

DYSLEXIA: EARLY IDENTIFICATION AND INTERVENTION

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ABOUT ME

2009: Ph.D. in School Psychology, Lehigh University


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2009–2016: Assistant Professor, School Psychology, Texas A&M University

2016 – Present: Associate Professor, Special Education, UT Austin

Areas of interest and expertise

- Reading development
- Improving assessment and intervention for reading disabilities
 - Word reading in K-2
 - Reading comprehension in middle school
- Assessment to intervention linkages



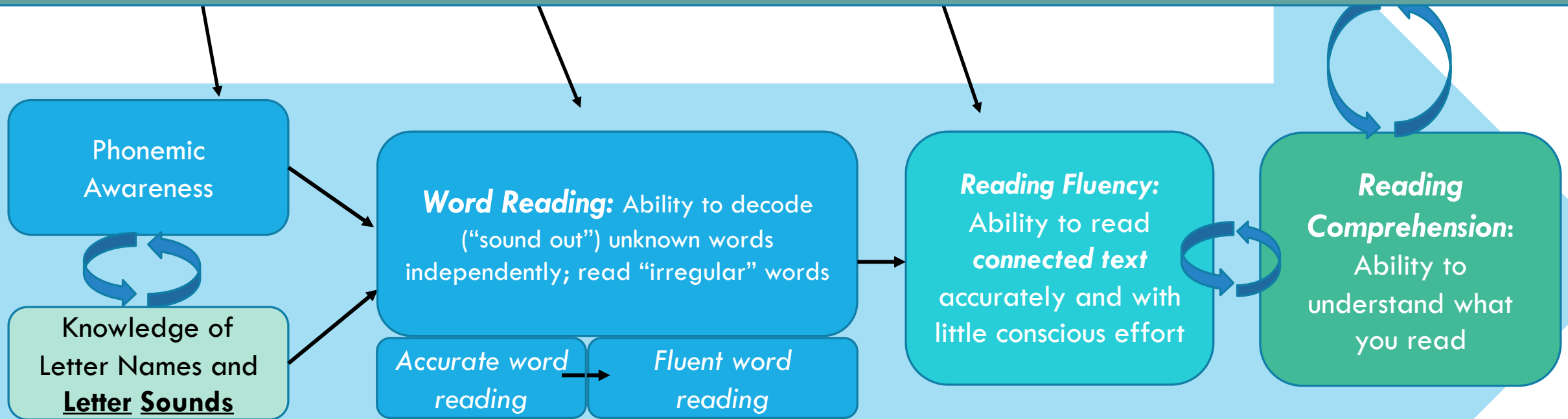
Dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by **difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities**. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. *Secondary consequences* may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge.

Lyon, Shawitz, & Shaywitz (2003), International Dyslexia Association

READING DEVELOPMENT

Understanding how reading commonly develops helps us understand how and why some children struggle

Language: Linguistic comprehension, **vocabulary** (knowledge of word meanings), linguistic reasoning skills, inference-making



- All skills exist on a continuum of proficiency
- Impairment in one aspect severely constrains or impairs subsequent skills

Language: 60,000 years

Reading: 5,000 years

PHONEMIC AWARENESS

Extends beyond appreciation of rhyme or alliteration:

- Insight that every word can be conceived as a sequence of phonemes

Discern that:

- coat and sit end with the same sound
- Bend and boat begin with the same sound
- /b/ /a/ /t/ can be blended together to make “bat”, which is different from “tab”
- Removing /r/ from trap leaves tap

PHONEMES

The particles of language: The smallest units of speech

44 phonemes, each represented by a printed letter or group of letters

They are building blocks of spoken and written words: Combined in various ways to form the 170,000+ words in English

Words differ by their unique combination of phonemes

Consonant phonemes, with sample words		Vowel phonemes, with sample words	
1. /b/ – bat	13. /s/ – sun	1. /a/ – ant	13. /oi/ – coin
2. /k/ – cat	14. /t/ – tap	2. /e/ – egg	14. /ar/ – farm
3. /d/ – dog	15. /v/ – van	3. /I/ – in	15. /or/ – for
4. /f/ – fan	16. /w/ – wig	4. /o/ – on	16. /ur/ – hurt
5. /g/ – go	17. /y/ – yes	5. /u/ – up	17. /air/ – fair
6. /h/ – hen	18. /z/ – zip	6. /ai/ – rain	18. /ear/ – dear
7. /j/ – jet	19. /sh/ – shop	7. /ee/ – feet	19. /ure/ ⁴ – sure
8. /l/ – leg	20. /ch/ – chip	8. /igh/ – night	20. /ə/ – corner (the 'schwa' – an unstressed vowel sound which is close to /u/)
9. /m/ – map	21. /th/ – thin	9. /oa/ – boat	
10. /n/ – net	22. /th/ – then	10. /oo/ – boot	
11. /p/ – pen	23. /ng/ – ring	11. /oo/ – look	
12. /r/ – rat	24. /zh/ ³ – vision	12. /ow/ – cow	

Cat = /k/ /a/ /t/

School = /s/ /k/ /oo/ /l/

Chopped = /ch/ /o/ /p/ /t/

Reading is a connection-forming process in which printed combinations of letters are linked to pronunciations

Printed letters linked to sounds (phonemes)

Combinations of letters are linked to pronunciations and meanings of whole words

“/k/”

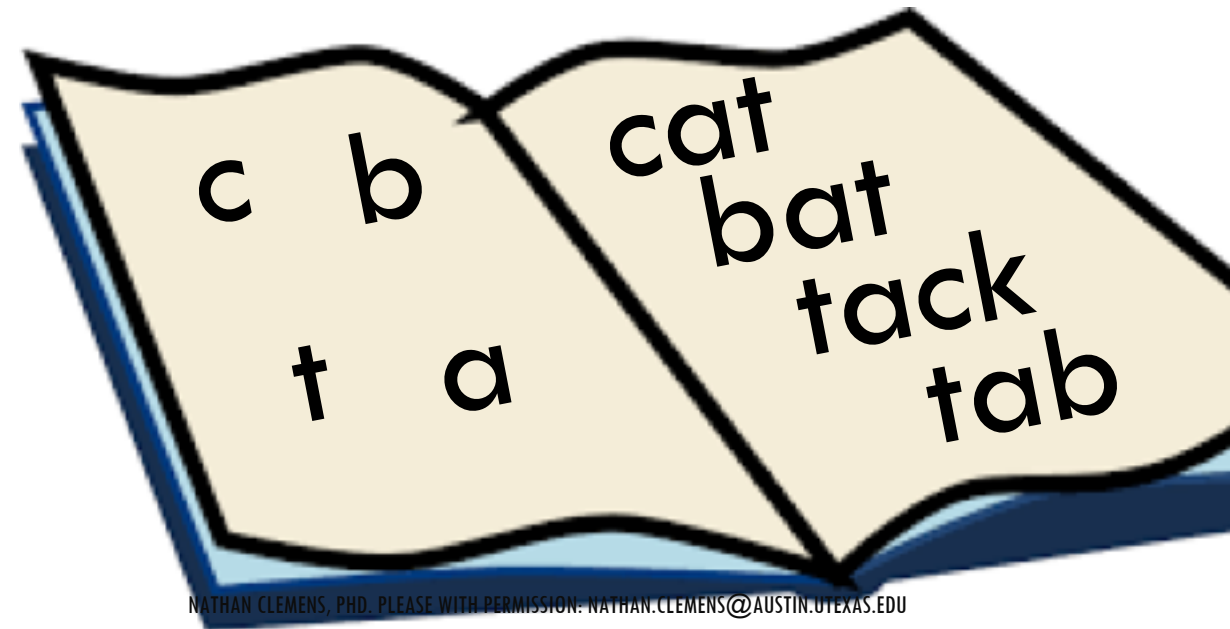
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THE IMPORTANCE OF PHONEMIC AWARENESS

