The Effect of Direct Instruction and prior Phonological Awareness Training on the Development of Reading Skills in First Grade

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In first grade the primary mission is to teach children to read. Over the last four decades considerable effort has gone into assessing beginning reading and how to optimize children's acquisition of early literacy skills. It is now well known that children who start out as proficient readers tend to be more successful in school. Children who are poor readers are frequently at risk for more academic and behavior problems and may ultimately find schooling so discouraging that they drop out.

Studies sponsored by the National Institute of Child Health and Human Development indicate that 44% of white students in fourth grade had reading skills so poor that they could not read to learn. The percentages were even worse for African Americans and Hispanics. It was found in NICHD studies that by the end of first grade that poor readers began to show significant decreases in self-esteem and motivation to learn to read. When these children are followed up later their problems only increase because they are unable to learn about science and literature. One strategy to combat this national tragedy is to try to remediate poor students. Expensive and time-consuming tutorial programs such as Reading Recovery have been tried. Another strategy is to optimize reading instruction before a poor developmental reading trajectory, as defined by Good Simmons and Smith (1998), occurs.

Chall (1967) in her work Learning to Read reported results of 25 studies undertaken between 1900 and 1960. Chall concluded that focused instruction in phonics is superior to instruction without this focus in teaching students word recognition, oral reading, and spelling. These findings held for both low performers and normally achieving students. Adams (1986) reviewed the research on reading instruction and came to the same conclusion - that code-based phonics programs produce much better reading comprehension scores than so called meaning-based programs.

Research reported by Juel and Roper-Schneider (1985) indicated that the growth of decoding skills was significantly affected by student basal reading program. By November of first grade, explicit phonics-oriented programs resulted in better performance. By the end of first grade, Juel and Roper-Schneider (1985) found that children who had used phonics-oriented primers were far better at decoding pseudo words than students who had been taught with meaning-oriented basal readers. Adams (1990) concluded that meaning-oriented basal reading series have a mismatch between the phonic principles that they teach and the opportunity to practice those principles in connected text.

Adams (1990) concluded that in order for students to appreciate the value of phonics, it must be taught explicitly and students need to practice it in the context of connected text.

Although years of research have promulgated a number of best practices there is little evidence that educational practice is following the data with any urgency.

The Studies of Brown and Felton (1990) have shown that programs that provide explicit systematic phonics instruction in decoding skills, along with the opportunity to engage in meaningful reading and writing experiences, provide greater improvement in word reading ability than programs that do not provide explicit and systematic phonics instruction. Torgesen (1999) found that explicit phonics leads to greater improvement in word reading ability than typical basal reading programs. Foorman et al (1998) found that at-risk students read in the average range after receiving instruction in a reading program that provided explicit phonics and direct instruction.

Foorman (1991) found that found that classes with more letter sound instruction improved spelling and reading skills more quickly. Phonological segmentation scores in October predicted overall performance in reading and spelling in June of first grade. Better word reading gin October was associated with faster growth in spelling.

Englemann (1997) presented a heuristic model for construction an instructional program. In Englemann's model educational objectives must be stated as a series of specific tasks and all other instructional activities must derive from these. Englemann proposes that a detailed task analysis is needed to specify what concepts need to be taught to acquire a high level of proficiency and each presentation must not lend itself to multiple interpretations by the learners. Englemann (1997) indicates that a teacher should determine from student performance whether students have mastered a concept and if not appropriate correction must be instituted. Englemann (1997) used his model for constructing an educational program to create the Horizons Fast Track A-B curriculum by Owen and Sigfried Englemann. It involves a direct-instruction method and incorporates the latest research findings concerning optimal reading decoding and reading comprehension.

The Direct Instruction approach method was evaluated in Project Follow Through, the largest educational experiment ever conducted. This project was funded by the federal government from 1968 to 1976 and involved more than 14,000 students. The results indicated that the Direct Instruction program had significantly superior basic skill, cognitive, and affective results compared to all other instructional methods it was compared to. Adams and Englemann (1996) prepared this study which was originally analyzed by Abt Associates. Direct Instruction reading scored about half a standard deviation above all other models in reading achievement as measured by the Metropolitan Reading Test.

Adams (1996) reported on a meta-analysis comparing forty-four non-Follow Through studies, the Direct Instruction approach had an average effect size of .68. This is a moderately strong effect. By contrast, whole language reading instruction had an effect size of .09. Although Reading Mastery and DISTAR curricula has been extensively researched through comparative studies, Horizons Fast Track A-B, being a newer direct instruction curriculum, has not had extensive comparative research to demonstrate its effectiveness.

Horizons Fast Track A-B was field-tested (Englemann 1999) between 1992 and 1998 and revised four times based on detailed instructor notes and daily performance assessment of students. Teachers took detailed notes, assessed student performance frequently, and were observed by the authors several times to ensure optimal student performance. The field tests occurred in nine classrooms in four different states. Students came from diverse backgrounds and lived in urban and suburban districts.

An unpublished study by Vreeland et al. (1998) from Kalamazoo Public Schools in Kalamazoo, MI, indicated that students who received instruction in Horizons Fast Track A-B improved their grade equivalent score from 1.0 to 2.7 in passage comprehension on the Woodcock Reading Mastery Tests-Revised. A low SES control group improved its grade equivalent score from K-9 to 2.2 in
passage comprehension. The Kalamazoo study involved 17 students from one
class and eight low SES control students. Inferential statistics were not used, the sample was not matched for reading skill, and the effect of instruction on various aspects of emerging literacy skill was not assessed.

