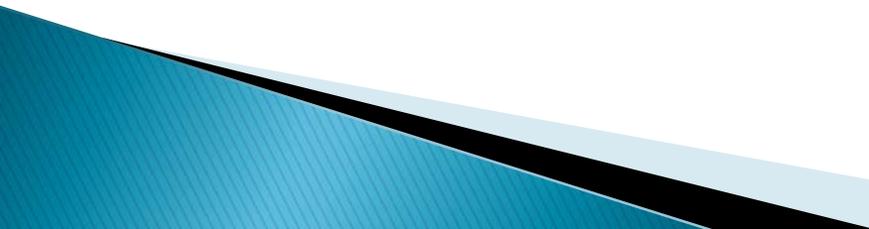


Understanding the Role of Phonemic Proficiency in Boosting Reading Skills in Struggling Readers

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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
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Review of Key Points from Previous session

- ▶ 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
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My Experience Reading Research Articles

- ▶ On the issue of the precise relationship between phonological awareness and reading
 - ▶ On the issue of precisely how do we remember words
 - ▶ Verbal feedback from researchers
 - ▶ My comments to Dr. Linnea Ehri
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Key Terms to Understand this Presentation

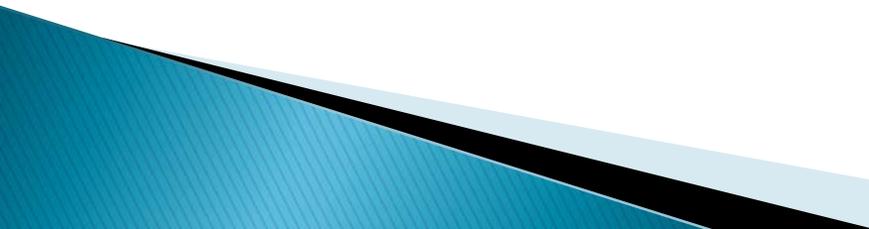
- ▶ Phonological vs. phonemic
 - ▶ Orthography and orthographic
 - ▶ Phonological awareness vs. phonics
 - ▶ Sight word and sight word vocabulary
 - Also called orthographic lexicon
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Objective 1:

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
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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 from statistical learning
 - Orthographic mapping involves connections between specific pronunciations and *specific* letter strings (written words)
 - Statistical learning *generalizes* patterns from multiple instances

Three Types of Learning Required for Word-Level Reading

| Type of Learning | Role in Word Reading | Effort | Domain | Speed of acquisition | Skills Required |
|---------------------------|---|-----------|-----------------------------------|---|---|
| Paired-Associate Learning | Letter Names & Sounds | Conscious | Specific to specific | Dozens to hundreds or even thousands of exposures | Visual discrimination & memory phonological memory |
| Statistical Learning | Deriving common patterns—supports phonic decoding | Implicit | Generalize from specific examples | Unknown—likely dozens to hundreds of exposures (may vary by pattern type) | Currently under study |
| Orthographic Mapping | Remembering specific words and word parts | Implicit | Specific to specific | 1–4 exposures | Letter-Sound proficiency Phonemic proficiency |

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

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

Word Reading Level 1: Accurately Sounding Out Unfamiliar Words

- 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 lightning 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)

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
 - Alliteration
 - Segmentation
 - Isolation
 - Manipulation
 - 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

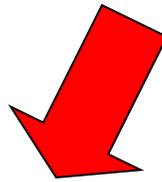
Phonological
Blending

Academic skill

Letter-Sound
Knowledge/Skills

Linguistic skill

Phoneme
Awareness
(Analysis)



**PHONIC
DECODING**
Identify
Unfamiliar Words

(Word Identification)

