Preventive and Remedial Interventions for Children with Reading Difficulties: Lessons from Research

Dr. Joseph K. Torgesen
Florida State University and
The Florida Center for Reading Research

Learning Disabilities Association, March, 2004
The top five myths about interventions for struggling readers

1. If a child is a “visual” learner, they should be taught to read using a visual, not an auditory strategy.

2. If a child has not learned “phonics” by the end of first grade, they need to be taught to read in some other way.

3. Children who struggle with phonemic awareness, vocabulary, or phonics in kindergarten and first grade will frequently “catch up” if given time.

4. We should take guidance from theories of “multiple intelligences” or “learning styles” to help us adapt our reading instruction for different children.

5. A little quality time with an enthusiastic volunteer tutor can solve most children’s reading problems.
The consensus view of most important instructional features for interventions

Interventions are more effective when they:

- Provide **systematic** and **explicit** instruction on whatever component skills are deficient: phonemic awareness, phonics, fluency, vocabulary, reading comprehension strategies
- Provide a significant increase in **intensity** of instruction
- Provide ample opportunities for guided practice of new skills
- Provide systematic cueing of appropriate strategies in context
- Provide appropriate levels of scaffolding as children learn to apply new skills
Two kinds of scaffolding are important

**Programmatic Scaffolding**

The program of instruction is carefully sequenced so that students are explicitly taught the skills and knowledge they need for each new task they are asked to perform.

- Oral blending skills before blending printed words
- Awareness of phonemes before learning how they are represented in print
- Grapheme-phoneme knowledge before decoding
- Vocabulary instruction before reading for meaning
- Strategies for oral language comprehension that support reading comprehension
Two kinds of scaffolding are important

**Responsive Scaffolding**

After an error, or inadequate response, the teacher provides responsive support to assist the child in making a more adequate, or correct response.

Through appropriate questioning or provision of information, the teacher supports the child in doing a task they cannot immediately do on their own.
Teaching children to identify the first phoneme in words

After telling child the names of the pictures, teacher says, “which one begins with /s/?” child chooses fan

“fan begins with /f/, which one begins with /s/? Child chooses can

“Listen, I’m going to say the names of the pictures very slowly- see which one begins with /s/ - “f-an, f-ire, c-an, s-ack” which one?
Two kinds of scaffolding are important

**Responsive Scaffolding**

Word reading error – “let’s check this word. Can you read it for me?

Child reads “side”.

Teacher says, “you’re right that the word begins with the /s/ sound. What letter do you see coming right after the s in this word?”

Child says “l”

Teacher says, “what sound does “l” make?”

Child says “/l/”

Teacher says, “if you say the /l/ sound right after /s/ in this word, what word does that make?”
Interventions should be organized in tiers

Layers of intervention responding to student needs

Each tier provides more intensive and supportive intervention

Aimed at preventing reading disabilities
TIER I: Core class instruction

TIER I is comprised of three elements

- Core reading program
- Benchmark testing of students to determine instructional needs at least three times a year
- Ongoing professional development
# Tier I: Core Class Instruction (cont’d)

<table>
<thead>
<tr>
<th>Focus</th>
<th>For all students in K through 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program</td>
<td>Scientific-based reading instruction and curriculum emphasizing the five critical elements of beginning reading</td>
</tr>
<tr>
<td>Grouping</td>
<td>Multiple grouping formats to meet student needs</td>
</tr>
<tr>
<td>Time</td>
<td>90 minutes per day or more</td>
</tr>
<tr>
<td>Assessment</td>
<td>Benchmark assessment at beginning, middle, and end of the academic year</td>
</tr>
<tr>
<td>Interventionist</td>
<td>General education teacher</td>
</tr>
<tr>
<td>Setting</td>
<td>General education classroom</td>
</tr>
</tbody>
</table>
Tier II is small-group supplemental instruction in addition to the time allotted for core reading instruction.

