

Afterschool Attendance Correlates with Early Reading Proficiency

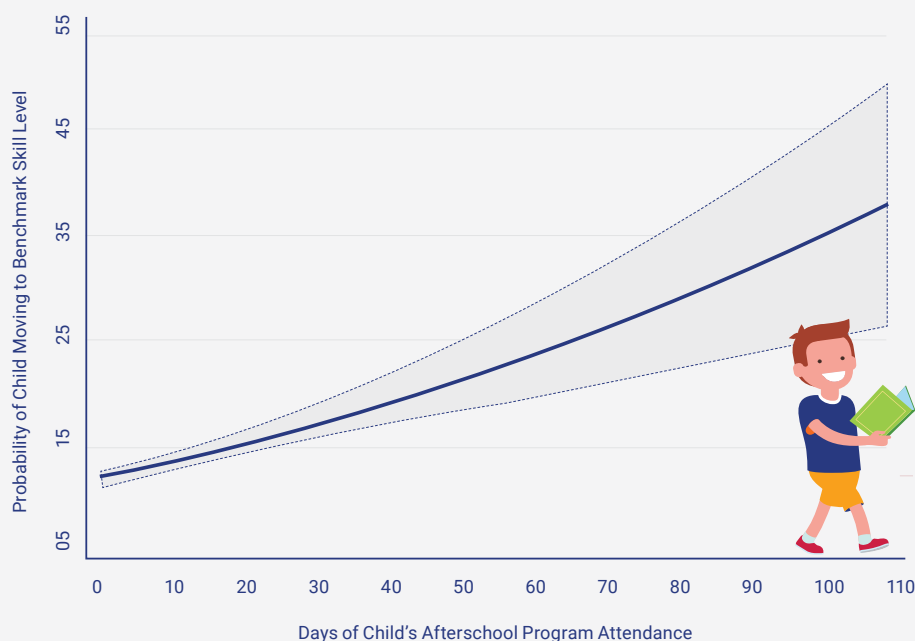


There is an ongoing national debate about the educational value of afterschool programs.¹ Critics of the federal 21st Century Community Learning Centers cite a lack of research demonstrating a concrete link between afterschool attendance and academic achievement.² Proponents of afterschool programs cite studies that show promising results in youth outcomes.

To help grow the body of evidence connecting afterschool to academics, the Reading Roadmap (RR)'s Data Analytics Team conducted a review of nearly 9,000 children in grades K-3 across 58 separate elementary schools during the 2017-18 school year. These schools all operated an afterschool program for a minimum of 100 days that was aligned with its school's multi-tiered system of supports. These schools, on average, had poverty levels that exceeded the average free-and-reduced meal rate by almost 20%. Individual data collected was obtained from school-administered, curriculum-based measures including AIMSweb, DIBELS and FastBridge assessments. After acquiring the data from schools, RR conducted a descriptive data analysis to test whether there was any difference between those children who attended the afterschool and those who did not.

The following chart shows the relationship between children's days of afterschool attendance and their probability of moving up to the benchmarked reading skill level by the end of the school year. The probability is the tick line shown in the graph. The shaded areas are in the upper and lower boundaries for 90% confidence interval of the predictive probability.

Correlation between Children' Tier Progress and Afterschool Attendance



Each day of afterschool attendance translated into a

1.7%
increase in the
likelihood of being a
grade-level reader.

¹ <https://www.brookings.edu/research/the-1-2-billion-afterschool-program-that-doesnt-work/>

² https://www.afterschoolalliance.org/afterschoolSnack/The-president-says-afterschool-doesn-t-work-That-s-just-not_03-16-2017.cfm

Attending Afterschool is Linked with Improving Reading Proficiency

RR aligns afterschool tutoring with in-school data and intervention. Based on school assessment and progress monitoring data, children are placed into targeted intervention groups in the afterschool program. To group children by need, schools administer curriculum-based measurements (CBM) of children three times a year and identify child reading progress. Based upon the CBM and further diagnostic data, children are placed into different tiers and groups within those tiers. The tiers include Tier 1 (meeting benchmark, or on track for grade-level reading), Tier 2 (near benchmark, needs supplemental instruction), and Tier 3 (below benchmark, needs intensive support).

In this study, individual child assessment data obtained from the CBM at the beginning of the school year was compared with data collected in the spring. This comparison determines child reading progress toward the benchmark as defined by the CBM. The annual report of RR program performance for the 2017-18 school year showed that the average rate of skill progression of children who participated in RR afterschool intervention was much higher than a peer who did not attend afterschool.

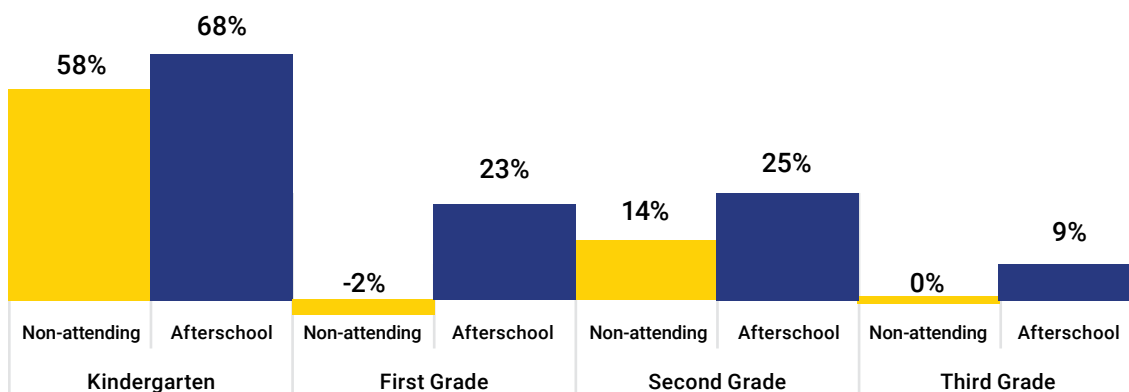
Children at Reading Benchmark in SY 2017-18