**ORTHOGRAPHIC
MAPPING**
Permanent Word
Storage

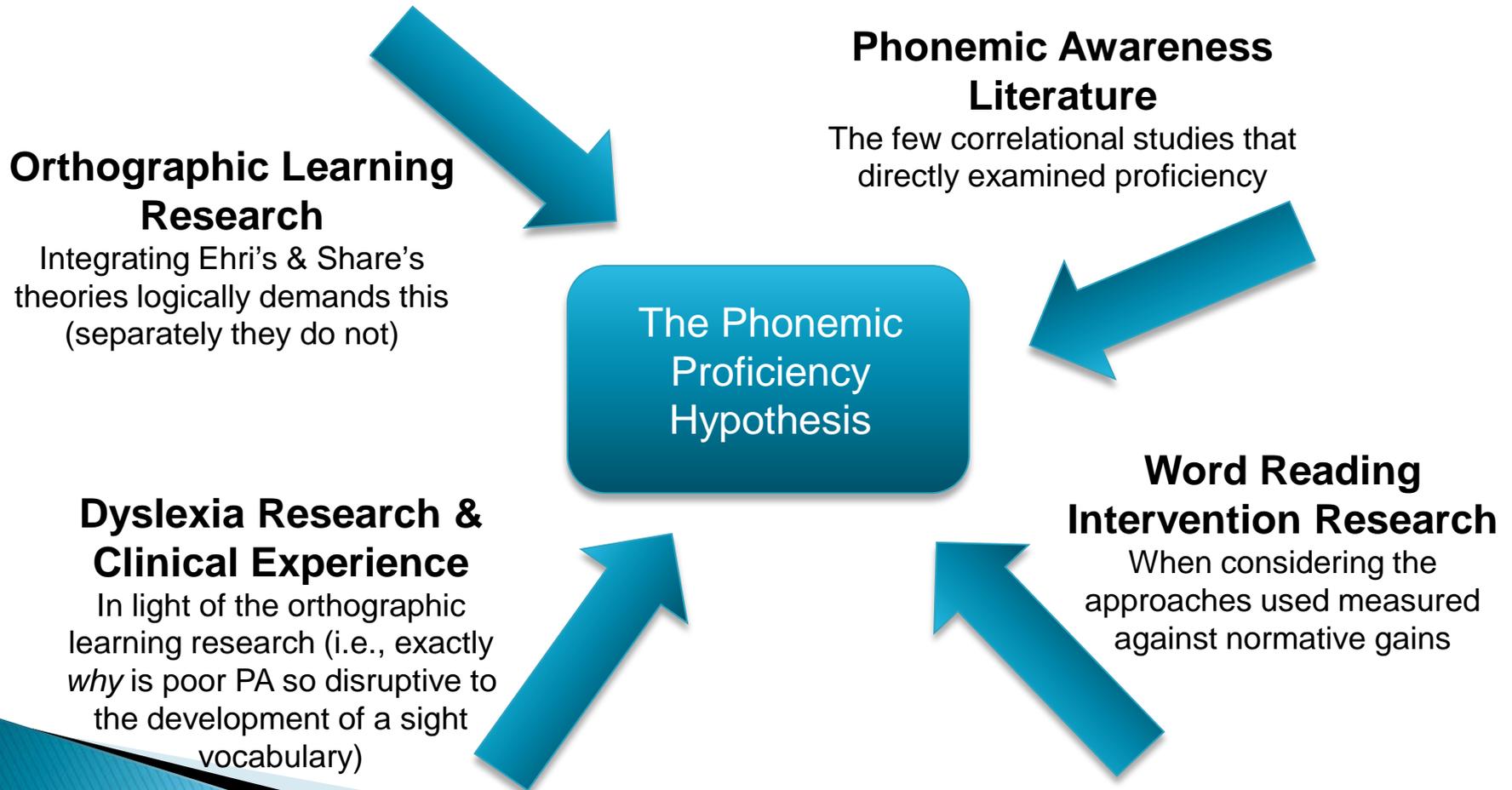
(Word Recognition)

Objective 4:

Understand the *Phonemic Proficiency Hypothesis*

The Phonemic Proficiency Hypothesis of Orthographic Learning

Current Evidence for The Phonemic Proficiency Hypothesis



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 / 20th 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

Reading Words vs. Learning Words

- ▶ *Reading* words means you correctly identify words
- ▶ *Learning* words means you remember words for later, instant and effortless retrieval
- ▶ *Learning* words fosters fluency – simply *reading* words does not
- ▶ Phonics programs teach those with dyslexia to *read* words; efficiently remembering words often does not naturally follow
 - Typically developing readers begin to efficiently *learn* words once they are taught the code or figure it out on their own

The Alphabetic Principle

- Alphabetic writing is phoneme-based writing
 - 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
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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

Why is Phonemic Proficiency Critical?

