Decoding the Science of Reading: Jedi Mind Training

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MISSISSIPPI DEPARTMENT OF EDUCATION

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VISION

To create a world-class educational system that gives students the knowledge and skills to be successful in college and the workforce, and to flourish as parents and citizens

MISSION

To provide leadership through the development of policy and accountability systems so that all students are prepared to compete in the global community

State Board of Education STRATEGIC PLAN GOALS

1. **ALL** Students Proficient and Showing Growth in All Assessed Areas
2. **EVERY** Student Graduates from High School and is Ready for College and Career
3. **EVERY** Child Has Access to a High-Quality Early Childhood Program
4. **EVERY** School Has Effective Teachers and Leaders
5. **EVERY** Community Effectively Uses a World-Class Data System to Improve Student Outcomes
6. **EVERY** School and District is Rated “C” or Higher

Today we will use the force to:

- Examine the Science of Reading
- Identify areas of the brain responsible for reading
- Learn how orthographic mapping occurs
- Analyze the roles of unitization, “sight words”, and fluency


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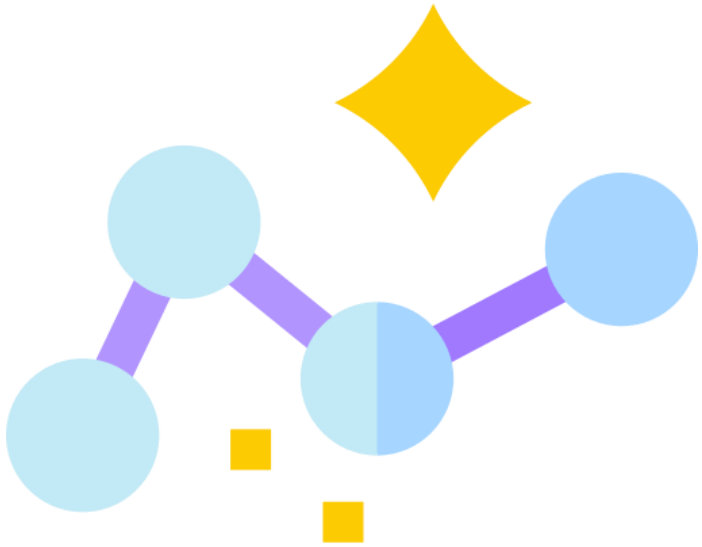
What is the Science of Reading?

Use the force, Luke!



The body of work referred to as the "science of reading" is not an ideology, a philosophy, a political agenda, a one-size-fits-all approach, a program of instruction, nor a specific component of instruction. It is the emerging consensus from many related disciplines, based on literally thousands of studies, supported by hundreds of millions of research dollars, conducted across the world in many languages.

Louisa Moats

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The science of reading is a vast, interdisciplinary body of scientifically based research about reading and issues related to reading and writing. This research has been conducted over the last five decades across the world, and it is derived from thousands of studies conducted in multiple languages. The science of reading has culminated in a preponderance of evidence to inform how proficient reading and writing develop; why some have difficulty; and how we can most effectively assess, teach, and improve student outcomes through prevention of and intervention for reading difficulties.

Science of Reading: Defining Guide (2022)

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Activity: What is the Science of Reading?

Scan the QR Code and review the two quotes from the previous slides. Use your knowledge of the Science of Reading and the information synthesized from the two quotes to create your personal definition of the Science of Reading.

https://bit.ly/scienceofreadingactivity

Scan here

What it is NOT

- A single, specific component of instruction, such as phonics
- A program of instruction
- A one-size-fits-all approach
- A political agenda
- A fad, trend, new idea, or pendulum swing
- An ideology or philosophy

What it IS

- A collection of research over time across multiple fields of study
- Teaching that encompasses all five components of reading
- A dynamic and always evolving body of work

What is the Science of Reading?

The Simple View of Reading

Decoding

- **Phonemic Awareness** (working with sounds)
- **Phonics** (working with letters and sounds)

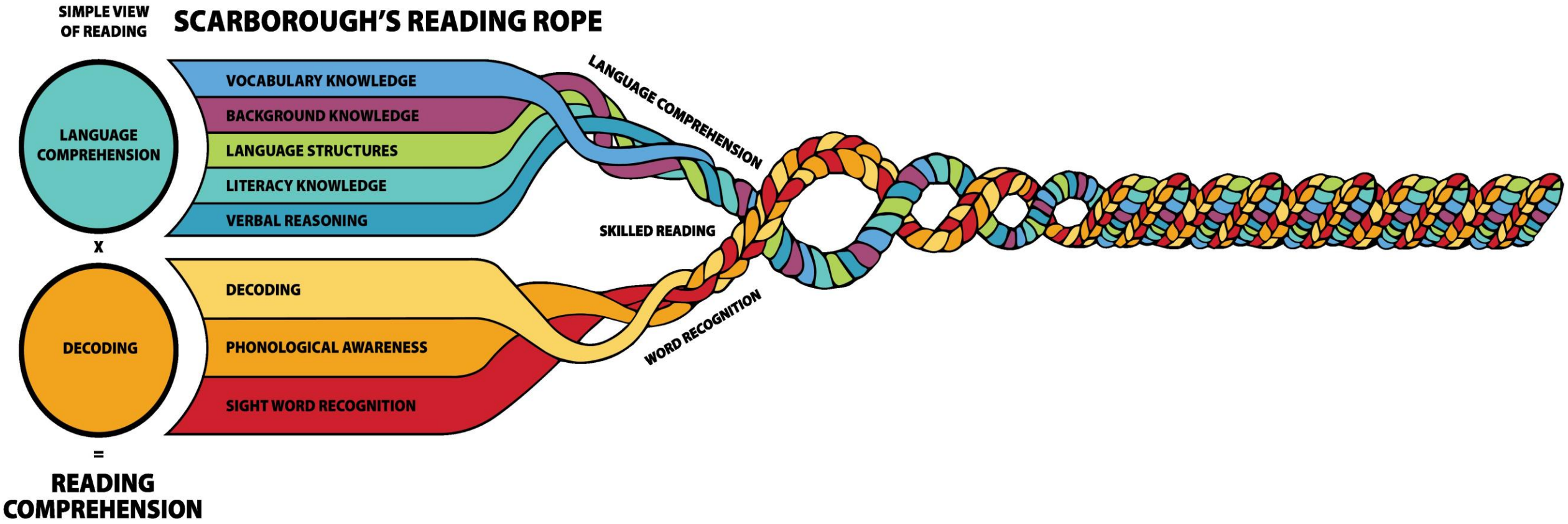
Language Comprehension

- **Listening**
- **Comprehension**
- **Vocabulary**

Reading Comprehension

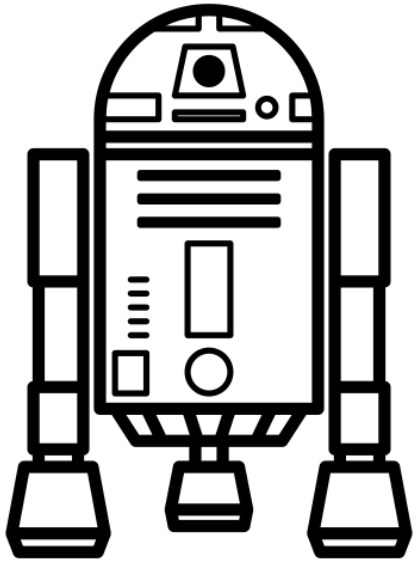
What is the Science of Reading?

Scarborough's Rope



The Reading Processors

What drives the ability to read?



Reading is about creating an interface between the visual and spoken language systems.

