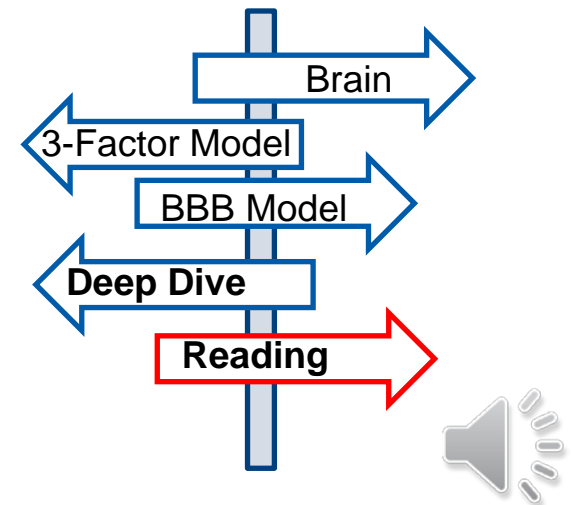# Module: 6.1
BBBM and Reading

Using the Building Blocks Brain Model to Understand and Assess Reading Disorders

Brain

3-Factor Model

BBB Model

Deep Dive

Reading

Learning Outcomes

- What are the common _Fundamental_ neurocognitive deficits related to reading disorders.

- Name one _Higher Order_ block that is linked to reading.

Important Note

The information, concepts, and models provided in this presentation are intended to give practitioners a framework when conducting special education evaluations. It is emphasized that <u>nothing in this presentation is meant to be directive or prescriptive.</u> Professionals are free to use some, or all of the information presented, but they <u>are not required</u> to do so in their practice. **Always consult with your special education director for clarity around district policies and expectations for special education evaluations.**
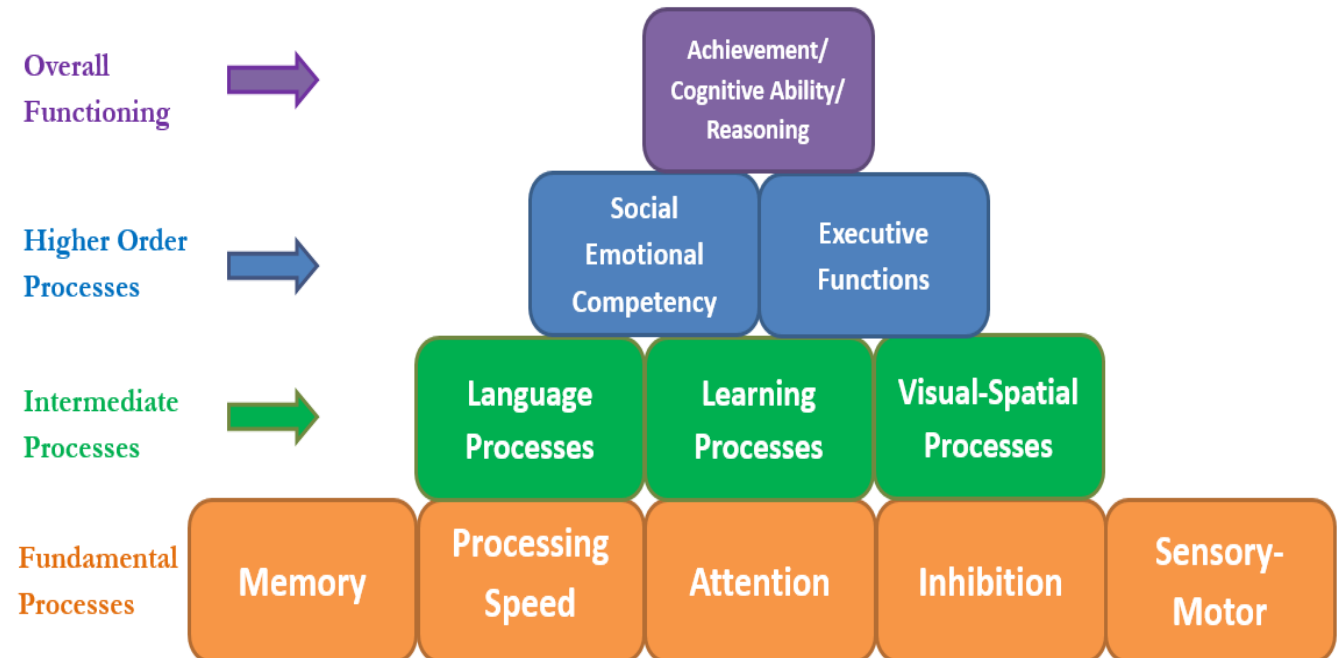
IMPORTANT

