Harrison County Community Foundation

Pre-K Pilot

Annual Evaluation Report

2018-2019

**APPLIED RESEARCH AND
EDUCATION CENTER**

INDIANA UNIVERSITY SOUTHEAST

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The Applied Research and Education Center (AREC) is an outreach project of Indiana University (IU) Southeast. The AREC provides research, consulting and technical assistance to nonprofit organizations, foundations, government agencies and local businesses. The student staff enhances classroom learning through applied research projects as it actively engages every stage of each community-based project. The AREC combines learning, teaching and doing to support and empower community organizations in the IU Southeast service region.

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Introduction

In 2013, the Harrison County Community Foundation began work on a pre-K pilot program, Jump Start. The program funds full-day pre-K for up to 200 low-income children. The project provides a local parallel, and now supplement, to the statewide "On My Way Pre-K" (OMWPK) pilot program that provides public subsidies for four-year-old pre-K enrollment in quality pre-K programs. Harrison County is now part of the statewide OMWPK pilot, providing additional pre-K slots for residents. Blue River Services, which includes North Harrison Elementary, Morgan Elementary, and Rainbow's End, South Harrison Community School Corporation, Noah's Ark Preschool, St. John's Lutheran School, and St. Joseph Catholic School are all part of both the On My Way Pre-K (OMWPK) pilot and Jump Start.

Beginning in 2014, implementation of the Jump Start pilot occurred on a relatively small scale with a handful of providers and a small pool of students. The 2018-2019 school year was the fifth year of full implementation and the program included 59 students across nine programs, eight of which operated in area public or parochial elementary schools.

With instruments and data systems in place, data collection at the outset of the school year, at mid-year, and at the end of the school year went quite smoothly. Mid-year data provide formative feedback for pre-school programs and are not included here. All programs used the Indiana Standards Tool for Alternate Reporting of Kindergarten Readiness (ISTAR KR) assessment to record observations of student behavior and skills.

The evaluation team explored opportunities and limits in obtaining data on kindergarten readiness prior to and after pilot initiation. The key finding from this effort is that schools vary in their methods of recording these data, often do not include K-readiness assessment scores in the student record, and rarely maintain those records across years. As we approach the 2019-2020 school year, the emerging Align Southern Indiana Early Childhood action team has a set uniform kindergarten readiness assessment, recording, and tracking as the first goal in moving all of Southern Indiana Louisville-Metro toward 100% kindergarten readiness. The group developed a simplified tool that some area schools will pilot at the beginning of the 2019 school year. Schools throughout the five-county area may all opt to use that in the fall of 2020.

Figure 1: Percent of Students with Three or More Areas of Developmental Delay[1] within Each of the Three Broad Categories of Assessment (Pre and Post)

Reading and Language: Pre 100.0%, Post 55.4%
Math and Quantitative Reasoning: Pre 100.0%, Post 55.4%
Social and Emotional Development: Pre 100.0%, Post 89.3%

■ Pre (n=57) ■ Post (n=56)
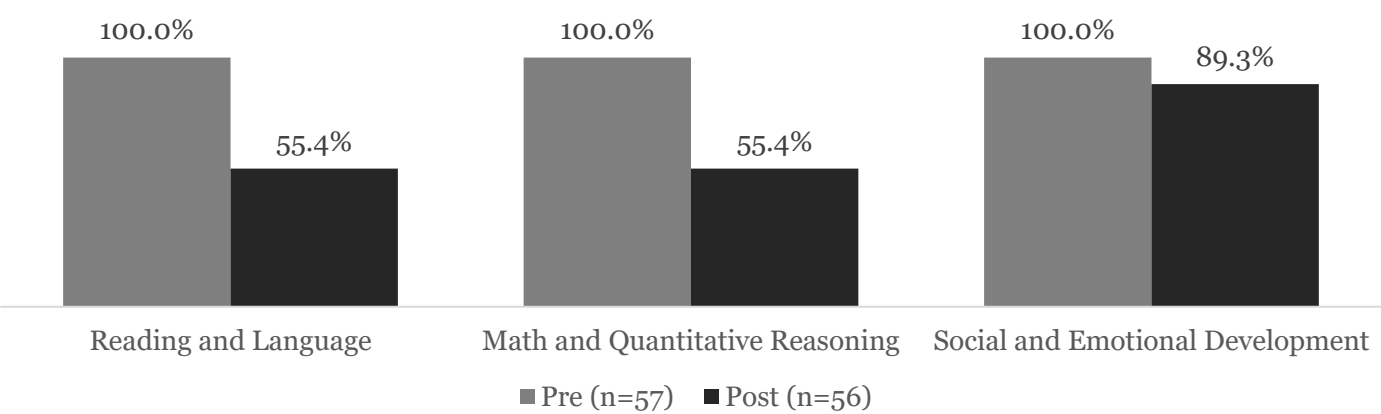
Findings confirm the significant immediate impact that pre-K programs have on kindergarten readiness. This report presents findings from the 2018-2019 school year that illustrate a statistically significant increase in skills across the board for those enrolled in the pilot. Over the course of eight months in quality full-day pre-K, the program reduced the percent of students with three or more areas of delay in Reading and Language from 100.0 percent to 55.4 percent; Math and Quantitative Reasoning from 100.0 percent to 55.4 percent; and Social and Emotional Development from 100.0 percent to 89.3 percent (Figure 1).

During the 2018-2019 school year, the program did not meet the target of 200 full day pre-K slots. The addition of On My Way Pre-K (OMWPK) cut into the pool of likely JumpStart participants. Still, more children qualify for and would benefit from JumpStart.

All participating programs report that reaching those not yet showing up remains a barrier to fully realizing the potential impact of the program. Providers work closely with the Harrison County Community Foundation to be sure people know where the program is available and they refer potential participants to other options when waitlisted at a facility that is already full. Public education on the benefits of pre-K and the

availability of this program are a priority for increasing enrollments. The Align Southern Indiana Kindergarten Readiness A-team will be engaging the Southern Indiana Early Learning Coalition in such a campaign (#SoIN4Early) over the next year.

In addition to understanding the value, transportation remains a barrier for many. In some areas, school district transportation services incorporate the pre-K children into their bus routes without too much trouble. Three of the pilot programs have transportation through the school district bus system. However, other districts express concerns about preschool children riding the bus and do not offer this option. For private providers, transportation remains a persistent concern. Program and Foundation staff consistently seek opportunities to overcome these barriers and maximize program reach and impact.

As Jump Start enters its 6th year, HCCF can report significant contributions to regional and state work on Early Care and Education. The JumpStart pilot contributes local data to the development of public education materials for use across the five-county Southern Indiana Louisville Metro region. The burgeoning public education effort launched by the early care and education coalition that operated as a precursor to the Align Southern Indiana (ASI)

Kindergarten Readiness Action Team includes JumpStart data as a local spotlight.

The Early Care and Education coalition received a grant to begin to address the public education needs identified in the first four years of HCCF's pilot. The group released "Early Care and Education: The Economic Case" in February 2018 and additional pieces on access, quality, and affordability in the fall of 2018 (http://soin4early.org/). The coalition released the full report with a press conference in February 2019 (www.ius.edu/arec/early). A social media strategy will highlight Jump Start's success and will break research into bite-sized easy-to-understand graphics to reach a broad audience. In addition to valuable contributions to this regional effort, the state added Harrison County to the statewide OMWPK pilot as a community that demonstrated "readiness" for success. Jump Start's success was a central indicator of the county's readiness.

Demographics

During the 2018-2019 school year, the Harrison County JumpStart Pilot included 59 children across 9 programs. Of these children, 56 had pre and post data that could be used for statistical analysis of improvement (Figure 2).

Participating programs include public and parochial elementary schools with pre-K classes, private secular programs, and private faith-based organizations that provide pre-K outside the elementary school setting.

Figure 2: Distribution of Pre-K Pilot Students across Participating Programs

n=59

Program	Count
Corydon Elementary School	17
Heth-Washington Elementary	12
South Central Elementary	10
Morgan Elementary School Jumpstart	7
Noah's Ark Preschool	5
North Harrison Elementary	3
St. Joseph Catholic School	2
Rainbow's End Preschool and Childcare Center	2
St. John's Lutheran School	1
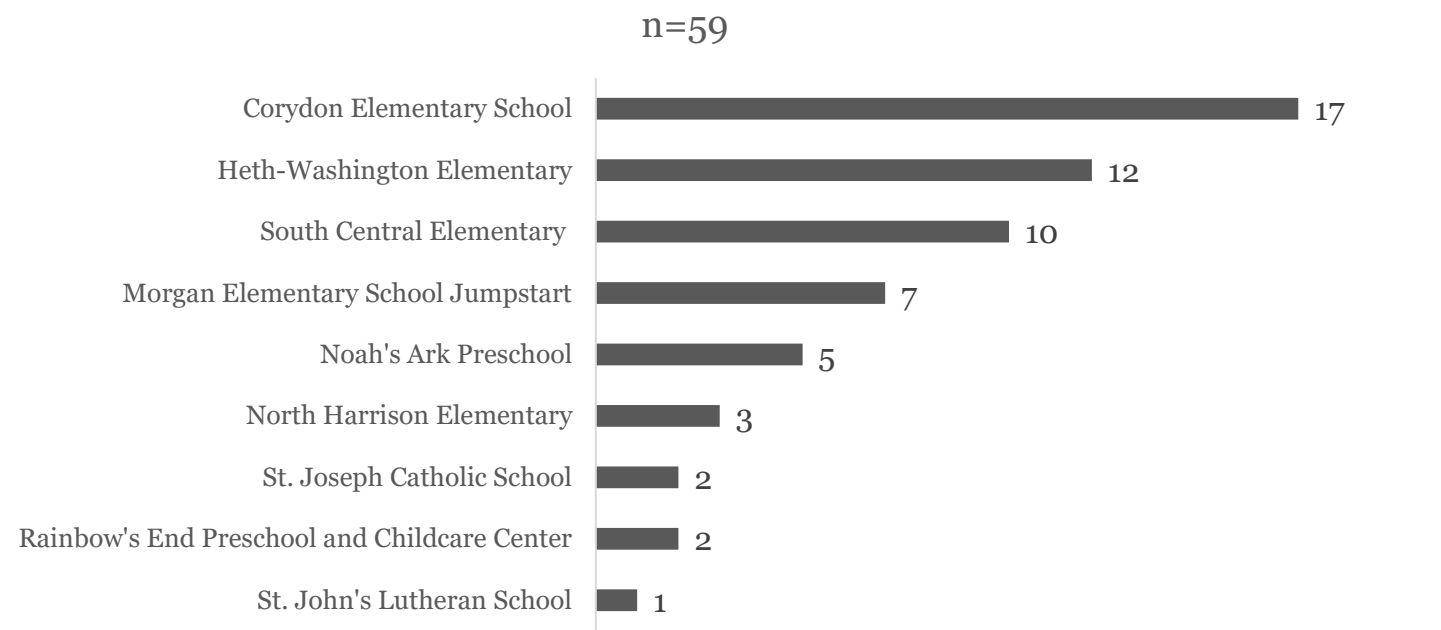
Teachers provide data on race and ethnicity based on student records or other sources. They can indicate more than one race, as was the case for three students. Hispanic origin is a separate ethnicity item not included in the race variable.

