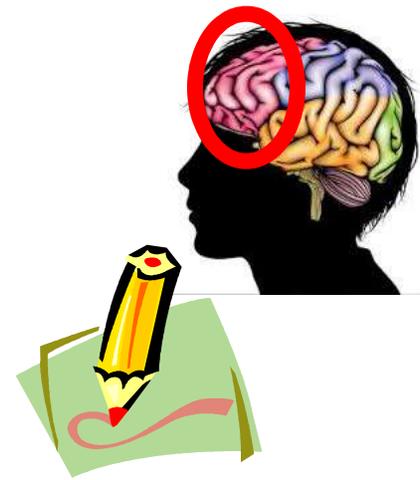


# The Role of Executive Functions in Writing



Presented by

**George McCloskey, Ph.D.**

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# Overview

- What are executive functions/ What is Executive Control?
- What is the difference between a learning disability and a producing disability?
- How is executive control involved in writing?
- How do you know if a writing problem is related to executive control difficulties?
- What instructional techniques can be used to address writing problems related to executive control difficulties?



# EF as the Conductor of the Brain's Orchestra or CEO of the brain (i.e., EF as “g”)



# Executive Control Is Not a Unitary Trait

Appropriate Metaphors  
for Executive Control:

- **The management structure of a multinational mind corporation**
- The brain's supervisory system

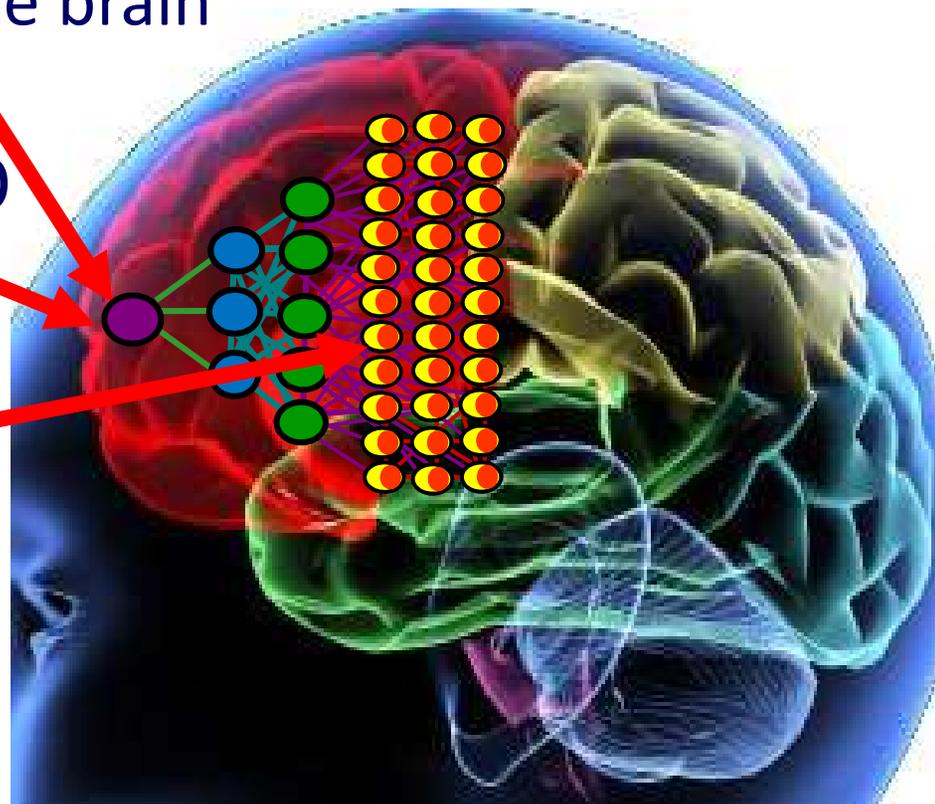


# The brain's supervisory system

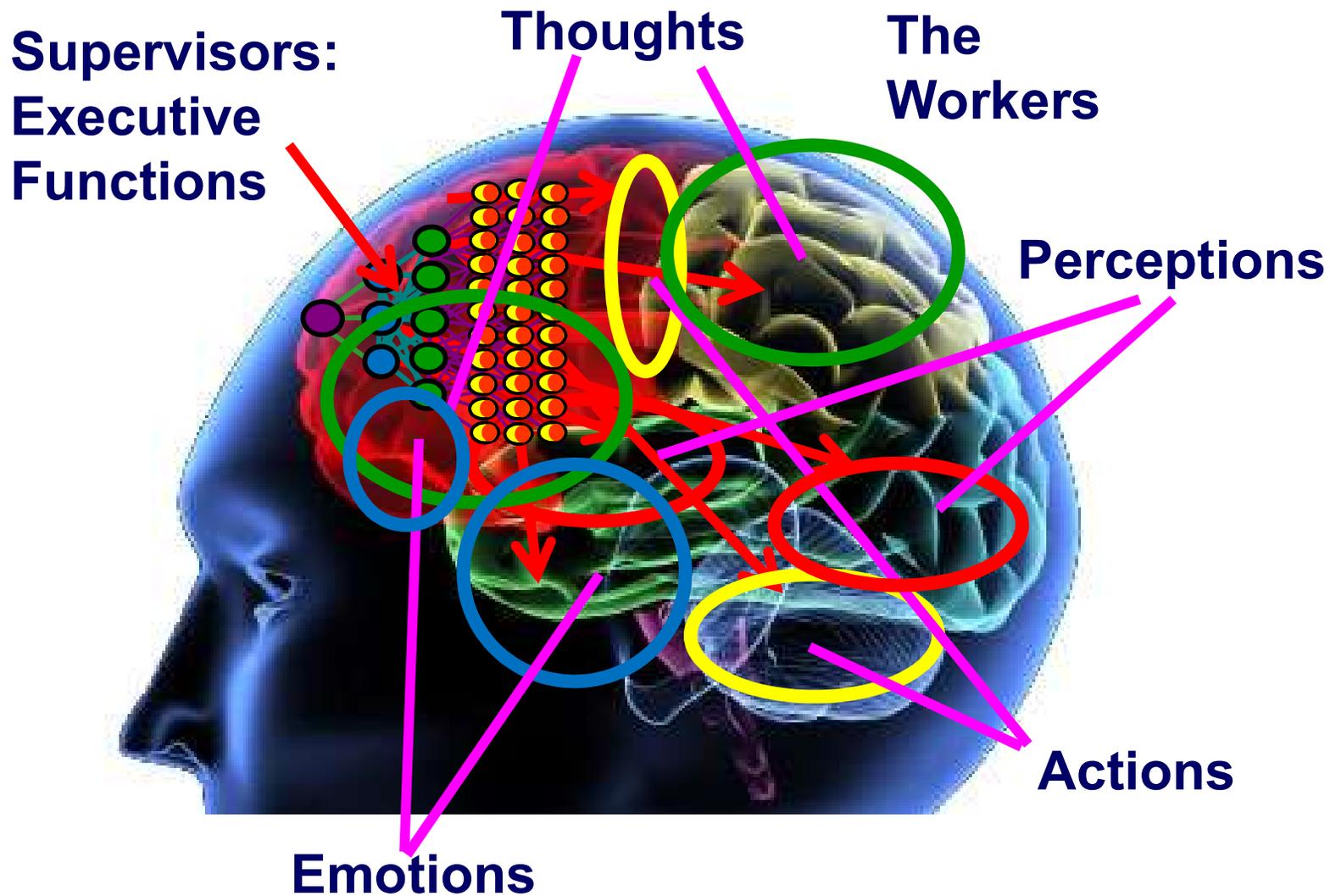
Executive Control  
isn't just a "CEO of the brain"

It involves the CEO

and all the  
other  
managers in  
the  
corporation



# The brain's supervisory system



# Self-Regulation “Supervisors”

## ATTENDING



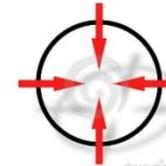
Perceive  
Focus  
**Sustain**

## ENGAGING



Energize    Initiate  
**Inhibit**  
Stop        Pause  
**Flexible**      **Shift**

## MONITORING & ADJUSTING



**Monitor**  
Modulate  
Balance  
Correct

## PERFORMING EFFICIENTLY



**Sense Time**                      Pace  
Sequence      Use Routines

## MANAGING MEMORY



Hold                      Store  
**Manipulate**      Retrieve

## INQUIRING REFLECTIVELY



Anticipate      Gauge  
**Estimate Time**  
Analyze        Compare

## SOLVING PROBLEMS



Generate              Associate  
**Plan**                      **Organize**  
Prioritize              Decide



# The Brain's Supervisory System

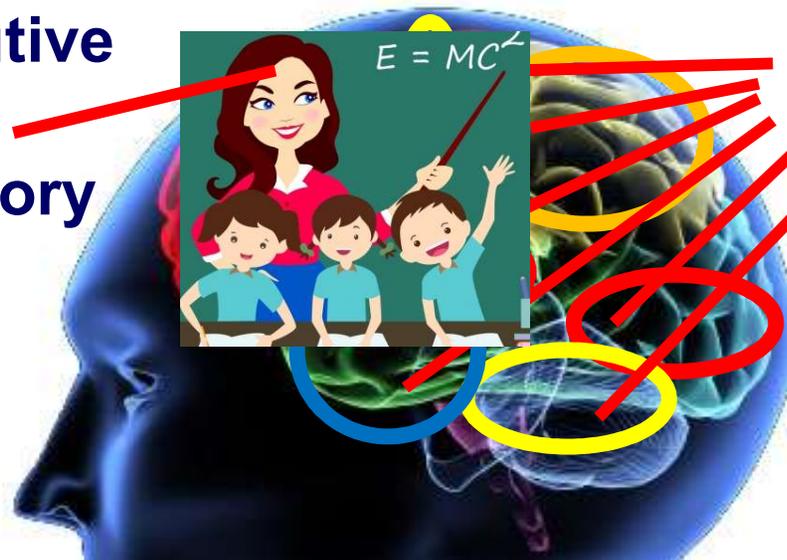
From adolescence throughout adulthood executive control involves:

- **Self-Regulation** – managing perceptions, feelings, thought and actions on a daily basis
- **Self-Realization** – awareness of personal strengths and weaknesses, openness to the need to change
- **Self-Determination** – setting personal goals and making long-term plans
- **Self-Generation** – developing a moral and ethical perspective through intentions, discernment and compassion
- **Trans-self Integration** – developing a connection to ideas, causes, and purposes beyond self

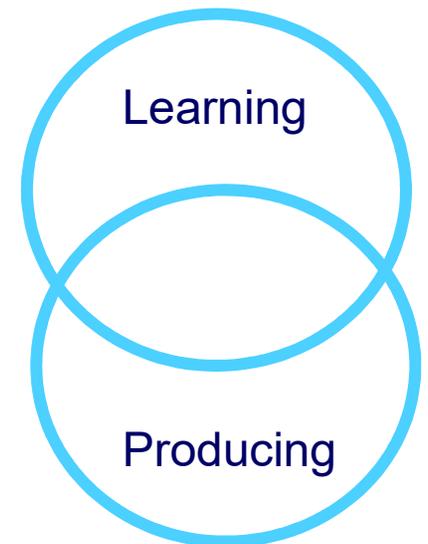
# Executive Control and School

## Teacher-Directed New Learning

**The Teacher**  
as Executive  
Control  
Supervisory  
System

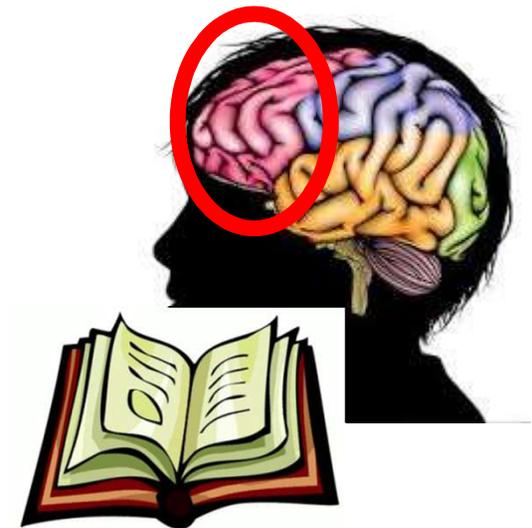


**The  
Workers**



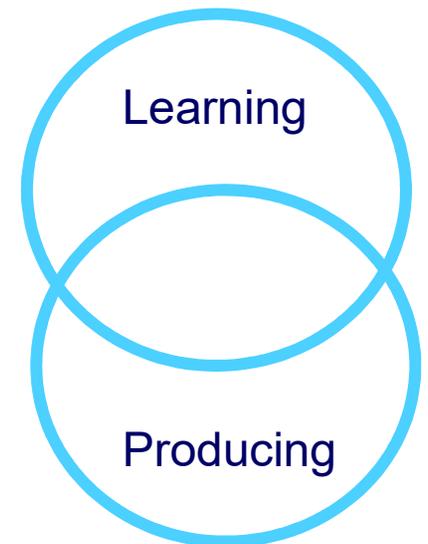
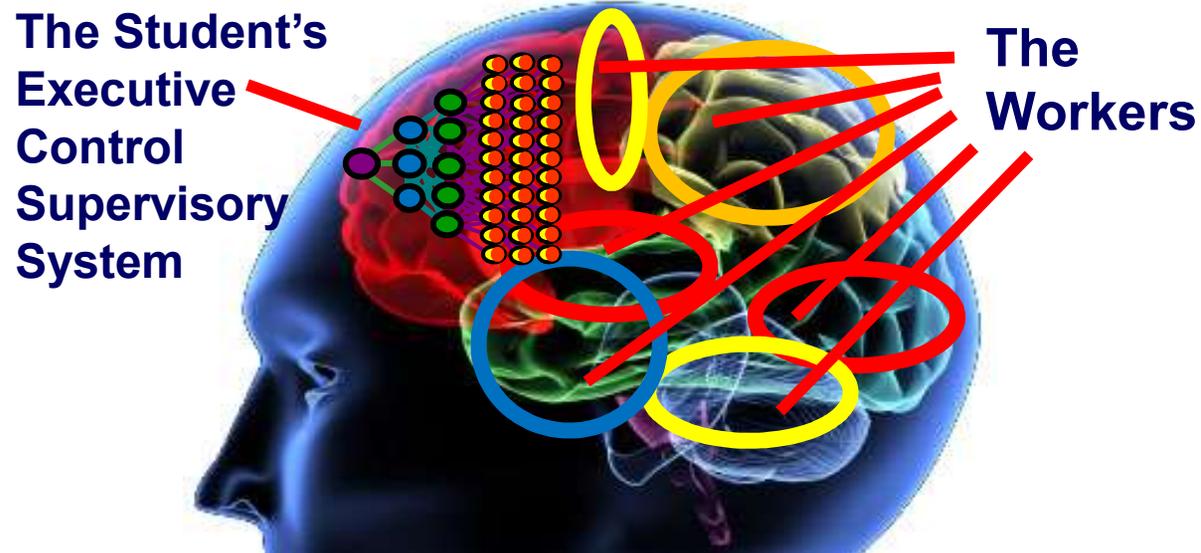
# Executive Control and School

- Although executive functions can be used to guide new learning, many new learning situations are structured in ways that reduce the need for strong executive direction.
- Teachers become the supervisory system of children's brains and lead them through the learning process.



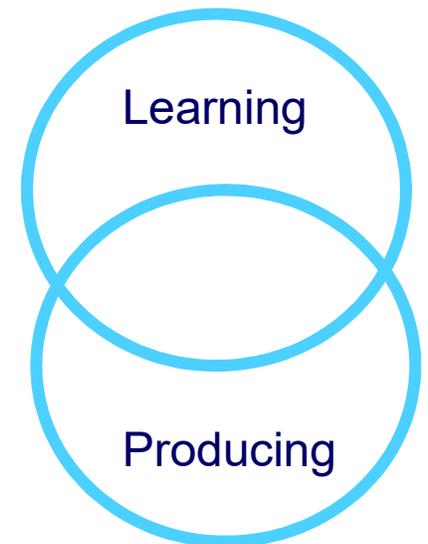
# Executive Control and School

## Self-Directed Production



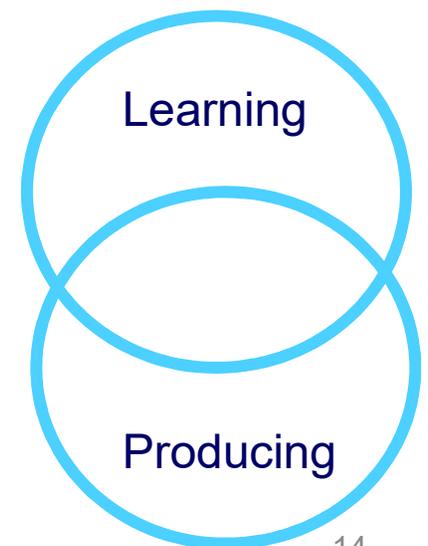
# Executive Control and School

- In contrast, **producing** (demonstrating what you have learned) usually requires a lot of involvement of executive control processes.

