

Putting the Pieces Together

A Cognitive Processing Model for Speech,
Language, Literacy & Executive
Functioning

Tera Sumpter, M.A., CCC-SLP

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SLP & BUSINESS OWNER

14 years experience in speech-language pathology
Growing Cleveland area private practice—Seeds of
Learning LLC—with two locations

AUTHOR & COMMUNITY ADVOCATE

Author of: *Seeds of Learning: A Cognitive Processing
Model for Speech, Language, Literacy, and Executive
Functioning*
Host and instructor for Seeds of Learning Mighty
Networks Community

Who am I?

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TERA SUMPTER

Neuroplasticity & Metaplasticity



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Cognitive Modifiability



"Structural changes refer not to isolated events but to the organism's manner of interacting with, i.e., acting on and responding to, sources of information."

-Reuven Feuerstein

(Feuerstein, Falik, and Rand (2006), *Creating and Enhancing Cognitive Modifiability: The Feuerstein Instrumental Enrichment Program*, ICELP Publications, page 16.)

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Cognitive Modifiability

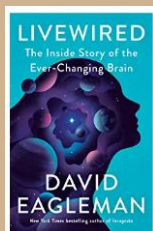


"Thus, a **structural change**, once set in motion, will determine the future course of an individual's development."

-Reuven Feuerstein

(Feuerstein, Falik, and Rand (2006), *Creating and Enhancing Cognitive Modifiability: The Feuerstein Instrumental Enrichment Program*, ICELP Publications, page 16.)

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"The brain's ability to rewire gives it tremendous flexibility: it dynamically reconfigures itself to absorb and interact with data."

-David Eagleman

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My Goal for Today...

**Keys to
Academic
Success**

**1.
Comprehension**

**2.
Expression**

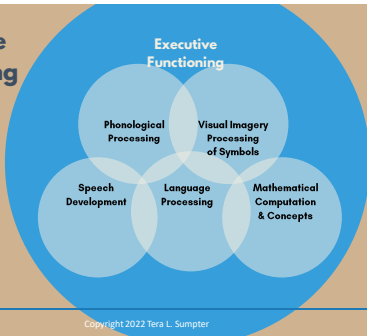
**3.
Reading**

**4.
Writing**

5. Self-Regulation



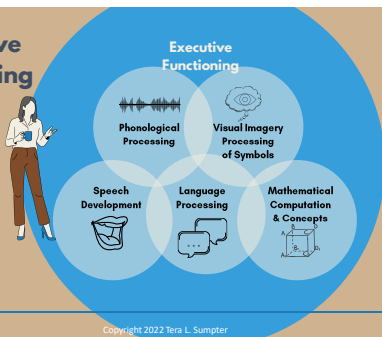
Cognitive Processing Model



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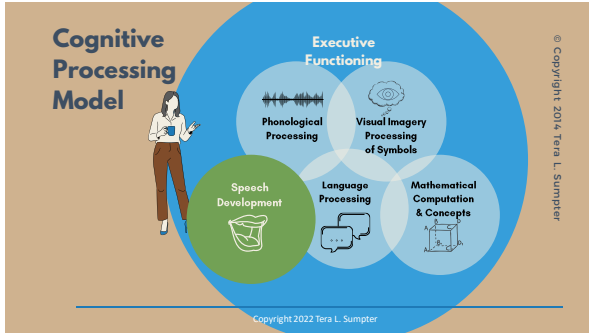
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Cognitive Processing Model

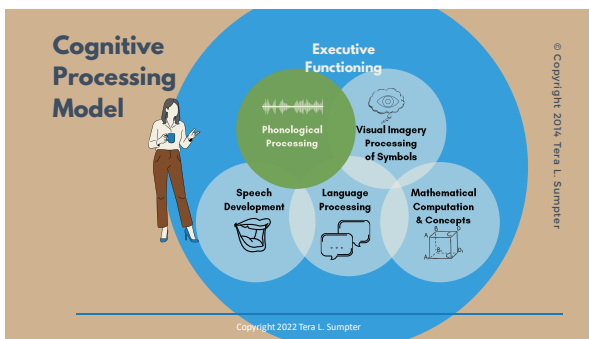


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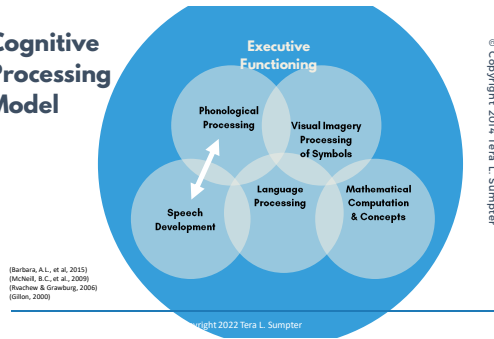
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Cognitive Processing Model



