Phonemic Awareness
Beyond First Grade:
The Missing Piece in Word-Level Reading Development for Struggling Readers

Arkansas Department of Education Summit
June 19, 2019
Today’s Objectives

1. Understand the three types of learning required for word-level reading
2. Understand the two levels of word reading and the skills required for each
3. Understand the difference between phonemic tasks and phonemic skills
4. Understand the Phonemic Proficiency Hypothesis
5. Understand the basis of poor word reading skills
6. Understand how to improve reading skills
Poor word reading is due to the phonological-core deficit

Words do not remember written words based on visual memory

The three-cueing approach does not represent how skilled readers read

Words are primarily learned during reading of real text

Memory for words occurs via an implicit, unconscious process called orthographic mapping

Orthographic mapping connects pronunciations to printed letter strings (the opposite direction of information flow from phonic decoding)

Despite its superior results compared to whole word and three-cueing approaches, phonics instruction still yields too high a rate of struggling readers
Key Terms to Understand this Presentation

- Phonological vs. phonemic
- Orthography and orthographic
- Phonological awareness vs. phonics
- Sight word and sight word vocabulary
  - Also called orthographic lexicon
Objective 1:
Understand the three types of learning required for word-level reading

Skilled Word Reading Requires Three Types of Learning
Three Types of Learning Required for Word-Level Reading

1) Paired-Associate Learning (PAL)
2) Statistical Learning
3) Orthographic Mapping

- These are typically not distinguished from one another, by teachers or researchers
- Each plays a different role in word-level reading acquisition
- Not acknowledging these different learning processes can negatively affect assessment and instruction
Paired-Associate Learning (PAL)

- Involves associating two things so that the presence of one activates the other
  - Language/labeling involves verbal PAL

- Foundational for learning letter names and sounds
  - Letter learning involves visual-phonological PAL
  - The visual half of that equation is not the problem

- *Not* the basis for written word learning
  - Yet many teaching methods seem to presume this

- Learning is explicit (i.e., conscious learning)

- Dozens to hundreds of exposures needed for accuracy-based *mastery*, hundreds to thousands for *automaticity*
Statistical Learning

- Involves deriving patterns from multiple incidences
- Statistical learning is generally implicit learning
- Skilled readers never taught the “six syllable types” learn them anyway via statistical learning
  - (e.g., *dack* vs. *dake* vs. *dar*)
  - Many other orthographic patterns learned this way
  - Source for build up of general orthographic knowledge
- Unclear how many learning “trials” are needed
  - It may vary depending on specific types of patterns
- Poor readers do not display efficient statistical learning when it comes to reading
- Statistical learning is currently a “hot” area of study
Orthographic Mapping

- The *process* involved in remembering words for later, instant and effortless retrieval
  - Also applies to word parts, not just words
- Orthographic mapping is the mechanism that builds the sight vocabulary/orthographic lexicon
- New learning requires only 1–4 exposures
  - Much, much faster than PAL or statistical learning
- Differs significantly from statistical learning
  - Orthographic mapping involves connections between specific pronunciations and *specific* letter strings (written words)
  - Statistical learning *generalizes* patterns from multiple instances
<table>
<thead>
<tr>
<th>Type of Learning</th>
<th>Role in Word Reading</th>
<th>Effort</th>
<th>Domain</th>
<th>Speed of acquisition</th>
<th>Skills Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paired–Associate Learning</td>
<td>Letter Names &amp; Sounds</td>
<td>Conscious</td>
<td>Specific to specific</td>
<td>Dozens to hundreds or even thousands of exposures</td>
<td>Visual discrimination &amp; memory phonological memory</td>
</tr>
<tr>
<td>Statistical Learning</td>
<td>Deriving common patterns–supports phonic decoding</td>
<td>Implicit</td>
<td>Generalize from specific examples</td>
<td>Unknown–likely dozens to hundreds of exposures (may vary by pattern type)</td>
<td>Currently under study</td>
</tr>
<tr>
<td>Orthographic Mapping</td>
<td>Remembering specific words and word parts</td>
<td>Implicit</td>
<td>Specific to specific</td>
<td>1–4 exposures</td>
<td>Letter–Sound proficiency Phonemic proficiency</td>
</tr>
</tbody>
</table>
Confusion Due to Not Knowing About the Three Types of Learning

