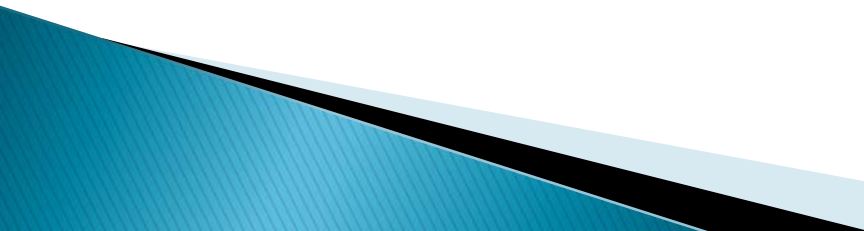


# Understanding the Role of Phonemic Proficiency in Boosting Reading Skills in Struggling Readers

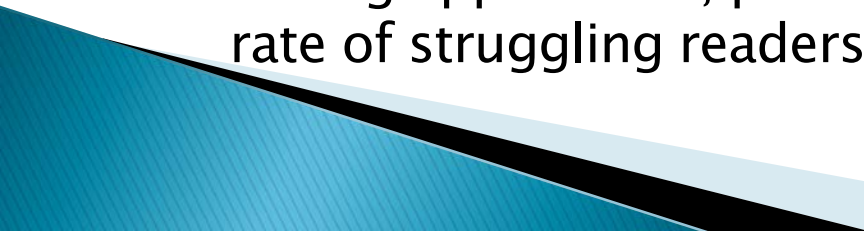
Ohio Literacy Academy  
**March 18, 2019**

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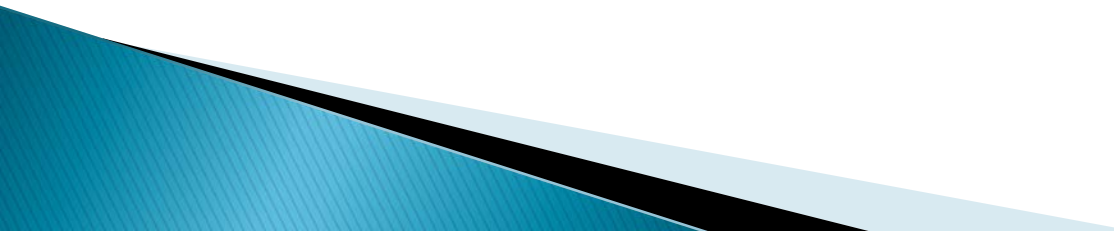
# Today's Objectives

- 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
- 

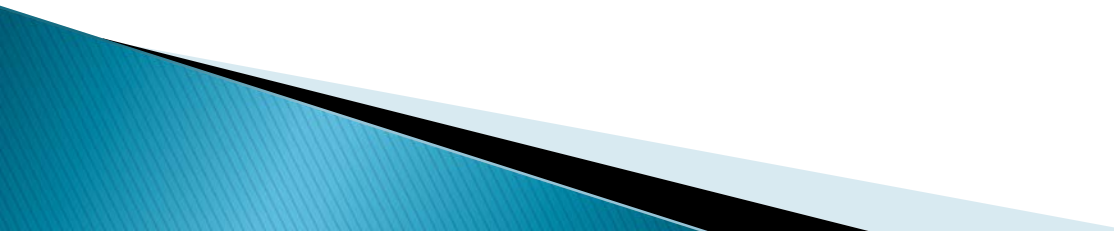
# Review of Key Points from Previous session

- ▶ 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
- 

# 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
- 

# Key Terms to Understand this Presentation

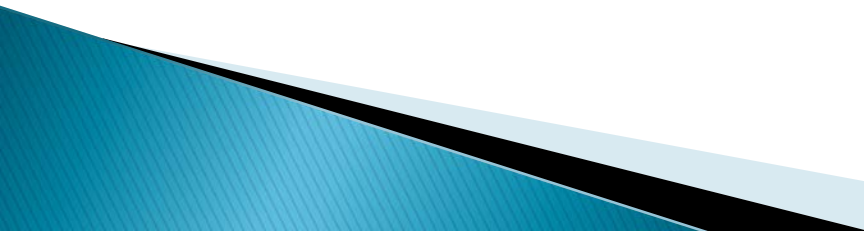
- ▶ Phonological vs. phonemic
  - ▶ Orthography and orthographic
  - ▶ Phonological awareness vs. phonics
  - ▶ Sight word and sight word vocabulary
    - Also called orthographic lexicon
- 

