

# Succeeding with High-Risk K–3 Populations Using Arts-Based Reading Instruction: A Longitudinal Study

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**ABSTRACT.** Numerous studies have identified isolated elements for successfully teaching early reading. However, very few studies have examined the effect of early reading programs that use a combination of multiple research-based practices. A 4-year longitudinal study starting with 243 students was conducted to determine the effects of the *Reading in Motion* reading program on standardized measures of students' reading skills. The program provided students from kindergarten through Grade 3 arts-based instruction in reading that teaches phonemic awareness, systematic phonics, and oral reading fluency using small groups and peer-assisted instruction with frequent, corrective feedback. Although the two groups were nearly identical upon entering kindergarten, the at-risk treatment students ( $N = 57$ ) significantly outperformed control students ( $N = 48$ ) at the end of kindergarten and Grades 1 and 2.

**Keywords:** arts education, Dynamic Indicators of Basic Early Literacy Skills (DIBELS), early literacy, early reading, high-risk populations, oral reading fluency, reading instruction

Despite considerable effort over the last 2 decades on the part of public school systems throughout the United States, little progress has been made in reversing poor reading levels among primary school students (Fiester, 2010; National Center for Education Statistics, 2009). Simply put, schools continue to struggle with teaching students to read. The consequences of this struggle are clear. Students who begin school with low reading scores are likely to always have low reading scores (Chard, Vaughn, & Tyler, 2002; Cunningham & Stanovich, 1997). Likewise, students who are poor readers before Grade 4 are likely to remain poor readers through high school (Fiester, 2010; Hanson & Farrell, 1995). Perhaps more concerning is the fact that students who struggle with reading are most likely to be poor and from minority populations. Fiester (2010) found that 83% of fourth-grade students from low-income families were below proficient in reading on the National Assessment of Educational Progress (NAEP) reading test compared with 55% of students from moderate to high-income families. However, the challenges are not merely a matter of eco-

omic status, as Fiester also found that 84% of all Black students were below proficient in reading on the NEAP, as compared with 58% of all White students. For a country that can send astronauts to the moon and robots to Mars, it is remarkable that teachers cannot teach their children to read.

Certainly, there is no shortage of innovative reading programs. But the effectiveness of such programs is widely varying, and many of these programs have no empirical data to support their use. Even when research exists, it often falls short of what is needed to help schools choose a reading strategy that will succeed. When reading programs are evaluated for effectiveness, researchers rarely use longitudinal designs (National Institute of Child Health and Human Development, 2000), rarely include matched control students, and do not assure instructional consistency (e.g., Byrne & Fielding-Barnsley, 1995). Perhaps more problematic from a policy standpoint is that much of the research tests isolated elements of reading instruction, such as the role of grapheme awareness versus phoneme awareness (Ball & Blachman, 1991; Ehri & Wilce, 1985), the role of rhyme in predicting reading outcomes (Bryant, MacLean, Bradley, & Crossland, 1990), or the impact of oral reading fluency on reading comprehension (Kim, Petscher, Schatschneider, & Foorman, 2010). Of course, there are some meta-analyses regarding various effects (e.g., Bus & van Ijzendoorn, 1999; National Institute of Child Health and Human Development, 2000), but these remain narrowly focused on very specific aspects of reading instruction. Although these isolated studies provide an essential foundation for developing reading programs, we will not move beyond these narrow findings as a field until the research on effective reading strategies shifts to an integrated approach where programs that combine these methods are tested empirically over an

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extended period with the students who are least likely to succeed.

In the present study we rigorously tested the effectiveness of a comprehensive sequential reading program developed on a foundation of prior research on reading acquisition. We followed a cohort of students during their first 4 years of reading acquisition (Grades K–3) from 2004 to 2008 and examined the effectiveness of a program that integrated a set of well-established findings regarding effective strategies for teaching reading. In addition to integrating a large set of empirical research on effective instructional strategies to guide program development, the new curriculum and teaching methods underwent five cycles of field testing and revision before being finalized. The final program provided a comprehensive, sequential approach to reading instruction that leveraged the best researched practices for early reading acquisition during the first 4 years of primary education. The program was implemented with Black students attending schools in the poorest neighborhoods in Chicago and was delivered by instructors who received extensive training and observation to assure quality and consistency of instruction. Last, the study included a matched control group consistent across all 4 years to assure that any changes in reading outcomes could plausibly be attributed to the reading program.

#### *Foundations of Effective Reading Instruction*

*Curriculum.* Based on a systematic review of available evidence, the National Institute of Child Health and Human Development identified five critical areas in reading instruction for Grades K–3: (a) phonemic awareness, (b) systematic phonics, (c) oral reading fluency, (d) vocabulary, and (e) text comprehension. Each of these elements of reading instruction has been researched and demonstrated to be essential components of early reading acquisition that add independently to predicting reading outcomes. The first three content areas are part of this study: phonemic awareness, systematic phonics, and oral reading fluency.

*Phonemic awareness.* Phonemic awareness is the understanding of phonemes, or different sounds, in spoken words. For example, the spoken word *bat* contains three phonemes or sounds: /b/ and /a/, and /t/. Likewise, the spoken word *bath* also contains three phonemes or sounds: /b/ and /a/, and /th/. Teaching phonemic awareness is one of the more effective methods of teaching beginning reading, and improves students' reading abilities in the short term (Byrne & Fielding-Barnsley, 1991; National Institute of Child Health and Human Development, 2000) as well as for years to come (Byrne & Fielding-Barnsley 1993, 1995; Cunningham & Stanovich 1997; International Reading Association and the National Association for the Education of Young Children, 1998; Lundberg, Frost, & Peterson, 1988). Because phonemic awareness is so fundamental to the basics of reading, phonemic awareness should be taught in kindergarten

(National Institute of Child Health and Human Development, 2000).

Phonemic awareness is a learned skill that requires training and practice (National Institute of Child Health and Human Development, 2000.) There are several instructional strategies for teaching phonemic awareness—some more effective than others. Blending phonemes (e.g., converting the individual sounds of b/a/t to one spoken word, *bat*) and segmenting words into phonemes (such as converting the spoken word *bat* to pronouncing the sounds of b/a/t individually) are much more effective for learning than using a multiple-skills approach, which could also include deleting phonemes and manipulating onsets and rimes in words (National Institute of Child Health and Human Development, 2000).

*Systematic phonics.* As important as phonemic awareness may be initially, reading instruction will not be effective unless students understand which letters represent what sounds (Bus & van IJzendoorn, 1999; McGuinness, McGuinness, & Donahue, 1995; National Institute of Child Health and Human Development, 2000). Systematic phonics teaches the full array of sounds for each letter, such as learning that the letter *o* can produce the long and short sounds, as well as other sounds when combined with specific letters, such as *oi*. Teaching systematic phonics is more effective than all other phonics programs, including basal programs, whole-word programs, and whole-language approaches (National Institute of Child Health and Human Development, 2000).

