

Accelerating the Reading Growth of At-Risk Kindergarten Students

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Accelerating the Reading Growth of At-Risk Kindergarten Students

Abstract

This paper presents the results of a three-year project to test the effectiveness of whole-class, intensive, explicit beginning decoding and spelling curriculum designed to accelerate the reading growth of a population of at-risk African-American kindergarten students. At pretest each year, the average score of students in the project on phonemic awareness was almost one standard deviation (14.3 standard score points) below the mean. At post-test, the average score of students on this measure was at the mean, and average measures of students' word reading scores were at the beginning first grade level. The project provides a model for eliminating the achievement gap in early reading performance.

Key Words: Achievement gap, beginning reading instruction, instructional efficiency, phonemic awareness instruction, phonics instruction

Introduction

A prominent concern in education today is the achievement gap between the academic performance of minority students and their white peers. In the most recent National Assessment of Educational Progress, 48% of white 8th grade students attained a proficient or better level in reading, whereas only 13% of black 8th grade students did so (U.S. Department of Education, 2003). Addressing this gap is a major focus of the federal No Child Left Behind legislation.

This gap exists as soon as students enter school. Downey, von Hippel, and Broh (2004) report that black children are on average .52 months behind their white peers in beginning reading skill at the start of kindergarten and that this initial gap widens by the end of first grade. The effect of this initial gap is pernicious because of so-called "Matthew effects" resulting from the advantages conferred by early reading achievement on subsequent achievement (Stanovich, 1986). Much of this effect is likely the result of how early reading ability affects the volume of reading a student does. Students who quickly master beginning reading typically read much more than readers who struggle, and this additional practice from the higher volume of reading serves to widen early differences in ability. These differences in early reading ability frequently translate into differences in motivation as many children who struggle with reading in the first grade soon decide that they neither like nor want to read (Juel, 1988). As a result, the volume of reading maintained by these students is likely further reduced because they do not seek out opportunities to read.

One way to address this situation is to begin formal reading instruction with at-risk students in kindergarten. A number of studies have suggested the effectiveness of kindergarten reading interventions that explicitly, intensively and systematically develop phonological

Accelerating Reading Growth of At-Risk Kindergartners

recoding skills, i.e., the ability to translate letters into sounds and blend these sounds into words (Simmons, Kame'enui, Stoolmiller, Coyne, & Harn, 2003; Torgeson, et al., 1999; Blachman, Schatschneider, Fletcher, and Clonan, 2003; O'Connor, 2000). Most kindergarten interventions, however, have focused on individual tutoring or small group instruction. The goal of the present project was to determine if the implementation of a systematic, explicit code-emphasis curriculum designed to teach beginning decoding of words and sentences delivered whole class by regular classroom teachers with supplemental tutoring for the lowest-performing students could significantly improve the reading achievement of a population of at-risk African-American students.

Specific Curriculum Features

The curriculum used in the present project was the beginning level of the ABeCeDarian Reading Program, written and developed by the lead author. (More advanced levels of the ABeCeDarian Program are designed for intervention suitable for students at first grade reading level and higher.) This program is organized to provide explicit, intensive, and systematic whole class instruction to develop phonological recoding skills as quickly as possible using five central activities, listed below. While this program builds on activities that have been successfully used in other instructional programs, there are several key organizational features of the program designed to improve the efficiency of the instruction. These instructional efficiencies include: focusing all phonemic awareness activities exclusively on phoneme blending and phoneme segmenting; always conducting phonemic awareness activities with letters, as opposed to conducting them as wholly oral activities; conducting virtually all letter/sound practice in the

context of reading and spelling words; and teaching letter/sound relationships and not letter names.

Word puzzle. Every word in the program is introduced with a Word Puzzle in which the teacher helps the students spell a word by identifying each individual sound and then using a letter tile with the appropriate letter to record the sound. Significant scaffolding is provided to help students perform this task. In presenting the puzzle, the teacher first draws on her board two, three, or four lines corresponding to the number of sounds in the word to be spelled. Then she displays only the letters needed to spell the word, but in mixed-up order. She pronounces the word and asks for the first sound. As the students are thinking, the teacher runs her finger slowly underneath the lines and pronounces the word slowly, elongating each continuant sound for approximately one second. She moves her finger under the lines so that by the time she is saying the second sound, her finger is under the second line, and by the time she says the third sound, it is under the third line. Students first identify the appropriate sound in isolation, and then help the teacher find the corresponding letter.