**“Children with CAS are particularly susceptible to phonological awareness and reading delay. “
(McNeill, B.C., et al., 2009)**

**“Research indicates that phonological awareness intervention holds promise for children with speech impairment.”
(Gillon, 2000)**

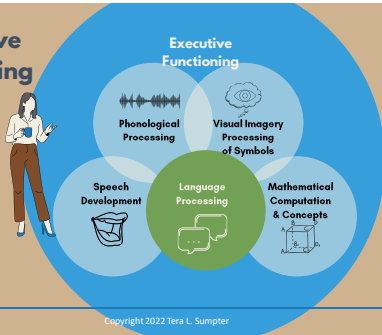


More than half the children with speech disorders experience trouble reading

(Bishop & Adams, 1990; Catts, Adlof, Hogan, & Weismer, 2004; Catts, 1986; Catts, 1991; Catts, Fey, Tomblin, & Zhang, 2002; McCardle, Scarborough, & Catts, 2001; Nathan, Stackhouse, Goulandris, & Snowling, 2004; Tomblin, Zhang, Buckwalter, & Catts, 2000).

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Cognitive Processing Model



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Language



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"Language isn't all encompassing; it's only a way to tag things that we already share. It's a system of agreement about communal experiences."

-David Eagleman,
neuroscientist

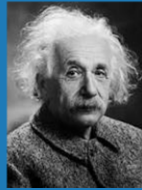
"I don't think that we think in language, or think in words. I think we think in visual images, we think in auditory images, we think in abstract propositions about what is true about what."

-Steven Pinker, experimental
psychologist at Harvard University



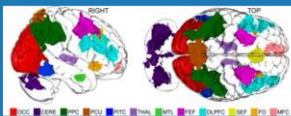
"If I can't picture it,
I can't understand it."

-Albert Einstein



MENTAL WORKSPACE

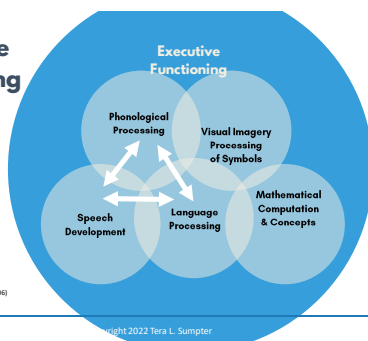
EX



Eleven areas of the brain are showing differential activity levels in a Dartmouth study using functional MRI to measure how humans manipulate mental imagery.

(Schlegel, A. et al. 2013)

Cognitive Processing Model



(Barbara A.L. et al. 2015)
(McNeill, B.C. et al. 2009)
(Raschke & Greenberg, 2006)
(Gillon, 2000)

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“Children with SSD are at greatest risk of delayed PA skills if they have poor speech perception abilities and/or relatively poor receptive vocabulary skills.”

(Rvachew & Grawburg, 2006)

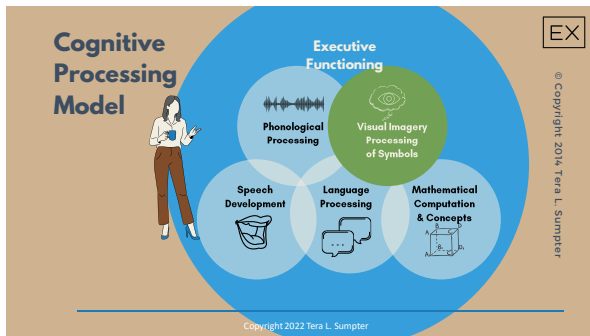
“Performance on phonological encoding tasks was more strongly affected by the size of a child’s receptive & expressive language lexicons rather than speech production accuracy.”