- Learning to read words is *not* via PAL
  - Neither phonic decoding nor instant recognition are based on PAL, once the letters are mastered
  - We need to think how to best use flashcards

- Deriving patterns via statistical learning is no substitute for orthographic learning
  - The former primarily helps with phonic decoding
  - Children can/should be taught the common patterns
  - Irregular words by their nature break these patterns
  - All regular and irregular words are specifically mapped (*word-specific knowledge* in the Simple View of Reading)
Objective 2:
Understand the two levels of word reading and the skills required for each

The Two Levels of Skilled Word Reading
This demonstration illustrates the two major presenting features of dyslexia:

- Poor phonic decoding
- Poor memory for words
Two Levels of Word-level Reading

1) The ability to sound out unfamiliar words
   - The “phonological route” in the Dual Route Theory
   - Researchers call this *phonological recoding, decoding*, or applying *grapho–phonemic correspondences* (GPCs)
   - Based primarily on letter–sound skills & phonemic blending
     • Also aided by knowledge of phonically regular patterns

2) The ability to remember words
   - The basis for the “direct route” in Dual Route Theory
   - Instant, *effortless* recognition
   - Words are remembered via orthographic mapping
   - Based on phonemic analysis skills and letter–sound skills
   - Unrelated to visual memory
All skilled readers of alphabetic writing systems learn this skill, whether we teach them or not.

Most weak readers do not naturally develop this skill.

Phonics instruction can reliably develop this skill if a student has sufficient basic phonological skills.

Promotes word memory in typical readers (Share’s theory of orthographic learning) but not weak readers.

The term “phonics” is a lightening rod for controversy, yet is required for skilled reading.

- National Reading Panel’s (NRP) definition of phonics:
  - “… the acquisition of letter–sound correspondences and their use to read and spell words”
Word Reading Level 2: The Ability to Efficiently Remember Words

- Requires Level 1: Skill at sounding out new words
  - David Share’s self-teaching hypothesis
- Letter-sound skills and phonemic skills also central
- Not addressed by any current reading approaches
  - Exposure only produces word memory for those already possessing word memory skills
- Weak readers may become competent at Level 1 (sounding out words), but virtually never at Level 2 (efficiently remembering words)
## The Two Levels of Word Reading

### Ability to Remember Written Words

<table>
<thead>
<tr>
<th>Ability to Sound Out Words</th>
<th>Strong</th>
<th>Weak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong</td>
<td>Skilled reading</td>
<td>Accurate but not fluent (likely phonic taught)</td>
</tr>
<tr>
<td>Weak</td>
<td>Non-existent phenomenon (past 3\textsuperscript{rd} grade)?</td>
<td>Poor readers not taught phonics or whose PA is too weak to benefit from phonics instruction</td>
</tr>
</tbody>
</table>
Objective 3:
Understand the difference between phonemic tasks and phonemic skills

Phonemic *Tasks* vs. Phonemic *Skills*
Phonemic TASKS vs. Phoneme SKILLS (Part 1)

- We need to move from a *task* mentality to a *skill* mentality
- Two types of phoneme tasks: *synthesis* and *analysis*
  - Each plays a different role in reading
  - *Synthesis* is primarily blending, *analysis* can involve many different tasks (segmentation, manipulation, isolation, etc.)
- *Skills* are unseen constructs we try to access via *tasks*
- There are many phoneme *tasks* but only two *skills* are needed for reading
Phonemic TASKS vs. Phoneme SKILLS
(Part 2 – Synthesis/Blending)

• **Synthesis** – putting phonemes together to activate words (or word parts or nonsense words)

• Tasks primarily include: *blending* and *addition*

• Synthesis/blending tasks involve *activation* rather than *awareness* per se

• We should not call this phoneme awareness but rather simply phonological/phonemic blending
  
  • Analysis and synthesis (blending) play different roles in the reading process – lumping them together compromises clarity in communicating concepts
Phonemic TASKS vs. Phoneme SKILLS
(Part 3 Phoneme Analysis)

- **Phoneme analysis** – pulling apart words or word parts into constituent phonemes
- Appears to represent true “awareness” (unlike blending)
- Tasks include:
  - Rhyming
  - Segmentation
  - Manipulation
  - Alliteration
  - Isolation
  - Categorization/Identification
  - Note: There are two to six variants on each of these tasks
- Question: What are each of these telling us?
- Answer: Nothing *specific* about the reading process; only *generally* that there are phonological issues interfering
Let’s Get Specific: The Phoneme SKILLS Necessary for Reading

