

VALIDITY REPORT

Lexia® PowerUp Literacy® and FAST™ aReading

Prepared by Lexia® Research & Analytics

METHOD

Sample

This report presents analyses conducted on a sample of 1,093 students in grades 6–8 at two schools in a mid-size district in the United States. To be included in the sample, students needed to have used Lexia PowerUp Literacy for at least 10 weeks of the school year and have available FAST aReading data.



**1,093
students**



**Grades
6–8**



2 schools



**10+ weeks
of PowerUp usage**

KEY FINDINGS



PowerUp Achievement and FAST Proficiency

90%

of students who **completed the PowerUp program** were **proficient** on the spring FAST aReading assessment.

3x

Struggling readers who finished the year in advanced content or completed PowerUp were 3x more likely to be proficient on the spring FAST aReading assessment.

PowerUp Achievement and FAST Performance

.57*

Pearson's *r*

There was a **strong, positive correlation** between where students ended the year in PowerUp and their spring FAST aReading scores.

Measures

Lexia® PowerUp Literacy® (PowerUp) is an adaptive, digital reading curriculum designed to help struggling students in grades 6 and above become proficient readers and confident learners. In PowerUp, students work in three strands of literacy instruction: Word Study, Grammar, and Comprehension. Each literacy strand is broken up into three zones of content: Foundational, Intermediate, and Advanced. The following analyses use students' **percent of PowerUp complete**, **percent of each strand complete**, and their **zone within each strand** at the end of the year as variables. The percent complete variables represent a student's location within the PowerUp curriculum and therefore include content the student tested over and worked through during the year.

The FastBridge Learning FAST™ Adaptive Reading assessment (FAST aReading) is a computer-administered adaptive measure of broad reading that may be individually or group administered in about 15–30 minutes. aReading is a screening and progress-monitoring tool for students in grades K–12 that measures decoding, word identification skills, and reading comprehension. The following analyses use **aReading scores** and **aReading proficiency** based on benchmark/criterion standards specified for each grade level and time point of the school year.

More details about sample, program, and measures are in the **Technical Appendix** section.

RESULTS

PowerUp Achievement Linked to FAST Proficiency

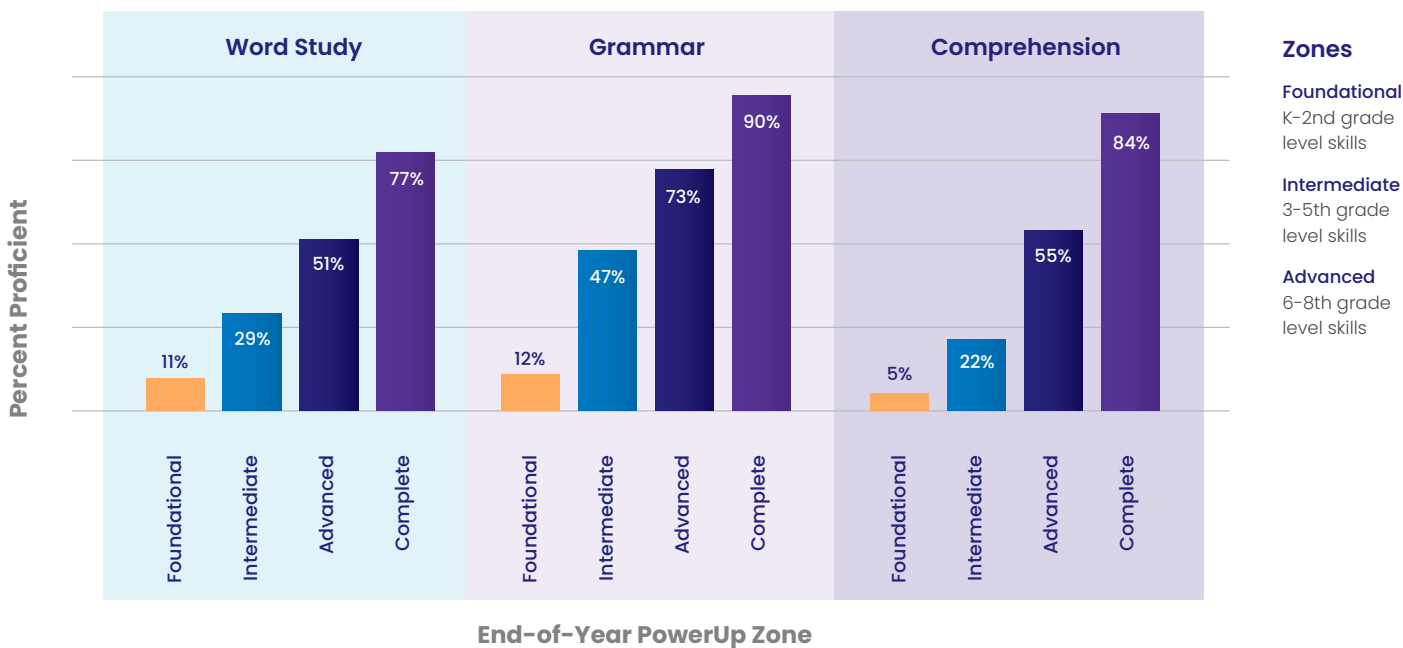
In each strand of PowerUp, students work through three zones of content that increase in complexity, each addressing skills from approximately three grade levels. Analyses showed **students working in higher zones at the end of the year had higher spring FAST aReading proficiency rates**, both overall and within each strand.