The assessment of many other comparative instruction studies has relied on post testing after a period of instruction between two groups of students. While this provides some gross measure of learning at the end of a period of training, it does not allow one to monitor the pattern of learning over time. Fortunately, the assessment of reading progress has been significantly enhanced in the last few years with the development of brief, reliable, and valid measures of early literacy from Good and Kaminiski (1996).

Good Simmons and Smith (1998) proposed that early intense literacy intervention be linked to frequent assessment in order to monitor individual reading trajectories. They propose that many current assessment practices in the area of early literacy are ineffective because they assess reading indirectly, assess performance infrequently, and don't assess student progress. In this study, an important measure of curriculum effectiveness was its effect on indicators of early literacy acquisition as well as traditional reading assessment.

Deno (1982), Deno et al (1983), Deno (1985), Fuchs and Deno (1981), Hintze, Daly, and Shapiro (1998), Shinn et al. (1992), and Hintze et al. (2000) found that oral reading fluency is a reliable and valid measure of reading proficiency which allows for ongoing progress monitoring especially at the elementary school level. Hintze (2000) found that practitioners can obtain reliable estimates of reading performance based on 8 to 10 data points. Hintze (2000) also concluded that oral reading fluency measures are highly related to differences between student of different grades and classifications and consistent with teacher judgment of student reading proficiency. Given its sensitivity reliability and validity for assessing the acquisition of reading skill, oral reading fluency measures were incorporated into this study.

In the present study, the hypothesis was tested that students who are taught to read with Horizons Fast Track A-B progress at a higher rate of learning compared to those taught using conventional

basal reading programs. Instruction in Horizons Fast Track A-B was expected to positively influence several aspects of reading skill acquisition including the following: nonsense word fluency, reading fluency, phonemic segmentation skills, reading accuracy, word recognition, and passage comprehension. Phonological awareness training in kindergarten and early first grade is expected to enhance reading acquisition among students in accelerated as well as conventional reading curricula.

Method

Subjects

The present study was designed in collaboration with the reading curriculum coordinator. It was decided to pilot the Horizons curriculum in two first-grade classes in two schools and to contrast the performance with two classes, in which reading was taught using the Silver, Burdet, and Ginn curriculum. In order to control for prior reading knowledge and ensure a fair comparison between instructional conditions, students were selected for the study after being matched within one quartile of their score on the Concept in Print Test. IQ, SES, gender, and race were not used to match students. All subjects scored between 178 and 205 on this the Concept in Print Test. The Concept in Print Test was developed by Clay (1970) and is used to screen children for remedial reading services. It involves letter recognition and reading orientation.

An Analysis of Variance was used to determine the effectiveness of the matching. The results indicate that there was no significant difference among these classes in their mean score on the Concept in Print test ($F = 2.13$ df 3
$p = .11$). The students in the Horizons Fast Track A-B classes and the Silver, Burdett, and Ginn classes had equivalent median scores on the Concept in Print test. Ten students were selected from each class who met the criteria of scores on the Concept in Print test. All students were at least six years of age in September of first grade. Initially, there were 20 girls and 20 boys in the study. Three students, two girls and one boy, moved in the spring. Three replacement students with matched Concept in Print scores were added, but one of these students also moved in the last quarter of the year and could not be replaced with a student who had an equivalent score on the Concept in Print Test. Nine percent of students were African-American; ninety percent were white. This is comparable to the citywide population, which is eighty-eight percent white, and nine-percent black

For two of the classes selected, students had received at least 40 minutes per day of phonemic awareness training with the Telian curriculum to enhance phonological awareness for several months during kindergarten. The other two classes did not have prior training in phonemic awareness. The district reading coordinator selected the control classes. Teachers who used the Horizons Fast Track A-B curriculum were selected on the basis of their willingness to pilot the material for one year. None of the students in the Horizons classes received remedial reading instruction. However four students from the control group were referred for remedial reading in the spring of first grade.

One Horizons Fast Track A-B class had been given intense training in phonological awareness by the kindergarten teacher using the Telian curriculum. One class that received Silver, Burdett, and Ginn instruction received frequent training in phonological awareness by a resource room teacher using the Telian curriculum. The intervention by the resource room teacher continued for the first six weeks of first grade and involved thirty-minute lessons with the Telian curriculum. The remaining Horizons Fast Track A-B class and Silver, Burdett, and Ginn class were heterogeneously grouped and had not received extensive training in phonemic awareness in kindergarten.

Instruments

The instruments used to monitor the progress of students and establish the difference between instructional conditions included The Dynamic Indicators of Basic Early Literacy Skills (DIBELS) by Kaminiski and Good (1996). First grade reading probes were obtained from John Hintze, Ph.D. of the University of Massachusetts. The Benchmarks Test, which consists of Dynamic Indicators of Basic Early Literacy Skills (DIBELS) and Test of Oral Reading Fluency from the Early Childhood Research Institute was used. The Test of Word Reading Efficiency and the Woodcock Diagnostic Reading Battery (WDRB) were the conventional post-tests used. Reading teachers initially screened students in kindergarten with the Concept in Print Test by Clay (1970)

The Dynamic Indicators of Basic Early Literacy Skills (DIBELS) was developed by a team of researchers at the University or Oregon by Kaminski and Good (1996)
The DIBELS consist of brief (about one-minute long) measures of critical basic literacy skills. These measures are designed to be reliable, accurate, and valid measures of essential skills and were not designed to be comprehensive assessments of all aspects of early literacy. They represent a downward extension of the methods of Curriculum Based Measurement (Shinn 1989), Deno (1985), Deno (1983), Deno, Marston, and Shinn (1983).

