Crane Center for Early Childhood Research and Policy

Ready 4 Success (R4S)

Evaluation Report

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Crane Center for Early Childhood Research and Policy (CCEC)

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Executive Summary

This report presents data from the 2017-2018 academic year of the Ready 4 Success (R4S) initiative, which was funded by the city of Columbus through FutureReady Columbus. The primary goals of R4S are to examine and improve early childhood programming in the city of Columbus, in order to increase the kindergarten readiness skills of 4-year-old children attending prekindergarten programs.

- In the 2017-2018 academic year, several improvements were implemented to streamline project activities and data collection. First, an online data management system (CeeHiVE) was widely used by all R4S programs in order to capture data regarding children's assessment scores and attendance. Second, all data were captured electronically, rather than on paper; thus scores were automatically updated and more readily available and accessible for review. Finally, the coaching services provided to teachers were based on classroom observations and assessment scores and, therefore, more individualized than in previous years.
- Overall results suggest that most children had significantly higher scores in the spring of 2018 compared to fall of 2017 in both literacy and math, with many advancing from the "below average" category to "average" category.
- However, nearly 50% of children remained below average in the domain of math.
- Teachers opted to participate in coaching activities at a higher rate than the previous academic year; approximately 25% of teachers chose to receive individualized coaching services.
- Results indicated that children who had lower initial scores in both literacy and math demonstrated more gain over the course of the year. In addition, children who had better attendance also showed more gain in literacy and math. Increased attendance was associated with higher scores on the Kindergarten Transition Summary, completed by teachers at the end of the year.
- Activities for the upcoming year involve observing teachers before and after coaching to more comprehensively understand the ways in which participation in professional development and coaching services impacts teachers' classroom practices.

Introduction

Program Context and Background

A wide body of research shows that children from economically disadvantaged backgrounds begin their formal schooling years with lower abilities in basic foundational academic skills, such as literacy and math (e.g., Barnett, Lamy, & Jung, 2005; Magnusson, Meyers, Ruhm, & Waldfogel, 2004; Wertheimer, Moore, Hair, & Croan, 2003; Wright, Diener, & Kay, 2000). Moreover, these achievement gaps are likely to persist throughout their entire academic careers, and children with poorer skills in kindergarten often have trouble catching up and keeping up with their peers. The decades of research underscoring these inequalities have led policy-makers to invest more purposefully and heavily into supporting the early academic development of children from low-socioeconomic status (SES) backgrounds prior to school entry, in an effort to reduce these gaps.

In the city of Columbus, Ready 4 Success (R4S) is one such program that seeks to bolster the kindergarten readiness of 4-year-old children from low-SES backgrounds. R4S offers professional development (PD) and coaching services to teachers who have at least one student in receipt of Early Start Columbus (ESC) funding. ESC funding is available through the city of Columbus to children who are or will be 4 years of age by September 30th of the current academic year, and whose families reside in the city of Columbus and meet the income level requirements (at or below 300% of the federal poverty guidelines). ESC funding allows families to receive free or low-cost tuition to attend high-quality prekindergarten programs in Columbus.

The two primary benefits R4S provides to prekindergarten programs are child screenings in literacy and math, and coaching and/or PD opportunities for their teachers. The underlying rationale for providing these two services is to a) identify areas of need in terms of children's skills, and b) support teachers' instructional practices to address those needs. Research suggests that individualized coaching services can be very effective for strengthening teachers' abilities to embed early literacy strategies in their instruction (Hsieh, Hemmeter, McCollum, & Ostrosky, 2009; Neumann & Cunningham, 2009; Wasik & Hindman, 2011), support children's social-emotional development (Filcheck, McNeil, Greco, & Bernard, 2004), and incorporate math-focused language into daily instruction (Rudd, Lambert, Satterwhite, & Smith, 2009).

R4S is predicated on a theory of change model designed to increase children's kindergarten readiness by improving and supporting teaching practices. First, data are gathered concerning children's initial abilities in literacy and math as well as general classroom practices via classroom observations. Using these data, teachers are offered the opportunity to work individually with a coach to develop coaching goals and guidelines, and are given support throughout the academic year to enhance their teaching practices. Children's literacy and math abilities are screened again at the end of the year to determine the extent to which children gained in these skill areas over the academic year. For the 2017-2018 year, R4S implemented this multi-pronged approach to meet program goals of preparing 4-year-olds in Columbus for kindergarten, and supporting the teachers who serve them.

Evaluation Aims

This evaluation of R4S is focused on 3 aims:

Aim 1: What are the literacy and math abilities of children attending programs served by the R4S initiative in the fall of their prekindergarten year?