90%

Overall, 90% of students who completed all three strands in PowerUp were proficient on their spring FAST aReading assessment.

Proficiency Rates on spring FAST by End-of-Year PowerUp Zone



Likelihood of Struggling Readers Achieving Spring FAST Proficiency

Analyses of students who were not proficient on the fall FAST aReading (struggling readers) showed those who made it to the Advanced Zone in all three strands, or who completed the PowerUp program, were three times more likely to achieve proficiency on the spring FAST aReading compared with struggling readers who did not.

Closing the Gap

Struggling readers who finished the year in or above advanced content were **3X more likely to be proficient** on the spring FAST aReading.

Strong Correlations Between PowerUp and FAST aReading

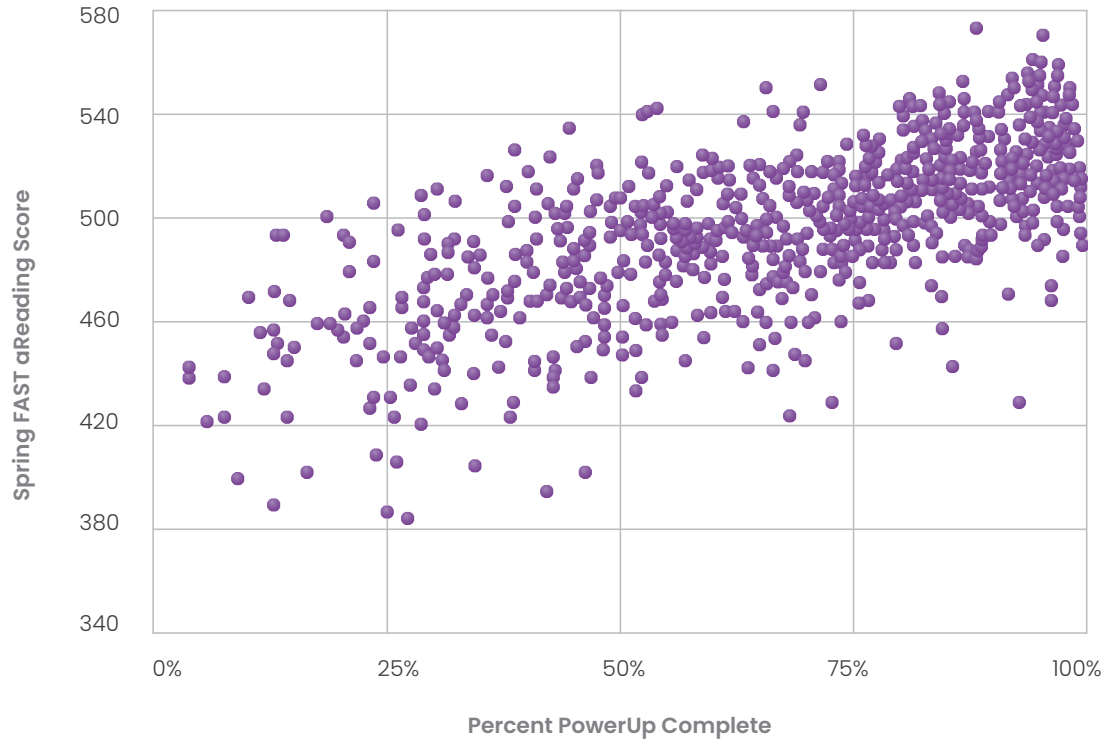
On the FAST aReading, student reading ability is summarized by their scale score, which ranges from 100 to 300. Analyses showed **strong correlations between indicators of reading ability in PowerUp and FAST aReading**. There was a large, positive, and statistically significant correlation between students’ scores on the spring aReading and where they finished the year in PowerUp (percent of program complete across all strands). Students’ scores were also highly correlated with where they ended the year in each of the three strands. In other words, students who were closer to completing PowerUp or a strand of PowerUp had, on average, higher aReading scores.