The BBBM-*Review*

- **Each block represents a key neurocognitive function(s)**

- **Each level is dependent on the level below**

- **When all blocks are working together in seamless integration, a child makes age-appropriate progress in multiple domains of life**

Building Blocks of Brain Development and Function

Overall Functioning → Achievement/ Cognitive Ability/ Reasoning

Higher Order Processes → Social Emotional Competency | Executive Functions

Intermediate Processes → Language Processes | Learning Processes | Visual-Spatial Processes

Fundamental Processes → Memory | Processing Speed | Attention | Inhibition | Sensory-Motor

The Hierarchy of Neurocognitive Functioning © - created by Peter Thompson, Ph.D. 2013, adapted from the works of Miller 2007; Reitan and Wolfson 2004; Hale and Fiorello 2004.

The Building Blocks of Brain Development © – further adapted by the CO Brain Injury Steering Committee, 2016.

Most Typical SLD Areas

- **Most typical disorders in school are _reading, writing and mathematics_**

- **"Why" a student is failing is typically answered by finding the crack in one or more blocks at the lower level(s) of the BBBM**

- **BBBM can be used with other models**
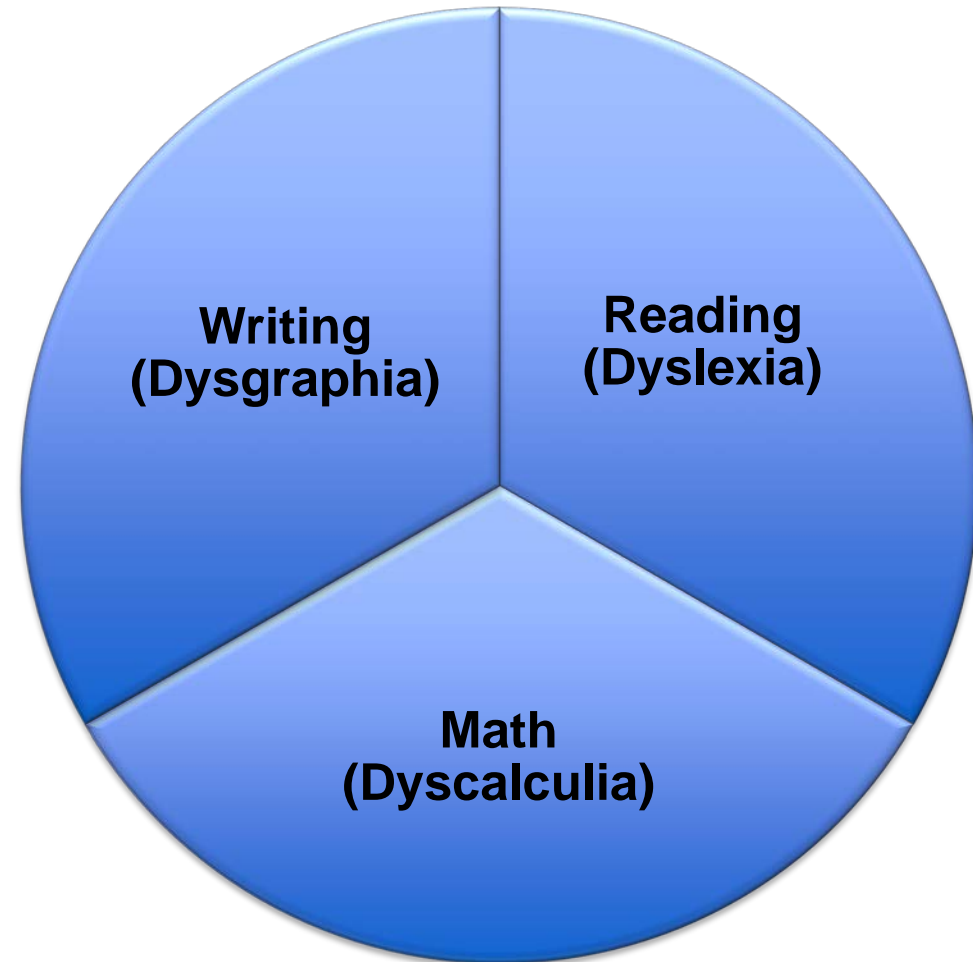
Assumptions and Critical Considerations

