in more detail.*

All member-respondents provided their rich descriptions. Approaches are unique to each member's context/settings. Overall, members seem to be methodical and reflective how they go about identifying students with whom to work. Collaboration and communication with teachers, interventionist is central to this process. The priority by most appears to be given to high risk students and then getting to students at medium and low risk levels. Some shared focusing more on students "in the yellow." Selecting students also depends on a class. Overall, the process is driven by relying on Lexia.

▪ *How is your service as a Lexia tutor most impactful to students?*

All member-respondents shared their insights that highlight the significance of the following factors to student learning and thriving:
- giving students more individualized, personal attention and instruction;
- providing one-on-one interactions;
- creating supportive environment that encourages and enables students' voices (listening to their stories) and questions;
- being "another support system" facilitating students' learning;
- enabling a sense of confidence;
- providing reinforcement and motivation;
- providing students with the opportunity to "establish a special bond with someone who is genuinely concerned about how they are doing on a daily basis;
- having extra time;
- delivering lessons in small groups centered in active learning;
- supporting positive attitude, and
- nurturing pride in accomplishments made.

- *What has been the most challenging?*

All member-respondents shared their perspectives that included:
- not <u>enough time to spend with the students</u>;
- sometimes students do not get the class time they need in Lexia, which, in turn, affects their overall scoring in Lexia;
- conflicts with and changes in classroom schedules – schedule coordination;
- setting up times when a member can work with students – member schedule, finding time to work with students;
- for new members, not having more training on Lexia; having more ideas about how to teach the lesson;
- getting to know how Lexia works and how to apply it to student learning;
- member integration into the school, classroom – role of and how to use a member within a classroom learning;
- getting students cooperate with the member;
- keeping students motivated and managing their interests;
- school staff may be lacking positive attitude toward the member's role – member confidence working with some school staff members and pulling students.

- *How have you dealt with these challenges?*

Strategies (approaches) shared by all member-respondents included:

- searching new resources/learning new ways to support and help student to overcome their unique challenges;
- being extremely organized;
- communicating with teachers;
- re-arranging the schedule to better meet the students' needs and to accommodate the teachers' plans;
- having support of a classroom teacher and instructional coach;
- having personal perspective (view);
- not being afraid to ask questions, reaching out to teachers, coaches – "making myself visible to the staff members";
- taking time to build relationships with teachers and students;
- using positive reinforcement, reward approach working with students acknowledging and celebrating their successes;
- observing in the classrooms, and
- being flexible.

▪ *Please share additional insights?*

Members' additional representative thoughts included (the text in quotation is verbatim):

"It takes a Village to raise a child, we all in this together. There is no big I or little U. It is Unity that makes it all happen. Education is the torchlight of civilization. Focus, Discipline, and Structure is the key."

"DMPS staff need to be aware that the first few weeks we are at the building we are there to support teachers and students by getting students on the computer to get them on a routine and help in any other ways but after those few weeks we are to start pulling groups. We are not responsible for continuing going into the classroom and logging students on the computer."

"My job is to help students fill in the gaps to becoming proficient readers. I help students to understand the topics they are struggling with so that they can successfully pass the topic and move on to the next step. My job is to help not only the students but the teacher. I aide the teacher by helping students learn those necessary skills needed to read. Teachers can help me by making sure that they see Lexia as being an important time in each student's day. Making sure that students are utilizing the program and fulfilling their minutes each week. Otherwise I don't have students to work with."

"I would have been nice for the stuff to introduce me right away as my position. Also it would have been nice to have my space ready and had provided support by administration, rather than seeking for support."

"1. When we get to a school it would be beneficial to have someone assigned to us to show us around the school so we know where to go. To introduce us to the interventionists, and have them assign us to class rooms. And make sure the teachers know. 2.More work in logging onto Lexia and doing practice lessons ourselves, and then how pick a matching activity."

"We are a resource to the student. Any time that we can have with them is beneficial for both them and the teacher. A majority of the students at my site are reading below grade level, so I think it is very important that we are able to communicate and work together in order to best help the student. "

"For people doing this for the first time, having more training before we actually start in the school on Lexia." – More guidance is needed at the beginning of the school year.
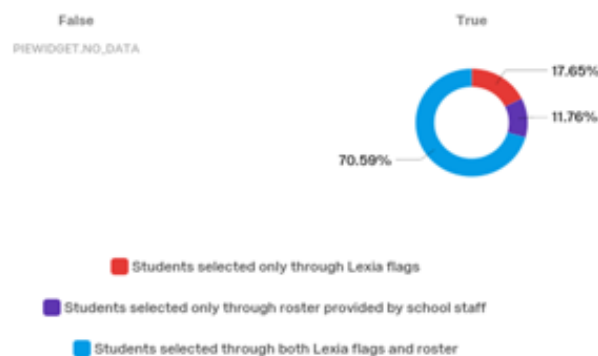
Appendix D: AmeriCorps Member Survey Results (April 2019)