Correlation: Spring FAST aReading Scores and Percent PowerUp Complete

Overall
.57*

Pearson's r

Correlation coefficient for Spring FAST aReading RIT scores and percent of PowerUp program complete at end of year



Correlations: Spring FAST aReading Scores and Percent of PowerUp Strand Complete

Word study
r = .53*
Pearson's r

Grammar
r = .52*
Pearson's r

Comprehension
r = .50*
Pearson's r

* $p < 0.05$ – Pearson's r sizes: Small .10 to .29; Medium .30 to .49; Large $\geq .50$ (Cohen, 1992)



TECHNICAL APPENDIX

INTRODUCTION

A program's level of validity depends on how effectively it measures what it claims to measure. This report documents the validity of PowerUp by evaluating various program indicators as measures of reading ability and showing how achievement in PowerUp are associated with meaningful differences in literacy performances.

Program Overview

Lexia PowerUp Literacy (PowerUp) is an adaptive, blended learning program that provides personalized literacy instruction for struggling and non-proficient readers in grades 6 and above. PowerUp helps educators simultaneously address gaps in fundamental literacy skills while helping students build the higher-order skills they need to meet College- and Career-Ready Standards.

Strands

Students work online in three different areas of literacy instruction based upon the Simple View of Reading (Grough & Tunmer, 1986). The three strands—Word Study, Grammar, and Comprehension—improve student proficiency and independence in reading and understanding complex, authentic texts. In **Word Study**, students develop automatic word-recognition skills and an understanding of multisyllabic academic vocabulary words. In **Grammar**, students learn how words function in sentences, as well as how various text genres are structured, to further develop their comprehension and composition skills. In **Comprehension**, students develop skills and strategies to analyze literary and informational texts of increasing complexity for deep meaning and understanding.

Zones

The content that students work through within each strand of PowerUp can be grouped into three zones that correspond with a range of grade-level skills and instruction. The Foundational (K-second-grade skills) and Intermediate (third-fifth-grade skills) zones provide the practice that builds automaticity of essential literacy skills. In the Advanced Zone (sixth-eighth-grade skills), students tackle higher-order literacy skills needed to master grade-level materials.

Methods

Sample

The sample for these analyses included 1,093 students, grades 6–8, from two schools in a mid-size district in the United States. Sample sizes varied across analyses based upon the availability of fall and spring data from the FAST aReading assessment and key demographic variables.

Students included in this analysis used PowerUp for at least 10 weeks and up to 39 weeks, averaging 34 weeks of use during the 2018–2019 school year. These students spent an average of 50 hours in PowerUp and completed an average of 61 activities. In all, 11 students were excluded from these analyses because they had not used the program for a minimum of 10 weeks.

Measures

PowerUp Zone Status indicates what zone (Foundational, Intermediate, and Advanced) a student was working in at the end of the school year. Students can be working in different zones in different strands.

Percent of PowerUp Complete is a measure of how close a student is to completing PowerUp by the end of the year. (A student with 100%, has completed the entire program). This is calculated by adding the number of activities a student placed over to the number of activities the student completed throughout the year and dividing by the total number of activities in PowerUp.

Percent of Strand Complete is a measure of how close a student is to completing a strand by the end of the year. For example, a student with 100%, has completed the entire strand. This is calculated by adding the number of activities a student placed over in the strand to the number of activities the student completed in the stand throughout the year and dividing by the total number of activities in the strand. Each student has one Percent of Strand Complete for each strand.

FAST aReading score is a standardized measure of reading ability based upon FastBridge’s FAST aReading computer-adaptive formative assessment tool. Performance on FAST is measured by a RaschunIT (RIT) scaled score. The scale is divided into equal intervals, which allows student growth to be monitored from year to year along a developmental continuum.

FAST aReading proficiency is an indicator of whether or not a student achieved a proficient score on the FAST aReading based on benchmark/criterion standards specified for each grade level and time point of the school year.

Analysis

The following sections present detailed analyses of the association between achievement and progress in PowerUp and performance on the FAST aReading. The first section explores FAST aReading proficiency rates disaggregated by students' PowerUp Zone Status. The second section describes a logistic regression analysis exploring whether PowerUp completion predicted FAST aReading proficiency. The third section presents correlations between FAST aReading scores and where students ended the year in PowerUp (i.e. Percent of PowerUp Complete and Percent of Strand Complete). The last section presents regression analyses that estimate the effect of completing PowerUp levels on spring FAST aReading performance.

