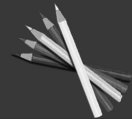# Sequence, Organize, and Plan: Language Processing and Executive Function
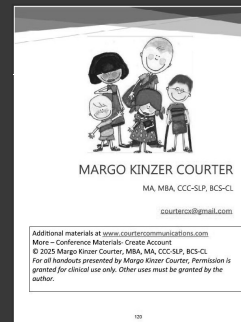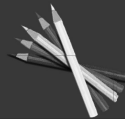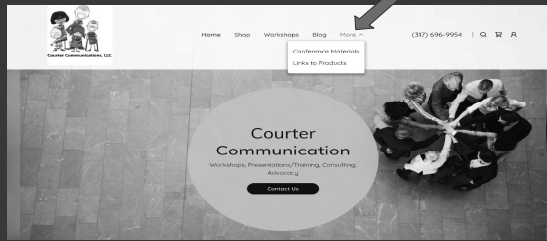
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Learning Outcomes

At the end of this presentation, our goal
is that you will be able to:

1. Better define how executive dysfunction plays a vital role in language processing
2. Define specific executive functions roles in language processing
3. Develop strategies to support EF and LPD

Definition of Language Processing

The top down integration of phonemic, linguistic, and cognitive information at a rapid pace to develop appropriate listening and language skills including higher-order cognitive (language processing speed and executive function), language (perceptual skills, retrieval, morphosyntax, and supralinguistic/metalinguistic skills), or related areas (pragmatic skills impacted by the aforementioned areas).

The Perceptual, Linguistic, and Cognitive Characteristics of Language Processing
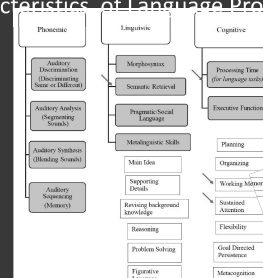
from page 56

Overview of Executive Function (EF)

Executive function (EF) skills are high level cognitive skills that allow one to override immediate needs in order to sustain action toward long term goals. They also allow one to organize behavior over time.

Executive function skills begin developing in very young children (toddler age) and continue to develop into young adulthood.
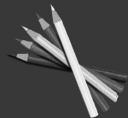
In This Presentation

In this presentation, we will examine e̶x̶... ̶o̶n̶ skills that are necessary for languag̶... ̶ determine strategies to target the̶... language processing perspective

Language Processing

Executive Function

EF from a LP Perspective

Dawson and Guare (2004/2010/2018) provide the following list of executive function skills. These are divided into skills needing for planning and achieving goals and skills needed for guiding behaviors.

Update from Dawson and Guare (2023)

Foundational Skills	Advanced Skills
Response Inhibition (begins developing around 6 months of age) Games: (anyone that develops wait and stop) Red Light Green Light, Mother May I	**Planning and Prioritizing** Strategy: Plan with students instead of for students.
Working Memory Strategy: Pair verbal with visual	**Organization** Strategy: Support students with creating and *maintaining* organization
Emotional Control Strategy: Acknowledge how the student feels	**Time Management** Strategy: Practice time estimation (How long do you think this will take you to complete?)
Flexibility Strategy: Help student find a plan B Resource: Decision Making Guide https://do2learn.com/organizationtools/SocialSkillsToolbox/DecisionMakingGuide.htm	**Goal Directed Persistence** Strategy: Support the student in setting small goals that are obtainable.
Sustained Attention Strategy: How long can you work before you need a break? (Increase the time in small increments)	**Metacognition** Use a situation that has occurred to self monitor and evaluate oneself. Strategy: Encourage self-reflect following success.
Task Initiation Strategy: Have student make a plan with a start time.	
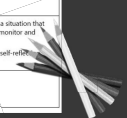
The Research

1. Supporting a student develop executive function skills can help children pause and think through the credibility of the information and inhibit the impulse to trust what they are told right away ((Landry, S. H., Miller-Loncar, C. L., Smith, K. E., & Swank, P. R., 2002