Tier II includes programs, strategies, and procedures designed and employed to supplement, enhance, and support Tier I.
<table>
<thead>
<tr>
<th><strong>Focus</strong></th>
<th>For students identified with marked reading difficulties, and who have not responded to Tier I efforts</th>
</tr>
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<tbody>
<tr>
<td><strong>Program</strong></td>
<td>Specialized, scientifically based reading program(s) emphasizing the five critical elements of beginning reading</td>
</tr>
<tr>
<td><strong>Grouping</strong></td>
<td>Homogeneous small group instruction (1:3, 1:4, or 1:5)</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td>Minimum of 30 minutes per day in small group in addition to 90 minutes of core reading instruction</td>
</tr>
<tr>
<td><strong>Assessment</strong></td>
<td>Progress monitoring twice a month on target skill to ensure adequate progress and learning</td>
</tr>
<tr>
<td><strong>Interventionist</strong></td>
<td>Personnel determined by the school (e.g., a classroom teacher, a specialized reading teacher, an external interventionist)</td>
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<tr>
<td><strong>Setting</strong></td>
<td>Appropriate setting designated by the school; may be within or outside of the classroom</td>
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Tier III is intensive, strategic, supplemental instruction specifically designed and customized small-group or 1:1 reading instruction that is extended beyond the time allocated for Tier I and Tier II.
<table>
<thead>
<tr>
<th><strong>Focus</strong></th>
<th>For students with marked difficulties in reading or reading disabilities and who have not responded adequately to Tier I and Tier II efforts</th>
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<tr>
<td><strong>Program</strong></td>
<td>Sustained, intensive, scientifically based reading program(s) emphasizing the critical elements of reading for students with reading difficulties/disabilities</td>
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<td><strong>Grouping</strong></td>
<td>Homogeneous small group instruction (1:1-1:3)</td>
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<tr>
<td><strong>Time</strong></td>
<td>Minimum of two 30-minute sessions per day in small group or 1:1 in addition to 90 minutes of core reading instruction.</td>
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What do we know about the success of our most effective interventions in preventing and remediating reading difficulties?
Intervention studies should be differentiated by the age of students included in the study.

**Prevention studies** – intervention begins before children have experienced a prolonged period of failure in learning to read.

**Remediation studies** – intervention occurs after children have experienced difficulties in learning to read for several years.
Studies of Prevention

How to measure successful prevention?

Meets standards on measure of reading comprehension at end of third grade

Achieves Oral Reading Rate of more than 40 correct words per minute by end of first grade

Achieves score above the 30th percentile on measures of word reading ability by end of first or second grade
We do not yet know how to prevent reading difficulties in “all” children

Percent of children scoring below the 30th percentile

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<th>overall %</th>
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<td>Foorman</td>
<td>174 hrs.- classroom</td>
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<td>Felton</td>
<td>340 hrs. - groups of 8</td>
<td>32%</td>
<td>5%</td>
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<td>35- 65 hrs. 1:1 tutoring</td>
<td>46%</td>
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These are likely to be overestimates of our success in preventing reading difficulties in all children

46% of sample had broad vocabulary scores below the 30th percentile

At end of second grade, although word level skills stayed strong (1.6% below 30th), estimate 4.1% failure rate for silent reading comprehension

Problem with comprehension will become more pronounced as comprehension tests become more complex
Evidence from one school that we can do substantially better than ever before

School Characteristics:

- 70% Free and Reduced Lunch (going up each year)
- 65% minority (mostly African-American)

Elements of Curriculum Change:

- Movement to a more balanced reading curriculum beginning in 1994-1995 school year (incomplete implementation) for K-2
- Improved implementation in 1995-1996
- Implementation in Fall of 1996 of screening and more intensive small group instruction for at-risk students
Hartsfield Elementary Progress over five years

Proportion falling below the 25th percentile in word reading ability at the end of first grade:

- 1995: 31.8%
- 1996: 20.4%
- 1997: 10.9%
- 1998: 6.7%
- 1999: 3.7%

Average Percentile for entire grade (n=105):