- Based upon the orthographic learning research, there are only two phonemic skills needed for competent reading:
- BLENDING (required for sounding out words)
- SEGMENTING *(required for remembering words)

*BUT, segmentation TASKS do a poor job of assessing the segmenting SKILL needed for proficient reading

- Segmenting SKILL must be highly automatized and unconscious for efficiently remembering words
- Timed segmentation TASKS are not sensitive to this SKILL
- I prefer “phonemic proficiency” to avoid confusion
National Reading Panel (2000) on the role of Phonemic Skills in Word Reading
(From Section 2 page 32)

**Blending:**
“The skill of blending is needed to decode unfamiliar words.”

**Segmenting:**
“Phonemic segmentation helps children *remember* how to read and spell words . . .” (emphasis added)
**Linguistic skill**
- Phonological Blending

**Academic skill**
- Letter-Sound Knowledge/Skills

**Linguistic skill**
- Phoneme Awareness (Analysis)

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**PHONIC DECODING**
- Identify Unfamiliar Words

**ORTHOGRAPHIC MAPPING**
- Permanent Word Storage

**Word Identification**

**Word Recognition**
Objective 4: Understand the *Phonemic Proficiency Hypothesis*

The Phonemic Proficiency Hypothesis of Orthographic Learning
The Origin of the Phonemic Proficiency Hypothesis

- 1997 to October 2001 PA assessment with McInnis’ *Phonological Processing Assessment*, based upon Rosner & Simon’s 1974 *Auditory Analysis Test*

- 4th, 5th, and 6th grade poor readers

- October 2001 screened a third grade class
Current Evidence for The Phonemic Proficiency Hypothesis

Orthographic Learning Research
Integrating Ehri’s & Share’s theories logically demands this (separately they do not)

Dyslexia Research & Clinical Experience
In light of the orthographic learning research (i.e., exactly why is poor PA so disruptive to the development of a sight vocabulary)

Phonemic Awareness Literature
The few correlational studies that directly examined proficiency

Word Reading Intervention Research
When considering the approaches used measured against normative gains
The Difference Between Phoneme Awareness and Phonemic Proficiency

• “Awareness” implies conscious attention
  • Many tasks get at conscious phoneme awareness, such as phoneme segmentation tasks
  • Fuzzy connection between PA and reading

• Proficiency refers to automatic access to phonemes
  • This is instant access, automatic, or unconscious
  • Only instant responses to phoneme manipulation tasks assess this
  • Very clear relationship between PA and reading
Research Support for Phonemic Proficiency and Sight–Word Learning

- Vaessen & Blomert (2010)
  - 1400 students, grades 1–6, over 200 at each grade
  - Phonemic manipulation – accuracy and timing
  - High frequency words and low frequency words
    - Low frequency words estimate size of sight vocabulary
  - PA accuracy and high frequency words, correlations dropped off quickly
  - PA timing showed steep continued growth 1–5
  - PA timing and sight vocabulary correlated .5 or higher right up to 6th grade

- Other studies with hundreds of children showed timing provides a better index of the phonemic skills underlying reading
Research Support for Phonemic Proficiency and Sight–Word Learning

- Studies I’ve done
  - 132 1st graders
    - Phonemic manipulation – accuracy and timing
    - TOWRE–2 Sight Word Efficiency
    - Instant responses to PA and SWE = +.58
    - Accurate, non-instant responses = +.004
  - 60 5th graders
    - Instant responses to PA and SWE also = +.58
    - Accurate, non-instant responses = -.25
  - Similar result with 26 high school students
    - Nearly identical to 5th grade results
A Common Misconception About Reading: “Children Learn to Read in Different Ways”

- This notion confuses *teaching* and *learning*
  - Teaching is what we do—learning is what their brains do
- We TEACH reading in different ways; they LEARN to read *proficiently* in only one way
  - It’s amazing there’s even one way our brains read so efficiently
    - Perceive words in 1/20\(^{th}\) of a second
    - Read 150–250 words a minute
    - Have 30,000 to 70,000 words in our instant, orthographic lexicon
    - Add new words to that lexicon after 1 to 4 exposures
  - There are not 2, 3 or 4 ways our brain is set up to do that!
- All skilled readers have the same basic skills
  - All skilled readers can read nonsense words, even if not taught phonics
  - All skilled readers have large and continuously expanding sight vocabularies
Objective 5:
Understand the basis of poor word reading skills

