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Why Don't My Best (Word) Readers Comprehend Text?

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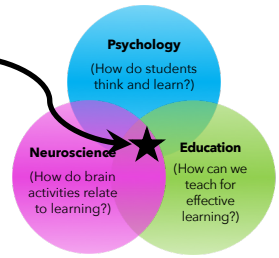
Working at an intersection…

Today, we are here!



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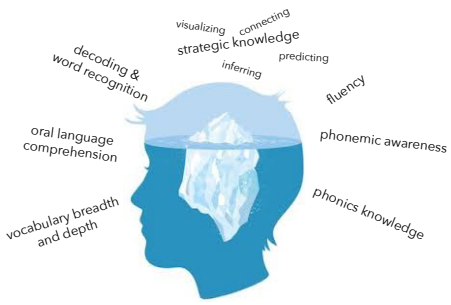
reading is thinking



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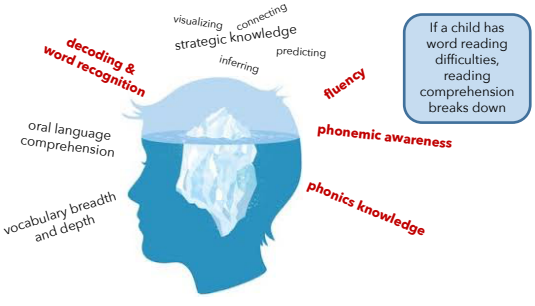
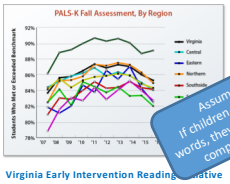


If a child has word reading difficulties, reading comprehension breaks down

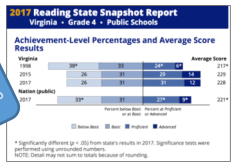
image credit: http://clipart-library.com

word reading doesn't guarantee reading comprehension

Virginia data as an example



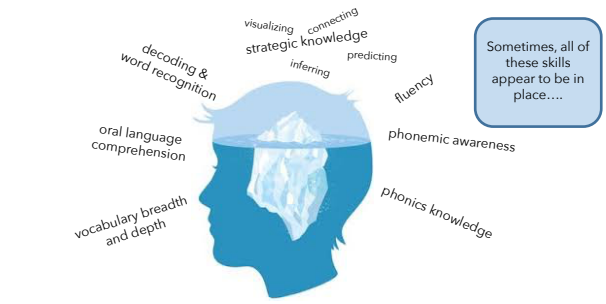
Assumption: if children can read the words, they WILL be able to comprehend texts.



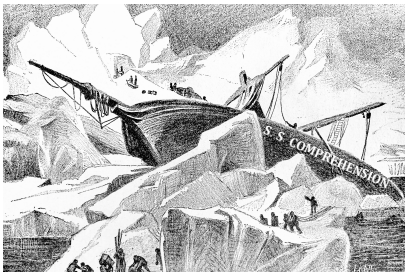
Virginia Early Intervention Reading Initiative
(since 1997) has focused on processes essential to word reading (using the PALS: Phonological Awareness Literacy Screening to identify students who need extra support in grades K-3).

National Assessment of Educational Progress:
almost 60% of Virginia 4th graders cannot comprehend text at a proficient level.

http://vapostforms.virginia.gov/Education_schoolReadiness.cfm



BUT, reading comprehension STILL looks like this for some of our students…



"It seems like one of my students has an issue with memory. Even after just reading the text beautifully, it's like he doesn't remember any of it!"
-- Reading Specialist

"You mean I have to know what it means, too?!"
-- Intervention Student

meaningless reading*
-- Dolch (1960)

"She's my best reader. She just can't comprehend!"
-- Classroom Teacher (Applegate et al., 2009)

*meaningless reading = specific reading comprehension deficits (**RCD**); "poor comprehenders" or "word callers"