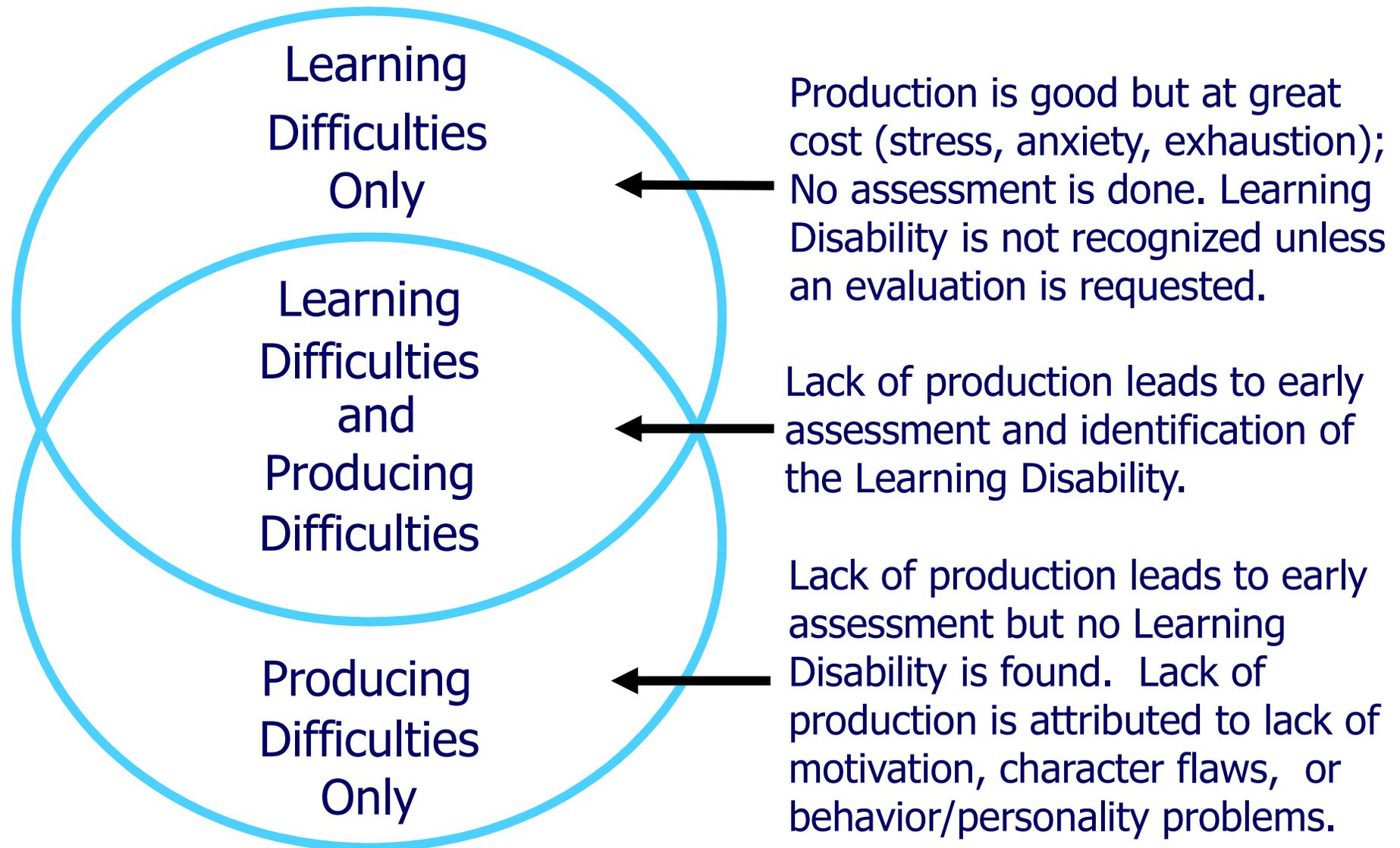


# Learning and Producing

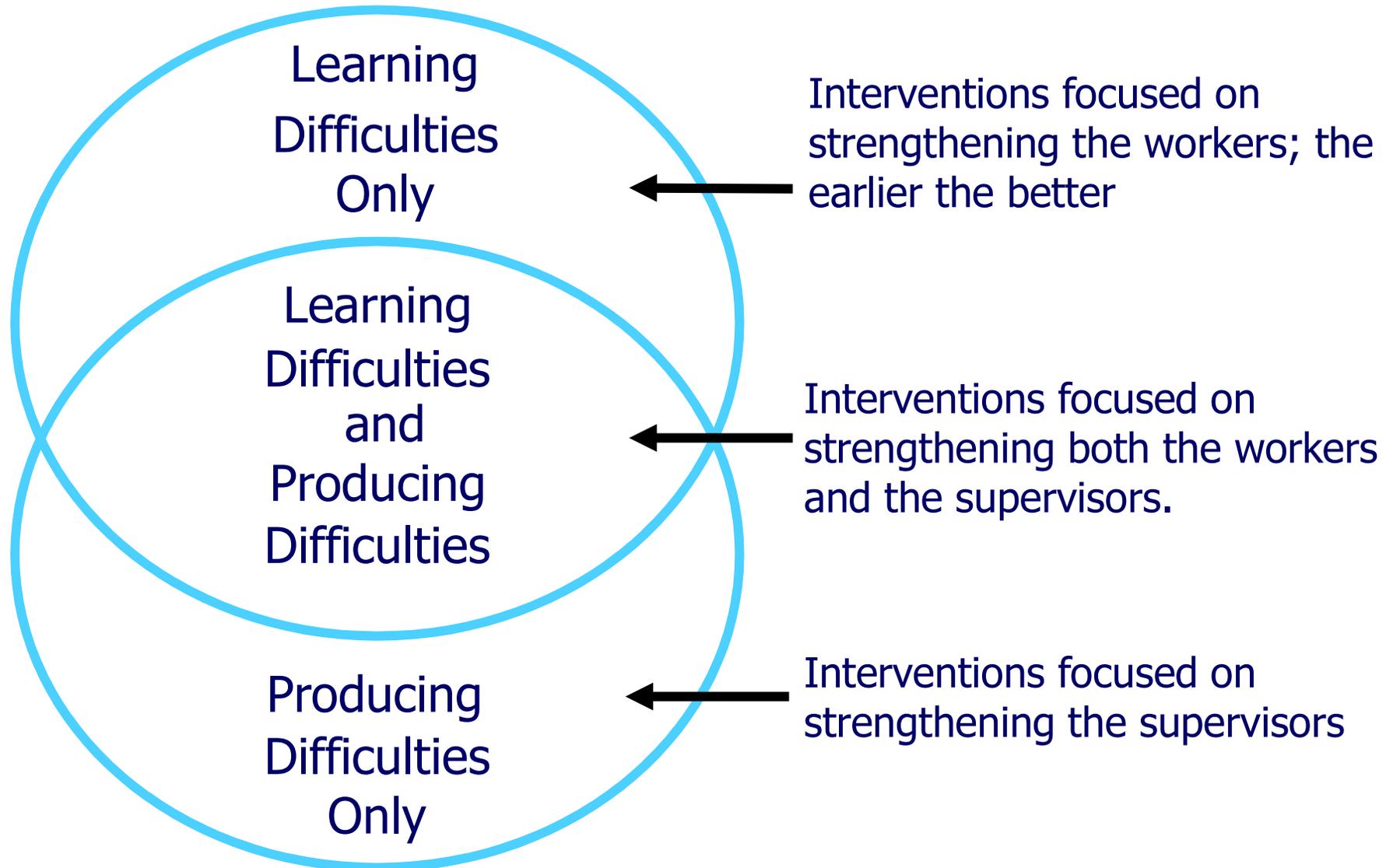
- We can't observe learning directly; we only observe production.
- Referrals are made on lack of production not lack of learning. The assumption is that a lack of production is the result of a lack of learning.
- In many instances, the lack of production is not the result of a lack of learning but a lack of knowing when or how to demonstrate what was learned.



# A General Model for Conceptualizing Learning and Producing Difficulties



# Interventions within the Learning and Producing Difficulties Model

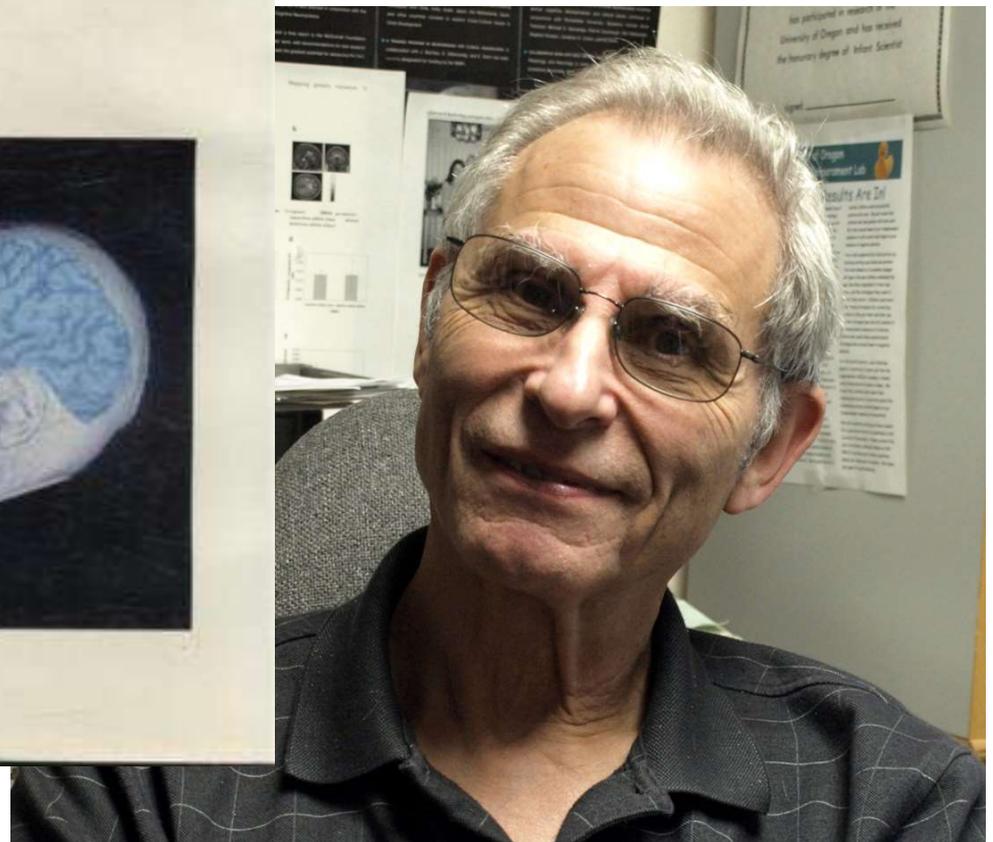


# IMAGES OF MIND

MICHAEL I. POSNER  
MARCUS E. RAICHEL



## Michael Posner

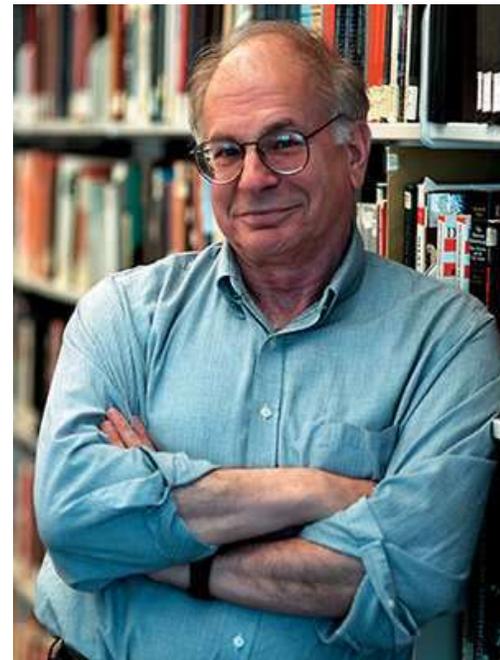


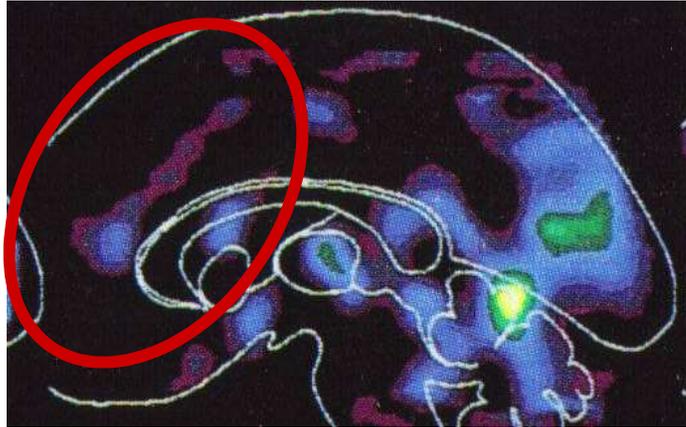
THINKING,  
FAST AND SLOW



DANIEL  
KAHNEMAN

WINNER OF THE NOBEL PRIZE IN ECONOMICS



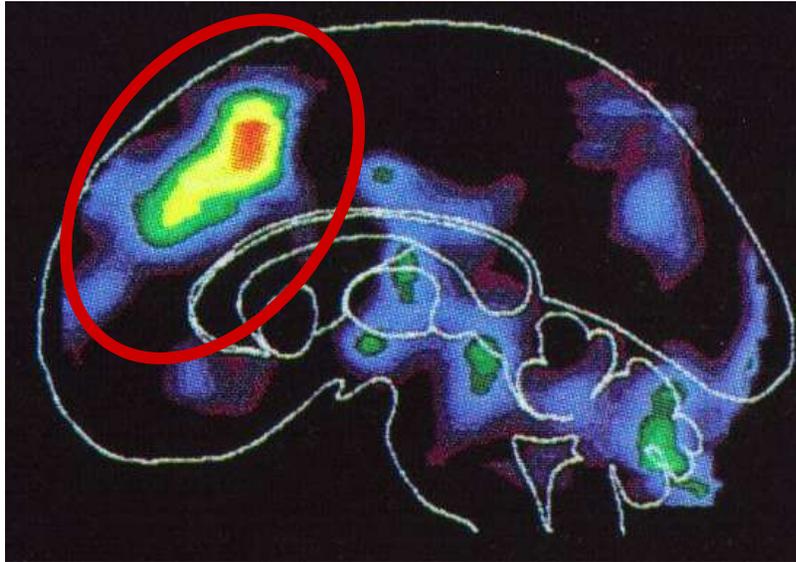


**System 1 –  
Fast,  
effortless,  
automatic**

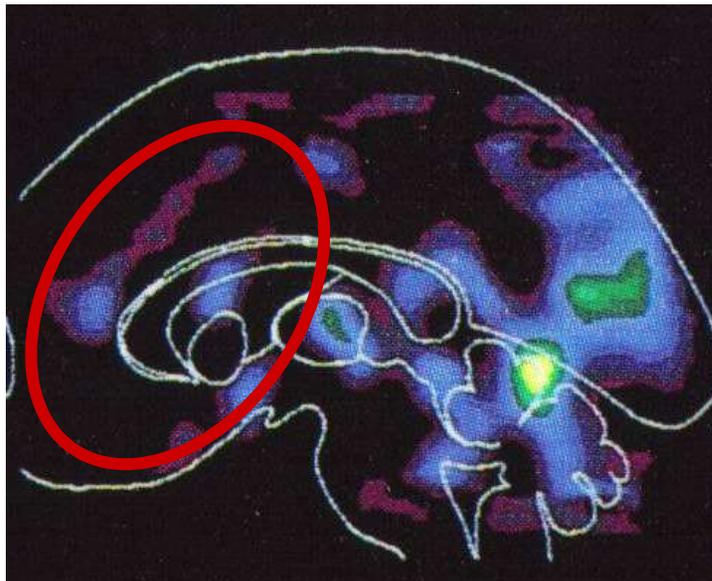


**System 2 –  
Slow, effortful,  
non-automatic**

**PET scan images from Posner & Raichle *Images of Mind*  
System 1/System 2 from Kahneman *Thinking Fast and Slow***



**Figuring out  
what, when and  
how with a new  
task**

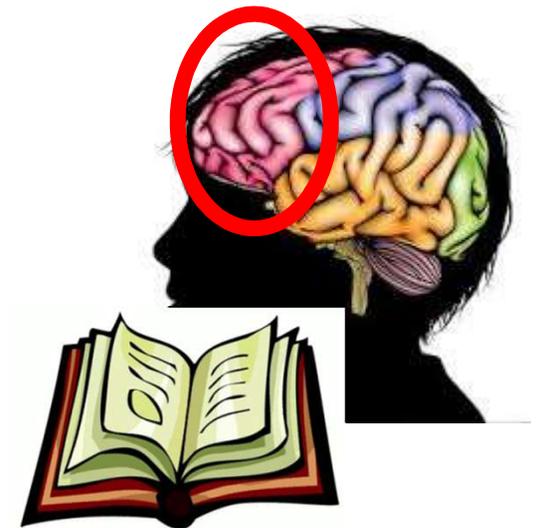


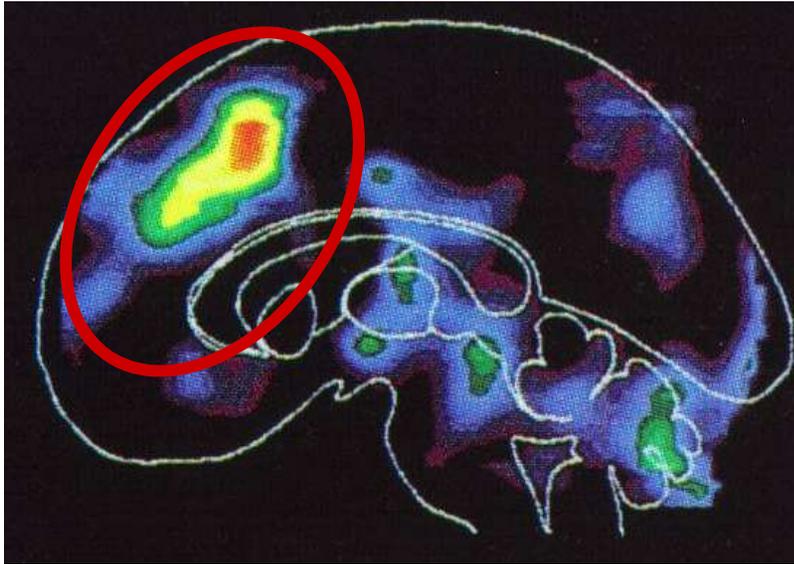
**Practicing  
what, when  
and how to  
automaticity**