**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 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)

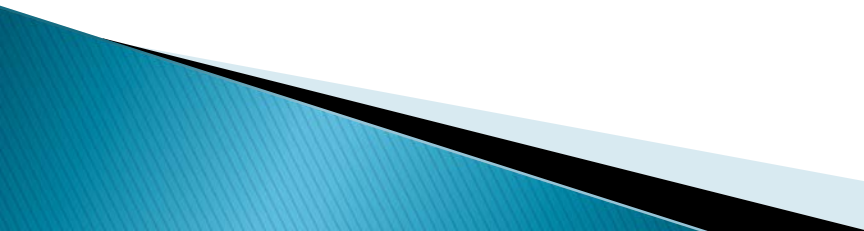


**Objective 3:**

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*

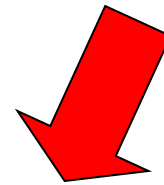
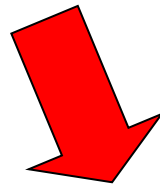
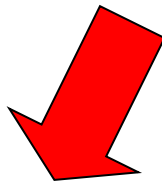
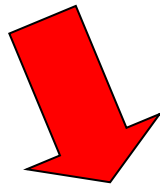
Phonological  
Blending

*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:**

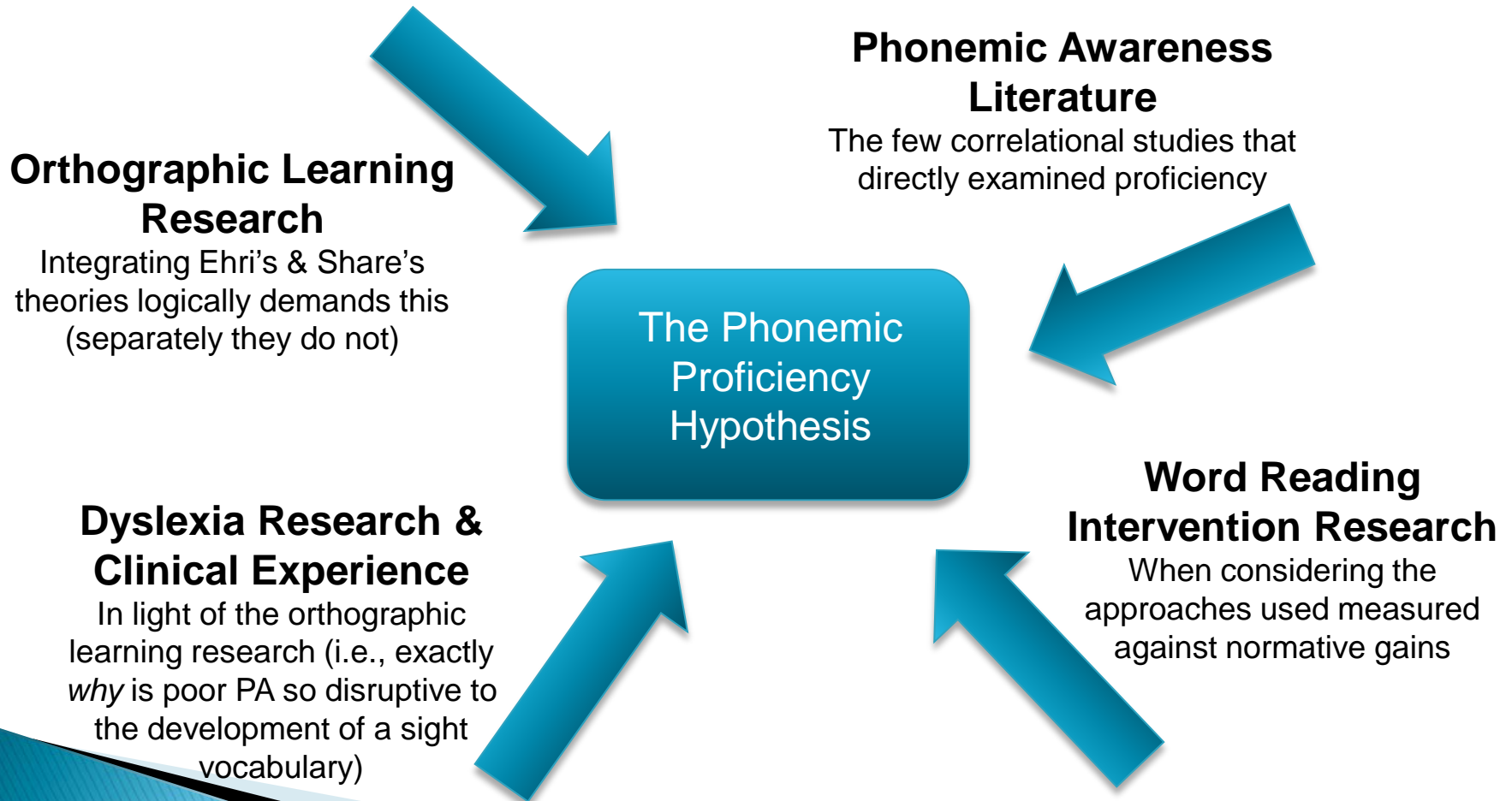
Understand the *Phonemic Proficiency Hypothesis*