The students were predominately White (Figure 3), reflecting the demographics of the area, and 5.1 percent of students were Hispanic (Figure 4).

Figure 3: Race (n=59)

White — 55
Other Race — 3
Black — 1
Native American/Pacific Islander — 1
Asian — 0
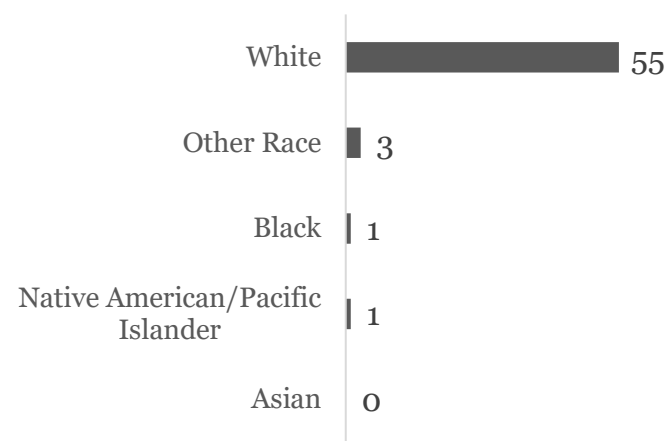
Figure 4: Hispanic Origin (n=59)

Hispanic	5.1%
Non-Hispanic	94.9%

Figure 5: Gender (n=59)

Male 42.4%
Female 57.6%
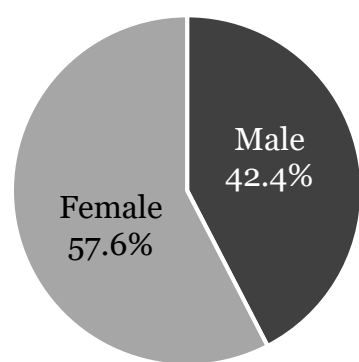
Of the students enrolled in the 2018-2019 pilot, 42.4 percent were male and 57.6 percent were female (Figure 5). The pilot program targets low-income children and 96.6 percent of students reflected in these data qualified for free and reduced price meals (Figure 6). Some children

completing the assessments do not qualify for free and reduced meals, but have household incomes at or below 200% of the federal poverty line.

Figure 6: Qualify for Free and Reduced Lunch (n=59)

No 3.4%
Yes 96.6%
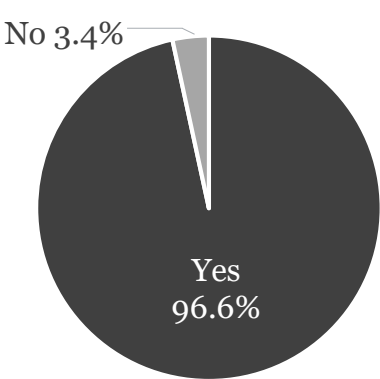
Of the 59 students in the pilot, 25.4 percent came from single-parent households, more than half (69.5 percent) from two-parent households and 5.1 percent from other household types (Figure 7).

Figure 7: Household Composition (n=59)

Other 5.1%
Single-Parent 25.4%
Two-Parent 69.5%
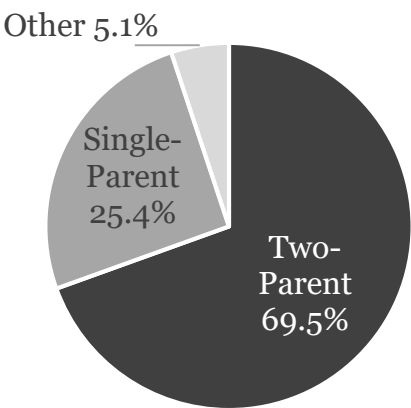
The role of family and home environment is an area the statewide pilot carefully explores, but is beyond the scope of this work. However, the OMWPK evaluation uses attendance as an indicator of family engagement. The average attendance rate for 2018-2019 Jump Start was 91.8%.

Findings

ISTAR KR Assessment Overview

The ISTAR KR assessment tool is a comprehensive observational record of a child's functional capacities across the following areas of development: reading and language, math and quantitative reasoning, and social and emotional development. Teachers observe students carefully to determine and rate function level. Overall, findings suggest that pre-K programs improve kindergarten readiness.

Scores on the ISTAR KR assessments indicate where the child's behaviors and skills fall in terms of average months of development. For example, a child scoring 38 on a particular dimension behaves at a level commonly seen in a 38 month-old child. Please note, however, children vary in their development and it is perfectly normal and expected for some kids to develop earlier and others later across dimensions. Our use of the term "delay" in reference to those whose development stage is below their age does not indicate a clinical delay—we are not qualified to make that assessment.

This coding is a change from the first couple years of pilot reports and reflects collaboration with the IU Early Education Center and its evaluation of the OMWPK program. We began using the new coding in the 2016-2017 annual report.

On average, student development increased between 19 and 27 months from pre-test to post-test in each of the three main ISTAR KR categories (Figure 8). That means that over the course of a 9-month school year, children progressed, on average, 19-27 months in terms of child development. Across the three domains, mean scores upon arrival at the pre-K programs were between 33.6 and 35.0 months—closer to three-year-old (36 months) than to four-year-old (48 months) development. By the end of the school year kids were much closer to the 5-year old level of development, even with their median age, for Reading and Language, and Math and Quantitative Reasoning.

While the Social Emotional post-assessment mean scores fall below 60 months development, the state does not have a Core Standard for Social and Emotional development by the end of Kindergarten or any other grade. Children vary far more in their social and emotional scores than in the other two areas and only the top end reach the level expected at age five. These figures suggest that while quality pre-K at age four has an impact, efforts will also need to address the importance of interaction-rich nurturing environments from birth through age three.

Figure 8: Summary of Pre- and Post-Test Performance

Subject	Full Data		Paired Samples	
	Pre Mean	Post Mean	Pre Mean	Post Mean
Reading and Language Total	34.6 (n=58)	62.2 (n=57)	35.0 (n=56)	62.1*
Math and Quantitative Reasoning Total	33.3 (n=58)	60.5 (n=57)	33.6 (n=56)	60.4*
Social and Emotional Development Total	34.2 (n=58)	53.2 (n=57)	34.2 (n=56)	53.1*
Median Age	54.0	63.0		

*Denotes statistical significance at a level of p<.05

Data Details

Full data for pre- and post-tests include some children who only took one or the other. A student who took the pre-test but left before the post-test will be included in the pre-test data in these summary figures but not in the post. Similarly, a late arrival may show up only in the post-test data.

Paired samples tests allow us to assess the statistical significance of changes from pre- to post-test. Statistical significance means the observed changes from pre to post are not likely to have occurred by chance. The p-value of <.05 means that there is less than five percent likelihood that the kids in this study improved this much by chance.

The statistical significance test, however, requires a matching of each student's pre- to each student's post-test. Our "paired samples" include only students who have both pre- and post-test data. This distinction is important, as there will be larger sample sizes for figures listed under "Full Data" than under "Paired Samples" ("n" denotes the sample size).

The following sections report quantitative measures of performance across reading and language, math and quantitative reasoning, and social and emotional development portions of the ISTAR KR assessment. Following the initial data summary are breakdowns based on gender and household type.

Reading and Language

While children do not usually learn how to "read" until about first grade, they actually begin developing pre-literacy skills much earlier.[2] Quality pre-K programming helps children develop these important pre-literacy skills before they walk into kindergarten so that kindergarten teachers can move forward in developing reading and language skills.[3] Pre-K progress can reduce class time on remedial efforts and demand for special education.[4]

In the fall of 2017, the research team interviewed kindergarten teachers at Corydon Elementary school. Teachers noted the presence of pre-literacy skills as a key benefit of the JumpStart program, one teacher explained,

> *Just having kids know which way is right side up for a book and what direction the pages turn—that makes a big difference.*

Among all providers mean scores for the reading and language category increased from 34.6 on the pre-test to 62.2 on the post-test (Figure 9). This means they went from well below average development for their age to within the normal distribution of ability for their age (less than 2 standard deviations from the mean).

