

S.P.I.R.E. Intensive Reading Intervention: A Comparative Analysis at Second Through Sixth

Grades

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### **Abstract**

Pre- and post-treatment and control and treatment group reading achievement and growth outcomes for the S.P.I.R.E. reading intervention program were examined in a sample of second through sixth grade struggling readers and typical peers from a suburban public school district in central Ohio. Pre- and post-treatment data indicated significant improvements in reading achievement for treatment participants. Control and treatment outcomes indicated that treatment outcomes significantly outpaced control group reading achievement growth, but was varied by grade level. In contrast, despite lacking significant differences in all measures of reading achievement growth, the treatment group was not significantly outperformed by the control group. Together, these findings suggest that the S.P.I.R.E. reading program is an effective intervention for addressing the needs of struggling readers.

*Keywords:* reading intervention, struggling readers, dyslexia, S.P.I.R.E.

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### S.P.I.R.E. Intensive Reading Intervention: A Comparative Analysis at Second Through Sixth Grades

Schools are often faced with finding cost effective solutions to address the complex literacy needs of their students (Ehri, Nunes, Stahl, & Willows, 2001; Mesmer & Griffith, 2005). One particular challenge is providing the appropriate reading instruction and intervention for students with dyslexia - specifically phonics instruction (Ehri, Nunes, Stahl, & Willows, 2001). While the definition of dyslexia can be varied, dependent upon the professional, for the purposes of this study, students that present with dyslexia are those that struggle with basic reading skills - phonemic awareness, alphabetic principle, and phonics - but also adversely a students ability to read fluently and comprehend what they are reading (Shaywitz, Mody, & Shaywitz, 2006; Meisinger, Bloom, & Hynd, 2010; Kim, 2015; Pikulski & Chard, 2005).

Current research suggests that systematic phonetic approaches to reading instruction are more effective than non-systematic instructional approaches (Ehri, Nunes, Stahl, & Willows, 2001). Further, in order to provide balanced reading instruction, children should be provided with systematic phonics instruction (Ehri, Nunes, Stahl, & Willows, 2001). In order to systematically teach phonics to children, several different approaches have been used (Ehri, Nunes, Stahl, & Willows, 2001; Aukerman, 1984; Hodges, Harris, & Association, 1995). In terms of delivery, one-on-one, small group, and whole class approaches were significant ways of providing phonetic instruction to students (Ehri, Nunes, Stahl, & Willows, 2001).

In turn, students that present with dyslexia have been shown to improve their reading with structured reading intervention and phonological awareness training, more so than reading intervention or phonological awareness alone (Snowling, 1996). Further, specific interventions

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can be utilized after a clear identification of a student's reading difficulties have been made [Adams & Bruck, 1993; Foorman, 1995; Lyon, 1996; Moats & Lyon, 1996; Torgesen, Wagner, & Rashotte, 1994]. Evidence also suggests that explicit and systematic approaches for developing phonological awareness and decoding strategies are the most effective treatment for addressing the core symptoms of dyslexia (Padget, 1998; Gabrieli, 2009). Further, early and intensive intervention has been noted to significantly improve later reading outcomes (Gabrieli, 2009). Other instruction and intervention methodologies, such as phonics-focused professional development models (e.g. Orton Gillingham) have also demonstrated positive effects with regards to improving reading achievement (Slavin, Lake, Chambers, Cheung, & Davis, 2009).

The S.P.I.R.E. (Specialized Program Individualizing Reading Excellence) program is a combination of these evidence-based practices. It is an intensive reading intervention for struggling readers and students that are considered non-readers in kindergarten through eighth grade. S.P.I.R.E. is indicated to address the intervention needs of students at Tier II and Tier III of a Response to Intervention (RtI) or Multi-tiered System of Supports (MTSS) framework. The S.P.I.R.E. program includes print, online, and hybrid intervention materials that use a teacher-driven instruction methodology, a ten-step lesson, multisensory learning approaches, the mastery of literacy concepts, and spans eight progressively more difficult levels of intervention materials ("SPIRE Reading Intervention | EPS | School Specialty | EPS," n.d.; Torlakovic & Barnum, 2013).