Aim 2: To what extent do children served by R4S exhibit gains in literacy and math at the end of their prekindergarten year?

Aim 3: To what extent do children's gains in literacy and math, as well as their kindergarten readiness skills associate with child-level (e.g., attendance) or classroom-level predictors (e.g., classroom climate)?

Method

In the 2017-2018 academic year, ESC funding was utilized for children to receive free or low-cost tuition at high-quality childcare centers and prekindergarten programs. In order to be eligible for ESC funding slots, programs must have 3-, 4-, or 5-star ratings through Ohio's Step Up to Quality (SUTQ) Tiered Quality Rating System, and serve families of 4-year-old children who meet the specified income level requirements. Any classroom in eligible centers that served at least one child receiving ESC funding could participate in R4S services (i.e., child screenings, classroom observations and coaching opportunities).

Population

From the 123 classrooms served, 62 teachers responded to a survey gathering background information about their educational background and teaching experience. Of those who responded, 10% had an Associate's degree, 45% had earned at least a Bachelor's degree, and 45% had a Master's degree or higher level of education. Teachers had a range of experience with 24% having been in preschool classrooms for 2 years or less, 18% reporting 3-5 years of experience, 24% having 6-10 years of experience and 34% having served in preschool classrooms for more than 11 years. Class sizes ranged from 10-20 children, with an average of 16 children per classroom. Only one teacher reported that they were the only adult in the classroom; all other respondents noted that there were 2 or 3 adults in the classroom.

Screenings were offered to all children in eligible classrooms, regardless of whether they specifically received ESC funding or not. In total, 983 children from 123 classrooms were screened at both time points (fall and spring). In the 2017-18 year, this included 507 girls and 476 boys. Of those, 666 children were in receipt of ESC funding, either in isolation or in combination with an additional funding streams. Table 1 depicts the number of children who benefited from the various ESC funding streams available. As seen in the Table 1, a large proportion of children receiving ESC funding attended preschools in the Columbus City Schools (CCS) district. On average, children who received ESC funding were approximately 4.5 years old (M = 54.33 months, SD = 3.56, Range = 46-63 months) at pretest, and approximately 5 years old (M = 60.61 months, SD = 3.54, Range = 53-69) at posttest.

Table 1. Number and percent of children receiving different funding sources to attend prekindergarten.

Funding Source	Number	Percentage
ESC	61	6.2
ESC + CCS	371	37.7
ESC + ECE	174	17.7
ESC + PFCC-PT	25	2.5
ESC + PFCC-FT	4	.4
ESC + ECE + PFCC-PT	17	1.4
Other (non ESC-funded)	317	32.2

Note. ESC = Early Start Columbus; CCS = Columbus City Schools ECE = Early Childhood Education grant funds; PFCC-PT = Publicly Funded Child Care – Part Time; PFCC-FT = Publicly Funded Child Care – Full Time.

Research Design and Procedures

In the 2017-2018 year, the R4S initiative provided multiple services to support the teaching practices of prekindergarten teachers in Columbus who serve children who qualify for ESC funding:

- First, all children receiving ESC funding, as well as any additional children whose parents provided permission, completed the early literacy and math screening assessments in the fall of 2017 (i.e., pretest). The assessments were conducted by trained assessors; screenings were completed within a six-week window (October 2 – November 17). Tablets were used for all data collection activities; scores were then entered into the CeeHive system.
- Second, R4S staff contacted all site directors to review the screening data with the teachers. The purpose of these meetings was to ensure that teachers understood the CeeHive system, and were aware of the current levels of early literacy and math knowledge exhibited by their students.
- Third, R4S staff contacted site directors to schedule a classroom observation, to obtain additional qualitative information (e.g., classroom organization, instructional planning, and classroom management). Following the observations, data from classroom observations were combined to offer coaching goals and coaching plans for teachers.
- Fourth, teachers were offered the opportunity to participate in individualized coaching with R4S staff. The frequency of coaching sessions was agreed upon between R4S staff and the teacher, based on availability, goals, and desired consistency.
- Fifth, in the spring of the academic year, children completed the early literacy and math screening assessments, using the same assessments (i.e., posttest) in order to determine gains in these two important academic areas. All screenings occurred between April 1 and May 15 by the same staff of trained assessors who administered the fall screenings.
- Finally, teachers submitted their year-end assessment of children's kindergarten-readiness skills with the Kindergarten Transition Summary (KTS). This information was a requirement for those receiving ESC funding; KTS data were entered directly into CeeHive. Additionally, teachers who received coaching were asked to complete a brief exit survey to gather their feedback regarding their coaching experience and the extent to which they felt the coaching impacted their teaching practices.