The assessment includes eight English and Language Arts components. Kindergarten readiness is indicated by scores between one and seven, depending on the module, and these scores are transformed to match the age (in months) at which the average child demonstrates the corresponding skill or behavior. Teachers observe students over time and rate student ability based on specific tasks the student can complete independently.

Figure 9: ISTAR KR Reading and Language Total Mean Scores

Reading and Language Total	Pre Mean	Post Mean
Full Data	**34.6** (n=58)	**62.2** (n=57)
Paired Samples	**35.0**	**62.1*** (n=56)
Median Age (months)	**54.0**	**63.0**

*Denotes statistical significance at a level of *p*<.05

Among students for whom we have both pre-and post-tests, performance on reading and language related tasks improved from a mean score of 35.0 at the beginning of the school year to 62.1 at the end of the school year (Figure 9). Paired samples tests for statistical significance indicate that the improvement in average score is statistically significant, meaning that the average level of improvement across participants is very unlikely to happen by chance. Improvements on every item in the reading and language category are statistically significant (Figure 10).

Figure 10: ISTAR KR Reading and Language Means

Subject	Full Data		Paired Samples	
	Pre Mean (n=58)	Post Mean (n=57)	Pre Mean (n=56)	Post Mean
Reading and Language Total	**34.6**	**62.2**	**35.0**	**62.1***
Phonological Awareness	28.2	61.0	28.4	60.9*
Print Concepts, Phonics and Word Recognition	35.9	65.1	36.3	65.1*
Informational Texts	31.3	60.2	31.5	60.0*
Literature Texts	31.5	61.2	31.8	61.0*
Writing Standards	37.2	64.2	37.5	64.1*
Language Conventions	40.3	62.9	40.6	62.8*
Comprehension and Collaboration	31.0	58.2	31.6	57.9*
Presentation of Knowledge and Ideas	41.8	65.0	42.0	64.9*
Median Age (months)	**54.0**	**63.0**	**54.0**	**63.0**

*Denotes statistical significance at a level of $p<.05$

Figure 11: Reading and Language Pre-Assessment Mean Development Level (months) (n=58) **Compared to Median Age (months)** (n=57)
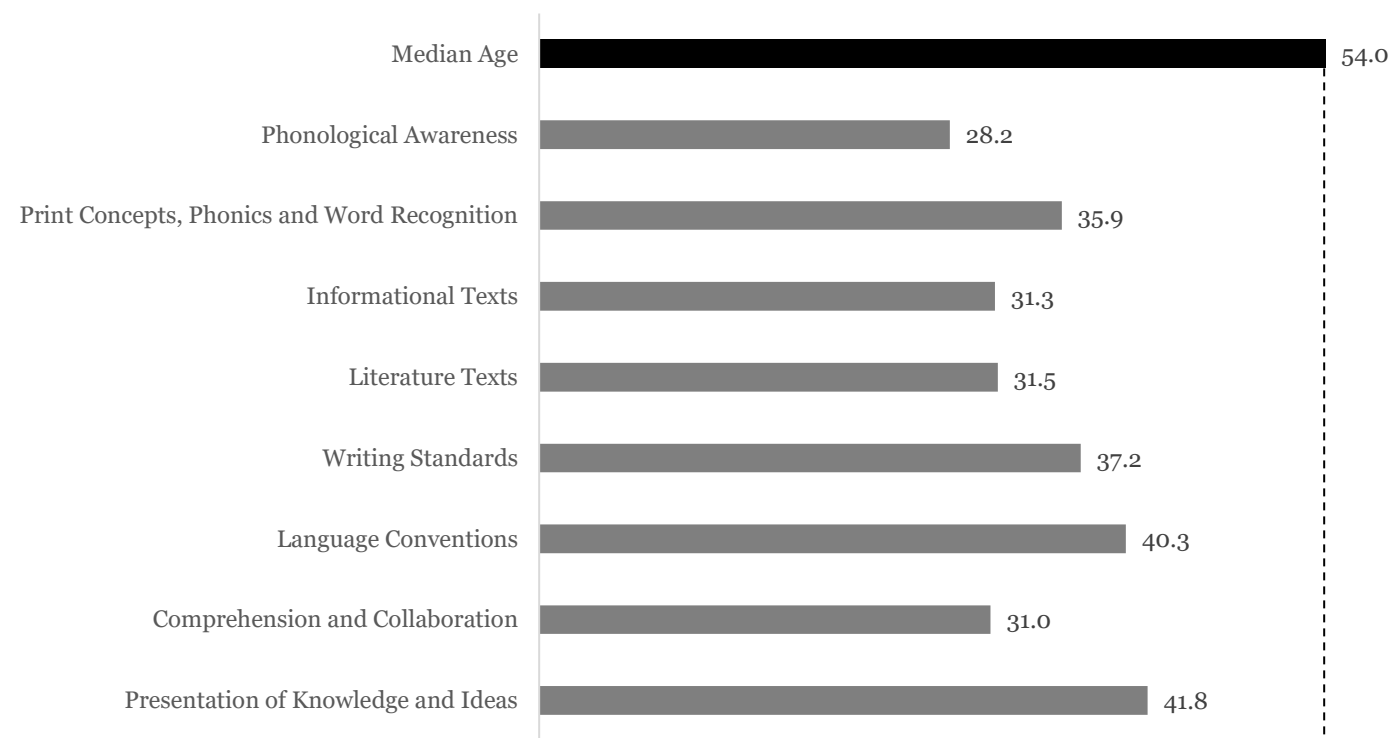
Students enrolled in the pilot began the school year well below expected levels of reading and language development for their age. The median age as of August 1 was 54.0 months and their average stages of development in reading and language skills ranged from 28.2 months to 41.8 months, placing them 12.2 to 25.8 months behind expected development. Phonological awareness is developed through verbal interaction, having someone read developmentally appropriate books and poems aloud, call and response conversation from infancy forward, and recitation of songs and nursery rhymes.

Figure 12: Reading and Language Post-Assessment Mean Developmental Stage Compared to Median Age (n=56)

Category	Value
Median Age	63.0
Phonological Awareness	61.0
Print Concepts, Phonics and Word Recognition	65.1
Informational Texts	60.2
Literature Texts	61.2
Writing Standards	64.2
Language Conventions	62.9
Comprehension and Collaboration	58.2
Presentation of Knowledge and Ideas	65.0
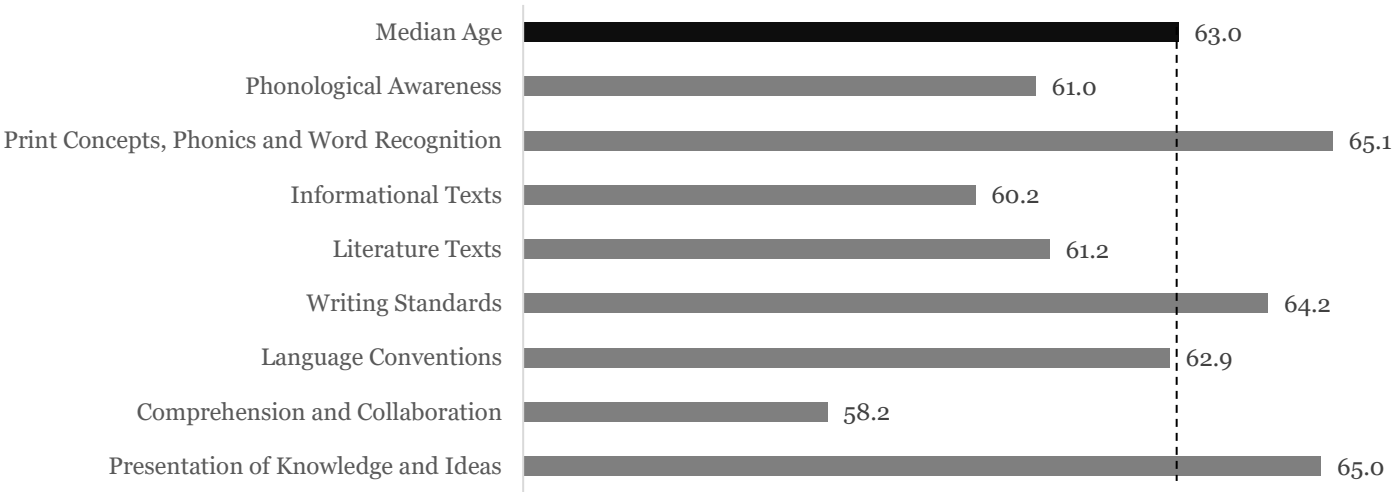
By the end of the year, students enrolled in Jump Start had narrowed or overcome the gaps in development in all categories of reading and language development (Figure 12).

In May, students' median age was 63.0 months and their mean assessed level of development in reading and language ranged from 58.2 months in comprehension and collaboration to 65.1 months in print concepts, phonics, and word recognition. The maximum negative gap was less than 5 months and average student development exceeded expected development in three categories. In all but one category, student averages were at or above that expected of a child who has just turned five (60 months, which is the age requirement for kindergarten).

The change from August to May reflects a significant closing of the gap for the target student population. Low-income kids came to pre-school with some deficits, as the research would predict, but one year of full-day quality pre-K brought them into the range of reading and language development expected for their age. At the beginning of the school year, 100.0 percent of students demonstrated three or more areas of delay in reading and language development. That number was reduced to 55.4 percent by the end of the school year (Figure 13). Comprehension and Collaboration is the weakest area in reading and language development. The greater struggle in collaboration may be related to persistent delays in social and emotional development.

Figure 13: Percent of Students Delayed in Three or More Areas of Reading and Language (Pre and Post)

Pre (n=57)   100.0%
Post (n=56)   55.4%

Math and Quantitative Reasoning

Children develop many quantitative and spatial skills before they start school. Shape-sorting infant and toddler toys are among the many ways that even very young children explore these concepts.