**PET scan images from Posner & Raichle *Images of Mind*  
System 1/System 2 from Kahneman *Thinking Fast and Slow***

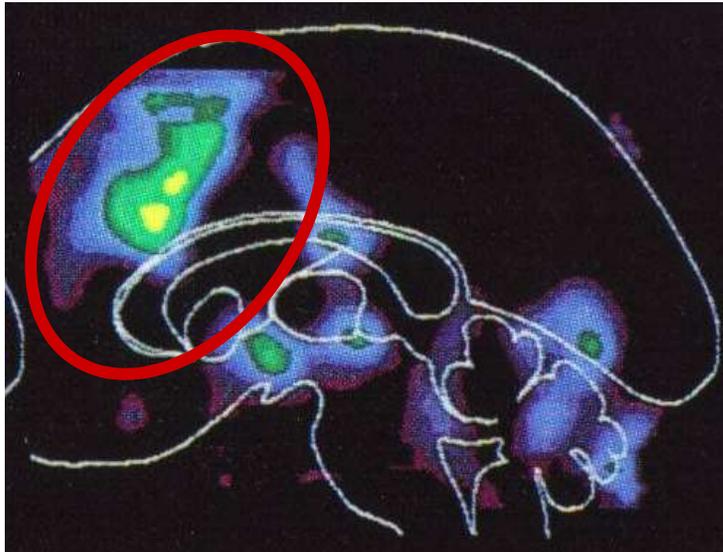
# Things that are Taught to Automaticity in Early Elementary School

- The alphabet and sight word recognition
- Graphomotor functioning for quick handwriting of letters and words
- Basic math facts and multiplication tables





**Figuring out  
what, when and  
how with a new  
task**



**Same task, new items**

**Using EFs to recognize  
when, then engaging  
already learned how**

**PET scan images from Posner & Raichle *Images of Mind*  
System 1/System 2 from Kahneman *Thinking Fast and Slow***

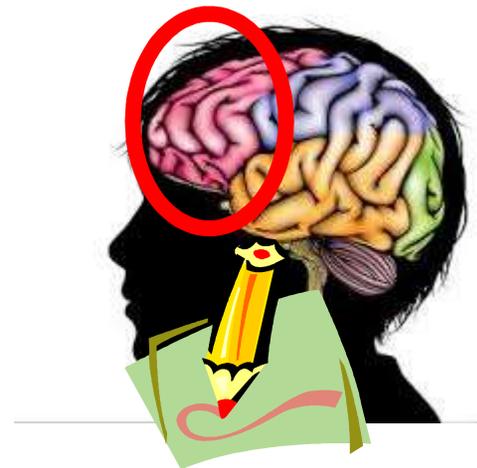
# Knowing When vs Knowing How

- **Executive skills (knowing how)** can be practiced to automaticity, reducing frontal lobe demands.
- **Executive functions (knowing when)** cannot be practiced to automaticity, the “when” is always changing depending on current conditions.



# Executive Control and Writing

Executive control is used to cue, direct, coordinate and integrate all the processes, skills, abilities, and knowledge bases used when writing.



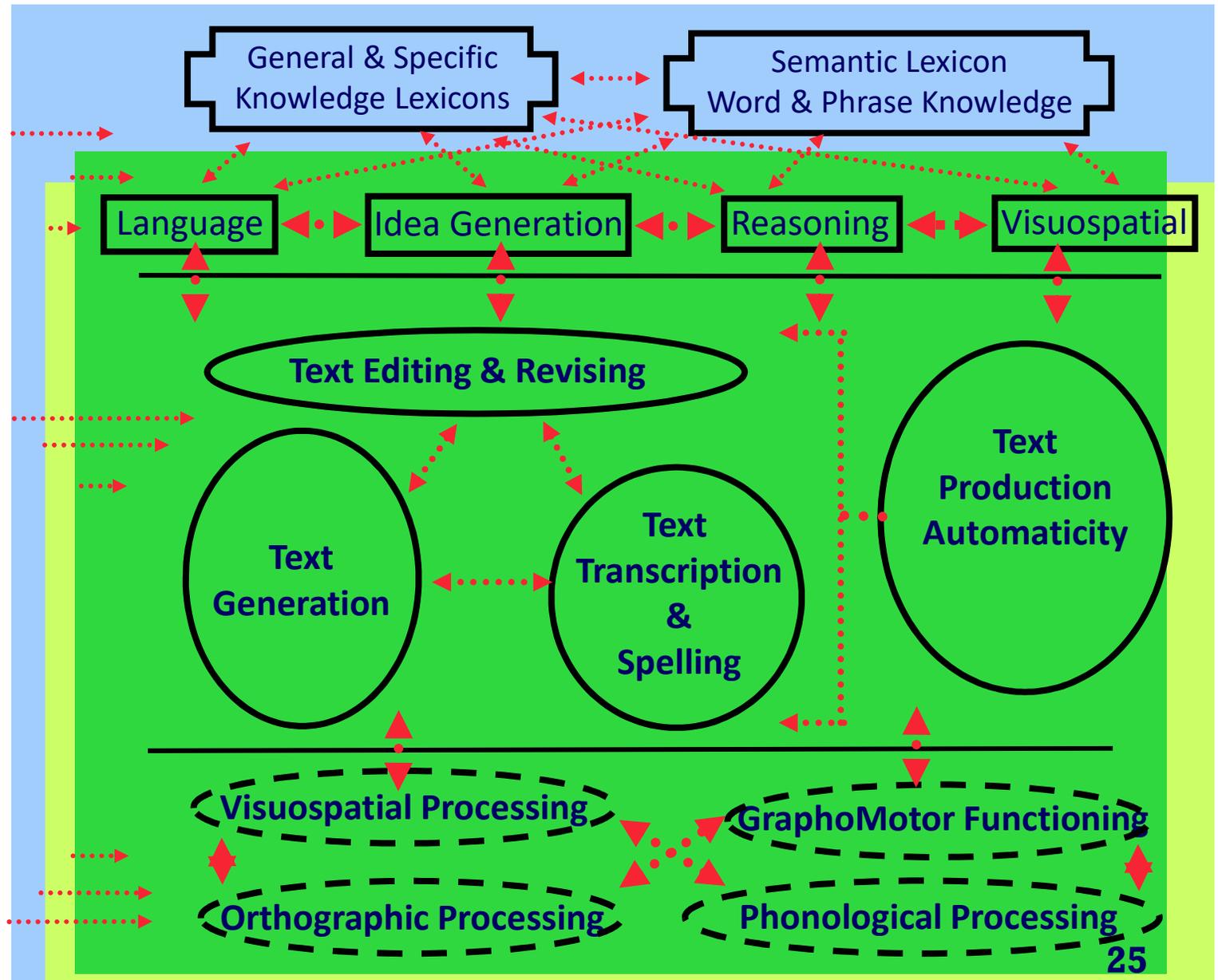
# An Integrative Model Specifying Processes, Abilities, Knowledge Bases, Skills, Memory and Achievement in Writing

◀...▶  
indicate  
Executive  
Function  
processing  
at work

Initial  
Registration  
(Immediate  
Memory)

Working  
Memory

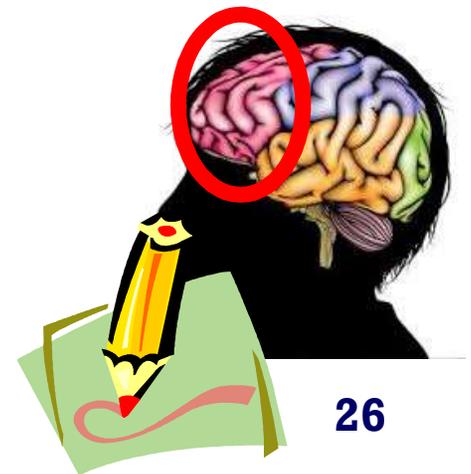
Retrieval  
from Long  
Term Storage



# Neuropsychology of Writing

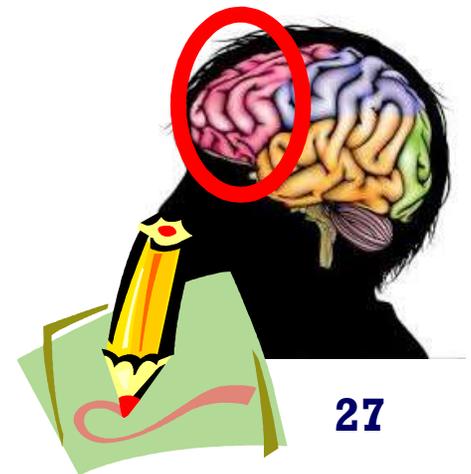
- Language by hand develops over a longer developmental trajectory than the other language systems.
- Language by hand requires the greatest involvement of frontal lobe functions (executive functions and working memory) for success; as a result, relatively skilled writing typically does not develop until late adolescence.

Adapted from Berninger & Richards (2003),  
Brain Literacy for Educators and Psychologists



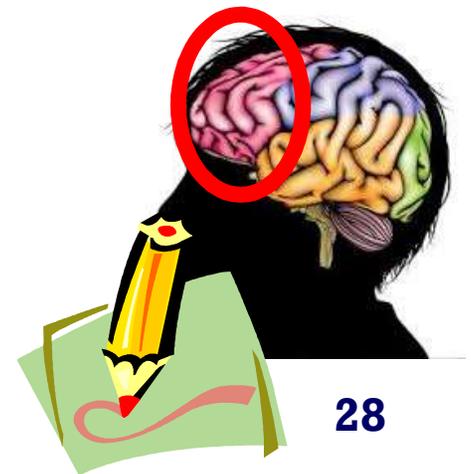
# Neuropsychology of Writing

- Writing is not just the output stage in relation to the input (reading) stage of written language.
- Writing is not merely a motor act.
- Handwriting, spelling, and composition are separable components of the developing writing system.



# Neuropsychology of Writing

It is important to note that if text transcription does not reach an adequate level of automaticity to support the writing process, alternative methods (typing, texting) and alternate modalities (dictation) can be used to transform language representation into written text.

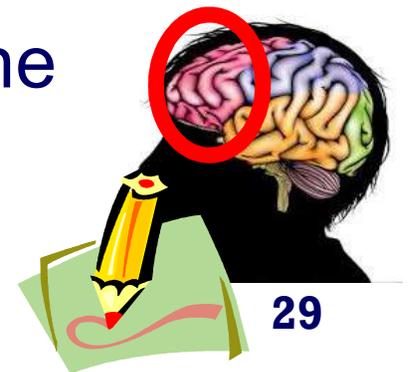


# Composition Instruction

## Transition from Other- to Self- Regulation

- Developing writing must become increasingly self-initiated, self-sustained, self-monitored, and self-disciplined.
- The transition to self-regulation is more likely to occur if adults explicitly prepare developing writers for it through instructional cueing. Strategies can be taught as they are unlikely to emerge solely on the basis of myelination of the frontal lobes.

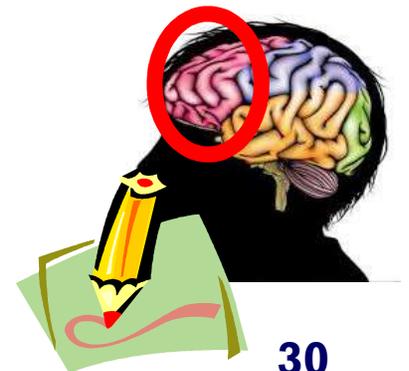
Adapted from Berninger & Richards (2003),  
Brain Literacy for Educators and Psychologists



# Composition Skill Development: Intermediate Writers

- Reviewing/revising is mostly at the word and sentence level.
- Executive control focus shifts to increasing self-regulation of higher level writing components.
- Revising/reviewing skills after transcription and text generation are developing more than idea generation skills.

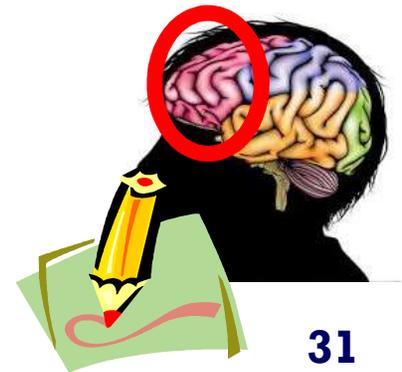
Adapted from Berninger & Richards (2003),  
Brain Literacy for Educators and Psychologists



# Composition Skill Development: Advanced Writers

- Executive control focus is devoted to self-regulation of higher level writing components in a more integrated manner.
- Idea generation and preplanning continue to develop.
- The integration of reading and writing skills becomes more critical.

Adapted from Berninger & Richards (2003),  
Brain Literacy for Educators and Psychologists



# Dealing with Physical Space Constraints: an Executive Control Challenge:



# Finding the EF Demand Balance in Writing Assignments

Extensive List of Detailed Constraints On the Writing Product

A few guidelines and suggestions for specific writing strategies that can be used to complete the writing product

No guidelines for the writing product

# Behaviors indicative of poor executive control when Writing

- Difficulty with topic/idea generation or resistance to accepting the topic/ideas of an outside source.
- Inability to get energized for, initiate, and remain engaged with the act of writing.



Adapted from McCloskey & Perkins (2012),  
Essentials of Executive Functions Assessment.

# Behaviors indicative of poor executive control when Writing

- Amount of written production is limited or writing is avoided despite adequate ideas and language representation.
- Written text is overly simplistic and minimal compared to good knowledge store and good oral expression of knowledge.



Adapted from McCloskey & Perkins (2012),  
Essentials of Executive Functions Assessment.

# Behaviors indicative of poor executive control when Writing

- Arguments lack coherence/logical order or do not create a visual image despite adequately developed reasoning, language and/or visuospatial translation abilities.
- Good initial use of reasoning or visuospatial translation abilities deteriorates as writing progresses.



Adapted from McCloskey & Perkins (2012),  
Essentials of Executive Functions Assessment.

# Behaviors indicative of poor executive control when Writing

- Long pauses needed to access correct spellings or words usually spelled correctly on tests are spelled incorrectly in written products.
- Poor wording or grammatical errors, poor punctuation, and misspellings are not checked and/or not corrected.



Adapted from McCloskey & Perkins (2012),  
Essentials of Executive Functions Assessment.

# Behaviors indicative of poor executive control when Writing

- Difficulty planning and organizing thoughts about what to write;
- Difficulty judging the adequacy of a written product and/or recognizing when text needs to be revised.



Adapted from McCloskey & Perkins (2012),  
Essentials of Executive Functions Assessment.

# Behaviors indicative of poor executive control when Writing

- Well-articulated ideas are quickly forgotten once text generation is started.
- Ideas for revision are clearly stated but quickly forgotten once text revision is started.



