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Literacy Lab

Early Literacy Intervention

Treatment and Comparison Group
FAST Bridge Assessment Differences
2017 – 2018

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Summary and Recommendations

The Literacy Lab intervention is providing valuable support for students who enter the school year reading below grade level targets. After receiving tutoring support, these students achieve more reading growth than their peers who did not participate in the intervention. These advantages in reading growth to students who receive the literacy intervention extend to students in all four regions: Washington D.C., Virginia, Missouri and Maryland. Unfortunately, despite greater reading growth than their peers without tutoring, many of these students are still not reaching the grade level average weekly growth targets.

In order to ensure that a greater number of students who receive tutoring support approach grade level weekly growth targets, Literacy Lab may wish to consider piloting variations to their model in different locations. It is possible that an intervention across more months may be useful in maintaining a favorable growth trajectory beyond the active intervention period. Another alternative might be to shift to lighter touch intervention for maintenance rather than removing all intervention supports once a student achieves their initial reading goal.

Study Design

The Literacy Lab is an AmeriCorps grantee and a national replication partner of the Reading Corps model. The study described in the following sections examines The Literacy Lab's replication of the K-3 Reading Corps program in Washington D.C., Virginia, Missouri, and Maryland. Reading Corps treatment and comparison youth were compared using FAST Bridge Assessment data collected by the Literacy Lab in selected schools during the 2017-2018 academic year. The data file, which was shared with Carson Research Consulting (now operating under the tradename Inciter), included assessment scores at two or three time points for each kindergarten to third grade student. The analyses that are outlined here look at changes in the assessment scores or the average weekly reading growth between two time points.

Kindergarten students took two assessments—letter names and letter sounds—in the fall and in the spring. Scores from each assessment taken in the fall are compared to those from the spring. First grade students took the nonsense words assessment in the fall and winter. Scores from the fall assessment are compared to scores from the winter assessment. First graders also took the CBM reading assessment in the winter and spring; scores were compared between the two time points. Finally, second and third grade students took the CBM Reading assessment in the fall and spring; scores were compared between the two time points.

In order to identify the most appropriate students to target for intervention within a school in which Literacy Lab tutors were working, students first completed the fall assessment associated with their current grade level. In most cases, students who earned a baseline score above the indicated benchmark for their grade did not receive treatment because they were already at grade level.[1] Across students who earned a baseline score below their grade level threshold, Literacy Lab tutors typically began targeted 20 minute per day reading intervention with the students who were closest to meeting their grade level benchmark. As these students reached their goal, they were cycled out of the program and were replaced in the treatment pool by students who had initially tested lower.

The goal of this document is to present results for the analyses that sought to answer the following research questions:

- Do students who receive targeted intervention from Literacy Lab tutors have significant improvement in their reading scores?
- Do comparison students who do not receive targeted intervention from Literacy Lab tutors have significant improvement in their reading scores?
- Do collected data support the hypothesis that gains to reading are greater for students who receive targeted intervention from Literacy Lab tutors?
- Do students who receive targeted intervention from Literacy Lab tutors exceed average weekly reading growth targets for their grade level?
- Does the effectiveness of Literacy Lab targeted intervention vary by grade?
- Does the effectiveness of Literacy Lab targeted intervention vary by geographic region?

Some students in the original data file were not eligible for Literacy Lab intervention given the outlined criteria for treatment, thus, these ineligible students were removed from the analysis sample. The initial analysis sample was defined as all treatment youth plus all comparison youth who did not score above the fall targeted benchmark for their grade, meaning they were eligible for treatment. For first grade, youth were also included in the analysis sample when they scored below the winter targeted benchmark on the CBM Reading assessment.

[1] The treatment group includes 52 cases that were above the benchmark for eligibility, but received treatment anyway (13 in Kindergarten, 14 in Grade 1, 18 in Grade 2, and 7 in Grade 3; across all four regions).

Group Comparison Analysis

Using the analysis sample defined in this way, we present data to address the first two research questions.

Change in Assessment Scores for Treatment and Comparison Students

Table 1 presents the baseline and final assessment scores for all treatment youth in the shared data file. It also includes the number of students in each grade level with two assessment points (N), and the average change on the assessments within each grade level with associated statistical significance as calculated through a paired t-test. Within each grade level, and on each assessment, we see that treatment youth show significant gains over the school year. These gains may be due to regular classroom instruction, the Literacy Lab targeted intervention, or a combination of the two. Subsequent tables will present results of analyses that seek to determine if there is added value from the Literacy Lab intervention.

Table 1: Average Baseline FAST Bridge Assessments by Grade Level for Treatment Youth, All

Grade Level	Assessment	Treatment Group Average Pre-test Score	Treatment Group Average Post-test Score	Average Difference Across Time on Assessments[2]	N
Kindergarten	Letter Names	13.51	39.37	25.86 ***	501
	Letter Sounds	2.38	38.43	36.05 ***	501
1st Grade	Nonsense Words	21.07	49.05	27.99 ***	838
	CBM Reading	22.90	41.91	19.00 ***	868
2nd Grade	CBM Reading	30.78	71.78	41.01 ***	777
3rd Grade	CBM Reading	60.05	97.71	37.66 ***	836

*** $p < .001$

Table 2 mimics the data presented in Table 1 for the comparison youth in the file who were part of the initial analysis sample. These youth had baseline scores on their grade level assessment low enough to mark them as eligible for treatment. As with the treatment youth, we see that within each grade level, on each assessment, comparison youth in the analysis sample show significant gains across the school year.

[2] Statistically significant differences in means are noted below each table, referencing applicable p-values. Differences in means without notes are not significant.