After the whole word has been formed, the teacher leads the students in a "tap-and-say," by touching an individual letter and saying its sound in isolation. An important feature of the program is that this word level analysis is not preceded by instruction in isolated letter/sound correspondences as is typically done in such explicit, code-emphasis programs, nor is there a separate, preliminary set of purely oral phonemic awareness exercises. Rather, the "code" is taught and phoneme awareness is developed in the context of spelling and reading words. In other words, code knowledge instruction and practice to develop phoneme blending and segmenting skills are united within the activity, a feature shared by all the other core activities in the program as well. This arrangement greatly saves on instructional time and provides

immediate relevance to all of the work students are asked to do since every activity directly involves reading and spelling words. If at any time students lack the segmenting skills or code knowledge to perform the word puzzle task, the teacher provides the answer explicitly, has the class repeat her answer, and, once the puzzle has been completed, repeats the task until students can perform it independently.

Word writing practice. Students learn how to form each letter needed to write the words they have just examined and they practice writing these words in a workbook. In addition to having static models of the correct formation of letters, the program provides students with explicit and simple oral steps to help them plan how to write each letter. For instance, to form the letter for the /m/ sound, students are taught to "Start at the dot. . .fall down to the line, bounce up and over . . .fall down to the line. . .bounce up and over."

Reading word cards. The words the students have examined are presented on word cards for the students to read. During the early stages of instruction, considerable time is spent helping students acquire the skill of isolated phoneme blending. Two instructional strategies are employed in this work, namely, saying the sounds of the word in isolation as well as a continuous blending technique. During the initial review of word cards, the teacher will display a word card, pronounce it, have the class repeat the word, and then have them perform the "tap-and-say" procedure introduced during the word puzzle, which involves pronouncing each phoneme in turn in isolation and then saying the whole word. This activity helps students to link the isolated sounds to the whole word.

Once students can perform this task easily, the teacher then presents the words without first pronouncing them. If a student doesn't recognize the word immediately, the teacher has him perform a "tap-and-say." If the student still doesn't recognize the word, the teacher pronounces

the word very slowly by elongating each continuant sound in the word for approximately 1 second, a technique dubbed "Turtle Talk." As she pronounces the word, she runs her finger in a slow continuous movement underneath it so that she is pointing to the letter for the sound that she is pronouncing at the moment. After she says the word in this manner, she has the student call out the word in "People Talk," i.e., in regular speech at normal speed. The teacher then has the student repeat the tap-and-say on the word. Presentation of the word cards for the unit is repeated until the students can recognize the words easily.

There are several benefits of presenting blending practice with these two methods in concert. Discrete phoneme blending helps students with planning by allowing a pause in between the phonemes for students whose processing is slower and focus is more problematic. It also more clearly reinforces letter/sound relationships and allows the teacher to identify and correct errors in letter/sound knowledge easily. The continuous blending, on the other hand, provides an effective bridge for many students in translating isolated phonemes into whole words because the product, the elongated word, more closely resembles the pronunciation of the word in regular speech. As students become more proficient, responsibility for saying the word in Turtle Talk is shifted from the teacher to the student.

Reading words and sentences from a fluency practice book. After reading isolated word cards, students read simple, decodable sentences in a specially prepared fluency practice book. At the top of the page of the fluency book, sentences are first presented in phrases that are repeated, and then at the bottom of the page, the sentence is presented all together and without repetition (see Figure 1). The purpose of this repetition is to provide sufficient exposures so that students can develop rapid recognition of the words presented. Each unit in the fluency book contains about 8 sentences, which are repeated all together without phrase breaks or repetitions

at the end of the unit. Once students have completed 11 units, they also read from the storybooks in the Primary Phonics series published by Educators Publishing Service. Students practice reading from the ABeCeDarian fluency book and the Primary Phonics story books until they are able to read the material without hesitation or error. *Insert Figure 1 about here.*

Spelling. Students practice spelling the words that have been presented to them. A variety of scaffolded activities train students to segment the words into their individual sounds and to associate the proper letter with each sound. For example, students practice copying the words (always saying the individual sound as they write each letter) and they take spelling "tests" in which they have to choose the correct word from a list of the word (again, saying the individual sound of each letter as they write it). Students also have opportunities to spell the words with letter tiles as well as with pencil and paper. Students practice spelling whole sentences as well as individual words.