Adapted from McCloskey & Perkins (2012),  
Essentials of Executive Functions Assessment.

# Behaviors indicative of poor executive control when Writing

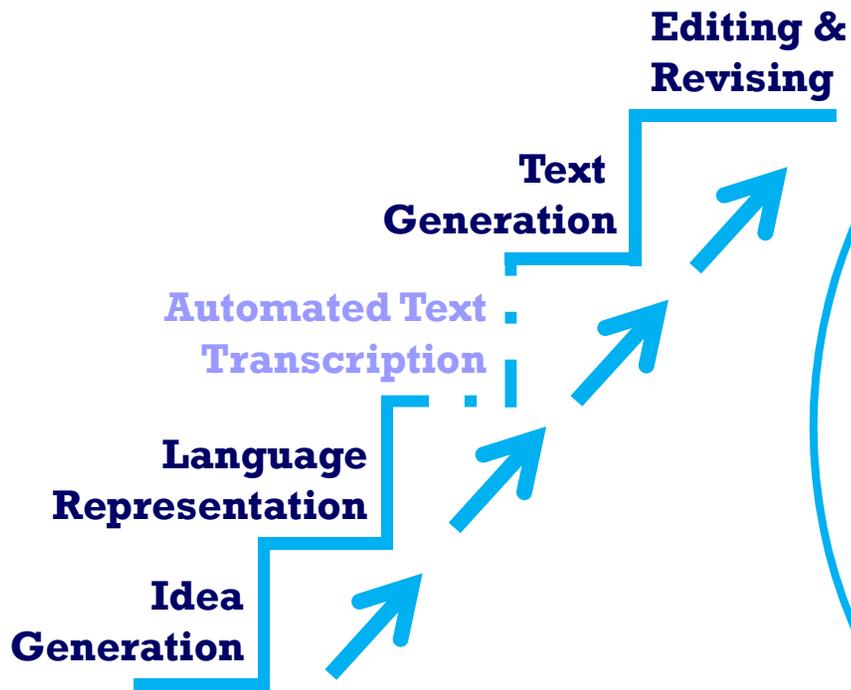
- Pace slows noticeably with passage of time.
- Use of pencil is resisted; pencil grasp is awkward and/or overly fatiguing.
- Letters and words are poorly formed, overall legibility is poor.

Adapted from McCloskey & Perkins (2012),  
Essentials of Executive Functions Assessment.

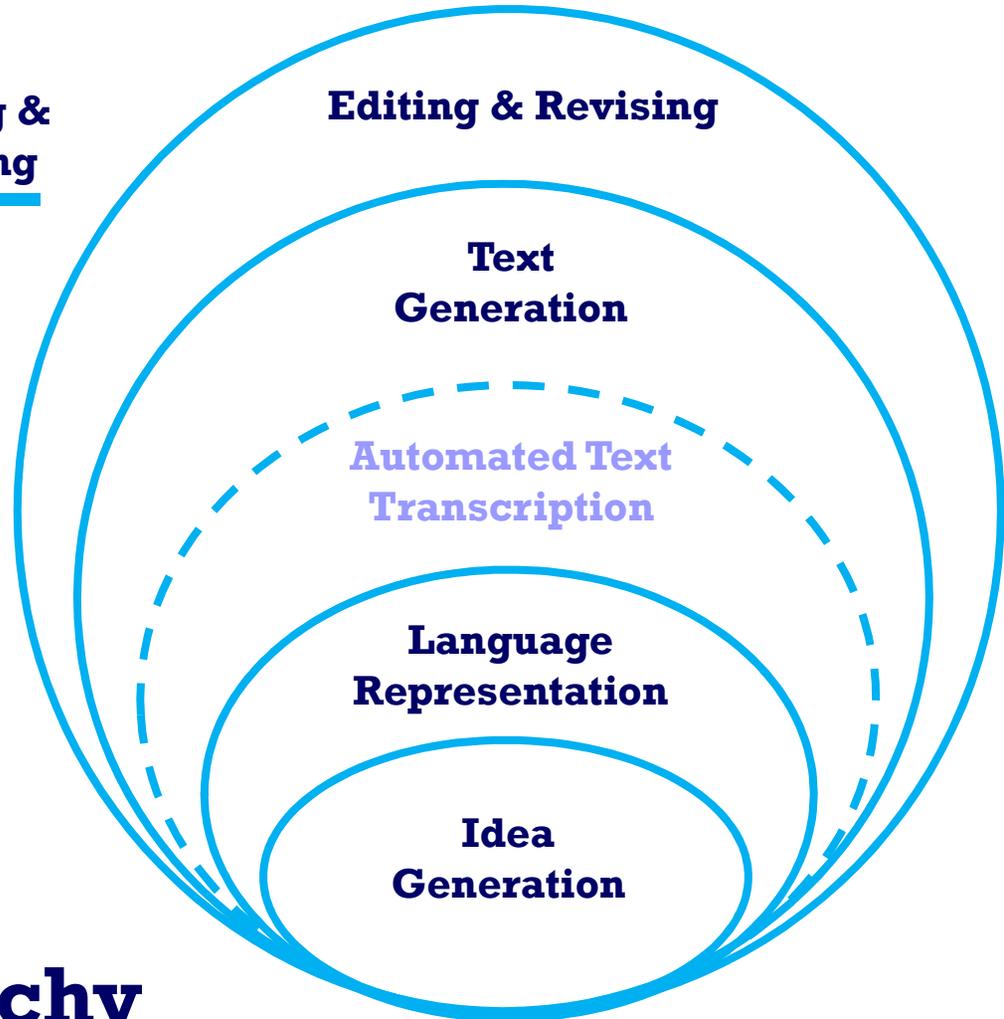


# Hierarchical vs Holarchical Writing

## Hierarchy

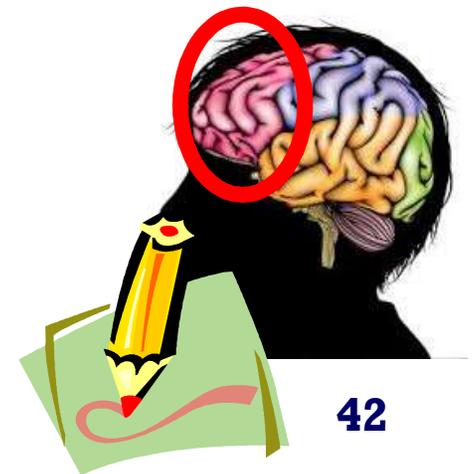


## Holarchy



# Holarchical Organization

- In a hierarchy, progression to the next stage cannot occur until after completion of the previous stage.
- In a holarchy, progression to the next stage can occur before completion of the previous stage.
- Holarchical development can continue at an earlier stage even after a later stage has begun.



# Language Representation vs Text Generation

What Evan wrote:

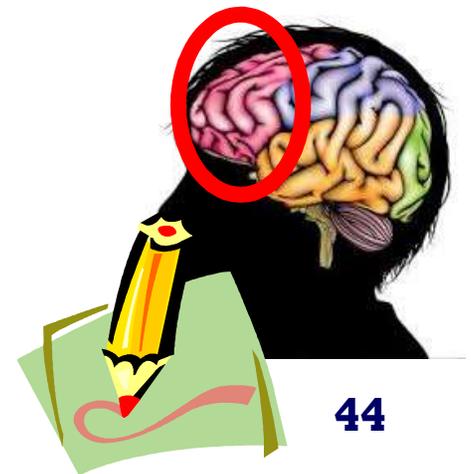
My favorite game is...  
“mabul roling it is  
fun. I like making  
the box to role in  
to. lam prety gode as  
well. It is rell inters  
ing. It is so fun.

What Evan said:

“My favorite game is rolling marbles. I think it is fun. I just learned it yesterday. It can be pretty hard at times. It can be fun and it’s interesting if you make it challenging. I like making the boxes to roll the marbles into. You probably need to be pretty skilled with eye hand coordination to do it. To get up the ramp you need to roll it really fast.”

# Brain Maturation and Executive Control Difficulties Related to Writing

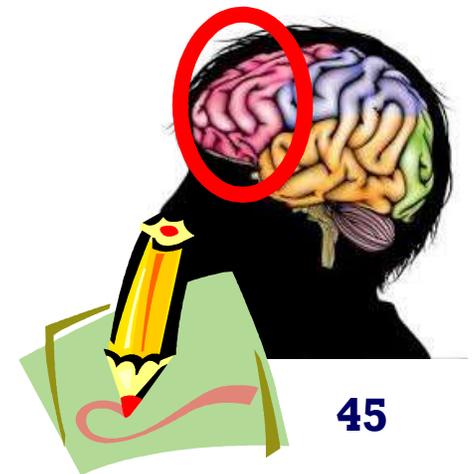
Many executive control difficulties related to writing are the result of a lack of adequate maturation of the neural networks involved in the use of these executive functions for writing.



# Later Composition Instruction: General Rationale

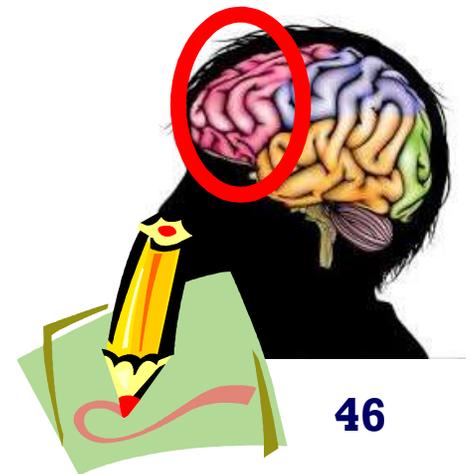
“...it is unlikely that brain maturation alone without explicit instruction in self-regulation strategies will help middle school and high school students develop and apply executive functions productively to writing. The major pedagogical goal at this stage of development is to guide the Writing Brain in becoming more self-regulated. A major research-supported technique for accomplishing this goal is teaching explicit strategies for regulating the writing process, some of which are genre specific, and all of which should be coordinated with curriculum.”

Berninger, 2003, page 248.



# Interventions for Executive Control Difficulties Related to Writing

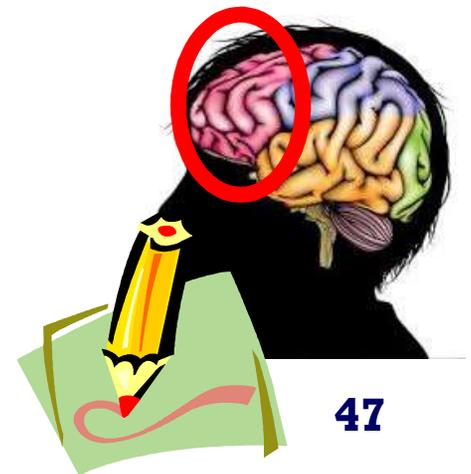
The most effective form of intervention for maturational difficulties with the use of executive functions is increased practice of all the stages of the writing process increasingly guided by the use of self-regulation strategies that can be taught to the student.



# Interventions for Executive Control Difficulties Related to Writing

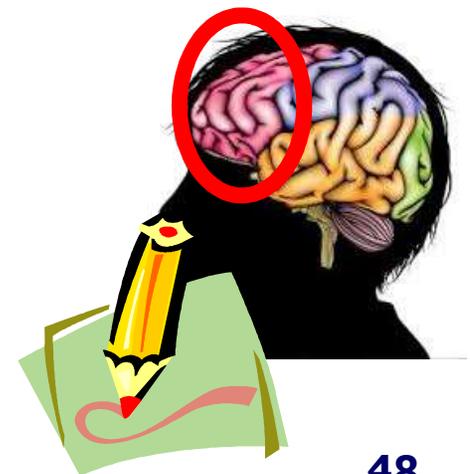
Brett: Oppositional Defiant?

Or struggling with the  
executive demands of the  
writing process?



# Brett's Dilemma: No Ideas

1. Brett was not being oppositional; he was honestly reporting that he had no ideas.
2. The psychologist discussed with Brett strategies that he could use to generate ideas



THIRD EDITION

Best Practices in

Writing  
Instruction

edited by

Steve Graham

Charles A. MacArthur

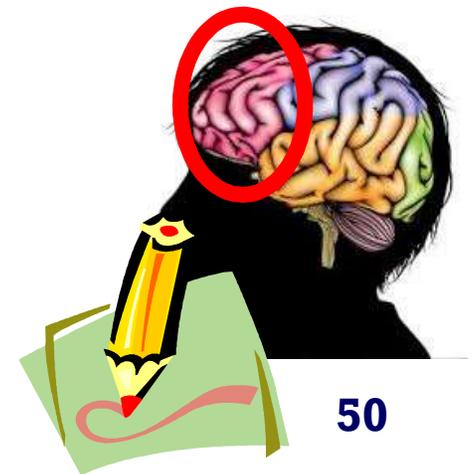
Michael Hebert

**Steve Graham**  
**Self-Regulated**  
**Strategy Development**  
**(SRSD)**



# Cognitive Strategy Instruction

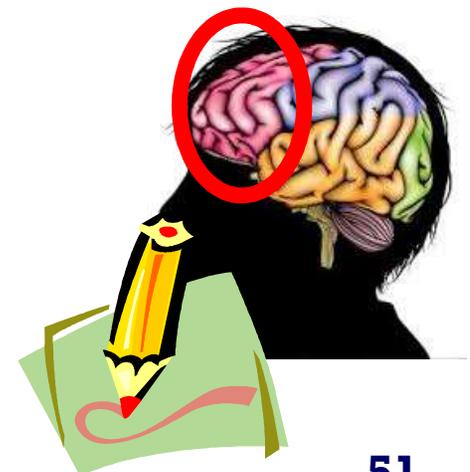
1. Explain the purpose.
2. Model the strategy.
3. Student memorizes the steps.
4. Mediate student's use of each step; scaffold as needed.
5. Student uses strategy guided by self-talk.
6. Teacher and student collaboratively evaluate student's efforts.



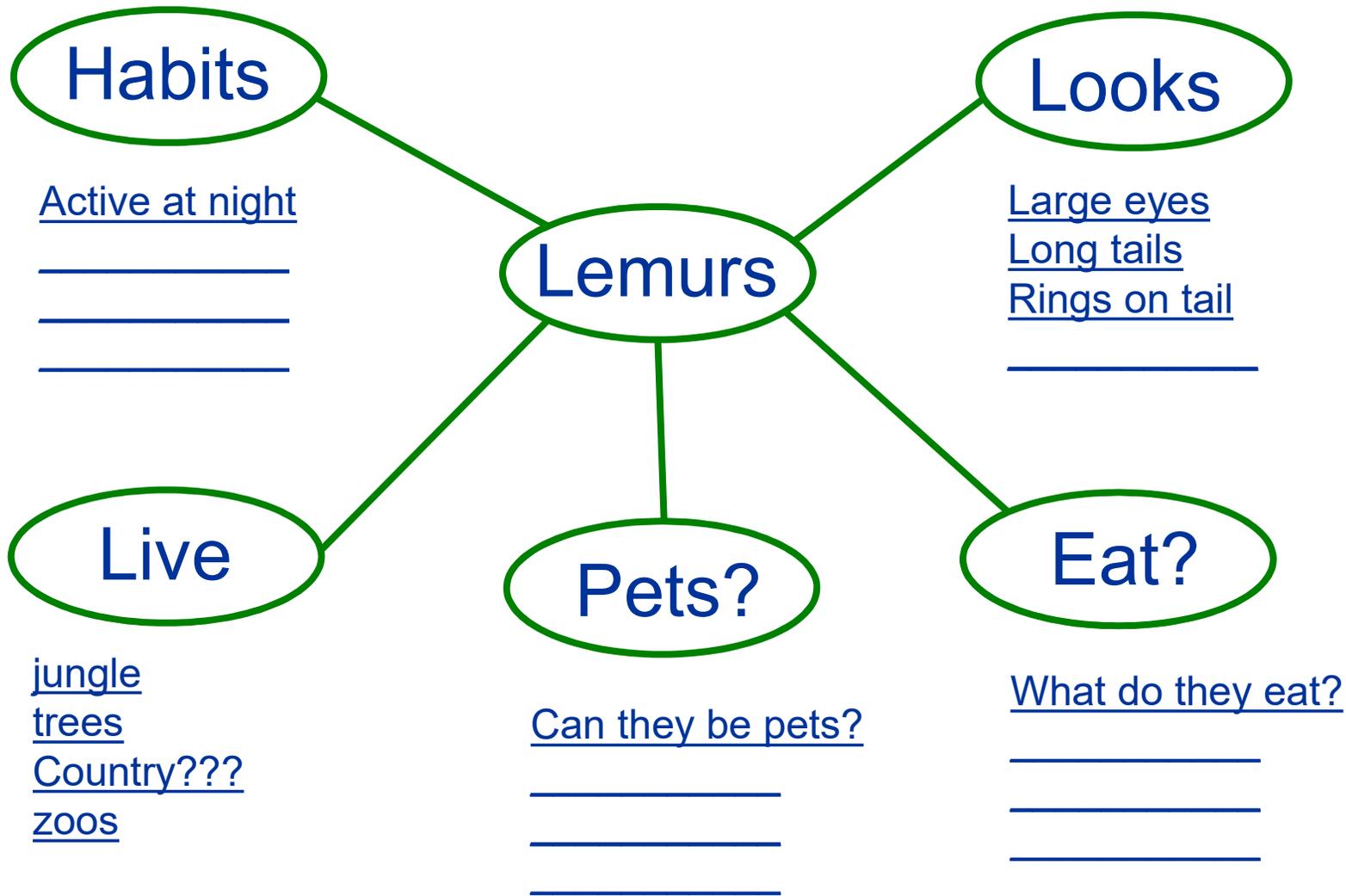
# The Report Writing Strategy

1. Select a topic.
2. Brainstorm what you know and what you want to learn.
3. Organize your information using a visual web.
4. Review your visual web and identify any holes or disconnects.