Words are processed by the language systems in the brain - reading involves translating the printed phonemes into their spoken sounds



cat, bat,
tack, tab



“The identification of words is mediated by the perception of letters” (Perfetti, 1984)

Printed word



Printed letters associated with sounds

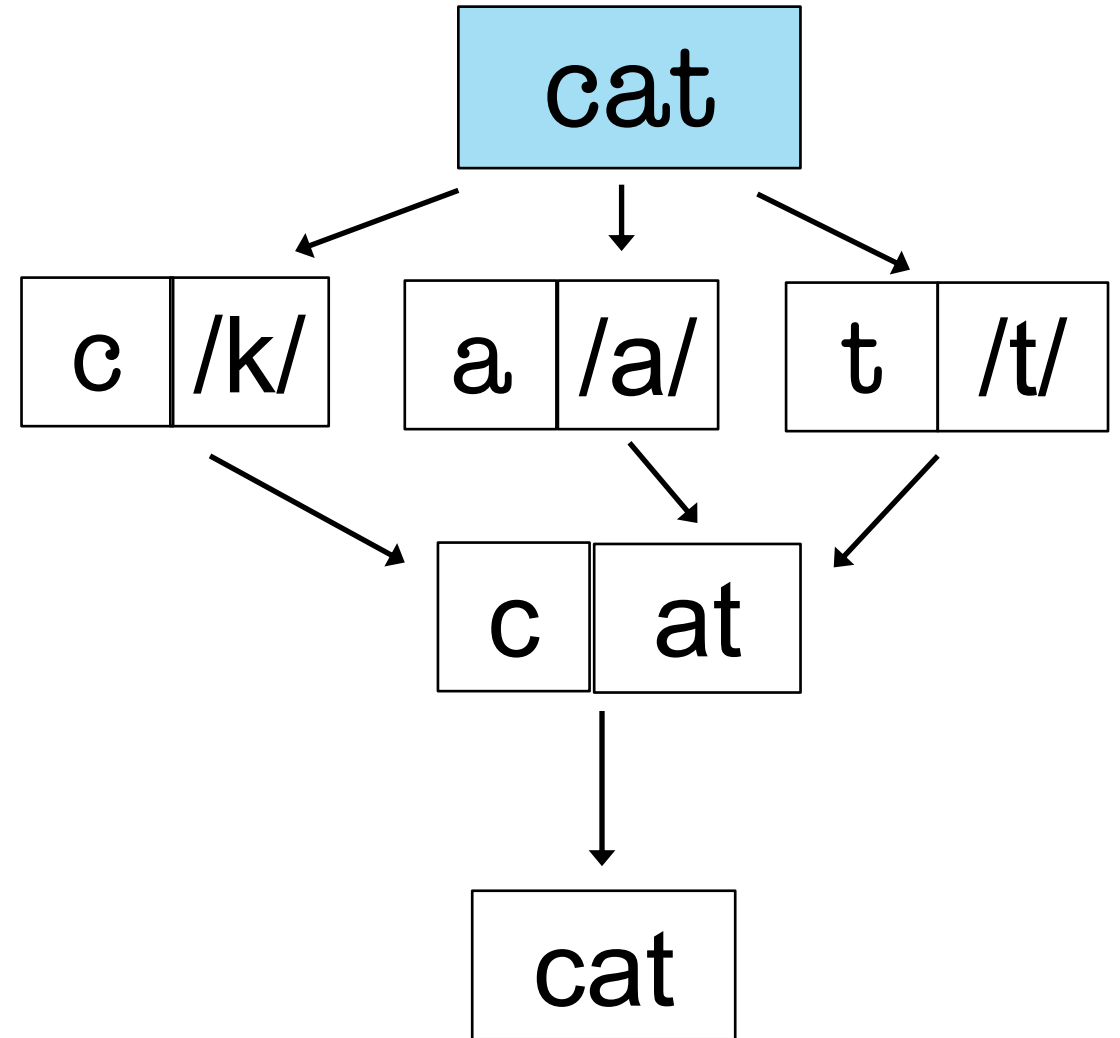


Letters are bonded to pronunciations in increasingly larger units (/a/ and /t/ becomes /at/)



A spelling is linked to a pronunciation. This allows it to be read very quickly, as if “by sight”

Ehri (2014)



READING WORDS

Skilled readers: Automatic, instantaneous word recognition

- Ability to read words rapidly (i.e., “by sight”) is a hallmark of skilled reading

But – words are not processed or memorized as “shapes” or whole word forms

“The identification of words is mediated by the perception of letters” (Perfetti, 1984)

Eye movement studies:

- Skilled readers fixate on nearly every word (Rayner & Pollatsek, 1989)
- ...and process most letters within each word. Why?



Understanding
and processing
words of a series
of sounds

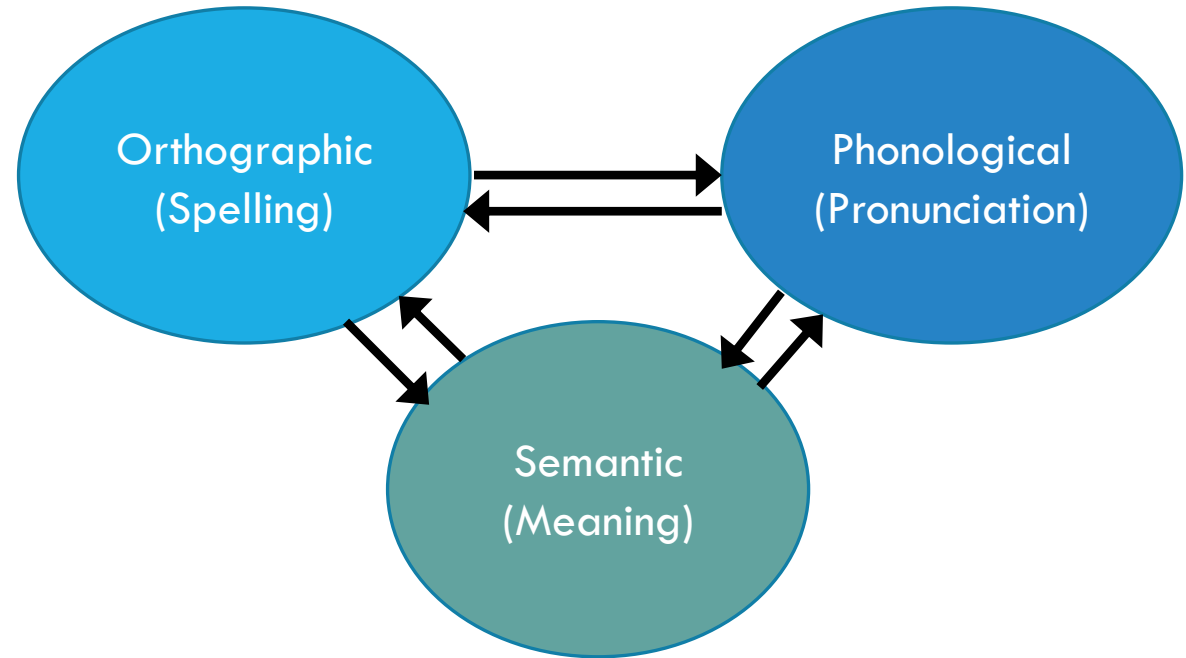
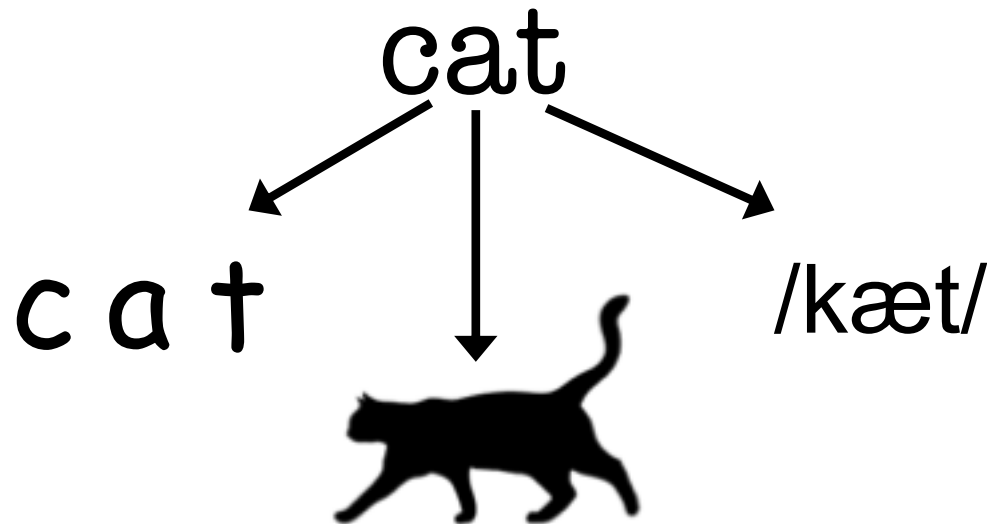
Letters represent
sounds