PowerUp Achievement and FAST Proficiency

Analysis

To understand how students' performance in PowerUp by the end of the year was associated with their proficiency on MAP Reading, cross-tabulations of proficiency rates were calculated. The following section presents the distributions of students who were and were not proficient on MAP Reading, disaggregated by PowerUp Zone Status.

Results

Table 1 presents the distributions of students who were and were not proficient on the spring FAST aReading and whether or not they completed PowerUp. Nearly all students (89.93%) who completed the program by the end of the year were proficient on FAST (positive predictive value). Notably, 59.22% of students who did not complete the program were not proficient. This combination of rates yields an overall classification accuracy of 63.13% and suggests that completing the program was a strong indicator of proficiency, but not completing the program was only a moderate indicator of non-proficiency.

Table 1: End-of-Year Proficiency on FAST by PowerUp Completion

	Not Proficient	Proficient
Did Not Complete PowerUp	59.22% (N = 565)	40.78% (N = 389)
Completed PowerUp	10.07% (N = 14)	89.93% (N = 125)

Tables 2, 3, and 4 present the spring FAST aReading proficiency rates by zone within each strand of PowerUp. Most of the students (77.49%-89.66%) who finished individual strands were proficient on FAST (positive predictive value). A majority of students (50.09%-72.73%) who ended the year in the Advanced Zone were also proficient on FAST. Notably, proficiency rates were substantially lower among students who ended the school year in lower zones.

Taken as a whole, these distributions suggest an alignment between FAST and PowerUp standards. Finishing one or more strands is a good indicator of reading proficiency as measured by FAST. Students working in higher Zones in each strand tend to have higher proficiency rates and being in Foundational in each or any of the strands is a strong indicator of non-proficiency.

Table 2: Proficiency on FAST by Word Study Zone Status

	Not Proficient	Proficient
Foundational	88.98% (N = 105)	11.02% (N = 13)
Intermediate	71.14% (N = 286)	28.86% (N = 116)
Advanced	49.10% (N = 109)	50.90% (N = 113)
Complete	22.51% (N = 79)	77.49% (N = 272)

Table 3: Proficiency on FAST by Grammar Zone Status

	Not Proficient	Proficient
Foundational	87.81% (N = 245)	12.19% (N = 34)
Intermediate	52.70% (N = 283)	47.30% (N = 254)
Advanced	27.27% (N = 36)	72.73% (N = 96)
Complete	10.34% (N = 15)	89.66% (N = 130)

Table 4: Proficiency on FAST by Comprehension Zone Status

	Not Proficient	Proficient
Foundational	94.92% (N = 56)	5.08% (N = 3)
Intermediate	78.20% (N = 312)	21.80% (N = 87)
Advanced	44.95% (N = 169)	55.05% (N = 207)
Complete	16.22% (N = 42)	83.78% (N = 217)



Probability of Reaching Proficiency on FAST aReading

Analysis

Logistic regression was used to determine the differences in probabilities of reaching end-of-year FAST aReading proficiency for students based upon their performance in PowerUp. Whether students were proficient on FAST at the end of the year was regressed on whether or not they reached the Advanced Zone in all three Zones, or completed PowerUp, by the end of the year.

Covariates were included for whether they were proficient on FAST at the beginning of the year and their demographics (grade, gender, race/ethnicity, IEP/special education status, and English Learner status). Variables were added sequentially to the model and only retained in subsequent models if they were significant predictors of FAST proficiency and significantly improved model fit. The final model is presented in Table 5. Students were only included in the analysis, if they had both beginning- and end-of-year FAST aReading data and all necessary control variables.

Results

As seen in Table 5, reaching the Advanced Zone or Above in all three strands of PowerUp was a significant, positive predictor of end-of-year FAST aReading proficiency (Odds Ratio = 4.88, CI = 3.01 – 7.91, $p < 0.001$). Reaching Advanced or Above in PowerUp was associated with a higher probability students had proficient scores on FAST at the end of the year. This was true even when accounting for the variance explained by beginning-of-the-year proficiency, English Learner status, and IEP/special education status. Grade, gender, and race/ethnicity were not predictive of proficiency on FAST in this sample, so these variables were not included in the final model.

To better understand this model, predicted probabilities were computed based upon whether or not students reached Advanced or above in PowerUp and whether or not they were proficient at the beginning of the year. To compute these probabilities, EL and IEP/SPED status were held constant.