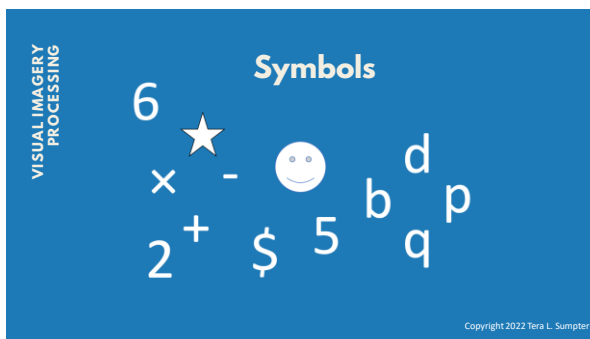
(Munson, B. & Krause, M.O.P., 2017)

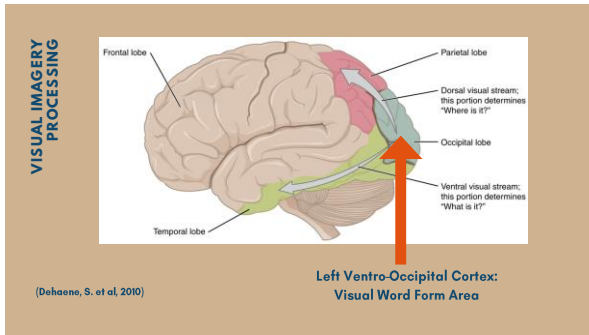
“Adolescents with persistent SSD had higher rates of comorbid LI and reading disability than the no SSD and resolved SSD groups.”

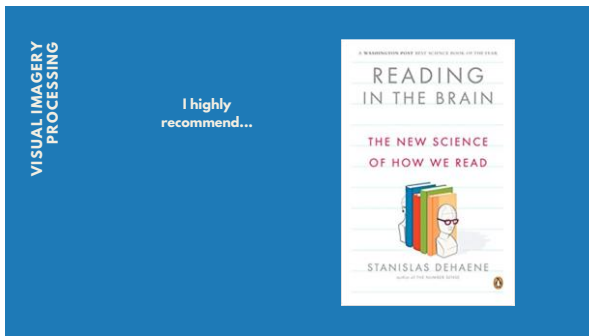
(Barbara, A.L., et al, 2015)

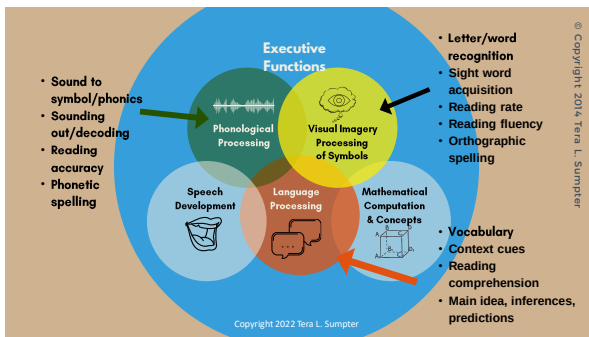
It's all connected!

