Assessing, Preventing, and Overcoming Reading Difficulties

A professional learning series presented by David Kilpatrick, Ph.D.

Module 4 *Session 4*

Sponsored by the Exceptional Student Services Unit (ESSU) and created in collaboration with Specific Learning Disability Specialists Jill Marshall and Veronica Fiedler

COLORADO
Department of Education

Module 4: Word-Level Reading

Session 4: Orthographic Mapping

Assessing, Preventing, and Overcoming Reading Difficulties

Objective:

Through engagement in this series of 13 on-demand webinars, participants will understand the current research, implications, and the essential elements necessary for assessing, preventing, and overcoming reading difficulties.

Assessing, Preventing, and Overcoming Reading Difficulties

Webinar Series Modules

Module 1: Reading Research and the Research to Practice Gap

Module 2: Current Approaches to Reading Instruction: Why Many Learners Still Struggle

Module 3: The Simple View Of Reading

Module 4: Word-Level Reading

Module 5: Reading Comprehension

Module 6: Introduction to Reading Assessment; Assessing Phonological Skills

Module 7: Assessing Phonics Skills

Module 8: Assessing Word Identification and Reading Fluency

Module 9: Assessing Reading Comprehension and Related Skills

Module 10: Effective Approaches for Preventing Reading Difficulties

Module 11: Effective Interventions for Reading Difficulties

Module 12: Case Examples of Reading Disabilities

Module 13: Specific Learning Disability Identification

Module 4 Overview

Module 4:
Word-Level Reading

4.1 The Challenges of Word-Level Reading
4.2 Word Reading Development
4.3 How Poor Phonological Skills Hinder Word Reading
4.4 Orthographic Mapping
4.5 Fluency
4.6 English Learners and Written Word Learning
4.7 Understanding Word-Reading Difficulties

Learning Intentions

Module 4 Session 4: Orthographic Mapping

Participants will be able to:

- ✓ Explain the process of orthographic mapping.
- ✓ Identify the two skills needed for efficient orthographic mapping.
- ✓ Understand how orthographic mapping is important to establishing sight vocabulary.

Recapping Things Learned

- Word-level reading is not based upon visual memory
- Skilled word readers do not guess at the words they read based upon context—most or all the words they read are familiar and instantly and effortlessly recognized
- Phonological/phonemic skills are central to remembering words
- Then how are words remembered?

  Orthographic memory

Orthographic Memory

- Orthographic memory is the memory for specific, familiar sequences of letters
- There are two broad levels to orthographic memory
  - Orthographic recognition is needed for instant and effortless recognition of written words
  - Orthographic recall is needed to produce the correct spellings of words that cannot be reliably spelled phonetically
    - Either irregularly spelled words or words with multiple phonetically correct possibilities (e.g., sent/cent or made/maid).
  - Orthographic recognition is typically easier than recall—more people can read words like rendezvous, colonel, and licorice than can spell them

Establishing Orthographic Memories for Words

- There is extensive research on orthographic learning
- Three of the major areas of orthographic learning research are
  - David Share's Self-Teaching Hypothesis
  - Linnea Ehri's Orthographic Mapping Theory
  - Various computer models that simulate how words are learned
  - Our focus will be on the first two, each of which has extensive direct and indirect scientific support
- Both indicate that letter-sound skills and phonemic skills are central to remembering words, and visual memory plays no measurable role beyond input of words visually
  - Input and storage are not the same thing

The Self-Teaching Hypothesis

- We teach ourselves most of the 30,000 to 60,000 words we know
  - Orthographic learning occurs one word at a time
  - This only occurs as a result of an encounter with the letters and sounds in the words we have learned — not some form of visual memory
  - Orthographic learning is implicit, rarely with conscious thought
  - From 2nd grade on, we need to see new words only 1 to 4 times for them to become permanently stored for future, instant recall
- As students phonically decode words, they are connecting phonemes with graphemes and forming orthographic connections
- Self-teaching occurs efficiently in students skilled with letters and phonemes but does not work well in students who struggle with letters and phonemes
- **Orthographic learning requires skilled phonic decoding!**