The Research

2. Students learn to make plans, discuss, evaluate ideas, participate in groups, reflect on their work, change their minds, and rewrite their papers" (Singer and Bashir, 1999

3. There is growing evidence that other cognitive functions also are affected in students with specific language impairments, including executive function skills (Im-Bolter, Johnson, & Pascual-Leone, 2006).
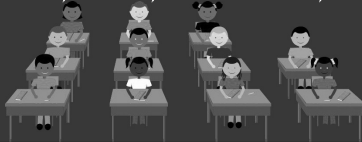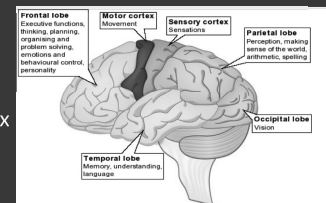
4. Results showed that parent and self-ratings of EF problems in everyday life were significantly higher for adolescents with specific language impairment (SLI) than for peers matched for age, sex, and race. Hughes, Turkstra, and Wulfeck (2008)

5 &6. A diversity of disorders in communication ability can be observed in cases of frontal lobe pathology including metalinguistic skill abnormalities, and verbal reasoning impairments. Complex and conceptual verbal abilities may be significantly impaired (Novoa & Ardila, 1987).

Executive Function

6. Contemporary neuroimaging studies have shown evidence that the prefrontal cortex has a monitoring role in language (Ardillo, 2013).

Frontal lobe
Executive functions, thinking, planning, organising and problem solving, emotions and behavioural control, personality

Motor cortex
Movement

Sensory cortex
Sensations

Parietal lobe
Perception, making sense of the world, arithmetic, spelling

Occipital lobe
Vision

Temporal lobe
Memory, understanding, language

Assessments

• Executive Functions Test Elementary (memory, attention, flexible thinking, shifting) Ages: 7-12

• Behavior Rating Inventory of Executive Function (BRIEF) By Gerard A. Gioia, PhD, Peter K. Isquith, PhD, et al Ages: 5-18

• NEPSY-II by Korkman, D   D. and Kemp, Ph.D. Ages

NEPSY·II
SECOND EDITION

Assessments

• Executive Skills Questionnaire for Students and Executive Skills Questionnaire (in the book, Executive Skills in Children and Adolescents, 3rd Edition Dawson and Guare, 2018)

Parents

https://www.efadvocates.com/wp-content/uploads/2020/08/Executive-Skills-Questionnaire-for-TeachersParents-.pdf

Teens

https://iod.unh.edu/sites/default/files/media/Project_Page_Resources/PBIS/2014PBISConference/a4_executive_skills_questionnaire teen pdf

Assessments

- TAPS 4 (Sentence Memory)
- Michigan Memory Test for Unrelated Sentences (in the Source for Stuttering and Cluttering - ___ ns author: David Daly)

TAPS-4

The Source for Stuttering and Cluttering

David A. Daly
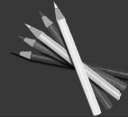
Crosswalk EF and LP: Foundational Skills

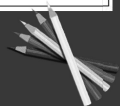| Executive Function Area	Language Processing
Response Inhibition	Delaying a response in order to process through the information in order to respond appropriately.
Working Memory	Holding language into memory to manipulate information and respond. Vital for overall language processing. One must be able to hold the entire message, discussion, lecture into memory to process the message.

Crosswalk EF & LP

Emotional Control	The ability to think about the information being presented, be flexible in understanding the message before an emotional impact is presented.
Flexibility	Ability to determine that there is more than one way to think about the information, processing multiple solutions before responding. Flexibility leads to greater supralinguistic abilities (inferencing, predicting, problem solving) Flexibility in thinking goes hand in hand with metacognition and is also necessary to increase and revise background knowledge.