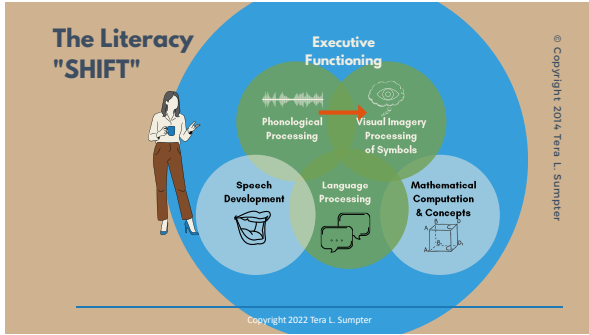


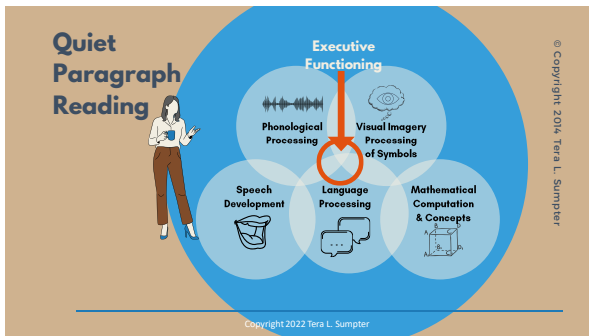


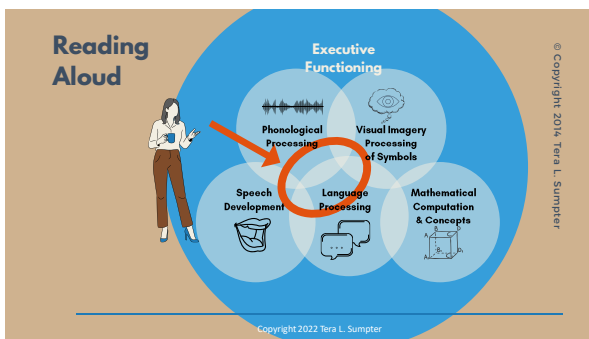




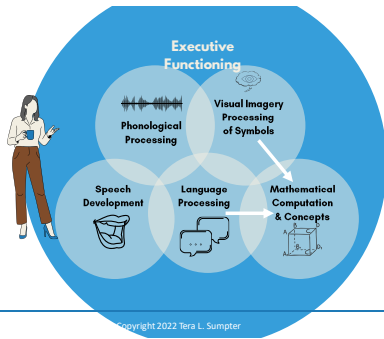








Math



Math

Students with a math disability are just over two times more likely to also have a reading disability than those without a math disability.
(Joyner & Wagner, 2020)

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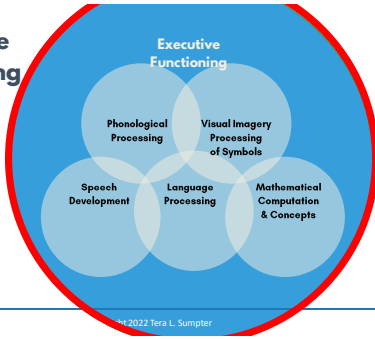
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Math

Research suggests that reading disorders and math disorders are distinct but related disorders that co-occur due to shared neuropsychological weaknesses in working memory, processing speed, and verbal comprehension.
(Willcutt, E.G. et al, 2013)

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Cognitive Processing Model



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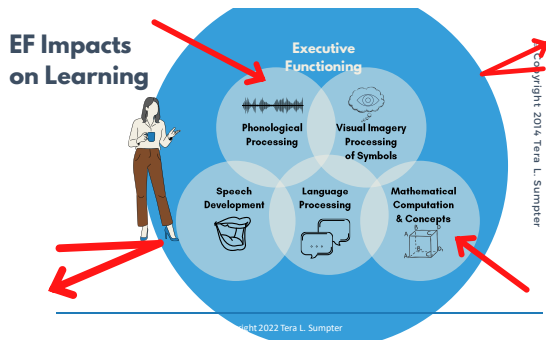
Executive Functions



Sumpter

Executive Function Skill Clusters (McCloskey 2015)

ATTENTION Perceive Focus Sustain	OPTIMIZATION Monitor Modulate Balance Correct	INQUIRY Anticipate Gauge Analyze Estimate time Compare	ENGAGEMENT Energize Initiate Inhibit Stop Pause Flexible Shift
EFFICIENCY Sense time Pace Sequence Execute	MEMORY Hold Manipulate Store Retrieve	SOLUTION Generate Associate Prioritize Plan Organize Decide	

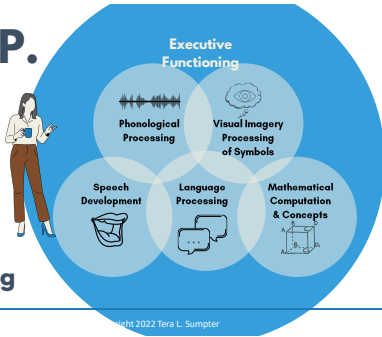


Assessment



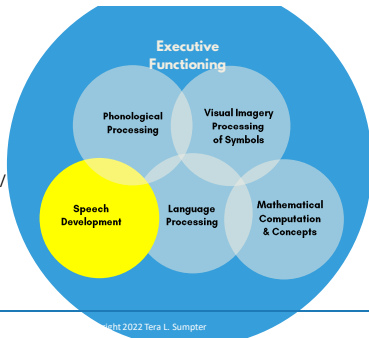
P. O. P.