Words are read
or spelled
rapidly
processing letters

HOW DO WE *REALLY KNOW* A WORD?

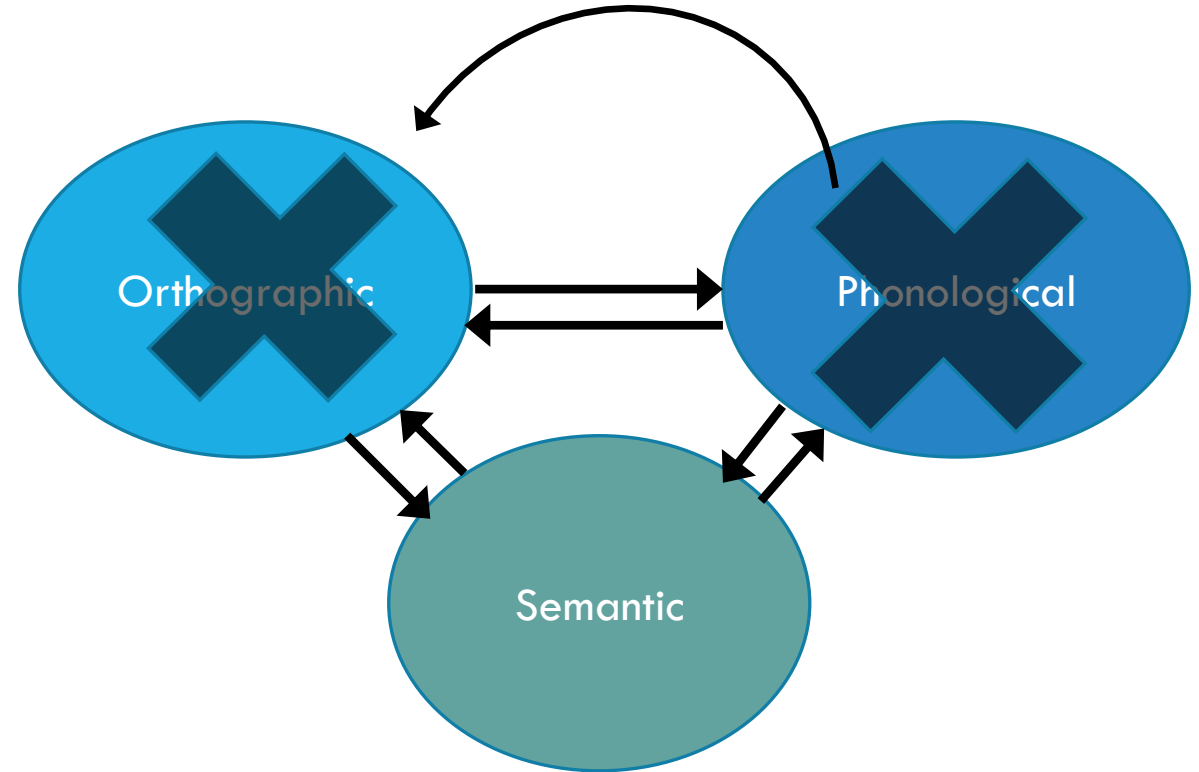
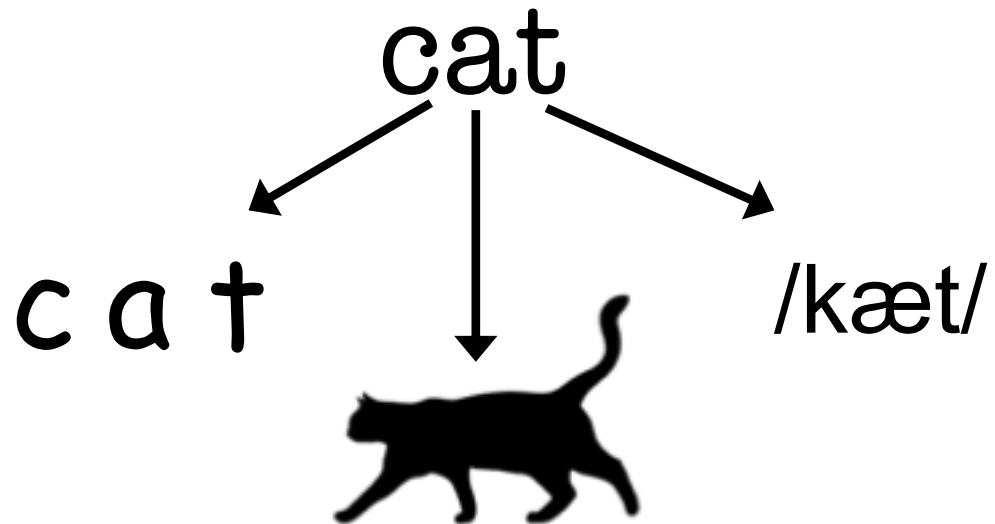
Perfetti's Lexical Quality hypothesis: A well-known word is represented in memory in three ways:

- Orthographic: How the word is spelled
- Phonological: How the word is pronounced
- Semantic: What the word means