Data Collection Tools

Primary Outcome Measures

Three measures of children's knowledge and academic progress were the primary outcomes of interest:

Get Ready to Read (GRTR). The GRTR (Whitehurst & Lonigan, 2001) is a 25-item early literacy screener for children ages three to five years. The GRTR is comprised of 25 questions and takes approximately ten minutes to administer. This early literacy screener assesses children's knowledge about letter names, letter sounds, phonological awareness, and print awareness. All items are administered directly to the child and scored as "1" if correct and "0" if incorrect. Scores are summed and reflect the total number of correct responses provided by the child. This summed score, along with the child's age, is used to classify the child's performance as *below average*, *average*, or *above average*, based on data from a normative sample. This screener was administered in the fall of 2017 (pretest) and again in the spring of 2018 (posttest).

Preschool Early Numeracy Screener – Brief (PENS-B). The PENS-B (Purpura & Lonigan, 2015) is a 24-item screener appropriate for children ages three to five years and assesses children's knowledge of the early numeracy skills needed for subsequent instruction in mathematics. It takes approximately ten minutes to administer directly to the child. The questions focus on assessing children's knowledge of cardinal numbers and number operations. Answers are scored as "1" if correct and "0" if incorrect. Testing is discontinued after three consecutive incorrect responses. Scores are summed and reflect the total number of correct responses provided by the child. The summed score, along with the child's age, is used to classify the child's performance as *below average*, *average*, or *above average,* based on data from a normative sample. This screener was administered in the fall of 2017 (pretest) and again in the spring of 2018 (posttest).

Kindergarten Transition Summary (KTS). The KTS is a 54-item comprehensive evaluation completed by teachers at the end of the prekindergarten year for each child. The KTS assesses five broad domains of development, including Social-Emotional Development, Approaches to Learning, Cognitive Development, Language and Literacy Development, and Physical Development. Total scores range from 0-110 and are organized into to three categories: a) *not yet evident*, b) *in progress*, and c) *proficient*. The KTS is a requirement by the city of Columbus for children receiving ESC funding, and all teachers were expected to submit their scores through CeeHiVE by the end of the academic year. KTS data for the majority of children who were receiving ESC funding (n = 464, 70%) were submitted at the time of this evaluation.

Primary Predictor Variables

Data from several different types of variables were used to understand the variability in children's gains in literacy and math throughout the academic year, specific to child-level factors (initial skill levels, attendance data) and classroom-level factors (classroom climate, teacher participation in coaching).

Initial Skill Level. Children's skill and knowledge abilities in the fall, as measured by the GRTR and PENS-B, were used to approximate children's initial skill levels in literacy and math, respectively at school entry. Accounting for children's initial skill levels is important for understanding the extent to which prior knowledge contributes to knowledge gain. For example, it may be the case that children who start the year with fewer skills gain the most, as they have more room to grow. Alternatively, it may be the case that children who have higher skill levels are better positioned to build upon the strong foundational skills they already possess.

Attendance Data. Information pertaining to daily attendance was entered by teachers into the CeeHiVE database for children receiving ESC funds. For the purposes of the analyses in this report, total days attended was tabulated for each child. Complete attendance data were available for 474 children (71% of those receiving ESC funding).

Classroom Climate. A classroom observation tool used as part of the R4S initiative this year was adapted from two validated and frequently used classroom observation tools (Early Childhood Environment Rating Scale (ECERS; Harms, Clifford, & Cryer, 1998), Early Language and Literacy Classroom Observation (ELLCO; Smith & Dickinson, 2002)). Specifically, for R4S, the focus was on the two academic areas of interest (early literacy and math), and designed to be completed within an hour. Section 1 focused on the classroom environment and materials (e.g., math materials and activities); Section 2 focused on language and literacy (e.g., emergent writing); Section 3 focused on overall instructional planning and classroom management (e.g., classroom climate). For each item in each section, members of the R4S staff provided a score of 1 (low), 2 (medium), or 3 (high). A total of 36 classroom observations were completed.

Coaching. Recommendations for improvement were written based on the results of the classroom observation. A recommendation was written for any area that was scored below a 3. Teachers established coaching goals based on the coaching recommendations and/or personal goals in which they wanted to improve. In total, 35 teachers from 31 classrooms self-selected to receive coaching. Coaches met with teachers for an average of 1.7 coaching sessions (range 1 – 8 times), and on average, spent 2 hours and 20 minutes with each teacher in total (range from 45 minutes – 11.5 hours). In the subsequent analyses, we considered both the *frequency* (total number of sessions) and *duration* (total number of hours) of coaching that teachers received.