Table 2: Average Baseline FAST Bridge Assessments by Grade Level for Comparison Youth, Initial Analysis Sample

Grade Level	Assessment	Comparison Group Average Pre-test Score[3]	Comparison Group Average Post-test Score	Average Difference Across Time on Assessments	N
Kindergarten	Letter Names	11.50	37.31	25.82 ***	508
	Letter Sounds	1.49	23.82	22.33 ***	508
1st Grade	Nonsense Words	19.79	37.17	17.38 ***	144
	CBM Reading	24.26	38.97	14.70 ***	115
2nd Grade	CBM Reading	23.31	53.36	30.05 ***	590
3rd Grade	CBM Reading	50.13	77.88	27.74 ***	588

*** $p < .001$

Assessment Scores for Treatment and Comparison Students at Baseline

Table 3 compares the baseline scores on each assessment for the treatment and comparison youth. If we see that the baseline scores are equivalent for treatment and comparison youth, then the initial comparison group sample provides a fair test of the effectiveness, or added value provided by the Literacy Lab intervention. If they are not equivalent, we would want to statistically construct a more appropriate comparison group to more accurately answer whether the targeted intervention was more effective than regular classroom instruction alone in promoting growth in reading. As shown in Table 3, there is no significant difference between baseline scores for treatment and comparison youth in first grade on either of the two assessments. Kindergartners, second and third grade students who received treatment, however, tested significantly higher at baseline on average than the comparison youth in the initial analysis sample.

[3] The constructed comparison group includes all youth who did not receive treatment, but had a baseline score below the target for their grade level.

Table 3: Comparison of Average Baseline FAST Bridge Assessments by Grade Level for Treatment and Comparison Youth, Initial Analysis Sample

Grade Level	Assessment	Treatment Group Average Pre-test Score	Comparison Group Average Pre-test Score	Difference Between Groups on Pre-test	Treatment N	Control N
Kindergarten	Letter Names	13.51	11.50	2.01 **	501	508
	Letter Sounds	2.38	1.49	0.89 ***	501	508
1st Grade	Nonsense Words	21.07	19.79	1.28	838	144
	CBM Reading	22.90	24.26	1.36	868	115
2nd Grade	CBM Reading	30.78	23.31	7.47 ***	777	590
3rd Grade	CBM Reading	60.05	50.13	9.91 ***	836	588

** p < .01, *** p < .001

Using Propensity Scores to Construct Comparison Sample for Analyses

Except in the case of first grade—because the treatment and comparison samples are not equivalent at baseline, even after eliminating all comparison youth who scored above the threshold at baseline—we conducted propensity score analysis to construct equivalent comparison groups for the kindergarten, second and third grade samples. Within each grade, propensity score analysis is conducted with replacement, and resulting weights are applied to all subsequent analyses.[4] For the kindergarten sample, propensity scores are calculated using district ID, and the fall scores on both the letter names and letter sounds assessments. For the second and third grade samples, propensity scores are calculated using district ID and the fall CBM Reading score. In each case, propensity scores with replacement are used rather than one to one matching because there were either an insufficient number of comparison youth or an insufficient number of comparison youth with similar baseline scores in the file. Using school ID rather than district ID was considered, but was rejected because it resulted in some extremely high weights for comparison youth where virtually all students in a given school received treatment. District ID is considered useful because it is expected that students within the same grade in the same district are experiencing the same district specified curriculum.

[4] When conducting the propensity score analysis, all students in the file are considered for matching, including those who were not part of the previously defined analysis sample.

Table 4 presents the baseline scores for treatment and comparison youth in the weighted propensity score sample. Three treatment cases from third grade were eliminated from the analysis sample because there were no appropriate comparison matches available. All other treatment cases are retained for the analysis. As shown in Table 4, the propensity score analysis successfully identified a comparison sample that is equivalent to the treatment group at baseline within each grade level and on each of the reading assessments. This propensity score sample will allow an accurate test of whether the targeted Literacy Lab intervention results in enhanced reading growth above and beyond that resulting from classroom instruction alone.

Table 4: Comparison of Average Baseline FAST Bridge Assessments by Grade Level for Treatment and Constructed Comparison Group Youth, Weighted Propensity Score Sample

Grade Level	Assessment	Treatment Group Average Pre-test Score	Propensity Score Comparison Group[5] Average Pre-test Score	Difference Between Groups on Pre-test	Treatment N	Control N
Kindergarten	Letter Names	13.51	13.99	0.48	501	250
	Letter Sounds	2.38	2.38	0.04	501	250
1st Grade	Nonsense Words	21.07	19.79	1.28	838	144
	CBM Reading	22.90	24.26	1.36	868	115
2nd Grade	CBM Reading	30.78	28.95	1.83	777	305
3rd Grade	CBM Reading	60.05	58.09	1.97	833	343

Reading Growth for Treatment vs. Comparison Students in Propensity Score Sample

As shown in Table 5, which presents data for the propensity score sample, treatment and comparison youth in each grade level have shown growth across the school year on their grade level reading assessments. For kindergarten youth, there is not a significant difference between treatment and comparison youth in their growth on the letter names assessment. Both treatment and comparison youth increased 26 points on the assessment, on average. On the letter sounds assessment, however, kindergarten youth in the treatment sample increased significantly more than youth in the constructed comparison group. While youth in the constructed comparison group

[5] The constructed comparison group is the group identified through propensity score matching, except for first grade where the original analysis sample is used.

showed gains of 26.4 points across the school year, gains for treatment youth were higher at 36.0, on average. Similarly, first grade youth who received treatment experienced greater gains than did first grade comparison youth on both the nonsense words assessment and the CBM reading assessment.

The findings are similar for second and third grade students, where treatment youth experienced greater gains on the CBM reading assessment than did the comparison youth who were comparable at baseline. It is important to note that the gains on the CBM reading assessment for first graders are of a smaller magnitude than those presented for second and third grade because they are calculated from winter to spring, while the growth for the two older grades is calculated from fall to spring.