Orthographic Mapping

- Orthographic Mapping describes the mental process used to remember words
  - The focus of the Self-Teaching Hypothesis includes 1) the real-world situation in which orthographic learning occurs, and 2) the central requirement for orthographic learning, which is phonic decoding
  - By contrast, Orthographic Mapping describes the mental/cognitive connection-forming process that makes words familiar
  - Together, they explain how we build the sight vocabulary and can account for an extensive amount of research on reading development
- Orthographic mapping is a mental process, not a teaching technique

Phoneme Skills and Orthographic Mapping

- What is the “mental process” described by Orthographic Mapping?
- Words are remembered by connecting pronunciations of oral words to their written counterparts (the words’ spellings)
- This can only happen at the phoneme level, given the phonemic nature of alphabetic writing
- Thus, proficient phonemic abilities are required to efficiently remember words by connecting the phonemes in words to the letter sequences used to spell that word

Flow of Information in Orthographic Mapping

- Phonic decoding goes from text to brain
  - From letters to sounds to that word's pronunciation
- Orthographic mapping goes from brain to text
  - From the word's pronunciation to the phonemes in that pronunciation to the letters in that printed word
- A specific letter order (i.e., a written word) becomes familiar when there is a well-established connection with the word's pronunciation
- Orthographic mapping benefits from phonic decoding
  - But that is only the first half of the equation
- **Orthographic Learning = Phonic Decoding + Orthographic Mapping**

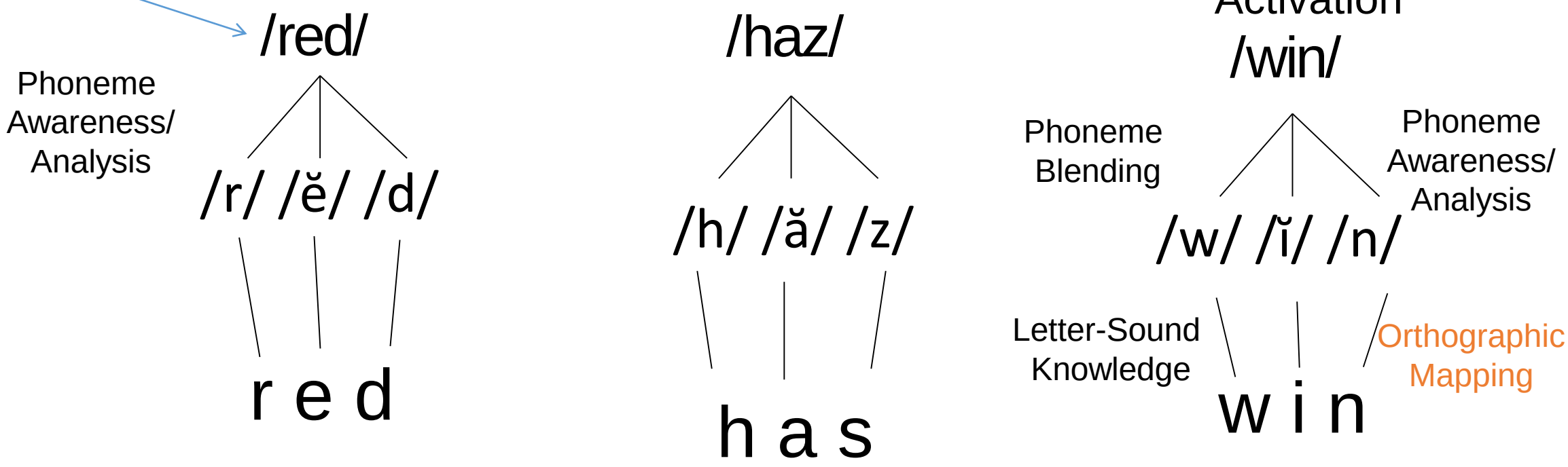
How We “Map” Words – 1

“Transparent” Words

(Words with one-to-one correspondence)