Let's think about these students…

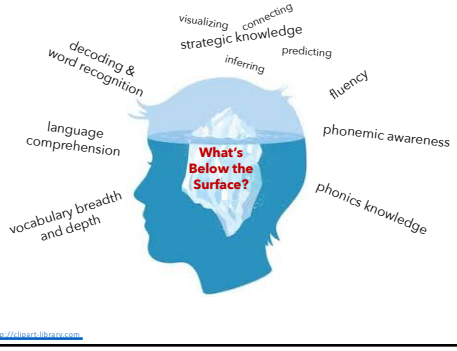
Name	Reading Rate (WCPM)	Word Decoding (Grade Level)	Comprehension (Grade Level)
Benson, Charles	52	2.1	1.3
Carter, Andrew	71	3.5	2.0
Franklin, Megan	73	3.2	3.1
Jones, Sarah	85	4.1	2.4
Lopez, Selma	63	3.1	3.0
Martin, David	91	4.3	4.0

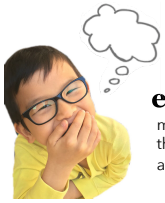
3rd grade students in September; grade-level rate = 71 WCPM
(Hasbrouck & Tindal, 2006)

How Many?

- Applegate, Applegate, & Modla (2009)
  Teacher-identified fluent readers; 34% were struggling comprehenders
- Torppa & Colleagues (2007)
  Finnish 1st & 2nd graders at risk for reading difficulties; 22% were poor comprehenders
- Catts, Hogan, & Fey (2003)
  183 poor comprehenders; 28.8% were good decoders
- Riddle Buly & Valencia (2002)
  108 children, failed state reading assessment; 33% poor comprehenders
- Shankweiler & colleagues (1999)
  Across 3 studies of struggling readers: 28% poor comprehenders

Students with reading comprehension deficits (RCD) comprise almost a third of struggling readers!





executive function skills

mental skills we use to manage our thoughts, feelings, & behaviors to achieve goals

IN READING: a critical set of mental skills that enable the management of reading processes toward the end goal of reading comprehension

Our plan for the morning…

- What are executive function skills?
- Why are they important?
- How do they support effective reading?

What are executive function skills?

Coming to terms….

- executive skills
- executive functions
- executive functioning skills
- executive control
- executive control processes

What are executive skills*?

mental skills we use to manage our thoughts, feelings, & behaviors to achieve goals

central to self-regulation!

*Umbrella term: includes many skills, core (or basic) & more complex

Umbrella term…

https://keystoliteracy.com/blog/executive-skills-and-reading-comprehension/

that includes many skills involved in regulating thinking, feeling, and behavior

3 Core (or Basic) Executive Functions*

working memory
- 2 parts: storage & processing
- e.g., remembering directions while carrying them out, holding text meaning in mind while using decoding strategies as you read through a text

cognitive flexibility (shifting, switching)
- switching between ideas or activities; revising goals/plans; shifting
- e.g., transitioning from math to circle time, juggling words' sounds & meaning

inhibition (self control or inhibitory control)
- resisting impulses, controlling behavior, ability to STOP and THINK
- e.g., waiting turn, using words instead of grabbing, ignoring irrelevant word meanings or details, ignoring distractors in the environment while reading

*underlie more complex executive skills like planning, organization, & monitoring

Why are executive skills important?

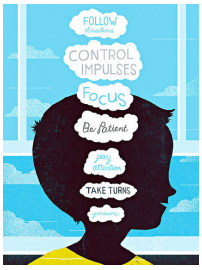


illustration by Christopher Silas Neal for *Parents Magazine*: http://www.parents.com/toddlers-preschoolers/development/executivefunction-skills

- behavior problems and reading difficulties occur together (comorbid) and are both associated with difficulties in executive functioning (Morgan, Farkas, Tufts, & Sperling, 2008)
- children with EF deficits exhibit behavior and reading problems (Pimperton & Nation, 2014)