The two DIBELS measures used in this study were phonemic segmentation fluency and nonsense word reading fluency. Phonemic segmentation fluency involves reading a list of up to 24 words to students and asking them to say all the sounds that they hear in each word. A running time is kept for one minute and then stopped. Students were tested individually. Twenty alternate forms of the phonemic segmentation fluency test were available. Alternate forms reliability is .88. Kaminski and Good (1996) found that the criterion and concurrent validity of the phonemic segmentation fluency test ranged between .43 to .65. The phonemic segmentation fluency measure was determined to be most appropriate during the period encompassing the middle of kindergarten to the middle of first grade. Therefore, this measure was used to track student progress biweekly from September to January. There was one follow up phonemic segmentation fluency probe administered in late May.

The other DIBELS measure used was nonsense word fluency. In nonsense word reading fluency, students are presented with a sheet of 80 one-syllable randomly arranged nonsense words and instructed to either say the sounds in each word or read the whole word. Students read these for one minute. Students were tested individually. There were 20 alternate forms of the nonsense word reading fluency test used. Nonsense word reading fluency has an alternate form reliability of .91, and its criterion and concurrent validity range between .47 and .69.

The Test of Oral Reading Fluency is a one-minute oral reading test with several alternate forms. The first-grade passages selected for this study came from John Hintze, Ph.D. from the University of Massachusetts. He derived these from a 1984 version of the Houghlin and Mifflin basal reader. No student read the same reading probe twice in this study. Hintze (1998) generated these probes by using a random number generator to indicate that page from which the passage should be selected. Passages averaged 240 words in length. Passages were taken from narrative text only and expository text and poetry was excluded. Each passage was retyped to remove picture cues. Students were given one passage to read while the examiner had a second copy of the passage with a cumulative word count in the right hand margin. Hintze (1998) used the Spache (1953) readability formula to calculate readability for each passage. All probes for the first grade level had a readability score of 1.0 to 1.9. Hintze (1998) reported parallel forms reliability for these probes. It ranged from .72 to .96.

Third-grade level reading probes from Hintze (1998) were used to assess the claim that Horizons produces accelerated learning. The readability of each passage was determined through the Spache (1953) readability formula.
The core subtests from the Woodcock Diagnostic Reading Battery (WDRB) by Woodcock (1997) was used in late May to assess final student proficiency. Letter/word identification has internal consistency reliability of .95. Word attack has internal consistency reliability of .92, and passage comprehension has internal consistency reliability of .94. Test retest reliability ranged between .94 and .90. The basic reading skills index of the WDRB has a correlation of .80 with the PIAT, .64 with the reading comprehension subtest of the K-TEA, and .86 with the WRAT-R. Thus, the WDRB has adequate concurrent and criterion-referenced validity. A reading teacher, who was blind to the instructional conditions of the children, administered this test. She called students down to a private room and tested student individually.

The Test of Word Reading Efficiency (TOWRE) was used in late May to assess final student reading proficiency. It is a reliable measure of automatic sight word reading and phonological processing. It has an alternate form coefficient alpha of .96 and a test retest reliability of .95. It has a high criterion and concurrent validity, and a confirmatory factor analysis supported the construct validity of this measure.

Procedure

The reading teachers in each school building gave students the Concept in Print Test at the end of kindergarten. These scores were used to select students. Students were included if their scores ranged between 178 and 205 on the Concept in Print Test. This was within the top quartile of students who took the test.
This restriction occurred because one class which had received considerable phonemic awareness training had such high scores on the Concept in Print test. This class set the parameters for the matching of students.

Beginning in September all students was monitored biweekly with the phonemic segmentation fluency and nonsense word reading fluency tests. Their scores were graphed. Beginning in early January, phonemic segmentation fluency was discontinued as a biweekly measure, and students were given one-minute tests of oral reading fluency instead. This substitution followed the protocol of the DIBELS. These were randomly selected from a set of 20 probes. These scores were graphed.

Students were tested individually with a nonsense word probe followed by an oral reading fluency probe. This took two minutes per child.

Progress monitoring sessions were scheduled every other week from Late September until late May. Eight phonological segmentation fluency probes were used, twice a month for four months. Ten oral reading fluency probes were used in five months. Missed probe sessions due to illness or other factors were not rescheduled. Before beginning each progress monitoring session the experimenter told the students that they would be asked to say the sounds in various words, read some nonsense words, or read aloud, starting on the top of the page. The experimenter read the directions for the phonological segmentation fluency task. " I am going to say a word. After I say it, you tell me all the sounds in the word. So, if I say, 'Sam' you would say /s/a/m/." The phonological segmentation fluency sheets were randomly selected from the set of 20 probes. The datum was the number of phonemes isolated.

Next the student was given a randomly sheet with 85 nonsense words on it asked to read make believe words and told "You can say the sounds of the letters or you can say the whole word." The datum was the number of letter sounds correctly identified. Finally, students were given a randomly selected reading passage which was not derived from the curriculum students were using. The experimenter marked reading errors on the corresponding scoring sheets. Separate scoring sheets were used for each student. At the end of one minute the experimenter stopped the student. If the student was in the middle of the sentence, the student was allowed to complete the sentence; however the student only received credit for words read up to one minute. The experimenter marked the passage with a bracket at the end of one minute. The experimenter then calculated the number of words read correctly by subtracting the errors made from the total number of words read in one minute. Both words read correctly and errors were recorded.

