

Teaching Reading in an Inner City School through a Multisensory Teaching Approach

R. Malatesha Joshi

Texas A & M University
College Station, Texas

Mary Dahlgren

Payne Education Center
Oklahoma City, Oklahoma

Regina Boulware-Gooden

Texas A & M University
College Station, Texas

The purpose of the present study was to examine the efficacy of the multisensory teaching approach to improve reading skills at the first-grade level. The control group was taught by the Houghton-Mifflin Basal Reading Program while the treatment group was taught by the Language Basics: Elementary, which incorporates the Orton-Gillingham-based Alphabetic Phonics Method. The results showed that the treatment group made statistically significant gains in phonological awareness, decoding, and reading comprehension while the control group made gains only on reading comprehension.

Nearly 15 to 20% of elementary school children experience difficulty in mastering the literacy skills of reading and spelling (Lyon, Gray, Kavanagh, & Krasnegor, 1993; Stedman & Kaestle, 1987). Several reasons have been advanced to explain reading difficulties experienced by some children. These include family background, paucity of literacy materials available at home, lack of motivation on the part of the learner, and some unspecified cognitive weakness. To this list of factors should also be added the quality of beginning reading instruction provided in many schools. Carroll, as early as 1963, noted that a high percentage of school children fail to acquire literacy skills when the classroom instruction is ineffective or insufficient. Calfee (1983) suggested that the majority of reading-disabled children "represent an instructional dysfunction rather than a constitutional disability" (p. 77). Poor instruction has a more direct impact on reading performance of children in early elementary grades than in later years. Furthermore, poor performance in early grades tends to persist as children advance through the educational system. Juel (1988), for instance, followed a number of poor readers from first grade through fourth grade, and found that children who read poorly at the end of the first grade remained poor readers at the end of fourth grade. Corroborating this conclusion is the finding by Strag (1972) that when a diagnosis of dyslexia was made in the first two grades and treated, nearly 82% of the students could be brought up to their normal classroom work; whereas only 46% of the dyslexic problems identified and treated in the third grade were remediated. This number falls off sharply to 10 to 15% when treatment is provided in grades five to seven. According to Torgesen (2000), it takes more than two hours of intensive intervention per day for a year to remediate a child at the sixth or seventh grade level. It follows, then, that poor readers need more intensive high-quality remedial instruction in early elementary grades than in later grades. When an intensive structured reading program was adopted at the early grade levels, there was a significant improvement in children's reading ability. Schenck, Fitzsimmons, Bullard, Taylor, and Satz (1980) found a significant improvement in academic development of high-risk children who received kindergarten interventions. Similarly, Blachman and her colleagues (Ball & Blachman, 1991; Blachman, 1987, 1997; Blachman, Ball, Black, & Tangel, 1994) and Foorman and her colleagues (Foorman, Francis, Fletcher, Schatschneider, & Mehta, 1998; Foorman, Francis, Novy, & Liberman, 1991) have showed that early intervention programs were been highly effective.

A number of studies have demonstrated that systematic, explicit, decoding instruction that emphasized synthetic phonics yielded better results than other instructional methods (Auckerman, 1984; National Reading Panel, 2000; Rayner, Foorman, Perfetti, Pesetsky, & Seidenberg, 2001, 2002; Snow, Burns, & Griffin, 1998; Torgesen, Wagner, & Rashotte, 1997; Torgesen, et al., 2001; Vellutino, 1991). A remedial instruction that has deep historical roots and is being widely used is the Orton-Gillingham Approach (OG hereafter). In clinical studies, this approach has proven to be very effective in improving reading and spelling among children with literacy problems (cf., McIntyre & Pickering, 1995).

Even though the principles of the OG have been in use since the 1930s, Anna Gillingham, a close associate of Samuel Orton, and Bessie Stillman are credited with publishing the principles of this approach only in the 1960s (Gillingham & Stillman, 1997). The most important feature of the OG is that it is a structured program that deliberately tries to establish a link between the printed language and the phonetic elements it represents. The ultimate goal of any instructional procedure is to develop reading comprehension, and the OG purports reading comprehension will emerge once decoding skills and vocabulary knowledge are well developed. Poor word recognition skills can act as a bottleneck and impede comprehension, causing the reader to spend an inordinate amount of time and energy decoding a word and losing the meaning of the passage.