Patterns Of Processing



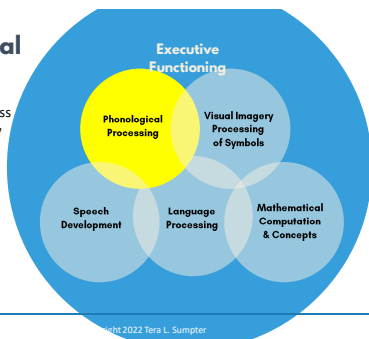
Speech

- Speech inventory (GFTA-3, Moving Across Syllables)
- DDK
- Natural speech sample/conversation/play
- Recordings from home



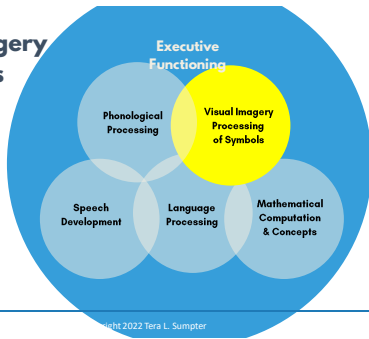
Phonological Processing

- Phonemic Awareness (Lindamood Auditory Conceptualization test)
- Phonics
- Nonsense word decoding (Word Attack: Woodcock Johnson)
- Nonsense word spelling



Visual Imagery Of Symbols

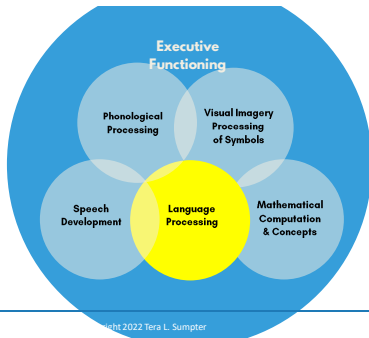
- Symbol Imagery Test
- Sight word inventory (SORT-R3)
- Orthographic spelling (WRAT-4 Spelling)



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Language

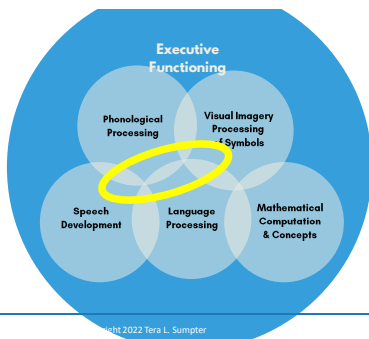
- Language assessments of different lengths and complexities (PLS-5, CELF-5)
- Written language measure
- Conversational language sample



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Reading in Context

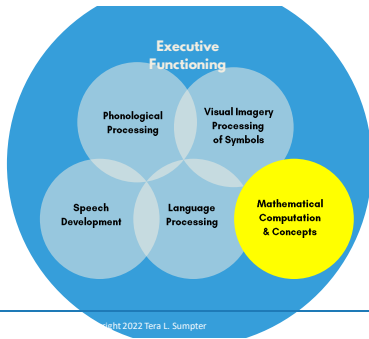
- Integrated literacy measure (GORT-5)



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Math

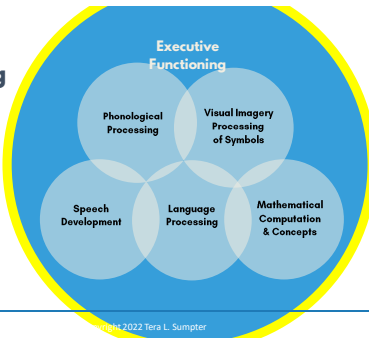
- Math academic test (WRAT-5)
- Classroom work samples



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Executive Functioning

- Dynamic assessment**
- Observation
 - Parent/teacher rating scales
 - Self-report
 - Work samples
 - Questionnaires



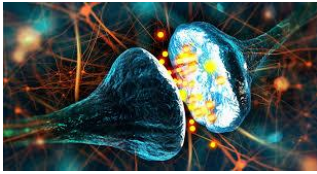
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Assessment Notes:

- Does your assessment tool require more than one type of cognitive processing? (ex. Phonological processing assessed using verbal expression.)
- Are you examining receptive & expressive pathways?
- If assessing reading comprehension, always compare to oral comp!

Intervention


What is learning?





