

Maximising access to reading intervention: comparing small group and one-to-one protocols of Reading Rescue

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Reading Rescue (Reading Rescue), a research and evidence-based programme for struggling readers (Ehri et al. 2007; Miles et al. 2018), was developed by an academic in response to the cost and lack of explicit letter, phonemic awareness and phonics instruction in Reading Recovery. Reading Rescue represents a pathway from research to practice. An academic advisor works closely with the nonacademic partner that trains school staff to deliver the programme in order to maintain alignment of the curriculum with research from the reading science field. In this study, the academic and nonacademic partner evaluated the effectiveness of small-group delivery of Reading Rescue, which has previously only been evaluated in a one-to-one delivery mode. This study therefore provides an illustration of how academics and practitioners can work together to achieve practical outcomes. This study compared the performance of two cohorts ($N = 146; 104$) of randomly assigned first-graders who received 50 sessions of Reading Rescue in a one-to-one or a small group setting compared with a control group. Results showed that intervention groups outperformed the control group (for most associations, $p < .05$) and performed similarly to each other (for most associations, $p > .05$), suggesting the small group protocol is as effective as one-to-one, enabling the programme to serve substantially more students. Discussion focuses on the importance of collaboration between academics and practitioners in expanding the reach of evidence-based programmes. The collaboration in this study serves as a model for how academics, and practitioners can join forces and leverage their expertise to reach more students.

Keywords: tutoring, early literacy intervention, struggling readers

Highlights

What is already known about this topic

- A need for strong academic–nonacademic partnerships is essential for translating science of reading findings into effective and manageable instructional approaches (Seidenberg et al., 2020; Solari et al., 2020)
- Ehri et al. (2007) demonstrated that students who received Reading Rescue outperformed students who received an alternative intervention, as well students in the control group. Also, Miles et al. (2018) found that Reading Rescue continued to be effective even after the programme had expanded substantially across a large metropolitan area.
- The National Reading Panel (2000) and other studies have demonstrated that depending on the format, small group instruction has the potential to be just as effective, if not more effective, for students learning certain foundational skills, but other reviews of the research (Neitzel et al., 2021) have suggested that small group instruction is either not as effective or less effective than individual instruction. More research is needed directly comparing two versions of the same programme.

What this paper adds

- This paper examines whether the small group version of the programme, designed and implemented with strong academic oversight, is as effective as the one-to-one version of the programme.
- This paper demonstrates that a strong partnership between academics and nonacademics can be mutually beneficial, resulting in expanded reach of evidence-based programmes.
- An explanation of the roles, traits and contributions that academics, non academics and stakeholders played in this study may serve to guide future partnerships.

Implications for theory, policy or practice

- This collaboration serves as an illustration of how to best leverage academic and practitioner skills to create, adjust and evaluate programmes to reach more students.
- This study also serves as a guide for how policy makers and administrators can engage with academics and literacy programmes to provide resources, guidance and opportunities to do more with evidence-based programmes.

Teaching children to read in the early grades is an essential obligation of our educational institutions. It enables students to make academic progress in subsequent grades, where word decoding and reading comprehension skills are presumed. However, the record of success in elementary schools in the United States is disappointing. Average scores of fourth graders on the National Assessment of Educational Progress (NAEP) test fall well below a proficiency level (NCES, 2018). Admittedly, learning to read in English is not as easy and takes longer than in more orthographically transparent languages (Seymour et al., 2003). As a result, more students are likely to fall behind their peers, so there is greater need for more intensive forms of instruction that rescue these students. Identifying and treating struggling readers as early as possible have been shown to improve the effectiveness of instructional programmes to prevent or remediate reading difficulties (Vellutino et al., 1996).

A major issue that has arisen is the chasm between research on reading development and intervention, and the practices that are actually implemented in schools (Kilpatrick, 2015; Seidenberg et al., 2020; Solari et al., 2020). Researchers in reading science have applied experimental methods to advance our knowledge about how children learn to read; however, not enough of this research has been translated into practice to impact U.S. students' reading achievement as evidenced by the NAEP scores mentioned above (NCES, 2018). Seidenberg et al. (2020) explain that much information is lost in the complex process of translating research findings into effective instructional approaches. Academic researchers investigating early literacy need to extend themselves outside of universities and into collaborative efforts to align instructional programmes with the science of reading. In fact, Solari et al. (2020) explain that applied reading scientists can serve as agents of change by translating basic research findings and troubleshooting implementation roadblocks with practitioners. These collaborative efforts can help to bridge the research-to-practice divide.

The current study showcases the use of one such academic-programmatic partnership, where the goal was to determine whether tutoring small groups of struggling first graders is as effective as tutoring individual students using this model. Thus, this article has two aims: (1) provide an illustration of an effective partnership between academics and nonacademics and (2) evaluate the effectiveness of a small group version of the programme that emerged from the partnership.

Tutoring for struggling readers

Tutoring is a common approach to support students who are falling behind. Neitzel et al. (2021) explain that not just any tutoring will do, however. Moving the needle for struggling readers requires carefully-designed curricula informed by research and evidence-based programmes. According to the National Reading Panel (2000), there are five instructional ingredients that enable children to become skilled readers: phonemic awareness, systematic phonics, fluency, vocabulary and reading comprehension. In particular, to establish foundational skills in the early grades, it is essential that students receive explicit systematic instruction in phonemic awareness and phonics. These skills enable beginners to learn how the writing system maps onto spoken language (Ehri, 1992; Perfetti & Hart, 2002; Share, 2008).

Phonemic awareness instruction teaches children to analyse spoken words into their smallest sounds or phonemes (Ehri et al., 2001b; Scarborough & Brady, 2002). Phonics instruction teaches children how individual letters or graphemes represent sounds or

phonemes in words (Ehri, 2020; Ehri et al., 2001a). A scope and sequence plan ensures that the major grapheme-phoneme relations are taught. Also, phonics teaches children how to apply their grapheme-phoneme knowledge to decode words. Decoding skill serves two functions. It enables students to read unfamiliar words by sounding out letters and blending the sounds to form recognisable words never read before (Gonzalez-Frey & Ehri, 2020), and it enables students to remember how to read words once the words have been decoded and become familiar (Ehri, 2014). This happens when readers form connections between graphemes in individual written words and phonemes in their spoken forms. With practice, the spellings become bonded to pronunciations of the words and are stored in memory (LaBerge & Samuels, 1974). They no longer have to be decoded letter by letter. This enables readers to focus their attention on the meanings of text and to become fluent in their reading.