The OG is a multisensory method of teaching language-related skills that focuses on the use of sounds, syllables, words, sentences, and written discourse. Instruction is explicit, systematic, cumulative, direct, and sequential. Ansara (1982) summed up the OG this way:

Although the first emphasis in the Orton-Gillingham Approach is to ensure decoding with visual accuracy, correct phonological association and facile performance, decoding encompasses a progression from graphemes to syllables to multisyllabic words with roots and affixes, along with their meanings, so that the structure of the English language is made explicit. Sufficient practice in both reading and writing is provided so that one reinforces the other while moving toward the goal of automatic decoding (p. 421).

Since the 1960s, several versions of the OG have been developed. A closely related approach is the multisensory approach developed by Beth Slingerland to remediate students

with specific language disorder (Slingerland, 1977). Another co-worker of Samuel Orton, Romalda Spalding, developed a program called the Writing Road to Reading or the unified phonics method (Spalding & Spalding, 1990). Even though much of the material is borrowed from the OG, the Spalding method differs from it in two important respects: emphasis on letter sounds rather than letter names, and emphasis on spelling through writing.

Other programs derived from the OG are Alphabetic Phonics (Cox, 1992), the Herman Approach (Herman, 1993), Project Read (Enfield, 1987), and the Wilson Approach (Wilson, 1988, 2000). These approaches share the same philosophy—namely the importance of word recognition skills for reading—and can be grouped under the umbrella term of multisensory instruction. These instructional procedures are systematic, sequential, explicit, and direct in imparting instruction and utilize visual, auditory, kinesthetic, and tactile senses for teaching reading.

Even though the OG was first published in 1960, its principles were used in classroom settings several years earlier. One of the earliest studies conducted that incorporated the OG principles was by Monroe (1932). Three groups of participants from different grade levels were involved in this study. Eighty-nine subjects received individual instruction based on the OG. The second group of 50 subjects received OG instruction in their classrooms by teachers trained in its principles, and the third group of 50 subjects served as a control group and received instruction that was used in the classroom. The instruction for all three groups lasted for about seven months. As expected, the first group that received the OG on an individual basis showed the most gain: 1.4 years for the seven-month period compared to three months gained by the control group. The second group that received the OG in classrooms showed a gain of eight months. Another study (Kline & Kline, 1978) reported that of the 92 dyslexic subjects taught through the OG, only 4.4% failed to show improvement.

Although not labeled as an OG, one study that has compared several reading instructional programs is one by Foorman, Francis, Shaywitz, Shaywitz, and Fletcher (1997). The study compared the effects of the three types of instruction in eight elementary schools in Houston. The three types of instruction were whole-language instruction, embedded phonics, and direct-code instruction. In whole-language instruction, the emphasis was on connected text with alphabetic learning assumed to go on implicitly. In embedded phonics instruction, sound-spelling patterns

were stressed by using connected text. In direct-code instruction, letter-sound correspondences were taught and practiced with various kinds of text, writing, and language games. The study found that the children from direct-code instruction improved in word reading at a faster rate and had higher word-recognition skills than children from whole-language instruction.

Almost all of the studies using multisensory teaching techniques based on the OG were conducted either in a clinical setting with special populations or taught in small group settings. Sometimes, instruction was provided by private tutors who were not likely to report the outcomes of their efforts. This led Moats & Farrell (1999) to remark that despite the widespread inclusion of multisensory techniques in remedial programs for dyslexic students, and strong beliefs among practitioners using these techniques that they work, there is little empirical evidence to support the techniques' theoretical premises. Although many of the programs incorporating these strategies have been effective according to clinical reports, the specific contribution of multisensory methods to the overall success of these programs has not been adequately documented through rigorous manipulation of instructional conditions and subsequent measurement of outcomes (Moats & Farrell, p. 7).