In addition to these core activities, a key component of the program is how teachers respond to student errors. The goal of the error correction techniques employed by the teachers is to make transparent to students precisely where they made a mistake when reading or spelling a word. For instance, if the student read the word "mop" as "map," the teacher would say, "You said 'map,' with an /a/ here. But look, we have /o/. Do a tap-and-say and try again please." The skills needed to process this information are practiced in each unit in an activity called the Error Game, in which the teacher reads words and students have to determine if she read them correctly or not. Thus a set of basic routines are employed to train students to self-monitor their own performance and to develop the skills, knowledge, and strategies needed for accurate self-correction.

Accelerating Reading Growth of At-Risk Kindergartners

This basic set of activities is repeated as students learn 106 words divided into 4 instructional sections, each section introducing about 8 new sounds. Most of the words consist of a consonant, vowel, and consonant; however, by the middle of the year, students also work with words containing adjacent consonant sounds, such as “must” and “frog.” In the course of this work, students learn the letter/sound correspondences for the one-letter consonants and the so-called “short” vowel sounds for *a, e, i, o, u* and the primary sounds represented by the digraphs *sh, ch, th, and ck*. The digraphs, it is important to note, are always represented on a single letter card during the Word Puzzle activity, and students play "I Spy" in their workbooks, looking for and underlining the digraphs in a series of words.

Six high-frequency words (*the, a, of, to, is, I*) that have sound/symbol correspondences not otherwise presented at this level are learned as wholes without presenting them with the tap-and-say or Turtle Talk procedures. These unanalyzed words are kept to a minimum at this beginning level so that instructional time can be devoted to ensuring that students learn letter/sound relationships and acquire skills and phoneme blending and phoneme segmentation. Irregularly spelled, high frequency words are fully addressed in the first grade level of ABeCeDarian (not used in this project with kindergarten students) at which point students have a firm grasp of the alphabetic principle as well as well-established blending and segmenting skill.

With the exception of these 6 unanalyzed words, all of the words presented use a simplified "code" in which each sound is represented by only a single spelling, and each spelling represents only a single sound. This allows all of the spellings to be referred to by sound rather than by letter names. Referring to letters by sounds exclusively during beginning reading instruction provides several instructional efficiencies: It reduces memory load for the student (he has only to associate a single sound with a letter or digraph); and it allows phoneme segmenting

Accelerating Reading Growth of At-Risk Kindergartners

and blending to be easily united with code knowledge instruction without interference or confusion provided by letter names. That being said, the school district these students attended nonetheless required that students learn letter names during kindergarten, so these students did learn letter names concurrently but in carefully segregated activities, such as during calendar time and in activities to go over the spelling of each student's name.

Participants

Students in this project attended a kindergarten center in Wilmington, Delaware between September 2001 and May 2004. This kindergarten center serves a population comprised almost entirely of African-American students, approximately half of whom qualify for Title 1 services. A total of 255 received pre-tests over the 3 years. A total of 225 received post-tests; 30 of the students no longer attended the same school by the time of the post-test.

Method

Six different teachers participated in the project over the three years of the project with only one participating all three years. There was at least one new teacher to the center each year. Teachers ranged in experience from 0 years to 25 years. Teachers received approximately 6 hours of training in the program before implementation. Following initial training, the program developer provided approximately 40 hours of time devoted to team meetings, in-class observations, and modeling lessons with the classes over the course of each school year. Teachers spent between 30 and 40 minutes a day divided equally between whole-group activities

Accelerating Reading Growth of At-Risk Kindergartners

and individual and partnered "centers" work. In addition, a tutor provided additional services for 3 hours daily 4 days a week for 30 weeks. The tutor worked individually and in pairs with 12-16 students a day who were not making adequate progress with the classroom instruction alone. Students moved in and out of tutoring throughout the year based on their performance on the unit check-outs. While most students who received tutoring received 15 minutes of tutoring 4 days a week, some received fewer lessons per week because they were not as far behind. The content of the tutoring lessons was exactly the same as the classroom content.

Testing was conducted in September and October, and again in May in all three years of the project. Each child was tested individually using the core subtests from the Comprehensive Test of Phonological Awareness (CTOPP) and the Letter/Word Identification and Word Attack subtests from the Woodcock Language Proficiency Battery-Revised (WLPB-R).