One-to-one versus small group tutoring

Research suggests that effective tutoring programmes should contain these essential ingredients, but there is less research to guide decisions about different delivery methods. It has been assumed that effective tutoring should be conducted one-on-one. This enables instructors to provide individualised feedback and gives students more opportunities to demonstrate what they know (e.g., Elbaum et al., 2000a; Vaughn et al., 2003). Indeed, there is good evidence for the effectiveness of one-on-one supplemental reading interventions (e.g., Elbaum et al., 2000a; Duff et al., 2008; McArthur et al., 2015; Neitzel et al., 2021). Unfortunately, however, one-on-one delivery is resource intensive, which means that in practice, access to such intervention is limited, and it is challenging to implement. Small group intervention is a promising alternative, as it allows for a favourable student-to-instructor ratio, but is less expensive and allows more students' needs to be served simultaneously. Small group instruction may also allow for the fostering of positive social dynamics, which may facilitate cooperation and support between group members (e.g., Iversen et al., 2005).

There is evidence to suggest that small-group reading instruction can be effective (e.g., National Reading Panel, 2000; Elbaum et al., 2000b; Rashotte et al., 2001; Hatcher et al., 2006). Syntheses of reading instruction and intervention research have compared the effect sizes of studies using one-on-one intervention with those using small group delivery. In the National Reading Panel (2000) report, no differences in effect size were found between phonics studies using one-on-one tutoring, those using small group instruction, and those using classroom instruction, although the effect size was largest for one-on-one instruction. The report did, however, find that small group instruction was more effective than both one-on-one and classroom instruction for teaching phonemic awareness.

In contrast, other studies have suggested that struggling readers do not benefit as much from small group instruction as they do from one-to-one tutoring. Specifically, another review (Slavin et al., 2011) found that phonics-based one-on-one instruction produced larger effect sizes ($ES + 0.69$) compared with a control group than small group phonics-based intervention produced ($ES + .31$). In a follow-up review, Neitzel et al. (2021) replicated these findings. Effect sizes of one-to-one instruction ($ES + 0.41$) were larger than those of small group interventions ($ES + 0.24$), although both were statistically significant compared with their control groups.

Finally, Galuschka et al. (2014) conducted a meta-analysis of interventions for children and adults with reading difficulties, which included diverse instructional methods such as phonics, phonemic awareness and motor exercises. They found no significant difference in effect sizes between one-on-one and group interventions.

Thus, findings comparing small group and one-on-one instruction are mixed. To date, however, only a very small number of studies have directly compared the effectiveness of one-on-one and small group delivery within the same study, using the same reading intervention method. A study by Vaughn et al. (2003) was the first to do so. In this study, 77 struggling readers in Grade 2 received reading instruction which included phonological awareness, word study, fluency practice and comprehension strategies. Vaughn et al. compared three different grouping formats – one-on-one, three students per group (small group) and 10 students per group (large group). One-on-one instruction was more effective than large group instruction for measures of phoneme segmentation, fluency and comprehension, but there were no significant differences between one-on-one and small group instruction. However, children in this study were not randomly assigned to groups and there was no untreated control group.

A second study (Iversen et al., 2005) compared the effectiveness of a modified version of Reading Recovery (involving the addition of instruction in phonological awareness and word analysis skills) when delivered one-on-one and in pairs. The two forms of delivery did not differ significantly although children's scores were somewhat higher in the pairs condition. However, once again, children were not randomly assigned, and there was no untreated control group. In sum, existing research is sparse, and randomised assignment designs have not been implemented to compare individual and small group instruction.

Reading Rescue

This study focused on Reading Rescue, a 30-minute per day, one-to-one intervention for struggling first grade readers. Reading Rescue was developed in 1993 by Dr. Nora Lee Hoover, a professor of literacy at the University of Florida, as a response to Reading Recovery, which required only certified experienced teachers to be trained in the programme, was costly for schools, and lacked explicit, systematic phonics instruction. Hoover's programme included phonemic awareness and systematic phonics instruction and was delivered mostly by paraprofessionals, teacher assistants and other uncertified school staff to individual struggling readers.

At the time this study was conducted (fall 2018-spring 2020), Reading Rescue was implemented in 100–140 high-needs schools per year in New York City by a nonprofit organisation, Literacy Trust, whose staff provided professional development, coaching and additional support to Reading Rescue tutors throughout the school year. The organisation worked closely with the Academic Advisor for Reading Rescue, the first author, who oversees the instructional and professional development curricula and guides research initiatives. This researcher-to-practitioner relationship enabled the programme to be updated and evaluated by academics and then delivered by practitioners.

Research has been conducted over the years on the one-on-one version of Reading Rescue. A randomised evaluation study (Muller, 2004) and a quasi-randomised study (Ehri et al., 2007) have been conducted on Grade 1 students in New York City elementary schools. The effect sizes were +0.33 on the Gates–MacGinitie Reading Test (GMRT) in the randomised study, and +.70 compared with an alternative small group intervention

and +0.74, compared with a control group (both also on the GMRT4) in the quasi-randomised study. In a correlational study, Miles et al. (2018) found that the programme continued to be effective in supporting struggling first grade readers in reaching grade level benchmarks.

Up to the advent of the current study, the programme had only been offered as a one-to-one intervention where instructors meet with a student five times a week or as often as possible. The 30-minute lessons include fluency building where the student practices reading familiar books, a running record where the child reads without support, phonics instruction, sentence writing and support reading a new book. Running record miscues are only analysed for grapheme–phoneme errors to inform instruction in phonics and writing. Embedded throughout the lesson are prompts for decoding that emphasise grapheme–phoneme relationships and prompts for comprehension that include book conversations, three types of questions and modelling think aloud. Standardised assessments are given preintervention and postintervention and progress monitoring is used monthly.

While the one-to-one protocol had been shown to be effective as evidenced by the research earlier, it was of interest to see if more students could be supported through a small group version of the intervention, which would expand the reach of the programme and make it even more cost effective. Therefore, the academic advisor worked closely with the nonprofit to develop a small group protocol. The result was a format that mirrors the one-to-one programme almost identically and makes accommodations for three children in the group to choral read when reading aloud or read independently in whisper phones in order to equate the amount of time children are reading out loud.