Student A


- Does well in math and science
- Comprehends everything presented orally
- Struggles in language arts
- Has had speech therapy since 4-years old
- Traditional speech therapy has not been very successful
- Has residual articulation errors of /r/, /s/ and /l/. Speech is "slushy"
- Reading scores are below average
- Doesn't attempt to sound out when reading
- Guesses a lot when reading
- Spelling is not phonetic
- Reading comprehension is below average.
- Very hard working


Executive Functioning


Phonological Processing


Visual Imagery Processing of Symbols

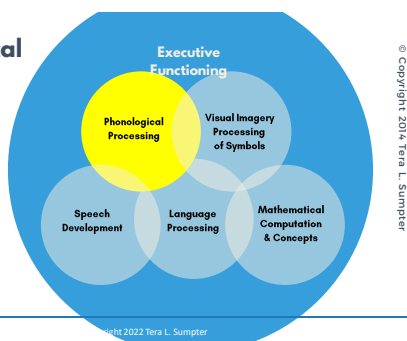

Speech Development


Language Processing


Mathematical Computation & Concepts

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Phonological Processing



Sample Chains

<u>CV/VC</u>	<u>CVC</u>	<u>CCVC</u>	<u>2-syllable</u>
eep	pib	flad	aption
ep	pab	flid	iption
et	pad	frid	ipture
it	lad	grid	mipture
ti	lud	grib	miply
too	lug	groob	moply
to		gloob	mogly

Sample Goals

- Dx: phonological impairment with breakdown at CVC syllable structure **or** literacy impairment characterized by phonological breakdowns at the CVC level

Goal 1: Student will label the number of sounds in a CVC+ word with 90% accuracy to improve phonological processing skills.

Goal 2: Student will label the order and identity of sounds in a CVC+ word with 90% accuracy to improve phonological processing skills.

Goal 3: Student will manipulate (initial, medial, final, blends) sounds in a CVC+ word with 90% accuracy to improve phonological processing skills.

Sample Therapy Activities

- 1.Orally repeating chains at CVC level
- 2.Manipulating syllables with mouth pictures
- 3.Block chains at CVC level
- 4.Phonics
- 5.Decoding at CVC level
- 6.Contextual reading at CVC level

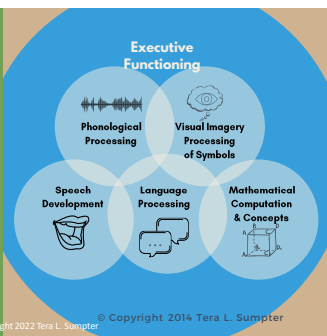
Favorite program: LiPS by Pat Lindamood

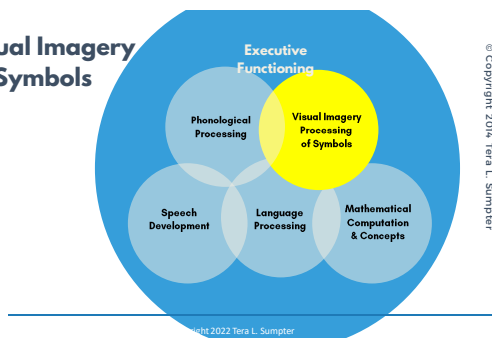
Phonological Processing Task: from the LiPS program

Phonological Processing Task: from the LiPS program

Student B

- Struggling in reading
- Sounds out most words
- Reading is slow and choppy
- Writing is phonetic
- Lots of letter reversals
- Reading comprehension is poor
- If information is presented orally, he does well
- Math is difficult- see number reversals and uses incorrect operations and has trouble keeping columns straight



Visual Imagery Of Symbols

Sample Goals

- Dx: visual imagery impairment of symbols with breakdown at CV/VC syllable structure **or** literacy impairment characterized by visual processing of symbols deficits at the CV/VC level

Goal 1: Student will retain and recall the letters in a CV/VC+ word with 90% accuracy to improve visual imagery processing skills for symbols.

Goal 2: Student will label the order and identity of letters in a CV/VC+ word from their visual memory with 90% accuracy to improve visual imagery processing skills for symbols.

Goal 3: Student will manipulate letters in a CV/VC+ word from their visual memory with 90% accuracy to improve visual imagery processing skills for symbols.