*Oral reading fluency.* Another critical area to include in early reading instruction is oral reading fluency: reading out loud with speed, accuracy, and expression. Reading fluently allows students to increase their reading comprehension (Fuchs, Fuchs, Hosp, & Jenkins, 2001; Herman, 1985; Kuhn & Stahl, 2000; National Institute of Child Health and Human Development, 2000) by freeing up students' minds to understand the content rather than think about how to read the words. This ultimately allows students to make the transition from learning to read, to reading to learn other subjects (National Institute of Child Health and Human Development, 2000), which should occur by Grade 3 (International Reading Association and the National Association for the Education of Young Children, 1988). Ironically, as much as the research has supported the importance of oral reading fluency, it is also the reading skill most neglected in instruction (Allington, 1983; Chard, Vaughn, & Tyler, 2002; Kame'enui & Simmons, 2001; Moss, Jacob, Boulay, Horst, & Poulos, 2006; National Institute of Child Health and Human Development, 2000).

One important aspect of oral reading fluency that has begun to be studied more closely is prosodic reading, or expression (Kuhn, Schwanenflugel, & Meisinger, 2010; Rasinski, Rikli, & Johnston, 2009). Prosody refers to the duration, volume, pitch, and pauses that occur during speech

(Cowie, Doublas-Cowie, & Wichmann, 2002; Valencia, Smith, Reece, Li, Wixson, & Newman, 2010). Prosodic reading may be a particularly important aspect of reading fluency to consider when planning instructional strategies for at risk students, as reading prosody becomes more pronounced with more difficult text (Benjamin & Schwanenflugel, 2010).

*Quality time on task.* While there is much research about what content to include in early reading instruction, there is less, but still useful, information on how to teach these concepts in a classroom situation so that all students learn to read by Grade 3. Not surprisingly, reading skill is related to the amount that a student reads (Juel, 1988). Likewise, students who need the most practice in reading actually spend less time in practice (Allington, 1977; Donahue, Voelkl, Campbell, & Mazzeo, 1999). Moreover, students who start off with poor reading skills typically continue to have poor reading skills (Cunningham & Stanovich, 1997). Thus, it is important for lower scoring students to dramatically increase the amount of quality time they spend reading, particularly in the early reading years, to increase their chances of becoming good readers.

Quality of reading instruction can be improved dramatically though the use of the arts. Indeed, meta-analytic research has shown significant effects for drama on reading outcomes (Podlozny, 2000). One reason for these outcomes may be improved visualization of the story (Rose, Parks, Androes, & McMahon, 2000). Another explanation for these effects relates to the reliance in drama on prosodic reading, or expression, which is a critical element of reading fluency (Kuhn et al., 2010; Rasinski et al., 2009). Thus, effective instructional methods could incorporate drama as a way to allow students to practice prosodic reading, which should also improve overall reading fluency. Indeed, drama-based programs that explicitly embed fluency instruction within a drama curriculum have demonstrated greater than expected gains in reading skills (Martinez, Roser, & Strecker, 1999; Rose et al., 2000; Young & Rasinski, 2009). Integrating other arts such as music and poetry into instructional methods may also prove effective at significantly improving reading fluency (e.g., Rasinski, Rupley, & Nichols, 2008).

*Student groupings.* Several strategies for providing varying amounts of instruction based on skill level have proven effective. First, using periodic and repeated skills-based testing is more effective than psychometric screening measures to determine which students should receive the most reading instruction (Vellutino, Scanlon, Zhang, & Schatschneider, 2007). Second, small groups can be very effective, particularly with lower skilled readers. In fact, the National Institute of Child Health and Human Development (2000) conducted a meta-analysis and found that small groups were more successful than whole group. Third, peer-assisted

strategies have been found to successfully impact reading skills (Fuchs & Fuchs, 2005).

*Feedback.* Regardless of the students' groupings, several studies have demonstrated that reading instruction is more effective when students are provided with frequent (Heubusch & Lloyd, 1998) and immediate (Barbetta, Heward, Bradley, & Miller, 1994; Pany & McCoy, 1998; Perkins, 1988) corrective feedback, in which someone models the correct pronunciation after an incorrect attempt.

*Student engagement.* Maintaining student attention and focus is among the most challenging aspects of teaching students in an area where they struggle. Arts-based instruction has proven particularly effective at increasing student engagement and reading outcomes in a number of controlled studies (Rose & Parks, 2002). For example, fourth-grade students who used drama as a method for practicing and learning to read narrative stories have been shown to outperform randomly selected control students on state-wide tests of reading comprehension (Rose et al., 2000). In another controlled study, 293 first-grade students who used dance to learn grapheme-phoneme relationships outperformed 337 randomly selected control students who learned using more traditional methods (McMahon, Rose, & Parks, 2003). Music instruction has also been shown to increase phonemic awareness, in particular phoneme segmentation fluency (Gromko, 2005). Keehn (2003) demonstrated that theater alone was just as effective as theater plus instruction at helping students gain oral reading fluency. Thus, arts-based instruction not only holds promise for engaging students who might otherwise struggle, but research supports the effectiveness of arts-based instruction as a means for increasing reading outcomes.

## Hypothesis

Students in Grades K–3 in an arts-based program teaching (a) phonemic awareness, (b) systematic phonics, and (c) oral reading fluency in small groups that provides frequent performance feedback will read more proficiently than students in Grades K–3 who learn using a less cohesive, non-arts-based method of instruction.

## Method

### *Program Description*

The *Reading in Motion (RIM)* program emerged from a multiyear research program to evaluate the effectiveness of various teaching strategies within some of the most underperforming schools in Chicago. Nine studies were completed in evaluating various aspects of the program's effectiveness

over a 13-year period. Results from these studies were used to refine and develop the reading program into its final form. During the course of developing and refining the program, it was used to teach reading to more than 10,000 students in over 100 schools, primarily in economically disadvantaged areas of Chicago.

The program was explicitly designed to address most of the components identified in the research as being critical for early reading. Each of these components was taught using elements of the arts directly relevant to reading. Figure 1 describes the reading skills covered at each grade level along with the age at which arts-based activities are introduced. Key elements of the program’s methodology include phonemic awareness, systematic phonics, oral reading fluency, small groups, frequent and corrective feedback, and arts-based instruction. See Appendix for a sample of activities used to teach each skill.

*Phonemic awareness.* Phonemic awareness is the ability to hear and mentally manipulate phonemes, or different sounds, in spoken words. The kindergarten level of the reading program focuses on teaching students phonemic awareness by leading students through a series of songs that help them to blend, segment, and manipulate phonemes. For example, the program teaches students a technique for segmenting phonemes with their fingers (segments are noted by taps and then the entire word is spoken or sung as each student scrapes with their fingers) that is done in a rhythmic and percussive way.