Mean scores for the math and quantitative reasoning category increased from 33.6 on the pre-test to 60.4 on the post-test (Figure 14). That means that on average, students accomplished two years of development during the 8-9 month school year.

Students exhibited significant improvement in the math and quantitative reasoning category as a whole as well as in all six modules (Figure 15). The median age student was roughly 21 months behind in math and quantitative reasoning development upon arrival at pre-K and caught up to 5 year old age level (60 months) by the end of the school year (Figures 17 and 18).

Figure 14: ISTAR KR Math and Quantitative Reasoning Total Mean Scores

Math and Quantitative Reasoning Total	Pre Mean	Post Mean
Full Data	33.3 (n=58)	60.5 (n=57)
Paired Samples	33.6	60.4*
	(n=56)	
Median Age (months)	54.0	63.0

*Denotes statistical significance at a level of *p*<.05

Figure 15: ISTAR KR Math and Quantitative Reasoning Means

Subject	Full Data		Paired Samples	
	Pre Mean (n=58)	Post Mean (n=57)	Pre Mean (n=56)	Post Mean
Math and Quantitative Reasoning Total	**33.3**	**60.5**	**33.6**	**60.4***
Counting	36.2	60.8	36.7	60.8*
Algebraic Thinking	40.9	65.8	41.0	65.7*
Time	29.9	57.5	30.2	57.4*
Location	28.7	59.1	29.0	58.9*
Length, Capacity, Weight and Temperature	30.8	59.3	31.0	59.1*
Geometry	33.4	60.5	34.0	60.5*
Median Age (months)	**54.0**	**63.0**	**54.0**	**63.0**

*Denotes statistical significance at a level of $p<.05$

Figure 16: Percent of Students with Developmental Delays in Three or More Areas of Math and Quantitative Reasoning (Pre and Post)
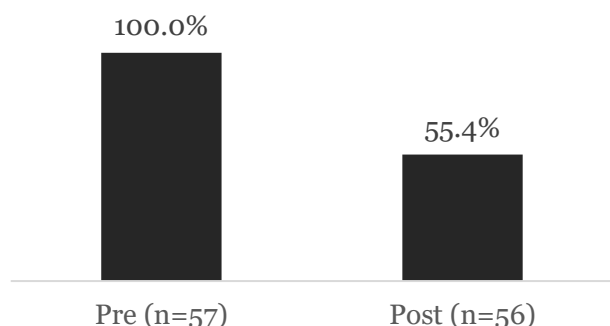
Student developmental deficits in math and quantitative reasoning at the beginning of the school year ranged from 13 to 25 months (Figure 15 and Figure 17). By May, student average development ranged from 2.2 to 5.5 months below median age, with the exception of "Algebraic Thinking" being 2.8 months beyond the median age (Figure 15 and Figure 18).

At the beginning of the school year, 100.0 percent of students demonstrated delays in three or more areas of Math and Quantitative Reasoning. By the end of the school year, that number declined to 55.4 percent (Figure 16).

Figure 17: Math and Quantitative Reasoning Pre-Assessment Mean Developmental Stage (n=56) Compared to Median Age (n=56)

Figure 18: Math and Quantitative Reasoning Post-Assessment Mean Developmental Stage (n=56) **Compared to Median Age** (n=56)

Category	Value
Median Age	63.0
Counting and Quantity	60.8
Algebraic Thinking	65.8
Time	57.5
Location	59.1
Length, Capacity, Weight, and Temperature	59.3
Geometry	60.5

Social and Emotional Development

Schools provide important opportunities for social and emotional development of students. School readiness includes demonstrating the ability to manage one's self in the presence of others, manage emotions, engage in social exchange with fellow students, take responsibility in the classroom community and for one's own schoolwork, and engage in problem solving and in learning more broadly. Pre-schools often pay close attention to how children interact with objects and with each other in order to target needed social and emotional development in preparation for the kindergarten environment.[5] However, the state of Indiana does not have a core standard for social and emotional development at any grade level.

Students increased their total mean scores on indicators of social and emotional development from 34.2 months to 53.2 months. The average performance progressed 18.8 months of development over an eight to nine month period (Figure 19).

Figure 19: ISTAR KR Social and Emotional Development Total Mean Scores

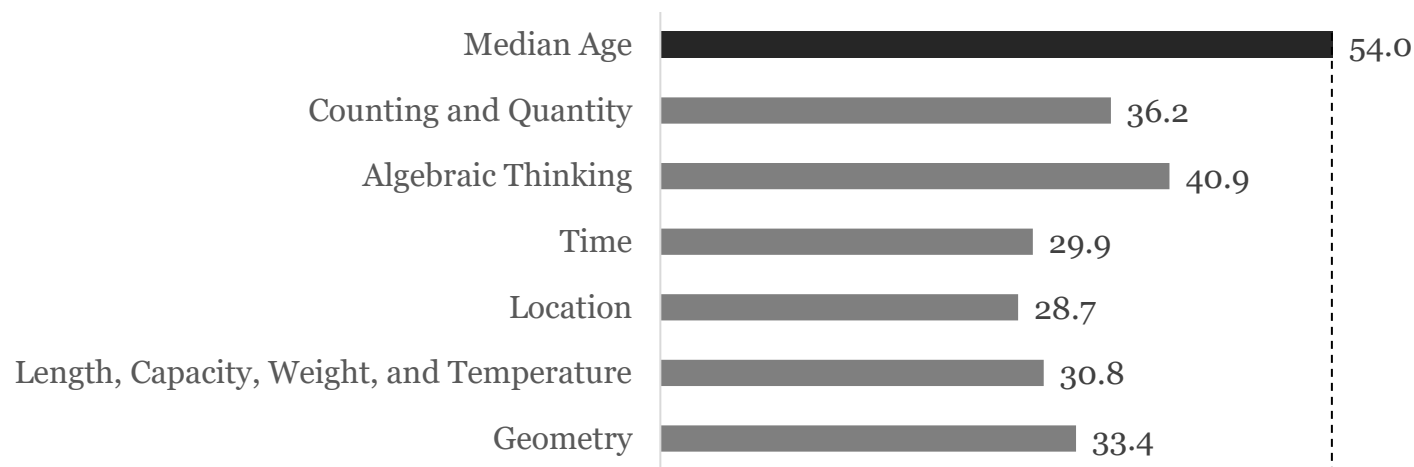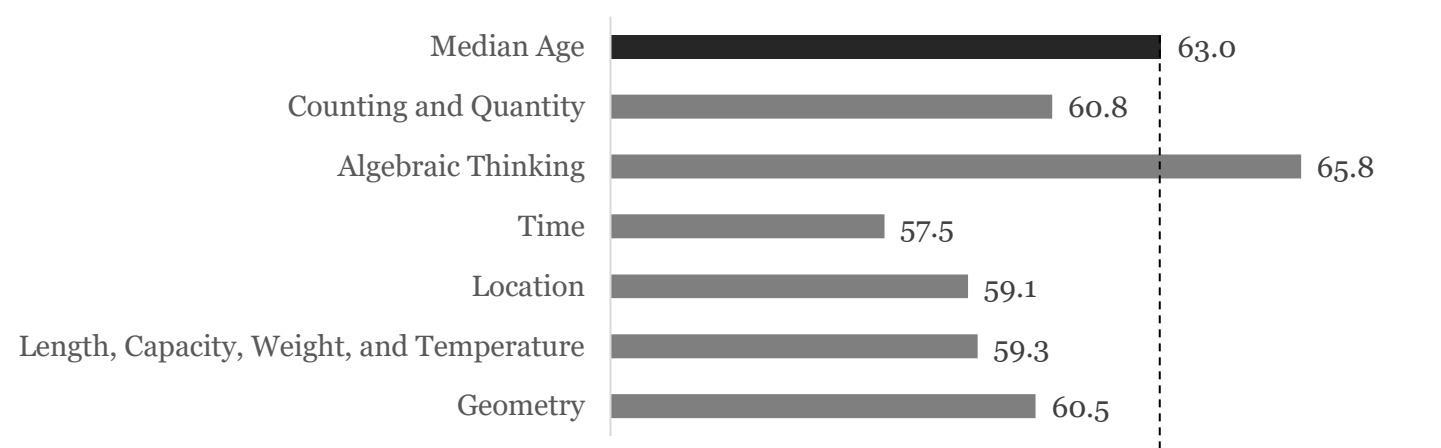| Social and Emotional Development Total of Means	Pre-Mean	Post-Mean
Full Data	**34.2** (n=58)	**53.2** (n=57)
Paired Samples	**34.2**	**53.1**[*] (n=56)
Median Age (months)	**54.0**	**63.0**

*Denotes statistical significance at a level of p<.05.

For students who stayed at the same school the whole year, the change in overall assessed ability from pre-test to post-test was statistically significant (Figure 19). Each module shows a significant improvement as well (Figure 20).

This means the group of students went from an average score that was roughly 20 months behind appropriate development for their median age to an average score roughly 10 months behind their median age at post-assessment. The gap between these kids and their average peers narrowed by 10 months over the course of the 9-month pre-K program. Had these children not enrolled and their development continued at the same pace as their first four or more years, the predicted average post-test score would have been 39.9 (about 23 months

behind average development for their average age). At the start of the school year 100.0 percent of students demonstrated three or more areas of delay in social and emotional development and by the end of the school year, 89.3 percent demonstrated three or more areas of delay.

