

The Role of Frontal Lobe in Speech and Language Functions

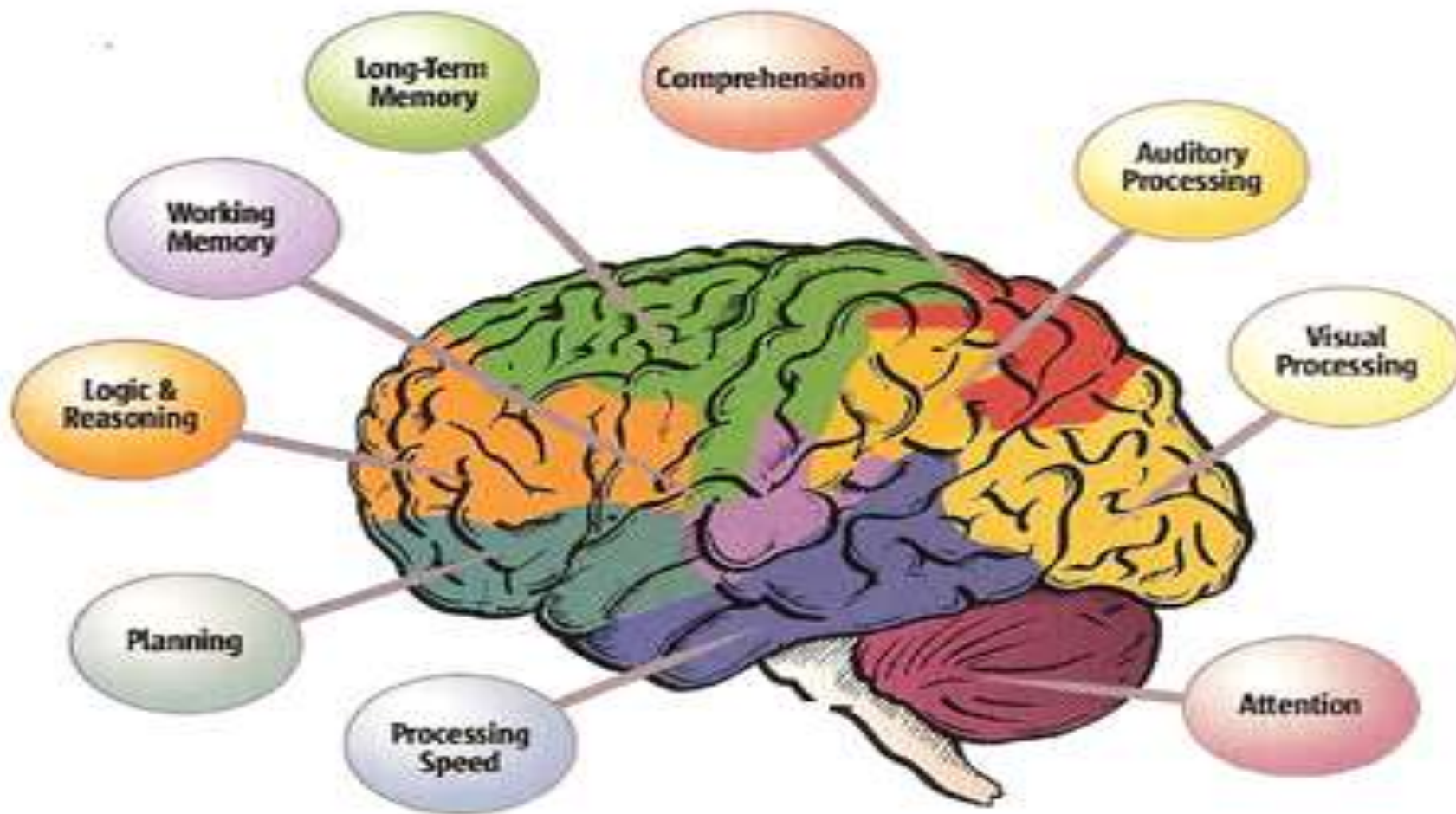
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FRONTAL LOBE AND LANGUAGE