Rationale and hypotheses

To increase the reach of the programme, a small group version of the protocol for Reading Rescue was developed in partnership by the academic advisor and the nonprofit practitioners. This collaboration attempted to address the commonly occurring implementation gap in education (Kilpatrick, 2015; Seidenberg et al., 2020; Solari et al., 2020). As Cook et al. (2019) explain, when schools are left to adopt a research-based programme, issues of fidelity and sustainability arise. Frameworks exist to guide best practices for collaboration in academic–nonacademic partnerships in order to address this implementation gap (Pfadenhauer et al., 2017; Roach et al. 2009; Solari et al., 2020). For example, Hall and Hord (2006) describe six essential strategies for an effective partnership, which include clarifying a shared vision, sufficient resource planning and allocation, ongoing professional learning for nonacademics, regular check-in on implementation progress, continuous assistance and facilitating an overall context of supportive change.

Therefore, in this article, we describe the results of a trial that was conducted to examine whether a small group (three students per group) version of the Reading Rescue programme was as effective as the one-on-one version. We provide details on the nature of the researcher–practitioner collaboration and discuss the study’s results with reference to the strategies for effective partnership. The research questions were

- Will students in the two Reading Rescue intervention groups outperform students in the control/business as usual group on outcome measures of early literacy?
- Will students in the small group version of Reading Rescue perform as well as students in the one-on-one version on early literacy outcome measures?

We hypothesized that students in the small group and one-on-one versions of the intervention would perform significantly better on measures of early literacy skills than students in the business-as-usual control group, and that students in the small group and one-to-one version would perform equally well.

Methods

Research design

This was a randomised control trial design. Students who qualified for the intervention were randomly assigned to one of three conditions: one-to-one, small group and control/business as usual. For the first cohort, stratified random assignment was used based on student reading level data provided by the school such that each condition was composed of students with a range of baseline reading abilities. The second cohort was randomly assigned, regardless of reading level data, to each of the conditions.

Participants

The first round of data collection (Cohort 1) happened during mid-fall to late winter of the 2018–2019 school year. Ten schools in New York City that had at least 2 years of experience using Reading Rescue were included in the study. Principals agreed to have their school participate, and consent and assent were obtained from all families and students who participated.

At each of these schools, tutors who had used the one-on-one protocol for at least 2 years served as the small group instructors. In addition, other veteran or new instructors at the school provided tutoring for the students assigned to the one-to-one condition. Students in the control group received business as usual, and at the end of the study, they received either one-to-one or small group instruction based on availability of the tutors and the needs of the child. As far as the researcher and nonprofit were made aware, students in the control group were not offered any additional intervention or instruction beyond typical classroom activities. The business as usual classrooms provided whole and small group literacy instruction for 90 minutes a day using a programme that addressed word reading skills, fluency, comprehension and writing. All schools were using levelled readers as part of their literacy instruction; in addition, schools used some curriculum combination of Foundations, ReadyGen, and/or Teachers College Reading and Writing Project. Information was not collected on the extent of word reading skill instruction or type of comprehension support provided, but it can be assumed that this instruction varied across schools.

Lists of students stratified by reading level were randomly assigned to one of the three conditions. Students in the one-to-one and small group intervention were tutored five times a week. All preassessment data were collected within the first three sessions and all post assessment data were collected on the 50th session regardless of whether the student was continuing with the programme after that session.

The second round of data collection (Cohort 2) took place in mid-fall to late winter of the 2019–2020 school year. Eight of the 10 schools in Cohort 1 participated in Cohort 2. In this second year, a fully random assignment approach was used to assign individuals from lists of students who were at least two reading levels behind grade-level expectations to one of the three conditions. Again, at the end of the study, students in the control group received

either one-to-one or small group instruction based on availability of the tutors and the needs of the child. All preassessment data were collected within the first three sessions, and all post-assessment data were collected on the last, roughly the 50th, session.

Demographic data were not collected on the students, but descriptive information on the schools was available. For Cohort 1, 161 students were randomly assigned. Due to scheduling conflicts, low attendance or data inaccuracies, 146 students were included in the analysis sample: 56 in the control, 39 in one-to-one, and 51 in the small group across 10 schools. On average, schools in Cohort 1 had 84.49% of students qualify for free/reduced lunch ($SD = 19.0$, range 37–98%). Schools' average English Language Arts proficiency level on the 3rd grade state test was wide ranging from 16 to 64% ($M = 36.66\%$, $SD = 19.23$), and they differed in the per cent of English Language Learners (ELLs) in each school ranging from 2% to 34% ($M = 18.03$, $SD = 11.24$). Similarly, schools varied in the per cent of students with Individualised Education Plans (IEPs) ranging from 19% to 37% ($M = 26.75$, $SD = 5.11$).

For Cohort 2, 136 students were randomly assigned. Due to an entire school dropping out because of a sick school programme coordinator, attendance issues and the fact that the programme ended in March at almost the exact same time that the COVID-19 pandemic hit NYC, there were 104 students with complete data to include in the analysis: 35 students in the control group, 24 students in one-to-one and 45 in the small group distributed across 8 schools. On average schools in Cohort 2 had 82.87% students qualify for free/reduced lunch ($SD = 19.51$) with a range of 31–95%. Schools' average English Language Arts proficiency level on the 3rd grade state test was wide ranging from 5% to 77% ($M = 42.85\%$, $SD = 23.33$), and they differed in the per cent of ELLs in each school ranging from 1% to 32% ($M = 15.65$, $SD = 10.14$). Similarly, schools varied in the per cent of students with IEPs ranging from 21% to 33% ($M = 26.65$, $SD = 4.87$).

Materials and procedures

Collaboration. The roles, traits, and contributions of the three groups in this collaboration are summarised in Figure 1. The relationship began by having the academic advisor immerse herself in the one-to-one programme for 8 months. She sat in on the professional development sessions facilitated by the organisation, observed instruction by the tutors in the field, and studied the curriculum and all materials that supported the implementation of the programme.

She then worked closely with the executive director of the not-for-profit organisation. The initial conversations focused on the need for an additional version of the programme and whether there was enough capacity at the organisation to support such an effort. From there, the executive director and the academic advisor met with stakeholders. These stakeholders included funders, administrative leaders at the Department of Education who knew the programme well, and principals at schools that used the programme. Feedback from these meetings informed next steps. Funders emphasised the need for a reasonable cost per student implementation. Administrators at the Department of Education central offices emphasised the importance of academic oversight of the programme and the desire to closely align the new protocol to the one-to-one programme. School principals emphasised the need for efficient training of the small group programme for tutors. This step of the process proved to be very effective in generating the interest and support which sustained stakeholder buy-in over the course of the 2 years.