PLTM

Phonological LTM Activation



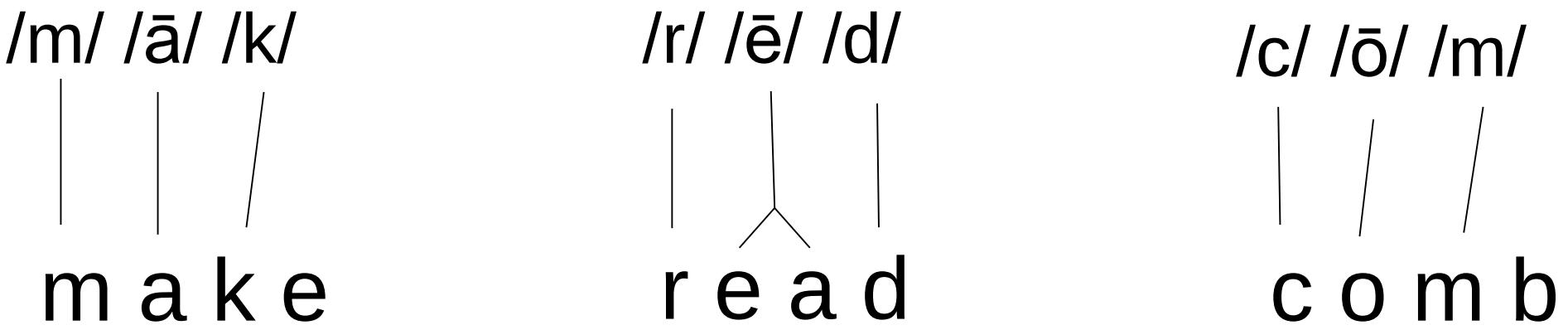
Oral First: A mind prepared to store words

Self-Teaching Hypothesis

How We “Map” Words – 2

Words that are “Opaque”

(Words without a one-to-one correspondence)



Orthographic Mapping and Phonic Decoding

- In phonic decoding, the written word is unfamiliar
  - The word is figured out via letter-sound knowledge and phonological blending
  - The flow of information is from orthography to phonology, i.e., from text to brain
  - Phonic decoding is about identifying a word, not about remembering it
- Orthographic mapping only works if the word has been identified
  - The pronunciation of the spoken word then is mapped onto that letter sequence
  - The flow of information is from phonology to orthography, i.e., from brain to text
  - Orthographic mapping is about remembering a word, not about identifying it
  - This mapping is only efficient at the phoneme/letter level
    - Eventually orthographic patterns get mapped and this assists with the mapping process (e.g., —ing, —ence, —ight, —tion; plus rime units, prefixes, etc.)
      - Mapping patterns presumes previous phoneme-level mapping of those patterns

Skills Needed for Orthographic Mapping

- Orthographic mapping requires two foundational skills
  - Skilled readers have both of these foundational skills
  - A compromise to these skills results in a compromise in the efficiency with which a reader builds the orthographic lexicon/sight vocabulary
- The two skills needed for efficient orthographic mapping are
  - **Letter-sound proficiency**
  - **Phoneme proficiency**

Knowledge vs. Proficiency

- We need to move away from the terms:
  - Letter-sound knowledge
  - Phonological awareness
- And replace them with:
  - Letter-sound proficiency
  - Phonemic proficiency

- *Knowledge* does not presume automaticity/proficiency
- *Awareness* does not presume automaticity/proficiency

Implications of Knowledge vs. Proficiency

- Many phonological awareness (PA) tests are not sensitive to the phonemic underpinnings of the reading process
  - Phoneme segmentation tests cannot determine segmentation proficiency
    - Only a timed phoneme manipulation test can do that
- The best assessment of the skills needed for orthographic mapping are:
  - Timed nonsense word reading subtests
    - (e.g., *Test of Word Reading Efficiency* [TOWRE-2])
  - Timed phoneme manipulation tests
    - (e.g. *Phonological Awareness Screening Test* [PAST])

What About Irregular Words?