Preschool executive functions predict…

Growth in emergent literacy, vocabulary, and math across Pre-K (McClelland et al., 2007)

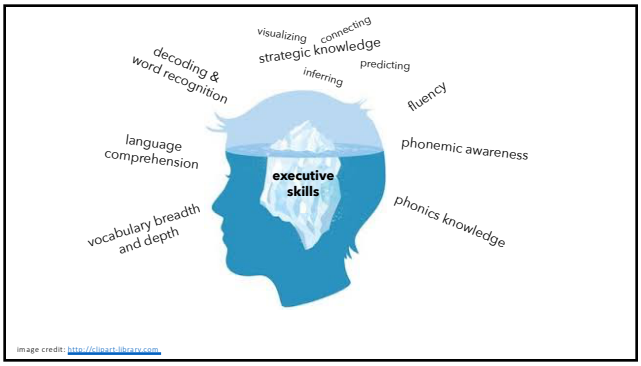
Kindergarten literacy and math skills (Blair & Razza, 2007)

3rd grade reading comprehension (Guajardo & Cartwright, 2016)

Math & reading achievement at age 21 (McClelland et al., 2013)

College completion by age 25 (McClelland et al., 2013)

LIFESPAN ACADEMIC SUCCESS!



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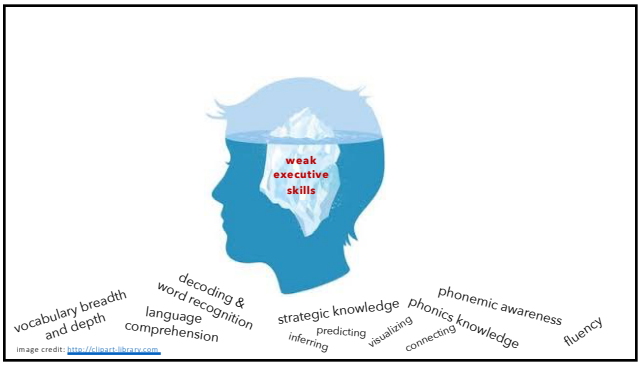

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Specific executive skills underlie successful reading comprehension…

planning & organization (Cutting, Materek, Cole, Levine, & Mahone, 2009; Locascio, Mahone, Eason, & Cutting, 2010)

working memory (Borella, et al., 2010; Cain, 2006;; Carretti, Cornoldi, De Beni, & Romanó, 2005; De Beni, Palladino, Pazzaglia, & Cornoldi, 1998; Oakhill, Hartt, & Samols, 2005)

cognitive flexibility (Cartwright, Bock et al., 2017; Cartwright, Coppage et al., 2017; Colé et al., 2014; Søndergaard Knudsen et al., 2018)

inhibition (Borella, Carretti, & Pelegrina, 2010; Cain, 2006; Locascio, et al., 2010)

social understanding (Brown, Oram-Cardy, & Johnson, 2013; Cartwright et al., 2017; Guajardo & Cartwright, 2016; **see Zelazo & Carlson, 2012, for a discussion of hot EF skills**)

What about word reading?

EF skills are more likely to underlie RCD than WRD (Sesma, Mahone, Levine, Eason, & Cutting, 2009)

BUT, executive functions are related to aspects of word reading

- phonological awareness: cognitive flexibility (Farrar & Ashwell, 2008, 2012)
- phonemic awareness & letter knowledge: inhibition (Blair & Razza, 2007)
- word identification & fluency: cognitive flexibility (Cartwright, Marshall, Huemer, & Payne, 2019)
- shifting among orthographic, semantic, syntactic, & phonological aspects of words: cognitive flexibility; Perfetti's lexical quality hypothesis (Clay, 2001; Gaskins 2008, 2011; Perfetti, 2007, LQH)

How do executive function skills support successful reading?