The present study was conducted to investigate empirically the effectiveness of using multisensory teaching technique with first-grade children. We specifically wanted to see whether, after one-year of instruction delivered through multisensory techniques, first grade children would perform significantly better in the basic reading skills of phonological awareness, decoding, and comprehension when compared to a group of children taught in the conventional manner.

METHOD

The multisensory method of instruction used in the present study is called the Language Basics: Elementary. The materials and procedures used in this study were prepared by the Payne Education Center in Oklahoma City, Oklahoma. This method is based on the OG, specifically the Alphabetic Phonics (Cox, 1985, 1992). Aylett Cox worked with Lucius Waites from the mid-1960s to the mid-1970s at the Texas Scottish-Rite Hospital in Dallas directing the Childhood Language Disorders Clinic. During this period, they developed the Alphabetic Phonics curriculum based on their work with over 1,000 children who were

failing in school despite average or above average intellectual ability. Because the lessons combined all three learning modalities—auditory, visual, and kinesthetic—it is called multisensory instruction. Two or more of the sensory modalities were used simultaneously to receive or express information. The lessons were made up of 11 components, and included direct and systematic instruction in phonemic awareness, alphabet activities, oral language, reading and spelling practice, reading comprehension, and vocabulary development based on the sound-structure of the English language. The lessons moved through a specific instructional sequence daily (additional information about the method and materials for this multisensory teaching approach can be obtained from the Payne Education Center in Oklahoma City, Oklahoma; the Web site address is www.payneeducationcenter.org).

PARTICIPANTS

Participants came from four first-grade classrooms from an inner-city school district with approximately 40,000 students in a southwestern city. Children from two classrooms were taught through the “Language Basics: Elementary” materials. Children from two other first-grade classrooms from another school made up the control group. Both the treatment and control groups were similar in SES background. The distribution of minority population (predominantly African-American) in the control and treatment groups was 49% and 57%, respectively. Further, 82.3% and 80.0% of the students were on free or reduced lunch programs in the control and treatment groups, respectively. None of the subjects had repeated a grade, and according to the teachers’ reports, none had any known hardship in cognitive abilities, uncorrected vision, hearing problems, and none were below average intelligence. In spite of the high mobility of the student population, 32 children from the control group and 24 children from the treatment group stayed in the study throughout the academic year.

INSTRUMENTS

The following tests were administered to all the subjects: *Test of Phonological Awareness (TOPA)* (Torgesen & Bryant, 1994); Word Attack subtest of *Woodcock Reading Mastery Test-Revised (WRWT-R)* (Woodcock, 1987); and the comprehension part of the *Gates-MacGinitie Reading Test (GMRT)* (MacGinitie & MacGinitie, 1989).

The *TOPA* is a group-administered test designed to examine phonological awareness in kindergarten, first-, and second-grade

students. The test was standardized on a normative sample of 3,654 children from 38 states and took 15 to 20 minutes to administer. It had an internal consistency reliability ranging from 0.86 to 0.89, and a test-retest reliability of 0.69. The predictive validity of *TOPA* was 0.62 when computed with the word attack subtest of *WRWT-R* at the end of first grade.

The Word Attack subtest of *WRMT-R* evaluates decoding skills and requires the subjects to read 30 pseudowords. The words are arranged from simple monosyllable, short-vowel patterns to multisyllabic words with different vowel patterns. The test was normed on 6,089 students from kindergarten through college and adulthood. The split-half reliability coefficients ranged from 0.81 to 0.99, and its concurrent validity between *WRMT-R* and other widely used reading tests ranged from 0.78 to 0.92.

GMRT measures vocabulary and reading comprehension, and is a group-administered test. The reading comprehension test took 35 minutes to administer and used the multiple-choice format where the subject is required to read a sentence and select the correct answer from four choices. The *GMRT* reported good validity and reliability coefficients, and was normed over 77,000 individuals enrolled in 222 schools. The reliability coefficients of tests for grades 1 through 12 were in the upper 0.80s and 0.90s, and the validity coefficient with tests such as *Iowa Test of Basic Skills*, *Comprehensive Test of Basic Skills*, and *California Achievement Test* was substantial. According to Swerdlik, the test reviewer, "The *GMRT* is a well-standardized instrument with a large and representative norm sample. Adequate reliability and validity data are presented to use the test as a useful measure of reading achievement, or as a first level screening to be followed up by more of a diagnostic reading test" (1994, p. 352).