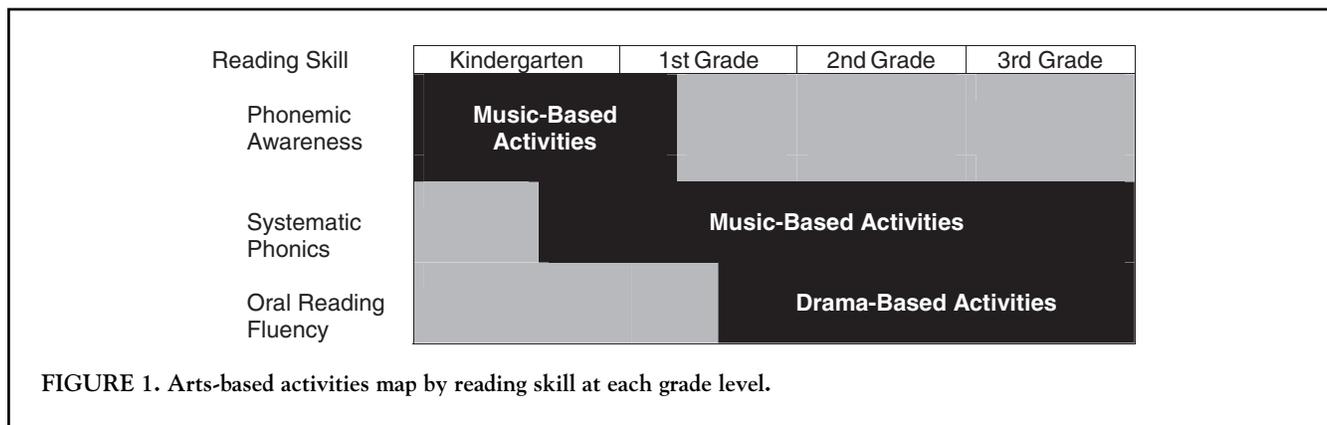
*Systematic phonics.* Instruction also engages students in making explicit connections between letters or letter combinations and sounds. In the Grade 1 level of the reading program, students are taught an infectious song called “Word Blues,” which helps students generate the sounds for all letters in words and then blend the sounds into recognizable words. As part of the song, the instructor shows a word, and the students call out the individual sounds and then

blend the sounds into the word. The practice and monitoring of this early reading skill is made exciting through this song, which prescribes the tempo and rhythm to challenge the children. As students progress to saying whole words without first saying each individual sound, they are challenged to read multiple words and word lists in time with the music.

*Oral reading fluency.* Beginning in Grade 1, oral reading fluency is taught through partner reading, during which students repeatedly read a script with a partner, as actors would do during a rehearsal. Through this activity, they improve their oral reading fluency while gaining self-confidence and drama skills, which they demonstrate on Fridays when they perform the script for the whole class.

*Small groups.* In a typical week, in addition to their standard reading instruction, students in the treatment classrooms received daily arts-based reading instruction lasting 40–60 min. Four sessions per week involved the students in rotations through independent work areas, including reading practice, listening, and spelling areas, or teacher-led small-group work, and the culminating Friday session brings students together as a whole group. These small groups were designed to provide each student with considerable opportunity to practice each skill. Small groups were determined monthly with skills-based testing. In Grades 2 and 3, while one small group met with the instructor, other students were paired to provide peer-assisted feedback.

*Frequent and corrective feedback.* Small groups are an important component of the program because they provide teaching, practice, and feedback opportunities; enable teachers to respond to individual students’ skill deficiencies; and increase the responsiveness of individual children. During small-group work, the teacher can be giving three students the exact skills they need in the moment, and in 20 min those three students can get a week’s worth of practice



on those skills, due to the close attention of the teacher and immediate feedback. Also, in a learning area such as phonemic awareness, a small-group approach includes others advantages as well, such as affording children a clearer view of the teachers' mouth when he or she is pronouncing words.

*Arts-based instruction.* RIM uses music and drama to teach reading from Grades K–3. The program is based on an intersection of the skills needed for learning reading and the arts. Instruction leverages skills that need to be mastered, or the way they are practiced in order to be mastered, that overlap significantly between reading and various arts disciplines (mostly drama and music). For example, in oral reading fluency, one goal is to “make it sound like spoken English.” This incorporates reading with speed, accuracy, and expression. This is also what is required of an actor when reading a drama script. In addition to this simple illustration of how similar the skills are in oral reading and in drama, mastering each is practiced similarly, through the repeated reading of text.

#### Participants

Participants in this quasi-experimental study comprised 57 treatment and 48 control students who were enrolled in Grades K–3 in one of four schools in Chicago. The study participants were all located in economically distressed inner city neighborhoods characterized by high crime rates where residents often lacked stable shelter and adequate food. Moreover, positive role models with greater than a high school education were rare. As one teaching artist observed, “The vast majority [of students] are not getting help from home as far as reading. Most of them don’t spend any time at all reading with their parents so most of the burden in on the schools.”

The treatment group was drawn from two schools and the control group came from two different schools that were matched on a variety of characteristics that could influence

reading outcomes. The two treatment schools were selected because they had (a) a prior relationship with RIM, (b) present leadership support of the program, and (c) a minimum of two full-day kindergarten classes each. Study schools were also chosen based on low percentages of English language learners so the research could identify the program’s effects with students whose first language is English. Demographic analyses of the schools in the treatment group indicated students were predominately Black and had low income, and had 18%–35% of students reading at grade level using the Iowa Test of Basic Skills in the year prior to the study.

After participant schools were selected, possible matches were identified for the control group. Control schools were first selected if they matched the treatment group schools on the following criteria: higher than 90% low income, lower than 35% student mobility rate, fewer than 5% English language learner, and according to the U.S. Census (2000) a catchment area in which greater than 95% of population over age 25 years had a high school degree. Sixty-two elementary schools in the Chicago Public School system matched the participant schools on these criteria. Schools in similar neighborhoods were then matched to five schools with the most similar mobility rates and reading test scores. Researchers asked each of the five matching schools if they were willing to participate in the research, beginning with schools where the researchers had prior relationships. Three of these schools were willing to participate, and so the researcher selected two of these schools to comprise the matched control group (based primarily on proximity and leadership support for the study). Table 1 illustrates the strong demographic similarities between the treatment and control group schools.