Stanislaus Dahaene

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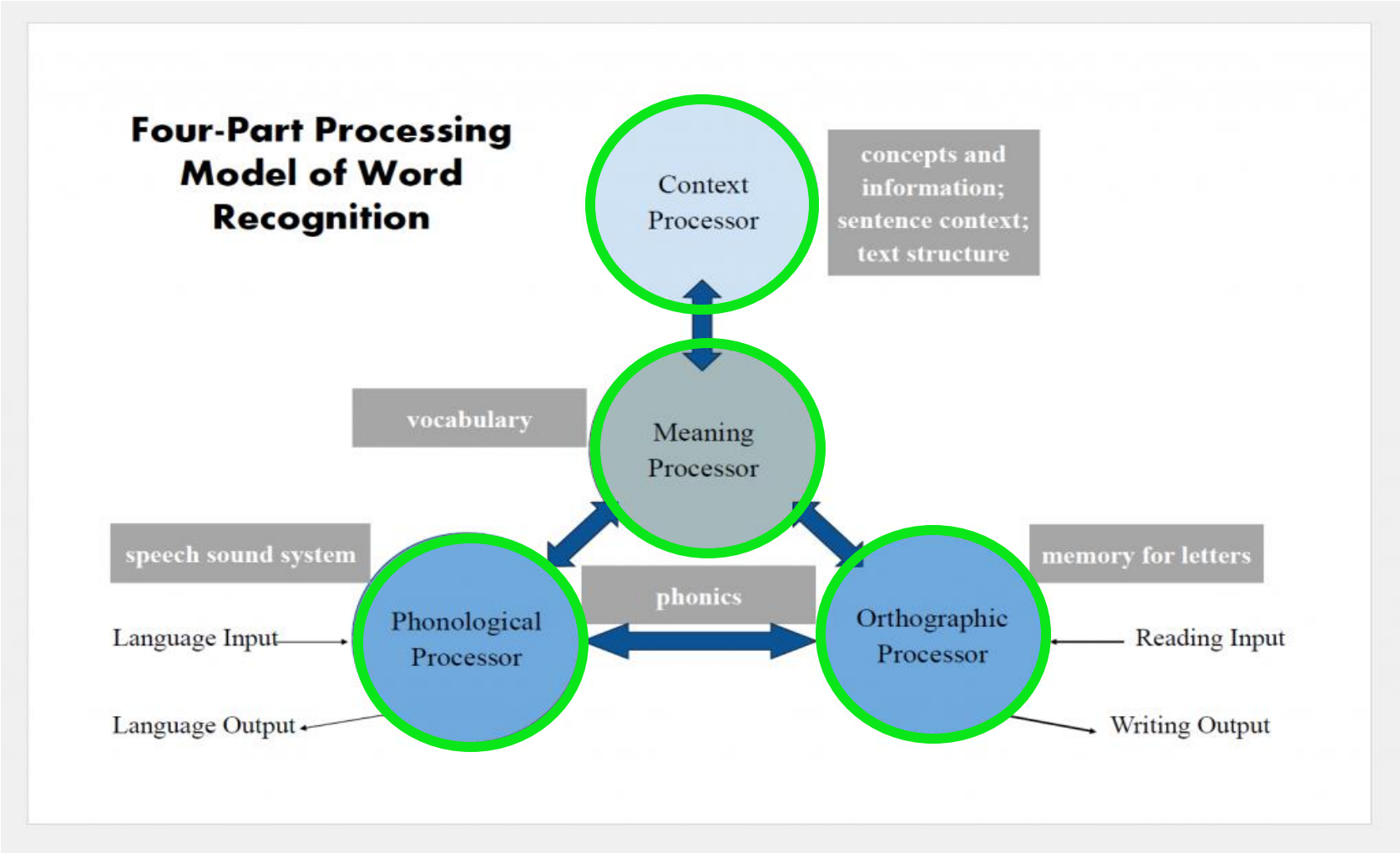
Phonological and Orthographic Processors

The Brain:

- Learns to read by connecting already learned sounds to the letters and graphemes that represent them
- Is naturally wired for speech, but not for reading.
- Relies on other systems already in place, mostly in the brain's language center, to work together to read.

Phonological and Orthographic Processors



(Seidenberg & McClelland, 1989)

Phonological and Orthographic Processors

The **phonological** and **orthographic processors** work together for **word recognition.**

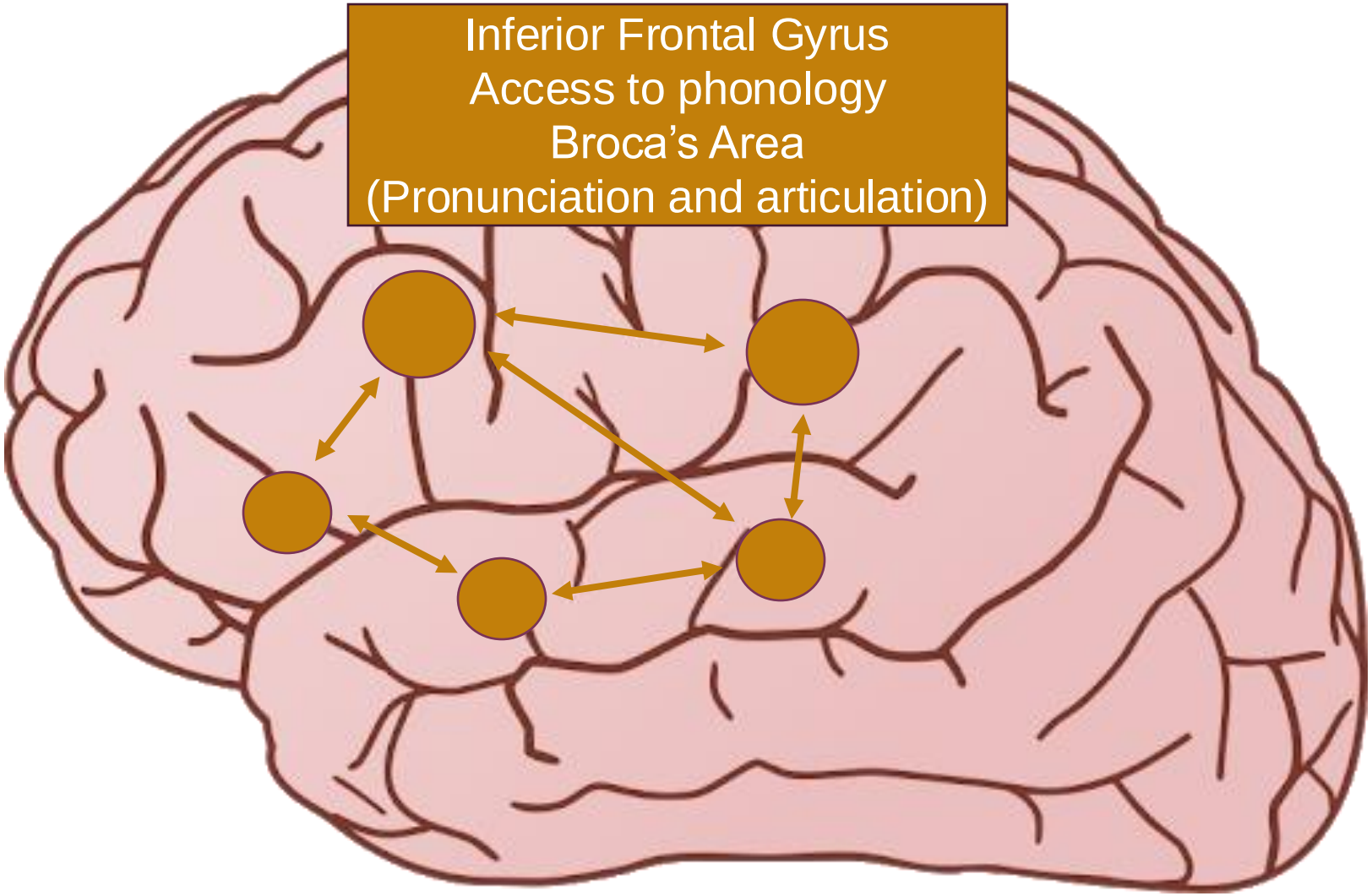
Orthographic Processor

- Identifies and processes the letters and letter patterns that our eyes see on the page.
- Helps us remember letter sequences for spelling.