- Student has been identified with poor achievement in reading

- Student has <u>not</u> responded to interventions (RTI)

- Student is in special education process for a full evaluation and the student performed below average on <u>formal achievement / academic testing (e.g. WCJ, WIAT, etc)</u>

- Some academic and/or cognitive skills are average
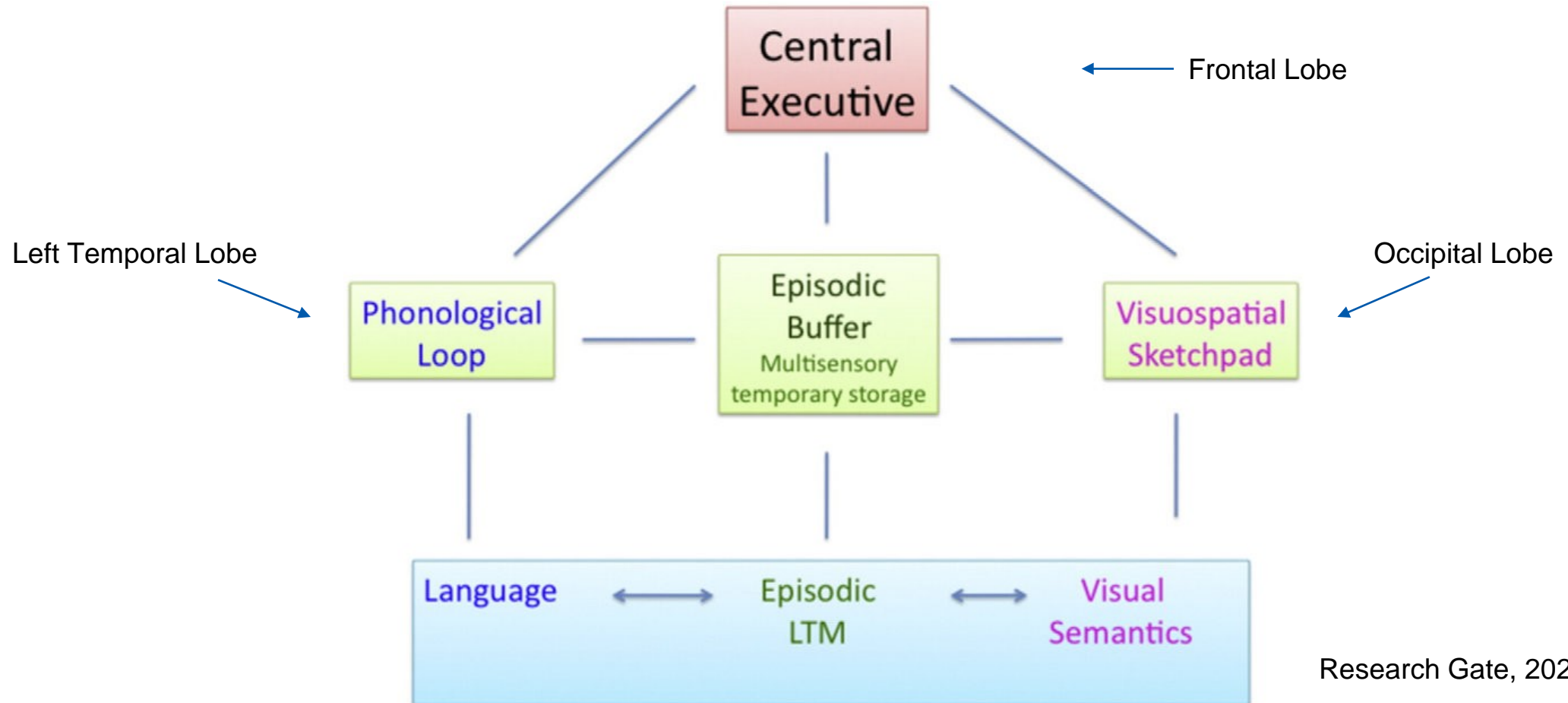
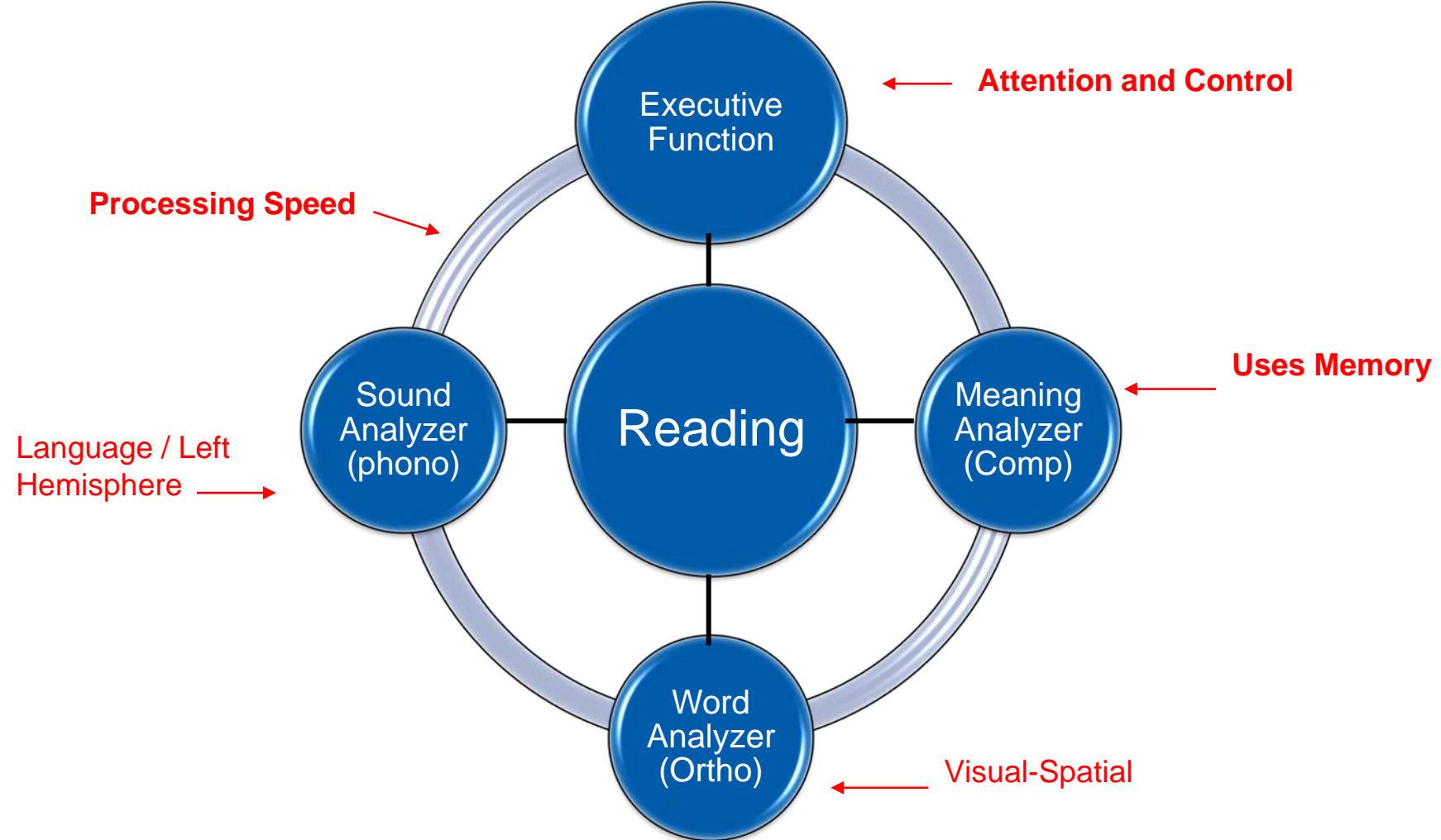# I. Reading Brain *Circuitry*
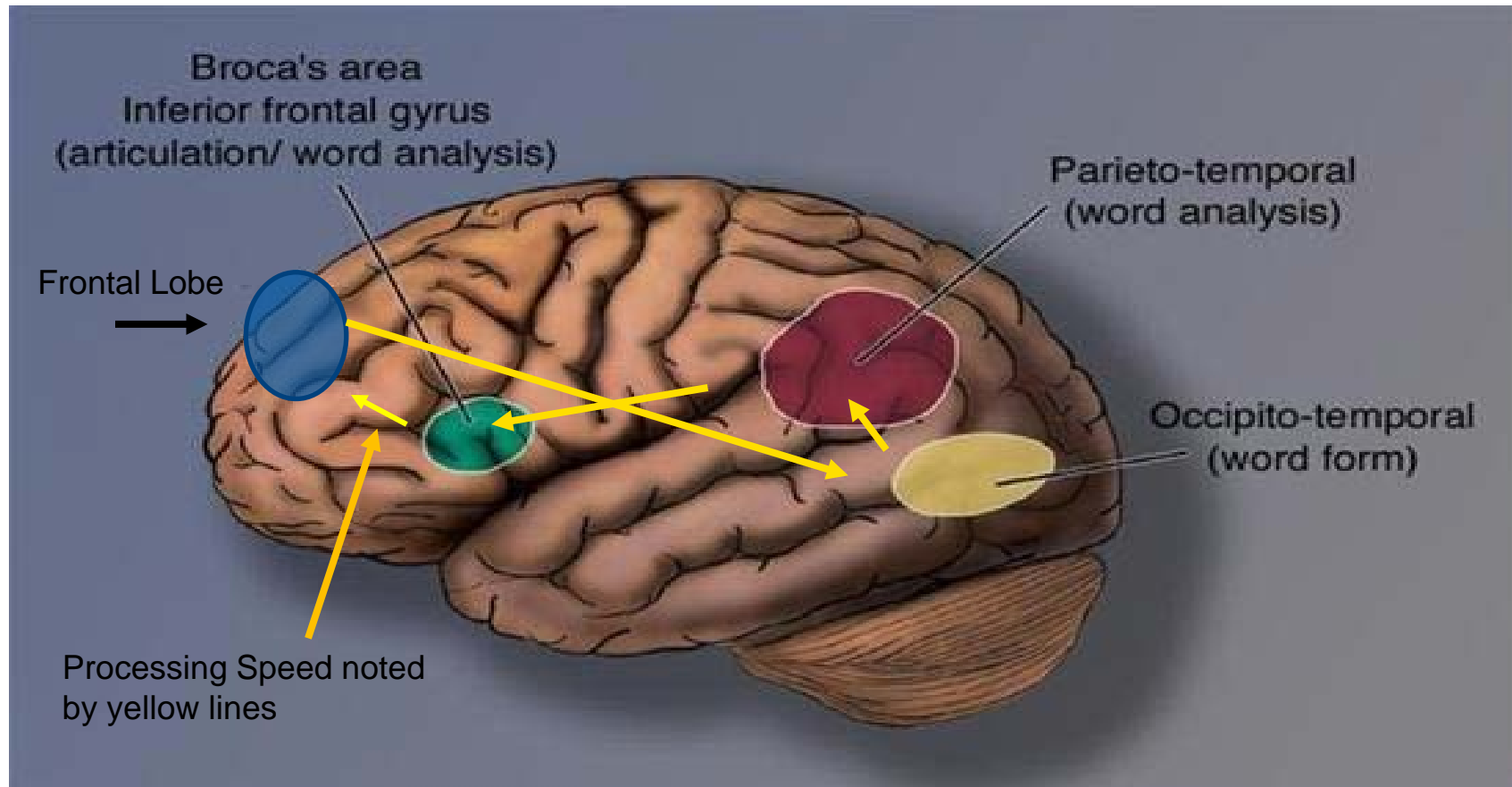
Baddeley's Model: Explains Some Disabilities