# The Phonemic Proficiency Hypothesis of Orthographic Learning



# Current Evidence for The Phonemic Proficiency Hypothesis

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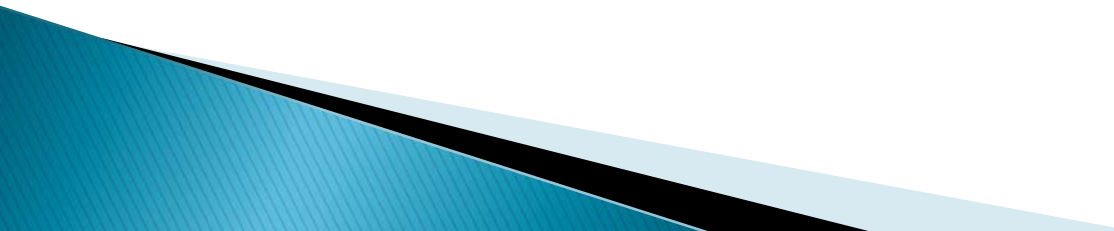
## A Common Misconception About Reading: “Children Learn to Read in Different Ways”

- ▶ 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<sup>th</sup> 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

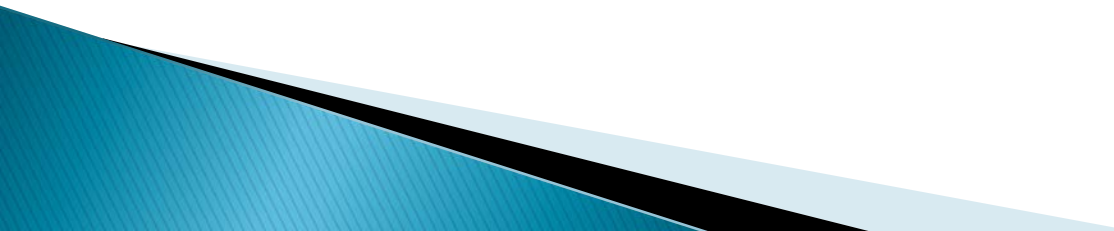
# The Alphabetic Principle

- 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
- 

# 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 2<sup>nd</sup> 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



/sat/

Phoneme Awareness/  
Analysis

/s/ /ă/ /t/

s a t

Oral First: A mind  
prepared to store words

Close phonetic  
approximate plus  
semantic context

/was/

/w/ /ŭ/ /z/

w a s

/said/

Phonological LTM Activation

Phoneme  
Blending

Phoneme  
Awareness/  
Analysis

//s/ //ă/ //d//

Letter-Sound  
Knowledge

Orthographic  
Mapping

s a i d

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 6<sup>th</sup> 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 1<sup>st</sup> graders
  - Phonemic manipulation – accuracy and timing
  - TOWRE-2 Sight Word Efficiency
  - Instant responses to PA and SWE =  $+.58$
  - Accurate, non-instant responses =  $+.004$
- ▶ 60 5<sup>th</sup> graders
  - Instant responses to PA and SWE also =  $+.58$
  - Accurate, non-instant responses =  $-.25$
- ▶ Similar result with 26 high school students
  - Nearly identical to 5<sup>th</sup> 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