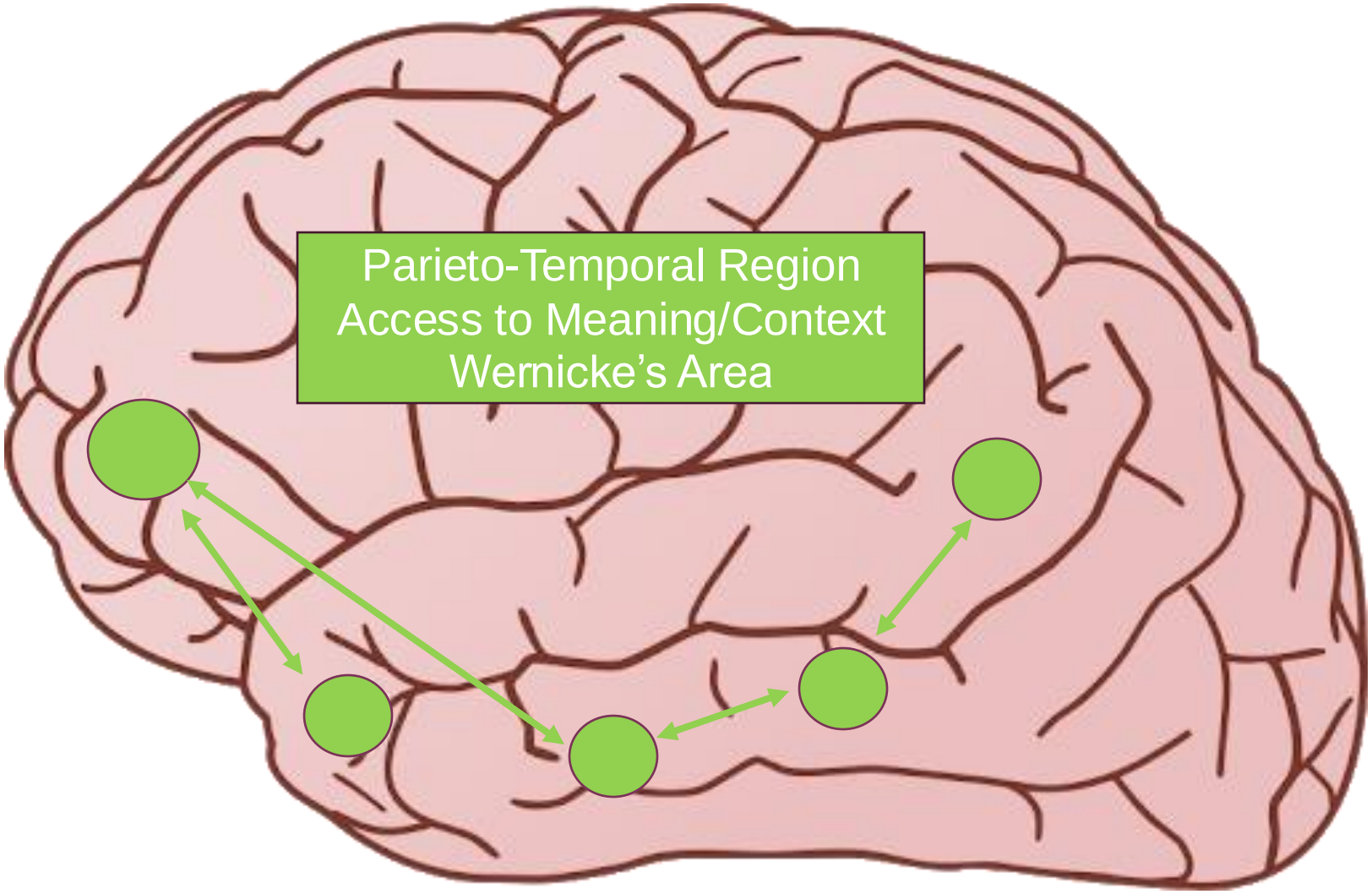
Phonological Processor

- Identifies, remembers, interprets, and produces speech sounds.
- Functions in phoneme awareness as one of its jobs.