Research Gate, 2020
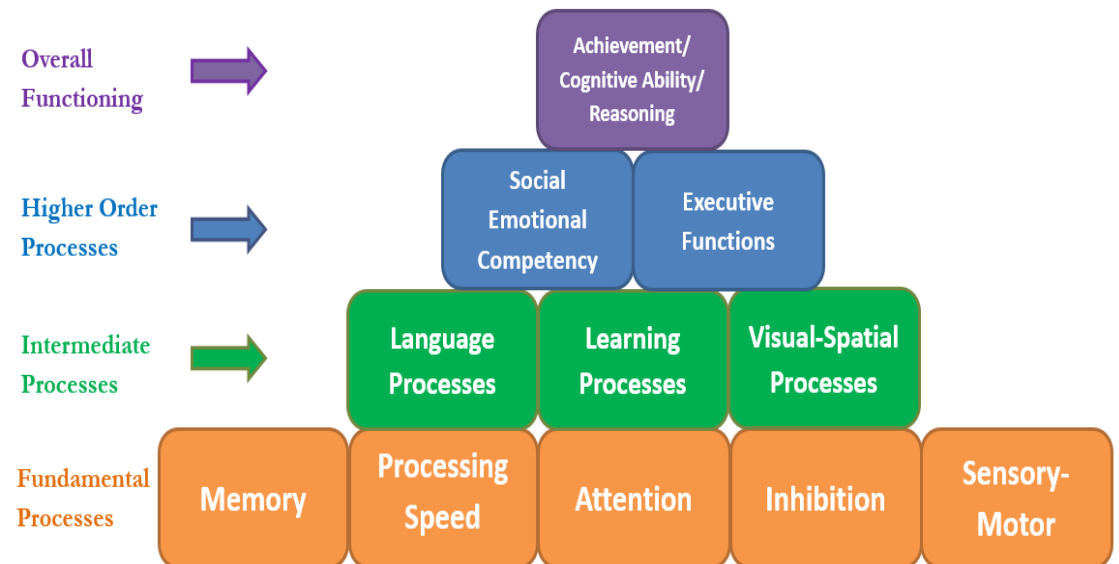
Another Perspective: Reading