The program's lessons are a spiraling curriculum (with previously learned concepts being taught in subsequent lessons) and each ten-step lesson addresses an array of emerging literacy skills (phonological awareness, alphabetic principle), as well as spelling, reading fluency,

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vocabulary, and reading comprehension. The S.P.I.R.E. program also includes a reading placement test (the *S.P.I.R.E. Initial Placement Assessment*) to determine a student's starting level. Lessons are designed to be delivered for 60 minutes per day, five days per week. To accommodate for time, a 60 minute lesson can be divided in half and completed in 30 minute increments ("SPIRE Reading Intervention | EPS | School Specialty | EPS," n.d.; Torlakovic & Barnum, 2013).

### **Method**

The goal of the present study was to evaluate the effectiveness of the S.P.I.R.E. program at second through sixth grade during the 2017-2018 school year at Marysville Exempted Village School District. Study participants included second, third, and fourth grade students that were administered the AIMSweb oral reading fluency (ORF) curriculum-based measures (CBM) during the fall of 2017 and the spring of 2018 and second through sixth grade students that had also been administered the i-Ready computer adapted reading diagnostic during the fall of 2017 and spring of 2018.

### ***Participants***

Study participants were second through sixth grade students that attended Marysville Exempted Village School District, a public school system in central Ohio, during the 2017-2018 school year. Participants were varied and included students from the general education population and students with disabilities.

Treatment condition participants included struggling readers that were selected at each grade level of the study's scope and identified through a diagnostic-prescriptive process - using a pattern of strengths and weaknesses to match students to the most appropriate reading

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intervention (Arter & Jenkins, 1979; Ysseldyke & Salvia, 1974). In the case of this study, the most appropriate intervention and treatment condition was participation in the S.P.I.R.E. reading intervention program. Students assigned to the treatment condition presented with a neuroatypical profile consistent with developmental dyslexia based upon on the results of the *Comprehensive Test of Phonological Processing, Second Edition (CTOPP-2)*. The CTOPP-2 is a norm-referenced, standardized assessment of phonological awareness, phonological memory, and rapid naming (“Comprehensive Test of Phonological Processing, Second Edition,” n.d.).

Treatment group participants were administered the CTOPP-2 within the previous 12 months of being selected for participation in the S.P.I.R.E. program. Treatment group participants with a neuroatypical profile based upon their CTOPP-2 results presented with the hypothesized double-deficit (deficits in phonological awareness and either rapid naming or phonological memory) or triple-deficit developmental dyslexia profiles (deficits in all three CTOPP-2 domains) (Badian, 1997; Norton et al., 2014). Further, treatment group participants did not meet AIMSweb ORF or i-Ready reading diagnostic (reported as scale scores and a percentile) grade level expectations for the fall of 2017 assessment period. Further, treatment condition participants also presented with contiguous data on both reading outcome measures (AIMSweb and i-Ready). Finally, to be selected for the treatment group, students had to have completed the S.P.I.R.E. program from September of 2017 to May of 2018 for 30 minutes per day, 5 days per week.

The control group included students that did not receive reading intervention services during the 2017-2018 school year, demonstrated contiguous data, and met grade level expectations on the AIMSweb ORF and i-Ready reading diagnostic assessments. Further, control

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group participants were selected post hoc via random selection without replacement (via the `sample` function in R) to match the number of test group participants at each grade level. Total participants by contiguous assessment condition are outlined in Table 1 and Table 2.

**Table 1** Study Participants that Meet Selection Criteria Based Upon Contiguous aimsweb Data

<i>Grade Level</i>	<i>Treatment (n)</i>	<i>Control (n)</i>
2	25	25
3	29	29
4	28	28

**Table 2** Study Participants that Meet Selection Criteria Based Upon Contiguous i-Ready Data

<i>Grade Level</i>	<i>Treatment (n)</i>	<i>Control (n)</i>
2	26	26
3	28	28
4	30	30
5	27	27
6	29	29

A priori power analysis indicated a necessary sample size of at least 18 participants at each grade level and treatment condition to attain 80% power for detecting a strong effect ( $d = 0.7$ ) when employing a traditional .05 criterion of statistical significance.