The same school psychologist did the DIBELS and TORF assessments. Unfortunately, this assessor was not blind to the treatment condition of these students. In order to ensure that this assessor's bias played no role in this study, a reading teacher was hired as an independent evaluator. She assessed the children with the WDRB and scored the protocols independently with the appropriate scoring software. She was blind to the instructional conditions in this study and the initial performance of students on the Concept in Print Test.

Analysis

JMP Statistics Made Visual software by SAS Corporation was used to analyze data. JMP is a well-respected statistical analytical program. The variables analyzed included phonemic segmentation fluency, nonsense word reading fluency, words read correctly and errors on the TORF and letter/word identification, word attack, and passage comprehension on the WDRB.

In addition, all students were given three third grade level reading probes in June to evaluate the claim that Horizons Fast Track A-B produces advanced reading skills. Repeated measures Analyses of Variance were used to determine the differences between the instructional conditions on the dependent measures. Post hoc analyses were done using the Tukey-Kramer Pair-Wise Comparison Test. A Pearson Product Moment Correlation was used to assess the relationship among the measures.

Results

An Analysis of Variance was used to determine the differences between instructional conditions in the following comparisons. The results indicate that students in the four classes did not differ in their initial reading scores as measured by the Concept in Print test. ($F = 2.13$ df 3 $p = .11$)

Table 1. Shows the Concept in Print mean and median scores for the two Horizons and two Silver Burdette and Ginn classes

Table 1. Concept in Print Test Scores from June of Kindergarten

Condition		Mean	Median
Silver, Burdett, and Ginn with prior PA	195	197	
Silver, Burdett, and Ginn without prior PA	196	191	
Horizons Fast Track A-B with prior PA	202	204	
Horizons Fast Track A-B without prior PA	193	202	

Effect of Instruction on Phonological Segmentation Fluency Scores

There was a significant difference between Horizons Fast Track A-B and Silver, Burdett, and Ginn on phonological segmentation fluency by December. A repeated measure ANOVA indicated that there was a significant difference between the curriculum used ($F = 4.64$ df 3 $p < .01$) and a significant time effect ($F = 52.88$ df 4 $p < .0001$). There was no time by curriculum interaction effect. Students in the Horizons Fast Track A-B curriculum significantly outperformed student in the control group even if they had been given Phonemic Awareness training. Students in the Horizons Fast Track A-B curriculum who had prior phonemic awareness training began the year at a significant advantage in phonological segmentation skill. This set a pattern that allowed them to progress quickly and achieve excellent reading results in a few months. Students in the Horizons Fast Track A-B curriculum without the benefit of prior phonemic awareness training initially began at the same level as students receiving instruction in a conventional basal reader, but by December began to accelerate in their phonological segmentation skills. Figure 1 shows the improvement in mean scores for each of the four classes. It is apparent that the Horizons classes make substantial gains in phonological segmentation skills.

Table 2. Shows the mean phonological segmentation fluency scores for student in Horizons and Silver Burdett and Ginn Curricula from September to November and then in June.

Phonological Segmentation Fluency
Sept
Oct
Nov
Dec
June
Condition

Silver, Burdett, and Ginn with prior PA
18
37
33
34
52
Silver, Burdett, and Ginn without prior PA
19
21
23
30
46
Horizons Fast Track A-B with prior PA
34 **
50 **
60 **
56 **
70 **
Horizons Fast Track A-B without prior PA
23
31
38
49 **
65 **

(** $p < .01$)

Effect of Instruction on Nonsense Word Fluency

There was a significant difference between Horizons Fast Track A-B and Silver, Burdett, and on nonsense word fluency scores. Repeated measures ANOVA indicated that there was a significant difference between the curriculum used ($F= 2.97$ df 3 $p < .05$) and a significant time effect ($F= 11.70$ df 4 $p < .0001$). There was no time by curriculum interaction effect. Although the Horizons class which did not have prior phonemic awareness training did not differ from the Silver Burdett and Ginn class in March.

In June, there was a significant difference between both the classes that received Horizons Fast Track A-B and classes that received Silver, Burdett, and Ginn ($F= 4.40$ df 3 $p < .01$). This was a moderately powerful effect $R2 = .27$. The Horizons Fast Track A-B class that did not have prior phonological awareness training caught up with the Horizons Fast Track A-B that had prior phonological awareness instruction. Figure 2 shows the change in nonsense word fluency form November until May.

Table 3. Shows the mean Nonsense Word Fluency Scores for student in Horizons and Silver Burdett and Ginn Curricula from November to May

Nonsense Word Fluency				
Nov	Jan	Mar	May	
Condition	Mean	Mean	Mean	Mean
Silver, Burdett, and Ginn with prior PA				
43	45	54	58	
Silver, Burdett, and Ginn without prior PA				
27	30	45	60	
Horizons Fast Track A-B with prior PA				
71 *	89 *	93 *	112 *	
Horizons Fast Track A-B without prior PA				
46	54	81 *	100 *	

(** $p < .05$)

Effect of Instruction on Oral Reading Fluency

A Repeated Measures Analysis of variance was done using the monthly average scores on oral reading fluency probes. The results indicate that there was a significant effect of Curriculum ($F= 7.06$ df3 $p < .001$), Time ($F= 21.18$ df3 $p < .001$), and a Time by Curriculum Interaction effect ($F= 2.60$ df3 $p < .01$).