Figure 20: ISTAR KR Social and Emotional Development Means

Subject	Full Data		Paired Samples	
	Pre Mean (n=58)	Post Mean (n=57)	Pre Mean	Post Mean (n=56)
Social and Emotional Development Total	**34.2**	**53.2**	**34.2**	**53.1***
Sense of Self and Others	39.8	57.0	39.7	56.9*
Manages Emotions	31.0	54.1	31.1	54.0*
Interpersonal Skills	32.3	49.2	32.3	49.1*
Responsibility	32.9	46.0	32.8	45.9*
Problem Solving	34.5	57.9	34.6	57.8*
Approaches to Learning	34.9	55.1	34.7	55.0*
Median Age (months)	**54.0**	**63.0**	**54.0**	**63.0**

*Denotes statistical significance at a level of p<.05

These findings suggests that the pilot targeting low-income kids is narrowing the gap between at-risk children and average expected development for kindergarten readiness. The pilot pre-K programs close the gap almost completely for Math and Reading, and achieve some success, albeit less dramatic, with social and emotional development.

While these programs may not have been the sole cause of score improvements, it is clear students enrolled in these programs leave ready for kindergarten. Some of this development would have occurred without the program, but the findings are significant and, in some places, quite dramatic. The tables in the appendix list the skills assessed in each module. The more difficult skills are toward the bottom of each table. As you look through those tables, think about whether children would be likely to develop those skills at home.

Gender and Pre-K Inputs and Outcomes
Gender differences in education have long been an important topic of inquiry. Historically, teachers neglected girls in the classroom. Boys received the lion's share of attention resulting in better outcomes and higher levels of education for boys. However, today's girls stay in school and achieve higher levels of education at higher rates than today's boys achieve. With this in mind, we examine gender differences in pre- and post-test performance across all categories of assessment.

Upon entry into pre-school (pre-test), no evaluation items revealed significant or marginally significant differences between girls and boys.

Figure 21: ISTAR KR Reading and Language Total Mean Post Scores by Gender (n=57)

Reading and Language Score by Gender	Male	Female
Total Subject Mean	59.4	64.2*

*The difference in mean score by gender for this domain was significant (*p*=.039).

For Reading and Language assessments, by the end of the school year, the average girl post-test score of 64.2 (n=34) was significantly higher (*p*=.039, variance not assumed) than the average boy score of 59.4 (n=23) (Figure 21). Girls scored higher on every dimension, and three of the individual items are significantly different, with girls scoring higher: "Phonological Awareness," "Literature Texts," and "Writing Standards" (Figure 22). The items "Language Conventions" and "Comprehension and Collaboration" are marginally significant (*p*=.064 and .056, respectively).

Figure 22: ISTAR KR Reading and Language Mean Post Scores by Gender (n=57)

	Male	Female
Phonological Awareness*	55.5	64.8
Reading Foundational Skills	64.5	65.6
Informational Texts	59.0	61.1
Literature Texts*	58.3	63.2
Writing Standards*	60.7	66.7
Language Conventions	60.5	64.5
Comprehension and Collaboration	54.4	60.7
Presentation of Knowledge and Ideas	62.4	66.7
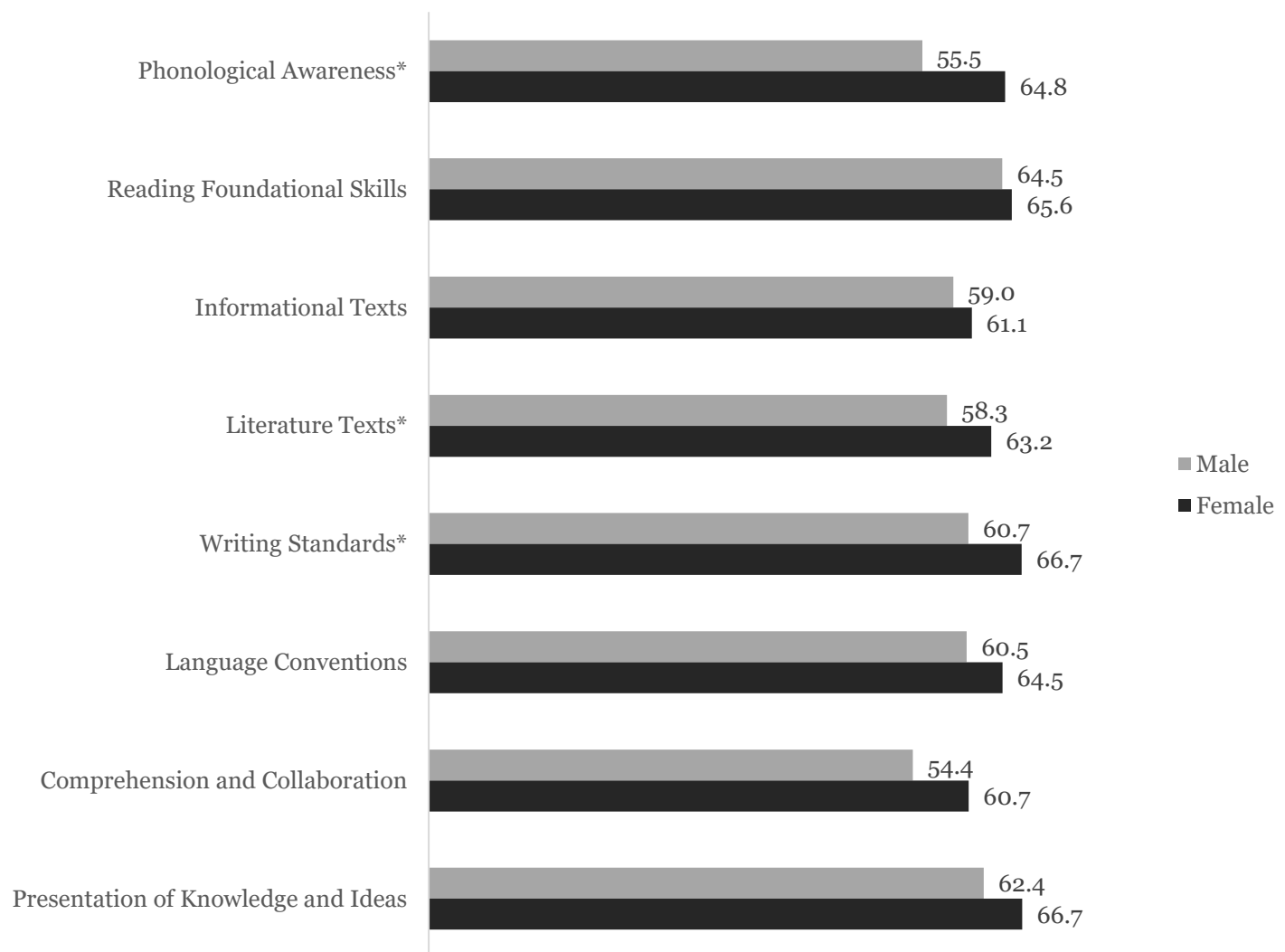
*Denotes statistical significance at a level of *p*<.05

Figure 23: ISTAR KR Math and Quantitative Reasoning Total Mean Post Scores by Gender (n=57)

Math and Quantitative Reasoning Score by Gender	Male	Female
Total Subject Mean	58.8	61.7

In the Math and Quantitative Reasoning category there was not a significant difference (*p*=.205) between the girls' mean score of 61.7 (n=34) and the boys' mean score of 58.8 (n=23) (Figure 23).

Analyses of the items comprising the Math and Quantitative Reasoning domain indicate that girls scored higher than boys on all items on the post-

test except for "Length, Capacity, Weight, and Temperature." In this category, the difference between the boys' mean score of 59.8 (n=23) and the girls' mean score of 59.0 (n=34) was not statistically significant (*p*=.816). None of the other categories in the Math and Quantitative Reasoning domain had statistically significant or marginally significant differences on the post-test.

Figure 24: ISTAR KR Math and Quantitative Reasoning Mean Post Scores by Gender (n=57)
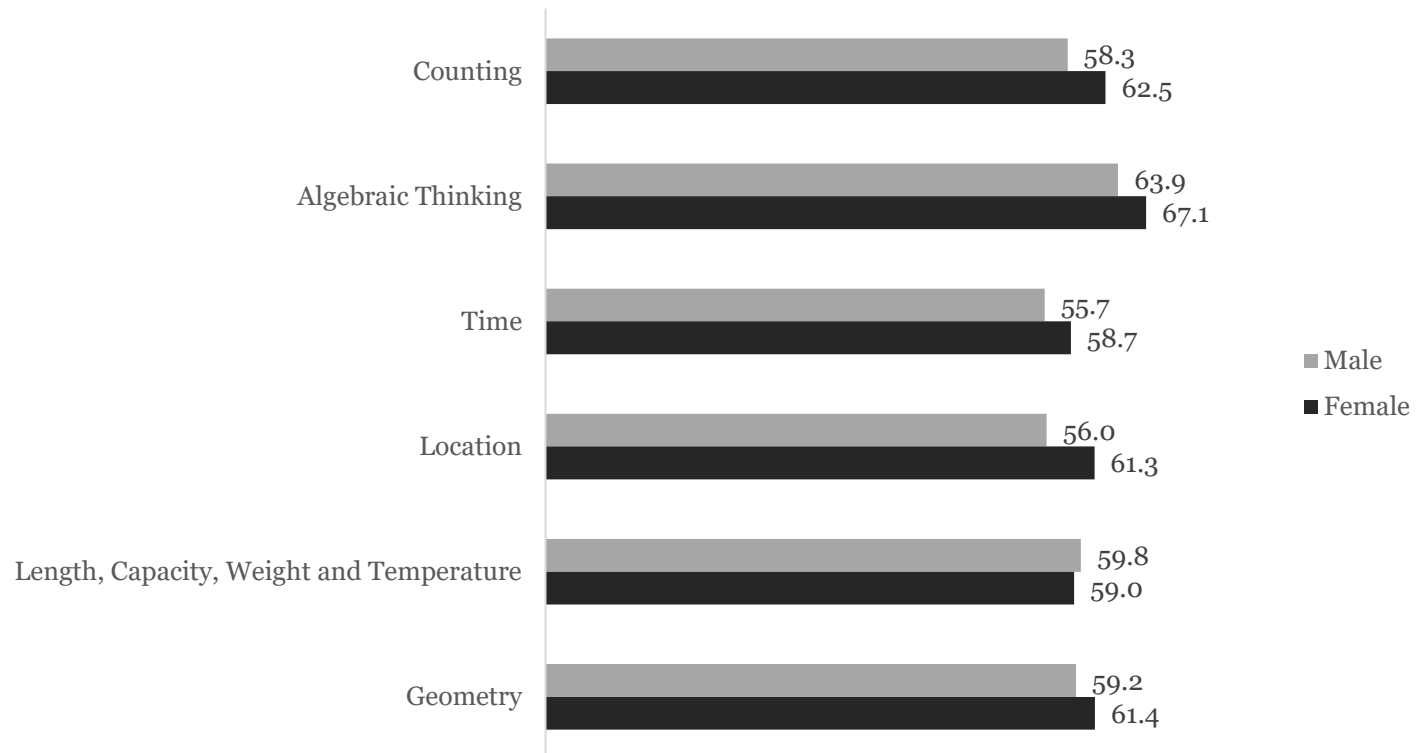
Figure 25: ISTAR KR Social and Emotional Development Total Mean Post Scores by Gender (n=57)