Table 5: Comparison of Baseline FAST Bridge Assessments Reading Growth by Grade Level for Treatment and Constructed Comparison Group Youth, Weighted Propensity Score Sample

Grade Level	Assessment	Treatment Group Average Reading Growth	Propensity Score Comparison Group Average Reading Growth	Difference Between Groups in Reading Growth	Treatment N	Control N
Kindergarten	Letter Names	25.86	26.24	0.38	501	250
	Letter Sounds	36.05	26.37	9.68 ***	501	250
1st Grade	Nonsense Words	27.99	17.38	10.61 ***	838	144
	CBM Reading	19.00	14.70	4.30 **	868	115
2nd Grade	CBM Reading	41.01	32.06	8.95 ***	777	305
3rd Grade	CBM Reading	37.57	28.34	9.23 ***	833	343

** p < .01, *** p < .001

In addition to examining the absolute growth in reading scores across the school year, we calculated the average weekly reading growth for students in the weighted propensity score sample. These are presented in Table 6. As shown in the table, for each grade, the average weekly reading growth is greater for the students who received the intervention compared to their comparison group peers in the weighted propensity score sample. Even among treatment youth, however, many did not exceed the targeted weekly growth rates on the reading assessment for their grade. First grade treatment youth showed an average weekly growth of 1.65 on the nonsense words assessment, which exceeded the growth target of 1.59. On each of the other grade level assessments presented in

Table 6, however, the average weekly growth rate for the average treatment student was lower than the targeted weekly growth for that grade.

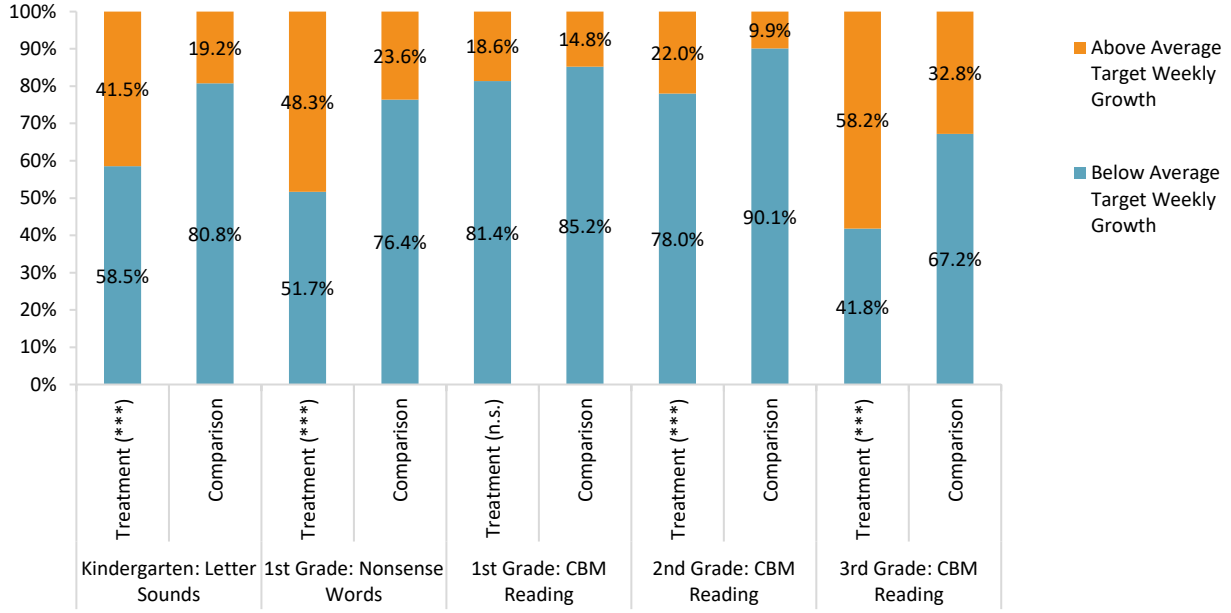
Table 6: Comparison of Average Weekly Growth on Baseline FAST Bridge Assessments by Grade Level for Treatment and Constructed Comparison Group Youth, Weighted Propensity Score Sample

Grade Level	Assessment	Target Weekly Growth	Treatment Group Average Weekly Reading Growth	Propensity Score Comparison Group Average Weekly Reading Growth	Difference Between Groups in Average Weekly Reading Growth	Treatment N	Control N
Kindergarten	Letter Sounds	1.21	1.09	0.80	0.29 ***	501	250
1st Grade	Nonsense Words	1.59	1.65	1.02	0.62 ***	838	144
	CBM Reading	1.88	1.19	0.92	0.27 **	868	115
2nd Grade	CBM Reading	1.61	1.24	0.97	0.27 ***	777	305
3rd Grade	CBM Reading	1.06	1.14	0.86	0.28 ***	833	343

** p < .01, *** p < .001

Recognizing that the averages across all treatment youth were often shy of the target, we explored the percentage of youth in each group who were exceeding the grade level weekly growth targets. These are presented in Figure 1. For all paired comparisons, except for first grade on the CBM Reading assessment, a significantly higher percentage of treatment students compared to the comparison students exceed the average weekly targeted growth on the indicated assessment. For the first grade CBM Reading assessment, the difference between average weekly growth for treatment and comparison youth is not statistically significant. On each bar, the orange portion indicates the percentage of students who exceeded the targeted weekly growth on the specified assessment. Only among third graders did at least one-half of treatment youth exceed the target. Kindergartners on the letter sounds assessment and first graders on the nonsense words assessment are close behind at almost 42 percent and a little over 48 percent, respectively.