Horizons Fast Track A-B with prior PA differed significantly from Silver, Burdett, and Ginn classes and the Horizons Fast Track A- B without prior PA in oral reading fluency as measured by the TORF by January. By April, the Horizons Fast Track A-B without prior PA had improved and by May this group became almost as proficient in oral reading fluency as the Horizons fast Track A- B class with prior phonemic awareness. By May, it was evident that the effectiveness of

Horizons Fast Track A-B was considerable, as indicated by the proportion of variance accounted for (R2 = .44). It is important to note that the expected instructional range in oral reading fluency in first grade ranges between 40 and 60 words per minute. This means that the Silver, Burdett and Ginn classes produced average effects on oral reading fluency, whereas, the Horizons Fast Track A-B instruction produced superior reading fluency scores. These results are shown in Table 4. Figure 2 shows the improvement of oral reading fluency from January to May.

Table 4. Shows the mean oral reading fluency scores for student in Horizons and Silver Burdett and Ginn Curricula from February to May

Oral Reading Fluency	Feb	Mar	Apr	May
Condition	Mean	Mean	Mean	Mean
Silver, Burdett, and Ginn with prior PA	42	43	35	42
Silver, Burdett, and Ginn without prior PA	28	33	32	47
Horizons Fast Track A-B with prior PA	85 **	94 **	105 **	115 **
Horizons Fast Track A-B without prior PA	42	57	64 **	91 **

(** $p < .001$)

In addition to oral reading fluency, there is the issue of accuracy. Reading quickly but making many errors is no advantage to the reader. Therefore a Repeated Measures Analysis of variance was

done using the monthly average error scores from oral reading fluency probes. The results indicate that there was a significant effect of Curriculum ($F= 13.42$ df3 $p < .001$), Time ($F= 9.94$ df3 $p < .001$), but no Time by Curriculum Interaction effect ($F= 1.33$ df3 $p = .23$). In January, there was a significant difference between Horizons Fast Track A-B with prior PA instruction and all other classes ($F= 10.19$ df 3 $p < .001$). This pattern was evident in February and March. A Tukey-Kramer Pair-wise Comparison Test revealed that only the Horizons Fast Track A-B with prior PA instruction was significantly superior from January to March. However, by May the Horizons Fast Track A-B classes without prior PA became indistinguishable from the other Horizons Fast Track A-B class. In May, there was a significant difference between Horizons Fast Track A-B classes and the Silver, Burdett, and Ginn classes ($F= 10.62$ df 3 $p < .0001$). This effect is quite powerful as indicated by the proportion of variance accounted for ($R2 = .48$). These results are shown in Table 5.

Table 5. Shows the mean oral reading error scores for student in Horizons and Silver Burdett and Ginn Curricula from January to May

Oral Reading Errors	Jan	Feb	Mar	May
Condition	Mean	Mean	Mean	Mean
Silver, Burdett, and Ginn with prior PA	6.1	5.7	4.55	4.22
Silver, Burdett, and Ginn without prior PA	7.1	4.85	5.71	4.57
Horizons Fast Track A-B with prior PA	0.8 **	0.8**	1.5 **	0.6**
Horizons Fast Track A-B without prior PA	4	2.7	2.85	

1 **

(** p < .001)

Effects of Instruction on Woodcock Diagnostic Reading Test

It was found that there were significant differences between Horizons Fast Track A-B and Silver, Burdett, and Ginn classes on the WDRB standardized letter/word identification subtest scores (F= 3.33 df 3 p < .05) and between standardized word attack subtest scores (F= 4.36 df 3 p < .01). There was no difference among the classes on standardized passage comprehension scores (F= 1.46 df 3 ns). The Horizons Fast Track A-B with prior phonological awareness was significantly better than Silver, Burdett, and Ginn classes in letter word identification and word attack skill, as indicated by a Tukey Kramer Pair-Wise Comparison. This effect was moderately powerful, as indicated by the proportion of variance accounted for (R2 = .27).

Table 5. Shows the mean factor scores on the WDRB for student in Horizons and Silver Burdett and Ginn Curricula in May

Woodcock Diagnostic Reading Battery		
Letter Word ID	Word Attack	Passage Comprehension
Condition		
Silver, Burdett, and Ginn with prior PA		
115	115	116
Silver, Burdett, and Ginn without prior PA		
112	114	115
Horizons Fast Track A-B with prior PA		
127 *	121 **	126 *
Horizons Fast Track A-B without prior PA		
121 *	121 **	

Note standard scores have a mean of 100 and a standard deviation of 15
(* p < .05) (** p < .01)

Effect of instruction Word Reading Efficiency
There was a significant difference between Horizons Fast Track A-B with prior PA and Silver, Burdett, and Ginn instruction on the Test of Word Reading Efficiency (F= 6.20 df 3 p < .001). A Tukey-Kramer Pair-Wise Comparison supported this conclusion. This effect was moderately powerful (R2 = .34).

Table 6. Shows the mean total scores on the TOWRE for student in Horizons and Silver Burdett and Ginn Curricula in May
Test of Oral Word Reading Efficiency
Mean Score
Condition

Silver, Burdett, and Ginn with prior PA
108
Silver, Burdett, and Ginn without prior PA
111
Horizons Fast Track A-B with prior PA
125 **
Horizons Fast Track A-B without prior PA
120 **

Note standard scores have a mean of 100 and a standard deviation of 15
(** p < .01)

The Dynamic Indicators of Basic Early Literacy Skills (DIBELS), the Test of Oral Reading Fluency, the TOWRE, and the WDRB were correlated to determine the degree of relationship among these measures. Letter/word identification has a significant positive correlation with phonemic segmentation fluency, nonsense word fluency, and oral reading fluency. The correlation varied between
.53 and .73. Table 6. shows the correlation among the measures used in this study.