This document presents the results from the AmeriCorps Member Lexia End of the School Year survey conducted from April 11 - 16, 2019 organized by the survey questions. All 17 (100%) AmeriCorps members completed the survey. The purpose of the survey was to gain the members' experiences serving as DMPS AmeriCorps Lexia tutors during the 2018-2019 school year, and to inform potential changes and improvements planning the program implementation for the new school year. The members were asked one multiple choice and five open ended questions that focused on methods (i.e., through roster provided by school staff and/or Lexia flags, including percentage of each use when both methods are used) and processes related to student selections; and members' reflections on their service potential value to students, and challenges and ways to address those. Members were invited to share their additional insights.

➢ **Methods used by members to select students for tutoring sessions**

Twelve members (70.59%) used both Lexia flags and roster methods to select students for tutoring sessions. Only three members utilized Lexia flags and two members used the roster provided by school staff. Compared to the beginning of the school year survey results, the trend seemed to have been that of using both methods.

Figure 1: Methods used to select students for tutoring

False   True

PIEWIDGET.NO_DATA

17.65%

11.76%

70.59%

■ Students selected only through Lexia flags

■ Students selected only through roster provided by school staff

■ Students selected through both Lexia flags and roster

While the percentages of use of each method across members varied, there was a split among members. That is, six members out of 11 (55%) associated the highest percentage (from 90% to 80%) with Lexia flags, and four (36%) – with roster (from 75% to 60%). One member used both methods equally. These members shared that the variation in using each method depended on (1) grade level, (2) teacher's feedback and recommendations, and (3) changes in a school using more roster method compared to the beginning of the school year.

> ➤ **Members' perceptions about how their service as a Lexia tutor is most impactful to students**

Members shared impacts on students' learning associated with:
- *bringing enthusiasm* supporting and seeing students as learners;
- *affirming and celebrating students' success, learnings, progress;*
- *creating a positive relationship for them [students]to learn when we work one on one or in small groups;*
- *having more opportunities to use their [students'] developing skills, to practice skills in order to become proficient;*
- *giving individualized* **(one-on-one)** *tutoring that teachers do not have time for; yet, students need to succeed;*
- *providing (emphasizing) positive feedback and incentives;*
- *motiving students to learn;*
- *working with students using their first language (Spanish);*
- *providing students with needed attention, giving their [students'] learning a fun twist to learn and ENJOY learning;*
- *encouraging them [students] to grow and expand not only in their literacy skills, but their social and emotional learning skills; encouraging them [students]to ask questions, create an open-minded environment, and broaden their perspectives, set literacy goals (Lexia certificates);*
- *helping build their [students'] confidence in learning, as well as in themselves in general;*
- *being a* **safe adult** *that respects and encourages them [students] in their learning and self-development;*
- *having a more relaxed learning environment in an area that they [students] are struggling;*
- *being another resource for students, providing the tools for them [students] to succeed;*

Overall, one member's statement summarizes the AC Tutors' perceptions of their potential impact:
I think that they [students] view me as a friendly safe person where they could be themselves, making mistakes and learning the lessons was part of learning process. Most students responded positively to this approach.

> **Members' most challenging experiences as a Lexia Tutor, and how they dealt with these challenges.**
> Described challenges and approaches to address them could be characterized at the AC members' personal (personal characteristics, values) and professional (work/school dynamics of relationships; environment) traits; student, and the AC program staff member levels, and included:

Challenging Experiences	Approaches to Address Them
• *Having many students who need support.*	• *Focusing on teacher and students who value my support.*
• *Having a noisy workspace.*	• *[I] Did what I thought was right and watched other staff that pulled out for tutoring and modeled their approach.*
• *I usually work with students in hallway but it can be noisy and chaotic and not conducive to teaching/learning/focusing.*	• *Sometimes you just have to go with the flow.*
• *Schedule changes and communication.*	• *Being flexible by rearranging my schedule to accommodate the students' needs, and communicating with teachers.*
• *Some staff including leadership--not principal--do not understand the phonic instruction and progression and review that Lexia offers, so they are less supportive. It might be helpful for tutors and staff to understand the level of commitment from literacy leadership.*	• *I smile a lot, and go out of my way to make teachers and building staff know that I respect the students, and that I am willing to do whatever it takes to help them.*
• *When I first arrived to the new school, it was finding students to work with. I did not understand how they would be assigned to me. When staff does not know you they may over look my need for students, because they are so busy, or maybe they did not know who needed support early on also.*	• *Being well organized and flexible with programming and building staff.*
• **Not being welcomed** by classroom teachers at the beginning of the year. [This initial experience has changed over the course of the school year. An AC member eventually felt welcomed.]	• *Being a positive reinforcement for them [student] and encouraging them to keep pushing and trying.*
• *Sometimes it can feel isolated when you are the Lexia tutor, since no one else in the building does quite the same job.*	• **Building relationships with student and teachers.**
• *Finding an appropriate time that could allow an opportunity to meet with all students.*	• **Working closely with teachers and staff; being sensitive to their needs as well as the needs of the students.**
• **Working with/ building relationships with building staff.** *There are teachers that are welcoming and look forward to me working with their students; however, a large percentage of them are not very friendly and the school environment has not been the most welcoming.*	• *Working with student acknowledging and celebrating their [student] successes.*
• *Meeting the special needs of students through referrals from interventionist.*	• *Asking for help.*
• **Not enough time to spend with the students.** *Getting students to cooperate with the Lexia tutor.* **Working with school staff member pulling students.**	• *I work with what I can but it is never consistent.*
• *Engaging volunteers.*	************
• *Having to tell students that I will not be working with them when they ask. I have struggled with this the previous years as well. It makes me sad telling them no*	*A note:*
	Strategies acknowledged/used by many members are **in bold**.

| *because I know how impactful I am as a tutor. I know students benefit from working with me but I know that I do not have time to meet with each and every student in the classrooms.*
• ***Finding a place*** *to take the students for the lessons.*
• *Some classes are not doing lexia at all. also, it has been difficult to find the students that are flagged because they are involve in other interventions*

*****
<u>*A note*</u>:

(1) Challenging experiences could also be considered/used by the AC program staff members as suggestions/opportunities for improvements.
(2) Challenges experienced by many members are **in bold**. | |

➢ **Members' additional insights to help the DMPS staff better understand their service to students as a Lexia Tutor and make improvements:**

Seventeen (all) members provided additional insights. Members suggestions, insights to consider for potential programmatic improvements included (*italicized* statements are the members' direct quotations):

- *Tutors need to go to the schools first and familiarize themselves with the school's lay out, their work space, and get to know staff as much as possible.*

- *Teachers are collecting data on every student to see who needs support. It is good for tutors to sit in on literacy classes during this time.*

- *More guidance in beginning would have been helpful.*

- *I would like to see more of our AmeriCorps meetings devoted to sharing and learning more about how to effectively do this [teaching the Lexia objectives; creating games and engaging activities for students]. It would also be useful to know and understand how what we are doing should reinforce whatever other things are going on in the district for reading instruction.*

- *Have a specific standard for what a Tutor needs in their buildings. This includes an intervention plan/ schedule, a desk, a work space for the tutor and the student(s), and consistent check-ins or a mentor from within the building.*

- Members emphasized that they are a resource to teachers and students – "*another support system for students.*"
  It is important to remember that we are not behavior interventionists - if a child struggles during phonics having us sit with them during instruction in the classroom is not necessarily a solution to learning.

- *Des Moines Public schools staff need to be aware that the first few weeks of school are at the building we are there to support teachers and students on the computer to get them on a routine.*

- *Right now I can only think of creating more creative ways of approaching a intervention with a Child/Student.*

- *I feel as though there needs to be a time frame as to how long Lexia tutors are to help classroom teachers support lower elementary students log onto the computer as well as long onto Lexia.*

Overall, the members seem to have felt positive about their experiences and grateful to have this opportunity to support students in their learning, contribute to the classroom learning environment, and "*continue teaching and learning with students*" – as captured in (evident from)

the members' insights:

This program is often a win-win for all.

But thank you for allowing me to be service to the Teachers, Staff and Students of my School. It has been such a pleasure to do what I do at my sight.

Members also seem to have acknowledged that context matters. Each school is different and has different (unique) expectations. *Flexibility* is critical in their work.