Figure 1: Average Weekly Growth in FAST Bridge Assessment Scores Relative to Grade Level Targets for Treatment and Comparison Youth by Grade



Regional Analysis

The section that follows explores whether the overall results are consistent across each of the four regions in which Literacy Lab tutors served students. Within each region we use the previously defined propensity score sample to address this question and present three tables and one figure. The first table in each region explores whether or not the treatment and comparison youth in the propensity score sample in the given region are equivalent at baseline. In many cases they are, but there are exceptions which must be considered when evaluating the second table presented for each region. The second table in each region compares the growth on each reading assessment for youth in the propensity score sample. The third table compares average weekly growth on the reading assessments for treatment and comparison youth, and the figure presents the percentage of students in each group who exceed the grade level average weekly growth targets.

Washington D.C.

Tables 7 and 8 present the data for students from Washington D.C. Table 7 compares the baseline scores for treatment and comparison youth in the propensity score sample from Washington D.C. Second and third grade youth in the treatment and comparison groups are not significantly different at baseline. In addition, kindergarten youth in the two groups are not

significantly different with respect to the letter sounds assessment. Comparison kindergarten youth do test slightly higher on the letter names assessment compared to their treatment group peers. Most important to note is that there are no first-grade comparison youth from Washington D.C. Also important to remember is that the first-grade analysis group includes all youth in the original file provided by Literacy Lab who tested below their grade level benchmark.

Table 7: Comparison of Average Baseline FAST Bridge Assessments by Grade Level for Treatment and Constructed Comparison Group Youth, Weighted Propensity Score Sample, Washington D.C.

Grade Level	Assessment	Treatment Group Average Pre-test Score	Propensity Score Constructed Comparison Group Average Pre-test Score	Difference Between Groups on Pre-test	Treatment N	Control N
Kindergarten	Letter Names	12.74	14.95	2.20 +	289	137
	Letter Sounds	2.01	2.46	0.45	289	137
1st Grade	Nonsense Words	22.35	–	–	303	0
	CBM Reading	22.41	–	–	312	0
2nd Grade	CBM Reading	30.11	30.82	0.71	296	112
3rd Grade	CBM Reading	54.27	56.76	2.49	294	113

+ $p < .10$

Table 8 presents a comparison of the growth on each reading assessment for treatment and comparison youth in the weighted propensity score sample from Washington D.C. Although they began at slightly different points, the growth for kindergarten students on the letter names assessment is equivalent. For the letter sounds assessment, growth is 8.6 points higher on average for kindergarten students who received the targeted reading intervention. In second grade, growth on the CBM reading assessment is 5.6 points higher for students receiving the targeted intervention, and in third grade, it is 9.9 points higher for students receiving the targeted intervention. Apart from the change on the letter names assessment, each of these differences shows statistically greater improvement for youth receiving the targeted literacy intervention from Literacy Lab tutors.

Table 8: Comparison of Baseline FAST Bridge Assessments Reading Growth by Grade Level for Treatment and Constructed Comparison Group Youth, Weighted Propensity Score Sample, Washington D.C.

Grade Level	Assessment	Treatment Group Average Reading Growth	Propensity Score Constructed Comparison Group Average Reading Growth	Difference Between Groups in Reading Growth	Treatment N	Control N
Kindergarten	Letter Names	25.80	25.25	0.56	289	137
	Letter Sounds	37.51	28.87	8.64 ***	289	137
1st Grade	Nonsense Words	27.05	–	–	303	0
	CBM Reading	17.87	–	–	312	0
2nd Grade	CBM Reading	37.62	32.00	5.62 *	296	112
3rd Grade	CBM Reading	35.68	25.74	9.94 ***	294	113

* $p < .05$, *** $p < .001$

As shown in Table 9, the average weekly reading growth for students receiving the tutoring intervention exceeds that for the Washington D.C. students in the constructed comparison group. In addition, third grade treatment youth met the weekly growth targets on the CBM reading assessment and first grade students met the target on the nonsense words assessment. Since data were not available for comparison youth in Washington D.C., values are only presented for treatment youth for the two first grade assessments.

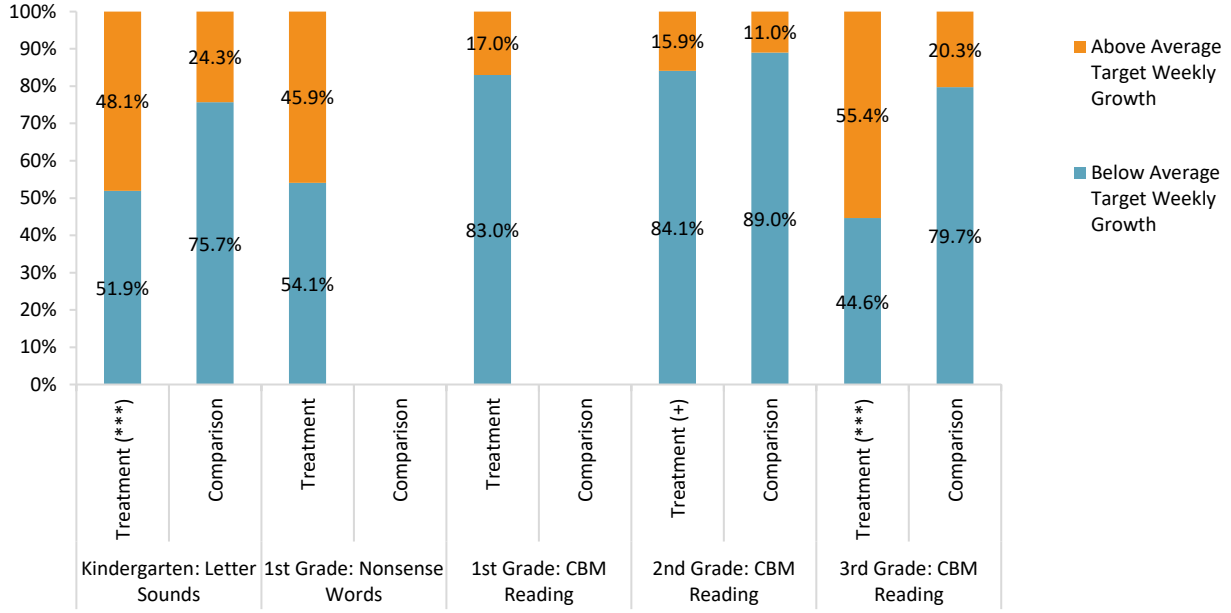
Table 9: Comparison of Average Weekly Growth on Baseline FAST Bridge Assessments by Grade Level for Treatment and Constructed Comparison Group Youth, Weighted Propensity Score Sample, Washington D.C.