- 1995: 48.9
- 1996: 55.2
- 1997: 61.4
- 1998: 73.5
- 1999: 81.7

Screening at beginning of first grade, with extra instruction for those in bottom 30-40%
Proportion falling below the 25th Percentile

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Average Percentile
- 1995: 48.9
- 1996: 55.2
- 1997: 61.4
- 1998: 73.5
- 1999: 81.7

Hartsfield Elementary Progress over five years

- 1996: 14.5
- 1997: 9.0
- 1998: 5.4
- 1999: 2.4

Average Percentile
- 1996: 58.2
- 1997: 67.1
- 1998: 74.1
- 1999: 81.5
Why the disparity between early word-level outcomes and later comprehension of complex texts?

Accelerating introduction of complex and unfamiliar words in text places stress on children with remaining dysfluencies in word level processes.

Demands of vocabulary in complex text at third grade and higher place stress on the remaining SES related “vocabulary gap”.

More complex text demands reading comprehension strategies and higher level thinking and reasoning skills that remain “deficient” in many children.
On the one hand....

Hartsfield might be criticized for placing too much emphasis on phonemic awareness, phonics, and fluency and not enough emphasis on comprehension.

But on the other hand....

We could recognize their success in teaching all children critical beginning reading skills, and work with them to add in more powerful instruction in vocabulary and comprehension strategies.
This brings us to the first important gap in our knowledge related to the prevention of reading difficulties in all children.

We do not yet understand the conditions that need to be in place to “close the gap” for children who enter school seriously behind in vocabulary development.
Bringing Words to Life

Isabel Beck
M. McKeown
L. Kucan

Guilford Press

“robust vocabulary instruction”
What do we know about the effectiveness of most special education interventions for children with reading difficulties in third grade and later?

We know that it tends to stabilize the relative deficit in reading skill rather than remediate it.
Change in Reading Skill for Children with Reading Disabilities who Experience Growth in Reading of .04 Standard Deviations a Year

Grade Level

Standard Score in Reading

- Average Readers
- Disabled Readers

Grade 3 | Grade 4 | Grade 5 | Grade 6

70 | 71.8

- Reading disabled score
“The ultimate test of the value of special education is that, once identified, children close the gap with their peers.” (President’s commission, 2002)
Examine outcomes from five clinical or experimental studies of remedial interventions with children from 10-12 years of age experiencing reading difficulties.

One sample of mildly impaired children with beginning word level skills around the 30th percentile.

Two samples of moderately disabled children with beginning word level skills around the 10th percentile.

Two samples of severely disabled children with beginning word level skills around the 2nd percentile.
Instructional Effectiveness Measured by Outcomes in Four Areas

Phonemic Decoding Accuracy -- skill at using sound-letter relationships to decode novel words

Text reading accuracy -- Accuracy with which individual words are identified in text

Text reading fluency -- speed of oral reading of connected text

Reading Comprehension -- accuracy with which meaning is constructed during reading

Outcomes measured in standard scores. An improvement in standard score means that a child is improving his/her reading skills compared to average readers. On all the measures used here, 100 is average.
A Brief Description of the Spell/Read P.A.T. program

Distribution of activities in a typical 70 minute session:

40 minutes -- Phonemic awareness/phonics
20 minutes -- shared reading
7 minutes -- writing about what was read
3 minutes -- wrap up

Systematic instruction in phonic elements beginning with mastery of 44 phonemes at single syllable level through multi-syllable strategies. Fluency oriented practice from beginning of instruction. Discussion and writing to enhance comprehension.
A Clinical Sample of 48 Students aged 8-16

Middle and upper-middle class students

Mean Age 11 years

79% White, 67% Male

Received 45-80 hours (mean=60) hours of instruction

Intervention provided in groups of 2-4

Remedial Method: Spell Read P.A.T.