Sustained Attention	Staying tuned into the listening situation even in language overload situations.
Task Initiation	Initiate a communication task such as a conversation, answering a question, and participate in conversations

---

Advanced Skills

Executive Function Area	Language Processing
Planning & Prioritizing	Goes hand in hand with organizing thoughts. The ability to gather thoughts into cohesive chunks to determine the most essential information and then a plan to respond in an organized manner.
Organizing	Putting thoughts together in a logical sequential manner. Students with lag in language processing speed may have difficulty organizing the language that is coming to them to respond quickly.

| Time Management	Determining duration for planning and organizing ideas and duration for speaking
Goal Directed Persistence	Goes hand and hand with sustained attention. Staying on task even when the language coming in is overwhelming.
Self Monitoring	Ability to stay on track when expressing oneself and make communication repairs as needed

Metacognition	"The Big Picture" The ability to use background knowledge to apply to a new situation. Being able to then use relational reasoning to modify and enhance background knowledge. The ability to analyze a situation and determine what worked and didn't work. The ability to make modification in the future.

Strategies to Support LP and EF
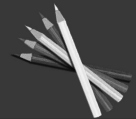
Ways to Assist with Increasing Executive Function: Pre K-2nd

Sequencing boards for activities of daily living

Executive Functions:
- Sustained attention
- Working memory
- Planning
- Organizing
- Time management
- Retelling sequence
- Flexibility in thinking (transitions and background knowledge)

turn water on | get soap | rub hands | rinse hands

turn water off | dry hands | throw away towel | back to the room

(Customboards app by SmartyEars)

Ways to Assist with Increasing Executive Function: Pre K-K

Sequencing boards for classroom activities

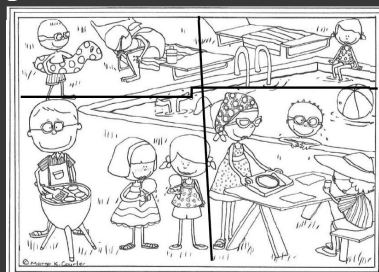arrive in classroom | put backpack in cubby | craft center | story time

Use picture system for transitions between activities and rooms in the building or schedule changes
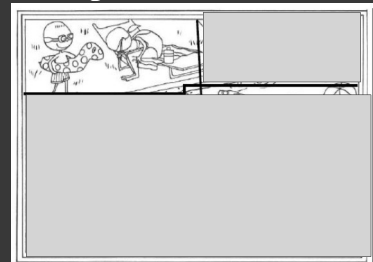
Discussing Pictures in Quadrants
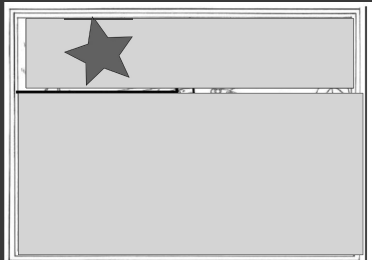
Executive Functions:
- Sustained attention
- Working memory
- Planning
- Organizing
- Retelling sequence in order
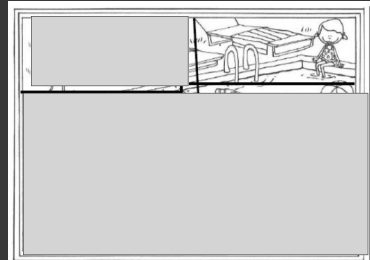- Flexibility in thinking (background knowledge)

Discussing Pictures in Quadrants

Discussing Pictures in Quadrants
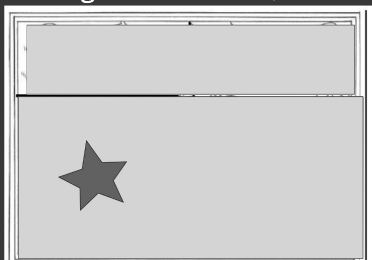

Discussing Pictures in Quadrants

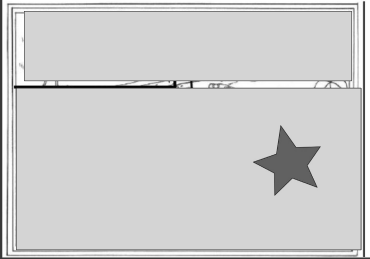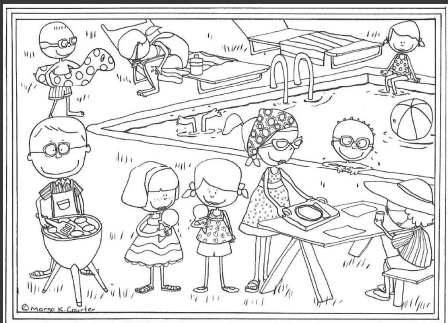Discussing Pictures in Quadrants