Introducing the executive skills…

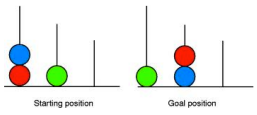
4 points for each:

- definition
- assessment example
- everyday examples, such as in familiar games
- applications to reading

1. Planning (& Organization)

(ability to implement multi-step tasks, in proper order, to reach a goal)

- Tower of London task: arrange balls or disks on pegs to match a goal (count number of moves, errors, speed)



How many moves would it take you to get these colored balls from the starting position to the goal position, moving only ONE ball at a time?

- Games that require planning: Jenga, Chess, Checkers
- Games that require organization: 20 questions, Apples to Apples

Planning and Reading

- Draws on many things we know good readers do
- Involves goal-setting and teaching students steps they can take to reach their reading goal for a particular text

My Plan to Understand

Good readers are good planners: Know why they are reading and make a plan to get there

My Plan to Understand

First, set a goal: _____ *discuss w/students

THEN ask yourself these questions

- **Preview:** Looking through the book, what do I see to help me get there?
- **Focus:** Should I pay more attention to some parts and slow down for others?
- **Connect:** What do I already know about this topic that will help me reach the goal?
- **Question:** What goal-related question(s) can I ask myself?
- **Predict:** What do I guess will be in this book?
- What other steps can I take to reach my goal?
- What will I know when I'm done?

2. Organization

(Ability to recognize order, impose order, or create systems to manage information or objects)

How many sentences can you make with these words?

book fun a good reading is

Similarly, with words….

How many words can you make with these letters?

W B L O E

teaching word study involves teaching sound and spelling patterns – how letters & sounds are organized to create words

Organization and Reading

Recognition of organization already in words and texts
- spelling patterns (letter/sound organization)
- syntax (word order)
- text structure (narrative or various informational structures)

Ability to USE a word's organization to decode it; or a text's organization to remember what's in it

Ability to apply one's own knowledge of organization to words and texts (requires explicit knowledge of organization as a tool)

Good readers are organized thinkers: They know how words, stories, and books are put together and use what they know to help them remember what they read

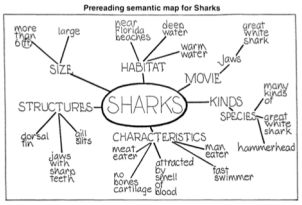
Some Types of Organization

- Internal structure of words (phonemic structure, spelling patterns)
- Conceptual organization (world knowledge)
- Language organization (syntax)
- Narrative Organization (causal organization / story structure)
- Various Organization Types for Informational Text

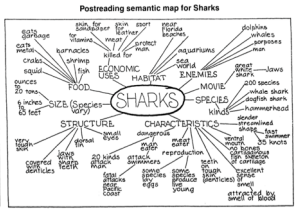
Concept Maps (Semantic Maps): knowledge organization

- Pre- and Post-reading Assessment (Johnson et al., 1982)

Prereading semantic map for Sharks



Postreading semantic map for Sharks



Language Organization: Scrambled Sentences

Syntax: the way language is organized to make

Example:

quickly backyard dog the she

You can do the same thing with word anagrams, teaching students to use & recognize spelling patterns

You can assess this ability. Children with reading comprehension deficits (RCD) are significantly lower on this skill.

Guo et al., 2009; Nation & Snowling, 2000; Shiotsu & Weir, 2007)

Supporting Language Organization: Word Grouping Activity (Weaver, 1979)

quickly backyard dog the she in brushed the

First: Which word is the action word?

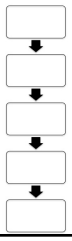
Next: Group the rest of the words by answering these questions

- Who did it? (The answer to this question usually goes before the action word.)
- How did they do it? (The answer to this question usually goes right before the action word)
- To whom or what did they do it? (The answer to this usually goes after the action word.)
- Where did they do it? (The answer to this usually goes at the end of the sentence.)

Narrative Organization: Causal Connections in Stories

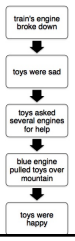
(van den Broek, 1989; Walker, Gopnik, & Ganea, 2014; Wolman, van den Broek, & Lorch, 1997)

In narratives, events are connected because of cause/effect



Think about The Little Engine that Could:

How are events causally connected?