Mean beginning Word Identification Score = 92

Children with word level skills around the 30th percentile
Outcomes from 60 Hours of Small Group Intervention with upper middle class students--Spell Read

<table>
<thead>
<tr>
<th>Metric</th>
<th>Standard Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word Attack</td>
<td>114</td>
</tr>
<tr>
<td>Text Reading Accuracy</td>
<td>113</td>
</tr>
<tr>
<td>Reading Comp.</td>
<td>108</td>
</tr>
<tr>
<td>Text Reading Rate</td>
<td>99</td>
</tr>
</tbody>
</table>

30%
A Middle School Sample of 14 Students aged 11-14

Working class students
Mean Age 12 years
39% White, 64% Male
Received 37-58 hours (mean=51.4) hours of instruction
Intervention provided in groups of 2-4
Remedial Method: Spell Read P.A.T.
Mean Word Identification Score = 80
Children with word level skills around the 10 percentile
Outcomes from 50 Hours of Small Group Intervention with working class students--Spell Read

- Word Attack: 102
- Text Reading Accuracy: 90
- Reading Comp.: 94
- Text Reading Rate: 78

Standard Scores: 30%
A School-based, treatment control study of 40 students

60% Free and reduced lunch
Mean Age 12 years (range 11-14)
45% White, 45% Black, 10% other
53% in special education
Received 94-108 hours (mean=100) hours of instruction
Intervention provided in groups of 4-5
Remedial Methods: Spell Read P.A.T.
Mean Word Identification Score = 83
Children begin with word level skills around 10th percentile
Outcomes from 100 Hours of Small Group Intervention--Spell Read

- Word Attack: 111
- Text Reading Accuracy: 96
- Reading Comp.: 96
- Text Reading Rate: 79

Standard Score

30%
A study of intensive, highly skilled intervention with 60 children who had severe reading disabilities

Children were between 8 and 10 years of age

Had been receiving special education services for an average of 16 months

Nominated as worst readers: at least 1.5 S.D’s below grade level

Average Word Attack=69, Word Identification=69, Verbal IQ=93

Randomly assigned to two instructional conditions that both taught “phonics” explicitly, but used different procedures with different emphasis

Children in both conditions received 67.5 hours of one-on-one instruction, 2 hours a day for 8 weeks

Children were followed for two years after the intervention was completed
Outcomes from 67.5 Hours of Intensive LIPS Intervention

- **Word Attack**: 96
- **Text Reading Accuracy**: 89
- **Reading Comp.**: 86
- **Text Reading Rate**: 75
Oral Reading Fluency was much improved on passages for which level of difficulty remained constant.

Absolute change in rate from pretest to 2-year follow-up.

Most difficult passage
Pretest -- 38 WPM, 10 errors
Posttest -- 101 WPM, 2 errors

Next most difficult passage
Pretest -- 42 WPM, 6 errors
Posttest -- 104 WPM, 1 error
Growth in Total Reading Skill Before, During, and Following Intensive Intervention

![Graph showing growth in reading skill over time with intervals in months between measurements.]
Follow-up study of intensive intervention with 60 children who have severe reading disabilities - preliminary results

Children were between 8 and 10 years of age
All are currently receiving or were identified for special education services
Nominated as worst readers: at least 1.5 S.D’s below grade level
Average Word Attack= 72, Word Identification= 72, Verbal IQ=87

Randomly assigned to two instructional conditions that both taught “phonics” explicitly, but contained different emphasis on fluency oriented practice
Children in both conditions received 83 hours of one-on-one and 50 hours of small group instruction, 2 hours a day for 16 week

Preliminary results for 45 children in both conditions combined
Major differences between **Accuracy** and **Accuracy + Fluency Groups**