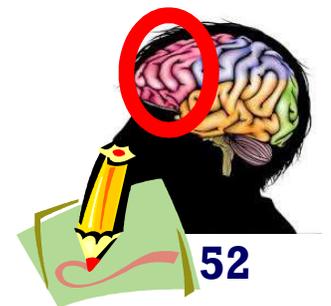
Adapted from Graham, et al., (2007),  
Essentials of Executive Functions Assessment.



# Web for what I know and what I want to learn



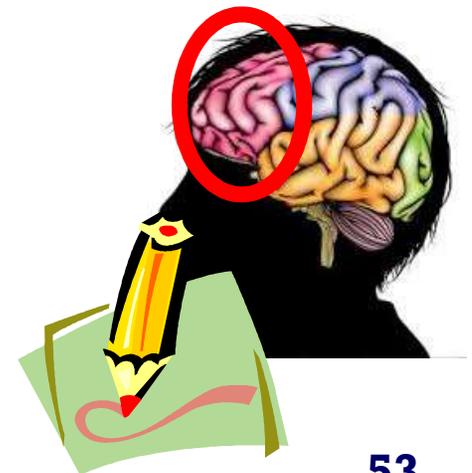
Adapted from Graham, et al., (2007),  
Essentials of Executive Functions Assessment.



# The Report Writing Strategy

5. Gather new information and revise your visual web.
6. Use the visual web to help construct an outline for the report or to begin writing.
7. Review, plan and revise as you write.

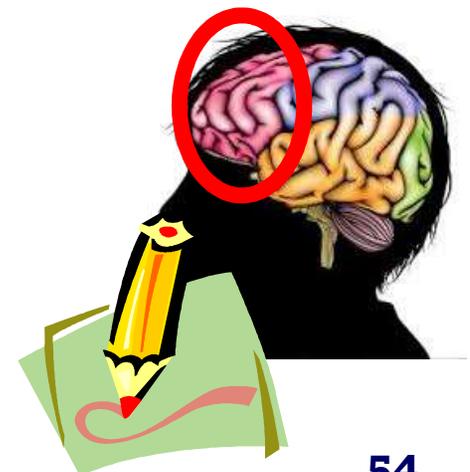
Adapted from Graham, et al., (2007),  
Essentials of Executive Functions Assessment.



# The Report Writing Strategy

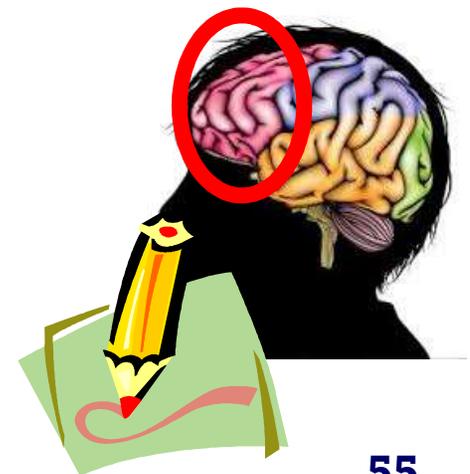
8. Check the visual web; did you write what you wanted to write?
9. Add information that is missing; fix sentences that don't say what you want to say.

Adapted from Graham, et al., (2007),  
Essentials of Executive Functions Assessment.



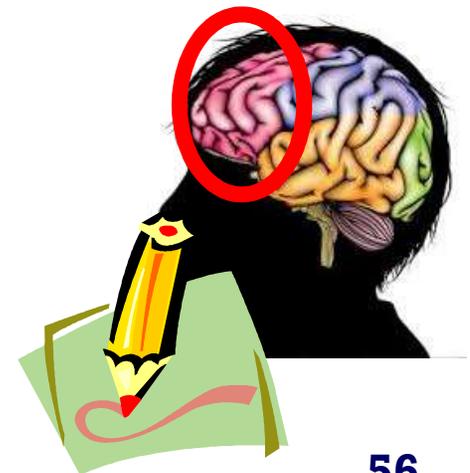
# Scaffolding Step 9

- A. Read the sentence silently and/or aloud.
- B. Does the sentence make sense to you?  
What does it mean?
- C. Is that what you meant to say?

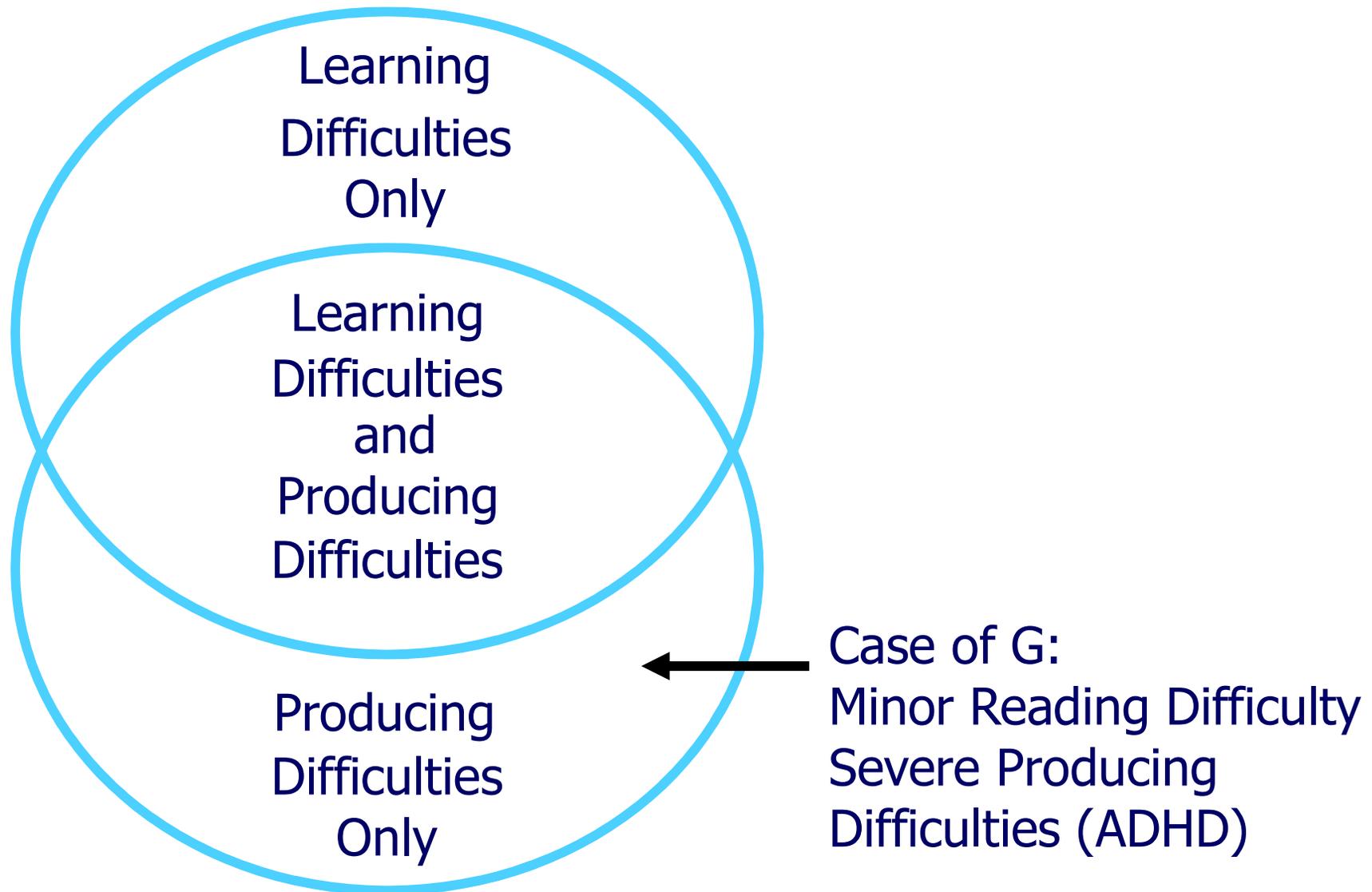


## Scaffolding Step 9

- D. What's missing? What doesn't make sense?
- E. Restate what you want to write. Repeat it to yourself.
- F. Write what you just said.
- G. Read what you wrote; go through steps A-F if needed.



# A General Model for Conceptualizing Learning and Producing Difficulties



# **G. Age 6 to Age 7**

## **George Case Example**

**Remediating Reading and Writing**

**Producing Difficulties through**

**Aligning external demands with**

**internal desires, practice with**

**feedback, and goal-setting**

# George's Avoidance Problem

- Despite adequate ability, George was not acquiring reading and writing skills. His ADHD symptoms were interfering with his academic production. His lack of success led to avoidance of tasks involving reading and writing.
- The psychologist helped George increase his realization of what was happening, increase his motivation to engage with activities necessary for skill acquisition, practice these activities with feedback for improvement, and achieve the academic goals that he set for himself.



November 2018

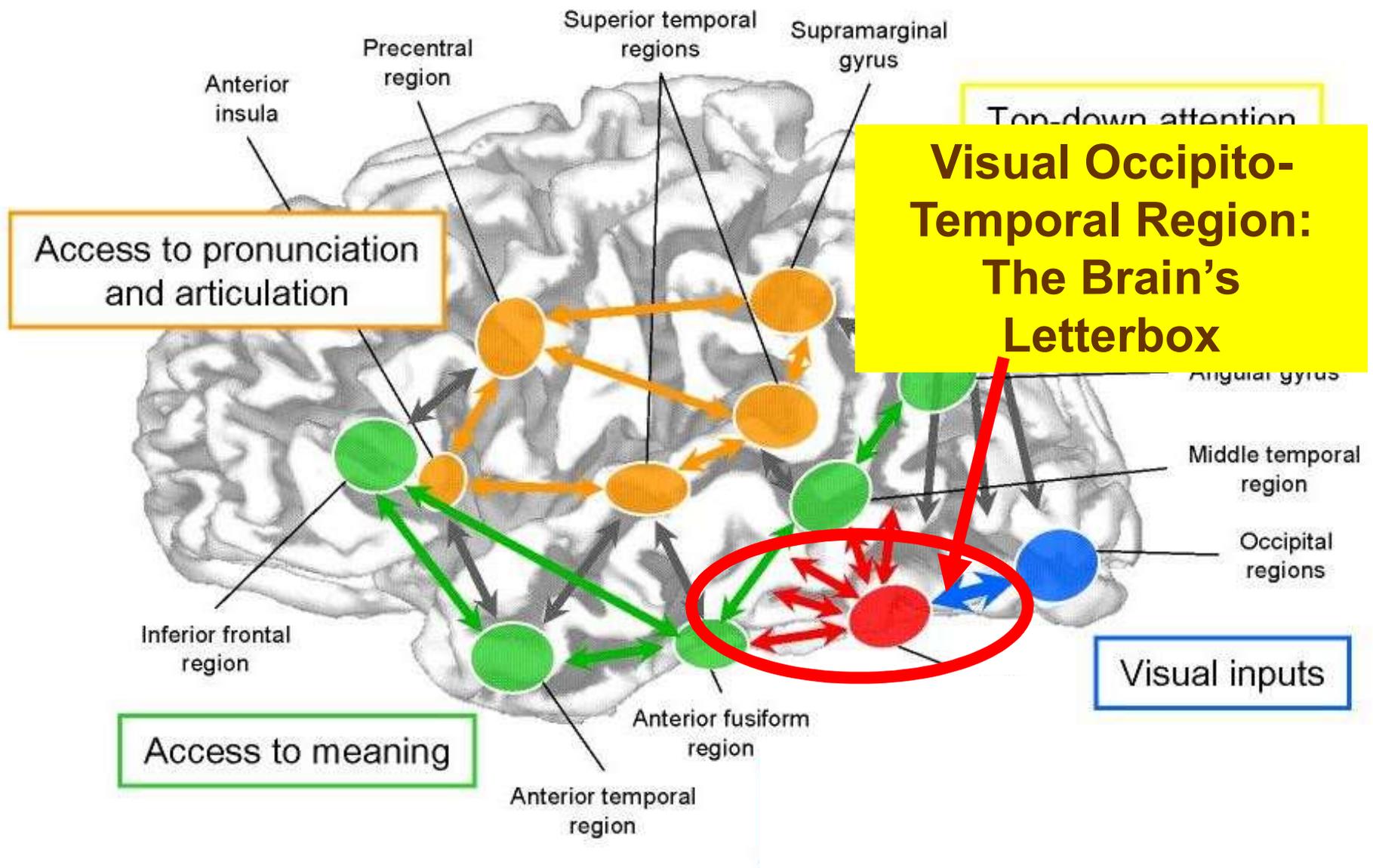
# Alphabet Writing

 K-Grade 1

Handwritten alphabet practice on four sets of three-line guides. The letters are written in a cursive style. Red circles highlight specific letters: 'A', 'B', 'C', 'D', 'E', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S', 'T', 'U', 'V', 'W', 'X', 'Y', 'Z'. Some letters have small 'x' marks above them, possibly indicating errors or corrections. The letters 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S', 'T', 'U', 'V', 'W', 'X', 'Y', 'Z' are written on the second line, while 'A', 'B', 'C', 'D', 'E', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S' are on the third line. The letters 'T', 'U', 'V', 'W', 'X', 'Y', 'Z' are on the fourth line. The letters 'A', 'B', 'C', 'D', 'E', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S' are on the first line. The letters 'T', 'U', 'V', 'W', 'X', 'Y', 'Z' are on the second line. The letters 'A', 'B', 'C', 'D', 'E', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S' are on the third line. The letters 'T', 'U', 'V', 'W', 'X', 'Y', 'Z' are on the fourth line.