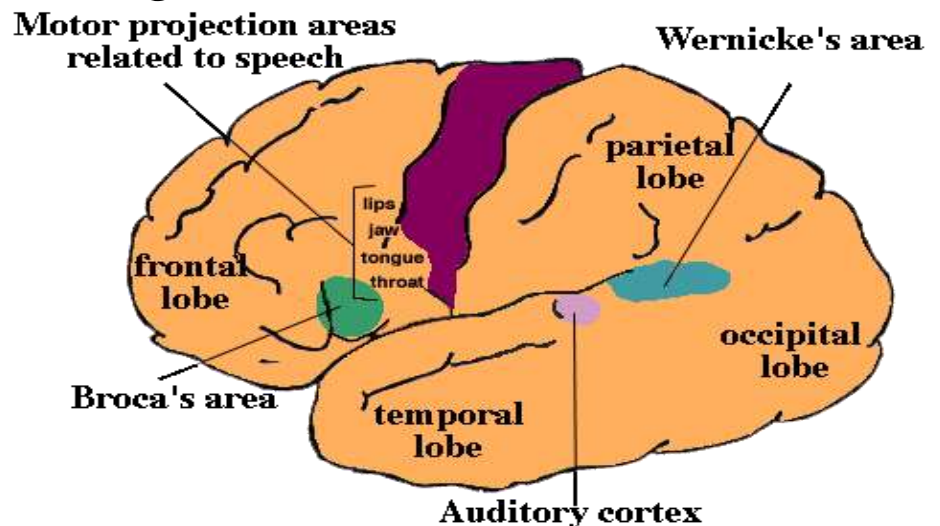


Frontal Lobe Hemispheres

- Left Frontal Lobe Hemisphere controls language related movement
- Right Frontal Lobe Hemisphere is responsible for non-verbal abilities
- However, researchers emphasize that this rule is not absolute and that with many people, both lobes are involved in nearly all behavior

Left Frontal Lobe

- Broca's area
 - Found in the inferior third frontal gyrus in the left hemisphere and is responsible for language production. Helps to:
- Process the sounds making up words (phonemes)
- Produce verbal output
- Activate the motor centers of the tongue and mouth
- Remember verbal material
- Involved in syntax



Frontal Lobes (cont)

- Frontal Lobe is extremely vulnerable to injury due to its location at the front of the cranium and its large size.
- MRI studies have shown that the frontal area is the most common region of injury following mild to moderate traumatic brain injury (Levin et al., 1987).

What Is The Difference Between Damage And Impairment?

- DAMAGE

- Area that was previously normal has sustained some form of injury
 - Car accident

- IMPAIRMENT

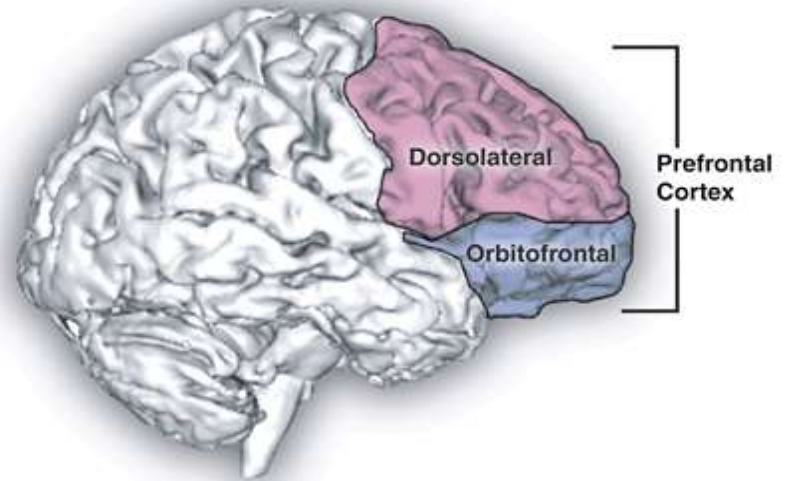
- Subtle organic differences in the brain may not be easily detectable via traditional tests (MRI, PET, SPECT);
- Child may have been born with them
 - Fetal Alcohol Spectrum Disorders, result of maternal drug addiction,

- IMPAIRMENT

- May affect the child's executive functions (and many other areas) as he/she matures

Frontal Lobe and Executive Functions

- Precentral cortex
 - Planning, initiation and control of physical movement
- Prefrontal cortex
 - Executive functions
 - planning, strategy
- Orbitofrontal cortex
 - left hemisphere
 - Verbal memory
 - Right hemisphere
 - Response inhibition, impulse control, and social behavior



Frontal Lobe and Executive Functions (cont)

- Researchers who study executive functions agree that the frontal lobes of the brain play a major role in executive function.
- Executive functions are necessary for goal-directed behavior.
- Include:
 - Ability to initiate and stop actions
 - Monitor and change behavior as needed
 - Plan future behavior when faced with novel tasks and situations
- Executive functions allow us to anticipate outcomes and adapt to changing situations.
- The ability to form concepts and think abstractly are often considered components of executive function.

How Do Executive Functions Affect Learning?

- They allow us to successfully:
- Make plans
- Keep track of time and finish work on time
- Keep track of more than one thing at once
- Meaningfully include past knowledge in discussions
- Evaluate ideas and reflect on our work
- Change our minds and make mid-course corrections while thinking, reading, and writing
- Ask for help or seek more information when needed
- Wait to speak until we're called upon

When Executive Functions Are Impaired

- Cognitive manifestations
 - Inattention
 - Short attention span
 - Poor working memory
 - Poor short term memory
 - Difficulty in planning and reasoning
 - Poor decision making
 - Difficulty processing information

WHEN EXECUTIVE FUNCTIONS ARE IMPAIRED

- Emotional manifestations
 - Poor impulse control
 - Difficulty inhibiting emotions, anger, excitement, sadness
 - Risk of developing mood disorder in late childhood early adolescence
 - Difficulty with perspective taking
 - Low motivation