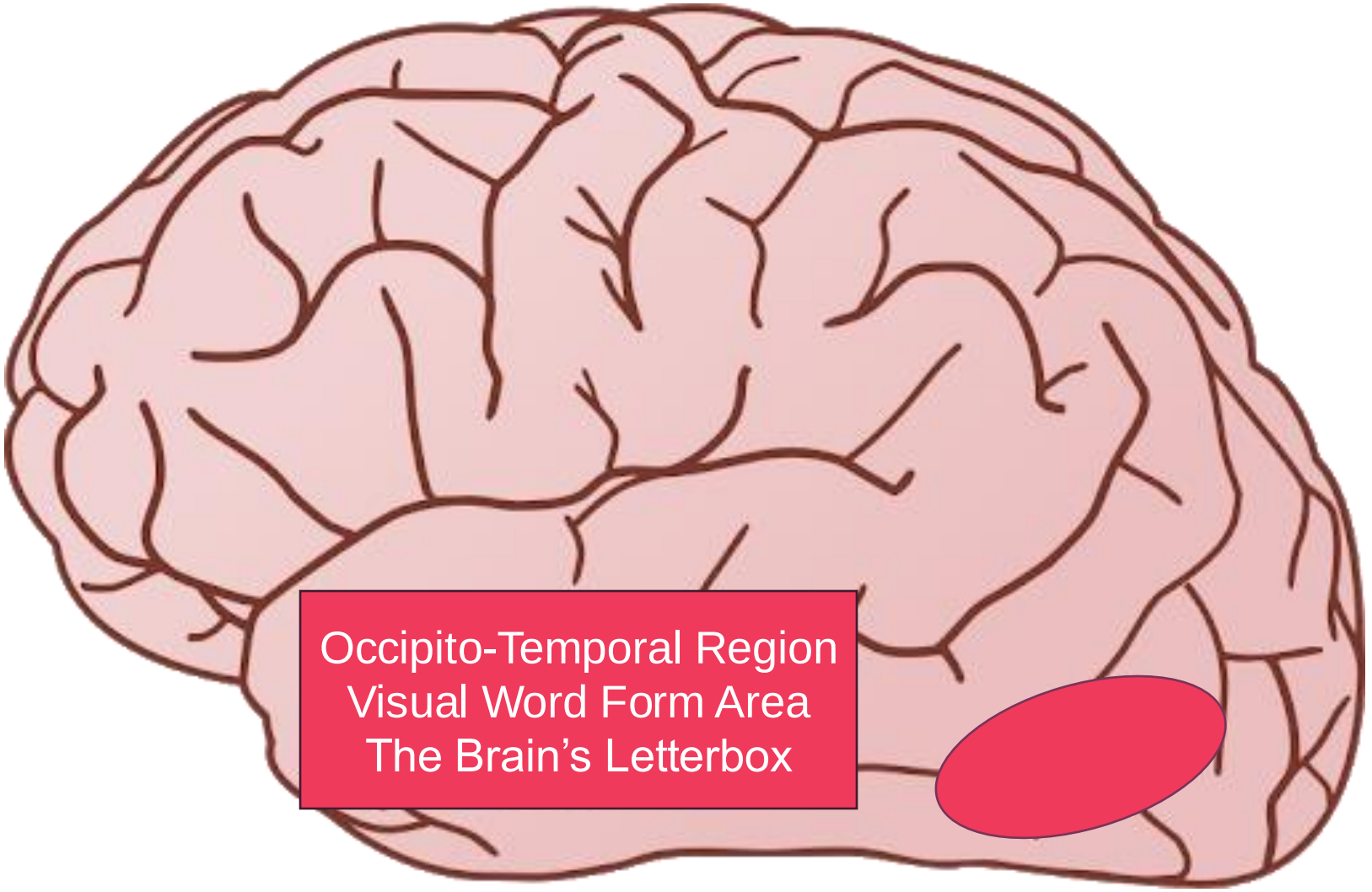
The Reading Processors



The Reading Processors

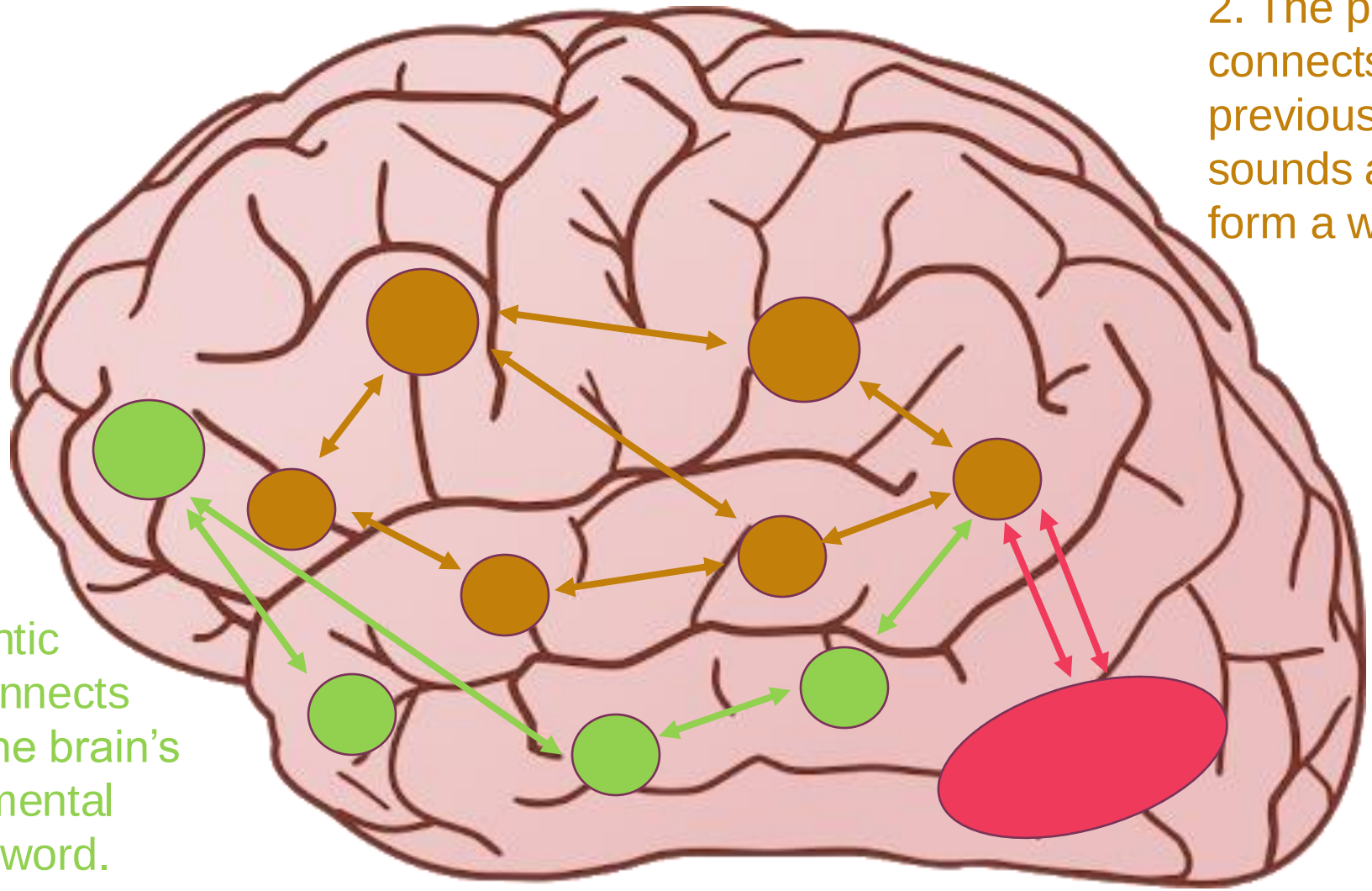


The Reading Processors



The Reading Processors

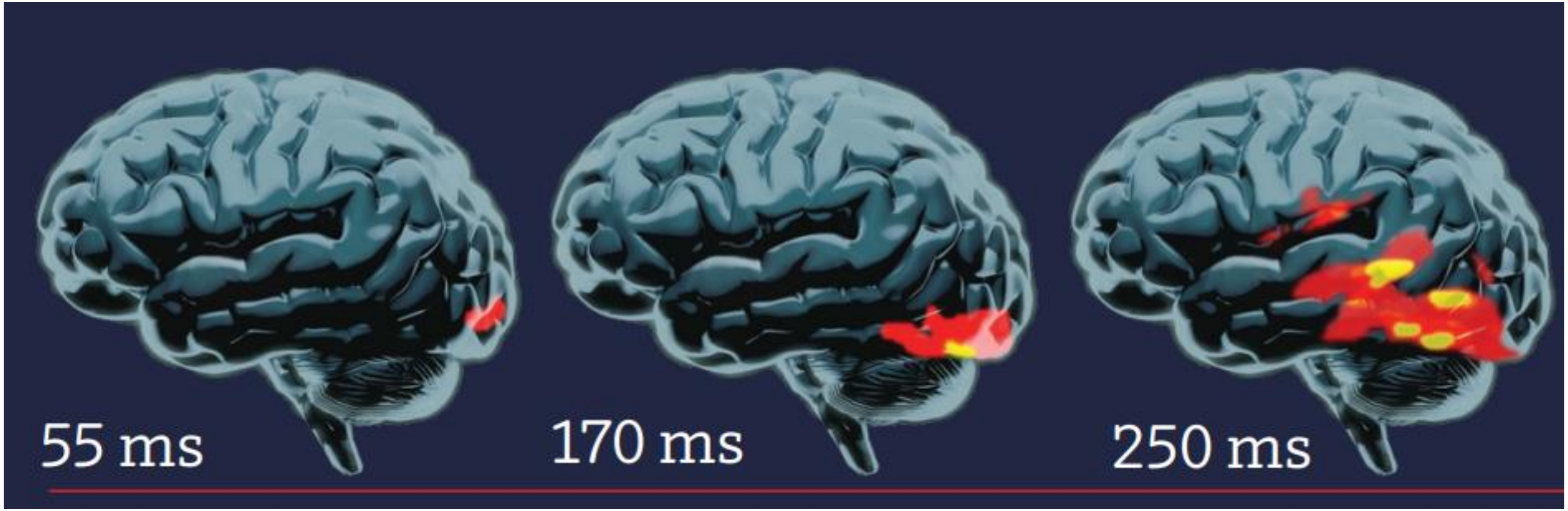
2. The phonological processor connects the graphemes to previously learned speech sounds and blends them to form a word.



1. The visual word form area recognizes the graphemes or letter sequence.

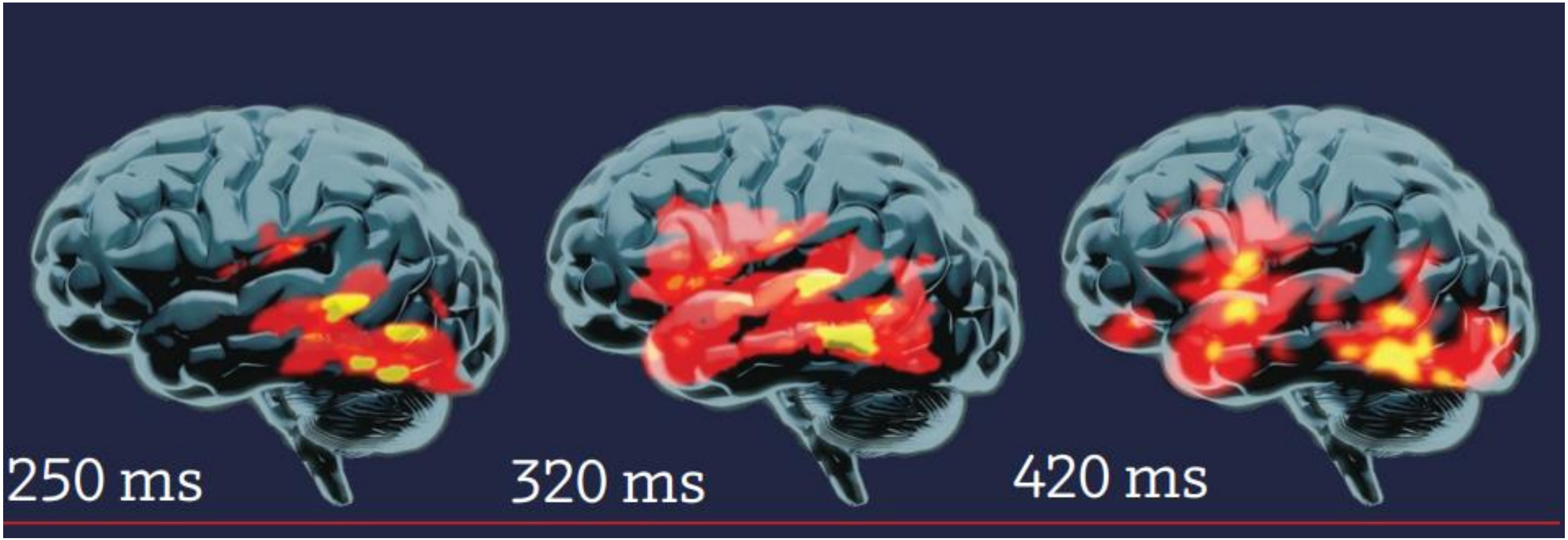
3. The semantic processor connects the word to the brain's established mental model of the word.