Word attack scores were significantly positively correlated with phonemic segmentation fluency, nonsense word fluency, and oral reading fluency. The range went from .56 to .58. The Concepts about Print Test was not correlated with the WDRB subtests, nonsense word fluency, oral reading fluency, or reading errors. The results indicate that there is no relationship between the Concepts about Print Test and these other measures.

Passage comprehension was correlated with phonemic segmentation fluency, nonsense word fluency, and oral reading fluency. The correlation ranged between .44 to .68. The subtests of the WDRB correlated as well with the DIBELS and Test of Oral Reading Fluency as they did among

themselves. This confirms the criterion-referenced validity of DIBELS and TORF measures. The TOWRE was significantly correlated with phonemic segmentation fluency, nonsense word fluency, and oral reading fluency and the subtest of the WDRB. The correlation ranged between .65 to .87. The Concept in Print test was not correlated with the TOWRE.

Table 6 Shows the Pair wise Correlation among Reading Measures

Variable	by Variable	Correlation	Sig. Prob.
Phonemic Segmentation	Concept in Print	0.11	0.6137
Nonsense Word	Concept in Print	0.16	0.3117
Nonsense Word	Phonemic Segmentation	0.72	0.0001
Words Read Correctly	Concept in Print	0.18	0.2623
Words Read Correctly	Phoneme Segmentation	0.70	0.0002
Words Read Correctly	Nonsense Word	0.88	0.0000
Letter Word ID	Concept in Print	0.15	0.3340
Letter Word ID	Phonemic Segmentation	0.53	0.0087
Letter Word ID	Nonsense Word	0.66	0.0001
Letter Word ID	Words Read Correctly	0.73	0.0001
Word Attack	Concept in Print	0.14	0.3869
Word Attack	Phonemic Segmentation	0.56	0.0045
Word Attack	Nonsense Word	0.55	0.0003
Word Attack	Words Read Correctly	0.58	0.0001
Word Attack	Letter Word ID	0.71	0.0001
Passage Comprehension	Concept in Print	0.24	0.1282
Passage Comprehension	Phonemic Segmentation	0.44	0.0330
Passage Comprehension	Nonsense Word	0.61	0.0001
Passage Comprehension	Words Read Correctly	0.67	0.0001
Passage Comprehension	Letter Word ID	0.76	0.0001
Passage Comprehension	Word Attack	0.66	0.0001
TOWRE	Concept in Print	0.13	0.4273
TOWRE	Phonemic Segmentation	0.62	0.0014
TOWRE	Nonsense Word	0.83	0.0001
TOWRE	Words Read Correctly	0.87	0.0001
TOWRE	Letter Word ID	0.73	0.0001
TOWRE	Word Attack	0.65	0.0001
TOWRE	Passage Comprehension	0.73	0.0001

Discussion

Although the students in this study came to first grade with a comparable level of basic literacy skills, the students who received Horizons Fast Track A-B and phonemic awareness developed the best skills in the fall. As fall gave way to spring, the students who did not have the advantage of phonemic awareness training in kindergarten, but who received reading instruction in Horizons

Fast Track A-B, greatly improved their skills. By June, these students had attained scores almost equal to the Horizons Fast Track A-B with prior phonemic awareness training.

Students who received Horizons Fast Track A-B did much better on measures of reading fluency, reading accuracy, and nonsense word reading than students who received instruction in Silver, Burdett, and Ginn. Regardless of the reading task - reading nonsense words, reading unfamiliar passages fluently without errors, decoding unfamiliar words, displaying word attack skills, or completing missing words in sentences - the students who received phonemic awareness instruction and Horizons Fast Track A-B did much better than students who received instruction in Silver, Burdett, and Ginn. Students who received Horizons Fast Track A-B without prior phonemic awareness instruction gradually increased their skills so that they had almost the same level of reading fluency and accuracy as those who had intense phonemic awareness in kindergarten. This suggests that direct instruction in first grade can help close the gap produced by a lack of previous enrichment. It certainly supports the claim of the author that it is an accelerated reading program.

Although students in one Silver, Burdett, and Ginn class had several hours of phonological awareness training in September and early October and had received several weeks of intervention in kindergarten, this was not sufficient to accelerate their reading acquisition. This is not entirely consistent with the findings of Foorman (1989) who concluded that kindergarten instruction in phonemic awareness improved first grade reading performance, compared to students who did not receive this instruction.
Byrne and Fielding-Barnlsey (1991) found that phonemic awareness training improved children's ability to decode unfamiliar words. They conclude that phonological awareness and letter knowledge is necessary, but not sufficient for the acquisition of the alphabetic principle. These results appear to support this conclusion as well and suggests that in addition to phonological awareness and instruction in letter recognition that is common to most kindergarten and first grade reading instruction, it is necessary to provide systematic phonics instruction, teach blending, and give children considerable opportunity to read decodable text. In addition spelling lessons should reinforce the relationship between sounds and spelling patterns. Foorman et al. (1991) found that letter sound instruction mediates progress in first grade reading and spelling acquisition.

It may be that generalization of phonics skills is more difficult to obtain in a literature-based basal curriculum where vocabulary is not controlled and phonics lessons are not linked to passages of connected text as suggested by Adams (1990). It may be the case that initial at risk students in the Silver Burdett and Ginn curriculum improved as a result the phonemic awareness training so that they performed in the average range in reading by May. The other issue is the quality of phonemic awareness training. Although the classes were matched for the type of training provided it was not possible to specify the exact instructional procedures and duration of lesson length. Qualitative and quantitative factors in the provision of phonemic awareness training could have contributed to these results. Follow up studies to determine the relationship between phonemic awareness training and the reading trajectories of individuals would be useful.