- Both “irregular” and “opaque” words may take longer to learn
  - Perhaps 1-2 extra exposures for typical readers; many more for RD
- Most irregular words are off by only one letter-sound element
  - For example, *said, put, comb, island*
  - Multiple violations are rare, such as *of, one, iron*
- Irregular words not a challenge for orthographic mapping
  - *“Exception words are only exceptional when someone tries to read them by applying a [phonic] decoding strategy. When they are learned as sight words, they are secured in memory by the same connections as regularly spelled words . . .”*

(Ehri, 2005, *Scientific Studies of Reading,* p. 171-172)

Why Exception Words Are Not an Issue for Mapping

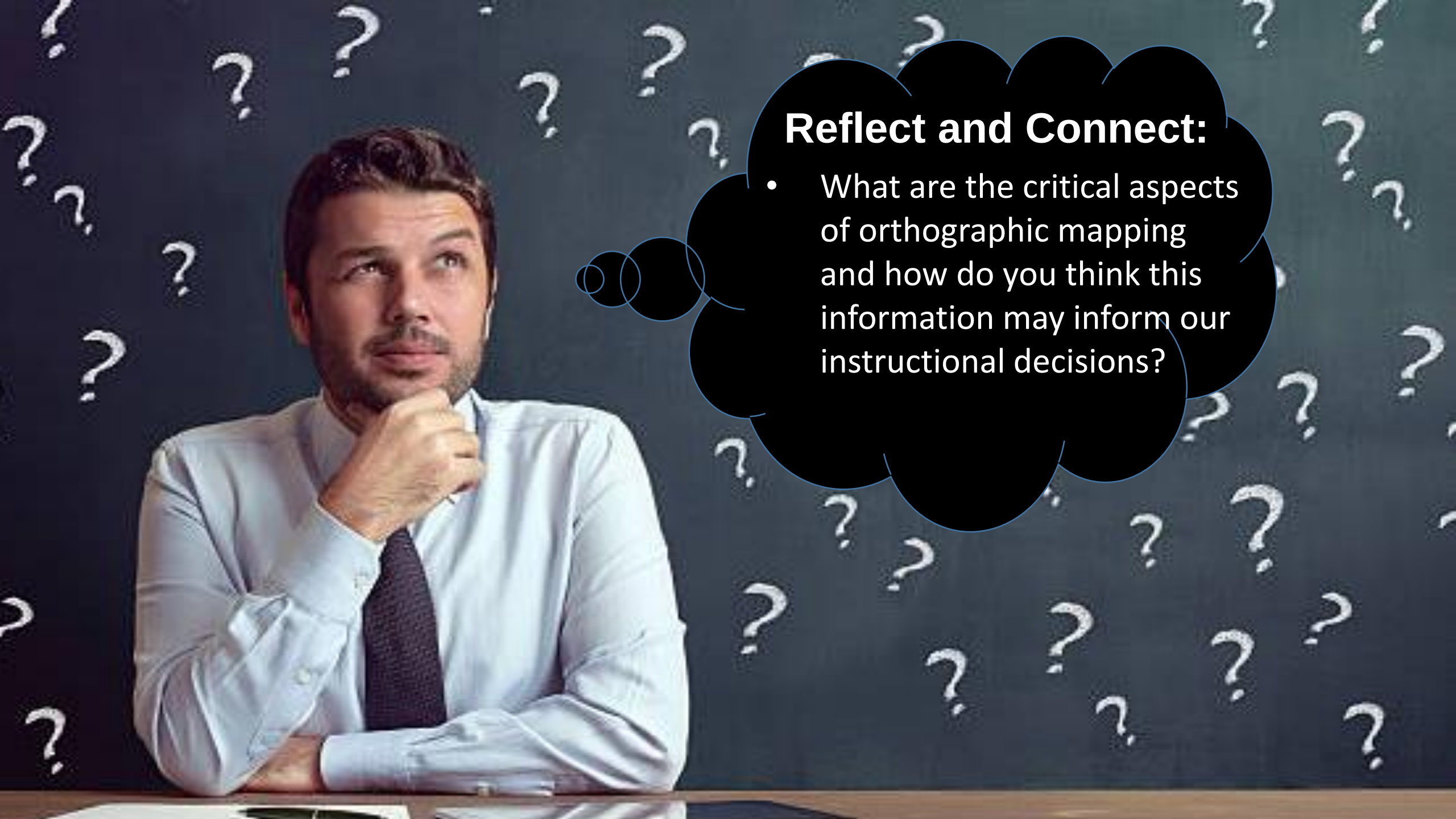
- Many “regular” words require mapping adjustments just like irregular words
  - Silent *e* words, vowel digraphs, and consonant digraphs are all opaque
  - Multisyllabic “regular” words with vowel reductions require mapping adjustment, much like irregular words (e.g., *holiday, market*)
- Irregular words are *not* the cause of reading problems in English
  - Poor word-level reading is as common in regular orthographies (e.g., Italian, Spanish), due to poor orthographic mapping
  - Irregularities make English phonic decoding harder, no doubt, but do not the cause poor sight-word reading
    - That is caused by a limited sight vocabulary—same problem in Spanish, etc.
    - Even regular words are poorly represented in the orthographic lexicons of poor readers