The Reading Processors



Marinkovic, Dhond et al. (2003)

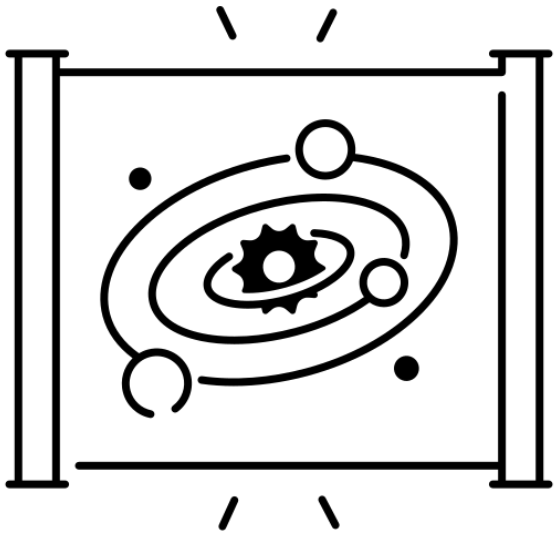
The Reading Processors



Marinkovic, Dhond et al. (2003)

Orthographic Mapping

The brain discovers new ways to make connections with the force



If you can read, your brain has been dramatically changed.

If you want to change the system, you have to know how it works.

Stanislaus Dehaene

Orthographic Mapping

- A skilled reader can access around 50,000 words on sight without any conscious effort. (Kilpatrick)
- No one consciously memorizes that many “sight” words, so cognitive processes must be occurring “behind the scenes” making it possible to instantly access that many words.
- Orthographic mapping describes the “behind the scenes” processes of mapping sounds to letters resulting in automatic retrieval.
- Orthographic mapping is the strengthening of associations between graphemes and phonemes “to bond the spellings, pronunciations, and meanings of specific words in memory.” (Ehri, 2014, pg. 5).

Orthographic Mapping

Ortho= correct or straight

(think of orthodontist)

+

Graph= writing

Meaning: **Correct Writing**

- **Orthography** refers to how language is represented in written form.
- **Mapping** is connecting *sounds* in words to letters/spellings in *print.*

Orthographic Mapping

Two Levels of Word Reading

Phonetic Decoding

- Sounding out words
- Letter-sound knowledge
- Phonemic knowledge/blending

Orthographic Mapping

- Instantaneous retrieval
- Letter-sound proficiency
- Phonemic analysis proficiency

Orthographic Mapping

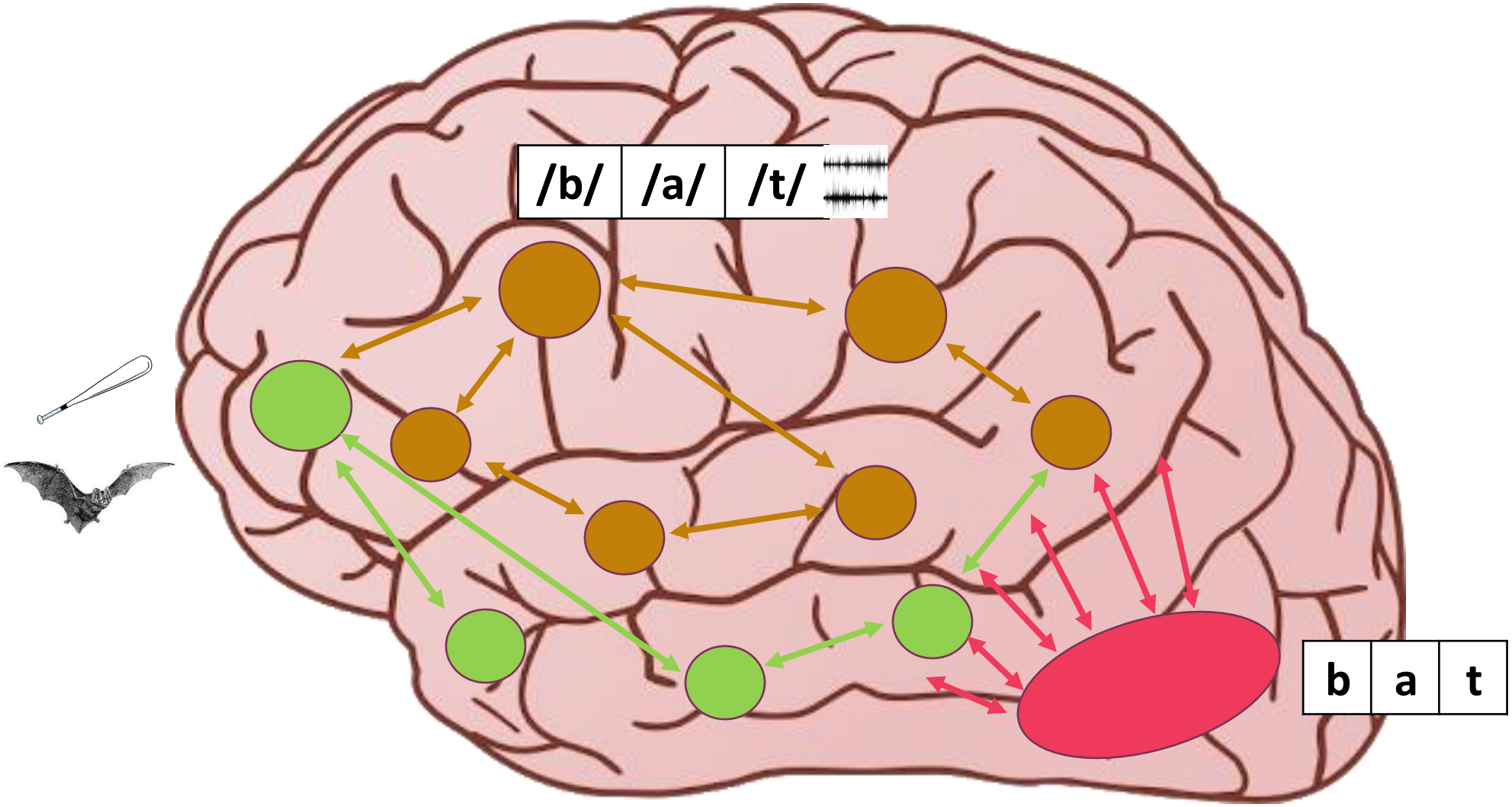
Orthographic Mapping is the mental process we use to store words for immediate, effortless retrieval. It requires **phoneme proficiency** and **letter-sound proficiency**, as well as the ability to unconsciously or consciously make connections between the oral sound in spoken words and the letters in written words.

(Kilpatrick, 2016)