Children with RCD struggle with understanding cause and effect in stories:

their retellings are like a string of unrelated events!

Narrative Organization: Causal Connections in Stories

Story sequencing (putting pictures in correct order) with verbal explanation for WHY they are connected – keep track of their use of connecting words.

Children with RCD use few connecting words in comparison to peers with better comprehension

Connecting Words:

Independence Between Ideas: and, additionally, now, as well, also, in addition…

Dependence (Connection) Between Ideas: if, but, because, so, so that, in order to, however, in contrast, or else, instead of…

Time Sequence: later, first, next, since, and then, when, before, finally…

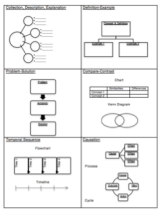
(Cain, 2003; Trabasso et al., 1981)

Informational Text Organization

Must be taught explicitly!

- collection, description, explanation
- definition-example
- problem-solution
- compare-contrast
- temporal sequence
- causation (process or cycle)

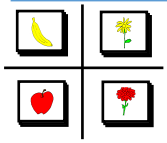
start with one at a time; then, provide multiple texts and have students identify multiple structures (some texts have more than one, too)



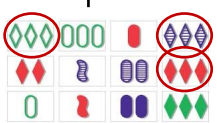
(Reutzel, Read, and Fawson, 2009; Williams, 2003, 2005; Williams et al., 2014)

3. Cognitive Flexibility

(ability to consider multiple bits of info & actively switch between them)



What two ways are these cards sorted?



- Multiple Classification tasks

  sort sets of cards along 2 (or more) dimensions at once; indicates the flexibility with which individuals can consider these dimensions at the same time

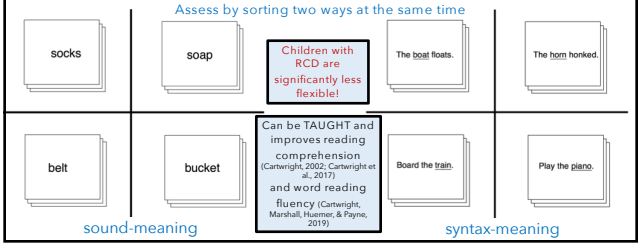
- Games: Set®

- Uno

Cognitive Flexibility and Reading (Cartwright, 2002; Cartwright, Bock et al., 2017; Cartwright, Coppage et al., 2017; Cartwright, Marshall, Dandy & Isaac, 2010)

Good readers are flexible thinkers: They can think about (and do) lots of things at the same time

Assess by sorting two ways at the same time



Supporting Cognitive Flexibility: Multi-feature Questions - sound & meaning

I am thinking of a red food that starts with /b/.

I am thinking of a flower that rhymes with *lazy*.

Tell me a /p/ word that names a kind of food.

4. Working Memory

(storage & processing: ability to hold information in mind while processing/transforming info.)

Let's try a sentence completion task…

Another assessment: the letters backward task

- "I'm going to say some letters, and you repeat them backwards."

Games: "Johnny has a _____ in his pocket" & "The name game"

- Name Ice breaker: Each student says their name and something they like; subsequent students must remember each student, their liked item, AND come up with their own response, adding it to the list
- Pocket Game: Students take turns, add an item each time; alphabetical order; say entire list PLUS their new item on their turn

Working Memory and Reading

- Storage AND Processing
- Constructing and remembering text meaning (storage), while ….
  - Decoding the words in text
  - Processing anaphors (e.g., pronoun references)
  - Encountering new ideas in a text & updating
  - Connecting text with prior knowledge
  - Inferring missing bits by connecting text parts or filling gaps
  - Using strategies to monitor/maintain meaning
  - Keeping goal of reading in mind while reading

Good readers have good memories: They can keep some things in mind while doing other things

Working Memory and Reading: Resolving Anaphors

Sally loves to go the the park with Jane because **she** always pushes **her** very high on the swings.