### ***Instruments***

Two measures of reading achievement were collected for the present study and descriptions of the individual assessments are outlined below.

#### ***1. aimsweb***

aimsweb is an assessment platform that utilizes curriculum-based measures (CBM) for universal screening and measuring student progress. The Tests of Early Literacy include

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assessments for phonemic segmentation fluency (PSF), nonsense word fluency (NWF), letter sound fluency (LSF), letter naming fluency (LNF), letter identification (LID), and oral reading fluency (ORF) (“aimsweb®,” n.d.). For the purposes of this study, ORF and accuracy were used. ORF is reported as words read correctly (WCPM) and accuracy is reported as a percentage of words that were read correctly. The assessment requires students to read out loud to an assessment administrator for one-minute, the administrator marks errors and omissions committed by the reader, and then reports the WCPM and accuracy (Valencia et al., 2010). Student results are then reported as falling with the benchmark (meeting grade expectations), strategic (performing below grade expectations, and intensive (performing well below expectations).

### ***2. i-Ready Reading Diagnostic***

The i-Ready reading diagnostic is a computer-based, adaptive diagnostic that measures phonological awareness, phonics, high frequency words, vocabulary, informational text, and literature achievement. During the completion of the diagnostic, the questions presented to the student increase or decrease in complexity and difficulty until the student is no longer able to answer questions correctly (a basal and ceiling procedure). Each of the diagnostic domains are reported as a scale score, as well as an overall scale score and percentile (“i-Ready,” n.d.). In order to use samples with contiguous, only the overall scale score, percentile, vocabulary scale score, literature scale score, and informational text scale score were utilized for the purposes of this study due to a student’s ability to test out of the phonological awareness, phonics, and high frequency words domains - which results in no scale scores being reported for those respective domains.



### ***Procedure***

In order to evaluate the effectiveness of the S.P.I.R.E. intervention treatment, treatment sample data were analyzed through effect size and paired samples t-Test. Control and treatment data were analyzed through a Student's two-sample t-Test. All student data was compiled post hoc, personally identifiable data was removed from the final data sets, and records were codified with a random identifier for anonymity purposes.

### **Results**

Overall results indicate S.P.I.R.E. serves as an effective intervention for addressing the needs of struggling readers that present with a neuroatypical profile or dyslexia. Within the paired samples t-test and effect size evaluation of S.P.I.R.E., results were consistent across grades two through six ( $p < .05$  at all grade levels and reading achievement measures), with the ORF measure at second, third, and fourth grade ( $d = 2.76, 1.76, \text{ and } 1.50$ , respectively) demonstrating the largest effect sizes. Further, significant differences were observed between control and treatment groups at various grade levels on the ORF, accuracy, overall scale score, percentile, informational text, and literature reading achievement measures.

### ***Paired Samples t-Test & Effect Size***

Based upon the results of a paired samples t-test comparing pre- and post-S.P.I.R.E. treatment outcomes, all observed reading achievement measures at grades two, three, four, five, and six of the present study demonstrated significant mean differences ( $p < .05$ ). The smallest effect size ( $d = .45$ ) was observed at fourth grade on the percentile measure, while the largest effect size ( $d = 2.76$ ) was observed at second grade on the ORF measure of reaching achievement.

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Overall, second grade treatment participants produced large to very large effect sizes, with the largest effect sizes observed on the ORF and accuracy measures. Very large effect sizes were observed on the ORF, accuracy, overall scale score, vocabulary, and informational text measures. The smallest effect size was observed on the percentile measure. All second grade measures demonstrated statistical significance ( $p < .05$ ). See Table 3.