Data Analysis

To address the program aims, descriptive statistics, t-tests, and Chi-square tests evaluated children's levels of risk, as well as differences between children's scores on the literacy and math screeners in the fall and spring of the academic year. Descriptive analyses from the KTS were used to determine relative areas of strengths and weaknesses of school readiness across the five KTS domains. Three-level hierarchical linear modeling (HLM) was used to understand the associations between children's gains in literacy and math and the predictor variables (i.e., children's fall scores, attendance, classroom climate and coaching data) while controlling for the nested nature of the data (i.e., children clustered within classrooms, and classrooms clustered within school buildings). HLM considers the extent to which children's gains might be partially accounted for by classroom-level or school-level influences.

As a preliminary step to determining the need for HLM, we calculated an intra-class correlation (ICC) to approximate the amount of variability that could be accounted for by both teacher-level and school-level effects. A large ICC indicates significant and large differences between classrooms and justifies the need for hierarchical level modeling. With the current population of schools, teachers, and students involved in this evaluation of R4S, analyses determined that the degree of variation in children's gains *attributable to school differences*, was 24.5% for literacy, 16% for math, and 21% for the kindergarten readiness, confirming the need for HLM in subsequent analyses. Variation *attributable to teacher differences* was negligible for literacy (3%) and math (0%) but 16% for kindergarten readiness.

Results

Aim 1: What are the literacy and math abilities of children attending programs served by the R4S initiative in the fall of their prekindergarten year?

To address this question, we first considered the scores of all 983 children who participated in both the fall and spring assessments. In the fall of their prekindergarten year, children, on average, correctly answered 12.5 out of 25 questions on the GRTR (range from 0-25), and 7.8 out of 24 questions on the PENS-B (range from 0-24). These scores are similar to those achieved by the 2016-2017 cohort of children receiving ESC funding (children scored an average of 13 on the GRTR and 7 on the PENS-B). We also examined the subgroup of children who received ESC funding, to determine the extent to which four-year-old children in need of these supports begin their year at a notable disadvantage compared to their peers. Results indicated no significant difference in GRTR and PENS-B scores between children who received ESC funding (n = 666) and those who did not (n = 317).

As a next step, we examined the proportion of ESC children who met classifications for *below average*, *average*, or *above average* for their age on literacy and math skills. As shown in Figure 1, a large proportion of children in the R4S program exhibited *below average* skills in early literacy and math in the fall.

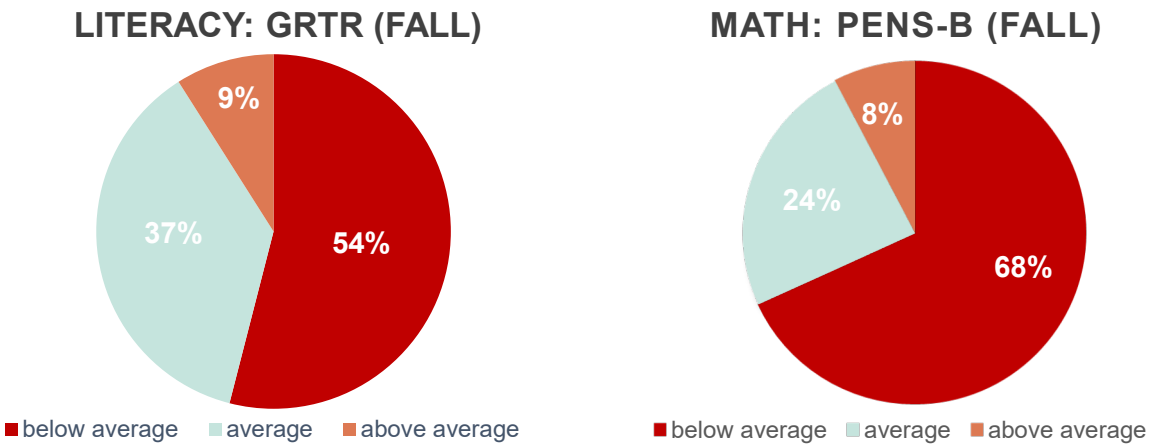

Figure 1. Proportion of R4S children at each performance level in literacy (GRTR) and math (PENS-B) in fall.

Aim 2: To what extent do children served by R4S exhibit gains in literacy and math in the spring of their prekindergarten year?

As seen in Figure 2, the proportion of ESC children classified as *below average* decreased by approximately 20-25% in each skill area. However, nearly half of children who completed the fall screening were classified as *below average* in math, even at the end of the prekindergarten year. A key objective for the R4S initiative is to support children's development in critical early literacy and math skills as preparation for their upcoming kindergarten year. Therefore, it was important to determine the extent to which children would continue to perform *below average* for their age in the spring, or might advance from *below average* in the fall to the *average* or *above average* category in the spring.