Social and Emotional Development Scores by Gender	Male	Female
Total Subject Mean	51.0	54.6*

*The difference in mean score by gender for this domain was significant (*p*=.027).

In the Social and Emotional Development domain of the post-test girls averaged a score of 54.6 (n=34) while boys averaged 51.0 (n=23) (Figure 25). The difference in these scores is significant (p=.027).

The difference between girls' and boys' scores is statistically significant for four items in this domain of the assessment, "Sense of Self and Others," "Manages Emotions," "Interpersonal Skills," and "Responsibility" (Figure 26).

In prior years, girls were slightly ahead of boys in this domain at the beginning of the school year, and seemed to develop more quickly. The 2017-2018 assessment analyses illustrate more balanced mean scores between girls and boys in this domain for both the pre-test and post-test. This year, pre-test performance showed no statistically significant difference between boys and girls, but girls finished significantly stronger than did boys in four of the six areas.

Figure 26: ISTAR KR Social and Emotional Development Mean Post Scores by Gender (n=57)

Domain	Male	Female
Sense of Self and Others*	53.8	59.1
Manages Emotions*	51.0	56.3
Interpersonal Skills*	46.0	51.3
Responsibility*	43.8	47.4
Problem Solving	56.7	58.7
Approaches to Learning	55.0	55.1
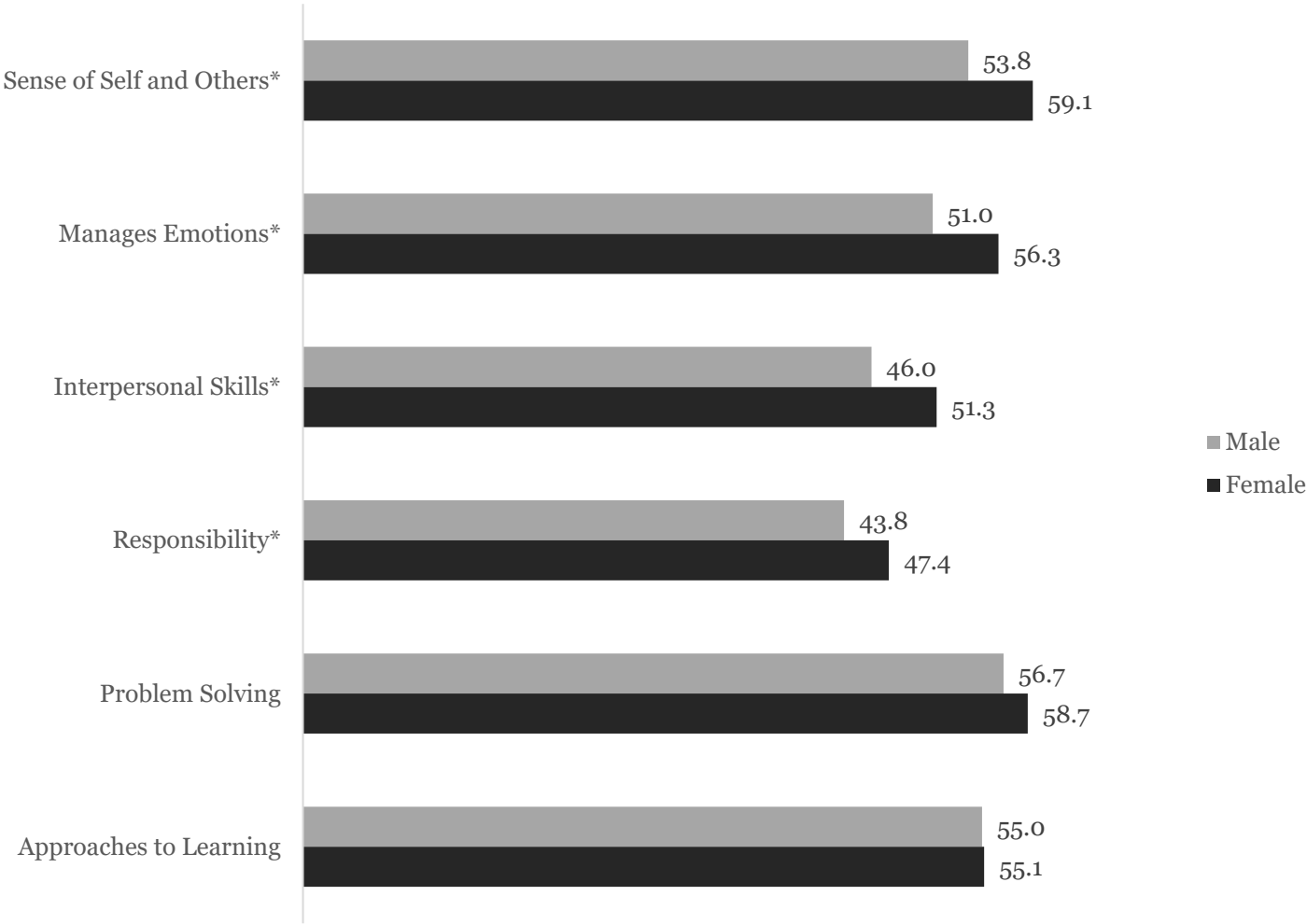
*Denotes statistical significance at a level of p<.05.

Household Composition and Pre-K Inputs and Outcomes

Household composition, particularly in low-income households, gets a lot of attention as a causal factor in shaping outcomes. The IU Southeast AREC asks providers to indicate each student's household composition. Household types other than single-parent or two-parent comprised 5.1 percent of the sample (Figure 7). We suspect this reflects the recent rise in grandparents and other family members raising children whose parents are unable to do so.

In the 2018 pre-test there is only one marginally significant difference found between those from two-parent households and those from single-parent households. Children from two parent families demonstrated marginally higher development on the item "Algebraic Thinking" (p=.067).

Household type drove some significant differences in Reading and Language results on the post-test. Kids from single-parent households performed significantly better than kids from two-parent households in the following areas:

- Phonological Awareness
- Print Concepts, Phonics, and Word Recognition
- Presentation of Knowledge and Ideas

Interestingly, students from single-parent households had a significantly higher mean subject score for Reading and Language 65.5 months of development compared to 64.5 for students in two-parent households (p=.034). Student scores in Math and Quantitative Reasoning and Social and Emotional Development did not vary across household type in any significant way.

Classroom Observations

In addition to the quantitative pre- and post-test data, the research team conducts field observations in all participating programs. The evaluation team uses the Classroom Assessment Scoring System (CLASS)™ (the same classroom assessment tool used for the state OMWPK pilot) to evaluate teacher-student interactions at every program in the pilot. Each site visit consists of four to six consecutive 30-minute cycles—a 20-minute observation period followed by a ten-minute period used to summarize the collected information into scores from one to seven. Low scores consist of ones and twos, moderate scores include threes, fours and fives, and high scores are comprised of sixes and sevens.

Researchers averaged related scores within the general categories of *Emotional Support*, *Classroom Organization*, and *Instructional Support*.

Emotional Support includes the subcategories:

- Positive climate.
- Regard for student perspectives.
- Teacher sensitivity.
- Negative climate.[1]

Emotional Support dimensions focus on whether the program creates a welcoming atmosphere that allows students to grow at their own pace. Scores in this domain range from 2.3 to 6.6. Regard for student perspectives and positive climate both had strong scores: three classrooms had high scores in each category, and all earned a moderate score in both dimensions (five in the five range).

All but one class had a moderate or high score in "teacher sensitivity" (range =2.3-6.3). "Regard for student perspectives" and "positive climate" had the highest scores across all domains. In general, providers scored well in *Emotional Support* with an overall average of 5.1, the highest average score of the three domains. Emotional support in the classroom contributes to stronger child outcomes in

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[1] We observed and assessed negative climate, but did not include it in the index for emotional support. For the negative climate variable low scores mean good and high scores mean bad. The mean score

for negative climate was 1.1, with a standard deviation of only .24. When added to models for social and emotional development, the factor was not significant in predicting end of year assessment.

social and emotional development and English Language Arts, even when we control for other factors.

The category *Classroom Organization* includes:

- Instructional learning formats.
- Productivity.
- Behavior management.