**Table 3** 2nd Grade Treatment Condition Paired Samples t-Test of Reading Achievement

<i>Measure</i>	<i>Fall, 2017</i>		<i>Spring, 2018</i>		<i>n</i>	<i>95% CI for</i>			<i>df</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		<i>Mean Difference</i>	<i>d</i>	<i>t</i>		
ORF	16.20	7.97	63.80	23.03	25	39.84	55.36	2.76	12.66*	24
Accuracy	64.92%	15.07%	92.20%	6.59%	25	21.72%	32.84%	2.35	10.13*	24
Overall Scale										
Score	404.27	20.26	459.12	35.71	26	41.37	68.32	1.89	8.38*	25
Percentile	13.65	7.56	29.85	20.41	26	8.94	23.44	1.05	4.60*	25
Vocabulary	398.35	34.06	452.04	43.16	26	37.86	69.52	1.38	6.99*	25
Literature	406.15	29.94	463.73	54.75	26	35.57	79.59	1.24	5.39*	25
Informational										
Text	402.77	27.84	460.77	47.77	26	34.45	81.55	1.48	4.60*	25

\*  $p < .05$

Third grade treatment participants demonstrated a very large effect size on the ORF, overall scale score, and informational text measures. Further, the smallest effect size was observed on the vocabulary measure. Large effect sizes were also observed on the accuracy, percentile, and literature measures. All third grade measures demonstrated statistical significance ( $p < .05$ ). See Table 4.

**Table 4** 3rd Grade Treatment Condition Paired Samples t-Test of Reading Achievement

<i>Measure</i>	<i>Fall, 2017</i>		<i>Spring, 2018</i>		<i>n</i>	<i>95% CI for</i>			<i>df</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		<i>Mean Difference</i>	<i>d</i>	<i>t</i>	

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ORF	31.31	14.17	76.69	33.70	29	34.13	56.63	1.76	8.26*	28
Accuracy	80.55%	14.98%	93.59%	8.67%	29	8.62%	17.45%	1.06	6.05*	28
Overall Scale										
Score	445.12	27.17	487.25	30.59	28	33.23	51.06	1.46	9.70*	27
Percentile	15.25	9.55	27.29	17.08	28	6.82	17.25	.87	4.74*	27
Vocabulary	454.07	32.62	481.00	36.12	28	12.27	41.59	.78	3.77*	27
Literature	449.46	33.73	491.61	43.55	28	25.18	59.11	.90	5.10*	27
Informational										
Text	442.18	33.95	491.39	35.81	28	35.06	63.37	1.41	7.13*	27

\* $p < .05$

Fourth grade treatment participants demonstrated a range of effect sizes from small to very large. Overall, fourth grade students demonstrated the largest effect size on the ORF measure and the smallest effect size on the percentile measure. Further, large effect sizes were observed on the accuracy, overall scale score, vocabulary, and informational text measures. All fourth grade measures demonstrated statistical significance ( $p < .05$ ). See Table 5.

**Table 5** 4th Grade Treatment Condition Paired Samples t-Test of Reading Achievement

Measure	Fall, 2017		Spring, 2018		n	95% CI for			df	
	M	SD	M	SD		Mean Difference	d	t		
ORF	44.32	19.87	79	25.85	28	29.60	39.75	1.50	14.02*	27
Accuracy	87.96%	9.52%	95.32%	5.74%	28	5.11%	9.60%	.94	6.74*	27
Overall Scale										
Score	472.23	37.14	504.67	31.76	30	21.56	43.31	.94	6.10*	29
Percentile	18.77	17.85	26.47	16.12	30	1.55	13.85	.45	2.56*	29
Vocabulary	466.13	36.06	500.13	35.44	30	22.83	45.17	.95	6.22*	29
Literature	472.60	52.01	506.60	41.18	30	15.19	52.81	.62	3.70*	29
Informational										
Text	471.90	56.01	518.37	41.21	30	25.59	67.34	.95	4.55*	29

\* $p < .05$

Fifth grade treatment participant reading achievement outcomes indicate medium to large effect sizes. Specifically, a large effect size was observed on the literature measure. Further, medium effect sizes were observed on the overall scale score, percentile, vocabulary, and informational text measures. All fifth grade measures demonstrated statistical significance ( $p < .05$ ). See Table 6.