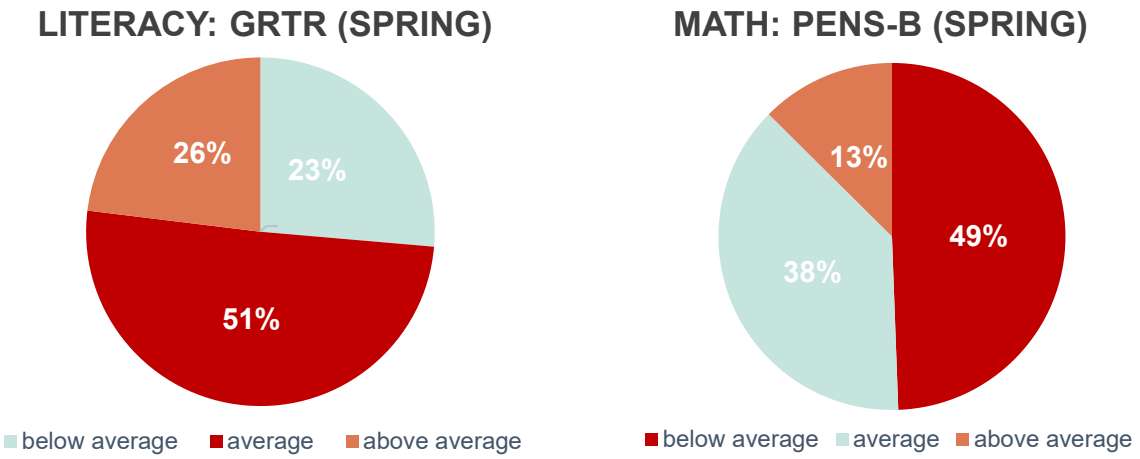

Figure 2. Proportion of children at each performance level in literacy (GRTR) and math (PENS-B) in spring.

In addition, 24% of children who received ESC funding were classified as below average on literacy in the fall *and* in the spring; thus, demonstrating little growth over the year. However, 26% of children demonstrated enough growth in literacy over the prekindergarten year to have improved from a below average category in the fall to the average category in the spring. The proportion of children who were classified as below average on the math screener in both the fall and the spring was much greater (42%).

Although classification categories offer a broad overview of children's relative abilities, it may be more important to understand the extent to which children demonstrated actual gains on the two screeners over time. The classification categories children fell into in the spring might suggest only modest progress; however, the examination of raw score differences indicates significant growth over the academic year. As shown in Figure 3, children demonstrated significant gains in both literacy (5.15 points) and math (4.53 points) throughout the academic year. Results from the HLM, controlling for school and teacher level effects, confirmed that gains in average scores from fall to spring were statistically significant for both literacy ($t(77.13) = 7.15$, $p < .001$) and math ($t(77.99) = 18.74$, $p < .001$).

Effect sizes were also calculated to determine the magnitude of children's gains over time. Cohen's *d* calculations of effect sizes can be interpreted as small (.3), medium (.5), or large (.8). The effect size for gains in literacy was .94 and .82 for math, indicating a very large magnitude of change over time.

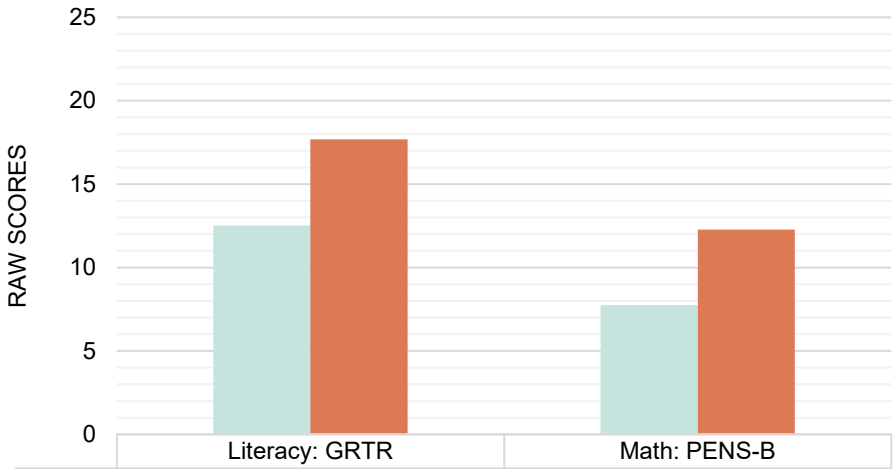

Figure 3. Gains in literacy (GRTR) and math (PENS-B) from fall to spring for children receiving ESC funding.