DYSLEXIA

Impaired phonology impedes word spellings from being stored in memory



DYSLEXIA

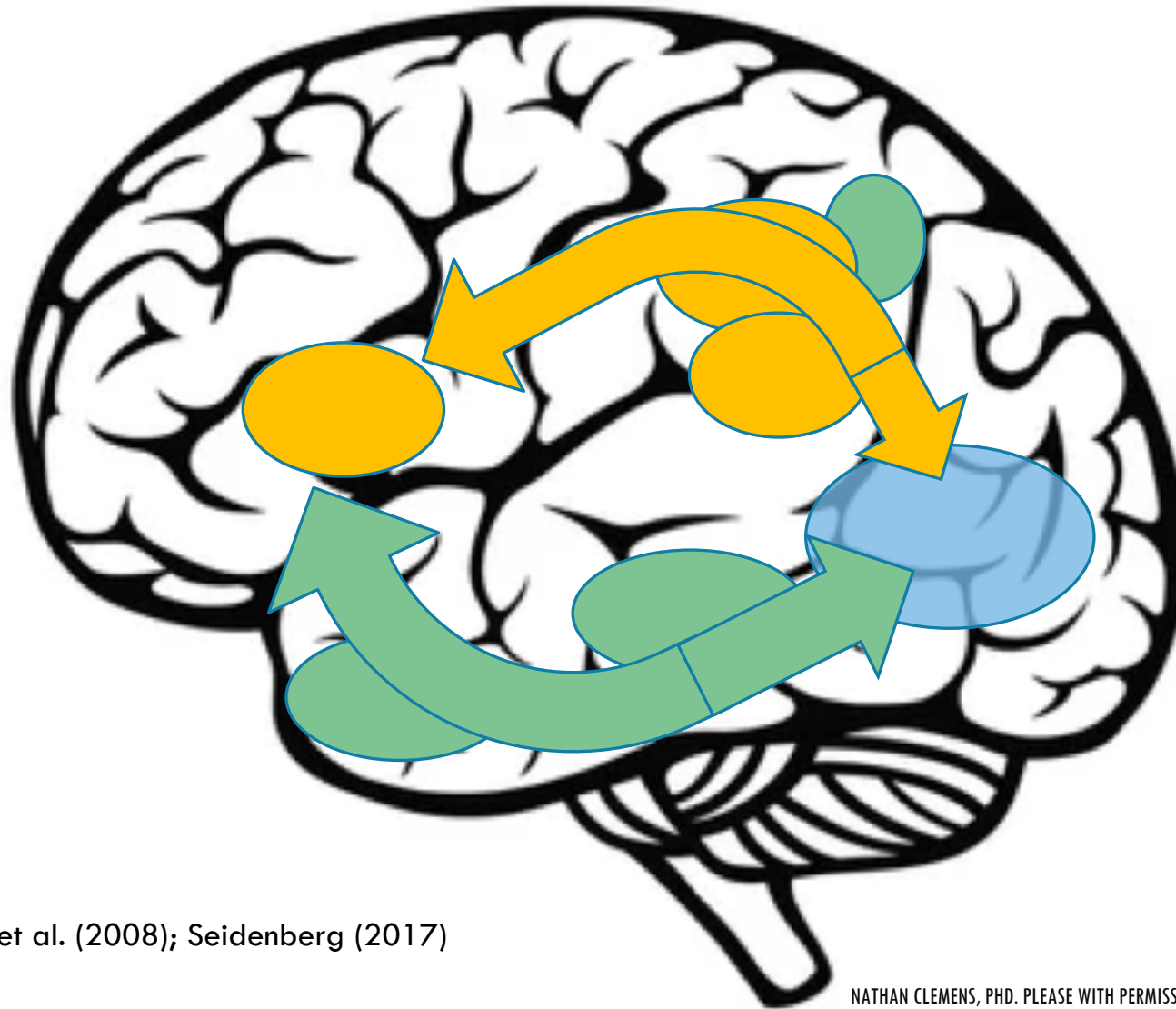


Orange = Phonological (how words sound)

Green = Semantic (what words mean)

Blue = Orthographic (word spellings)

Non-Impaired Reading



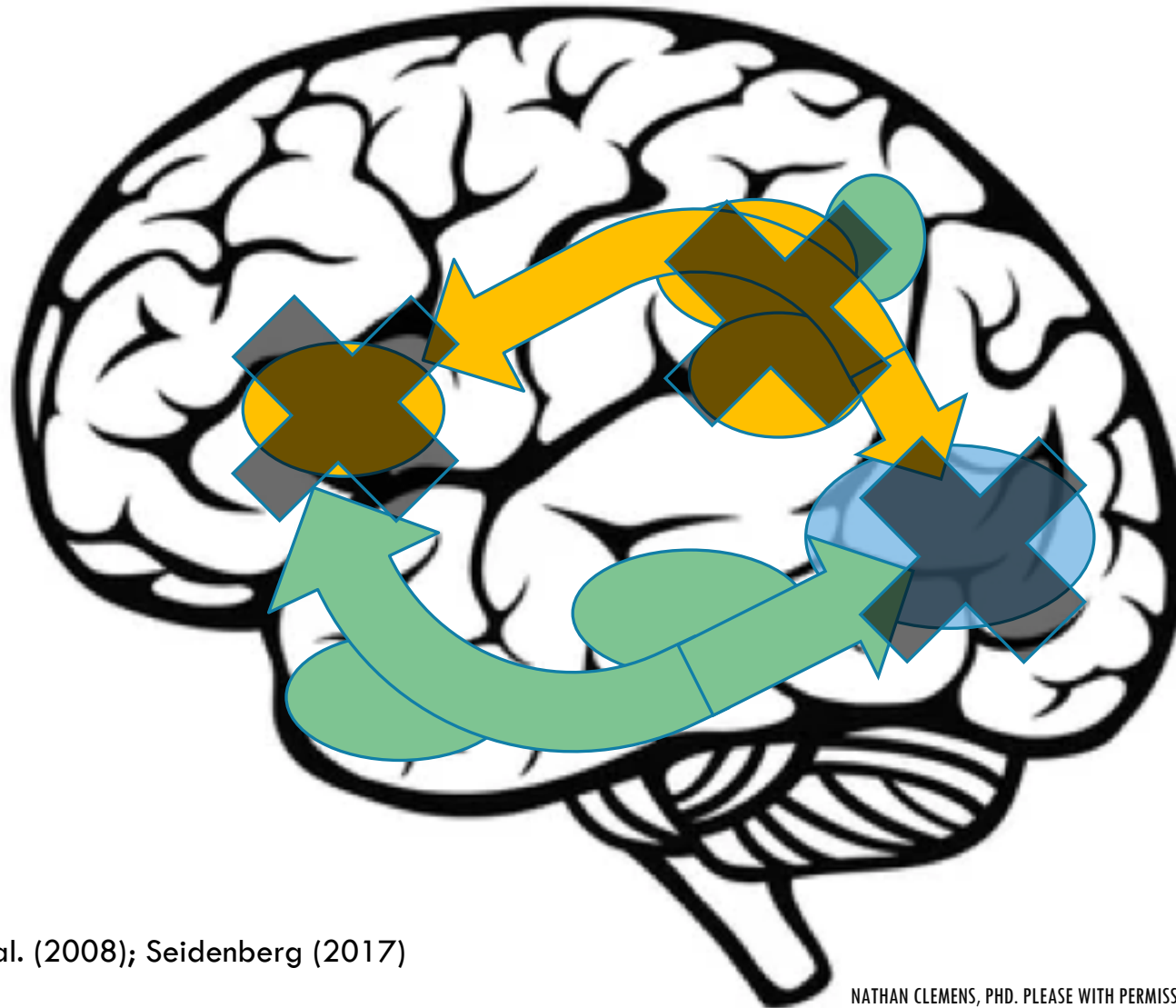
Paulesu et al. (2014); Quaglino et al. (2008); Seidenberg (2017)