**Table 6** 5th Grade Treatment Condition Paired Samples t-Test of Reading Achievement

<i>Measure</i>	<i>Fall, 2017</i>		<i>Spring, 2018</i>		<i>n</i>	<i>95% CI for</i>		<i>d</i>	<i>t</i>	<i>df</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		<i>Mean Difference</i>				
Overall Scale										
Score	472.15	42.44	503.74	47.36	27	20.29	42.90	.70	5.74*	26
Percentile	11.67	10.50	18.78	14.49	27	2.98	11.24	.56	3.54*	26
Vocabulary	482.00	45.28	509.81	49.20	27	12.33	43.30	.59	3.69*	26
Literature	465.33	51.85	493.52	57.11	27	11.53	44.84	.88	3.48*	26
Informational										
Text	470.59	49.54	503.44	56.15	27	12.79	52.91	.62	3.37*	26

\*  $p < .05$

Sixth grade treatment participants demonstrated medium to large effect sizes (in step with their fifth grade peers) on all measures of reading achievement. Specifically, a large effect size was observed with regard to the informational text domain. Further, medium effect sizes were observed on the overall scale score, percentile, vocabulary, and literature reading achievement measures. All sixth grade measures demonstrated statistical significance ( $p < .05$ ). See Table 7.

**Table 7** 6th Grade Treatment Condition Paired Samples t-Test of Reading Achievement

<i>Measure</i>	<i>Fall, 2017</i>		<i>Spring, 2018</i>		<i>n</i>	<i>95% CI for</i>		<i>d</i>	<i>t</i>	<i>df</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		<i>Mean Difference</i>				
Overall Scale										
Score	449.86	66.08	496.21	65.56	29	31.48	61.21	.70	6.38*	28

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Percentile	6.90	9.42	14.48	15.19	29	3.38	11.80	.60	3.69*	28
Vocabulary	456.76	67.83	502.24	75.33	29	25.96	65.01	.63	4.77*	28
Literature	444.24	73.23	489.72	71.22	29	27.06	63.90	.78	5.06*	28
Informational Text	438.03	67.31	491.83	67.29	29	34.36	73.23	.80	5.67*	28

\*  $p < .05$

**Two Sample t-Test**

In order to compare significant differences in treatment and control group means, treatment and control group growth data was calculated for each individual participant on each reading achievement measure (difference in Fall, 2017 and Spring, 2018 performance).

Treatment and control group growth were then evaluated via Student’s t-test for significant differences in their growth.

There was a significant difference in second grade ORF growth between the treatment (M = 47.60, SD = 18.8) and control group (M = 38.08, SD = 20.98). Further, a significant difference was observed between the second grade treatment group’s accuracy growth (M = 27.28%, SD = 13.46%) and the control group (M = 2.72%, M = 5.11%). No other significant differences were observed at second grade. See Table 8.

**Table 8** Comparison of 2nd Grade Reading Achievement Growth

Measure	Control			Treatment			95% Confidence Interval		t	df
	M	SD	n	M	SD	n				
ORF	38.08	20.98	25	47.60	18.8	25	-20.85	1.81	-1.69*	48
Accuracy	2.72%	5.11%	25	27.28%	13.46%	25	-30.35%	-18.77%	-8.53**	48
Overall Scale Score	51.85	22.88	26	54.85	33.36	26	-18.94	12.94	-.38	50
Percentile	18.35	15.65	26	16.19	17.95	26	-7.23	11.53	.46	50
Vocabulary	49.65	38.87	26	53.69	39.19	26	-25.78	17.70	-.37	50

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Literature	52.12	50.72	26	57.58	54.49	26	-34.79	23.86	-.37	50
Informational Text	53.62	41.96	26	58.00	58.32	26	-32.68	23.91	-.31	50

\*  $p < .10$ , \*\*  $p < .05$

At third grade, there was a significant difference in accuracy growth between the treatment (M = 13.03%, SD = 11.61%) and control groups (M = 3.31%, SD = 15.52%). A significant difference was also observed with regard to overall scale score growth between the treatment (M = 42.14, SD = 22.99) and control groups (M = 25.96, SD = 21.35). Significant percentile growth differences were also observed between the treatment (M = 12.04, SD = 13.44) and control groups (M = 5.79, SD = 12.99). Further, a significant difference was observed in informational text score growth between the treatment (M = 49.21, SD = 36.51) and control groups (M = 34.25, SD = 28.12). No other significant differences were observed at third grade.