COMPARING SMALL GROUP AND ONE-TO-ONE PROTOCOLS

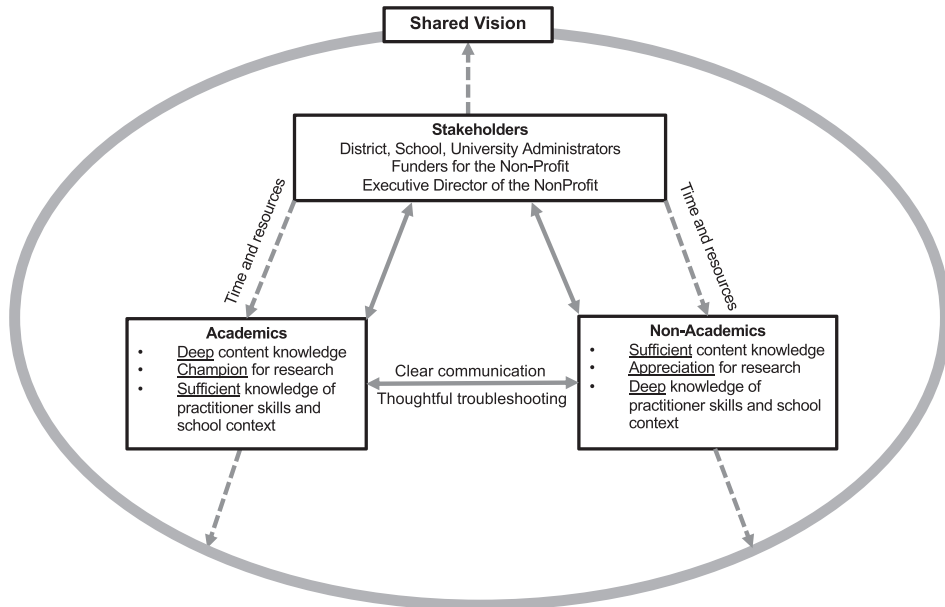


Figure 1. Roles, traits and contributions of the academic–nonacademic collaboration.

After numerous meetings with stakeholders, the executive director and the academic advisor developed a framework and timeline for the project. This was brought back to stakeholders to keep them engaged in the process. As part of this step, the academic advisor and executive director agreed on a shared set of expectations regarding the role each party would play in development and research.

From here an experienced staff member was assigned as the point person for the project. The academic advisor and staff member met weekly over the course of a month to develop the protocol for the small group intervention by aligning it as closely as possible to the one-to-one version of the programme. The academic advisor presented the reasoning for keeping the protocols so closely aligned based on research and stakeholder requests. The staff member was tasked with developing the documents and materials needed to support instructors in implementing the programme. The weekly meetings provided the necessary time to review and revise the documents and materials together and collaboratively work on a short professional development training for small group instructors.

The academic advisor and staff member agreed on a 2-month pilot implementation. This provided invaluable insights into adjustments that needed to be made. The academic advisor also spent time training the staff member on basic research–design methods, including having the staff member and her manager receive their research compliance certificates. After the first cohort of students went through the programme, results were analysed and then shared with the staff members, executive director and boards of the not-for-profit and funder. The academic advisor emphasised the need to replicate these findings and therefore, with support from all parties, a second round of data collection was executed.

Materials for intervention. Both small group and one-to one instructors received kits that included a binder of the curriculum, tool-kit, box of magnetic letters, white board, dry erase markers, timer, and laminated practice mat (double decker Elkonin boxes) with chips.

Also, each school received a set of levelled texts. These books were chosen by the programme for their pairing of fiction and nonfiction texts, interesting content and decodability ratings for each level. They were not decodable readers, but the publisher considered the percentage of words that are decodable based on the phonics concepts that are likely to be taught prior to and at each level.

Intervention. During the first three sessions, students were eased into the programme through a series of fun activities such as reading a book together, making words they know with magnetic letters and drawing a picture and then writing a sentence about it. Then tutoring began using the lesson protocol which consisted of five parts: fluency practice, assessment, phonics, writing and introducing a new book. The patterns of word reading errors that arise during the daily assessment determine the phonics instruction in Part 3 and encoding instruction in Part 4. The phonetics element chart (i.e., scope and sequence), the choice of five different research-based phonics activities and the instruction sheets that support the activities provide strong systematic and explicit grapheme–phoneme instruction during the lessons.

Reading Rescue trains instructors in using decoding prompts that emphasise letter-sound relationships in words. These prompts are used throughout the lesson whenever the student is reading aloud. Also, the programme addresses comprehension throughout the lesson by using book conversation to increase oral language, activate background knowledge and make meaningful connections; by asking three types of questions: literal, inferential and evaluative; and by modelling the use of think aloud. The overarching goal of the comprehension prompts/approaches are to activate and build background knowledge, probe understanding, and model what proficient readers do to monitor their thinking while reading.

The small group version of the intervention modelled the one-to-one protocol almost identically. However, whenever students were reading aloud in Part 1: Fluency, and Part 5: New Book, students chorally read instead of reading independently. Also, only one student in the group was assessed each day during Part 2: Assessment, so during that time the other two group members read the passage into a whisper phone (i.e., a pretend telephone that magnifies the sound in their own ear to eliminate distraction from the other readers).

Measures

Acadience/DIBELS Next Assessments (Acadience Reading K–6, 2020) were used as the preassessment and postassessment measures. All assessments were administered for 1 minute, and scored by the students' tutor based on the test's protocols. Phoneme Segmentation Fluency measured students' ability to identify all of the sounds in words. Students were scored on the number of sounds they identified in each word. Nonword Fluency measured students' ability to read consonant-vowel-consonant nonwords. Students were scored on their ability to identify the correct letter-sound relationship in each word (NWF-CLS), and their ability to read each whole word (NWF-WWR).