Grade Level	Assessment	Target Weekly Growth	Treatment Group Average Weekly Reading Growth	Propensity Score Comparison Group Average Weekly Reading Growth	Difference Between Groups in Average Weekly Reading Growth	Treatment N	Control N
Kindergarten	Letter Sounds	1.21	1.14	0.87	0.26 ***	289	137
1st Grade	Nonsense Words	1.59	1.59	–	–	303	0
	CBM Reading	1.88	1.12	–	–	312	0
2nd Grade	CBM Reading	1.61	1.14	0.97	0.17 *	296	112
3rd Grade	CBM Reading	1.06	1.08	0.78	0.30 ***	294	113

* p < .05, *** p < .001

Figure 2 presents a comparison of the percentage of students in the treatment and comparison groups who exceed or fall below the average weekly reading growth targets for their grade. Higher percentages of Washington D.C. treatment youth, compared to comparison youth, in kindergarten, second and third grade exceed the average weekly growth targets. Over one-half of third grade treatment youth exceed the weekly growth targets, as do just over 48 percent of kindergarteners and almost 46 percent of first graders on the nonsense words assessment.

Figure 2: Average Weekly Growth in FAST Bridge Assessment Scores Relative to Grade Level Targets for Treatment and Comparison Youth by Grade, Washington D.C.



Virginia

Table 10 compares the baseline scores for treatment and comparison youth in the propensity score sample from Virginia. As shown in Table 10, when we restrict the sample to students from Virginia, we see that the treatment and comparison groups are not equivalent at baseline on any of the assessments. In each case, the students in the treatment groups score higher on their baseline assessment than students in the comparison group. As was the case in Washington D.C., there are no first-grade comparison youth from Virginia. Since the groups in Virginia are not equivalent at baseline, the test of the effectiveness of the Literacy Lab intervention in this location is not as clean, and should be interpreted cautiously.

Table 10: Comparison of Average Baseline FAST Bridge Assessments by Grade Level for Treatment and Constructed Comparison Group Youth, Weighted Propensity Score Sample, Virginia

Grade Level	Assessment	Treatment Group Average Pre-test Score	Propensity Score Constructed Comparison Group Average Pre-test Score	Difference Between Groups on Pre-test	Treatment N	Control N
Kindergarten	Letter Names	14.27	11.26	3.01 +	130	69
	Letter Sounds	2.91	1.72	1.19 ***	130	69
1st Grade	Nonsense Words	20.41	–	–	216	0
	CBM Reading	22.74	–	–	230	0
2nd Grade	CBM Reading	34.28	27.74	6.54 **	195	89
3rd Grade	CBM Reading	67.77	56.89	10.88 ***	229	118

+ p < .10, ** p < .01, *** p < .001

Table 11 presents a comparison of the growth on each reading assessment for treatment and comparison youth in the weighted propensity score sample from Virginia. Although they began at slightly different points, the growth for kindergarten students on the letter names assessment is equivalent. For the kindergarten letter sounds assessment, as well as the second and third grade CBM Reading assessments, growth is significantly higher for the treatment youth than for youth in the comparison youth. It is important to note that these treatment youth were more proficient readers at baseline, so may have progressed more quickly even without the intervention.

Table 11: Comparison of Baseline FAST Bridge Assessments Reading Growth by Grade Level for Treatment and Constructed Comparison Group Youth, Weighted Propensity Score Sample, Virginia

Grade Level	Assessment	Treatment Group Average Reading Growth	Propensity Score Constructed Comparison Group Average Reading Growth	Difference Between Groups in Reading Growth	Treatment N	Control N
Kindergarten	Letter Names	27.77	30.18	2.41	130	69
	Letter Sounds	34.58	22.02	12.56 ***	130	69
1st Grade	Nonsense Words	25.04	–	–	216	0
	CBM Reading	19.33	–	–	230	0
2nd Grade	CBM Reading	44.01	34.73	9.27 ***	195	89
3rd Grade	CBM Reading	36.24	27.29	8.95 ***	229	118

*** $p < .001$

Table 12 presents the average weekly reading growth scores for treatment and comparison group students in Virginia. Kindergarten, second and third grade students who participated in the Learning Lab intervention had significantly higher average weekly reading score growth than their peers in the constructed comparison group, but this should be interpreted cautiously because the two groups were not equivalent at baseline. In Virginia, treatment students scored more favorably on the baseline assessment than their peers in the constructed comparison group. While treatment youth exceeded comparison youth on the average weekly reading growth, only third grade treatment youth met the weekly growth target for their grade.