See Table 9.

**Table 9** Comparison of 3rd Grade Reading Achievement Growth

Measure	Control			Treatment			95% CI for Mean Difference			
	M	SD	n	M	SD	n	Difference	t	df	
ORF	35.52	37.30	29	45.38	29.58	29	-27.57	7.85	-1.12	56
Accuracy	3.31%	15.52%	29	13.03%	11.61%	29	-16.93%	-2.51%	-2.70**	56
Overall Scale Score	25.96	21.35	28	42.14	22.99	28	-28.07	-4.29	-2.73**	54
Percentile	5.79	12.99	28	12.04	13.44	28	-13.33	.83	-1.77*	54
Vocabulary	16.21	30.40	28	26.93	37.81	28	-29.09	7.67	-1.17	54
Literature	29.29	39.81	28	42.14	43.76	28	-35.27	9.56	-1.15	54
Informational Text	34.25	28.12	28	49.21	36.51	28	-32.42	2.49	-1.71*	54

\*  $p < .10$ , \*\*  $p < .05$

The only significant difference observed at fourth grade was with regard to accuracy growth between the treatment ( $M = 7.36\%$ ,  $SD = 5.77\%$ ) and control groups ( $M = .61\%$ ,  $SD = 1.99\%$ ). No other significant differences were observed at fourth grade. See Table 9.

**Table 9** Comparison of 4th Grade Reading Achievement Growth

<i>Measure</i>	<i>Control</i>			<i>Treatment</i>			<i>95% CI for Mean</i>			
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>Difference</i>	<i>t</i>	<i>df</i>	
ORF	35.57	19.90	28	34.68	13.09	28	-8.13	9.92	.20	54
Accuracy	.61%	1.99%	28	7.36%	5.77%	28	-9.06%	-4.43%	-5.85**	54
Overall Scale										
Score	32.40	18.63	30	32.43	29.13	30	-12.67	12.60	-.01	58
Percentile	10.63	12.86	30	7.70	16.48	30	-4.70	10.57	.77	58
Vocabulary	20.43	36.86	30	34.00	29.92	30	-30.92	3.78	-1.57	58
Literature	38.10	37.00	30	34.00	50.36	30	-18.74	26.94	.36	58
Informational										
Text	40.37	27.86	30	46.47	55.91	30	-28.93	16.73	-.53	58

\*  $p < .10$ , \*\*  $p < .05$

A significant difference in overall scale score growth was observed at fifth grade between the treatment ( $M = 31.59$ ,  $SD = 28.58$ ) and control groups ( $M = 15.59$ ,  $SD = 22.63$ ). Further, a significant difference was observed in informational text growth between the treatment ( $M = 32.85$ ,  $SD = 50.71$ ) and control groups ( $M = 10.89$ ,  $SD = 35.03$ ). No other significant differences were observed. See Table 10.

**Table 10** Comparison of 5th Grade Reading Achievement Growth

<i>Measure</i>	<i>Control</i>			<i>Treatment</i>			<i>95% CI for Mean</i>			
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>Difference</i>	<i>t</i>	<i>df</i>	
Overall Scale										
Score	15.59	22.63	27	31.59	28.58	27	-30.08	-1.92	-2.28**	52

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Percentile	2.07	14.95	27	7.11	10.45	27	-12.08	2.01	-1.43	52
Vocabulary	19.70	33.43	27	27.81	39.14	27	-27.99	11.77	-.82	52
Literature	15.44	30.56	27	28.19	42.11	27	-32.83	7.35	-1.27	52
Informational Text	10.89	35.03	27	32.85	50.71	27	-45.76	1.84	-1.85*	52

\*  $p < .10$ , \*\*  $p < .05$

At sixth grade, significant differences were observed in overall scale score, vocabulary, literature, and informational text growth between treatment and control groups. There was no significant difference between the percentile growth of the treatment and control groups. See Table 11.