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Dyslexia

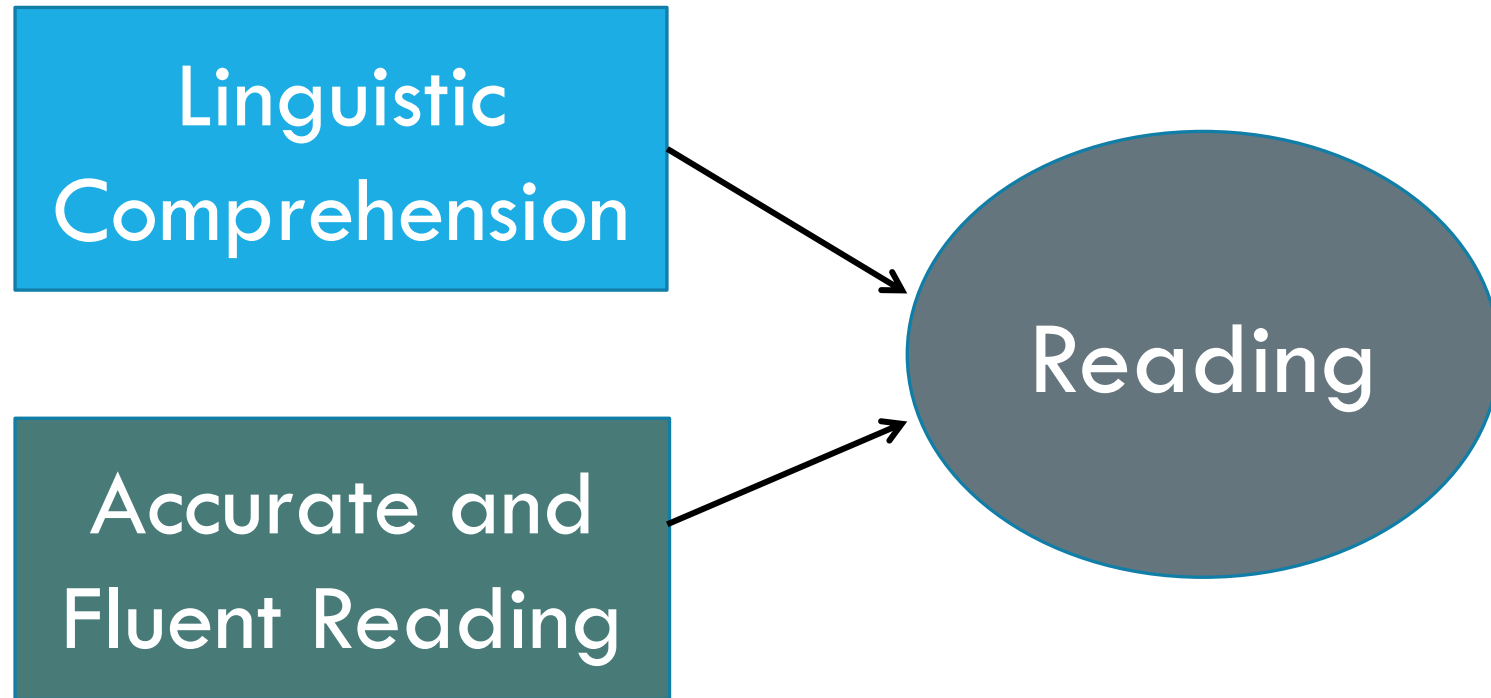


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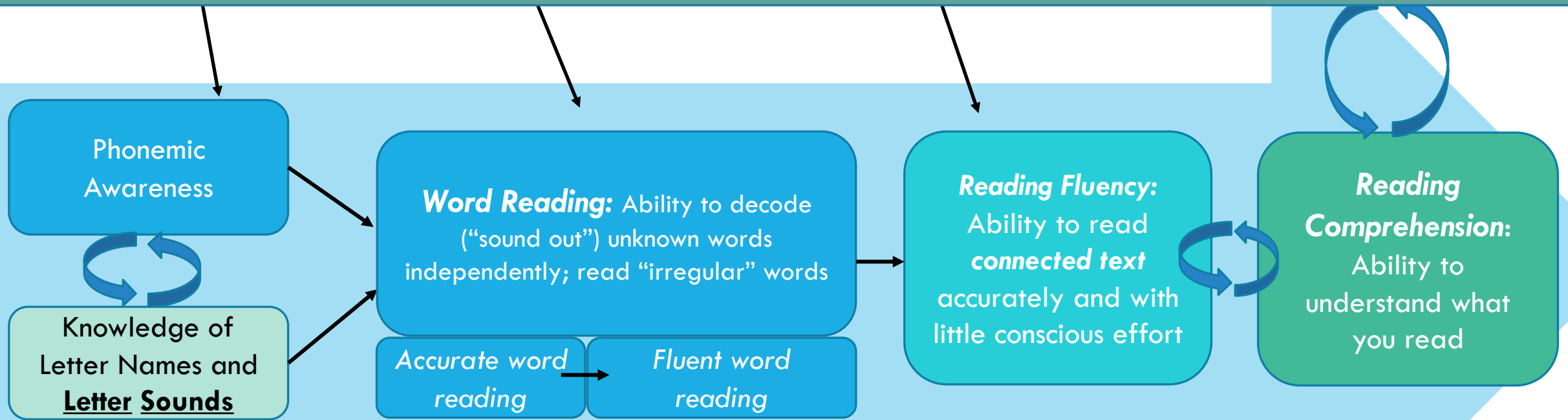
NATHAN CLEMENS, PHD. PLEASE WITH PERMISSION: NATHAN.CLEMENS@AUSTIN.UTEXAS.EDU

READING COMPREHENSION

Gough and Tunmer's "Simple View": $\text{Reading} = \text{Decoding} \times \text{Language Comprehension}$



¿De qué estás hablando?