Discussing Pictures in Quadrants

Discussing Pictures in Quadrants

Discussing Pictures in Quadrants

Discussing Pictures in Quadrants
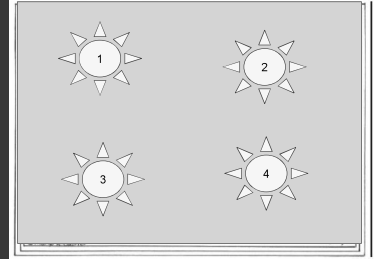

Discussing Pictures in Quadrants

Following Directions Acquisition

Type of Direction	Language Skills Required	Examples	Age Range
Basic 1 Step	Basic syntax and simple Tier I vocabulary	Get your shoes. Bring me your blanket.	Begins around 10 months.
Expand 1 Step	Add negation, contractions, and later developing Tier I vocabulary	Use the bigger ball. Get the blue crayon. Don't touch the stove.	1-2 years

Type of Direction	Language Skills Required	Examples	Age Range
Basic 2 Step (sequential directions)	1 conjunction or additional phrase. Still mostly Tier I vocabulary.	Bring me the apple and the orange. Color the circle blue and the square orange. Bring me the shoes and coat from your room.	2 - 3 year

Type of Direction	Language Skills Required	Examples	Age Range
Basic 3 Step (sequential. quantitative, and spatial))	1 conjunction or additional phrase. Still mostly Tier I vocabulary	Bring me the car, the boat, and the bus. Bring me the car, the boat, and the bus from your room.	3-4 years

Type of Direction	Language Skills Required	Examples	Age Range
Expanded 2 Step (Temporal)		Clean your room before you eat lunch. Get your lunch from your locker before you go to the cafeteria. Check in with your teacher before you come to speech.	3-4 years

Type of Direction	Language Skills Required	Examples	Age Range
Complex (Temporal)	Multiple clauses and later developing syntax. Adds Tier II vocabulary	Before we discuss the situation, tell me what happened and then we will decide what to do. After you pick up your papers and put them in your desk, move to the center of the room. If the circle is red, put your finger on the blue circle before you put your finger on the red square.	4 years and later

Follow Directions

Use a quadrant picture to have the student follow auditory directions after discussing the picture in quadrants.

Executive Functions:
- Sustained attention
- Working memory
- Planning
- Organizing
- Flexibility in thinking

Follow Directions

Use a quadrant picture to have the student follow auditory directions after discussing the picture in quadrants.

Examples using the above picture

1. Find the boy with the floaty. Color his floaty green and red. Color the boy's hair blue. (More complex: Find the boy with the floaty. After you color the floaty green and red, color his hair yellow.)

2. Find the empty lounge chair. Draw a boy sitting on the chair with his legs hanging over the side of the chair.

Answering Questions

Executive Functions:
- Sustained attention
- Working memory
- Planning
- Organizing
- Goal directed persistence

Use the quadrant picture to process questions.

Example using the above picture

1. Why can we see the boy's feet in the pool?

2. Why are the girls eating ice cream before they finish getting lunch ready?

3. How come only one child has a floaty?

Acquisition of Wh- ?