Although the KTS does not approximate change over the academic year, the measure provides teachers with an opportunity to assess children's kindergarten readiness across multiple areas, as described in the previous section. At the time of this report, KTS data were entered for 464 of the 666 ESC children (70%). The overall scores, which consider all skills areas, ranged from 20-110 (M = 94.14, SD = 15.38). The vast majority of children for whom scores were entered were categorized as "Proficient" (n = 408, 88%), with a much smaller percentage classified as "In Progress" (n = 54, 11.6%), and only 2 children had overall kindergarten readiness skills were deemed to be "Not Yet Evident" (0.4%). When considered by domain, the proportion of children categorized as "Proficient" was similarly large for Social Emotional Skills (85%), Approaches to Learning (78%), Cognitive Development (86%), Language and Literacy (85%), and Physical Development (98%).

Aim 3: To what extent do children's gains in literacy and math, as well as kindergarten readiness, associate with child-level or classroom-level predictors?

The final aim of this evaluation was to understand whether specific child-level or classroom-level variables might help to explain differences in how children's literacy and math skills changed over the academic year.

Identifying these variables is critical to continuing to improve R4S services and understanding optimal ways to serve prekindergarten children in Columbus. We considered the following variables: a) whether the child received ESC funding or not, b) the child's total days of attendance at school, c) the child's initial abilities at school entry (i.e., fall score/pretest), d) the frequency of the coaching sessions received by the child's teacher, e) the duration of the coaching received by the child's teacher, and f) the classroom observation score (i.e., overall classroom climate). Using HLM, we controlled for both school-level and teacher-level effects.

The first model examined the extent to which these variables predicted children's gains in literacy over the academic year. Results indicated that the two variables that were significantly associated with literacy gains; the child's fall literacy score (b = -.798, p < .001) and the child's school attendance (b = .043, p = .017). Results indicated a negative relation between children's fall score and the amount of gain they demonstrated on the literacy; that is, children with lower fall scores exhibited greater gain over the year compared to children with higher fall scores. The relation between attendance and literacy gains was positive, indicating that children with better attendance demonstrated more gain over the year compared to children whose attendance was less consistent.

We also examined the extent to which the same predictor variables were associated with children's gains on the math assessment over the academic year. Analyses yielded similar results in that fall scores were negatively associated with gains in math over the year (b = -.519, p < > .001), and attendance was positively associated with gains in the math over the academic year (b = .037, p = .007).

In addition, we tested associations between the predictor variables and children's KTS total score. Only the child's attendance was positively and significantly associated with a greater overall score on the KTS (b = .2164, p = .008). No significant effects were found for the classroom-level variables (i.e., coaching or classroom climate) for gains in literacy, math, or KTS total score.

Perspectives and Feedback on Coaching

Finally, although coaching was not found to be statistically significantly related to children's gains, it was of interest to gather the perspectives and feedback from teachers who received coaching, as this is one of the primary components of R4S. At the end of the academic year, teachers completed a feedback questionnaire that asked whether or not they implemented classroom changes based on the coaching and feedback. Teachers were also asked to rate on a 5-point scale how helpful the coaching sessions were, and the extent to which they would like to continue working with their coach. In addition, teachers were given space to respond to 5 open-ended questions about what they considered most valuable, and suggestions for future coaching and PD opportunities. All teachers who responded to the questionnaire (n = 16; 46%) indicated that they had implemented changes in their teaching practice. Of those who responded, most reported that they strongly agreed or agreed (n = 14, 88%) that their R4S coach helped them to improve their teaching practice and that they would like to continue working with their R4S coach in the future. Responses to the open-ended questions regarding future topics included more help with providing math-focused instruction, as well as classroom management. Several teachers also indicated they would like to receive more check-ins from the coach, via email if possible. These suggestions will be taken into consideration for the upcoming year.

Discussion

Interpretation of Results

R4S is an important initiative in the city of Columbus as it strives to support both children who are in need of high-quality prekindergarten experiences, and the teachers who serve them. Providing access to prekindergarten education programming is a fundamental first step for supporting children's long-term academic success. The data collected from this program each year continue to inform our understanding about the skills and knowledge children receiving ESC support typically possess at the

beginning of the prekindergarten year, as well as the extent to which they develop, learn, and are prepared for kindergarten at the end of their prekindergarten year. In the 2017-2018 year, the R4S team implemented several changes to services provided and workflow in previous years in order to focus on individualized coaching and PD opportunities for all participating teachers. Within this model, provision of coaching is the mechanism of change to improve teacher practices. Additionally, the use of CeeHiVE to collect student- and teacher-related data greatly improved our ability to process incoming data more efficiently, and more accurately track the attendance of children who received ESC funding. As such, data from this evaluation offer a much more robust representation of the literacy and math skills of 4-year-olds in Columbus who have benefitted from R4S programming to improve their kindergarten readiness. Below, we highlight some of the results from this evaluation that warrant further discussion and substantiate changes for the 2018-2019 year.