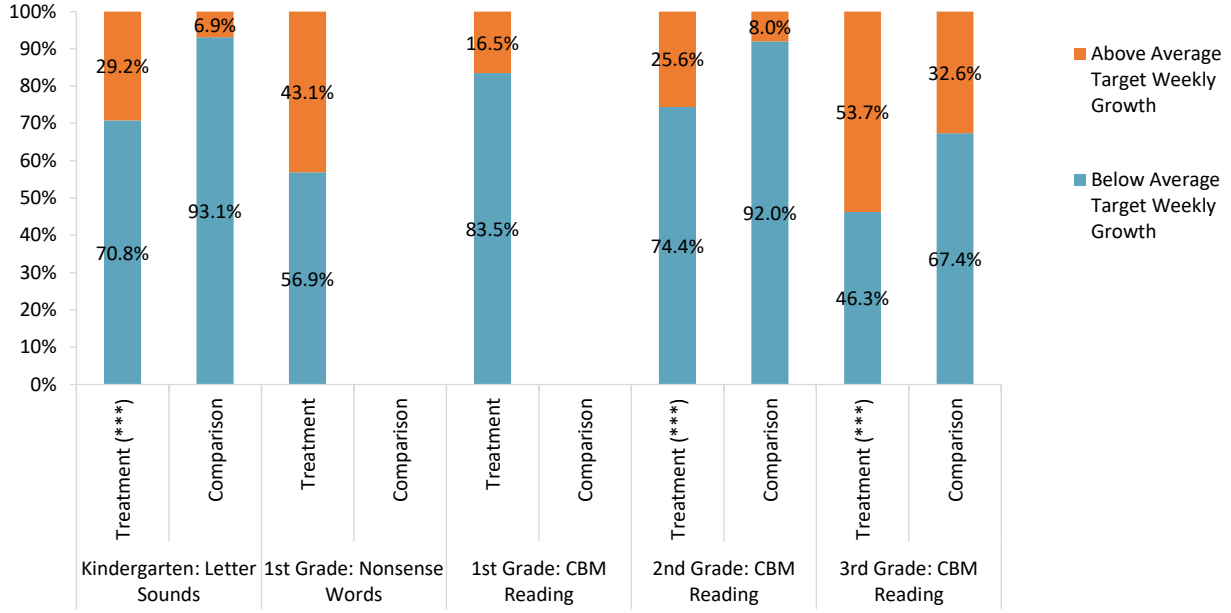
Table 12: Comparison of Average Weekly Growth on Baseline FAST Bridge Assessments by Grade Level for Treatment and Constructed Comparison Group Youth, Weighted Propensity Score Sample, Virginia

Grade Level	Assessment	Target Weekly Growth	Treatment Group Average Weekly Reading Growth	Propensity Score Comparison Group Average Weekly Reading Growth	Difference Between Groups in Average Weekly Reading Growth	Treatment N	Control N
Kindergarten	Letter Sounds	1.21	1.05	0.67	0.38 ***	130	69
1st Grade	Nonsense Words	1.59	1.47	–	–	216	0
	CBM Reading	1.88	1.21	–	–	230	0
2nd Grade	CBM Reading	1.61	1.33	1.05	0.28 ***	195	89
3rd Grade	CBM Reading	1.06	1.10	0.83	0.27 ***	229	118

*** p < .001

As shown in Figure 3, kindergarten, second and third grade students in Virginia who received the Literacy Lab intervention were more likely than their peers in the constructed comparison group to exceed the average weekly growth targets on their reading assessments. Over one-half of third grade treatment youth exceeded the average weekly growth targets for their grade, and 43 percent of first grade treatment youth exceeded the average weekly growth target on the nonsense word assessment. Fewer students exceeded the grade level weekly growth target on the other assessments.

Figure 3: Average Weekly Growth in FAST Bridge Assessment Scores Relative to Grade Level Targets for Treatment and Comparison Youth by Grade, Virginia



Missouri

Table 13 compares the baseline scores for treatment and comparison youth in the propensity score sample from Missouri. As shown in Table 13, kindergarten, second and third grade youth in the treatment and comparison groups, where propensity scores were used, are not significantly different at baseline. Missouri is the only region with comparison first graders. While these comparison youth were not significantly different when compared to the treatment youth across all regions simultaneously, they do test slightly lower at baseline than first graders who received the targeted intervention in Missouri.

Table 13: Comparison of Average Baseline FAST Bridge Assessments by Grade Level for Treatment and Constructed Comparison Group Youth, Weighted Propensity Score Sample, Missouri

Grade Level	Assessment	Treatment Group Average Pre-test Score	Propensity Score Constructed Comparison Group Average Pre-test Score	Difference Between Groups on Pre-test	Treatment N	Control N
Kindergarten	Letter Names	16.05	16.65	0.59	37	19
	Letter Sounds	2.22	3.26	1.04	37	19
1st Grade	Nonsense Words	22.27	19.79	2.48 +	212	144
	CBM Reading	28.27	24.26	4.01 +	212	115
2nd Grade	CBM Reading	34.89	34.34	0.55	187	62
3rd Grade	CBM Reading	66.28	70.53	4.25	220	72

+ $p < .10$

Table 14 presents a comparison of the growth on each reading assessment for treatment and comparison youth in the weighted propensity score sample from Missouri. For kindergarten youth, there is not a statistically significant difference in the level of growth between the treatment and comparison youth. On both tests, however, growth is higher for the treatment youth, and the relatively small sample size for this grade level may in part explain the non-detection of a significant difference. Among first graders, growth on both the nonsense words and CBM Reading assessments was higher for treatment youth than for youth in the comparison group, but in each case, these treatment youth were more proficient readers at baseline, so may have progressed more quickly even without the intervention. Among second graders, where the two groups were equivalent at baseline, treatment youth show a 12-point higher gain on the CBM Reading assessment than comparison youth, on average. For third grade youth in Missouri, there is no evidence of enhanced growth in reading as a result of targeted intervention from Literacy Lab tutors.