- ▶ Orthographic learning theories require it
 - ▶ A self-evident observation requires it
 - ▶ Correlational studies support it
 - ▶ Intervention research, using normative performance to determine efficacy, demonstrates its value
- 

David Share's Self-Teaching Hypothesis

- ▶ We teach ourselves most of the words we know
- ▶ Orthographic learning occurs one word at a time
- ▶ Orthographic learning is implicit – typically does not involve conscious thought or effort
- ▶ As students sound out words, they are forming orthographic connections
 - When newly encountered words are not sounded out, they are poorly remembered
- ▶ From 2nd grade on, typically developing readers remember words after only 1 to 4 exposures

Linnea Ehri's Orthographic Mapping Theory

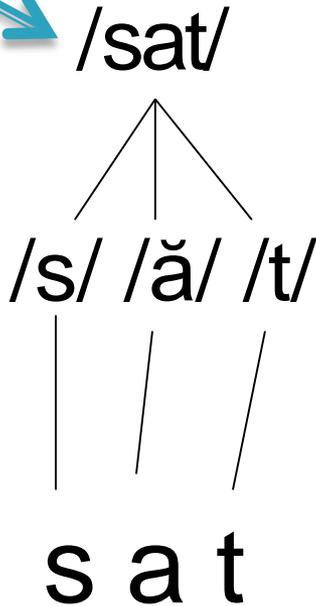
- ▶ Sight words are highly familiar spellings (i.e., letter sequences), regardless of the visual look of the word
 - e.g., bear, BEAR, **Bear**, bear , **bear**, *BEAR* , bear, *bear*, BEAR
- ▶ Sight words are anchored in long-term memory (LTM) via a connection between something well established in LTM (the word's pronunciation) and the stimulus that needs to be learned (the letter sequence in the word's spelling)
- ▶ Phonemic segmentation and letter-sound skills are central to this connection-forming process

How We “Map” Words

PLTM



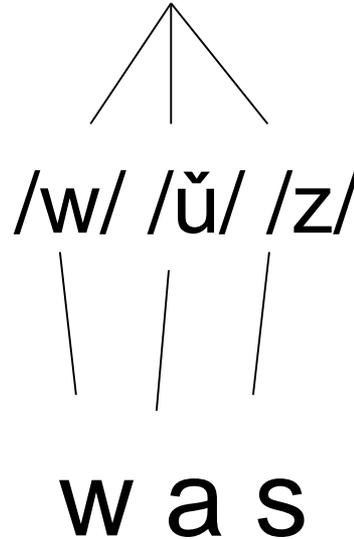
Phoneme Awareness/
Analysis



Oral First: A mind prepared to store words

Close phonetic approximate plus semantic context

/was/



/said/

Phonological LTM Activation

Phoneme Blending

Phoneme Awareness/
Analysis

//s/ //ă/ //d//

Letter-Sound Knowledge

Orthographic Mapping

said

Self-Teaching Hypothesis

Regular Words, Irregular Words, and Multisyllabic Words

- *Many* regular words, *all* irregular words, and *many* multisyllabic words require mapping “adjustments”
- **Regular words**
 - Silent e words, vowel digraphs, consonant digraphs are require adjustments
- **Irregular words**
 - Irregular consonants, vowels, and digraphs or rimes
- **Multisyllabic words** (regular and irregular)
 - Multisyllabic “regular” words with vowel reduction require mapping adjustment, much like irregular words (e.g., *holiday*, *market*)
- ***Skilled readers with letter–sound proficiency and phonemic proficiency accomplish all of this quite well!***

How Phonemic Proficiency Produces Efficient Orthographic Mapping

- ▶ Orthographic mapping requires:
 - Letter–sound proficiency
 - Phonemic proficiency (this goes well beyond what is tested on our universal screeners)
 - The ability to establish a relationship between sounds and letters unconsciously while reading
- ▶ *To do what Ehri's theory says we are doing in the time limited situation Share's theory says we are doing it, letter–sound proficiency and phonemic proficiency are an absolute necessity*
 - There is no other logical conclusion

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

Objective 5:

Understand the basis of poor word reading skills

Why Some Children Struggle in Word-Level Reading

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

The Phonemic Proficiency Hypothesis, Orthographic Mapping, and Reading Fluency

- In the early 2000s, Joseph Torgesen indicated that fluency is largely a function of ones:

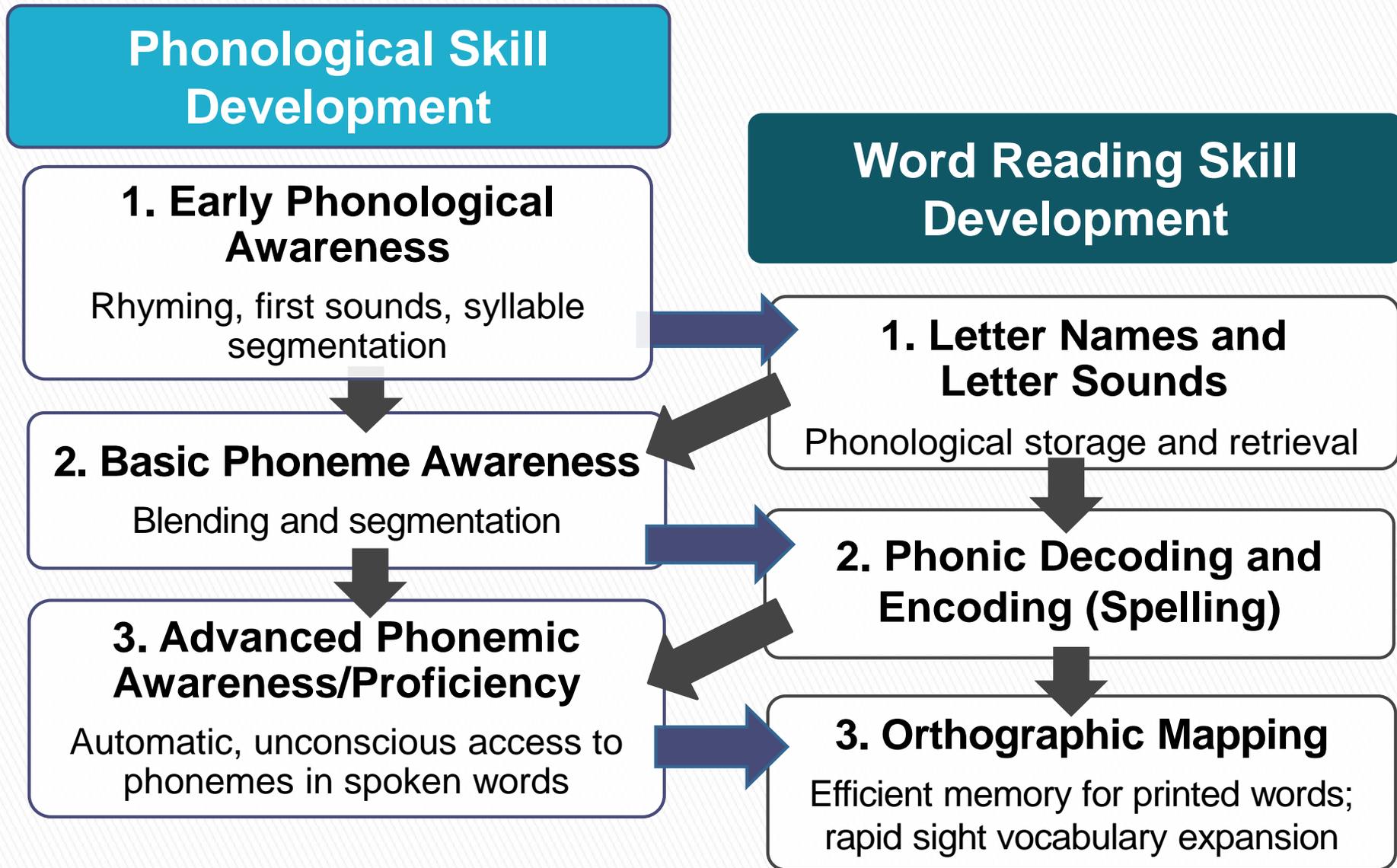
SIGHT VOCABULARY SIZE

- 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 “Path” to Fluent Word Reading

- **Word reading fluency** is primarily based on the . . .
- Size of the **sight vocabulary/orthographic lexicon**, which is based on . . .
- How skilled a student is in remembering words (**orthographic mapping skills**) combined with reading experience, and orthographic mapping is based on . . .
- **Letter–sound proficiency**/automaticity (unconscious access to the sounds letters represent) AND
- **Phonemic proficiency**/automaticity (unconscious access to phonemes in spoken words)
- This latter skill is a universally missing element
- (Develops in typical readers, but not in struggling readers)

The Developmental Relationship Between Phonological Skills and Word-Level Reading



Objective 6:

Understand how to improve reading skills

Intervention for Word-Level Reading Difficulties (Dyslexia)

In Light of the Phonemic
Proficiency Hypothesis

A Recent Finding about Intervention Research

- ▶ Using standard scores to determine effectiveness
- ▶ This results in three groups of intervention results
 - *Minimal results group*: 0 to 5 standard score improvements
 - Mostly 2–4 points
 - *Moderate results group*: 6 to 9 standard score improvements
 - Mostly 6–7 points
 - *Highly successful group*: 10 to 25 standard score point improvements
 - Mostly 14–17 points

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

An Important Inference, But Not a “High” Inference

- ▶ 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