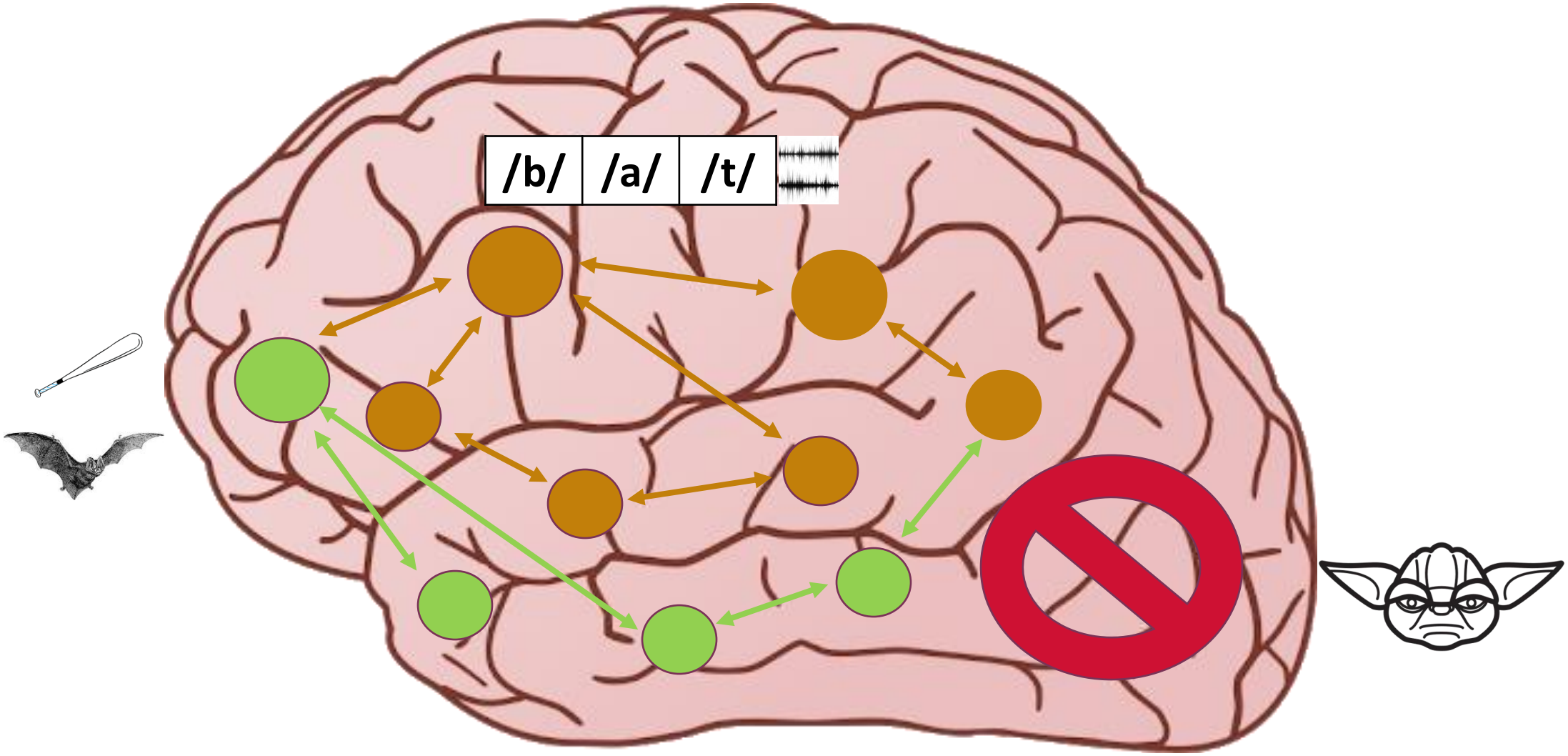
Orthographic mapping is the process by which children move from **decoding alphabetically** to reading via the **fluent recognition** of individual words.

(Castles, Nation 2006)