Table 14: Comparison of Baseline FAST Bridge Assessments Reading Growth by Grade Level for Treatment and Constructed Comparison Group Youth, Weighted Propensity Score Sample, Missouri

Grade Level	Assessment	Treatment Group Average Reading Growth	Propensity Score Constructed Comparison Group Average Reading Growth	Difference Between Groups in Reading Growth	Treatment N	Control N
Kindergarten	Letter Names	27.78	24.68	3.11	37	19
	Letter Sounds	34.32	27.97	6.36	37	19
1st Grade	Nonsense Words	32.62	17.38	15.25 ***	212	144
	CBM Reading	22.04	14.70	7.34 ***	212	115
2nd Grade	CBM Reading	46.95	34.58	12.37 ***	187	62
3rd Grade	CBM Reading	41.19	36.90	4.29	220	72

*** $p < .001$

Table 15 presents the average weekly reading growth treatment and comparison youth on each assessment together with the target weekly growth for each grade. First and second grade students in Missouri who participated in the Literacy Lab intervention showed higher average weekly growth on their reading assessments than their peers in the comparison group. Among students in kindergarten and third grade, the difference in average weekly growth between treatment and comparison youth was not statistically significant. Although they were not significantly different from comparison youth, both treatment and comparison group third graders exceeded the weekly grade level growth targets. The only other group of treatment youth exceeding the weekly growth targets in Missouri was first grade students on the nonsense words assessment.

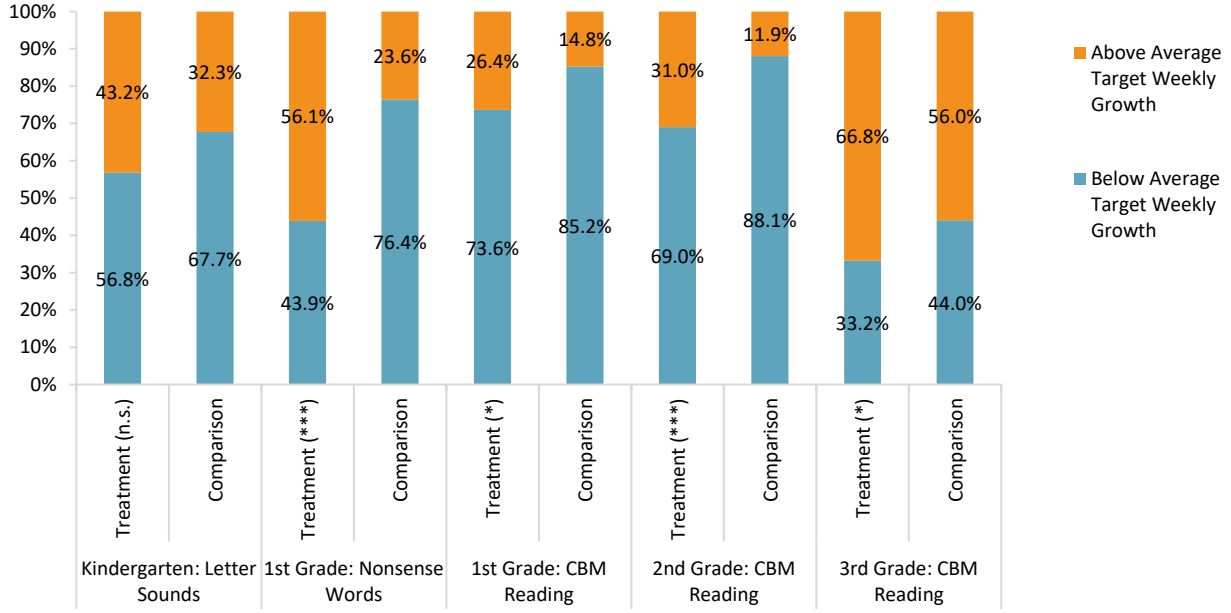
Table 15: Comparison of Average Weekly Growth on Baseline FAST Bridge Assessments by Grade Level for Treatment and Constructed Comparison Group Youth, Weighted Propensity Score Sample, Missouri

Grade Level	Assessment	Target Weekly Growth	Treatment Group Average Weekly Reading Growth	Propensity Score Comparison Group Average Weekly Reading Growth	Difference Between Groups in Average Weekly Reading Growth	Treatment N	Control N
Kindergarten	Letter Sounds	1.21	1.04	0.85	0.19	37	19
1st Grade	Nonsense Words	1.59	1.92	1.02	0.90 ***	212	144
	CBM Reading	1.88	1.38	0.92	0.46 ***	212	115
2nd Grade	CBM Reading	1.61	1.42	1.05	0.37 ***	187	62
3rd Grade	CBM Reading	1.06	1.25	1.12	0.13	220	72

*** $p < .001$

Figure 4 shows the percentage for Missouri treatment and comparison students who exceeded each of the average weekly growth targets in orange. As shown there, a higher percentage of Missouri students in first, second and third grade who participated in the Literacy Lab intervention exceeded the average weekly reading growth targets as compared to students in the constructed comparison samples. Among third grade students, nearly 67 percent of treatment youth exceeded the average weekly growth targets, while 56 percent of first grade treatments did so on the nonsense words assessment.

Figure 4: Average Weekly Growth in FAST Bridge Assessment Scores Relative to Grade Level Targets for Treatment and Comparison Youth by Grade, Missouri



Maryland

Table 16 compares the baseline scores for treatment and comparison youth in the propensity score sample from Maryland. As shown in Table 16, kindergarten, second and third grade youth in the treatment and comparison groups are not significantly different at baseline. As was the case for Washington D.C. and Virginia, there are no first-grade comparison youth from Maryland.