Oral reading fluency was measured by having students read a passage for 1 minute. Oral reading fluency words correct (ORF-WC) was the total number of words read. Accuracy rate (ORF-Acc) was calculated by using the following equation: $100 \times (\text{Words Correct} / (\text{Words Correct} + \text{Errors}))$. A composite score was also calculated for each student. The composite score at the beginning of the year consisted of letter name fluency, phoneme segmentation fluency, and nonword fluency correct letter sound. The composite score at the

end of the intervention was based on the Acadience/DIBELSNext middle of the year composite which included nonword fluency correct letter sound, nonword fluency whole words read, oral reading fluency words correct and oral reading fluency accuracy per cent.

Results

Descriptives and baseline measures

We first examined correlations between all study measures for Cohort 1 and Cohort 2 (Tables 1 and 2). Demographic covariates demonstrated inconsistent bivariate relationships with baseline and outcome measures across cohorts, and therefore, all were included in regression models testing programme impact on early literacy outcomes. We also tested whether any significant differences existed between groups on covariates or baseline measures of early literacy. There were no significant differences between groups on covariates on nearly all baseline measures, except for Nonsense Word Fluency in Cohort 2 (Tables 3 and 4).

Impact of Reading Rescue programme participation on early literacy outcomes

We next examined the impact of Reading Rescue programme participation on early literacy outcomes in regression analyses adjusting for demographic covariates and baseline performance on the relevant literacy measure, addressing our first research question regarding whether Reading Rescue was associated with greater gains in skills for programme students compared with control group students. We present results from these analyses first detailing findings for Cohort 1 followed by findings for Cohort 2.

Cohort 1. For Cohort 1, programme participation was for the most part significantly related to early literacy skill development across measures, with students in the one-to-one group outperforming control students on 4 out of 6 outcome measures, and students in the small group outperforming control students on 5 out of 6 outcome measures (Table 5). Effect sizes for the impact of Reading Rescue participation on early literacy outcomes for Cohort 1 ranged from d 's of .41 to .46 for one-to-one group participation and d 's of .32 to .70 for small group participation.

Cohort 2. Similar patterns were demonstrated for Cohort 2 outcomes. Reading Rescue programme participation was again, for the most part, significantly related to early literacy skill development, with students in the one-to-one group outperforming control students on 3 out of 6 outcome measures, and students in the small group outperforming control students on 5 out of 6 outcome measures (Table 6). Significant impacts on the Phoneme Segmentation Fluency outcome variable were not evidenced for either programme group in Cohort 2, but small group students otherwise outperformed control group students on all other outcome measures. Effect sizes ranged from d 's of .70 to .85 for one-to-one group participation and d 's of .38 to .96 for small group participation.

Table 1. Means, standard deviations and correlations between all study variables for Cohort 1.

Variables	M (SD)	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 Free/Reduced Lunch %	84.49 (19.03)	.23**	-.18*	-.46**	-.11	-.10	.05	-.20*	-.19*	-.14	.05	-.04	.03	-.14	.05	-.04
2 Enrolment	567.54 (171.51)		-.12	-.12	-.26**	-.24**	-.26**	-.03	-.18*	-.27**	-.23**	-.17*	-.18*	-.02	-.08	-.18*
3 Attendance	92.97 (2.45)			.74***	-.28**	-.24**	-.27**	-.21*	-.15	-.27**	-.21*	-.20*	-.18*	-.03	-.12	-.14
4 ELA Proficiency	36.66 (19.23)				-.10	-.14	-.17*	.10	.07	-.11	-.26**	-.16	-.15	.17*	-.10	-.03
5 Phoneme Segmentation Pre	23.88 (14.49)					.47***	.46***	.35***	.32***	.74***	.52***	.43***	.33***	.36***	.18*	.43***
6 NW Fluency CLS Pre	25.14 (17.57)						.74***	.47***	.69***	.87***	.28**	.60***	.43***	.46***	.56***	.66***
7 NW Fluency WWR Pre	4.35 (6.03)							.36***	.58***	.67***	.18*	.49***	.49***	.39***	.48***	.58***
8 Oral Reading Fluency Acc Pre	52.44 (26.82)								.67***	.55***	.09	.39***	.37***	.69***	.40***	.59***
9 Oral Reading Fluency WC Pre	15.66 (13.50)									.66***	.12	.37***	.30***	.42***	.63***	.59***
10 DIEBLS Composite Score Pre	92.48 (37.43)										.42***	.60***	.50***	.52***	.46***	.66***

(Continues)

COMPARING SMALL GROUP AND ONE-TO-ONE PROTOCOLS

Table 1. (Continued)

Variables	M (SD)	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
11 Phoneme Segmentation Pst	40.32 (16.92)											.37***	.32***	.12	.21**	.32***
12 NW Fluency CLS Pst	39.98 (20.72)											.83***	.46***	.58***	.83***	.83***
13 NW Fluency WWR Pst	9.55 (8.31)												.45***	.54***	.80***	.80***
14 Oral Reading Fluency Acc Pst	70.04 (24.46)													.40***	.74***	.74***
15 Oral Reading Fluency WC Pst	30.12 (19.57)															.81***
16 DIEBLS Composite Score Pst	128.32 (67.38)															1

Note.

* $p < .10$.

** $p < .05$.

*** $p < .01$.

**** $p < .001$.

Table 2. Means, standard deviations and correlations between all study variables for Cohort 2.

Variables	M (SD)	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 Free/Reduced Lunch %	82.88 (19.51)	.29**	-.42**	-.39**	-.24*	-.06	-.05	-.22*	-.27*	-.17	-.17	-.06	-.11	-.12	-.10	-.10
2 Enrolment	599.37 (198.31)		-.14	-.01	-.17	-.18	-.11	-.01	-.20*	-.16	-.03	-.20*	-.11	-.04	-.12	-.13
3 Attendance	92.17 (2.55)			.70***	.08	-.02	-.12	.24*	.26**	.05	.05	-.05	-.02	.05	.04	.01
4 ELA Proficiency	42.85 (23.33)				-.08	-.12	-.13	.09	.13	-.03	-.20*	-.26**	-.22*	-.10	-.05	-.20*
5 Phoneme Segmentation Pre	35.57 (15.37)					.35***	.13	.23*	.25*	.65***	.61***	.33**	.30**	.21*	.22*	.29**
6 NW Fluency CLS Pre	28.21 (15.75)						.75***	.38***	.46***	.81***	.27**	.62***	.48***	.24*	.52***	.54***
7 NW Fluency WWR Pre	3.28 (5.50)							.30**	.38***	.51***	.11	.54***	.52***	.25*	.46***	.50***
8 Oral Reading Fluency Acc Pre	54.98 (25.37)								.73***	.47***	.07	.36***	.35**	.39***	.45***	.47***
9 Oral Reading Fluency WC Pre	14.33 (11.71)								.49***	.15	.40***	.40***	.37***	.42***	.55***	.53***
10 DIEBLS Composite Score Pre	103.90 (35.24)									.44***	.57***	.45***	.39***	.39***	.54***	.57***
11 Phoneme Segmentation Pst	46.59 (14.83)											.34***	.35***	.31**	.16	.33**