Reading: Key Deficits Mapped onto the BBBM

✓ Starts with low "achievement"
in reading (RTI / achievement data)

- Executive Function
  - **Attention** and **Inhibition**
- Memory (WM, STM, LTM, VM)
- Processing Speed
- **Language (Left Hemi)**
  - Phonological
- Visual-Spatial

Building Blocks of Brain Development ©

Overall Functioning →		Achievement/ Cognitive Ability/ Reasoning
Higher Order Processes →		Social Emotional Competency / Executive Functions
Intermediate Processes →		Language Processes / Learning Processes / Visual-Spatial Processes
Fundamental Processes		Memory / Processing Speed / Attention / Inhibition / Sensory-Motor

The Hierarchy of Neurocognitive Functioning © - created by Peter Thompson, Ph.D. 2013, adapted from the works of Miller 2007; Reitan and Wolfson 2004; Hale and Fiorello 2004.
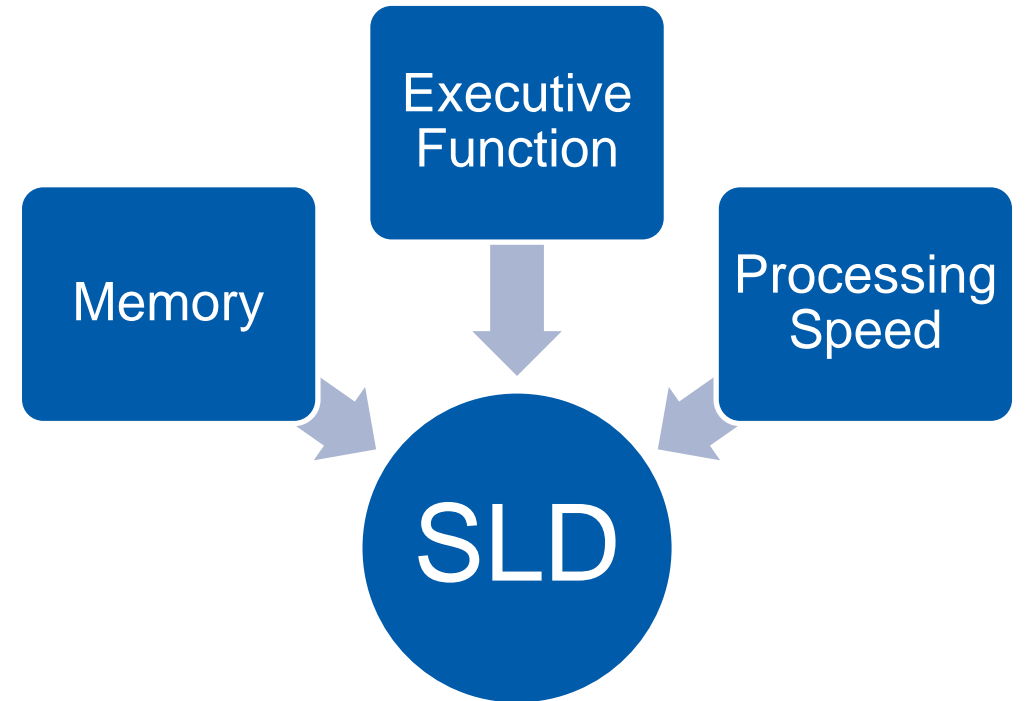
The Building Blocks of Brain Development © – further adapted by the CO Brain Injury Steering Committee, 2016.

Common Blocks for all SLD Evaluations (Necessary, but Not Sufficient)

Fundamental Blocks

- Executive Function
  - Attention
  - Inhibition
- Memory (WM, STM, VM)
- Processing Speed
  - Rapid Naming

Typical SLD and BBBM Profile

- **SLD evaluations should typically include <u>at least three major fundamental</u> areas (and subblocks)- Memory, Attention, Processing Speed.**

- **Plus one Higher-Order Area related to the suspected disability area**
  - **Reading ⟶ Higher Order Block ⟶ Language Processes**
  - **Math ⟶ Higher Order Block ⟶ New Learning and Visual-Spatial**
  - **Writing ⟶ Higher Order Block ⟶ Visual Spatial and Sensor-Motor**

SLD Evaluations: Typical Areas Assessed

Common BBBM For All SLD Evaluations

Fundamental Areas
(Exec Function)-Attention, Inhibit
(Memory) WM, STM, VM, and Proc Sp