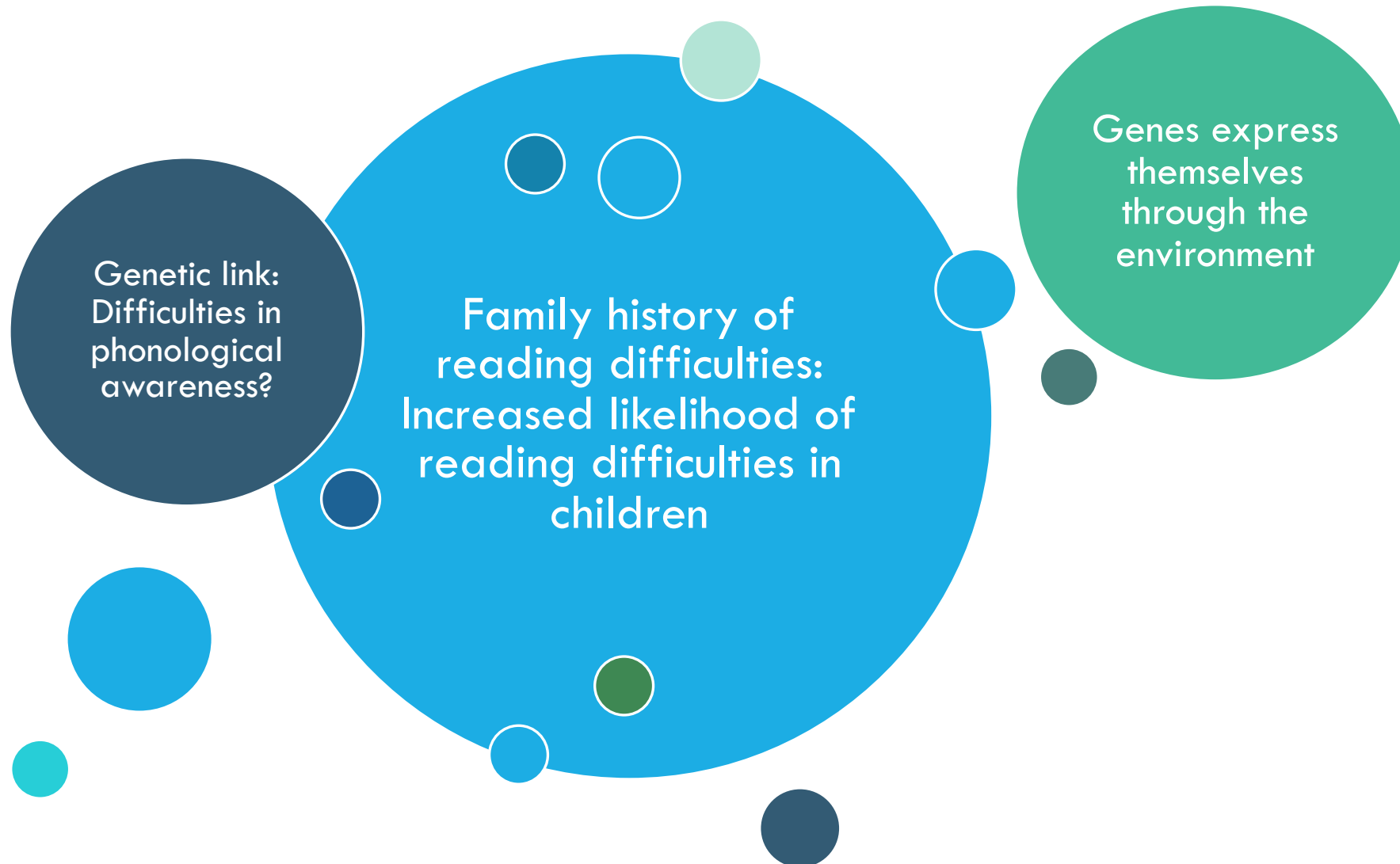


EARLY SPEECH AND LANGUAGE

Speech and language difficulties in toddlerhood and preschool associated with later identification with dyslexia, *but not guaranteed*

Delayed speech, language impairments – associated with later dyslexia identification to the extent they affect phonological awareness

THE HERITABILITY OF DYSLEXIA



(Bryne et al., 2002; Thompson et al., 2015; Christopher et al., 2015; Olson et al., 2017)

IDENTIFICATION OF DYSLEXIA



THE DIFFICULTY OF IDENTIFICATION

Dyslexia is dimensional - it exists along a continuum. There is no consistent biological, genetic, or chromosomal “marker”

The difficulty of early (pre-k, kinder) identification: Dyslexia is defined by significant difficulties in word reading and spelling. We typically do not expect a degree of word reading proficiency until mid-first grade, at the earliest

However, we can identify risk factors and skill profiles associated with subsequent identification

DYSLEXIA RISK: PRE-SCHOOL FACTORS AND SKILL PROFILES

Family history
of reading
difficulties

Child history of
speech or
language
delay/difficulty

Child
difficulties with
phonological
awareness skills

E.g., difficulties in
rhyming, noticing
similarities in words

DYSLEXIA RISK: KINDERGARTEN SKILL PROFILES

Family history of reading difficulties

Child history of speech or language delay/difficulty

Child struggles with phonemic awareness skills

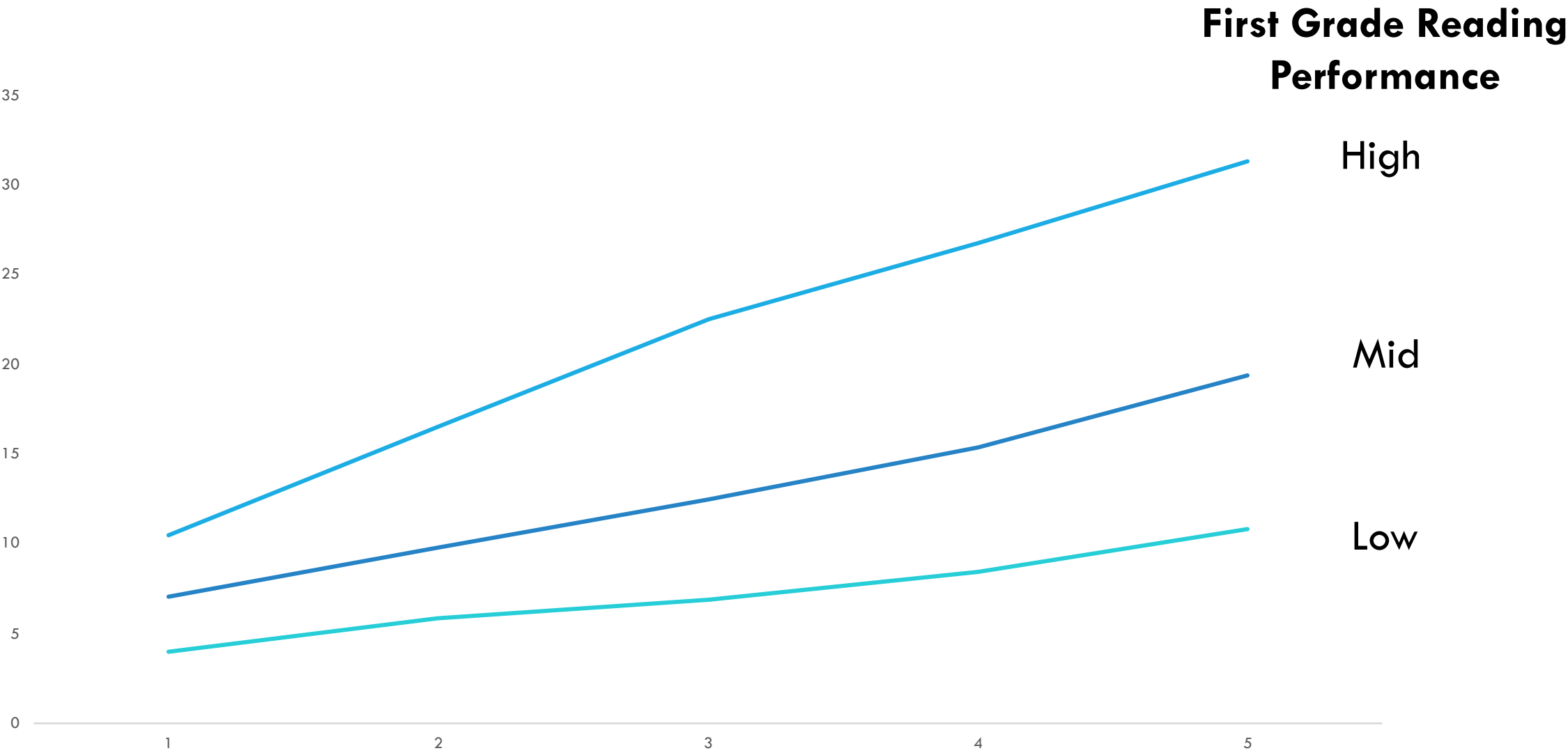
- Early: Rhyming, first-sound identification and matching, syllable segmenting and blending
- Later: Phoneme segmenting and blending, phoneme manipulation or deletion