(Continues)

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Table 2. (Continued)

Variables	M (SD)	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
12 NW Fluency CLS Pst	46.96 (21.21)												.88***	.42***	.66***	.84***
13 NW Fluency WWR Pst	11.03 (9.24)													.53***	.61***	.84***
14 Oral Reading Fluency Acc Pst	79.29 (16.12)														.64***	.79***
15 Oral Reading Fluency WC Pst	31.92 (18.73)															.88***
16 DIEBLS Composite Score Pst	149.95 (64.64)															1.00

* $p < .10$.

** $p < .05$.

*** $p < .01$.

**** $p < .001$.

Table 3. One-way ANOVA's on covariates and baseline measures by intervention group for Cohort 1.

	Control group (<i>N</i> = 56)		1-to-1 group (<i>N</i> = 39)		Small group (<i>N</i> = 51)		<i>F</i> (1, 79)
	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	
Free/Reduced Lunch %	84.00	(19.13)	82.77	(20.19)	86.33	(18.22)	0.41
Enrolment	557.82	(175.38)	620.21	(162.24)	537.94	(168.24)	2.75
Attendance	92.75	(2.41)	93.44	(2.44)	92.84	(2.49)	1.00
ELA Proficiency	35.39	(19.05)	40.36	(20.73)	35.24	(18.24)	0.98
Phoneme Segmentation Pre	21.00	(14.86)	23.13	(12.61)	27.61	(14.87)	2.92
NW Fluency CLS Pre	24.57	(16.63)	23.92	(16.19)	26.71	(19.69)	0.32
NW Fluency WWR Pre	3.89	(5.82)	3.54	(4.12)	5.47	(7.29)	1.40
Oral Reading Fluency Acc Pre	55.82	(25.11)	55.33	(24.30)	46.51	(29.81)	1.94
Oral Reading Fluency WC Pre	16.29	(14.81)	15.87	(10.87)	14.80	(14.00)	0.17
DIEBLS Composite Score Pre	88.39	(40.57)	91.26	(30.46)	97.88	(38.59)	0.88

+ *p* < .10.* *p* < .05.** *p* < .01.*** *p* < .001.**Table 4.** One-way ANOVA's on covariates and baseline measures by intervention group for Cohort 2.

	Control group (<i>N</i> = 56)		1-to-1 group (<i>N</i> = 39)		Small group (<i>N</i> = 51)		<i>F</i> (1, 79)
	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	
Free/Reduced Lunch %	88.31	(10.03)	76.29	(23.93)	82.16	(21.58)	2.86
Enrolment	612.66	(203.84)	600.96	(198.87)	588.18	(197.52)	0.15
Attendance	91.60	(2.27)	91.92	(1.98)	92.76	(2.92)	2.23
ELA Proficiency	41.34	(23.30)	41.92	(16.66)	44.51	(26.54)	0.20
Phoneme Segmentation Pre	34.24	(15.17)	40.33	(19.06)	34.04	(13.01)	1.52
NW Fluency CLS Pre	26.81	(13.83)	33.67	(17.48)	26.27	(15.70)	1.94
NW Fluency WWR Pre	1.42	(3.96)	5.12	(4.79)	3.58	(6.40)	3.34*
Oral Reading Fluency Acc Pre	50.81	(19.51)	58.67	(29.19)	55.51	(26.47)	0.62
Oral Reading Fluency WC Pre	11.81	(12.70)	15.88	(11.73)	15.02	(11.09)	0.91
DIEBLS Composite Score Pre	96.09	(37.82)	117.67	(42.54)	102.11	(26.77)	2.77

+ *p* < .10.* *p* < .05.** *p* < .01.*** *p* < .001.*Impact of group size on early literacy outcomes*

Cohort 1. Regression analyses adjusting for covariates and baseline performance demonstrated no significant differences between one-to-one and small group participation on 5 out of 6 outcome measures of early literacy skill for Cohort 1 (Table 7). Analyses did

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Table 5. Regression analyses predicting the impact of programme participation on early literacy outcomes for Cohort 1.

	PSF	NWF CLS	NWF WWR	ORF-Acc	ORF-WC	Comp
<i>F</i> (7, 138)	15.17***	12.56***	7.96***	22.33***	16.51***	17.02***
One-To-One (vs. Control)	7.00*	5.70+	3.75*	11.22**	4.46	27.72*
Sm Group (vs. Control)	11.85***	7.35*	3.42*	8.60*	6.29*	15.67+
Baseline Score	0.50***	0.67***	0.59***	0.66***	1.00***	1.17***
Free/Red Price Lunch %	-0.03	-0.04	-0.01	0.05	0.11	0.35
Enrolment	-0.01	-0.01	-0.01	-0.01	0.01	-0.02
Attendance	1.11	-0.06	-0.10	0.56	1.29	-1.12
ELA Proficiency	-0.33**	-0.10	-0.04	0.08	-0.22	0.34
<i>R</i> ²	0.44***	0.39***	0.29***	0.53***	0.46***	0.47***

Note: Unstandardized β weights presented are from the final multiple linear regression equations.

+ $p < .10$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 6. Regression analyses predicting the impact of programme participation on early literacy outcomes for Cohort 2.

	PSF	NWF CLS	NWF WWR	ORF-Acc	ORF-WC	Comp
<i>F</i> (7, 95)	12.99***	11.37***	8.58***	6.63***	7.42***	13.33***
One-To-One (vs. Control)	-3.35	5.98	3.90+	13.82**	12.01**	42.86**
Sm Group (vs. Control)	4.56+	7.80*	4.85**	15.60***	8.68*	47.55***
Baseline Score	0.57***	0.76***	0.77***	0.21***	0.75***	0.90***
Free/Red Price Lunch %	-0.09	-0.06	-0.05	-0.01	0.06	-0.09
Enrolment	0.01+	0.00	0.00	0.01	0.01	0.03
Attendance	1.17+	1.55+	0.88*	0.74	0.61	5.13+
ELA Proficiency	-0.21**	-0.24*	-0.12**	-0.08	-0.01	-0.64*
<i>R</i> ²	0.49***	0.46***	0.40***	0.35***	0.37***	0.50***

Note: Unstandardized β weights presented are from the final multiple linear regression equations.

