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## A Mini-Meta-Analysis of the Efficacy of Dialogic Reading on Silent Reading Efficiency and Comprehension in First Graders

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We trained undergraduate student interns to conduct standardized assessments and one-on-one dialogic reading interventions with first graders. The challenges in working in local elementary schools include: small sample sizes, diverse and potentially non-normal samples, and variable testing and intervention conditions. Despite the challenges, we found significant improvements in silent reading efficiency and comprehension and a narrowing of the gap between skilled and non-skilled readers. We report on a mini-meta-analysis of the efficacy of dialogic reading on silent reading comprehension and efficiency, in multiple samples of first graders between 2013 and 2018.

In the United States, only about one-third of fourth graders and one third of eighth graders nationwide are proficient readers, with children from lower socioeconomic status (SES) lagging behind peers from higher socioeconomic backgrounds (Scammacca, Roberts, Vaughn, & Stuebing, 2015). That we are in the midst of a literacy crisis has been well documented. A major goal of the Education Sciences Reform Act of 2002, was to increase the rigor of educational research. Rigorous research designs include valid and reliable measures and interventions, and true experimental designs. Meta-analytic reviews of the efficacy of assessments and interventions for struggling readers reveal significant differences in the efficacy of interventions between studies, which included standardized and norm-referenced measures and those that did not. Specifically, studies that did not include standardized, norm-referenced measures reported inflated identification and intervention success on reading outcomes (Pfof, Hattie, Dörfler, & Artelt, 2014; Scammacca, Roberts, Vaughn, & Stuebing, 2015; Suggate, 2016).

In four previous studies we investigated the efficacy of a Dialogic Reading intervention for improving reading efficiency and comprehension of at-risk first graders, from different classrooms. Some of the children identified as struggling readers by the school received small-

group instruction. We previously reported that the effects of dialogic reading intervention were unique to the intervention and did not interact with school-based RTI or other interventions (Durwin, Carroll, & Moore, 2016). We hypothesized that children who received the Dialogic Reading intervention would show significant gains in reading efficiency and comprehension, narrowing the performance gap between children who were previously deficient in these skills and typically-achieving children who scored at grade level, post-intervention.

### Method

**Participants:** The characteristics of the participants assigned to the control and intervention groups for each separate study year are summarized in Table 1.

Table 1: Participant Characteristics

Study / Academic Year	13-14	14-15	16-17	17-18
Mean Age at First Test	6.79	6.58	6.52	6.41
Age S.D.	0.33	0.32	0.51	0.39
N Control	25	21	11	22
N Intervention	6	9	13	7
Average # of Minutes of intervention	59.83	121.78	146.31	103.69

### Procedure

**Assessment:** The first graders were pre-tested on the Test of Silent Reading Efficiency and Comprehension (TOSREC) in October of each school year, and post-tested in May. This 3-minute grade-leveled, standardized comprehension test was administered as part of a larger

battery of standardized tests (including the Test of Word Reading Efficiency (TOWRE), and the Word Test 3).

Intervention: Based on the pre-test scores, and consultation with teachers and principals, children scoring lowest on the TOSREC were chosen to receive Dialogic Reading Intervention. Dialogic Reading is a shared-book technique in which adults stop frequently to ask open-ended questions. Our reading intervention technique follows directly from our EMPOWERED (Durwin, Carroll, & Moore, 2016) acronym:

**E**ncourage Vocabulary;

**M**ake it Fun:

**P**rompt Frequently;

ask **O**pen-ended Questions;

**W**H- questions;

**E**xpand on Utterances;

**R**epetition of Utterances;

**E**valuate Responses by providing feedback;

and include **D**istancing Questions.

Trained undergraduate Research Assistants read with each child, one-on-one for 10-minute sessions twice per week. The average number of intervention minutes per study ranged from 59.83 to 103.69 minutes. Intervention protocol fidelity was recorded at each session. Standard sets of books were used and the number of books read per child was recorded.

## Results

Descriptive Statistics: Table 2 contains the pretest and post-test Mean and SD TOSREC standard scores for the Control Groups and Dialogic Reading Intervention Groups, for each study. Note: the effect of interest is the Time X Group Interaction. The Mean pre-test and post-test TOSREC scores for the Intervention Groups are highlighted. Standard TOSREC scores between 90 and 110 are considered average.

Table 2: Mean and Standard Deviation TOSREC Scores by Group and Study

Study	Group	Pre-test		Post-test	
		Mean	SD	Mean	SD
13-14	Control	96.440	14.125	95.480	14.263
	Intervention	77.830	6.911	83.830	8.976
14-15	Control	99.000	18.434	102.670	12.051
	Intervention	80.000	0.000	91.560	9.515
16-17	Control	118.360	12.971	114.000	22.280
	Intervention	83.770	4.246	85.080	9.447
17-18	Control	108.410	13.637	104.320	10.825
	Intervention	84.140	3.338	92.290	12.257

Meta-Analytic Procedures: Since the Time X Intervention Group Interaction effect was the effect of interest, the following formula was used to compute effect size (d):

$$d = \frac{(\Delta_{\text{Control}}) - (\Delta_{\text{Intervention}})}{\sigma}$$

Where:

$$\Delta C = (\mu_{\text{control\_time\_2}}) - (\mu_{\text{control\_time\_1}})$$

$$\Delta I = (\mu_{\text{intervention\_time\_2}}) - (\mu_{\text{intervention\_time\_1}})$$

$\sigma$  = (weighted pooled standard deviation at time 1)

The interaction effect sizes ranged from 0.16 to 0.90. The average effect size across the 4 studies is 0.564 which is considered a moderate effect size.

## Discussion

The intervention narrowed the performance gap on a standardized test of reading efficiency and comprehension (TOSREC) between children who were previously deficient in these skills and children who scored at grade level, post-intervention. Although the intervention was relatively constant across studies, there were differences in baseline scores, sample sizes, and intervention times. Therefore, the meta-analytic technique employed is a more conservative and appropriate method for determining the efficacy of the Dialogic Reading Intervention. The effect size was moderate in 3 of the 4 studies. Despite the challenges, significant improvements in silent reading efficiency and comprehension and a narrowing of the gap between skilled and non-skilled readers was supported.

There are three major challenges to studying the efficacy of early reading interventions in schools: lack of standardized assessment; variability in identification for intervention and types of school intervention; lack of comparison to typical readers at the end of the assessment period. We have previously reported (Durwin, Carroll, & Moore, 2016) that students chosen for dialogic reading intervention were the lowest performing students, even lower than school-intervention only groups. Although students in our Dialogic Reading intervention groups were the poorest performing at the beginning of first grade, their post-test standard scores were higher than school-intervention only groups. Students receiving Dialogic Reading intervention showed the narrowest gap with typically-achieving students at post-testing.

As can be seen in Table 2, intervention students in all 4 studies had pre-test TOSREC scores that were two or more SD below grade-level peers. After only 108 minutes on average of one-on-one dialogic reading, intervention students showed significant improvements and a narrowing of the gap with typically-achieving students. In two of the four cohorts, the children receiving the intervention performed in the average range at post-testing. The findings suggest that a free, individual intervention delivered over a few weeks can significantly improve students' reading comprehension.

## References

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