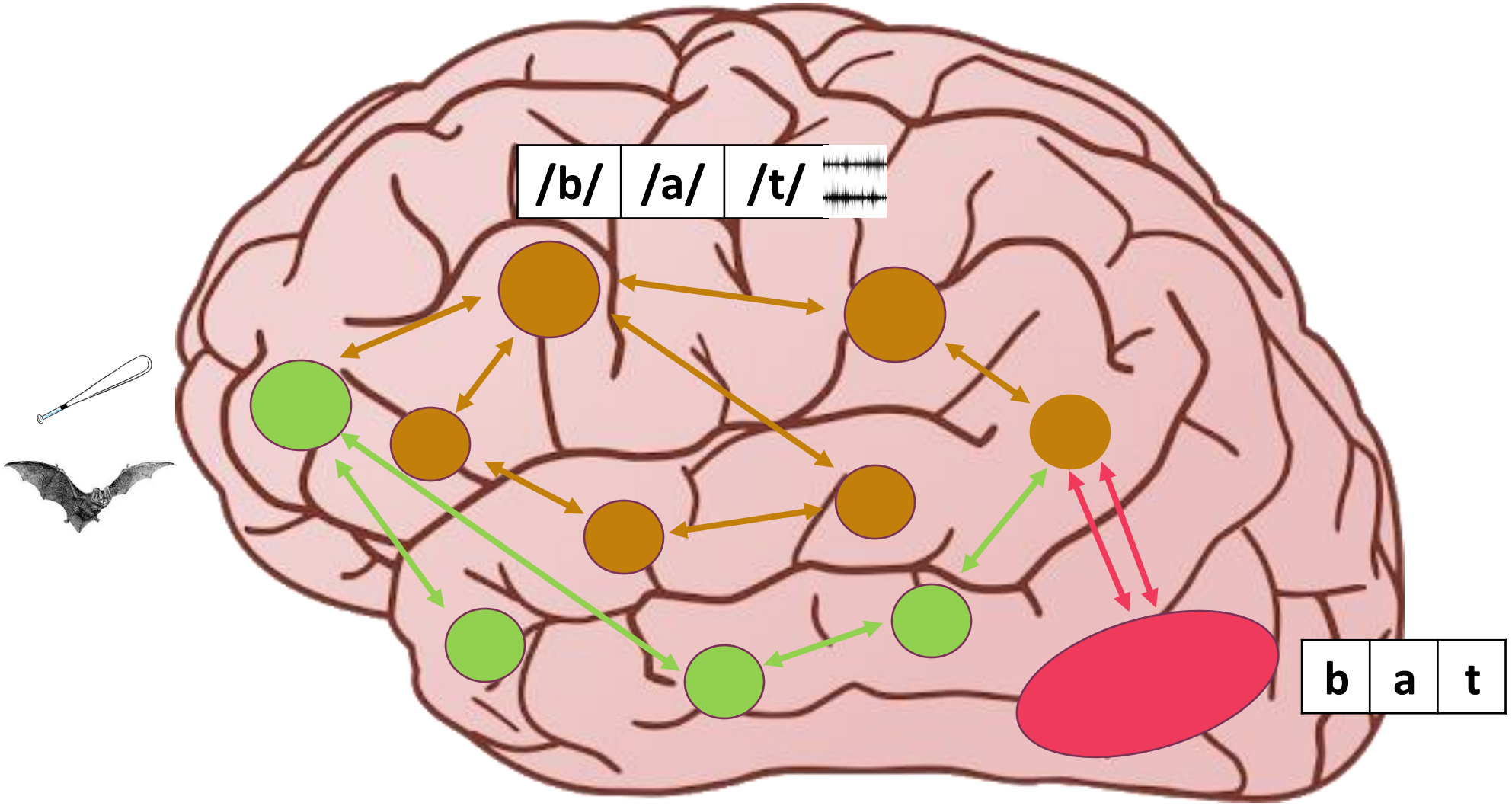
Orthographic Mapping



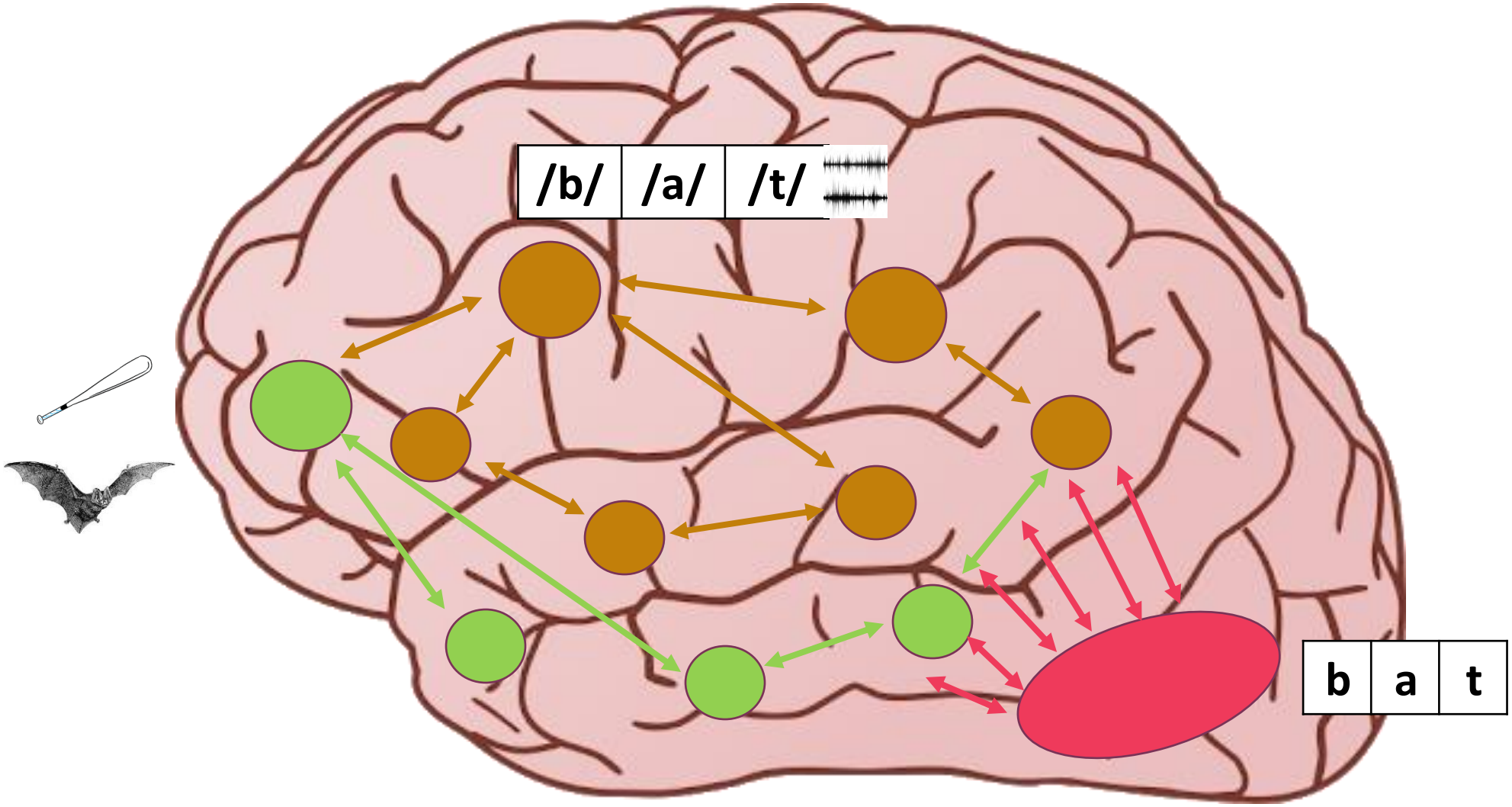
Orthographic Mapping



How the Brain Processes Text



Orthographic Mapping



How to Promote Orthographic Mapping

- “Typically developing readers will naturally analyze any whole word phonemically and establish an orthographic representation of that word.” (Kilpatrick 2015)
- Some students will require guided practice with phonemic analysis.
- **Weak readers** do *not* naturally engage in orthographic mapping because **they lack the necessary phonemic skills.**

How to Promote Orthographic Mapping

Develop Automatic Processes

- Train letter-sound skills to proficiency/automaticity
- Train phonemic access skills to proficiency/automaticity

If phonemic skills do not fully develop, word reading is compromised. They are the foundation for letter sound knowledge and letter sound proficiency.

(Kilpatrick, 2021)

At least 50% of a phonics lessons should be spent on applying a skill to reading and writing. It's in the application that the learning sticks.
Decodable texts are the critical application tool.

Wiley Blevins

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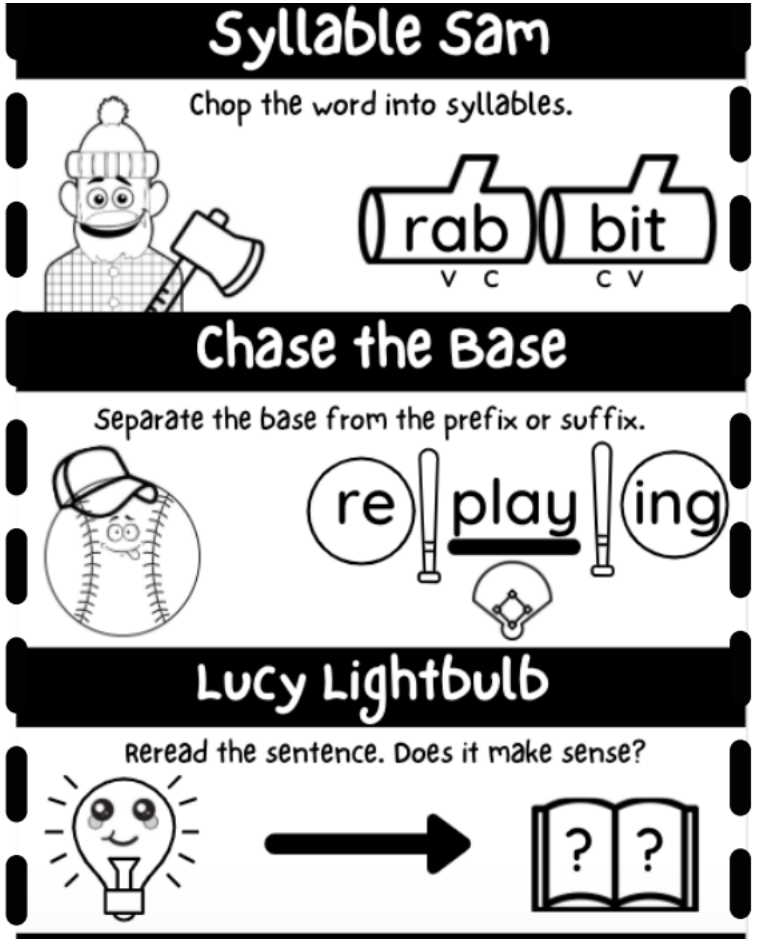
How To Promote Orthographic Mapping



How NOT to Promote Orthographic Mapping

What We Teach:	What Our Students D… …arn:	
	*Look a… …read.*	
	"I s… …e pict…	I don't need the w… Pictures are more use… …r sounds.
	…gopher hops up. "…?" *…he pictures.*	…for chunks but so… …ey don't work. …more usefu… …s.
	…the shark. "I se… …. s/h/ā/r/k?" *Lo… …s.*	Let… …are not reliable. I can cou…
	*Skip the word… …pictures.*	…lly if I ignore the words!

(Right to Read Project, 2019)

“Sight Words,” Unitization, and Fluency

"A powerful ally it is." -Yoda

How Words Become “Sight Words”

- When students are first learning to read, they are attempting to decode most words sound by sound.
- As students read more, they start to recognize words “**on sight**” without having to decode.
- Students need to store these letter sequences correctly (for word recognition) through orthographic mapping.

***(The Reading League,* 2017)**

How Words Become “Sight Words” 44

- The orthographic lexicon will develop as a child learns to read. Students will learn the exact *letter sequence* of words, which will then be recognized "by sight" without needing to be sounded out.
- Letter-sound skills and phonemic analysis skills will help students map the sequence of letters onto the pronunciation of words.
- The spelling of c-a-t becomes linked to the pronunciation and meaning that is already stored in that child's brain for years.

(The Reading League, 2017)

How Words Become “Sight Words”

- Automatic word recognition (identifying a word “on sight”) happens after the word is read and mapped over and over, and neural connections have gotten stronger and stronger.
- For some children, this happens quickly after only a few repetitions, while with others, it takes seemingly endless (possibly hundreds of) exposures.

(Paul, 2020)

How Words Become "Sight Words"

- After students have mastered many words (meaning they have stored those letter patterns in their own mental lexicon), then they can begin to read using these familiar patterns.
- They may be quicker to read “p-an” and “m-an” because they have read “can” so many times and have “mapped” the letters a-n to the pronunciation “an.”

Unitization, “Sight Words,” and Fluency

UNITIZATION occurs when our brains form connections between the pronounced phonemes in a word and the order of graphemes or printed letters in the word.

The brain maps the **SOUNDS** of a word to the visual **SEQUENCE** of letters on the page, and those letters become **UNITIZED** – known as a unit.

deoxyribonucleic

How do you pronounce this nonsense word?

nalk

Did your pronunciation rhyme with the word chalk or talc?

walk
talk
balk

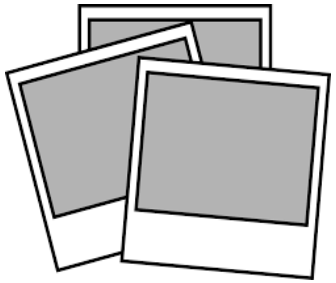
How do you pronounce this real word?

arm warm

Did your pronunciation rhyme with the word farm or form?