Why Some Children Struggle in Word-Level Reading
The Alphabetic Principle

• Chinese writing vs. alphabetic writing

• We do not write words!
  • We write sequences of characters designed to represent sequences of phonemes in spoken words

• Poor access to the phonemes makes reading alphabetic languages very difficult

• Phoneme skills are needed for BOTH sounding out new words AND remembering the words we read
The Phonological–Core Deficit of Dyslexia

- From “most common cause” to “universal cause”
- Weakness in one or more of the following:
  - Phonemic awareness/analysis
  - Phonemic blending/synthesis
  - Rapid automatized naming
  - Phonological working memory
  - Nonsense word reading, letter–sound knowledge acquisition
- Poor word–level readers do not reach automaticity in phonemic skills and thus do not develop phonemic proficiency
In the early 2000s, Joseph Torgesen indicated that fluency is largely a function of one's
sight vocabulary size:

- With a large sight vocabulary:
  Most (or all) words “pop out”; reading is *fast* and *accurate*

- With a limited sight vocabulary:
  Reading is effortful and often inaccurate because too many unfamiliar words require attention and strategic decoding
The Developmental Relationship Between Phonological Skills and Word-Level Reading

Phonological Skill Development

1. Early Phonological Awareness
   Rhyming, first sounds, syllable segmentation

2. Basic Phoneme Awareness
   Blending and segmentation

3. Advanced Phonemic Awareness/Proficiency
   Automatic, unconscious access to phonemes in spoken words

Word Reading Skill Development

1. Letter Names and Letter Sounds
   Phonological storage and retrieval

2. Phonic Decoding and Encoding (Spelling)

3. Orthographic Mapping
   Efficient memory for printed words; rapid sight vocabulary expansion
Objective 6: Understand how to improve reading skills

Intervention for Word–Level Reading Difficulties (Dyslexia)

In Light of the Phonemic Proficiency Hypothesis
Concerns About the Efficacy of Phonics

- Explicit and systematic phonics instruction displays superior results than whole word or whole language (three cueing, guided reading, balanced instruction)
  - This is true for all children but results “wash out” in the top half to two thirds of students by 3rd to 4th grade
  - Bottom third show ongoing benefit over time
- Too many, however, never “catch up”
- A small percentage cannot seem to learn via phonics
- No built-in mechanism or theory about fluency and building a sight vocabulary
Three levels of response to phonics based upon the severity of the phonological–core deficit

- (And you know all these students!)
A Recent Finding about Intervention Research

These three groups approached instruction differently!

- **Minimal Group (0 – 5.85 SS improvements)**
  - None formally trained phonological awareness/analysis
  - Most did explicit, systematic phonics
  - All provided reading practice with connected text

- **Moderate Group (6–9 SS improvements)**
  - All did explicit, systematic phonics
  - All provided reading practice
  - All trained phonological segmentation and/or blending
    - This is “basic phonological awareness” (mastered by most at end of 1st grade)

- **Highly Successful Group (10–25 point improvements)**
  - Aggressively addressed and “fixed” PA issues using advanced PA training
  - All did explicit, systematic phonics
  - All provided reading practice with connected text
The studies with the largest outcomes in all likelihood developed phonemic proficiency
  ◦ A few studies specifically said so, most did not

However, based upon
  ◦ My 20 years experience
  ◦ Dr. Philip McInnis’ 30 years before me
  ◦ Dr. Stephen Truch’s 30 years experience with hundreds of dyslexics

PA manipulation accuracy develops in nearly all students (99%+) when trained and automaticity nearly always follows

Conclusion/assumption: In the highly successful studies, students developed the automaticity

Case example: The growth of fluency in the Torgesen et al. (2001) study (the study that prompted Tier 3 of RTI)
Summary

• Word-level reading is driven by phonemic skills
  • This is based upon the alphabetic nature of our writing system
• Skilled readers are all good at phonic decoding and orthographic mapping – neither is optional
• Fluency is primarily a function of sight vocabulary size
• Phonemic proficiency appears to be foundational to orthographic mapping and thus reading fluency
• 1) Orthographic learning research, 2) correlational studies of phoneme proficiency, and 3) the studies with the most highly effective word-reading intervention outcomes support the centrality of phonemic proficiency in reading skill
• Thus, phonemic “awareness” is not enough