WHEN EXECUTIVE FUNCTIONS ARE IMPAIRED

- Behavioral manifestations
 - Poor impulse control
 - Overactivity
 - Perseverations (thoughts are stuck) on particular objects/topics/ideas
 - Inappropriateness
 - Aggression
 - Sexual behavior

The child with impaired EXECUTIVE FUNCTIONS may have

- Difficulty with behavior inhibition
 - Interrupts
 - Blurts out things
 - Talks at the wrong time
 - Acts before thinking
- Difficulty focusing/shifting attention
 - Upset by changes in plans
 - Doesn't understand that a problem can be solved in different ways
 - Difficulty getting used to new situations
 - Perseverates on same topic
 - Easily distractible

The child with impaired EXECUTIVE FUNCTIONS may have

- Difficulty with emotional self-control
 - Over -reactive
 - Becomes upset too easily
 - Mood fluctuations
 - Low frustration tolerance
 - Impatience
 - Small events trigger disproportionate reactions

The child with impaired EXECUTIVE FUNCTIONS may have

- difficulty with self-monitoring/self-regulating academic work and/or social behavior
 - doesn't check work for mistakes
 - makes careless errors
 - unaware how own behavior affects others
 - poor understanding of own strengths and weaknesses
 - sloppy work
- difficulty with organization/planning/execution of age-level tasks/activities

The child with impaired EXECUTIVE FUNCTIONS may have

- Difficulty with task initiation
 - Homework, reports, chores
 - Underestimates time needed to complete a task
 - Becomes overwhelmed by large assignments
 - Has trouble reaching set goals
 - Lacks follow through
- Difficulty with organization of materials/personal belongings
 - Messy / unorganized
- Difficulty regulating alertness levels
 - “too wired”
 - “too tired”
 - Gives up easily
 - Difficult to sustain long term effort

Executive Function Deficits are

- Associated with a number of psychiatric and developmental disorders, including:
 - Obsessive-Compulsive disorder
 - Tourette's syndrome
 - Depression,
 - Schizophrenia
 - Attention-deficit/hyperactivity disorder
 - Autistic Spectrum Disorders
- Executive function deficits also appear to play a role in antisocial behavior.

How are executive function deficits treated in the context of speech language therapy?

- It is within the scope of practice for SLP's to work on aspects of executive function deficits from a linguistic standpoint
- Cognitive deficits-
 - We create language goals targeting auditory processing, attention, problem solving and reasoning, as well as memory
- Emotional and Behavioral deficits
 - Social pragmatic therapy addresses aspects of pragmatic behavior
 - Appropriate vs. inappropriate topics
 - Cohesive and concise discourse
 - Social emotional thinking
 - Perspective taking
 - Theory of Mind

Executive function deficits and language therapy (cont)

- In sessions, SLP's also teach students various compensatory strategies to help them manage their difficulties better:
 - Sequencing information to remember steps/directions
 - Breaking and chunking information into manageable units
 - Requesting visual and oral directions
 - Quietly verbalize directions/information as it is given
 - Writing notes, using organizers, color coding etc
 - Creating and managing checklists
 - Constructively asking for help/support
 - Timing self for assignment completion during test preparation/practice

Conclusion

- Executive functions may be impaired due to a number of organic or acquired factors
- Speech Language Pathologists play an important role in the identification and management of executive function disorders
- You may not fix it but you can make it better by teaching our clients to compensate!

References

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Helpful Resource Bundles

- [The Checklists Bundle](#)
- [General Assessment and Treatment Start Up Bundle](#)
- [Fetal Alcohol Spectrum Disorders Assessment and Treatment Bundle](#)
- [Multicultural Assessment Bundle](#)
- [Narrative Assessment and Treatment Bundle](#)
- [Introduction to Prevalent Disorders Bundle](#)
- [Social Pragmatic Assessment and Treatment Bundle](#)
- [Psychiatric Disorders Bundle](#)

Helpful Resources

- [Assessment Checklist for Preschool Aged Children](#)
- [Assessment Checklist for School Aged Children](#)
- [Speech Language Assessment Checklist for Adolescents](#)
- [Differential Diagnosis of ADHD in Speech Language Pathology](#)
- [Creating Functional Therapy Plan](#)
- [Selecting Clinical Materials for Pediatric Therapy](#)
- [Social Pragmatic Deficits Checklist for Preschool Children](#)
- [Social Pragmatic Deficits Checklist for School Aged Children](#)
- [Auditory Processing Deficits Checklist for School Aged Children](#)

More Helpful Resources

- [Fetal Alcohol Spectrum Disorder An Overview of Deficits](#)
- [Speech Language Assessment and Treatment of Children with Alcohol Related Disorders](#)
- [The Role of Frontal Lobe in Speech and Language Functions](#)
- [Executive Function Impairments and At Risk Pediatric Populations](#)
- [Behavior Management Strategies for Speech Language Pathologists](#)
- [Narrative Assessment of Preschool and School Aged Children](#)
- [Treatment of Social Pragmatic Deficits in School Aged Children](#)

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