The first and most promising outcome from the results presented above is that the children receiving ESC funding to attend prekindergarten programs in Columbus demonstrated significant gains in their literacy and math skills across the academic year. Analyses indicated that the two significant factors influencing this gain over time were the child's initial skill level in the fall and their school attendance. Compared to children who started the year with stronger skills, and those whose attendance was less consistent, children who started the year with lower abilities performed better over time, and children who had better attendance also performed better over time. A possible explanation is that some of these children may not have had the opportunity to attend a high-quality preschool program prior to this year, if at all. If this is the case, it is clear that these children received a marginable boost in their learning from this one year of prekindergarten. This is an exciting and encouraging finding from this evaluation, and underscores the value of the city's efforts to support Columbus city children as they begin formal schooling.

It is worth noting the variables that were not significantly associated with children's gains over the academic year. For example, there were no differences in gains in literacy and math between children receiving ESC funding and those who did not. This suggests that even though they qualify for financial assistance, their ability to grow and benefit from school experiences are comparable to peers who do not require financial assistance. There is no "control group" as such, to determine whether children with similar financial needs would gain less than the children studied here, if not attending school. Overall, however, the results presented here confirm the benefits that high-quality prekindergarten programming provides for young children in Columbus.

It should also be noted that the analyses indicated the coaching services provided to teachers had no direct effects on children's outcomes. Regarding these non-significant findings, there are some possible reasons why these direct effects were not observed. First, it is likely that the effects from coaching to practice to child outcomes takes considerably more time to manifest than six months. Coaching primarily occurred between November and April, and children's literacy and math scores were assessed for the final time in the spring. Second, it may not be the case that direct effects would be observed at all; rather, that indirect effects would instead be detectable. Specifically, although research indicates that coaching impacts teacher practices (e.g., Magnusson et al., 2004; Powell, Diamond, Burchinal, & Koehler, 2010; Wright et al., 2000), the extent to which effects from coaching are directly observed in children's outcomes is less clear (e.g., Powell et al. 2010). In the 2017-2018 year, observations of teacher practices were only conducted once. In the upcoming year, we aim to observe teachers' practices after coaching and/or PD has been provided, to understand the ways in which this programming may affect instructional behavior.

Finally, it must not go unremarked that data from this evaluation show that despite gains in their total scores on these two measures, a large and significant proportion of children remained classified as "below average", particularly as it related to math skills. This is concerning as it indicates that many young children, even after a year of attending a high-quality prekindergarten program, continue to exhibit lower than average math skills compared to peers of the same age. In other words, even though their scores are increasing throughout the year, they have still not reached a skill level that would be deemed as "average".

It is important, however, to acknowledge that the classification categories designated by the developers of the PENS-B math screener had a much smaller sample size compared to the number of children evaluated in this year's R4S programming to determine the cut-off scores for each performance category. For example, the group of 4-year-olds in the normative sample included 203 children (Purpura et al., 2015) from a mix of socioeconomic backgrounds. It should be further noted that the mean scores of younger 4-year-olds in the sample was 8.18 points and 11.57 for older 4-year-olds (i.e., 4 years and 6 months through 4 years and 11 months). The 4-year-olds evaluated in this report achieved an average score of 7.98 in the fall when their average age was 4 years and 6 months, which is only just below that of the normative sample. Although this detail certainly not does not alleviate all concern about the long-term outcomes for these children, it is worthwhile to note and consider.

Implications

The implications from the 2017-2018 year of R4S data extend to both children and teachers. First, the fact that children demonstrated significant gains over the academic year in both literacy and math underscores the malleability of these skills, even for children who begin the year at a notable disadvantage compared to their peers. This pattern of growth suggests that providing access to high-quality prekindergarten programming and supporting strong attendance will continue to be crucial goals for improving children's kindergarten readiness in Columbus. However, it also highlights the need for continued high-quality instruction in kindergarten and beyond in order to ensure their learning and development is maintained.