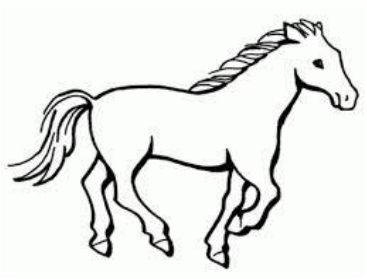
wart
warp
warn

Unitization and "Sight Words"



Photograph – Phonograph

House – Horse

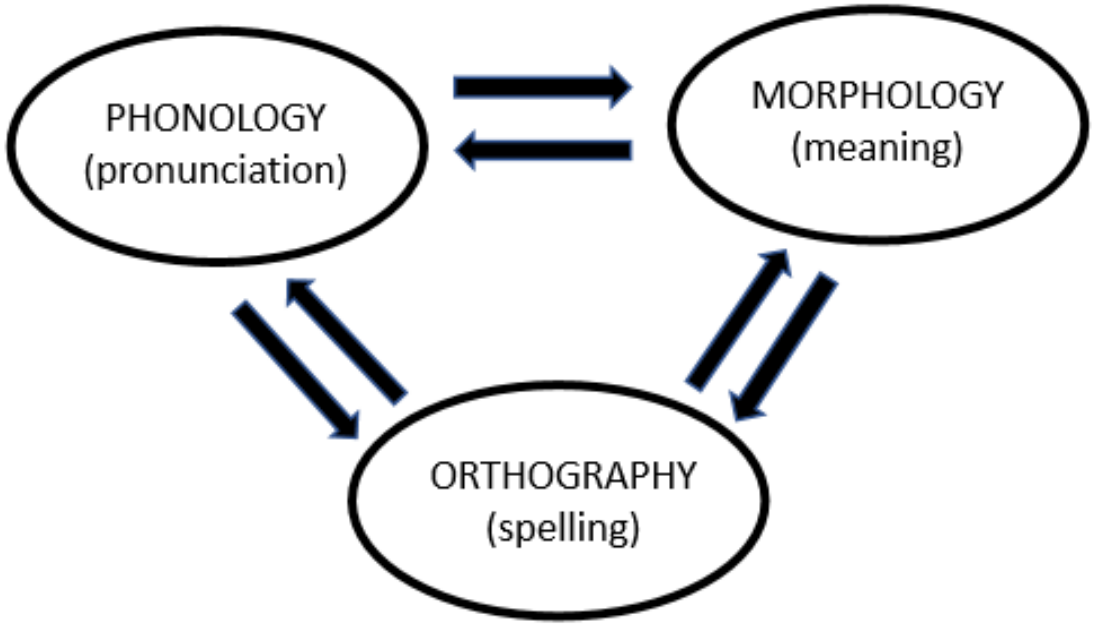


UNITIZATION is the *rocket fuel* that propels sight word development.

The Brain:

- Permanently identifies each letter in the word.
- Recognizes the units automatically.

Unitization and "Sight Words"



"SIGHT WORDS" = Words that our brain have mapped and can be retrieved instantaneously

- Once a sight word is learned, it is impossible for your brain to suppress it.
- Pronunciation and meaning are activated instantaneously.

The 3 processors work together to allow immediate access to words.

The Beauty of “Sight Words” and Unitization

Automatic and accurate recognition of words **eases the burden of reading**, makes it more **enjoyable**, and **frees up** cognitive resources to **think** and **learn**.

- The key to building fluency is orthographic mapping.
- Establishing “sight words” leads to **fluency**.

“If a child memorizes ten words, the child can read only ten words, but if a child learns the sounds of ten letters, the child will be able to read 350 three-sound words, 4,320 four-sound words and 21,650 five-sound words.”

Dr. Martin Kozloff (2022)

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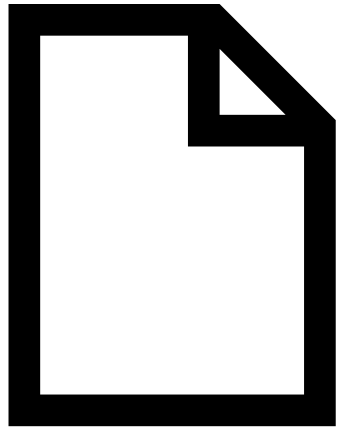
The Beauty of Sight Words and Unitization

per	sim	mon
super	simple	money
perhaps	simile	harmony
supper	assimilate	monkey
person	simper	summon

persimmon

The Stroop Effect

Directions: On the next slide, name the color of each word you see. **Do not read the words!** You will have thirty seconds to name all the colors.



The Stroop Effect- ACTIVITY

RED BLUE GREEN YELLOW ORANGE

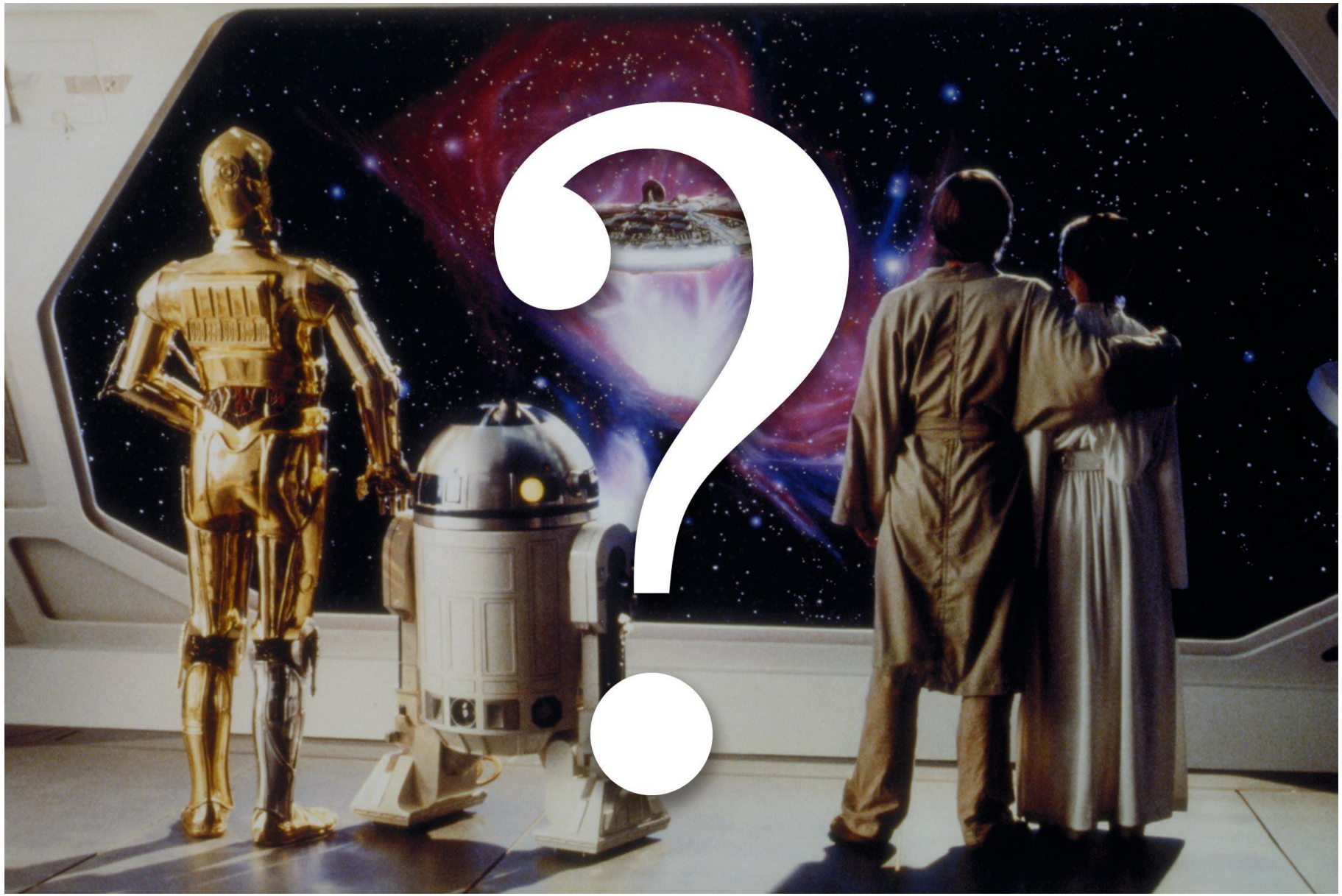
PURPLE ORANGE RED GREEN BLACK

BLACK YELLOW BLUE RED PURPLE

ORANGE RED GREEN PURPLE YELLOW

BLUE RED YELLOW ORANGE BLACK

- The Reading Brain- Star Wars Version



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