Difficulties with identifying printed letters by name, and later, by sound

Most important

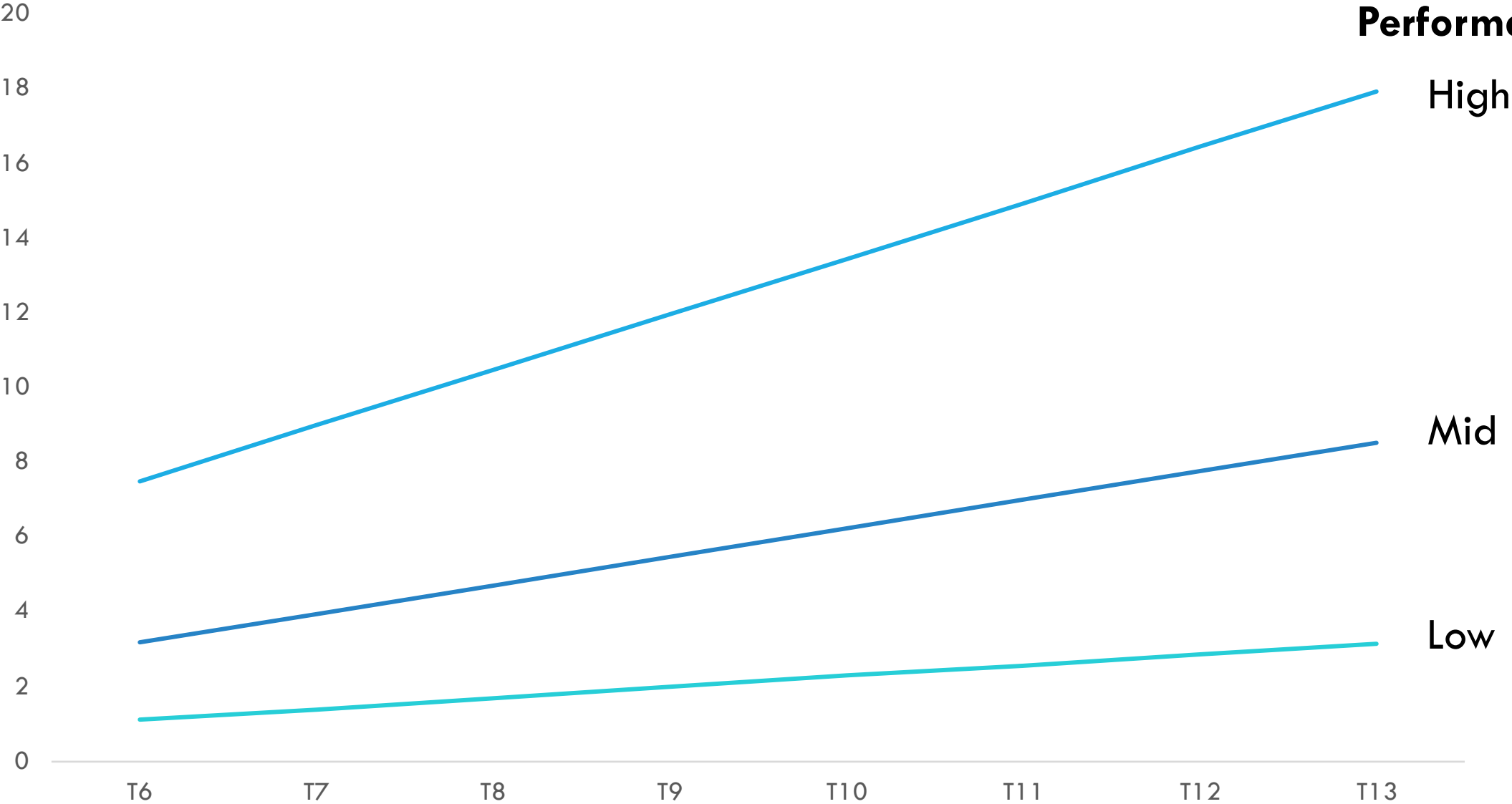
Later Kindergarten: Child struggles to read simple words

Growth in Letter Sound Fluency from October – December of Kindergarten, and Reading Performance at the End of First Grade



Growth in Word Reading Fluency from January – May of Kindergarten, and Reading Performance at the End of First Grade

First Grade Reading Performance



DYSLEXIA RISK: FIRST AND SECOND GRADES

Family history of reading difficulties

History of speech or language difficulties

History of difficulties in basic skills in preschool and kindergarten

- Phonemic awareness
- Alphabetic knowledge: Letter names and sound
- Decoding basic words

Significant difficulties in reading words accurately – reading words and text is slow, error-filled, laborious

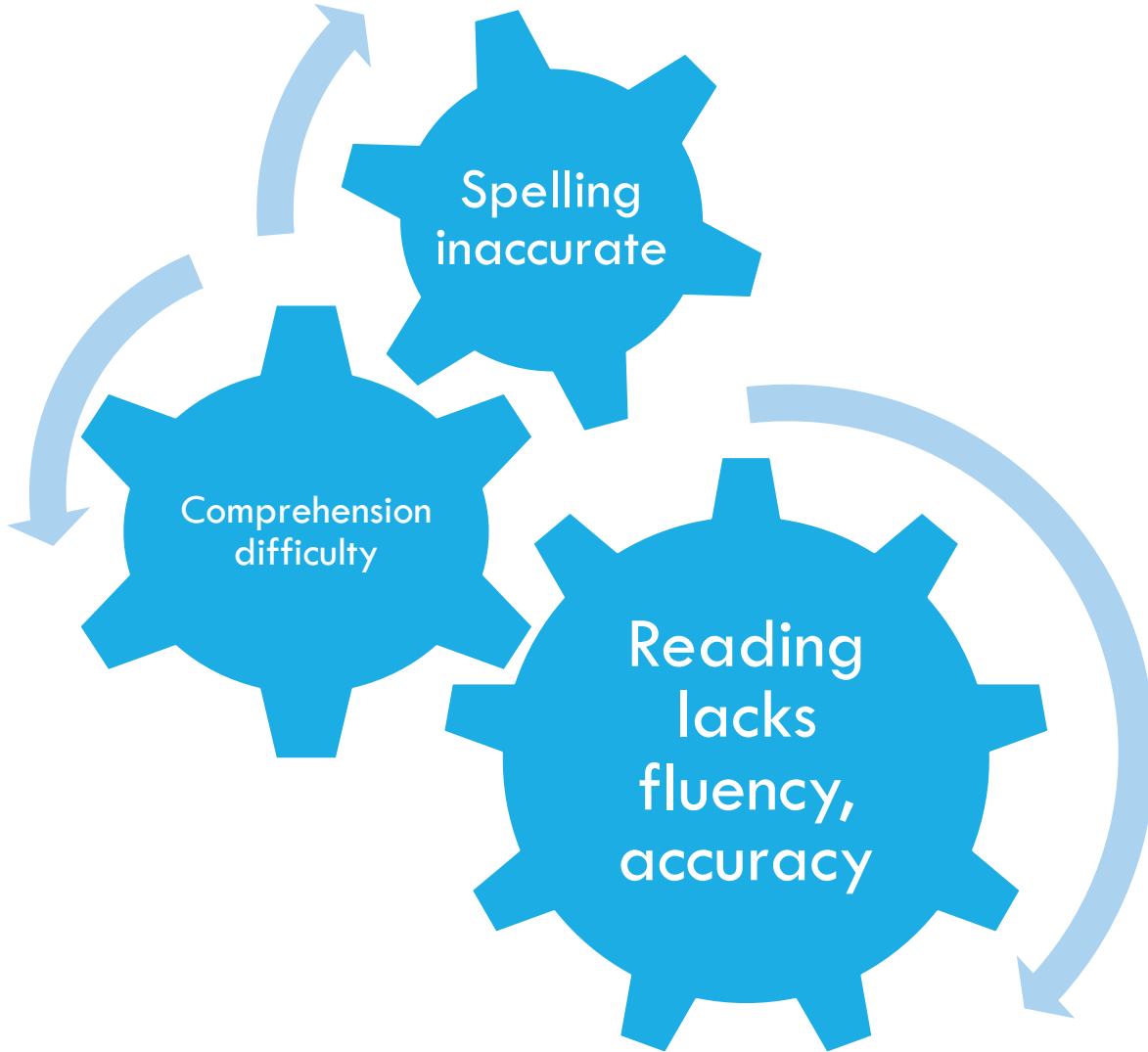
Most important

Tendency to guess at words based on pictures or meaning

Reading comprehension is impaired *as a result of slow and inaccurate reading*

Spelling difficulties start to emerge

SKILL PROFILES OF DYSLEXIA: MIDDLE TO LATE ELEMENTARY



Text is one of the primary ways in which students acquire new knowledge and vocabulary

Motivation, engagement may now be more affected

SKILL PROFILES: MIDDLE AND HIGH SCHOOL

Slow, difficult reading often the defining feature

Difficulties in encountering new words

Spelling remains challenging

Difficulties in comprehension primarily as a result of

- (a) difficulties reading text
- (b) accumulating deficits in background knowledge and vocabulary

APPROACHES AND STRATEGIES FOR INTERVENTION AND ONGOING SUPPORT

PRACTICES THAT HAVE ***NOT*** BEEN SHOWN TO IMPROVE READING SKILLS

Colored lenses or colored overlays

- See reviews by Griffiths et al. (2016); Suttle et al. (2018)

Special “dyslexia” fonts (e.g., “Dyslexie”)

- See studies by Kuster et al. (2018); Marinus et al. (2016); Wery et al. (2017)

***Dyslexia is not a problem
with vision***

Programs that focus primarily on movement, balance, perceptual-motor training, or kinesthetics

- See reviews by Hyatt (2007); Kavale & Mattson (1983)

Computer-based programs that target working memory and attention

- See review by Melby-Lervag, Redick, & Hulme (2016)

SUPPORT STRATEGIES: PRESCHOOL

The importance of reading with children (every day)

Language Development

Print Awareness

Attention and Behavior
Regulation

It's Fun



Dialogic Reading:

ask questions, add information,
discuss nouns, actions and feelings,
talk about word meanings, connect
events to child's life

PRESCHOOL SUPPORT (CONT.)