Because of student mobility, some students participated in the study during some of the years, while others participated in all 4 years (Grades K–3). That is, there were some students who joined the schools in the study after

**TABLE 1. Criteria for Matching Treatment and Control Group Schools**

| Matching criteria   | Treatment group |          | Control group |          |
|---|-----------------|----------|---------------|----------|
|   | School 1        | School 2 | School 3      | School 4 |
| English language learners <sup>a</sup>                          | 0.0%            | 0.0%     | 0.0%          | 0.0%     |
| Black students <sup>b</sup>                                     | 98.3%           | 98.1%    | 98.3%         | 98.9%    |
| Reading level on Iowa Test of Basic Skills in 2003 <sup>a</sup> | 33.1%           | 23.3%    | 28.7%         | 27.9%    |
| Age 25 years and over with high school degree <sup>b</sup>      | 64.8%           | 61.8%    | 59.6%         | 69.7%    |
| Low income status <sup>a</sup>                                  | 100.0%          | 96.3%    | 100.0%        | 99.5%    |
| Student mobility rate <sup>a</sup>                              | 33.6%           | 19.7%    | 31.1%         | 20.0%    |

Note. Data analysis provided by Child Health Data Lab of Children’s Memorial Research Center, Chicago, Illinois.

<sup>a</sup>Original data source Illinois State Board of Education Report Cards (2004).

<sup>b</sup>Original data source 2000 U.S. Census.

TABLE 2. Number of Students in the Sample During Each Year of the 4-Year Study Period

| Condition | 2004–2005<br>Kindergarten | 2005–2006<br>Grade 1 | 2006–2007<br>Grade 2 | 2007–2008<br>Grade 3 |
|-----------|---------------------------|----------------------|----------------------|----------------------|
| Treatment | 173                       | 141                  | 69                   | 57                   |
| Control   | 170                       | 130                  | 90                   | 48                   |

they had already completed kindergarten, and some students transferred to other schools midway through the study. However, the analyses for the present study were limited to the stable group of students who attended either the treatment group or control group schools during all 4 years of the study—from kindergarten to Grade 3. These students were present throughout the duration of the study, as evidenced by taking the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) pretest in kindergarten, at least one DIBELS test in each of Grades 1 and 2, and the final test at the end of Grade 3. This core set of 57 treatment group and 48 control group students, shown in Table 2, is the focus of this study.

### Measures

Researchers used multiple methods to assure consistency of implementation across classrooms in the treatment group. One standardized method of measuring reading skills was used to assess reading outcomes.

**DIBELS.** DIBELS assessments were used as a measure of student reading proficiency. DIBELS is a set of standardized, individually administered measures of early literacy development, which was used by over 15,000 schools in 2007–2008 (DIBELS, 2008). The measures are designed to monitor development of prereading and early reading skills, as well as identify instructional needs for each student. Researchers who were not involved in implementing the program, and were blind as to the study conditions for each classroom, collected student scores on the DIBELS reading assessments for the treatment and control schools at three points each year (September, January, and June). Raters were provided with training and achieved interrater reliability before using the assessments (interrater correlations exceeded .80). Once the scores were collected, program staff entered them into the DIBELS online data system. Researchers obtained a copy of the students' data from the online system at the end of each year and then linked all 4 years of data for each student.

Table 3 presents the skills tested for Grades K–3, benchmarks for those skills, and the timeline for testing. Benchmark target goals were taken directly from the DIBELS authors (Good & Kaminski, 2002). After the data were

collected, researchers compared student scores on the DIBELS assessment to benchmarks of success established by DIBELS, to determine the percentage of students meeting each benchmark based on the established standards for their grade.

**Attendance.** Program instructors recorded student attendance during their daily classroom visits, and noted the type of activity the students participated in.

**Interviews.** Researchers interviewed instructors and program staff three times over the course of the 4-year program. The interviews included the classroom instructors, reading specialists, the curriculum designer, and program administrators. Researchers collected formative data on the program to assess implementation consistency and to assure fidelity with the program's intent and purpose.

**Observations.** Researchers used two methods for observing program implementation. First, researchers conducted in-person observations of the kindergarten and Grade 2 programs. Researchers also viewed videotapes of the reading program in Grades 1 and 3 including samples of the full set of activities, whole-group activities, small-group activities, and work areas. Both types of observations provided a sense of teaching artist and student roles during each of these activities, examples of students' work, and varying levels of student performance.

**Reading curricula interviews.** Researchers interviewed control group and treatment teachers and lead literacy teachers about the core reading curriculum taught by the classroom teachers. This included obtaining samples of the reading curriculum and then, in Grades 2 and 3, included obtaining information related to the degree to which small group instruction was used.

## Results

### Comparability of Groups

**Reading level.** Because the kindergarten students were new to the schools, no previous test data were available to compare reading levels. Hence, the researchers administered DIBELS to all students in the study in September of 2004,

TABLE 3. DIBELS National Standards for Number of Sounds or Words Correctly Identified per Minute

| DIBELS early literacy indicator | Kindergarten |           |           | Grade 1    |           |           | Grade 2    |           |           | Grade 3    |           |           |
|---------------------------------|--------------|-----------|-----------|------------|-----------|-----------|------------|-----------|-----------|------------|-----------|-----------|
|                                 | Sept. 2004   | Jan. 2005 | June 2005 | Sept. 2005 | Jan. 2006 | June 2006 | Sept. 2007 | Jan. 2007 | June 2007 | Sept. 2007 | Jan. 2008 | June 2008 |
| Letter naming fluency           | 8            | —         | —         | —          | —         | —         | —          | —         | —         | —          | —         | —         |
| Initial sound fluency           | 8            | 25        | —         | —          | —         | —         | —          | —         | —         | —          | —         | —         |
| Phoneme segmentation fluency    | —            | 18        | 35        | —          | —         | —         | —          | —         | —         | —          | —         | —         |
| Nonsense word fluency           | —            | 13        | 25        | 24         | 50        | —         | —          | —         | —         | —          | —         | —         |
| Oral reading fluency            | —            | —         | —         | —          | 20        | 40        | 44         | 68        | 90        | 77         | 92        | 110       |

Note. DIBELS = Dynamic Indicators of Basic Early Literacy Skills.

before the program began. Letter naming fluency and initial sound fluency scores were used to confirm that students in the program and control groups entered school with comparable reading levels.

*Letter naming fluency.* DIBELS letter naming fluency (LNF) assesses the number of randomized written letters that a child can recognize in 1 min (Kaminski & Good, 1996). Students' LNF levels were assessed in September 2004 at the outset of the program. Researchers used LNF as one baseline to determine if students in the program and control groups entered the program with comparable skills. Researchers compared the mean scores on LNF for each of the schools using a one-way analysis of variance (ANOVA). Means and standard deviations are presented in Table 4. Results of the one-way ANOVA comparing the four schools revealed no significant differences between the incoming kindergarten students' scores on LNF,  $F(3, 101) = 0.85$ ,  $p = .47$ .

To further investigate possible differences, researchers conducted an independent samples  $t$  test to compare the mean scores on the September (pre)-LNF measure for the

two groups. No significant difference was found between the treatment ( $M = 12.8$ ,  $SD = 13.4$ ) and control students ( $M = 12.6$ ,  $SD = 12.2$ ),  $t(103) = 0.10$ ,  $p = .92$ . Thus, students in the treatment and control groups appear to have entered the study with nearly identical letter naming fluency skills.