This is particularly true in the domain of math. The fact that so many children remained in the "below average" category in the spring is concerning. Implications from this result are twofold. First, it seems clear that math-focused instruction in preschool must improve, particularly given evidence that early math skill is one of the most powerful predictors of subsequent academic achievement (Duncan et al., 2007). Second, it is also evident that better training for teachers in the area of math instruction is necessary. Indeed, more math-oriented PD was a particular request from teachers in the year-end follow-up surveys, and it is imperative that this need is addressed.

Finally, the implications from analyses examining factors associated with children's gains in literacy and math must be carefully considered. Children with lower fall scores demonstrated larger gains compared to children with higher fall scores. As discussed above, this implies that the provision of high-quality prekindergarten programming is extremely beneficial for children with lower initial skills. In addition, children who had better attendance also demonstrated larger gains compared to children with poorer attendance. On the one hand, this is a logical outcome. On the other hand, however, this result means that teachers and site directors must try to understand why variability in children's attendance exists, and support families who may encounter barriers in ensuring their child's consistent attendance. The data collected this year showed that there were school-level differences in children's gains; that is, patterns of growth were different between schools. The extent to which this result

intersects with attendance is not clear; for example, it may have been the case that some schools monitored or supported children's attendance more than other schools. Regardless, these results taken together imply that children's attendance should be a point of interest and concern by school and site directors.

Limitations and Recommendations

Limitations from the present year inform the recommendations and changes planned for the upcoming 2018-2019 academic year.

First, although coaching services were provided to all teachers, many did not partake in these opportunities, and perhaps did not have time to do so. In the coming year, R4S will provide online PD content that is relevant to the academic areas of interest (literacy and math), to broaden the accessibility of this information for all teachers. Given the difficulty that children appeared to continue to have with math concepts, R4S staff will make a concerted effort to provide instructional support for teachers in this area early in the academic year. After completing online PD, teachers who are interested, able, and in need of additional supports can receive continued individualized coaching and materials (e.g., book kits) to further develop their instructional methods. Streamlined PD and coaching will be directly aligned with academic areas of interest and the general trajectory of children's development. Online PD will begin in September with "Understanding the Social-Emotional Climate of Your Classroom", followed by "Effective and Authentic Math Instruction" in October, "Power Words: Enhancing Children's Vocabulary Development" in November, and "Print-Focused Read-Aloud for Literacy" in December.

Second, as noted above, observations of teacher practices only occurred once during the academic year. As such, it was not possible to determine the extent to which coaching impacted teaching practices. Thus, in the 2018-2019 year, R4S will include an additional data point in the spring to observe teachers' instructional practices after receiving coaching and/or PD. It is not a surprising outcome that children's gains are not directly affected by a teacher's receipt of coaching. The expected outcome is that teaching practices and perhaps teachers' self-efficacy are directly impacted by coaching. In the upcoming year, we will seek to better evaluate the direct effects of R4S coaching services on instructional practices for prekindergarten children.

Finally, in the past year, only limited information regarding children's demographic information was obtained, constraining our understanding of factors associated with gains in literacy and math. To address this limitation, we will work to increase data collection efforts pertaining to both children and teachers in R4S. For example, we will seek to obtain more complete data concerning children's school attendance rates and reduce the amount of missing information. In addition, we will work to gather some basic demographic information, including children's disability status to allow for a more nuanced understanding of the variables that contribute to children's gains in literacy and math throughout the academic year. Additionally, more information regarding teacher's backgrounds, teaching styles, and classroom environments will also inform how best to support prekindergarten teachers.

Conclusion

R4S collects valuable information and offers much-needed support for Columbus area children by developing their kindergarten readiness skills. R4S also supports teachers by providing individualized coaching and PD. Data showed that children made significant progress throughout the year, but that many children in Columbus begin their prekindergarten year at a remarkable disadvantage, compared to their peers, and many continue to perform below their peers in math, even at the end of their prekindergarten year. This information strongly supports the idea that the R4S program meets a critical need among young children in Columbus and the early childhood education programs that they attend, but that our work must be more specific and targeted to supporting math development and impacting teachers' instructional practices. Therefore, the recommendation and plan for the 2018-2019 year is to continue to gather data about the skills and school readiness of youngsters in our city, provide more targeted and accessible opportunities for teacher PD throughout the year, and more closely monitor the impacts this programming has on the ways that teachers meet children's needs in the classroom.

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The Crane Center for Early Childhood Research and Policy (CCEC)

The Crane Center for Early Childhood Research and Policy (CCEC), in the College of Education and Human Ecology at The Ohio State University, is a multidisciplinary research center dedicated to conducting high-quality research that improves children's learning and development at home, in school, and in the community. Our vision is to be a driving force in the intersection of research, policy and practice, as they relate to children's well-being.

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