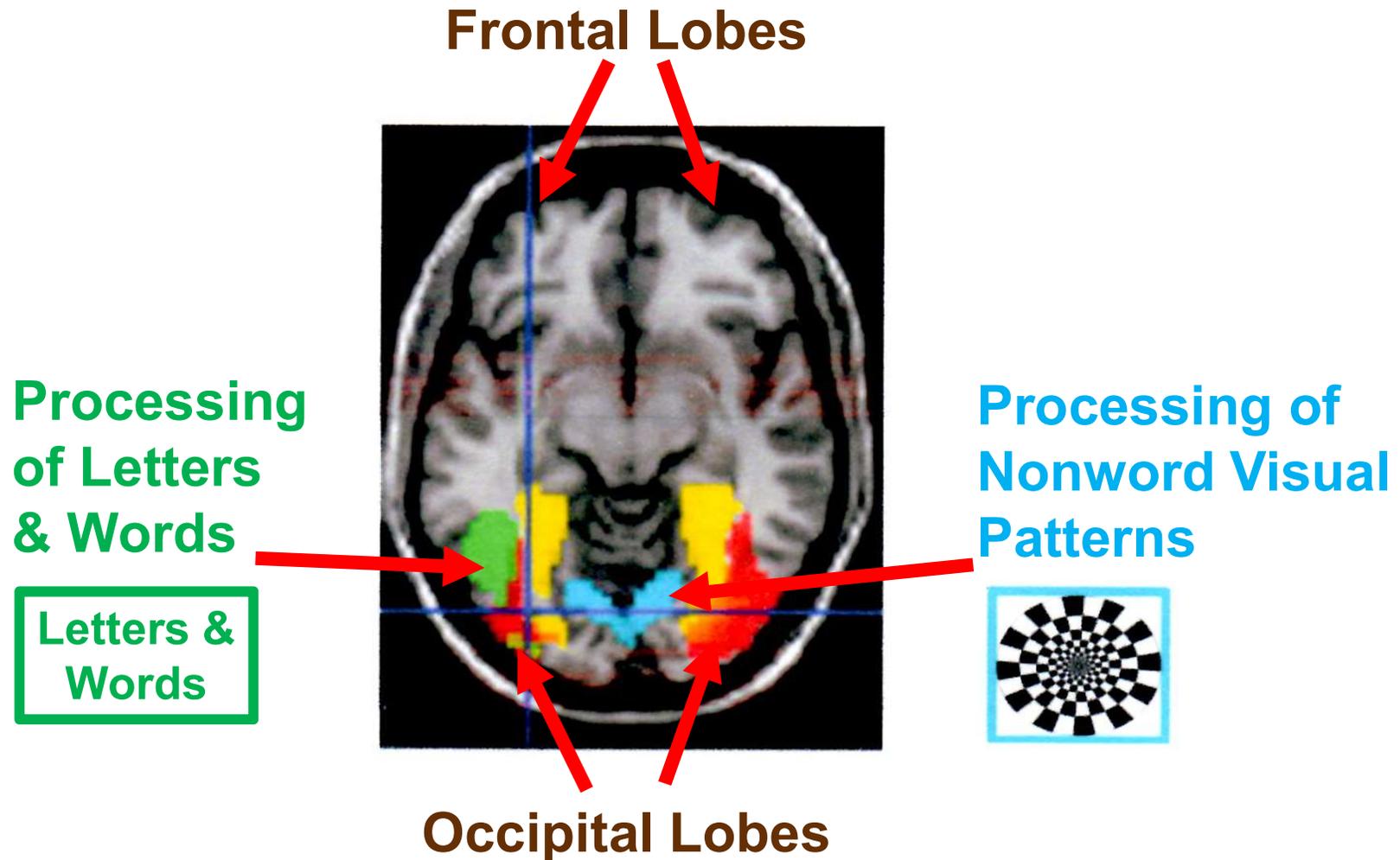


## A modern vision of the cortical networks for reading

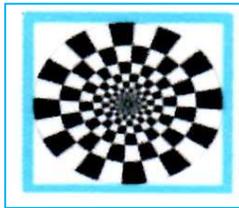


From : S. Dehaene, 2009, *Reading in the Brain*

# The brain processes letters & words differently than nonword images



From : S. Dehaene, 2009, *Reading in the Brain*



Non-word  
Visual Patterns

# Not effective for strengthening Occipito-Temporal processing

Sample Items

							<input type="checkbox"/> NO
							<input type="checkbox"/> NO
							<input type="checkbox"/> NO

Letters &  
Words

Effective for strengthening  
Occipito-Temporal processing

Visual Perception: Letters

PK-Grade 2

Example

g

a

b

h

r

p



# Session 1 February 18 Orthographic Drill

15  
3  
**15 seconds**  
**3 Letters**

c o d p o m l k  
f r o d n k  
d y q w z a t n x s g  
e d o b  
w y l n z  
j s i k p q m v c x z k  
q r k o l s b m c d q a  
b j y w a v c q e o p b  
t q f e x n i o l h g r  
s r d b w j k l p x s r  
q d k l j s d e b

**But he did not scan left to right to find them.**

**60 seconds**  
**11 Letters**

**And circled 3 more letters after being told to stop.**

PK-Grade 2  
Visual Perception: Letters

3  
2-18

# Session 1 February 18 Orthographic Drill

**18**

18

e

r s

z

f

c	r	o	t	d	n	k	p
t	d	y	q	w	z	a	t
e	d	b	r	q	o	p	l
w	y	t	u	e	o	s	y
j	s	i	k	p	q	m	v
q	r	k	o	l	s	b	m
b	i	y	w	a	v	c	q
t	q	t	e	x	n	i	o
<del>e</del>	r	d	q	w	j	k	l
q	d	k	l	j	z	d	e

**G. also used these Drills to work on correctly printing letters.**

j	l	u	z
k	x	z	b
c	d	q	p
c	o	p	q
e	h	g	r
j	x	s	u
p	v	i	f

31

PK-Grade 2

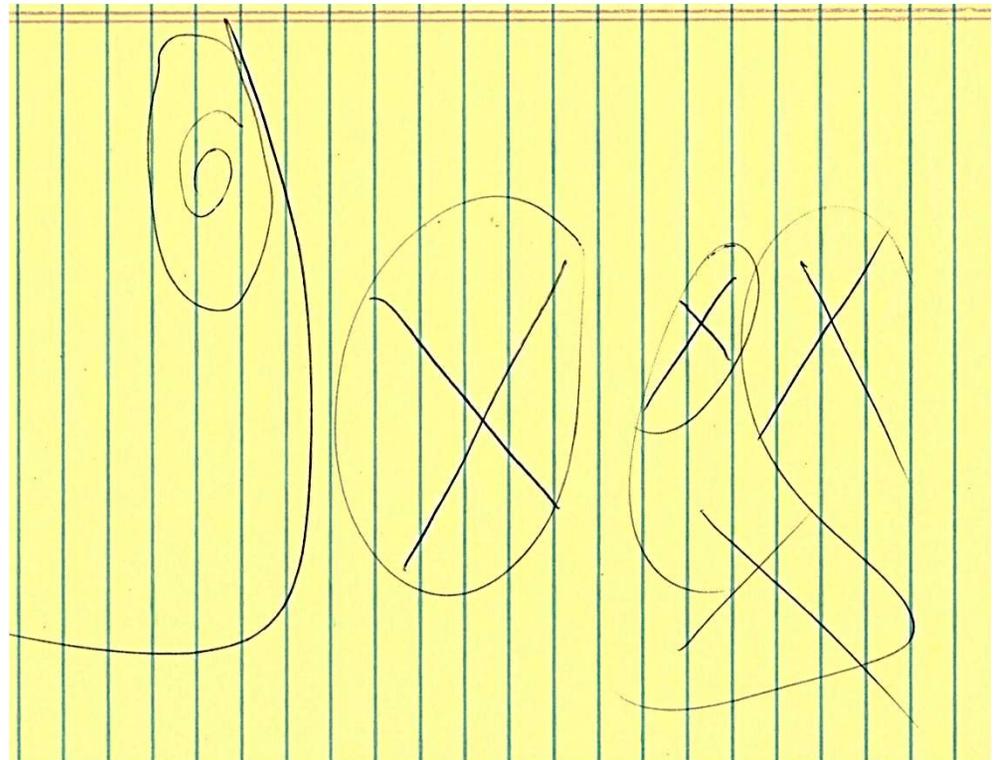
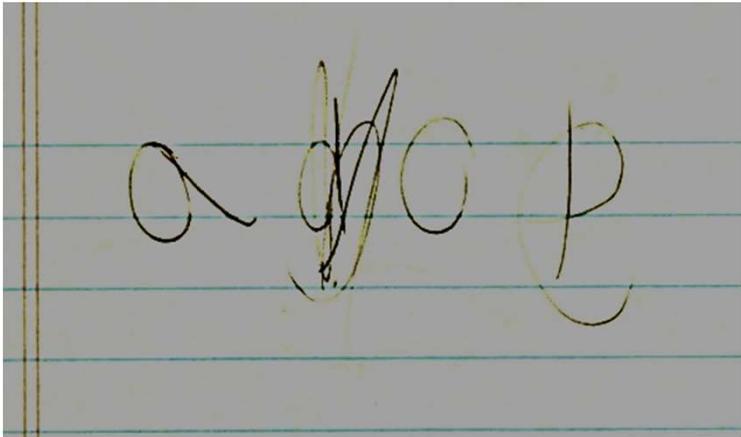
Visual Perception: Letters

# Session 3 March 4 Orthographic Drill

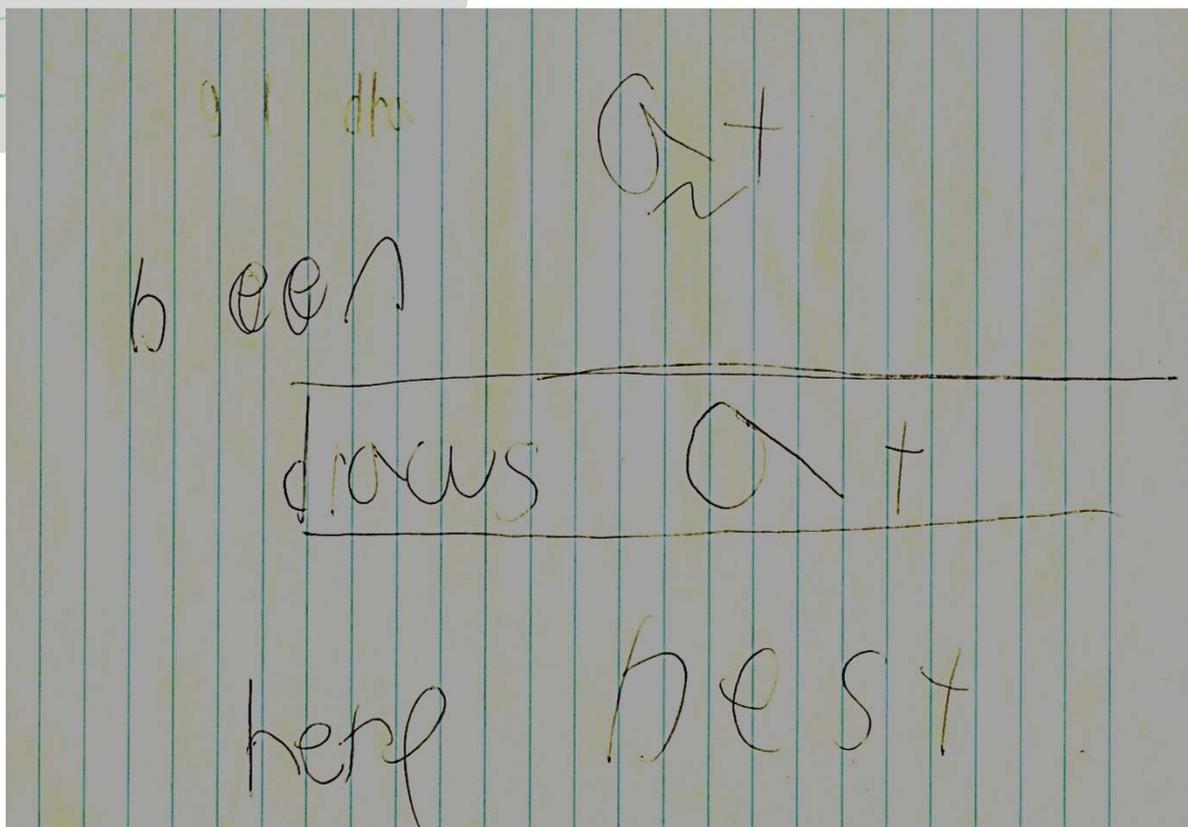
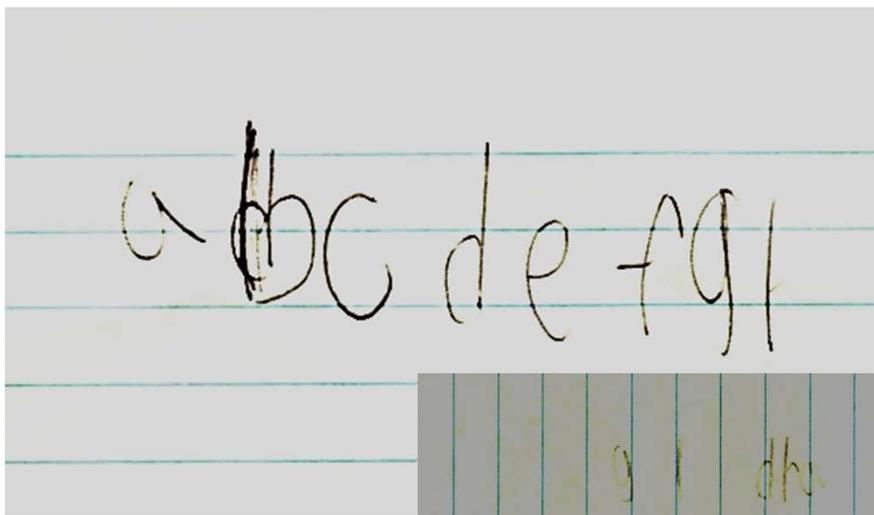
49

n	l	k	t	q	f	i	o	j	e	x	n
x	s	g	s	r	d	k	l	p	q	w	j
n	c	b	q	d	k	d	e	b	t	j	s
o	l	s	f	d	n	c	r	o	q	r	k
w	a	v	q	w	z	f	d	y	b	i	y
e	x	n	r	q	o	e	d	b	t	q	f
q	w	j	u	e	o	w	y	t	a	r	d
t	i	s	k	p	q	i	s	i	q	d	k
q	d	o	s	y	j	u	e	o	w	y	t
b	b	p	m	v	c	k	p	q	i	s	i
k	z	x	b	m	c	o	l	s	q	r	k
z	u	l	c	q	e	w	a	v	b	j	y

# Session 1 February 18 Alphabet Writing



## Session 2 February 25 Alphabet Writing





# Session 4 March 11 Alphabet Writing and Copying Words

a b c d e f g h i j k l m n o p  
q r s t u v w x y z 32 sec

---

about and  
about and  
about and  
~~about and~~  
about and  
about and

a b c d e f g h i j k l m n o p  
q r s t u v w x y z

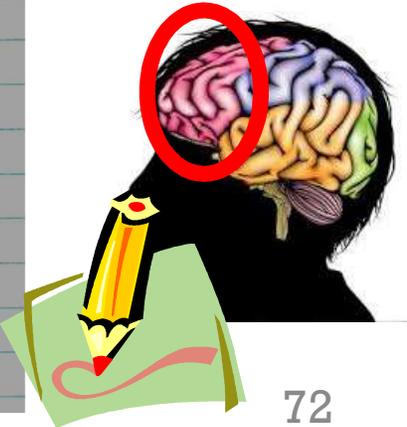
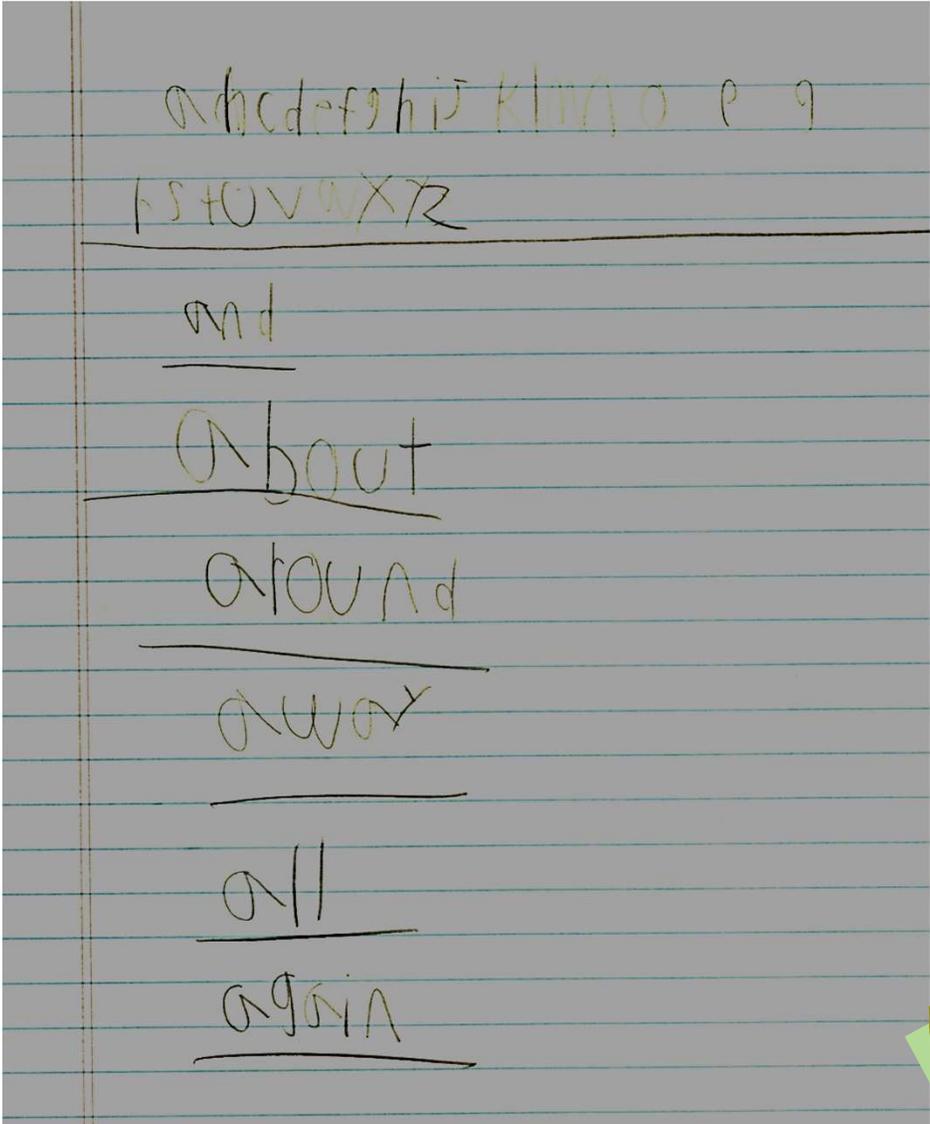
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and