PROCEDURE

All the subjects were administered the Word Attack subtest of *WRMT-R*, form G; Comprehension subtest of *GMRT*, form K; and the *TOPA* test, form A at the beginning of the fall semester in September. The *TOPA* and the *GMRT* tests were administered in small groups of five to seven students. The decoding subtest of *WRMT-R* was administered as an individual test and the responses were tape-recorded. There was an interval of one day between administering each of these three tests.

The teachers in the two classrooms of the control group used what they called a balanced approach to teaching reading.

But based on our observation, instruction was primarily based on the basal readers and not on systematic, explicit, sequential instruction. Both the teachers in the control group used the district-approved Houghton-Mifflin Basal Reading Program, and the daily lessons were taught strictly according to the scope and sequence accompanying the instruction manual. The classroom was observed once a week by a qualified instructor but no feedback was given as to how reading should be taught.

The treatment group received the multisensory reading instruction. The teachers in the two classrooms of the treatment group received 42 hours of training in the multisensory techniques during the beginning of the academic year. They were certified as Academic Language Therapists because they completed a structured, sequential, OG-based curriculum, and had participated in a clinical supervision under a qualified Academic Language Therapist. The instructional materials were obtained from the Payne Education Center and based on Alphabetic Phonics (Cox, 1992). A qualified instructor from the Payne Education Center observed the treatment groups once a week and ensured the fidelity of the implementation of the program.

Both the control and the treatment groups received 50 minutes of daily instruction in literacy activities. Teachers for all four classrooms had an average of 10 years of teaching experience.

At the end of the academic year in May, the same tests used for pretesting were used as post-tests. Alternate forms of the *GMRT* and *WRMT-R* were used. *GMRT*, form L, *TOPA*, form B, and *WRMT-R*, form H were administered as post-tests. The number of correct responses on *TOPA* and the Word Attack subtest of *WRMT-R* were scored and then converted into standard scores, which had a mean of 100 and a standard deviation of 15. The number of correct responses from the Comprehension subtest of *GMRT* were scored and then converted to Normal Curve Equivalent (NCE). The mean score of NCE is 50 with a standard deviation of 10. Since the tests were administered on different days, 31, 32, and 30 children from the control group completed the phonological awareness, decoding, and comprehension measures, respectively. Similarly, the number of children from the treatment group completing the phonological, decoding, and comprehension measures was 24, 25, and 24, respectively. The means and standard deviations of the pre-test and post-test scores are shown in table I.

TABLE I. Means and Standard Deviations (in parentheses) of the Scores on Different Tests.

Test	Control Groups		Treatment Groups	
	Pretest	Post-test	Pretest	Post-test
Phonological Awareness	91.65 (13.01)	94.61 (12.45)	91.46 (15.53)	100.75 (15.54)
Decoding	88.34 (6.81)	92.59 (13.69)	93.80 (12.00)	107.36 (13.59)
Comprehension	35.97 (15.17)	44.03 (14.27)	39.83 (11.03)	55.96 (15.22)

RESULTS

Statistical analyses were conducted to see to what extent children in both groups improved in the different aspects of reading, and whether or not children in the treatment group showed significantly greater gains than children in the control group for each of the variables. When the gain scores of the two groups were compared by using repeated measures multivariate analysis of variance, it was found that the gain scores of the treatment groups were significantly higher than that of the control groups. The following F values were found: for phonological awareness, $F_{(1,53)} = 5.02$, $p < 0.03$; $\eta^2 = 0.26$, for decoding, $F_{(1,55)} = 8.94$, $p < 0.004$, $\eta^2 = 0.14$, and for comprehension, $F_{(1,52)} = 6.35$; $p < 0.02$, $\eta^2 = 0.11$. The degrees of freedom are different because the tests were administered on different days and some children were absent during that time. Further, it was shown that children in the control groups showed statistically significant gains only on comprehension measures ($F_{(1,61)} = 5.36$, $p < 0.02$), but the gains in phonological awareness ($F_{(1,63)} = 0.838$, $p < 0.36$) and decoding tasks ($F_{(1,59)} = 2.87$, $p < 0.10$) failed to reach statistical significance conversely, the treatment groups showed significant gains on all of the three variables: phonological awareness ($F_{(1,47)} = 4.11$, $p < 0.05$), decoding ($F_{(1,49)} = 13.99$, $p < 0.000$) and reading comprehension ($F_{(1,47)} = 13.75$, $p < 0.001$).