Type of Question	Examples	Age of Acquisition
Where (location/position)	Where is the ball?	1-2 years
What's that?	Objects in the immediate environment	1-2 years
What (do you want)?	What do you need?	1-2 years

Type of Question	Examples	Age of Acquisition
What doing	What is he doing	2-3
Where (location)	Where are you going? Where should I go?	2-3 years
What do	What do you wear on your hands? What do you do if you are cold?	2-3 years
Who	Who is that?	2-3 years

Type of Question	Examples	Age of Acquisition
If What	If you are cold, what do you do?	3-4 years
What (functions)	What are spoons for?	3-4 years
Why (functions)	Why do you have shoes?	3-4 years

Type of Question	Examples	Age of Acquisition
When	When should we go?	4-5 years
How many/much (up to 4 items) (quantity)	How may apples?	4-5 years
How often (temporal)	How often do you read?	4-5 years
How far (distance)	How far to your house?	4-5 years
How (extent)	How happy are you? How wet are you?	4-5 years

Examples

Executive Functions:
- Sustained attention
- Working memory
- Planning
- Organizing
- Goal directed persistence

1. Where is the ball?
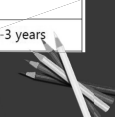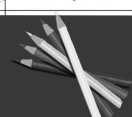2. What's that? (as you point to objects)
3. What is the dad doing?
4. Where are they?
5. Where is the swimming pool?
6. What does dad need to cook the hamburgers?

7. What should they do if the pool is too cold?
8. What should they put on before they are in the sun?
9. Why do we swim in the summer?
10. How often should they go to the park?
11. Why can we see the boy's feet in the pool?
12. Why are the girls eating ice cream before the adults finish getting lunch ready?
13. How come only one child has a floaty?

Retell a Story

A student must be able to sustain attention to a story, have the working memory to hold onto information about the story, process through the story elements, and then plan and organize thoughts to retell the story.

Executive Functions:
- Sustained attention
- Working memory
- Planning
- Organizing
- Time management
- Retelling sequence
- Flexibility in thinking   Goal directed persistence

Steps

1. Begin with a simple book that the student should have some background knowledge about the topic or plot.

2. Preview the story.

3. Ask the student for any background knowledge they have on the topic.

4. Read the story to the student.
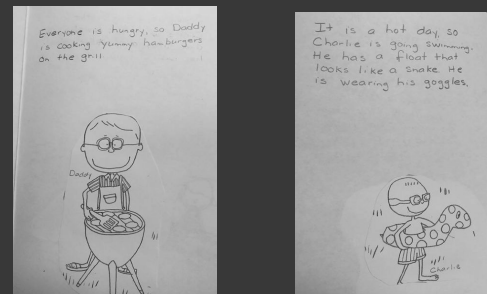

Third Grade through High School
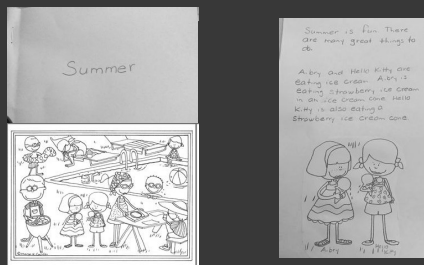
Students make a significant cognitive leap around the mid to end of second grade. This is where students should move from learning to read to reading to learn. Language processing skills should be developing to the point that students can begin thinking critically about information presented and formulating responses that are novel.

3rd Grade through High School

Visual graphic strategies to support planning, organizing, sequencing, working memory, flexibility in thinking, sustained attention, and metacognition skills will be vital for language processing skills.

Examples

Executive Functions:
- Sustained attention
- Working memory
- Planning
- Organizing
- Time management
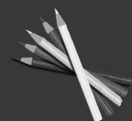- Retelling sequence
- Flexibility in thinking (increasing and revising background knowledge)
- Goal directed persistence

2/3 1/3 Notetaking

Name: _____
Class: _____

I. Main Idea	Comments
A. Detail	Questions
B. Detail	Link to what you know
C. Detail	Vocabulary
II. Main Idea	What you would like to learn more about
A. Detail	
B. Detail	
C. Detail	

2/3   1/3

Compare and Contrast

Executive Functions:
- Sustained attention
- Working memory
- Planning
- Organizing
- Time management
- Retelling similarities and differences in organized fashion
- Flexibility in thinking (transitions and background knowledge)

Compare and Contrast Chart — readwritethink

Item #1   Item #2

How are they alike?

How are they different?

www.ReadWriteThink.org

Organizing and Planning for Written Language Expression

The ability to write in a logical sequential manner requires most of the executive function skills. The student needs to be able to organize, plan, sequence, hold information into working memory and maintain attention to be a successful writer.