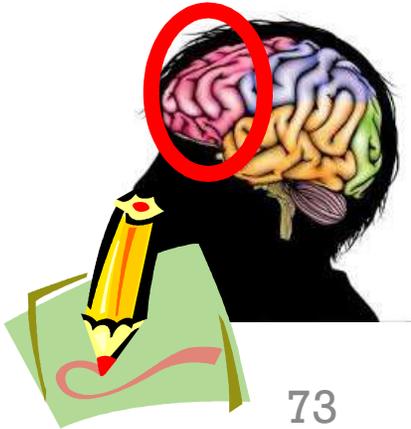
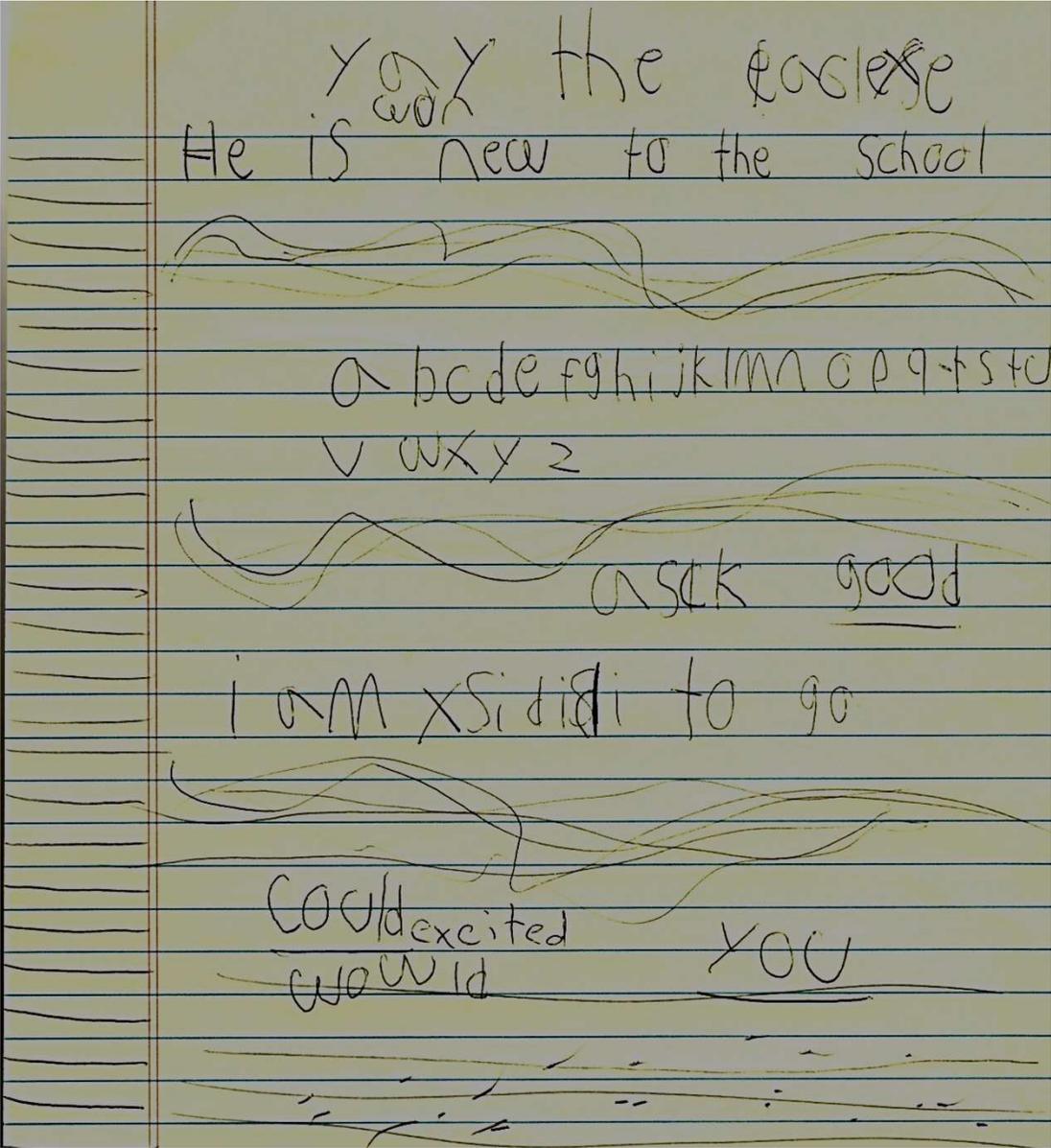
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about

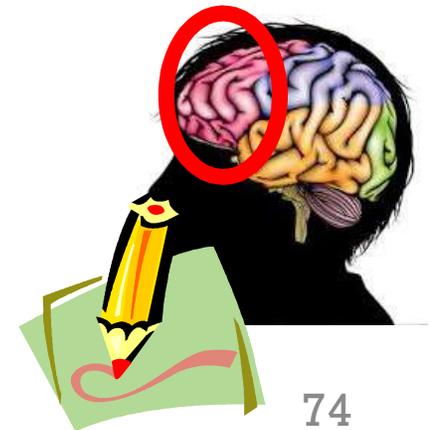
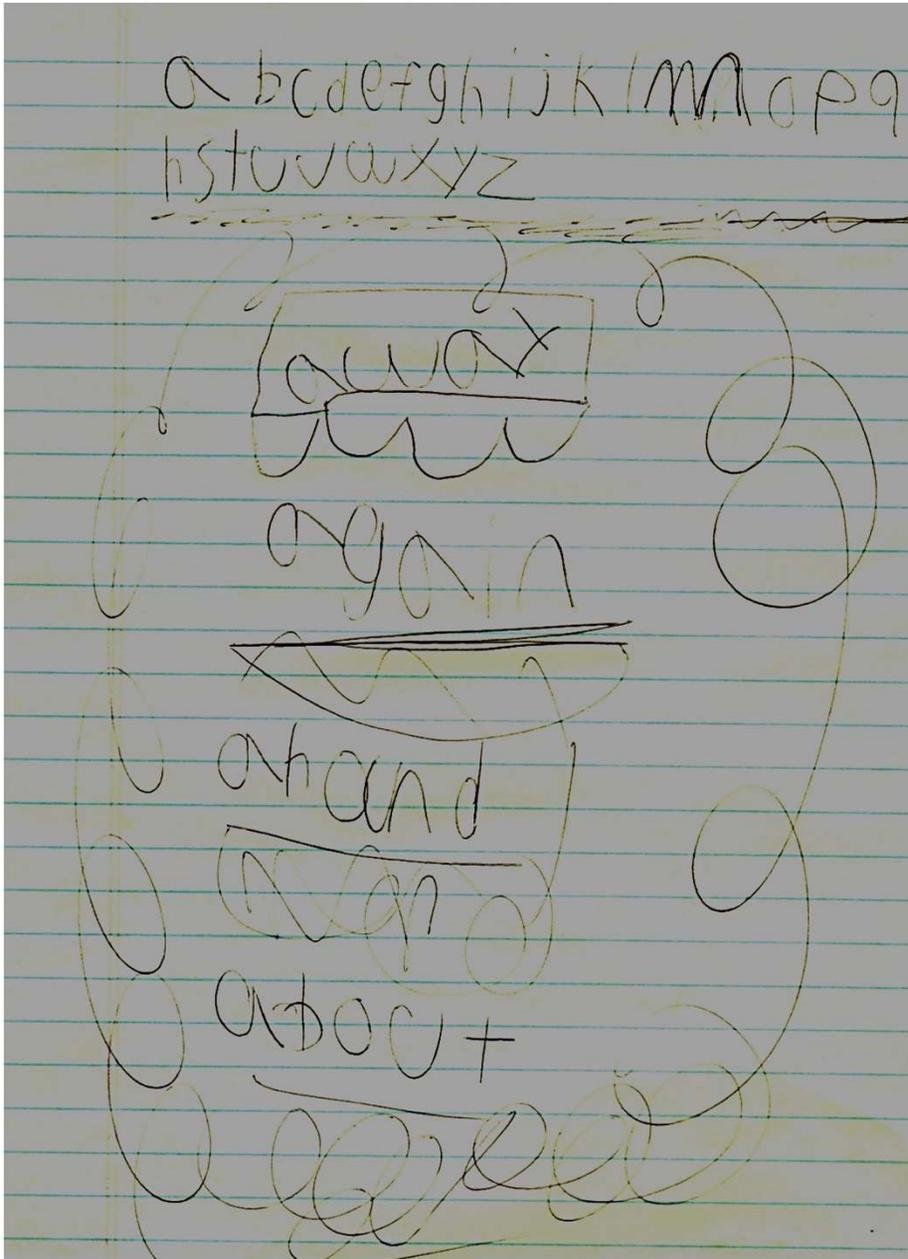
# Session 5 March 13 Alphabet Writing and Copying Words



# Session 6 March 19 Alphabet Writing and Copying Words



# Session 7 March 21 Alphabet Writing and Copying Words







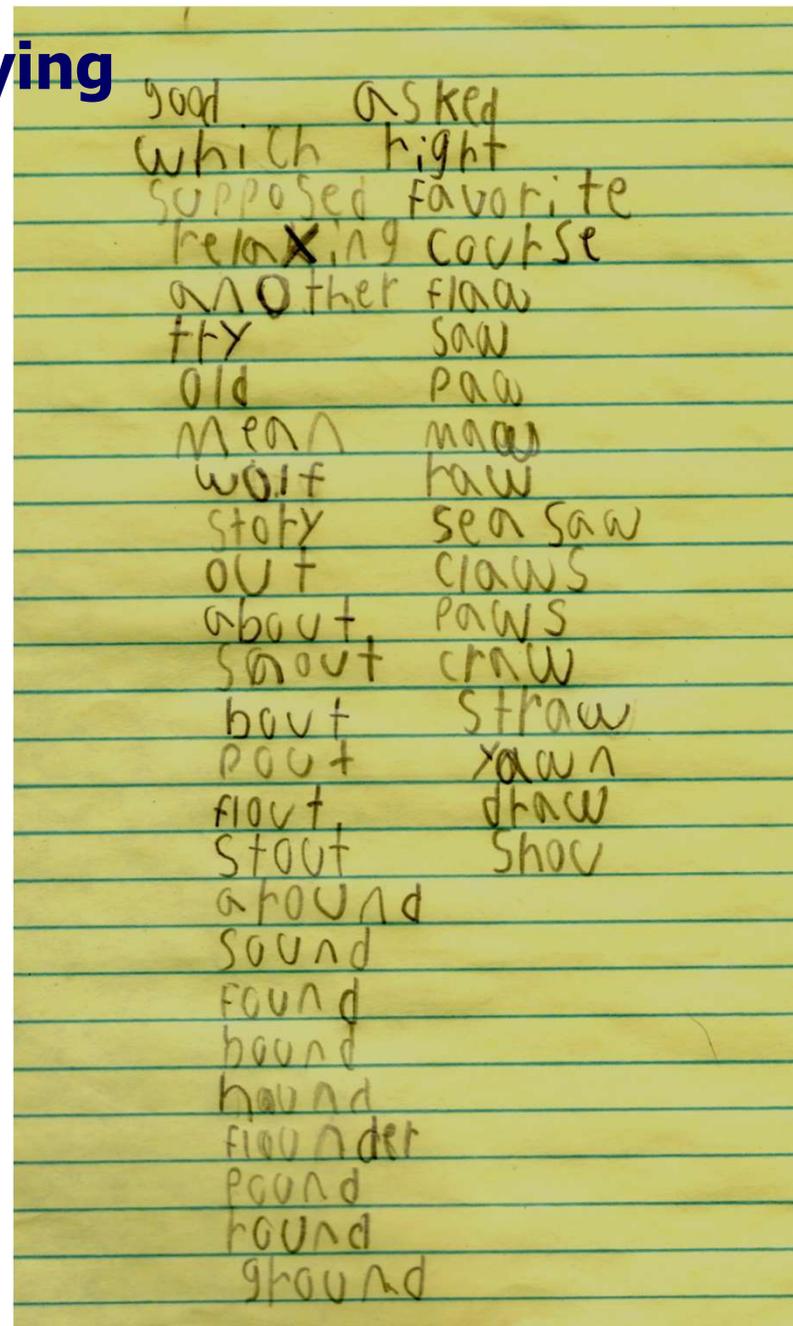
# Feedback from School

G.'s teachers notice improvements in reading and writing and offer G. more praise for his efforts.

Their praise motivates G. to do more during our sessions.

## Session 10 April 8 Self-directed word copying

At the beginning of session 10, G. announces that he is going to copy all the words from the previous session - and write them between the lines!



Date: April 9, 2019

Subject: Re: George

Hey S-----,

I sent home the book in George's reading bag today. Also, I was thinking about George working with Dr. George and was wondering if Dr. George would be ok with me maybe coming to observe him while he works with George. I would love to see the kind of strategies he is using with George to see if it would be something I could apply with him here at school.

Thanks so much,

K--

# Session 11 April 10 Spelling Words by Pattern

ing ear 4/10/19 (4)

Sing  
king  
sting  
fling  
bling  
ping  
ding  
ming  
cling  
ring  
wing  
bing

OU

loud found  
pound  
mouth sound  
mound found  
count snout  
pound

5" x 7"  
Paper

4/10/19 (5)

dge ledge badge bridge nudge budge hedge idge hidge	ing sing ring sting fling bling ping ding ming cling wing bing	OU loud mouth mound found pound sound found snout pout
---	---	---

↓

the boys are playing  
in the park.

---

it was nice out  
side.

ark park mark bark lark	ark
-------------------------------------	-----

# Session 12 April 24 Spelling Words by Pattern

4/24/19

①

ew	X
new	mix
blew	fix
chew	fox
grew	box
dew	six
crew	
brew	

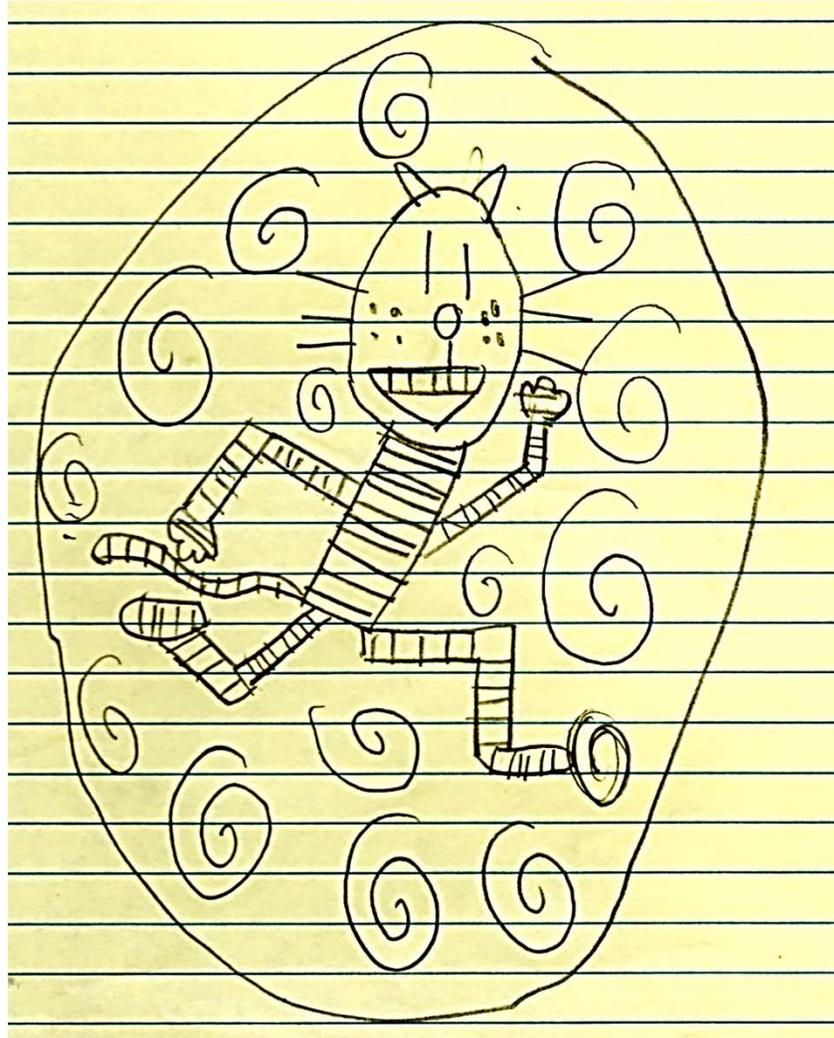
Handwritten notes on a separate sheet of lined paper, including a large 'X' at the top and the words 'mix', 'fox', 'box', 'six' written vertically in a column. There are also some faint horizontal lines and a large circle drawn around the bottom half of the page.