*Initial sound fluency.* DIBELS initial sound fluency (ISF) is a measure of phonological awareness that assesses a child's ability to recognize and produce the initial sound in an orally presented word (Kaminski & Good, 1996). ISF was first assessed in September 2004, at the same time as the LNF assessment described previously. Because the September assessment was performed at the start of the program, ISF scores were used as baseline data to identify whether students in the program and control groups entered the program with comparable skills. Researchers compared the mean scores on ISF for each of the schools using a one-way ANOVA. Means and standard deviations are presented in Table 5. Results of the one-way ANOVA comparing the four schools revealed no significant differences between the incoming kindergarten students' scores on ISF,  $F(3, 101) = 0.78$ ,  $p = .51$ .

TABLE 4. Pretest Mean Scores and Standard Deviations for RIM and Control Groups on Letter Naming Fluency upon Entering Kindergarten (September 2004)

| School             | M     | N  | SD    |
|--------------------|-------|----|-------|
| Treatment school 1 | 11.27 | 26 | 13.28 |
| Treatment school 2 | 14.10 | 31 | 13.59 |
| Control school 1   | 15.55 | 20 | 14.36 |
| Control school 2   | 10.43 | 28 | 10.25 |

TABLE 5. Pretest Mean Scores and Standard Deviations for Treatment and Control Group Students on Initial Sound Fluency upon Entering Kindergarten (September 2004)

| School             | M     | N  | SD   |
|--------------------|-------|----|------|
| Treatment school 1 | 10.46 | 26 | 5.87 |
| Treatment school 2 | 9.97  | 31 | 7.70 |
| Control school 1   | 8.00  | 20 | 6.60 |
| Control school 2   | 8.93  | 28 | 6.45 |

**TABLE 6. Teacher Estimates of Time Spent on Reading Instruction in Control and Treatment Classrooms**

|  | Treatment group |         | Control group |         |
|--|-----------------|---------|---------------|---------|
|  | Grade 2         | Grade 3 | Grade 2       | Grade 3 |
| Total hours in reading instruction per week (includes treatment instruction)   | 14              | 8       | 13            | 7       |
| Portion of time in small groups of 1 to 4 students, while other students work independently (includes RIM instruction) | 41%             | 49%     | 37%           | 42%     |

To further investigate group differences, researchers conducted an independent samples *t* test to compare the mean scores on the September (pre-)ISF measure for the two control groups. The treatment group students had a mean September (pre-)ISF score of 10.1 (*SD* = 6.9) compared with a mean of 8.2 (*SD* = 6.4) for the control students. This difference was not significantly different,  $t(103) = 1.50, p = .14$ . Thus, researchers concluded that students in the program and control groups appear to have entered the study with comparable initial sound fluency skills.

*Reading curriculum.* Researchers interviewed control and treatment classroom teachers and lead literacy teachers in Grades 2 and 3 to explore whether the amount of time students spent in reading instruction was comparable between the two groups. Teachers were asked to estimate the number of minutes each week that their students spent in reading instruction. Results showed that control group and treatment group students were exposed to about the same amount of reading time. Treatment group students were generally exposed to about 1 additional hour of reading instruction per week (see Table 6), which represents about 8%

more reading instruction in Grade 2 and 14% more reading instruction in Grade 3.

Also illustrated in Table 6, all treatment and control classrooms in Grades 2 and 3 employed small-group instruction with students for a portion of their reading instruction. Classrooms received a similar portion of small group time, with teachers estimating that treatment group students spent between 11% and 17% more time in small-group instruction than control group students.

Researchers also examined non-RIM reading instruction taught by the classroom teachers. Curricula from each year and school are presented in Table 7. In Grades K–3, all but one school used highly standardized curricula, with a clear scope and sequence and often scripted lessons for teachers to deliver.

One exception was control group School 3, which used less standardized curricula to teach kindergarten, as well as to supplement Grades 1 and 2. During kindergarten, this control school used the Pearson Learning program (*Sing, Spell, Read, & Write*)—a program that used songs to involve students. However, unlike treatment classrooms, the control group teachers neither used differentiated instruction

**TABLE 7. Nonbenchmarks Reading Curriculum Used by Each School in the Treatment and Control Groups**

|                    | Kindergarten   | Grade 1   | Grade 2   | Grade 3                                     |
|--------------------|--|---|---|---|
| Treatment school 1 | Harcourt Brace Collections Reading/Language Arts Program | Harcourt Brace Collections Reading/Language Arts Program                                  | Harcourt's Trophies   | Harcourt                                    |
| Treatment school 2 | Houghton Mifflin Reading                                 | Houghton Mifflin Reading  | Houghton Mifflin Reading & America's Choice                               | Houghton Mifflin Reading & America's Choice |
| Control school 1   | Pearson Learning's Sing, Spell, Read & Write             | MacMillan McGraw-Hill; 1 of 3 classrooms also used Phonemic Awareness by Michael Heggerty | Macmillan McGraw-Hill's Treasures & Michael Heggerty's Phonemic Awareness | Macmillan McGraw-Hill's Treasures           |
| Control school 2   | Harcourt Brace Collections Reading/Language Arts Program | Harcourt Brace Collections Reading/Language Arts Program                                  | Harcourt's Trophies   | Harcourt's Storytown                        |

in small groups nor provided frequent performance feedback the way instructors did in the treatment group. Additionally, in Grades 1 and 2, this school supplemented its reading curriculum with Phonemic Awareness by Michael Heggerty. While Heggerty's oral and speed emphasis are similar to the treatment program, the Heggerty curriculum is designed for whole-group instruction only.

*Attendance.* While attendance data were not provided by the control schools, RIM teaching artists collected daily attendance data to understand if students received enough of the program to improve their skills. Attendance was collected daily for all 4 years in treatment school 1, whereas treatment school 2 had full attendance data in Grades K–2, and intermittently through Grade 3.<sup>1</sup>

Individual student attendance rates were between 72% and 99% over the 4 years of the study. The median attendance rate was 96%. Thus, students seemed to receive enough of the program to interpret effects.

These attendance rates are inflated by the nature of this study's design. All treatment and control group students in this study were required to attend the participating schools from the beginning of the program through the end of the program as evidenced by taking the first DIBELS assessment in kindergarten and the last DIBELS assessment in Grade 3, as well as at least one test in Grades 1 and 2. It is likely that some treatment and control group students with lower attendance rates may have not met the requirement and thus

were excluded from the study, resulting in high attendance rates.

### Reading Outcomes

Once it was established that the treatment and control groups began kindergarten at similar reading levels and that the schools were comparable, researchers analyzed student outcomes. First, the treatment and control groups' DIBELS scores from Grades K to 3 were compared to determine whether there was a difference in reading skill over time. Then we compared the treatment group's reading levels to other programs across the nation from the DIBELS database.