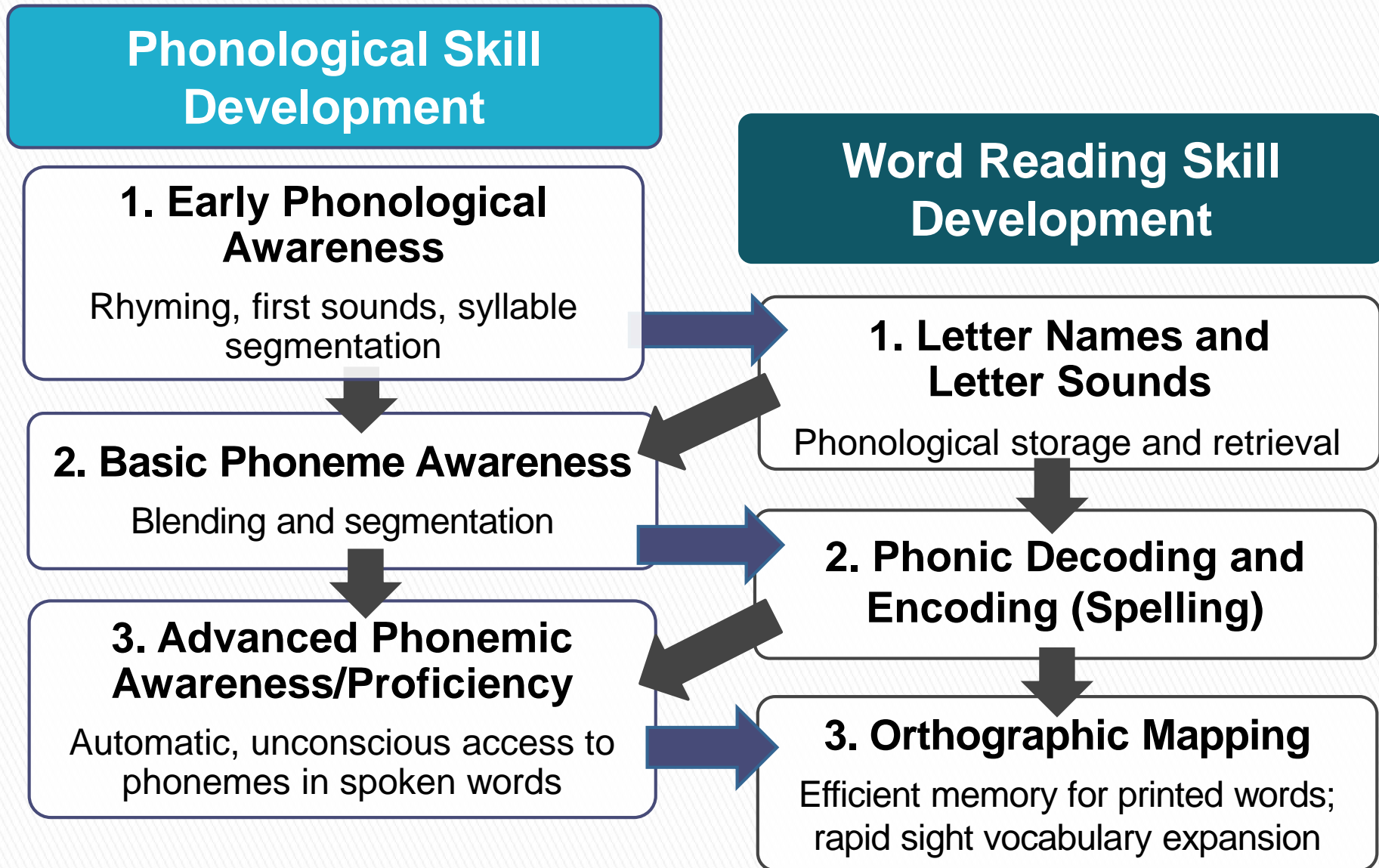
- With a large sight vocabulary:
  - Most (or all) words “pop out”; reading is *fast* and *accurate*
- With a limited sight vocabulary:
  - Reading is effortful and often inaccurate because too many unfamiliar words require attention and strategic decoding



# 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 1<sup>st</sup> 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