Results

At the beginning of the year in all three years, students were well below average in phonemic awareness and rapid automatic naming. The overall standard score group mean on the CTOPP in September/October was 85 for the phonemic awareness composite and 80 for the rapid naming composite. Sixty-eight percent of the students in the early fall were below average in phonemic awareness and 58% were below average on rapid naming. Only 1 student scored at the above average level in phonemic awareness in the fall of kindergarten.

Statistical analyses were conducted to measure the growth of students over the course of a school year. Repeated measures analyses of variance, with the student's pretest and posttest scores as the within-subjects variable and the teacher as a between-subjects variable, were

conducted for the CTOPP Phonological Awareness composite scores, and the WLPB-R Letter-Word Identification, and Word Attack.

Phonological Awareness Scores

Table 1 shows the average of students' pretest and posttest scores on the CTOPP Phonological Awareness (PA) composite measure. There was a dramatic increase over the course of the year. As indicated in the table, the group mean for the PA composite on the CTOPP is 85.7 at the time of the pretest, rising to 98.8 by the time of the posttest. The increase is substantial and statistically significant, $F(1, 211) = 238.03, p < .0001$. There is a comparatively modest main effect for the teacher ($F(5, 211) = 5.069, p < .0001$), and a similarly modest interaction between the teacher and the pre-post comparison ($F(5, 211) = 6.996, p < .0001$), showing that some teachers consistently had students with greater gains over the time period.

Figure 2 visually displays the dramatic shift from pretest to posttest on the combined student body's phonological awareness. At the pretest, the vast majority of students (68%) score at the poor or below average level on the Phonological Awareness composite of the CTOPP. By the time of the posttest, however, we see that the kindergarteners' scores now approximate a standard distribution. Just 23% score poorly or below average on this composite; the majority now perform at average or above average levels. *Insert Figure 2 about here.*

Letter Word Identification Scores

A similar repeated measures analysis of variance was undertaken with the students' pretest and posttest Letter-Word Identification (LWI) scores on the WLPB-R. Again, the analysis shows dramatic improvement ($F(1, 208) = 638.34, p < .0001$). The average LWI score is .303 at the time of the pretest, rising to 1.11 at the time of the posttest. Importantly, 80% of this at-risk group scores at or above grade level in the LWI subtest by the end of the year. As expected, there is also a relatively modest teacher effect ($F(5, 208) = 5.57, p < .0001$) and moderate interaction between the teacher and the pre-post-comparison ($F(5, 208) = 10.209, p < .0001$).

Word Attack Skills

Finally, a repeated measures analysis was performed on students' Word Attack (WA) scores on the WLPB-R at the pretest and posttest. A very similar pattern is observed: strong improvement from the beginning to the end of the school year ($F(1, 128) = 284.08, p < .0001$), a small but significant main effect for the teacher ($F(4, 128) = 5.043, p > .001$) and a similarly modest interaction between the teacher and the timing of the test ($F(4, 128) = 5.664, p < .0001$), showing that some teachers produce more substantial improvement in word attack skills than others.

Discussion

These data indicate that the instruction provided to classes with a significant proportion of at-risk kindergarten students dramatically reduced the number of students with below average PA and helped most develop above grade level word reading and word analysis skills. As shown in Table 1, the groups began the year below average in PA, and by the end of the year the performed as an average group. This performance is especially significant given that the initial gap in reading skills between black and white children at the start of kindergarten in the United States typically *increases* by the end of first grade (Downey, von Hippel, & Broh, 2004).

It is very important to point out that this project was conducted with regular classroom teachers and that the staff experienced turnover in each of the three years. Teachers ranged from very experienced to very inexperienced. The empirical results of this study show that there is a discernible but modest teacher effect, greatly overshadowed by the overall treatment effect. In other words, a wide range of teachers can be effective with this program, even when working with a class of students who are significantly below average in beginning reading skill.

Further research needs to be done to determine the ability of these students to sustain these gains and to build on them. The students in the first year (who were in kindergarten in the 2001-02 school year) have recently completed third grade. Their performance in the spring on the state reading test will be examined. An additional project is also being undertaken to compare the performance on the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) of the students in this program with all of the other kindergarten students in the district who received different instruction.

Accelerating Reading Growth of At-Risk Kindergartners

Nonetheless, this project clearly demonstrates that it is possible with a combination of precise and intensive whole class instruction and tutoring to bring a class of kindergarten students with weak beginning reading skills up to average levels of performance.