DISCUSSION AND CONCLUSION

The results of this study showed that first-grade children taught with the multisensory teaching approach based on OG principles performed better on tests of phonological awareness, decoding, and reading comprehension than the control groups. It

may, therefore, be concluded that the higher scores for children from the treatment groups may be attributed to the multisensory approach used in this study. As noted earlier, children in the control groups were not taught phonics skills in a systematic and explicit fashion, and they did not show any significant gains in phonological awareness and decoding skills.

Since the pioneering work of Liberman (1971, 1973), it has been demonstrated repeatedly that phonological awareness is a precursor to skilled reading. Rack, Snowling, and Olson (1992), for instance, after reviewing the literature on the role of nonword reading in fluent reading, concluded that "the development of word recognition is constrained by poor phonological decoding" (p. 29) and that "phonological deficit in the language domain plays a causal role in the reading problems of dyslexics" (p. 49).

This multisensory training could be used not only to improve phonological and decoding skills, but also for improving spelling. The correlation coefficient obtained between scores on a test of decoding nonwords and a test of spelling is in the neighborhood of 0.7 (Aaron & Joshi, 1992; Ehri, 1997; Joshi & Aaron, 1991), which indicates that phonological skills and spelling skills have a close, perhaps reciprocal, relationship. Further, several studies have shown that children having difficulty in developing good decoding skills at the beginning grade levels will develop reading problems during the later grades, setting a vicious cycle of Matthew Effect (Stanovich, 1986; Walberg & Tsai, 1983). Stanovich's study specifically showed that children's reading ability at the first-grade level generally is a good indicator of their 11th grade reading proficiency, since those who read well in the beginning practice more and improve their reading ability.

There are, however, some limitations of this study that should be considered. First, this study involved only one grade level. Currently, we are studying the efficacy of this multisensory training approach at second-, fourth-, sixth-, and eighth-grade levels. Second, the number of subjects, especially in the treatment groups, was 24. Even though we had selected over 40 subjects at the beginning of the study, many of these children moved out of the school district by the end of the school year. Future studies should include a larger number of students. Third, even though we tried to match as many variables as possible, training studies in natural settings are hard to conduct as there may be several confounding variables that are hard to control. Further, this was not an experimental study and the

gains might be due to the Hawthorne effect. However, this may be unlikely. Multisensory teaching techniques based on the OG have been claimed to be very helpful in improving reading skills in clinical settings and in small group instruction (Clark & Uhry, 1995; McIntyre & Pickering, 1995).

In conclusion, this study provides an empirical demonstration that the OG can be successfully implemented at the first-grade level. Of course, this will be possible only if future teachers are trained in the use of multisensory techniques. The reading scores in the United States have been declining during the past decade (National Assessment of Education Progress, 1994, 2000); hence, early systematic research-based reading instruction is crucial at the early elementary grade levels. As of now, preservice teachers are generally not well trained in multisensory techniques of reading instruction (Lieberman, 1987; Moats, 1994; Rayner et al., 2001, 2002). Systematic synthetic phonics instruction from the very early grade levels, as demonstrated by several studies, is an effective tool to combat reading failure and should become a part of the curriculum at every school.

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Address correspondence to: R. Malatesha Joshi, MS 4232, TLAC, College of Education, Texas A & M University, College Station, Texas 77843-4232. Ph: 979-690-7516, Fax; 979-845-9663. email: Mjoshi@coe.tamu.edu.

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