Table 16: Comparison of Average Baseline FAST Bridge Assessments by Grade Level for Treatment and Constructed Comparison Group Youth, Weighted Propensity Score Sample, Maryland

Grade Level	Assessment	Treatment Group Average Pre-test Score	Propensity Score Constructed Comparison Group Average Pre-test Score	Difference Between Groups on Pre-test	Treatment N	Control N
Kindergarten	Letter Names	14.16	12.62	1.53	45	25
	Letter Sounds	3.31	2.47	0.84	45	25
1st Grade	Nonsense Words	16.39	–	–	107	0
	CBM Reading	14.60	–	–	114	0
2nd Grade	CBM Reading	18.09	19.90	1.81	99	42
3rd Grade	CBM Reading	44.07	42.46	1.61	90	40

Table 17 presents a comparison of the growth on each reading assessment for treatment and comparison youth in the weighted propensity score sample from Maryland. There is no significant difference in growth between treatment and comparison kindergartners on the letter names assessment, but kindergarten youth who received the targeted literacy intervention improved an average of 13 points more on the letter sounds assessment than their peers in the comparison group. In second grade, growth on the CBM Reading assessment is 9 points higher for students receiving the targeted intervention, and in third grade, it is 12 points higher for students receiving the targeted intervention.

Table 17: Comparison of Baseline FAST Bridge Assessments Reading Growth by Grade Level for Treatment and Constructed Comparison Group Youth, Weighted Propensity Score Sample, Maryland

Grade Level	Assessment	Treatment Group Average Reading Growth	Propensity Score Constructed Comparison Group Average Reading Growth	Difference Between Groups in Reading Growth	Treatment N	Control N
Kindergarten	Letter Names	19.11	23.93	4.82	45	25
	Letter Sounds	32.33	19.27	13.07 ***	45	25
1st Grade	Nonsense Words	27.41	–	–	107	0
	CBM Reading	15.79	–	–	114	0
2nd Grade	CBM Reading	34.00	24.99	9.01 **	99	42
3rd Grade	CBM Reading	38.23	25.99	12.25 **	90	40

** p < .01, *** p < .001

Table 18 presents the average weekly reading growth for treatment and comparison students together with the grade level weekly growth targets. In Maryland, kindergarten, second and third grade students who participated in the Literacy Lab intervention show significantly higher levels of average weekly reading growth as compared to their peers in the constructed comparison group. Third grade students who received the intervention exceeded the weekly growth targets as did first grade treatment youth on the nonsense words assessment.

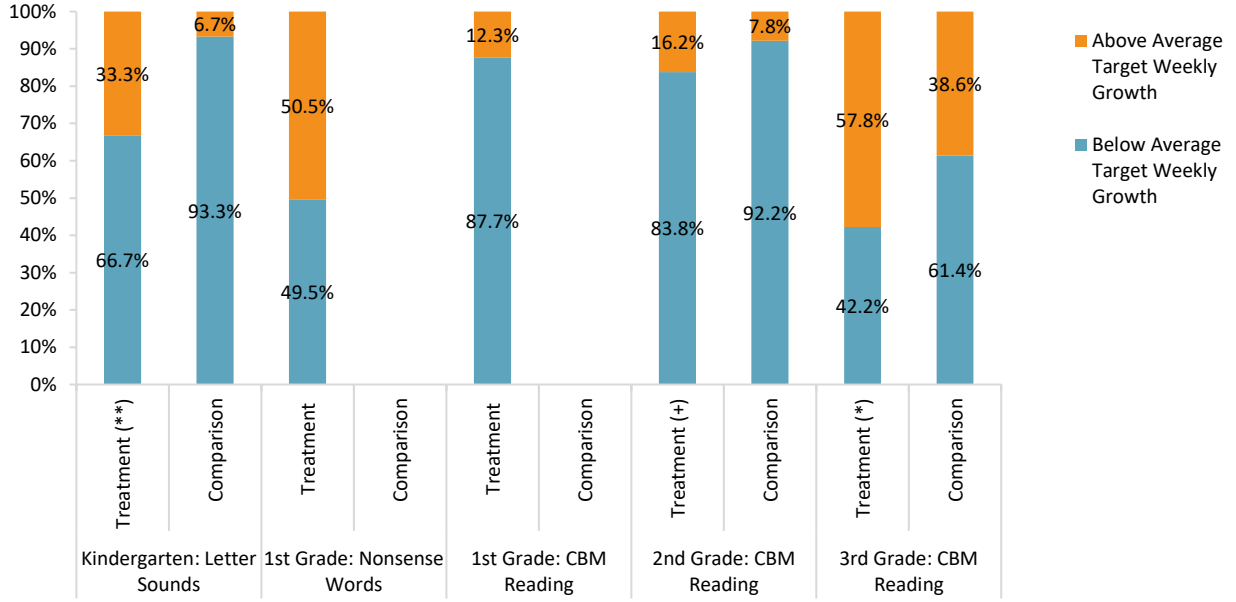
Table 18: Comparison of Average Weekly Growth on Baseline FAST Bridge Assessments by Grade Level for Treatment and Constructed Comparison Group Youth, Weighted Propensity Score Sample, Maryland

Grade Level	Assessment	Target Weekly Growth	Treatment Group Average Weekly Reading Growth	Propensity Score Comparison Group Average Weekly Reading Growth	Difference Between Groups in Average Weekly Reading Growth	Treatment N	Control N
Kindergarten	Letter Sounds	1.21	0.98	0.58	0.40 ***	45	25
1st Grade	Nonsense Words	1.59	1.61	–	–	107	0
	CBM Reading	1.88	0.99	–	–	114	0
2nd Grade	CBM Reading	1.61	1.03	0.76	0.27 **	99	42
3rd Grade	CBM Reading	1.06	1.16	0.79	0.37 **	90	40

** p < .01, *** p < .001

As shown in Figure 5, higher percentages of Maryland treatment than comparison youth in kindergarten, second and third grade exceeded the average weekly reading growth targets. Among third grade students receiving the intervention, 58 percent exceeded the weekly growth targets as did 50 percent of first graders on the nonsense words assessment and one-third of kindergarten students on the letter sounds assessment. Only a small subset of first and second grade youth receiving the intervention met the average weekly growth targets on the CBM assessment for their grade.

Figure 5: Average Weekly Growth in FAST Bridge Assessment Scores Relative to Grade Level Targets for Treatment and Comparison Youth by Grade, Maryland



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