Term	Fall 2017		Spring 2018		Success Rate in Transitioning Children to Grade Reading Level
Cohort	# of Children	% of Cohort	# of Children	% of Cohort	
Non-attending	3,863	59.6%	4,053	62.5%	4.9%
Afterschool	799	33.5%	1,029	43.1%	28.8%

As seen in the table above, two of every three children in the RR afterschool program were lacking the skills necessary to meet grade-level reading at the beginning of the 2017-18 school year. By the end of the year, nearly 29% of afterschool attendees had transitioned to grade-level reading as compared to only 5% of non-attending children.

The bar graph below shows the average percentage of children who began the school year below the targeted benchmark score and then subsequently moved up to or above benchmark during the school year. As is shown in the graph, at each grade level, afterschool participants were more likely to reach benchmark than did their peers.

Average Benchmark Transition Rate Comparison of Two Child Cohorts



After running the descriptive analysis of the data, as reported above, RR conducted a one-way ANOVA analysis to inquire if the differences between two cohorts in progressing children in each cohort to the grade reading level is statistically significant. According to the ANOVA assessment results, we find that with 99.9% confidence there are statistically significant differences between the progression of two cohorts.

To take the analysis further, the RR data analytics team obtained individual-level data from the University of Kansas, Center for Public Partnerships and Research. The data set provided the CBM assessment data of children in 58 RR partnering schools. The limitation of the data is that no individually-identifiable information has been included in the data set other than children's school affiliation, grade level information, RR afterschool participation, afterschool attendance, and CBM test results.

With this data set, the RR Data Analytics Team calculated some additional variables, as well as children's benchmark skill level transition variable, to conduct an analysis of the logistic regression model. The mathematical modelling of the logistic model is as follows:

$$\text{Log} \left(\frac{\text{Prob}(Y = 1)}{1 - \text{Prob}(Y = 1)} \right) = \beta_0 + \sum_{i=1}^k \beta_i X_i$$



Where Y is the individual level outcome variable showing if the child has moved up to benchmarked skill level, or has not:

$Y = \{0, \text{if student did not move up to benchmarked skill level}$

$1, \text{if student moved up to benchmarked skill level} \}$

In the meantime, X is a matrix designated for the individual level data of children for all predictive variables in the model. Because of the limitations of the data for student level information, we have included only the following individual level data to the model:

X_1 = Student's grade level (K-3)

X_2 = Student's afterschool attendance information (0-110)

X_3 = The quadratic form of the student's afterschool attendance data

In addition to these individual level data, the RR Data Analytics Team calculated the following school level information based on student level data and included that information in the model:

X_4 = School population of K-3 students

X_5 = Percentage of K-3 population participated the RR afterschool program

X_6 = Targeted K-3 population in school (number K-3 students in the school who were not at the benchmark skill level at the beginning of the school year)

X_7 = Percentage of Targeted K-3 in school who participated in the RR afterschool program

X_8 = Percentage of RR students in school who progressed to benchmark skill level by the end of the school year

Based on the individual and school aggregated data of 8,869 children in the analysis, about a 15% variation in children's movement into benchmark reading can be explained by the variables included in the model. Moreover, the model has been found to be true at a 99.99% confidence level.

The following table shows the results of the logistic regression model. As shown in the table, every individual-level variable defined in a linear relationship with the outcome has been found statistically significant at a 99.9% confidence level. All school-aggregated variables, except school size and percentage of children in the afterschool program, have been found statistically significant at least at 95% confidence level. The sign of the coefficient shows the relationship between each predictor and the child's probability of moving up to the benchmarked reading skill level. The odds ratio of coefficients with a positive sign indicates the increase in the child's chances to move to benchmark when the value of that variable increases one unit. In the case of afterschool attendance, the odds ratio is about 1.017. This means a one-day increase in program attendance is expected to increase children's average chance to move up to benchmark by 1.7%.

	Coefficient	Odds Ratio
Grade Level (Kindergarten Base)		
<i>1st Grade</i>	-2.3590	0.0945 ***
<i>2nd Grade</i>	-1.6209	0.1977 ***
<i>3rd Grade</i>	-2.0969	0.1228 ***
Afterschool Attendance	0.0169	1.0171 ***
Afterschool Attendance (Quadratic)	-0.0001	0.9999 *
School Variables		
<i>K-3 Population</i>	-0.0004	0.9995
<i>Percentage of K-3 in Afterschool</i>	-0.4408	0.6434
<i>Targeted K-3 population</i>	0.6750	1.9640 *
<i>Percentage of Targeted K-3</i>	0.9474	2.5790 ***
<i>Percentage of Targeted K-3 population Moved up to Tier1</i>	0.7302	2.0756 ***
Constant	-1.7309	0.1771 ***
Chi-Square = 0.0000	Pseudo R-Square = .1455	

*** indicates $(P>|z|)<0.001$, * indicates $(P>|z|)<0.05$



Key Findings



Children who attended afterschool regularly had a

26% greater chance of finishing the year

at benchmark, or on track for grade-level reading, as compared with their non-attending peers

(Based upon three different school-administered assessments)



The predicted probability of children reaching benchmark reading who attended afterschool was as high as

38% greater than their non-attending peers.

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