**Table 11** Comparison of 6th Grade Reading Achievement Growth

<i>Measure</i>	<i>Control</i>			<i>Treatment</i>			<i>95% CI for Mean Difference</i>		<i>t</i>	<i>df</i>
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>				
Overall Scale										
Score	20.34	19.51	29	46.34	39.09	29	-42.25	-9.75	-3.21**	56
Percentile	6.45	10.84	29	7.59	11.07	29	-6.90	4.63	-.40	56
Vocabulary	21.24	39.31	29	45.48	51.34	29	-48.29	-.19	-2.02**	56
Literature	17.31	35.75	29	45.48	48.43	29	-50.56	-5.78	-2.52**	56
Informational Text	23.34	31.18	29	53.79	51.09	29	-52.71	-8.18	-2.74**	56

\*  $p < .10$ , \*\*  $p < .05$

**Discussion**

This study presents findings from a quasi-experiment of the S.P.I.R.E. reading intervention program involving grade two through grade six students from a moderately sized suburban school district in central Ohio. The primary analyses included comparing



improvements in reading achievement for treatment participants, then comparing their reading achievement growth to the growth of the control group on the same set of measures.

Overall, results indicate that the S.P.I.R.E. reading intervention program is an effective program for addressing the needs of struggling readers, which includes students that present with neuroatypical profiles and dyslexia. Specifically, treatment participants demonstrated statistically significant growth on all reading achievement measures post-treatment ( $p < .05$ ). Further, treatment participants demonstrated a range of small to very large effect sizes ( $d = .45$  to  $2.76$ ), with the largest effect sizes being observed on the ORF and accuracy measures of reading achievement and the smallest effect size being observed with regard to percentile. These results are consistent with ORF improvements demonstrated by Torlakovic & Barnum, 2013 and suggest that the S.P.I.R.E. reading program has efficacy with regard to pre- and post-treatment improvements.

Further analysis indicated significant differences between control and treatment group reading achievement growth. While these improvements were varied by grade level, overall results are promising given the profiles of the struggling readers in the present study. Specifically, while S.P.I.R.E. did not always produce growth that was significantly different than the control group, it does appear to enable a struggle reader to growth instep with their typical peers (evidenced by the control group failing to outperform the treatment group's growth). This is remarkable given the neuroatypical and/or dyslexic profiles of the struggling readers in the present study.

### ***Limitations***

The results should be interpreted with caution due to the present study failing to specifically account for the impact of socioeconomic status, race, ethnicity, disability, gender, sex, or transiency. Participants were also not assigned to the treatment condition through a randomized controlled trial process. Further, the present study did not exclude students that had received the S.P.I.R.E. program during the 2016-2017 school year, therefore the impact of prolonged or sustained participation in the S.P.I.R.E. program cannot be ascertained. Finally, another limitation of the present study is the lack of data related to the integrity of implementation.

### ***Implications for Future Research***

Due to the limitations of the present study, additional research should include investigations into the impact S.P.I.R.E. has with regard to sex, gender, race, ethnicity, socioeconomic status, transiency, and disability. Further, future research should examine the impact of receiving the S.P.I.R.E. program on a prolonged (multiple years), sustained (every day), or semi-sustained (every other day) basis, as well as relationships between the integrity of S.P.I.R.E. implementation and student outcomes.

### ***Conclusions***

The primary findings of the present study are encouraging regarding the treatment of struggling readers. In certain grade levels and on certain measures, it was evidenced that struggling readers that received the S.P.I.R.E. program were effectively gap closing and outgrowing their typical peers to a significant degree and in other areas of reading achievement these struggling readers were able to keep pace with their peers rather than continuing to fall behind. These findings provide a sense of hope, optimism, and open a path forward for school

systems to explore when considering how they will best meet the needs of their struggling readers.

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