<table>
<thead>
<tr>
<th></th>
<th>Accuracy</th>
<th>Accuracy + Fluency</th>
</tr>
</thead>
<tbody>
<tr>
<td>First 33 Hrs. 1:1</td>
<td>LIPS</td>
<td>LIPS</td>
</tr>
<tr>
<td>Next 50 Hrs. 1:1</td>
<td>LIPS</td>
<td>70% LIPS, 30% Fluency</td>
</tr>
<tr>
<td>Next 50 Hrs. Sm. Grp.</td>
<td>Extended LIPS</td>
<td>Comprehension--V V</td>
</tr>
<tr>
<td></td>
<td>Comprehension V V</td>
<td>Repeated reading practice</td>
</tr>
<tr>
<td></td>
<td>Accuracy Oriented</td>
<td>with text and word drills</td>
</tr>
<tr>
<td></td>
<td>Text practice</td>
<td></td>
</tr>
</tbody>
</table>
Outcomes from 133 Hours of Intensive LIPS + Fluency+ Comprehension Intervention

- Word Attack: 96 (Standard Score)
- Text Reading Accuracy: 85 (Standard Score)
- Reading Comp.: 87 (Standard Score)
- Text Reading Rate: 73 (Standard Score)
Summary and Conclusions:

1. For many older children with word level reading skills around the 30th percentile, a relatively brief (60hrs) dose of appropriate small group instruction can bring their skills in phonemic decoding, text reading accuracy and fluency, and comprehension solidly into the average range.

2. For many older children with word level reading skills around the 10th percentile, a more substantial dose (100hrs) of appropriate small group instruction can bring their skills in phonemic decoding, text reading accuracy, and reading comprehension solidly into the average range. Although the gap in reading fluency can be closed somewhat, reading fluency is likely to remain substantially impaired.

3. For older children with word level reading skills around the 2nd percentile, intensive interventions can have a strong effect on phonemic decoding, text reading accuracy, and reading comprehension, but they are likely to leave the fluency gap essentially unaffected.
Disparity in outcomes for rate vs. accuracy in five remediation studies

- **Accuracy**
- **Rate**

![Bar chart showing the disparity in outcomes for rate vs. accuracy in five remediation studies.](chart)

- Standard Score
- Beginning level of Word Identification Skill

- 2nd
- 10th
- 30th
Our current hypothesis about the difficult fluency gap

Children who struggle initially in learning to read miss out on many hundreds of thousands of opportunities to learn to recognize individual words because they read inaccurately and they don’t read very much.

By the time they reach 3-4 grade, their “sight word vocabulary” is severely restricted compared to good readers of their same age.

After they become more accurate readers, there is still a huge gap in the number of words they can recognize by sight. They can’t catch up with their peers because 4th and 5th grade good readers are continuing to add words to their sight vocabulary at a very fast rate.
Projected growth in “sight vocabulary” of normal readers and disabled children before and after remediation.
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A very important factor in determining how fluently a child will read a passage involves the proportion of words in the passage the child can recognize by sight
These are interesting and challenging times for anyone whose professional responsibilities are related in any way to literacy outcomes among school children. For, in spite of all our new knowledge about reading and reading instruction, there is a widespread concern that public education is not as effective as it should be in teaching all children to read.
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A very important factor in determining how fluently a child will read a passage involves the proportion of words in the passage the child can recognize by sight.

Unless poor readers who have received strong remediation can add words to their “sight vocabulary” at a faster rate than their peers, the “fluency gap” will continue.
What happens to accuracy and fluency of reading scores when children receive powerful preventive instruction?
Disparity in outcomes for rate vs. accuracy in remediation and prevention studies

![Bar chart showing the comparison of accuracy and rate for different grade levels and groups.](chart.png)
Summary and qualification:

After problems with reading accuracy have been substantially remediated through intensive instruction, children remain dysfluent readers relative to age peers primarily because there are too many words in grade level passages that they still cannot recognize as sight words.

1. Their early practice deficits leave them just ‘too many words behind” in the growth of their sight vocabulary.

2. Some dyslexic children may also have special difficulties acquiring sight words for neurobiological reasons.
The second important gap in our knowledge related to the instruction for children with reading difficulties is that we do not yet understand the conditions that need to be in place to "close the gap" in reading fluency for children who reach late elementary school with serious word level reading difficulties.
Thank You

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“the science of reading”