*Meeting the final benchmarks.* After establishing that the treatment and control students entered kindergarten with no significant differences on their reading skills, we analyzed DIBELS scores to see if there was a significant difference between the groups on whether they met the final reading benchmarks in each grade over time. Figure 2 illustrates this progression by test and grade. There was no significant difference between treatment and control students in reading skills when they entered the program in kindergarten, for ISF,  $\chi^2(1, N = 103) = 2.55, p = .11$ ; for LNF,  $\chi^2(1, N = 103) = 0.26, p = .61$ . This indicates that both groups had similar reading levels when they first joined the program. By the end of kindergarten, the

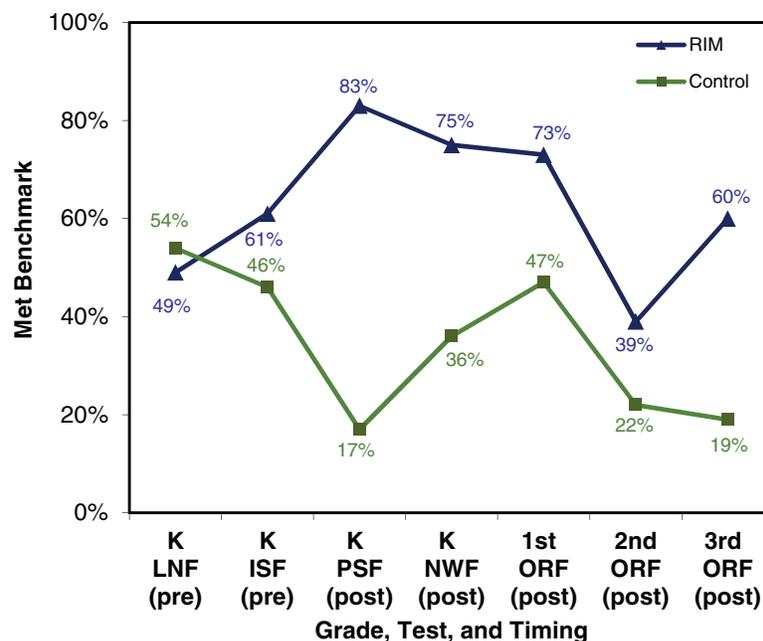


FIGURE 2. Percentage of students that met test benchmarks by grade over time (color figure available online).

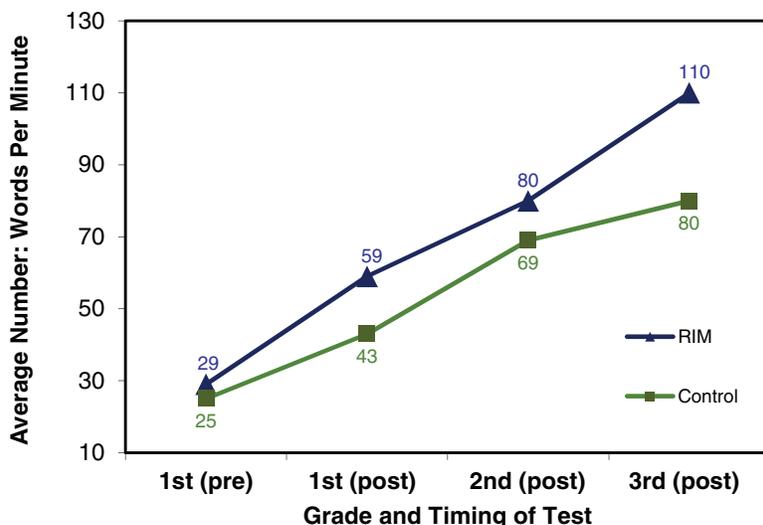


FIGURE 3. Average number of words read per minute on oral reading fluency tests over time (color figure available online).

program had already begun to show an effect. That is, a significantly greater percentage of treatment students (83%) met the benchmark as compared to the control group (17%) on phoneme segmentation fluency,  $\chi^2(1, N = 104) = 44.27, p < .001$ . Likewise, a significantly greater percentage of treatment students (75%) met the benchmark as compared to the control group (36%) on nonsense word fluency,  $\chi^2(1, N = 104) = 16.27, p < .001$ , by the end of kindergarten. This trend continued in Grade 1, in which significantly more treatment students (73%) met the benchmark on oral reading fluency than control students (47%),  $\chi^2(1, N = 103) = 7.50, p < .01$ . In Grade 2, a greater percentage of treatment students (39%) also met benchmark than control students (22%); however, the difference between treatment and control group students was not statistically significant. But by the time the students completed Grade 3, the difference between the two groups on oral reading fluency was statistically significant once again, with a greater percentage of treatment students meeting the benchmark (60%) than control students (19%),  $\chi^2(1, N = 105) = 18.02, p < .001$ .

*Words read per minute.* Although in the previous section we explored the portion of students meeting benchmark, in this section we describe the average number of words that the students could read per minute over the course of the study. Researchers who were not involved in implementing the program and were blind as to the study conditions for each classroom used the DIBELS oral reading fluency tests to determine how many words students could read fluidly per minute. As illustrated in Figure 3, the first time that this test was administered (middle of Grade 1), students were at similar skill levels with no significant difference between

treatment group and control group students,  $t(102) = 0.87, p = .39$ . A  $2 \times 4$  MANOVA repeated across four benchmark tests was used to examine differences in oral reading fluency growth. This test revealed that the treatment group students gained the ability to read a significantly greater number of words than the control students from the middle of Grade 1 to the end of Grade 3,  $F(1, 96) = 7.07, p < .01$ .

Results showed that by the end of Grade 3, after 4 full years of learning to read using the arts-based curriculum, treatment group students had significantly greater reading skills than control group students. Specifically, by the end of Grade 3, treatment group students could fluently read an average of 110 words per minute compared with an average of 80 words per minute for students in the control group,  $t(103) = 4.12, p < .001$ .

*National normative comparison.* Final results for treatment group students on the oral reading fluency measure were also compared with the DIBELS normative scores, which were derived from a national sample of third-grade students (Good, Simmons, Kame'enui, Kaminski, & Wallin, 2003). Overall, the experimental treatment was better at helping students meet the oral reading fluency benchmark than most of the programs in the DIBELS database. To compare treatment group students to the national norms, oral reading fluency pre scores from the beginning of Grade 3 were used to categorize students according to their initial third-grade level of oral reading fluency performance in accordance with Good et al. (2003). The poorest performing students were identified as at risk, midlevel students were identified as some risk, and better performing students were identified as low risk. Analyses were then conducted to determine how effective the treatment was at getting each of the risk

groups to meet the end-of-year benchmark in comparison with programs in the DIBELS normative database. In the at-risk group, the experimental treatment helped 6% of the students meet the oral reading fluency benchmark by year's end, which is more effective than 80% of the programs in the DIBELS database. The experimental treatment also helped 53% of the some-risk students to reach the oral reading fluency benchmark by year's end, which is better than 80% of the programs in the DIBELS database. Last, the treatment helped 100% of the students in the low-risk category to reach the end-of-year oral reading fluency benchmark, which is more effective than 95% of the programs in the DIBELS database.