+ $p < .10$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

demonstrate that small group students significantly outperformed one-to-one group students on the Phoneme Segmentation Fluency measure.

Cohort 2. The same pattern was evidenced among Cohort 2 (Table 8). Regression analyses demonstrated no significant differences between one-to-one and small group participation

Table 7. Regression analyses predicting early literacy outcomes by programme group for Cohort 1.

	PSF	NWF CLS	NWF WWR	ORF-Acc	ORF-WC	Comp
<i>F</i> (6, 83)	7.05***	11.55***	6.64***	14.71***	16.24***	13.71***
One-To-One (vs. Sm Group)	-5.52*	-2.19	-0.32	1.12	-2.26	7.02
Baseline Score	0.27*	0.72***	0.76***	0.60***	1.15***	1.37***
Free/Red Price Lunch %	-0.10	-0.17	-0.07	-0.10	0.06	0.10
Enrolment	-0.02*	-0.01	0.01	0.02	0.01	0.03
Attendance	0.93	-0.69	-0.12	0.23	0.45	-3.70
ELA Proficiency	-0.31*	-0.03	0.01	-0.01	-0.11	0.81
<i>R</i> ²	0.34***	0.46***	0.32***	0.52***	0.54***	0.50***

Note: Unstandardized β weights presented are from the final multiple linear regression equations.

* $p < .10$.

** $p < .05$.

*** $p < .01$.

**** $p < .001$.

Table 8. Regression analyses predicting early literacy outcomes by programme group for Cohort 2.

	PSF	NWF CLS	NWF WWR	ORF-Acc	ORF-WC	Comp
<i>F</i> (6, 62)	9.82***	8.79***	4.857***	3.53***	7.33***	6.78***
One-To-One (vs. Sm Group)	-8.40**	-1.81	-0.88	-2.72	1.86	-8.82
Baseline Score	0.57***	0.80***	0.80***	0.23***	0.95***	1.02***
Free/Red Price Lunch %	-0.10	-0.08	-0.05	-0.03	0.00	-0.33
Enrolment	0.01	-0.01	0.00	0.01	0.01	0.02
Attendance	0.78	2.26+	0.96	-0.20	-0.61	4.62
ELA Proficiency	-0.28**	-0.36**	-0.12+	-0.05	0.02	-0.87*
<i>R</i> ²	0.49***	0.46***	0.32***	0.25***	0.42***	0.40***

Note: Unstandardized β weights presented are from the final multiple linear regression equations.

* $p < .10$.

** $p < .05$.

*** $p < .01$.

**** $p < .001$.

on 5 out of 6 outcome measures of early literacy skill, and again, small group students significantly outperformed one-to-one group students on Phoneme Segmentation Fluency, suggesting this is a consistent difference in the outcome of the two Reading Rescue programme types.

The data that support the findings of this study are available from the corresponding author upon request.

Discussion

This paper examined the impact of a programme built via an effective relationship between researchers and practitioners to support struggling readers in developing critical foundational literacy skills. The aim of this study was to provide an illustration of an effective partnership between academics and nonacademics and to determine the effectiveness of a small-group version of the programme, which was originally designed to be delivered one-on-one. Creating the small group protocol was not a simple matter of the academic advisor designing a programme and handing it off for implementation, or the organisation asking the academic advisor to rubber stamp an idea for a new product. Instead, a deep collaboration occurred that capitalised on the strengths of both sides of the partnership: the academic's knowledge of research-based practices and effective programmes, and the organisation's ability to train and coach instructors in the field. This partnership reflected the argument put forth by Paige et al. (2021) that the science of reading research is not enough to improve reading outcomes. It must be combined with deep knowledge of the implementation context. When researchers and practitioners work together, research can be effectively translated into practice resulting in improved reading outcomes.

Through the partnership described here, a rigorous study was conducted. Students with low levels of early literacy skills were identified in a number of urban schools mostly serving populations of students from low-income homes. The current study examined whether a small-group version of the Reading Rescue programme would continue to be effective, and whether it would be as beneficial as the one-to-one tutoring programme for supporting reading skill development among struggling readers.

Our first research question concerned whether participation in Reading Rescue produced greater gains in early literacy skills for programme students compared with control group students. Results largely supported existing research revealing the positive impact of Reading Rescue on the early literacy skills of struggling readers. For both cohorts, participation in either type of Reading Rescue programme (one-to-one or small group) resulted in significantly larger gains in early literacy skills compared with control group students on nearly all outcomes. The only notable exception to this overall pattern was that programme students in Cohort 2 did not differ from control group students on phoneme segmentation fluency. This finding may be due to the fact that the academic year was cut somewhat short due to the start of the global pandemic for Cohort 2, or that participating schools already had a curriculum that focused on this skill. However, overall, the evidence overwhelmingly supports the conclusion that Reading Rescue programme participation significantly impacts struggling readers' early literacy skills. Students who received this programme improved in their literacy skills by larger than a quarter and up to nearly a full standard deviation on measures of these skills.

Our second research question concerned whether one-to-one or small group instruction produced differences in programme students' literacy gains. Findings suggested that overall, there were no differences. A notable exception was phoneme segmentation fluency. Students who received the small group Reading Rescue programme significantly outperformed students who received the one-to-one version in both cohorts. Interestingly, the National Reading Panel (2000) reported that phonemic awareness instruction in small groups was more effective than one-on-one instruction. One possible explanation is that students in the small group condition were learning from their peers in a way that was unavailable in the one-to-one format (e.g., Iversen et al., 2005).

Taken together, these findings suggest that both versions of Reading Rescue instruction have the potential to significantly improve the early literacy skills of struggling readers in high-needs communities, and that participation in this programme with a small group of peers may be even more beneficial for the development of phoneme segmentation skills. This provides evidence contrary to the findings of Slavin et al. (2011) and Neitzel et al. (2021) that one-on-one interventions showed larger effect sizes than small group interventions. It also adds to the limited number of studies directly comparing one-on-one to small group versions of the same programme. This type of research is especially valuable in identifying how effective one-on-one interventions can be converted to effective small group interventions in order to reach more struggling readers, especially those in high needs urban communities.