Sample Therapy Activities

1. Finger write CCVC/CVCC words
Always follow with questions about word
 2. Finger write chains at CCVC/CVCC level
 3. Sight Words
 4. Orthographic Spelling
- Favorite program: Seeing Stars by Nancy Bell**

Visual Processing for Symbols Task

Visual Processing for Symbols Task

Student C

- Reading fluency and accuracy are good
- Reading comprehension is poor
- Zones out during class lectures
- Has trouble explaining her responses to questions orally and in writing
- Has trouble following and participating in class discussions
- Has trouble following classroom instructions
- Doesn't understand classroom material
- Verbal and written expression is hard to follow-very disorganized and jumps from idea to idea
- Doing poorly in math
- Teachers say she's simply lost
- Homework takes a long time

Executive Functioning

Phonological Processing

Visual Imagery Processing of Symbols

Speech Development

Language Processing

Mathematical Computation & Concepts

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All 3 kids are having trouble with reading comprehension

But Why?

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- Residual artic issues
- Reading rate: 50th percentile
- Reading accuracy: 13th percentile
- Phonological Processing: 1st percentile
- Nonsense word decoding: 5th percentile
- Sight words: 37th percentile
- Oral language comprehension: 75th percentile

Executive Functioning

Phonological Processing

Visual Imagery Processing of Symbols

Speech Development


Language Processing

Mathematical Computation & Concepts

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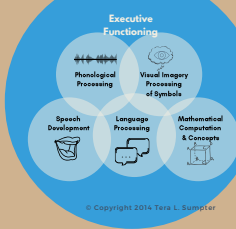
Why is he having trouble with reading comprehension?

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- Reading rate: 90th percentile
- Reading accuracy: 75th percentile
- Phonological Processing: 84th percentile
- Nonsense word decoding: 50th percentile
- Sight words: 40th percentile
- Oral language comprehension: 10th percentile

Why is she having trouble with reading comprehension?

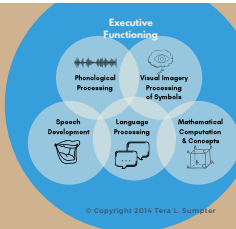


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- Reading rate: 5th percentile
- Reading accuracy: 37th percentile
- Phonological Processing: 50th percentile
- Nonsense word decoding: 75th percentile
- Sight words: 2nd percentile
- Oral language comprehension: 90th percentile

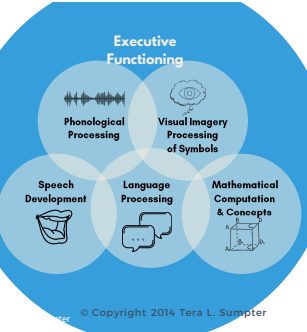
Why is he having trouble with reading comprehension?



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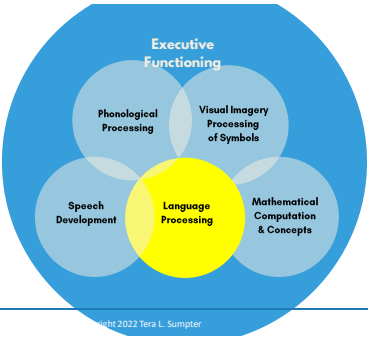
Student D

- Difficulty following oral and written directions
- Needs lots of repetition of new concepts
- Poor comprehension
- Difficulty expressing themselves verbally and in writing
- Poor generation of novel ideas
- Difficulty getting started on tasks

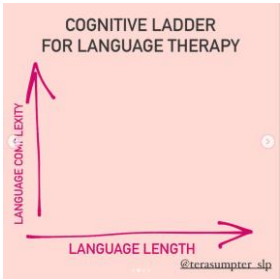


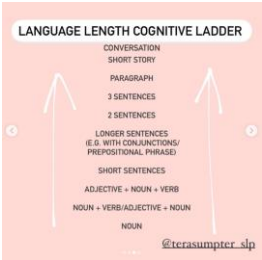
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Language



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1 activity, 4 steps

Use the same steps for each level of your scaffold

1) child examines & describes object. EET can be incorporated to organize expressive language.

2) tell child to use their imagination to "take a picture" of the object.

3) remove & hide object, and have child describe from the picture in their mind.