### Discussion

The results reveal, with students who have historically struggled in the most challenged public schools, that programs can succeed at teaching reading when they thoughtfully integrate existing research and empirically evaluate results. When students were taught to read using arts-based methods to teach phonemic awareness, systematic phonics, and oral reading fluency in small groups with frequent feedback, they significantly outperformed their peers. This effect began at the very first testing period and increased over a 4-year period.

We do not intend to suggest that primary reading research has reached all the answers, but rather that to advance as a science and as a field, reading researchers must begin to test the combined effects of methods that have individually proven to be effective. Testing the effects of such programs requires implementation consistency and procedures to assure fidelity with the intended curriculum. This issue is central for studies assessing the effects of programs that integrate multiple research findings, as the premise of any such study is to test the outcomes when multiple methods are combined. If these methods are inconsistently combined, then there is no core program to test. It is essential that researchers assure consistency of implementation so the findings are clearly generalizable to other populations and other settings. For example, Byrne and Fielding-Barnsley (1995) conducted a very similar multiyear analysis of a reading program but they specifically did not assure the fidelity or consistency of implementation. Indeed, Byrne and Fielding-Barnsley (1995) explicitly stated, "We gave no guidance in how to administer the program, leaving this to the staff, who worked from the manual" (p. 489). This lack of standardization poses a considerable barrier for advancing our knowledge of effective reading instruction because future researchers and instructors would be hard pressed to know what to replicate. In contrast, the present study provides strong evidence that when implemented as planned, an arts-based reading program that is built on a combination of research-based practices (phonemic awareness, systematic instruction, and oral reading fluency through arts-based instruction with small groups and frequent feedback) can produce significantly greater

reading outcomes for students than reading instruction typically provided in public schools.

Given the rigor of the present study, these data provide clear and compelling evidence that the arts can be a powerful medium for teaching reading when the curriculum is specifically designed to do so. Certainly the research base on reading fluency upon which this particular reading program was built contributed significantly to the effectiveness of the program. However, equally important to the reading research was the fact that the program was grounded in the arts. Though the arts have intrinsic value as a subject in their own right (Eisner, 1998, 2009), the present study and others (e.g., Podlozny, 2000) illustrate that drama in particular can provide a highly effective medium for teaching core academic skills such as reading. Clearly, arts-based instruction provides a compelling medium to engage students in reading. However, in addition to increased engagement, drama may be particularly effective for teaching reading because it involves creating images of the information being read (Rose et al., 2000). Drama-, poetry-, and music-based activities all require a focus on prosodic reading, which is a critical element of oral reading fluency (e.g., Martinez et al., 1999; Young & Rasinski, 2009). Thus, regardless of whether the arts should or should not be included as a component of a modern American education, the present study adds to an increasingly large and rigorous research base suggesting that students who learn to read using arts-integrated instruction can significantly outperform their peers who learn to read using more traditional non-arts-based reading curricula.

This study also provides evidence that other successful programs could be developed by integrating a small set of well-established research findings into a cohesive reading program. In particular, the combined use of four essential components of the reading program was found to be effective: (a) teaching a curriculum that emphasizes phonemic awareness, systematic phonics, and oral reading fluency; (b) use of small groups; (c) frequent performance feedback; and (d) highly engaging arts-based interactions with students. These findings are particularly encouraging because the RIM program was so successful with students in a population that has historically underperformed. We strongly encourage future researchers to continue the focus on assessing results with students who are at risk but who are not developmentally delayed. How can reading programs truly claim success until they can demonstrate results among populations of struggling but otherwise normal students? Certainly at a system-wide level, improvements will be very limited unless we can consistently demonstrate an ability to get the most challenged students to read at grade level.

### Limitations

We have illustrated what is possible when effective teaching is consistently applied, but conclusions should be made cautiously about how the program might work with nontrained instructors. For instance, Byrne and Fielding-Barnsley (1995) conducted a 3-year follow up study of a

reading program that was similar to the present study in many ways but they relied on regular classroom teachers to deliver instruction and neither provided training other than written materials, nor evaluated the quality or consistency of instruction. Assuring implementation fidelity and consistency is essential when testing program effectiveness, because individual teacher effectiveness is too easily confounded with program content. Though this aspect of the present study increases our confidence that the program can be effective when delivered as intended, the use of highly trained instructors does leave open the question of generalizability with respect to delivery by regular classroom teachers. It remains for future researchers to determine how effective a program such as this would be if regular classroom teachers were asked to learn it and use it on a regular basis.

Perhaps the single greatest limitation for the study was the researchers' lack of influence over instructional methods in the control group. Though the groups were very well matched in all respects at the outset of the study, it would have been preferable to control and standardize reading instruction in the nontreatment group so that it included none of the features present in the treatment group. Of course, in field research, such control is rarely possible and from an ethical standpoint such a configuration would be highly questionable. Thus, rather than concluding that the treatment produced better results than a specific instructional method without any of these research-based components, the present study is limited to concluding that the RIM program was far more effective than the first 4 years of reading instruction typically found within the Chicago Public Schools in neighborhoods with low high school graduation and income rates.

By the end of the 4 years, sample size was relatively small (105 students), though given the longitudinal nature of the study, the attrition levels (from 343 students in Year 1 down to 105 in Year 4) were not unexpected. Though attrition did not appear to differentially affect the groups, future research on larger more diverse samples would be valuable to replicate the present findings and assess any potential boundary conditions for the program. For example, it would be interesting to see if the program would get the same or similar results with highly affluent students, students of other ethnicities, and even students for whom English is not their first language.

Last, in the present study we used only one measure of reading skills (DIBELS). Though this measure is widely used by school districts throughout the United States, it did not include reading comprehension, which has been widely acknowledged as an essential metric of reading ability (cf. National Institute of Child Health and Human Development, 2000). Nonetheless, given the research demonstrating a link between early literacy and later comprehension (Fiester, 2010) and oral reading fluency and comprehension (Fuchs et al., 2001), we would expect the 4-year trend observed in this study to continue into later years and more advanced levels of reading.

## Conclusion

This study provides one small step forward for reading instruction and educational policy by illustrating that even in the most difficult of circumstances, reading programs that integrate existing research can succeed. In particular, it is clear from these data that arts-based curricula hold great promise for engaging students in a way that can generate significant gains in academic achievement. A well-built arts-based program consistently implemented during the first 4 years of a child's education can succeed in teaching reading to many more of the students who have been failed most consistently in the past by our educational system. It is time to stop testing the separate parts of effective reading instruction and to start putting them together into programs that work. Until we demonstrate the effectiveness of comprehensive, practical, and research-based reading programs that get even most challenged students to read by Grade 3, public education in the United States will continue its slide toward the bottom of the world rankings.