+

At Least One or More Higher Order Block

Reading----Language Processes
Math—New Learning / Visual Spat
Writing—Visual Spat / Sens/Motor
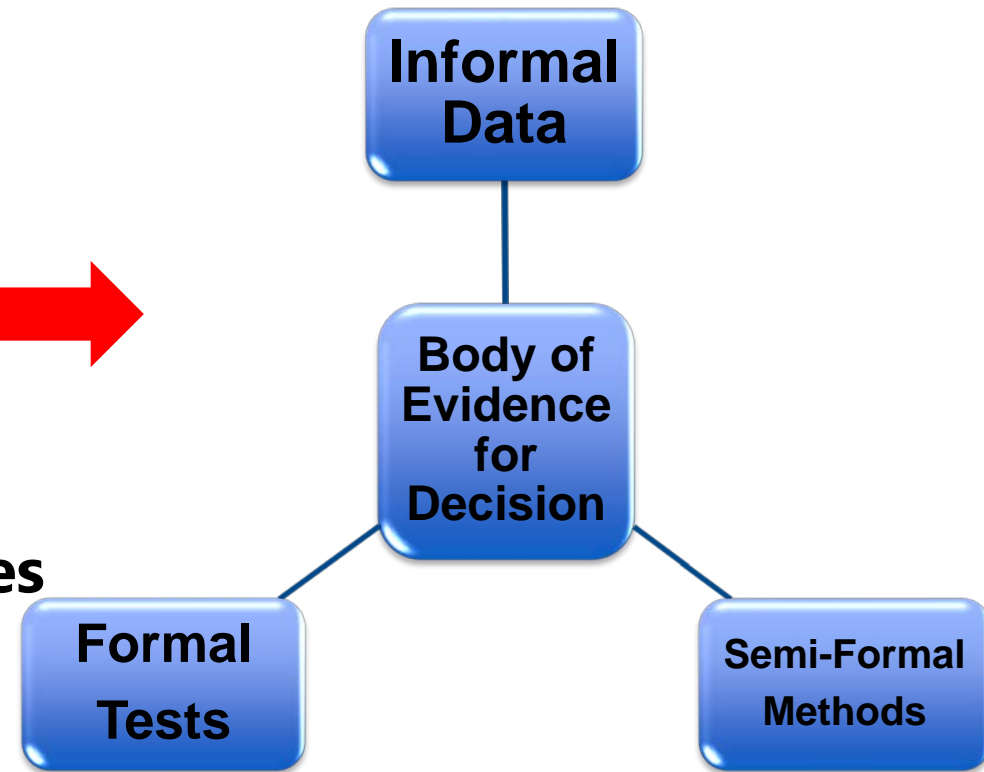
Typical Evaluation: Reading Disorder

I. Starts <u>RTI</u> information and <u>Achievement testing</u> data

II. <u>BBBM</u> and <u>3 Factor Model</u>
- Attention
- Processing Speed
- Memory (Multiple Types)
- Language /Phonological Processes
- Visual-Spatial

Informal Data

Body of Evidence for Decision

Formal Tests

Semi-Formal Methods

Thompson-Sousa 2013 / 2020

Key Points: Identifying SLD in Reading

➢ <u>RTI</u> and <u>standardized reading test scores</u> are below average

➢ 3-Factor Model of assessment utilized—ensures a <u>comprehensive</u> eval

➢ At least 3 fundamental cognitive blocks assessed that are commonly associated with most SLDs—determine the **"why"** and the **"extent"** of problem

➢ **<u>Reading</u>**-<u>Phonological</u> and <u>processing speed</u> assessed (Higher Block)

➢ Gather <u>several perspectives</u> from stakeholders (rating scales- semi-formal)

➢ Account for <u>exclusionary</u> factors

➢ <u>One or more cognitive deficit(s) confirmed</u>

Special Considerations for Reading Disorders

- **Different subtypes of reading disorders**

- **Reading disorders may have multiple dysfunctional brain areas**
  - ***Double Deficit—severe cases***

- **ADHD and reading disorders have high correlation**

- **Responsive to phonologically based treatments, but not 100%**

Summary

- All learning disabilities involve a <u>neurocognitive deficit</u> in one or more of the BBBM blocks.

- Typically, SLD evaluations should include at least 3 major fundamental blocks, such as <u>*Attention, Memory, Processing Speed*</u>. Different aspects of Executive Function also will be involved.

- At least one higher order area will be involved that is associated with reading, writing and math.

- In an evaluation, the higher order blocks associated with reading are <u>*Language Processes*</u> (phonological) and <u>*Visual-Spatial Processes*</u>.

End of Module 6.1
BBBM and Reading

Using the *Building Blocks of Brain Development* for a Comprehensive SLD Evaluation

Peter Thompson, Ed.S., Ph.D.