4) bring object back out and compare to child's mental image description. "How did we do? Did I picture in our imagination match?"

terasumpter_slp

1) Start concrete

This can be an actual object or picture



terasumpter_slp

2) Scaffold Length & Complexity of object

And therefore language and amount visualized



4) Scaffold Length & Complexity of object

And therefore language and amount visualized



terasumpter_slp

3) Scaffold Length & Complexity of object

And therefore language and amount visualized



5) Scaffold Length & Complexity of object

And therefore language and amount visualized



terasumpter_slp

- 6) One sentence: *The girl eats the cereal.*
- 7) Two sentences: *The girl eats the cereal. She drinks the milk left in the bowl.*
- 8) Three sentences: *The girl eats the cereal. She drinks the milk left in the bowl. She puts the empty bowl in the sink.*

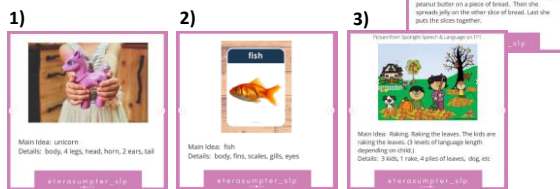
Process (see *Visualizing and Verbalizing* program for more details)

1. Child hears or reads sentence(s)
2. Child describes visualized image that matches the sentence(s).
3. Lay place holder (colored square)
4. Review pictures from visual memory
5. Child retells story
6. Identify main idea
7. If appropriate, ask abstract questions: inferences, predictions, etc.

[illegible]

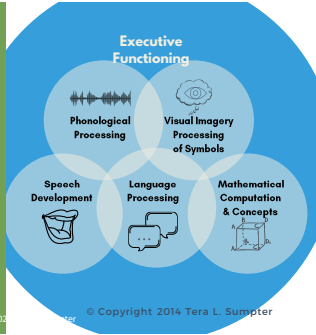
Gestalt Formation:

Main idea versus details

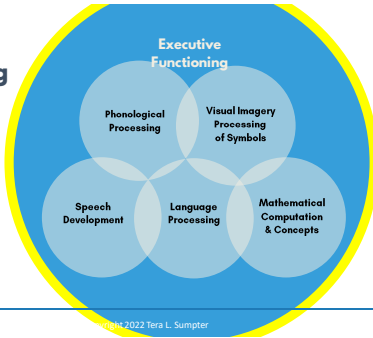
[illegible][illegible]

Student E

- Rarely turns in homework
- Extremely disorganized
- Misplaces personal items
- Makes careless mistakes on work
- Makes lots of mistakes when reading
- Doesn't notice mistakes when reading
- Doing poorly in all subjects
- Difficulty initiating assignments
- Difficulty with time management skills



Executive Functioning



WHAT CAN WE DO?

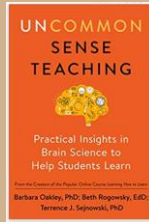
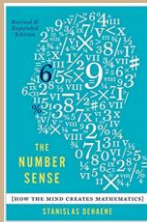
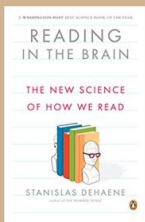
- INCREASE AWARENESS
- VISUALIZE
- PLAN
- SELF-EVALUATE

■

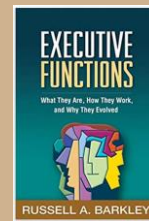
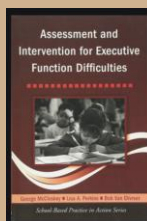
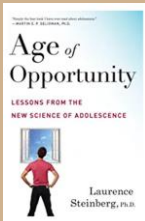
Female, 8-yo: narrating Buddy story



Favorite Books



Favorite Books

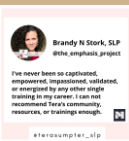
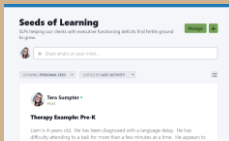


The Seeds of Learning: A Cognitive Processing Model for Speech, Language, Literacy & Executive Functioning

By Tera Sumpter,
M.A. CCC-SLP



Executive Functioning Educational Community



- 5+ modules of executive functioning education
- 32+ hours of recorded Office Hours
- Weekly Live Zoom Office Hours
- Resource libraries
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