Handwritten notes on a sheet of lined paper, organized into columns and rows. The top section lists words with their corresponding patterns: 'hook', 'look', 'took', 'book', 'hook', 'good', 'stood', 'foot', 'cook', 'room', 'pool', 'wool', 'brook', 'took', 'hook', 'took', 'hook'.

ou	ear	ew	X
out	near	new	mix
loud	tear	blew	fix
round	fear	chew	fox
found	dear	flew	box
sound	tear	grew	six
mount	tear	dew	ax
south	tear	stew	tax
shout	clear	chew	box
ground	hear	brew	sax
bound	spear	few	max
around	spear	few	pix
found	year	few	tex
sought	year	screw	tex
about	year		

# Session 13 April 29 NOT Spelling Words by Pattern!

**G. Decides to take a well-deserved creative break from reading and writing.**



# Session 14 May 2 Spelling Words by Pattern

5/2/19

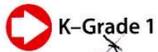
**G. Announces that he is going to fill the entire page with words he spells (so don't try to stop me).**

The image shows a handwritten list of words on lined paper, organized by pattern. The words are written in a grid-like fashion. Three red arrows point to the words 'Wick', 'Suck', and 'Block'. On the right side of the page, there are three large spiral drawings, with a red arrow pointing to the top one. The words are as follows:

rack	Wick	CK	ai	igh	ou
duck	Wick	duck	train	high	bout
pack	suck	UCK	chain	light	loud
tick	trick	rock	faint	right	poor
Jack	block	Sack	pail	Slight	wound
clock	stock	Shock	foal	Sigh	out
crook	smock	dock	sail	fight	loud
lift	lint	Sick	trail	might	out
hint	Sift	tack	vain	bright	foul
Fist	left	lack	Paint	Night	Saw
low	row	sock	Sail	Sight	duck
to w	bow	Pick	gain	blight	bow
mow	glow	tick	gain	right	cloud
me	no	back	chain	higher	round
go	so	lock	chain	right	South
pro	be	mock	rain	lighter	round
we	he	deck	raid	fighting	could
by	my	lick	maid	brighter	would
shy	sky	peck	stain	fighter	bound
fix	chx	Sack	hair		spot
Sly	dy	duck	trait	mate	sound
fly	plx	hack	dit	rip	rent
play	max	duck	pair	and	last
sax	day	JACK	fair	lamp	sent
bay	gray	neck	chair	Sand	limp
Sly	Slay	Shack	braid	ben	Husk
try	tray	MUCK	faith	Storm	P

# November 2018

## Alphabet Writing



Handwritten practice on lined paper showing the letters A through Z. The letters are written in a cursive style with arrows indicating stroke direction. Some letters have 'x' marks above them, possibly indicating corrections or specific features. The letters are arranged in four rows: Row 1: A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q; Row 2: R, S, T, U, V, W, X, Y, Z; Row 3: A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z; Row 4: R, S, T, U, V, W, X, Y, Z.

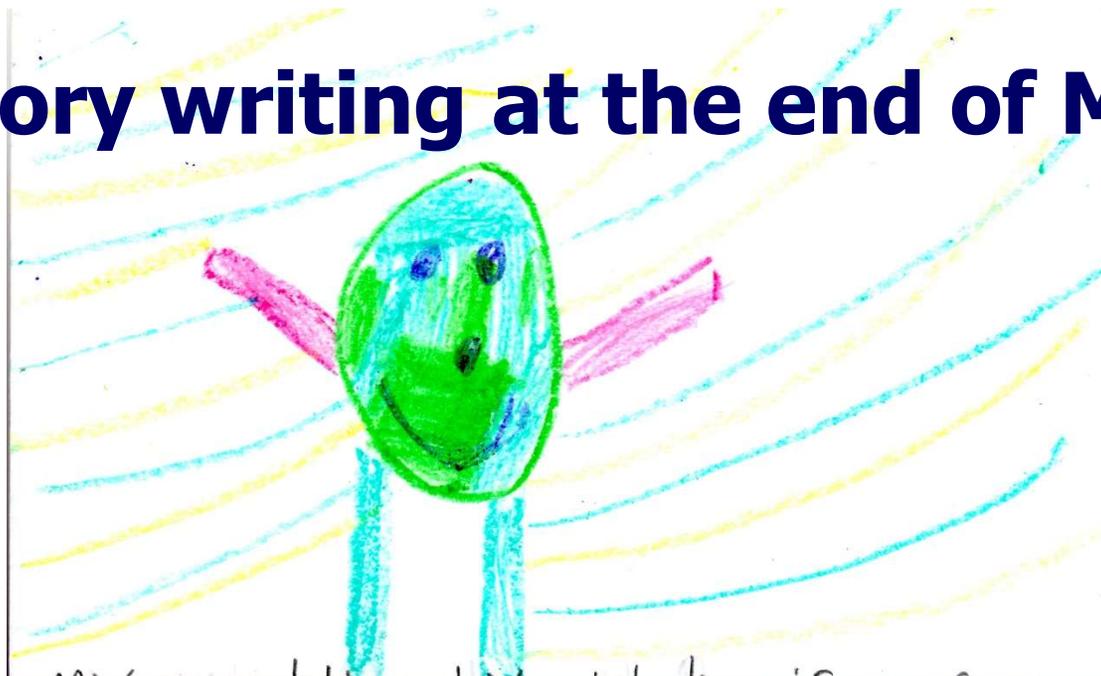
# May 2019

5/2/19

rack	nick	ck	ai	igh	ou
puck	wick	duck	train	high	bou-
pack	suck	luck	chain	light	lou
hick	tock	rock	faint	right	poat
jack	block	sack	pail	slight	woun
flock	stock	shock	fall	sign	out
crook	smock	dock	sail	fight	lout
lift	lint	sick	tail	might	out
hint	sift	tack	vain	bright	foul
fist	left	lack	paint	right	sour
low	row	sock	sail	sight	duck
tow	bow	pick	gain	blight	bowse
mow	glow	tick	grain	tight	cloud
me	no	back	brain	higher	found
go	so	lock	chain	priest	south
pro	be	mock	rain	lighter	found
we	he	deck	raid	fighting	could
by	my	lick	maid	brighter	would
shy	sky	peck	stain	tighter	bound
fix	chix	sack	hail		shoot
sly	diy	buck	trait	made	sound
fly	pix	hack	ait	rip	rent
play	max	dock	pair	and	last
sax	day	jack	fork	lamp	sent
bay	gray	neck	chair	sand	limp
sly	slay	shack	braid	ben	hens
trix	tray	muck	faith	stamp	

Handwritten practice on lined paper showing a list of words and their corresponding phonics. The words are arranged in a grid-like format. To the right of the grid, there are three large, hand-drawn circles, each containing a spiral pattern. The page number 84 is written in the bottom right corner.

# G's story writing at the end of May



MY earth day chiter is a good  
littl chiter it likes to Play  
evhe day it si fune and  
Swete but it dos not like  
wen a nuther chiter tushis  
him



# G's story writing at the end of May



My eerth day chiter is a good  
earth critter  
littl chiter it likes to play  
little critter  
evhe day it si funne and  
every is fun  
Swete but it dos not like  
sweet does  
wen a nuther chiter tushis  
when him another critter touches



# G's story writing at the end of May



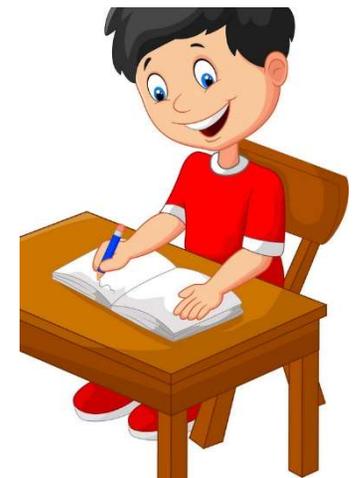
My earth day chitter is a good

little chitter. It likes to play

every day. It's fun and sweet,

but he does not like when another

chitter touches him.



# G's Assessment

## Above Average to Superior Range

- Reasoning with Language and Language Abilities –
- Immediate and Working Memory
- Retrieval from Long-Term Storage
- Phonological Processing
- Nonsense Word Decoding
- Reading Comprehension



# G's Assessment

## Below Average to Extremely Low Range

- **Orthographic Processing**  
(recognizing of letters and words)
- **Orthographic Retrieval**  
(retrieving visual images of letters and words)
- **Word Reading**
- **Reading Speed**
- **Silent Reading Fluency**



# Observation of Behavior During Testing

- G. could not focus and sustain attention to orthography (letters, numbers and math operation signs) leading to word reading errors and incorrect math calculations.
- G. was unable to sustain attention for more than 10-30 seconds for any task that he perceived to be too difficult to complete successfully.
- G. exhibited hyperactivity when trying to do word and sentence reading fluency tasks.
- Letter reversal errors when reading and when writing due to lack of attention to details.



# Observation of Behavior During Testing

- Overemphasis on speed of handwriting resulting in poor accuracy and legibility of letter formation.
- G. could not sustain effort to accurately produce all the letters of the alphabet.
- Although he copied the words of a sentence at a relatively quick pace, G. could not sustain effort to accurately copy all the words of the sentence.
- G. exhibited hyperactivity during breaks.



# ORIENTING: Building Awareness

- G. was not aware of the difficulties he was having with lack of attention to detail.
- The psychologist worked with G. to help him realize the kinds of errors he was making with his favorite subject – math.
- The psychologist showed G. how he was making similar kinds of errors when reading words and printing letters of the alphabet.
- The psychologist helped G. think about why he would want to get good at reading and writing.



November 2018

# Alphabet Writing

 K-Grade 1

Handwritten alphabet practice on four sets of three-line guides. The letters are written in a cursive style. Red circles highlight specific letters: 'A', 'B', 'C', 'D', 'E', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S', 'T', 'U', 'V', 'W', 'X', 'Y', 'Z'. Some letters have small 'x' marks above them, possibly indicating corrections or specific features. The letters are arranged in rows: Row 1: A, B, C, D, E, G, H, I, J, K, M, N, O, P, Q; Row 2: R, S, T, U, V, W, X, Y, Z; Row 3: A, B, C, D, E, G, H, I, J, K, L, M, N, O, P, Q, R, S; Row 4: T, U, V, W, X, Y, Z.



# ORIENTING: Explanation and Goals

- G. was provided with an explanation of the workers and the supervisors in the brain and the need to strengthen his supervisors so they can take charge and direct his very capable workers.
- G. was told that his time with the psychologist would involve playing a lot of games, especially games that involved timing to see how fast he could complete a task.
- G.'s goal would be to do his best when playing the games.



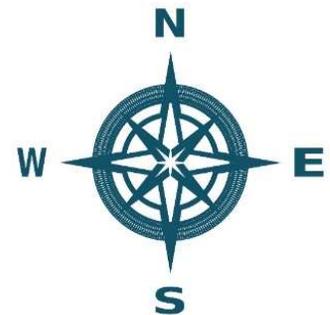
# G's Production Goals: Improve Executive Control

- Focus and sustain attention for any task.
- Inhibit impulsive responding.
- Get started quickly with assignments.
- Modulate his motor responses to reduce hyperactivity
- Engage executive control to respond to external demands without emotional resistance.



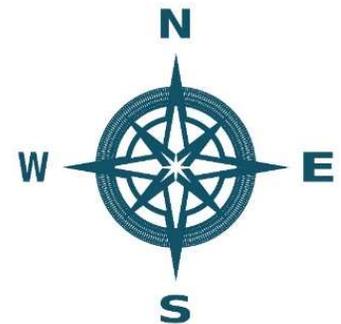
# G.'s Production Goals: Automate Word Reading and Writing Skills

- Quickly and accurately identifying words by sight
- Monitor word reading to identify unfamiliar words
- Stop and decode unfamiliar words.
- Focus and Sustain Attention to the words on the page and construct meaning from the text instead of inferring meaning from previously stored information.



# G's Production Goals: Automate Word Reading and Writing Skills

- Increase accuracy and speed of sight word reading.
- Expand awareness of decoding patterns that can be used to increase word decoding speed and accuracy.
- Automate accurate handwriting of alphabet.
- Improve legible writing and correct spelling of words.



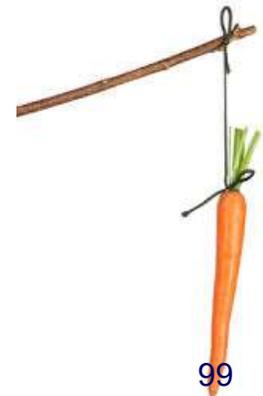
# External Control Strategies used with G.

- **Mediate Production**
  - Psychologist posed questions to G. or talked G. through the steps required to produce correctly formed letters or pointed out letter features that differentiated similar looking letters (b, d, p, q and g; s and z).



# External Control Strategies used with G.

- **Obtain Production with Reward Contingencies**
  - The psychologist consistently stated expectations, then reinforced desired behaviors with attention and engagement and ignored undesired behaviors.
  - Desired behaviors initially were defined as any behavior that demonstrated focused and sustained attention and gradually transitioned to mostly academic task behaviors.



# Bridging Strategies used with G.

- **Aligning External Demands with Internal Desires**
  - Help G. maintain a high level of motivation for academic tasks by using drills that are fun and/or move quickly.
  - Presenting most reading and writing tasks as timed challenges enabled G. to sustain motivation and effort.



# Bridging Strategies used with G.

- **Aligning External Demands with Internal Desires**
  - My willingness to join in fun activities when G. wanted to do so increased our personal bond and increased his motivation to do tasks that I asked him to do.



# Bridging Strategies used with G.

- **Modeling**
  - Psychologist sat in one location and remained stationary despite G.'s frenetic activity; only calm, centered behavior was modeled.
- **Practice & Rehearsal with Feedback**
  - Visual discrimination tasks were practiced until letter recognition speed and accuracy was automated.



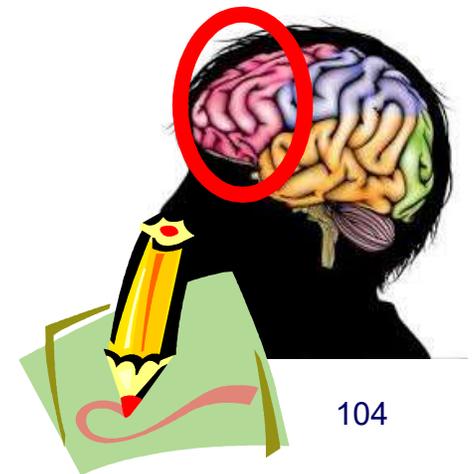
# Interventions Used with G.

- Visual (orthographic) discrimination “game”: Find as many reversed letters as possible within a specific time limit to increase attention to orthography and speed of accurate orthographic processing. Also helped to correct reversal errors in reading and writing.



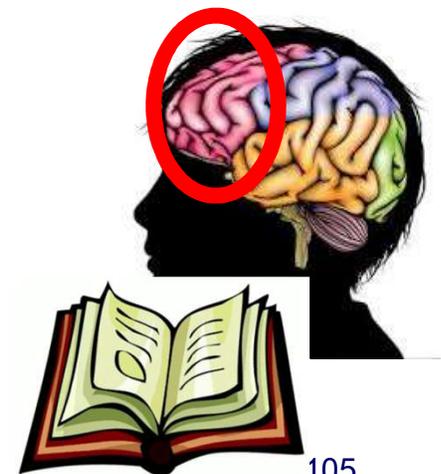
# Writing Intervention Methods

- Writing the alphabet as a timed “game.”
- Writing words as they were spelled to him.
- Writing words based on decoding/spelling patterns chosen by G.
- Spelling words from dictation “game.”



# Reading Intervention Methods

- Playing sight word sentence reading “games” by timing performance to increase speed of sight word recognition.
- Reading books selected by G.
- Providing immediate feedback about the accuracy of word reading efforts.
- Introducing decoding and spelling patterns; G. was allowed to choose the patterns that he wanted to learn.



THE DAY  
**FRANKIE**  
LEFT HIS FRONTAL LOBES AT HOME



Written by Laurie McCloskey & George McCloskey  
Illustrated by Rebecca Doran

Telling a story or reading a story along with students and leading a discussion about “take-aways” from the content.





# Frankie Book Synopsis

What happens when Frankie forgets to put the **frontal lobes** of his brain into his head and tries to make it through his day without them? Spend the day with Frankie as he discovers just how important that part of our brain really is! It all comes to a head when a day that started out pretty bad gets decidedly worse! But help is on the way and Frankie gets a crash course on “frontal lobes” that blows his mind!