Phonological awareness

- Rhyming books and songs
- Talk about and play with words – words that rhyme, sound alike (first sound, last sound), clap words by syllables, remove syllables

Talk about letters

- Play with letter magnets and blocks
- Identify letters name and sound
- Talk about words that start with that sound

*Keep things
fun and
informal*

DYSLEXIA IS A PERSISTENT PROBLEM THAT IS NOT OUTGROWN

Does not represent a temporary lag

Do not delay kindergarten because of a delay in early language or literacy readiness skills with the idea that they will "catch up"

SUPPORT STRATEGIES: KINDERGARTEN

Alphabetic Knowledge: Clear and explicit instruction

- Letter names
- Letter sounds

Phonemic awareness

- Rhyming, alliteration, and syllable segmenting/blending – work toward phoneme segmenting and blending
- Integrate with print – letters and words

Decoding/Word Reading

- Clear and consistent instruction to read words - focus on the letters within the word and how they sound
- First: Always prompt students to sound out, even if it doesn't work for a word
 - Point to letters as you sound out
 - Talk about exception pronunciations

INTERVENTIONS AND SUPPORT STRATEGIES: FIRST AND SECOND GRADES

Address missing letter sounds

Decoding and word reading

- Focus on how words are spelled and the sounds the letters make, even words that are irregular
- Talk about the meanings of words

Spelling: Integrate with reading instruction

- Spelling words should mirror the word types targeted in reading instruction

FIRST AND SECOND GRADES (CONT.)

Practice Reading Every Day

- **Read aloud** with an adult
- At school: Supervised partner reading
- At home: Brief, high-interest, fun reading practice
- Familiar texts in which student is at least 95% accurate:
Focus on building automaticity in word recognition

Unknown/challenging words: Adult should prompt student to focus on sounds within the word, and how the word is spelled



MIDDLE ELEMENTARY AND BEYOND

Reading practice: Address accuracy, build fluency

- Word study strategies for longer, multi-syllabic words
- Easier texts to build fluency
- “Stretch texts” to develop word reading and vocabulary skills
- Integrate spelling to within reading instruction

Vocabulary

- Expand depth and breadth

Comprehension: Focus on inference-making

- Connecting pronouns to their referent
- Connecting ideas within and across texts
- Inferring word meaning from context

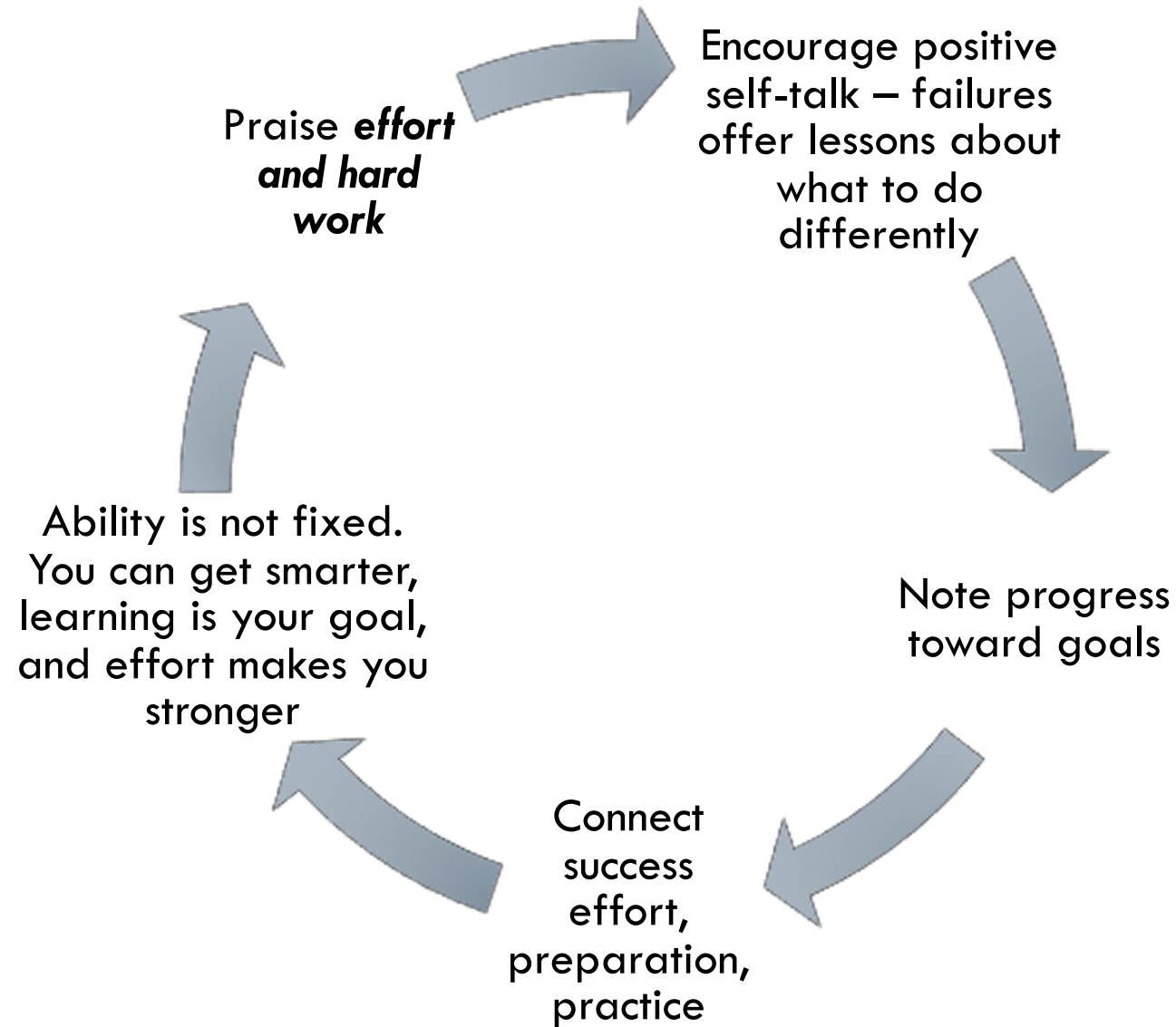
MOTIVATION, AFFECT, AND SELF-REGULATION

Attention to task, persistence

Personal Goal-Setting: Short- and long-term

Mood and Affect: Youth with dyslexia are at greater risk for internalizing disorders such as anxiety and depression

- (Klassen et al., 2013; Mugniani et al., 2009; Maag & Reid, 2006; Nelson et al., 2011)



PROMOTE A **GROWTH MINDSET** (CAROL DWECK)

THANK YOU



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