The *Classroom Organization* domain focuses on whether teachers make the most of their time with students. "Behavior Management" and "Instructional Learning Formats" both had a mean score of 4.8 with high scores of 6.3 and 6.0, respectively. Low scores in this area dipped down to 1.8 for Productivity and Instructional Learning Format and 2.0 for Behavior Management. Most programs performed in the moderate range.

The widest range of performance occurred in the "behavior management" indicator (2.0-6.3) and "instructional learning formats" (1.8-6.0). Overall, *Classroom Organization* scores averaged about 4.4 on the 7-point scale, suggesting moderate performance with some room for improvement.

The category *Instructional Support* includes:

- Concept development.
- Quality of feedback.
- Language modeling.

Scores across these items ranged from 1.8 to 6.5. Teachers who score high in this category ask students to explain the logic of their answers, and provide the appropriate amount of help to allow students to arrive at their own answers. Most programs achieved a moderate score in "concept development," four of which were in the high moderate range and only one score that was in the low range. "Quality of feedback" had three scores in the high moderate range and three low scores. The weakest of the three areas was "quality of feedback," suggesting room for growth. "Concept development" had strong performers who may be able to lead the way to bringing all classrooms up to a higher level of instructional support.

Examining the average of all providers' scores for each domain reveals that as a whole, programs in the pilot scored mostly in the moderate range. Providers tend to be strongest in the *Emotional Support* domain, and weakest in the *Instructional Support* domain, though the mean scores are within a little more than one point of each other.

These findings are instructive, but also based on very limited observation. Observations indicate opportunities for growth, but are not a definitive assessment of program quality.

In the case of students' performance on the social-emotional post-assessment items, gender and average scores on emotional support and classroom organization had a significant impact on post-assessment performance. This means that when we assume the same level of classroom organization and the same gender, emotional support is the best predictor of performance on post-assessment. When we assume the same level of emotional support and the same gender, classroom organization is the best predictor of performance on the end of year assessment, and when all else is equal, girls perform better in social and emotional development than do their male peers.

The finding suggests that strong classroom organization and emotional support (as measured by the CLASS observation tool) should be important focus points for professional development of pre-K instructors. Social and Emotional development is the area where the programs are making the least amount of progress. While a pre-K program cannot completely counter-balance what happens at home in this area, these findings suggest that teachers with strong instructional support can effect positive outcomes.

When we look at performance on the post assessment for math and quantitative reasoning, gender is again a significant predictor of performance as is classroom organization, but we also see that assessed ability at the beginning of the year remains significantly correlated with end of

year skills. Attendance rate is moderately significant (p=.07). When we look at the same set of variables in relation to English and Language Arts, skill level at pre-assessment is less significant (p=.09), but gender and classroom organization remain significant. Attendance rate is moderately significant (p=.07). These findings vary some from the previous year and reflect a smaller sample of students. The final report for the pilot will run the same models on the full pilot data set to gain some statistical power in understanding the potential importance of various factors related to classroom organization and teacher behavior.

Conclusions

Findings from year five of the Harrison County Community Foundation Pre-K Pilot indicate positive program impacts. Children attend full-day programs in nurturing and constructive environments.

Student performance on tasks related to language, math, and quantitative reasoning, and social and emotional development progresses significantly during the pre-K year.

The full pilot program report will combine data from multiple years for a closer look at these dynamics. The higher number of cases will make our findings more reliable and will allow for greater statistical power. But the preliminary findings still indicate some interesting patterns.

Reading and Language Arts
Reading and language arts development is a function of a variety of factors. Girls tend to perform better on the reading and language arts assessments. In fact, attendance rate, English and language development at the start of the program, are all just moderately significant when we control for the other listed factors. Classroom organization is significant at the p=.05 level. Gender, however, is the most robust predictor of outcomes (p<.01).

Even in a high quality environment, some of the differences kids come in with at age four persist after sharing a language rich, developmentally appropriate classroom for eight to nine months.

Math and Quantitative Reasoning
Math development, like language arts, reflects the girl advantage at this early age. Pre-test performance on math and classroom organization are statistically significant predictors of assessed math and quantitative reasoning skills at the end of the program. Attendance rate is moderately significant. The first four years prior to pre-K shape outcomes, and gaps created in those years are difficult to eliminate. Consistent attendance in a quality program that provides strong classroom organization, however, can give kids a good opportunity to close the gap and accelerate development in math and quantitative reasoning.

Social and Emotional Development
Social and emotional development is the area where one year of full day quality pre-K at age 4-5 is able to do the least (of the three areas examined). The progress of the pre-K year, however, is important and it largely depends on the quality of the pre-K program. When we control for other factors, a few key components maintain significance as predictors and produce a model that explains more than half of the variation in kids' end of year social and emotional development. Girls experience some development ahead of boys. Girls, for example, demonstrate a more advanced level of social and emotional development than do boys. In addition, positive emotional support in the classroom and strong classroom organization both contribute to stronger social and emotional outcomes at the end of the pre-K year.

Program Take-Aways
Overall, year five findings confirm positive program impacts and suggest avenues for further exploration in the year ahead. Full-day quality pre-K is closing the developmental gap between at-risk kids and population averages. Children make significant strides in reading and language, and

math and quantitative reasoning, achieving as much as 27 months of development in just nine months. Children who come to pre-k with higher levels of development continue to experience the cumulative advantages of a stronger base. Regular attendance and various aspects of classroom structure and organization shape outcomes across language, math, and social and emotional development.

While pre-K does narrow the gap between at-risk kids and the general population of children, developmental differences shaped by experiences in the first four years of life continue to have an impact on progress and outcomes.

Appendices

The ISTAR KR assessment instruments offer progressive responses within each assessment item, meaning that the difficulty or skill level increases further down the table. The percentage for each item reflects the percent of students who mastered that skill level. Students advance upon mastery of each level of the module. As a result, we expect fewer students to master items in the lower portions of the tables.

Indiana has no Common Core Standard for the ISTAR category Social and Emotional Development, so this category of the kindergarten readiness assessment does not describe when students have mastered skills that prepare them for kindergarten schooling. Instead, this category measures social and emotional skill development with general child development as a reference and features no precise indicator of what is expected by the end of Kindergarten.

Note: These data tables do not match the 2015-2016 tables. The evaluation team believes this format is easier to read. Take care not to compare these tables to those in the 2015-2016 academic year's report. The data do not look appreciably different from that academic year. Data for all years will appear in a common format for the final Pilot report.

Appendix A: Language and Reading, Full Frequency Percentages

Figure 27: ISTAR KR Phonological Awareness

Phonological Awareness	Pre-Test (n=58)	Post-Test (n=57)	Development (in months) when commonly demonstrated
Mean	28.2	61.0	
No evidence	NA	NA	4
Responds to sounds in the environment	100.0%	100.0%	10
Produces a variety of sounds	79.3%	99.9%	22
Produces and blends the sounds of letter patterns into recognizable words	34.5%	92.9%	46
Compares sounds of different words	1.7%	75.4%	67
KG Standards: Distinguishes sounds within words (to be mastered by end of KG)	0.0%	17.5%	72

Figure 28: ISTAR KR Print Concepts, Phonics and Word Recognition

Print Concepts, Phonics and Word Recognition	Pre-Test (n=58)	Post-Test (n=57)	Development (in months) when commonly demonstrated
Mean	35.9	65.1	
No evidence	1.7%	NA	7
Responds to familiar pictures	98.3%	100.0%	25
Labels familiar pictures	62.1%	100.0%	37
Recognizes familiar symbols	15.5%	96.5%	61
Compares, combines, and orders letters and letter sounds	0.0%	66.7%	67
KG Standard: Recognizes that letters make words and words make sentences (to be mastered by the end of KG)	0.0%	19.3%	72

Figure 29: ISTAR KR Informational Texts

Informational Texts	Pre-Test	Post-Test	Development (in months) when commonly demonstrated
	(n=58)	(n=57)	
Mean	31.3	60.2	
No evidence	NA	NA	7
Engages with a book	100.0%	100.0%	16
Imitates proper handling of books	75.9%	100.0%	34
Distinguishes print from pictures	13.8%	98.2%	46
Orients to print in books	0.0%	80.7%	61
KG Standard: Chooses reading activities for meaning (to be mastered by end of KG)	0.0%	21.1%	72

Figure 30: ISTAR KR Literature Texts

Literature Texts	Pre-Test	Post-Test	Development (in months) when commonly demonstrated
	(n=58)	(n=57)	
Mean	31.5	61.2	
No evidence	1.7%	NA	16
Reacts to a story or event	98.2%	100.0%	22
Identifies details from a story or picture	53.4%	100.0%	37
Talks about characters and settings	10.3%	96.5%	49
Retells familiar stories	3.4%	86.0%	58
KG Standard: Comprehends and responds to stories (to be mastered by end of KG)	0.0%	35.1%	72

Figure 31: ISTAR KR Writing Standards

Writing Standards	Pre-Test	Post-Test	Development (in months) when commonly demonstrated
	(n=58)	(n=57)	
Mean	37.2	64.2	
No evidence	NA	NA	13
Intentionally makes marks or scribbles	100.0%	100.0%	28
Associates writing with purpose	51.7%	98.2%	43
Creates writing with the intention of communicating	6.9%	85.9%	64
Produces recognizable writing that conveys meaning	0.0%	52.6%	70
KG Standard: Gathers ideas for writing for a purpose (to be mastered at the end of KG)	0.0%	14.0%	72