Students who were not proficient at the beginning of the year (struggling readers) and did not reach Advanced or above in PowerUp had a probability of being proficient at the end of the year of 16%. In contrast, struggling readers who reached Advanced in all three strands or completed PowerUp had a probability of being proficient at the end of the year of 49%. This translates into struggling readers who reached Advanced or above in PowerUp being 2.97 times more likely to be proficient than struggling readers who did not (calculation based off of the Relative Risk equation in Osborne, 2006).

Table 5: Logistic Regression Predicting Spring FAST aReading Proficiency

Predictors	Final Model	
	Odds Ratios	CI
Intercept	0.20 ***	0.14 – 0.29
BOY aReading proficient	17.93 ***	11.98 – 26.82
EL status	0.22 ***	0.14 – 0.36
IEP/SPED status	0.29 **	0.13 – 0.65
PowerUp Advanced All Strands or Completed	4.88 ***	3.01 – 7.91
Observations	1059	
Tjur's R²	0.575	
AIC	753.516	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

PowerUp Achievement and FAST Scores

Analysis

To measure the association between where students ended the year in PowerUp and their spring FAST performance, correlations (Pearson's r) were calculated between students' FAST aReading scores and their percent of PowerUp complete. This percent complete included the portion of PowerUp students placed over (due to auto placement or manual placement). Correlations were calculated for the percent of the entire program complete as well as the percent of each strand complete and disaggregated by grade.

Results

Table 6 shows the correlations (Pearson's r) between students' percent of PowerUp/strands complete and spring FAST aReading scores. There were large, positive correlations across grades and medium to large positive correlations within all grade levels.

Notably, the correlations are strongest in sixth grade. Strength of the correlations is fairly similar across strands but it is consistently highest for the percent of PowerUp complete than it is for any of the individual strands. This suggests students' achievement across strands is more tightly related to their FAST aReading performance than students' achievement in any strand in isolation.

Table 6: Correlations (Pearson's r) between EOY MAP Score and the percentage of PowerUp complete by strand and grade

	Number of Students	PowerUp	Word Study	Grammar	Comprehension
Grand Total	1,093	.57*	.53*	.52*	.50*
Grade 6	362	.69*	.65*	.65*	.59*
Grade 7	372	.52*	.48*	.46*	.45*
Grade 8	359	.57*	.52*	.50*	.51*

* $p < 0.05$. Correlations are considered small if they fall between .10 and .29; medium if they fall between .30 and .49; and large if they fall above .50 (Cohen, 1992).

GLOSSARY

Correlation is a standardized measure of the association between two variables. **Pearson's r** is the statistic typically used to quantify the correlation between two continuous variables.

Likelihood is the probability that something will occur.

Logistic Regression is a method of analysis that predicts the likelihood of something occurring based upon multiple variables. Put differently, it is used to predict a dichotomous variable. The effect sizes (B) are in log odds. These can be converted to odds ratios or probabilities. The predicted outcomes of a logistic model can be used to compare the likelihood of something occurring for different populations.

Odds Ratio is the probability that something will happen divided by the probability that something will not happen.

Positive Predictive Value is the number of true positives divided by the number of true and false positives. Put differently, it is the proportion of students who actually had a positive outcome out of the students identified with a positive indicator.

Relative Risk is a way of comparing the likelihood that something will occur for two different populations. To calculate relative risk, divide the probability that something will occur for one population by the probability that it will occur for another population.

REFERENCES

- Baird, M., & Pane, J.** (2018). Translating standardized effects of education programs into more interpretable metrics. *Educational Researcher*, 48 (4), 217-228. doi:10.7249/wr1226
- Cohen, J.** (1992). A power primer. *Psychological Bulletin*, 112(1), 155-159.
- Gough, P. B., & Tunmer, W. E.** (1986). Decoding, reading, and reading disability. *Remedial and Special Education*, 7(1), 6-10. doi:10.1177/074193258600700104
- Osborne, J.W.** (2006). Bringing balance and technical accuracy to reporting odds ratios and the results of logistic regression analyses. *Practical Assessment Research & Evaluation*, 11(7). Retrieved from <http://pareonline.net/getvn.asp?v=11&n=7>
- Petscher, Y., & Kim, Y.** (2011). Efficiency of predicting risk in word reading using fewer, easier letters. *Assessment for Effective Intervention*, 37(1), 17-25. doi:10.1177/1534508411407761

For more information about
Lexia's implementation services,
visit www.lexialearning.com
or call 1-800-435-3942