What About “Orthographic Skills”?

- Popular discussions of “orthographic processing” are about 10 years outdated
  (See the review of orthographic skills by Jennifer Burt (2006) in the *Journal of Research in Reading* and subsequent research on the topic)
  - The four most common tasks used to establish “orthographic skills” are:
    - Wordlikeness task (e.g., *lmk* vs. *pim; bbap vs. bapp*)
    - Homophone/pseudohomophone task (e.g., *sail/sale; brane/brain*)
    - Reading irregular words
    - Spelling irregular words
  - These tasks correlate with reading skills (but correlation ≠ causation)
- Orthographic knowledge is a byproduct of learning to read
  - It is not causal like letter-sound skills and phoneme skills
  - Orthographic “skills” result from reading experience and orthographic mapping
    - Orthographic mapping establishes words *and* word patterns (e.g., *–ing, –tion, –ight*)
- Current ideas floating around about orthographic processing implicitly posit word learning based upon visual memory
  - Intervention recommendations based on such a notion have been shown to be ineffective

Summary: Module 4 Session 4

- ✓Orthographic learning results from an interaction between sounds and letters in written words, not by any visual memory process.
  - ✓Orthographic mapping is the mental process used to store words for instant, effortless retrieval—it generates the sight vocabulary
  - ✓Orthographic mapping connects what is known and already well-established in memory (a word's pronunciation) with what the reader needs to remember (a word's spelling)
    - ✓The process is implicit, so the reader typically is not consciously "trying" to remember; the connection forming process happens "behind the scenes"
- ✓The critical skills needed for orthographic mapping are letter-sound proficiency and phonemic proficiency
  - ✓Students with these skills develop reading skills fairly easily
  - ✓Students without these skills struggle in reading


Reflect and Connect:
• What are the critical aspects of orthographic mapping and how do you think this information may inform our instructional decisions?

Wrap Up

What was your biggest takeaway?

What questions do you still have?

Up Next

Module 4.5
Fluency

Thank you!


thank you
merci
спасибо
gracias
danke
hvala
감사합니다
köszönöm
mulțumesc
তোমাকে ধন্যবাদ
متشکرم
תודה
ありがとう
obrigado
dankjewel
děkuji
na gode
misaotra anao
Շնորհակալություն
សូមអរគុណអ្នក
teşekkür ederim
хвала
tack
σας ευχαριστώ
paldies
dankie
dankon
asante
cảm ơn bạn
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dziękuję
go raibh maith agat
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ধন্যবাদ
คุณขอบคุณ
terima kasih
grazie
daalu
баярлалаа
salamat
நன்றி

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https://www.cde.state.co.us/cdesped/SD-SLD