It is important to bear in mind that all of these classes had readers who were initially quite capable and probably would have done well in any reading program. What is most striking about students in the Horizons Fast Track A-B classes is the accuracy of their reading. Even the slowest reader in

Horizons was very accurate and made fewer than two errors while reading between sixty and ninety words a minute.

In contrast, students who received instruction in Silver, Burdett, and Ginn made four, five, and sometimes as many as seven errors when reading forty to fifty words a minute. The range of scores for students in Horizons Fast Track A-B was much narrower for reading errors. This suggests that students in this program developed their skills more evenly. The pattern over time indicates that weaker students made more dramatic improvements with Horizons, whereas, stronger students did not increase reading fluency as rapidly. This is because they were already quite fluent earlier in the year.

Reid Lyon, Ph.D., chief of the Child Development and Behavior Branch of the National Institute of Health pointed out in his Overview of Literacy Initiatives in April 1998 that reading words accurately is a necessary skill in learning to read. He also noted that the speed at which this is done is a critical factor in ensuring comprehension. While some children can learn to read a word with only one exposure to it, many children need multiple exposures, in some cases more than twenty, according to Lyon (1998). Lyon (1998) concluded that when children learn to read, they need to have large amounts of text that they can read with ninety-five percent accuracy. Students instructed in Horizons Fast Track A-B appear to acquire the fluency and the practice with text at their level that makes the difference for emerging readers.

The results of this study indicate that instruction in Silver, Burdett, and Ginn leads to average reading performance for many students. However, for about thirty percent of the students in this study, it produced results that were below instructional standards of oral reading fluency, reading error rate and nonsense word fluency. Since many studies suggest that oral reading fluency is critical in initial reading, it appears prudent to monitor student progress in this area and to ensure that curriculum maximizes the acquisition of oral reading fluency. These results support the position of Goodman Simmons and Smith (1998). All of the students initially identified as at-risk that entered the Horizons Fast Track A-B classes made excellent progress and read rapidly with almost no errors. They initially reduced their error rate compared to students in Silver, Burdett, and Ginn classes, then as spring came, their reading fluency gradually increased.

These results suggest that not all reading curricula are designed to maximize the critical components of reading and that teachers and school administrators should examine how the curriculum the want to purchase and use performs on critical benchmarks or reading proficiency. It would be silly to use a curriculum, which purports to be effective before it has been pilot tested and compared to whatever curriculum is currently in use in the district.

One of the surprising findings of this study was the absence of a relationship between the Concept in Print Test and any other measure of reading proficiency one year later. The Concept in Print Test was not correlated with any of the subtests of the WDRB or the TOWRE. It was also not correlated with nonsense word fluency, reading fluency, or reading errors. This test is a poor indicator of later reading behavior and its usefulness as a diagnostic tool needs to be called into question.

This study reveals that the less familiar assessment tools of the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) and the Test of Oral Reading Fluency have criterion validity with respect to reading. The WDRB and TOWRE yielded similar results as these less familiar measures and the subtests of the WDRB were positively correlated with these measures. In fact the subtest of the Woodcock Diagnostic Reading Test correlated as well with the DIBELS and TORF as they did with each other. This supports the criterion validity of the DIBELS and TORF and is consistent with the work of Shinn (1989) and Hintze et al (2000)

References

Adams, G., and Englemann, S. (1996) Research on Direct Instruction. Seattle, WA. Educational Achievement Systems.

Adams, M.J. (1994) Beginning to Read: Thinking and Learning About Print. Cambridge, MA. MIT press.

Beck, I.L. (1981) Reading Problems and Instructional practices. In Mac Kinnon, G.E. and Waller, T.G. (Eds.) Reading Research Advances in Theory and Practice 2. 53-94. Academic Press. New York.

Brown, I.S. and Felton, R.H. (1990) Effects of Instructions on Beginning Reading Skills in Children at risk for Reading Disability. Reading and Writing: an Interdisciplinary Journal. 2. 223-241.

Byrne, B. and Fielding - Barnsley, R. (1991) Evaluation of a Program to Teach Phonemic Awareness to Young Children. Journal of Educational Psychology. 83. 451-455.

Chall, J.S. (1967) Learning to Read: the Great Debate. Mc Graw -Hill. New York.

Clay, M.M. (1970) An increasing effect of disorientation on the discrimination of print a developmental study Journal of Experimental Child Psychology. 9.
153-162.

Deno S.L. (1985) Curriculum Based Measurement: The Emerging Alternative. Exceptional Children 52. 219-232

Deno, S.L, Mirkin P.K., and Chiang, B. (1982) Identifying Valid Measures of Reading Exceptional Children 49. 36-45.

Deno, S.L., Marston, D., Shinn, M.R. and Tindal, G. (1983) Oral Reading Fluency A simple datum for scaling reading disability. Topics in Learning and Learning Disabilities 2. 53-59.

Dickson, S.V., Bursuck, W.D. (1999) Implementing a Model for Preventing Reading Failure: a report from the field. Learning Disability Research and Practice. 14. 191-202.

Elliot, S.N. and Fuchs, L.S. (1997) The Utility of Curriculum Based Measurement and performance Assessment as Alternatives to Traditional Intelligence and Achievement Tests. School Psychology Review. 26. 224-233

Englemann, S. (1997) Preventing Failure in the Primary Grades. ADI Press. Eugene, OR.

Englemann, S. (1999) Field Testing Horizons: using the classroom to develop a highly effective reading program. SRA / McGraw -Hill. Columbus, OH.