Authors use **shortcuts** when writing. They **substitute shorter words or phrases for longer bits of text**, and we have to figure out what they mean. Requires holding words in mind so you can connect them to later words.

Jim's mother said **he** couldn't have **a pet** because **he** didn't have time to take care of **one**.

(García-Madruga et al., 2013; Oakhill & Yuill, 1986; Yuill & Oakhill, 1988)

Working Memory and Inferences

It was 8:55, and the school bell rings at 9:00. Andy was pedaling as fast as he could, because he was worried that he might miss his test.

Where was Andy going? (Text-connecting, local coherence inference)

How was Andy getting there? (Gap-filling, global coherence inference)

(Bowyer-Crane & Snowling, 2005; Cain & Oakhill, 1999; Elbro and Buch-Iversen, 2013)

5. Inhibition

(ability to wait, stop and think, and restrain habitual, potent responses; self-control)

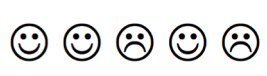
In adults: color word inhibition (Stroop)

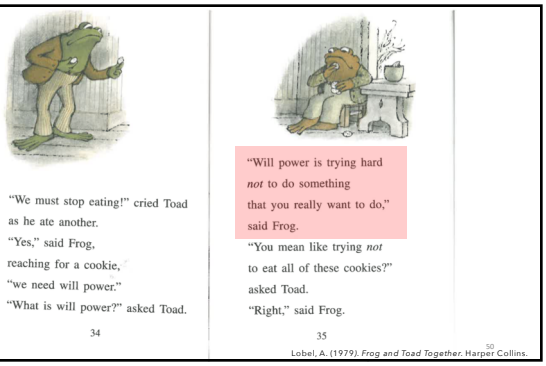
- Name patches of color
- Read color words green red blue red
- Then, name the **ink colors** green blue red red

In children: happy/sad task

- When you see a happy face, say "sad"
- When you see a sad face, say "happy"

Games: Simon Says, Taboo (trying NOT to say a target word)





"We must stop eating!" cried Toad as he ate another.
"Yes," said Frog, reaching for a cookie, "we need will power."
"What is will power?" asked Toad.

34

"Will power is trying hard *not* to do something that you really want to do," said Frog.
"You mean like trying *not* to eat all of these cookies?" asked Toad.
"Right," said Frog.

35

Lobel, A. (1979). *Frog and Toad Together*. Harper Collins.

Inhibition Problems

- Calling up irrelevant word meanings (***jam***: traffic jam or edible jam)
- Trouble ignoring irrelevant details
- Reflexively blurting out "stories" that are marginally related to a text
- Trouble ignoring distractions while reading
- Reflexively blurting out the first word that comes to mind with partial letter-sound information ("bring" for "bridge")

Good readers are good at ignoring (inhibiting) things that are not important to understanding

Inhibition: Polysemy and Academic Language

- Poly = many; semy = meanings
- Sometimes we expect students to learn (or know) academic meanings for words that also have everyday meanings

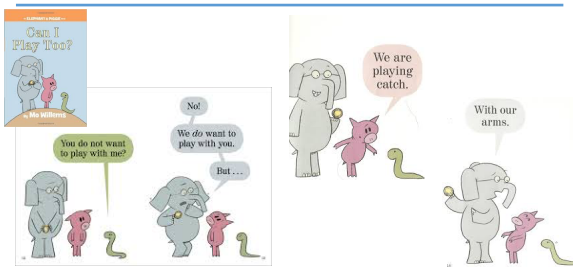
readers (and listeners) must inhibit the common meaning and pay attention to the more specialized academic meaning!