Figure 32: ISTAR KR Language Conventions

Language Conventions	Pre-Test (n=58)	Post-Test (n=57)	Development (in months) when commonly demonstrated
Mean	40.3	62.9	
No evidence	NA	NA	13
Grasps writing tools	100.0%	100.0%	31
Imitates specific writing strokes to make a picture	68.9%	100.0%	37
Copies specific writing marks	32.7%	98.3%	52
Approximates writing strings of letters	1.7%	73.7%	67
KG Standard: Writes from left to right spacing letters correctly (to be mastered by end of KG)	0.0%	1.8%	72

Figure 33: ISTAR KR Comprehension and Collaboration

Comprehension and Collaboration	Pre-Test (n=58)	Post-Test (n=57)	Development (in months) when commonly demonstrated
Mean	31.0	58.2	
No evidence	NA	NA	4
Responds to cues in the environment	100.0%	100.0%	13
Responds to familiar gestures and words	84.5%	100.0%	25
Follows a familiar verbal or signed direction	46.6%	100.0%	40
Follows unfamiliar direction	6.9%	84.3%	52
KG Standard: Follows directions with steps and descriptors (to be mastered by end of KG)	0.0%	40.4%	72

Figure 34: ISTAR KR Presentation of Knowledge and Ideas

Presentation of Knowledge and Ideas	Pre-Test (n=58)	Post-Test (n=57)	Development (in months) when commonly demonstrated
Mean	41.8	65.0	
No evidence	NA	NA	10
Uses gestures or sounds to communicate	100.0%	100.0%	19
Uses single words to communicate	96.5%	100.0%	28
Uses two-word phrases or signs	75.8%	100.0%	37
Uses simple phrases and sentences with simple grammatical rules	46.5%	91.3%	52
Uses varied grammar in expression	1.7%	75.5%	70
KG Standard: Shares information and ideas to describe, explain, predict (to be mastered by end of KG)	0.0%	35.1%	72

Appendix B: Mathematics and Spatial Reasoning, Full Frequency Percentages

Figure 35: ISTAR KR Counting

Counting	Pre-Test	Post-Test	Development (in months) when commonly demonstrated
	(n=58)	(n=57)	
Mean	36.2	60.8	
No evidence	1.7%	NA	4
Demonstrates awareness of the presence of objects	98.3%	100.0%	22
Identifies more	75.9%	98.3%	40
Uses numbers to compare	6.9%	93.0%	49
Names and orders quantities	1.7%	80.7%	61
KG Standard: Describes relationships between numbers and quantity (to be mastered by end of KG)	0.0%	28.1%	72

Figure 36: ISTAR KR Algebraic Thinking

Algebraic Thinking	Pre-Test	Post-Test	Development (in months) when commonly demonstrated
	(n=58)	(n=57)	
Mean	40.9	65.8	
No evidence	5.2%	NA	13
Manipulates objects for a purpose	94.8%	100.0%	31
Matches objects and sets	63.8%	100.0%	46
Makes a set of objects smaller or larger	6.9%	91.2%	64
Follows models of addition or subtraction situations	0.0%	52.6%	70
KG Standard: Describes the application of addition and subtraction to situations (to be mastered by end of KG)	0.0%	10.5%	72

Figure 37: ISTAR KR Time

Time	Pre-Test	Post-Test	Development (in months) when commonly demonstrated
	(n=58)	(n=57)	
Mean	30.0	57.5	
No evidence	1.7%	NA	13
Anticipates a routine	98.3%	100.0%	22
Uses vocabulary to identify events in a routine	55.2%	100.0%	34
Sequences events	12.1%	94.7%	46
Uses measuring vocabulary for time	0.0%	64.9%	64
KG Standard: Uses measuring units for time (to be mastered by end of KG)	0.0%	5.3%	72

Figure 38: ISTAR KR Location

Location	Pre-Test	Post-Test	Development (in months) when commonly demonstrated
	(n=58)	(n=57)	
Mean	28.7	59.1	
No evidence	NA	NA	7
Demonstrates an awareness of location of objects	100.0%	100.0%	19
Identifies location	60.3%	100.0%	25
Follows directions involving location	32.7%	98.2%	37
Communicates with location words	10.3%	87.7%	58
KG Standard: Uses prepositions to describe location (to be mastered by end of KG)	0.0%	28.1%	72

Figure 39: ISTAR KR Length, Capacity, Weight and Temperature

Length, Capacity, Weight and Temperature	Pre-Test	Post-Test	Development (in months) when commonly demonstrated
	(n=58)	(n=57)	
Mean	30.8	59.3	
No evidence	5.2%	NA	13
Explores measurement attributes	94.8%	100.0%	25
Distinguishes between big and little, hot and cold	50.0%	100.0%	37
Differentiates gradients of size and weight	3.4%	94.7%	49
Uses common measuring tools in correct context	0.0%	50.8%	70
KG Standard: Makes direct measurement comparisons (to be mastered by end of KG)	0.0%	14.0%	72

Figure 40: ISTAR KR Geometry

Geometry	Pre-Test (n=58)	Post-Test (n=57)	Development (in months) when commonly demonstrated
Mean	33.4	60.5	
No Evidence	1.7%	NA	10
Explores attributes (e.g. shape, size, color)	98.2%	100.0%	22
Matches same attributes	60.3%	100.0%	40
Matches opposites	5.1%	98.3%	46
Sorts and patterns by one attribute	3.4%	93.0%	58
KG Standard: Sorts and patterns by more than one attribute (to be mastered by end of KG)	0.0%	24.6%	72

Appendix C: Social and Emotional Development, Full Frequency Percentages

Figure 41: ISTAR KR Sense of Self and Others

Sense of Self and Others	Pre-Test	Post-Test	Development (in months) when commonly demonstrated
	(n=58)	(n=57)	
Mean	39.8	57.0	
No Evidence	NA	NA	4
Demonstrates self-awareness	100.0%	100.0%	22
Demonstrates independence	84.5%	100.0%	34
Engages with others	39.7%	94.8%	52
Demonstrates respect for self and others	6.9%	73.7%	60
Uses strategies consistent with children over the age of 5	0.0%	0.0%	

Figure 42: ISTAR KR Manages Emotions

Manages Emotions	Pre-Test	Post-Test	Development (in months) when commonly demonstrated
	(n=58)	(n=57)	
Mean	31.0	54.1	
No Evidence	NA	NA	4
Expresses a variety of emotions	100.0%	100.0%	10
Responds to a variety of emotions	77.6%	100.0%	28
Manages emotions with adult assistance	36.2%	94.7%	46
Uses strategies to manage emotions	3.4%	64.9%	60
Uses strategies consistent with children over the age of 5	0.0%	0.0%	

Figure 43: ISTAR KR Interpersonal Skills

Interpersonal Skills	Pre-Test	Post-Test	Development (in months) when commonly demonstrated
	(n=58)	(n=57)	
Mean	32.3	49.2	
No Evidence	NA	NA	7
Interacts with caregiver	100.0%	100.0%	13
Engages in parallel play	93.1%	100.0%	25
Interacts with others	50.0%	96.5%	40
Engages in cooperative interactions	5.2%	80.7%	52
Uses strategies consistent with children over the age of 5	0.0%	0.0%	

Figure 44: ISTAR KR Responsibility

Responsibility	Pre-Test	Post-Test	Development (in months) when commonly demonstrated
	(n=58)	(n=57)	
Mean	32.9	46.0	
No Evidence	1.7%	NA	7
Recognizes steps in familiar routines	98.2%	100.0%	19
Follows familiar routines	67.2%	98.3%	34
Follows rules	32.7%	91.3%	46
Applies rules to situations	3.4%	63.2%	48
Uses strategies consistent with children over the age of 5	0.0%	0.0%	

Figure 45: ISTAR KR Problem Solving

Problem Solving	Pre-Test	Post-Test	Development (in months) when commonly demonstrated
	(n=58)	(n=57)	
Mean	34.5	57.9	
No Evidence	3.4%	NA	7
Initiates an action to get a desired effect	96.6%	100.0%	22
Uses trial and error to manipulate objects	53.5%	100.0%	40
Searches for possible solutions	19.0%	92.9%	58
Finds alternative strategies and solutions	0.0%	56.1%	60
Uses strategies consistent with children over the age of 5	0.0%	0.0%	

Figure 46: ISTAR KR Approaches to Learning

Approaches to Learning	Pre-Test	Post-Test	Development (in months) when commonly demonstrated
	(n=58)	(n=57)	
Mean	34.9	55.1	
No Evidence	1.7%	NA	4
Demonstrates curiosity	98.3%	100.0%	22
Sustains attention to preferred activities	65.5%	98.3%	40
Sustains attention to a challenging activity	10.3%	89.5%	52
Applies creativity to activities	1.7%	57.9%	60
Uses strategies consistent with children over the age of 5	0.0%	0.0%	

[1] The term "Developmental Delay" does not necessarily indicate a clinically relevant delay. Child development varies within a range. Our use of this term simply indicates that the observed level of development falls short of average development as determined in the validation studies for the ISTAR KR assessment.

[2] Whitehurst, Grover J. and Christopher J Lonigan. 1998. "Child Development and Emergent Literacy." *Child Development* 69(3):848-872.

[3] Howes, Carollee, Margaret Burchinal, Robert Pianta, Donna Bryant, Diane Early, Richard Clifford, and Oscar Barbarin. 2008. "Ready to Learn? Children's pre-academic achievement in pre-Kindergarten programs." *Early Childhood Research Quarterly* 23(2008): 27-50.

[4] Temple, Judy A. and Arthur J. Reynolds. 2005. "Benefits and costs of investments in preschool education: Evidence from the Child-Parent Centers and related programs." *Economics of Education Review* 26: 126-144; Heckman, James and Stefano Mosso. 2014. "The Economics of Human Development and Social Mobility." National Bureau of Economic Research Working Paper 19925 (http://www.nber.org/papers/w19925).

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