Neitzel et al. (2021) urged further research and development of small group interventions, even though the effect sizes were smaller than the one-to-one interventions in their study. The authors explain that the small group programmes still had significant effect sizes and were able to reach substantially more students at a fraction of the cost. The findings of the current study and the continued partnership between the academic advisor, the non-profit organisation, and stakeholders allowed for a quick larger scale roll-out of the small group programme using experienced tutors to reach more children just when the need was greatest, during the COVID-19 pandemic and its soon-to-be aftermath.

Collaboration

Reading Rescue is a programme that reflects close relationships between research and practice. The partnership reflects many of the components found in collaboration frameworks and roadmaps (Pfadenhauer et al., 2017; Roach et al., 2009; Solari et al., 2020), particularly those discussed by Hall and Hord (2006). These components include a clear understanding of the vision for solving the problem, realistic expectations and support from stakeholders regarding sufficient resources and time, regular and open communication between academics and nonacademics in order to troubleshoot and maintain programme fidelity, and a deep appreciation for the implementation context on the part of the academic, as well as an appreciation for research and the research process by the nonacademics (Figure 1).

The current collaboration started with a clear shared vision, stakeholder buy-in and support for resources and time, and genuine appreciation for the roles of the team members. This allowed the applied research scientist to translate the research in a supportive environment, collaborate on a research-based design that was rigorous yet manageable for educators to conduct in school settings, and thoughtfully address programmatic and implementation roadblocks with the lead nonacademic on the project who then supported the practitioners in the field. This effective researcher–practitioner partnership created an environment of thoughtful, research-based decision-making represented by the roles, traits, and contributions outlined in Figure 1. The findings of this research will feed back into future implementations of Reading Rescue, perpetuating a ‘virtuous circle’ between research and practice (e.g., Snowling & Hulme, 2011).

The strong research-to-practice environment was facilitated by the executive director of the not-for-profit organisation at the time. She made the research and development process of the small group programme obvious instead of burdensome. Time was given to develop, field test, adjust, and then pilot the use of the new programme. The executive director could

have easily pushed for a fast roll out of an adequate product, and could have ridden the coat-tails of the evidence-base of the one-to-one programme. Instead, a joint decision was made between the academic advisor and executive director to develop and research the small group programme for 2 years to ensure effectiveness. A staff member was dedicated to the project and worked closely with the academic advisor to implement the programme in a way that met research standards.

It is important to note that these kinds of partnerships can be weakened or damaged with a change of leadership. Therefore, the value of these strong collaborations between academics and organisations need to be embedded into the culture and procedures of the organisation. The organisation's board and leadership team is responsible for messaging the value of this relationship to all staff members and carefully mapping out a succession plan that reflects the importance of the partnership. Hiring of a new leader should include evaluation of prior work with academics, research teams, or even partnerships with other mission-aligned organisations. Including the academic in the hiring process would be one way to demonstrate the value of the partnership to the new leader. Also, regular check-ins between the board, academic, and leadership team, especially in the initial months after a leadership change are critical to maintaining such a relationship.

Limitations and directions for future research

This study was designed as an evaluation of a new version of a successful reading programme, and provides an illustration of a successful researcher–practitioner partnership, but it was not designed as a detailed process evaluation. Thus, data was not collected on the impact and facilitators of the academic–practitioner partnership. Future research could shed light on how the components of collaboration identified by previous research might be driving successful collaborations, and in turn driving the effectiveness of programme implementation.

For logistical reasons it was not possible to collect demographic data on the instructors. Future studies should gather this information so that instructors' level of training/position and years of experience using the programme can be included in the data analyses. One question to address is the contribution of experience to success as an instructor in the small group programme. In the current study, small group instructors participated in 3 hours of professional development in addition to the standard 23–24 hour Reading Rescue training they received 2 years prior. In future studies, every attempt to equate training time between instructors in both groups should be made.

A further area that warrants future exploration is whether different types of struggling readers do better with one intervention format versus another. More specifically, our study findings suggest that most young readers in need of the added support the intervention provided improved in their literacy skills at relatively similar levels whether they received the small group or the one-to-one version of the intervention. Yet it may be the case that certain types of struggling readers – perhaps those most in need of intervention – would nonetheless benefit more substantially from a more intensive one-to-one version of the intervention than from a small group format where the instructor's attention is divided among the students in the group. Future research should examine differing levels of skills among struggling readers to determine whether certain types of students benefit more from one form of intervention than another.

Issues that plague schools regularly, including low student attendance and data reliability due to inaccurate administration of assessments, also arose in this study. In these cases, the programme lead at the nonprofit worked with the instructors to determine how best to support children with low attendance, and the programme lead also provided coaching to the instructor on how to improve administration fidelity of assessments. Because students with low attendance are often the students most in need of support, every effort should be made to engage the families in motivating their students to attend school in order to receive critical reading intervention.

Conclusion

As Seidenberg et al. (2020) state, there is tremendous potential for research to improve literacy outcomes, but based on the substandard rates of proficient literacy in the United States, there is still much work to be carried out. This study attempts to heed Seidenberg et al.'s call for the findings of reading science to be translated into classroom practice. It also addresses Paige et al.'s (2021) argument that the science of reading research must be combined with deep understanding of instructional context in order to improve outcomes. It is essential that academics involved in reading science research work in close partnership with those delivering instruction, observing how instruction is implemented, and possibly even tutoring themselves. This relationship facilitates a rigorous feedback cycle grounded in reality, not just theory. Both sides learn from each other, and outcomes improve for students.

This type of academic-to-practitioner partnership can lead to programme development that is steeped in research and reasonable to execute in schools. It can also lead to collaborative evaluation efforts that reveal avenues for curriculum and implementation improvement and/or opportunities for programme expansion. The academic–practitioner partnership that facilitated this study was one such example of a robust relationship that produced findings that will ultimately allow three times as many children to receive a research and evidence-based programme. More broadly, our findings add to the small but growing body of research suggesting that with careful implementation, small group interventions can be just as effective as one-on-one interventions for improving children's literacy skills.

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COMPARING SMALL GROUP AND ONE-TO-ONE PROTOCOLS

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