"sentence" in language arts vs. math class
"some" (part) vs. "sum" (total)

52

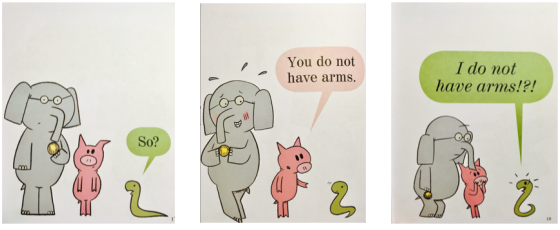
6. Social Understanding

(understanding internal mental states: thoughts, feelings, intentions, beliefs, desires…)



Social Understanding

(understanding internal mental states: thoughts, feelings, intentions, beliefs, desires…)



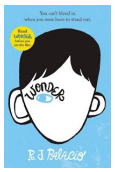
Social Understanding and Reading

(Carnine, Stevens, Clements, & Kameenui,1982; Guajardo & Cartwright, 2016; Lysaker & Miller, 2002)

- Required to understand WHY characters do what they do
- Supports **social inference-making** – essential for narrative texts and social informational texts (e.g. history and social studies)
- Supports understanding of author's purpose
- Reciprocal: Adults who read more fiction have better social understanding! (Kidd & Castano, 2013)

Good readers are good "mind readers": Can think about characters' thoughts and feelings

Social Understanding: Texts (highlight multiple perspectives)



Pulling it all together…

(Cartwright, 2015)

"Re-vision – the act of looking back, of seeing with fresh eyes, of entering an old text from a new critical direction."

-- Rich (1972, p. 18)

(familiar reading skills in underlined blue font and executive functions in **BOLD blue font**)

Before reading…

Skilled readers **approach the reading task with a plan** to understand the text for a particular purpose. To prepare to understand a text, they preview the text, making connections to their own prior knowledge about the topic of the text, asking themselves questions about what they might encounter in the text, and making predictions about what they expect to discover as they read. They preview the text's structure, because they are aware that knowledge of text structure will help them **organize incoming information** as they read and support their own construction of a model of the text's meaning in **working memory**. Thus, even when **planning** for comprehension before reading begins, skilled readers display remarkable **cognitive flexibility**, shifting between thoughts of their own prior knowledge, asking questions, making predictions, and previewing text structure, all while **maintaining focus** on their primary goal for understanding the text.

During reading…

Skilled readers build a coherent model of text meaning in **working memory.** To do this, they **flexibly juggle multiple kinds of information** as they read, such as letter sound information, information about text and language **organization**, word meanings, and links to prior knowledge, making gap filling inferences when necessary. They check predictions, visualize events, make text-based inferences, and use **social understanding** to make inferences based on characters' internal mental worlds, while continually monitoring understanding and progress toward their **planned goal**, and **updating their mental model of text meaning in working memory**. They draw on **inhibition** to suppress irrelevant information, ignore distractions, and refrain from engaging in behaviors that undermine reading comprehension. They are able to **manage flexibly** all of these processes while they identify, and **hold in working memory,** the most important features of text that will support comprehension and memory for text content.

After reading…

Skilled readers continue to reflect on text content **in working memory,** connecting the new information they have learned to their existing knowledge structures in ways that capitalize on their existing **conceptual organization**, **flexibly shifting and adjusting** their own knowledge structures as necessary in response to the new information gleaned from text. They also draw conclusions about the questions and predictions that guided their **planning** and processing of the text, and they evaluate the extent to which they were successful in implementing their **plan to reach particular comprehension goals**. These post-reading activities necessarily **recruit working memory** as readers reflect on their summary of text information and **flexibly shift between** thinking about their own prior knowledge, predictions, and questions, revising knowledge structures as necessary, and evaluating the extent to which their comprehension goals were met.

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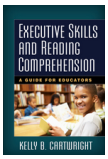

Learn more about executive functions and reading comprehension in this book!

Guilford Press

More Resources – Executive Function 101: https://developingchild.harvard.edu/guide/a-guide-to-executive-function/

Thank you! Questions?

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Learn more about poor comprehenders in this book.