Englemann, S., Englemann, O., and Seitz-Davis , K. L.(1997) Horizons Learning to Read Fast Track A-B . SRA / McGraw -Hill. Columbus, OH.

Flett, A. and Snider,V.E. (1999) Changing Teacher Practices: A follow up study of participants in a summer clinic. Effective School Practices. 18. 35-42.

Foorman, B.R., Francis, D.J., Novy, D.M., and Liberman,D. How Letter sound instruction Mediates Progress in First Grade Reading and Spelling. Journal of Educational Psychology. 83. 456-469.

Foorman, B.R., Francis, D.J., Fletcher, J.M., Schatschbneider, S., Mehta, P. (1998) The Role of Instruction in Learning to Read. Preventing Reading Failure in At-Risk Children. Journal of Educational Psychology. 90-1-15.

Fuchs, L.S, and Deno, S.L (1981) The relationship between curriculum based mastery measures and standardized test in reading. 97. Univeristy of Minnesota Institute for Research on Learning Disabilities.

Good, R.H. and Kaminski, R.A. (1996) Assessment of Instructional Decisions: Toward a Proactive Prevention Model of Decision Making for Early Literacy Skills. School Psychology Quarterly. 11. 326-336.

Good, R.H., Simmons, D.C., and Smith, S. B. (1998) Effective Academic Interventions in the United States: Evaluation and Enhancing the Acquisition of Early Reading Skills. School Psychology Review. 27. 45-56.

Gough, P.B. (1996) How Children Learn to Read and Why they Fail. Annals of Dyslexia. 46. 3-20.

Gough, P.B. and Walsh, S. (1991) Learning to Read: an Unnatural Act. Bulletin of the Orton Society. 30. 171-176.

Herzog, N.A. Marchand- Martella, N.E., Martella, R.C., Ebey,T.L. Mc Glockin, L., Hornor, S., and Cooke, B. A. Comparison of Assessment Results Between Reading Mastery and the Qualitative Reading Inventory II. Effective School Practices. 18. 43-49.

Hintze, J.M., Daly, E.J., and Shapiro, E.S. (1998) An Investigation of the Effects of Passage Difficulty Level on Outcomes of Oral Reading Fluency Progress Monitoring. School Psychology Review. 27. 433-445.

Hintze, J.M, Owen, S.V., Shapiro, E.S. and Daly III, E.J. (2000) Generalizability of Oral Reading Fluency Measures: Application of G Theory to Curriculum Based Measurement. School Psychology Quarterly. 15. 52-68

Howell, K., Direct Assessment of Academic Performance. School Psychology Review. 15. 324-335.

Juel, C (1988) Learning to Read and Write A longitudinal study of 54 children from first to fourth grade. Journal of Educational Psychology. 80. 437-447.

Juel, C. and Roper-Schneider, D. (1985) The influence of basal readers on first grade reading. Reading Research Quarterly. 20. 134-152.

Juel, C. Griffin, P.L. and Gough, P.B. (1986) Acquisition of Literacy: A longitudinal study of children in first and second grade. Journal of Educational Psychology. 78. 243-255.

JMP Statistics made Visual (1997) version 3.2 . SAS Institute. Cary, NC.

Kaminski, R. A. and Good, R. H. (1996) Toward a Technology for Assessing Basic Early Literacy. School Psychology Review. 25. 215-227

Lyon, G.R (1998) Overview of Reading and Literacy Initiatives of the National Institute of Child Health and Human Development. A statement given to the
Committee on Labor and Human Resources. Senate Dirkson Building.

McGill-Franzen, A. (1987) Failure to Learn to Read: Formulating a policy problem. Reading Research Quarterly 22. 475-490.

Nicholoson, T. (1991) Do Children Read Words Better in Context or in Lists? A Classic Study Revisited. Journal of Educational Psychology. 83. 444-450.

Powell-Smith, K.A. Shinn, M.R., Stoner, G, Good III, R. H. (2000) Parent Tutoring in Reading Using Literature and Curriculum materials: Impact on Student Reading Achievement. School Psychology Review. 29. 5-22.

Shinn, M.R. (Ed.) (1989) Curriculum Based Measurement: Assessing Special Children. New York. Guilford.

Shinn, M.R., Good R.H. Knutson, N, Tilly, W.D., and Collins V.L. (1992) Curriculum Based Measurement of Reading Fluency: A confirmatory factor analysis of its relationship to reading. School Psychology Review . 21 459-479.

Torgesen, J.K., Wagner, R.V., Rashotte, C.A. Rose,E., Lindamood,P., Conway, T., and Gavan, C. (1999) Preventing Reading Failure in Young Children. Journal of Educational Psychology. 91. 579-593.

Torgesen, J.K. , Wagner, R.V. , Rashotte, C.A. Burgess, S., Hecht, S. (1997). Contribution of Phonological Awareness and rapid naming to the growth of word reading skills in Second to Fifth Grade Students. Scientific Studies of Reading. 1. 161-185.

Torgesen, J.K., Wagner, R.V., Rashotte, C.A (1998) Test of Oral Word Reading Efficiency. Austin. TX. ProEd.

Vreeland, M., Huth, E., Lum,V. Pattison, R., and Vail, J. (1998) Accelerating Cognitive Growth: Horizons Learning to read Fast Track A-B Program Research from the field. Kalamazoo Public Schools. Kalamazoo, MI.

Woodcock, R.M. (1997) Woodcock Diagnostic Reading Battery. Riverside Publishing. Itasca, IL.