Appendix E: General Analytic Model

Linear Multilevel Model Specification[1]

Level 1: Time

At the first level of the model, repeated identical assessments (Y), the FAST or MAP assessments in this evaluation, were specified as outcomes due to time (t) nested within student (i). Coding of time is somewhat arbitrary in terms of months vs. weeks, etc. as is the setting of the 'intercept' parameter (π_0) that can be specified at any point where the effect of time is set to zero. For example, coding time as $t = 0, 1, 2$ for three assessments sets the intercept as the initial score on the assessment. Alternatively, coding time as $t = -2, -1, 0$ sets the intercept as the final assessment at Time 3. Change over time in the repeated measures is modeled as a linear (or nonlinear) function of time (t) and captured by the slope parameter (π_1). Because time is not a perfect predictor of observed scores on the repeated assessments, unexplained variance is captured by a residual (e). The residual estimation can involve time-specific components (shown here as the more general model) or be estimated in a restricted form to reflect equality of the residual variance across time.

$$Y_{ti} = \pi_{0ti} + \pi_{1ti}(\text{Time}) + e_{ti}$$

Level 2: Student

At the second level of the model, the growth parameters of the Level 1 model (π_0 and π_1) were estimated as outcomes that vary across Level 2 units, individual students in this case. Variability in the intercept term (r_{0i}) indicates that individual students differ in their initial level (if $t_1 = 0$) or final level (if $t_3 = 0$) of the measured assessment. Variability in the slope term (r_{1i}) indicates that the <u>rate of change</u> in assessment scores differs across individual students. Each of the Level 1 growth components has an overall average that reflects the average intercept (β_{00}) and average slope (β_{10}) across all students.

$$\pi_{0i} = \beta_{00} + r_{0i}$$
$$\pi_{1i} = \beta_{10} + r_{1i}$$

Variables of interest at the student level enter the model at this point becoming potential predictors of individual variability in both starting (or ending) points and rates of change. For example, a student's degree of absenteeism or previous year's proficiency might serve to predict lower starting (or ending) levels of proficiency on the FAST/MAP assessments and also predict the rate of change, indicating that higher absenteeism or lower baseline proficiency corresponds to less improvement (a flatter slope) in proficiency over the full school year. Entry of predictors at the student level only slightly modifies the Level 2 equations:

$$\pi_{0i} = \beta_{00} + \beta_{01}(\text{Days Absent}) + r_{0i}$$
$$\pi_{1i} = \beta_{10} + \beta_{11}(\text{Days Absent}) + r_{1i}$$

---

[1] Notation consistent with most MLM sources

Linear Multilevel Model Extension

The general growth model described above extends directly to a third level, reflecting either school or AmeriCorps service member in the current analyses. The extension changes in only notation at Levels 1 and 2 where the additional *j* subscript reflects school/member.

Level 1: Time

Equations and parameter interpretations remain the same as described above, with the addition that repeated assessments (t) are nested within students (i) who are nested within school/member (j).

$$Y_{tij} = \pi_{0tij} + \pi_{1tij}(\text{Time}) + e_{tij}$$

Level 2: Student

Once again, model equations and parameter interpretations remain unchanged.

$$\pi_{0ij} = \beta_{00j} + r_{0ij}$$
$$\pi_{1i} = \beta_{10j} + r_{1ij}$$

Level 3: School

At Level 3, the average growth parameters of the Level 2 model (β_{00j} and β_{10j}) were estimated as outcomes that vary across Level 3 units, schools or AmeriCorps members in this case. Variability in the average intercept (U_{00j}) indicates that the average starting (or ending) point for students within schools/members differs across schools/members. Similarly, variability in the average slope (U_{10j}) indicates that the average rates of change within each school/member vary across schools/members. Each of the Level 2 average growth components are averaged across Level 3 units (schools/members) to obtain an overall intercept (γ_{000}) and an overall slope (γ_{100}), reflecting the average starting (or ending) point and average rate of change for all students across all schools/members.

$$\beta_{00j} = \gamma_{000} + U_{00j}$$
$$\beta_{10j} = \gamma_{100} + U_{10j}$$

Level 2 variables of interest at the school or AmeriCorps member level enter the model at this point becoming potential predictors of school/member variability in starting (or ending) points, and rates of change. For example, a member's delivery modality might predict higher average starting (or ending) levels of proficiency on the FAST/MAP assessments and also predict the average rate of change, indicating that one-to-one delivery relates to better improvement (a steeper slope) in proficiency over the full school year. Entry of predictors at the school/member level results in similar modification of the Level 3 equations:

$$\beta_{00j} = \gamma_{000} + \gamma_{001}(\text{Service}) + U_{00j}$$
$$\beta_{10j} = \gamma_{100} + \gamma_{101}(\text{Service}) + U_{10j}$$