Executive Functions:
- Sustained attention
- Working memory
- Planning
- Organizing
- Time management
- Retelling sequence
- Flexibility in thinking (transitions and background knowledge)
- Goal directed persistence
- Metacognition

Web Mindmap

Web Mindmap

John Lewis — Leader/contribution — Leader/Contribution — Ruth Bader Ginsburg

- Explain who
- Why important
- Changes because of their work
- Summarize advances
- Similarities among leaders

Detail 1 — Transition statement to first paragraph in body

Detail 2 — Transition statement to 2nd paragraph in body

Main Idea Sentence 1 or 2 paragraph

background

Detail 4 or conclusion — What is a leader

Detail 3 — Transition statement to third paragraph in body — Martin Luther King Jr.

Transition to conclusion restating some info from the introduction

What makes a person a leader

Why the three leaders were chosen

Thesis statement

Inspiration 9
Comprehend. Create. Communicate. Achieve more.

Ms. Lane's SLP Materials

Inspiration Maps Templates

Start with a built-in template or create your own.

360 THINKING
Cognitive Connections

Math Story Problem

Executive Functions:
- Sustained attention
- Working memory
- Planning
- Organizing
- Retelling sequence
- Flexibility in thinking (transitions and background knowledge)

Solving Math Story Problems

☐ Read and highlight the most important words in each sentence
☐ Link words with numbers

☐ What are you solving for? _____

Strategies for Solving:
- ☐ Act it out
- ☐ Find a pattern
- ☐ Draw a picture/diagram
- ☐ Work backward
- ☐ Make a list, table, or chart
- ☐ Logical reasoning
- ☐ Choose the correct operation
- ☐ Guess and check
- ☐ Write an equation using variables
- ☐ Solve a simpler problem

☐ Solve

☐ Check your answer

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Overall Strategies

1. Use a visual reminder on the student's desk to support sustained attention and goal directed persistence.

2. If the teacher uses complex language, simplify support working memory, sustained attention, planning, organizing, sequencing, and task initiation. (lag of language processing speed, the student needs time to organize thoughts and plan response before the directions are restated.)

3. Write main concepts on board

4. Use of graphic organizers or graphic organizer apps for note taking

5. Use a Mindmap to organize for writing. This can be used for planning as the student is reading a project description.

6. Use pictures, videos, computer generated models

7. Allow students extra time to listen, think, process, plan, organize and form their own thoughts about the written and/or spoken material in the classroom.

8. Encourage the teacher to give the topic up front, then, give directions

9. Preview and Review Constantly -

10. Relate new material to previous lessons and experiences. Use background knowledge that was developed in previous subjects

11. Provide pre-assigned readings, homework, videos, or online explanations before introducing new material and/or topics

12. Provide a short preview, outline, list of new vocabulary, and key points for class discussion and as a guide for parents to help with homework and review for tests.

13. Self Advocacy

a. The student must first understand where he/she has difficulty

b. Student must take ownership of strategies that support his/her executive function skills.

Overall Classroom Strategies

1. Make tasks more explicit
2. Offer choices on how to complete the assignment.
3. Connect the skills to be taught to the individual interest and background knowledge of the student.

4. Scaffold concepts and tasks
5. Provide rubrics to support planning, organizing, time management, and task initiation through the project.
6. Use visual schedules (pictures for younger students, written schedules for older students) to support information given verbally

Key Takeaways

- Language Processing requires higher order language skills which require strong executive functions.

- There is a hierarchy to executive function from foundational skills to advanced skills.
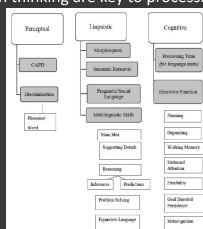
Key Takeaways

- Each stage is needed to support the next.

- Executive function allows a student to pause and think about credibility of information.

Language processing relies on higher-order cognitive skills to support higher order language skills. The ability to plan and organize one's thoughts, sustain attention to language, hold it in working memory, and be flexibility in thinking are key to processing language.