## ACKNOWLEDGMENTS

The authors would like to thank the following professionals who made significant contributions to this research: Karl Androes, Sommer C. Harvey, Liz Johnston, Chelsea K. Leonard, and Christine Thomas. We would particularly like to thank Dr. Jenifer Cartland from the Child Health Data Lab of Children's Memorial Research Center for her help with matching treatment and control schools.

## NOTE

1. In treatment school 2, intermittent weeks of attendance data were lost after being collected in Grade 3; approximately one half of the data was misplaced and irretrievable.

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APPENDIX  
Sample Activities for Each Reading Skill from the *Reading in Motion* Curriculum in Grades K–3

| Phonemic awareness (kindergarten and first grade)  | Phonics (kindergarten through third grade)   | Oral reading fluency (first, second, and third grade)  |
|--|--|--|
| <p><b>Description:</b> Students segment phonemes with their fingers (segments are noted by taps and then the entire word is spoken or sung as each student scrapes with their fingers) that is done in a rhythmic and percussive way.</p>  | <p><b>Description:</b> Students are engaged to make explicit connections between letters or letter combinations and sounds to improve their alphabetic principal skills. The practice and monitoring of this skill, and later the skill of blending, is made exciting through songs which prescribe tempos and rhythms to challenge children's automaticity with the skills.</p>   | <p><b>Description:</b> Beginning at the middle of first grade, oral reading fluency is taught through "partner reading," during which students repeatedly read a script with a partner, as actors would do during a rehearsal. Through this activity, they improve their oral reading fluency while gaining self-confidence and drama skills, which they demonstrate on Fridays when they perform the script for the whole class.</p>  |
| <p>Sample activity: "Train Is A-Coming" (kindergarten, Week 20)</p>  | <p>Sample activity: "Word Blues" (first grade, Week 6)</p>   | <p>Sample activity: Partner Reading (second grade, Week 6)</p>   |
| <p><b>Do:</b> Separate the cards for bus, ball, fan, fish, bed, cup, bat, house from the deck of cards. Hold the cards for bus, ball, fan and fish and keep the remaining deck of cards in close reach.</p> <p><b>Say:</b> Now we will segment and name all the sounds in the words. Get your finger rhythms sticks ready.</p> <p><b>Do:</b> Use words: bus, ball, fan, fish, bed, cup, bat, house.</p> <p>Use this response pattern for verses one and two:</p> <p>Leader: Bus. . .the sounds are /b/ /u/ /s/ in bus.</p> <p>Students: Bus. . .the sounds are /b/ /u/ /s/ in bus.</p> <p>Use this quicker response pattern for the third and final verse:</p> <p>Leader: Bus. . .</p> <p>Students: The sounds are /b/ /u/ /s/ in bus.</p> <p>Sing the song with CD track #9 or #10. Turn off the music. Pick up the other deck of cards and place them behind the cards you have been using for the song.</p> <p><b>Say:</b> Now, I'm going to give you solo chances to tap a word. I'll go around the circle.</p> <p><b>Do:</b> One, by one, give each child a word and allow them to tap out the sounds. Correct any missed sounds by correctly modeling the sounds and allowing the child to try one more time. Move at a steady pace. Make sure each child gets a turn.</p> | <p><b>Say:</b> I have a new song to teach you today. This song will help us practice reading our nonsense words. Listen to me sing the first part of the song.</p> <p style="padding-left: 40px;">I've got the blues.<br/>Hear what I say.<br/>I'm going to read my nonsense words today. Sing that much with me.</p> <p><b>Do:</b> Sing the first three lines again with the students. Repeat the chorus as necessary until they are singing it accurately.</p> <p><b>Say:</b> We will come back to these three lines throughout the song. Whenever I say back to the chorus you will sing:</p> <p style="padding-left: 40px;">I've got the blues. Hear what I say.<br/>I'm going to read my nonsense words today.</p> <p><b>Do:</b> Pick up the card tray and letter cards. Place the nonsense word sib in the tray.</p> <p><b>Say:</b> After we sing the first part of the song, we are going to read some nonsense words. I'll point to each letter while you say each sound. Then, I'll sweep my finger across the word while you blend the sounds to say the word. After we read four nonsense words, we'll go back and sing the chorus again. Let's try it.</p> <p><b>Do:</b> Play track 8 on the CD, and sing the song. Use the letter cards to form words from the word list printed below. After each set of four words, sing the chorus. When the music runs out, turn off the CD.</p> <p><b>Say:</b> Now let's practice a cappella, or without music. I'm going to go a little bit faster.</p> | <p><b>Do:</b> Have George and the Dragon, Act 2 ready for use today.</p> <p><b>Say:</b> It's time for Partner Reading. It's time to find out what happens next in the story. You will begin with Step 1, 2 and 3 of the script today.</p> <p><b>Do:</b> Hold up Step 1.</p> <p><b>Say:</b> Before you get started, listen while I read the story to you so that you will be familiar with the ideas presented in the script.</p> <p><b>Do:</b> Read the story, Step 6, to the students.</p> <p><b>Say:</b> Let's get started. I will have a group of you read over here, near me.</p> <p><b>Do:</b> Call on the partners who need the most support with Partner Reading and direct them to move to the area where you will work with them.</p> <p><b>Say:</b> I would like the rest of you to move next to your partners.</p> <p><b>Do:</b> Allow the rest of the class to move next to their partners.</p> <p><b>Say:</b> After you have read a step two times through, you may decide if you are ready to go on to the next step. You should not go on to the next step unless you can read the previous step with two or less mistakes, and also read at a speed that sounds like natural speaking. If you are still making mistakes or reading very slowly, spend some more time developing your accuracy and rate and then move on to the next step.</p> <p>Start with Step 1 in the script booklet and move through them in order.</p> |

APPENDIX  
Sample Activities for Each Reading Skill from the *Reading in Motion* Curriculum in Grades K-3 (Continued)

| Phonemic awareness (kindergarten and first grade) | Phonics (kindergarten through third grade)  | Oral reading fluency (first, second, and third grade)  |
|---|---|--|
|   | <p><b>Do:</b> Drill the students, using words from the word list again, at a slightly faster pace. Allow the students to answer in unison.</p> <p><b>Say:</b> Now, I want to give you each a turn to read a word by yourself. I'll call on you.</p> <p><b>Do:</b> Go around the room, giving each student a word from the word list. Continue to assist them by pointing to each letter and then sweeping your finger across the word to signal them to blend. Provide any missing sounds. Respond to any incorrect answers by modeling the correct answer and allowing the student to try again. Repeat the chorus after every fourth student.</p> <p><b>Words</b> sib tib hib mib nib lib pib kib kif<br/>pif lif nif mif hif tif sif</p> | <p>This is your time to practice reading the scripts so that you will know them really well when it is time to perform at the end of the week.</p> |