Accelerating Reading Growth of At-Risk Kindergartners

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Accelerating Reading Growth of At-Risk Kindergartners

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Figure 1

Sample page from Fluency Practice Book

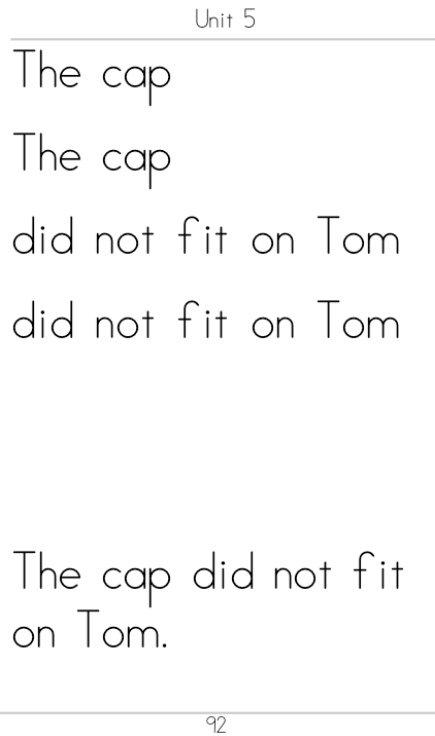
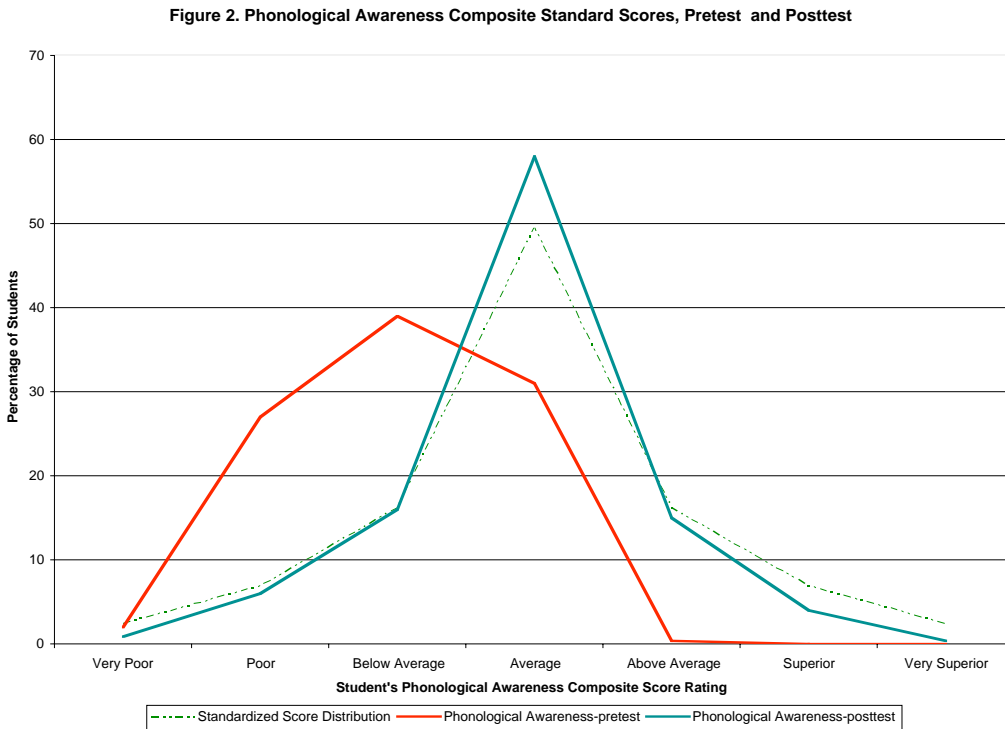


Figure 2

Distribution of Pre-and Post-Test Scores on PA composite and normal distribution



Accelerating Reading Growth of At-Risk Kindergartners

Table I

Average Group Phonological Awareness and Reading Performance Scores

	October	May
CTOPP Phonemic Awareness Composite (standard scores)	85	99
Percent of students below average on CTOPP Phonemic Awareness Composite	68	23
WLPB-R Letter-Word ID (grade equivalent scores)	K.1	1.2
WLPB-R Word Attack (grade equivalent scores)	K.7	1.4