

Addressing Auditory Processing Deficits in Young Children and Children with Multiple Disabilities

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Disclosures

- Financial
 - Invited presentation; received registration waiver as compensation
- Non-financial
 - Member, ASHA PAC Board of Directors

Objectives

- Describe the need for early intervention in young children with auditory processing deficits
- Describe methods for determining what listening deficits are being experienced in young children and children with multiple disabilities
- Explain ways to target listening deficits through therapeutic interactions with young children, children with multiple disabilities, and their families

Introductions



LITTLE HEROES
PEDIATRIC HEARING CLINIC



Lenses of Auditory Processing

Early Intervention



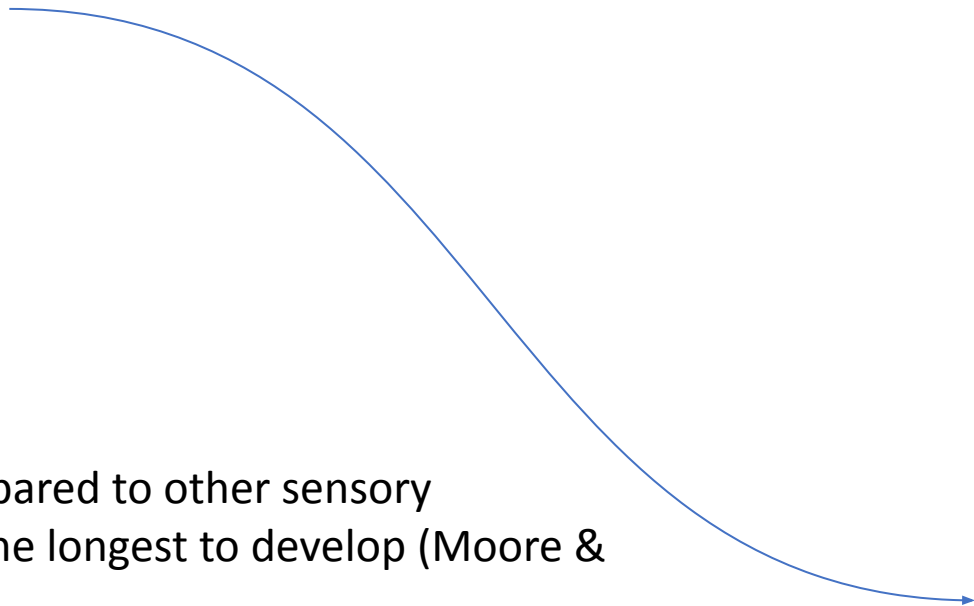
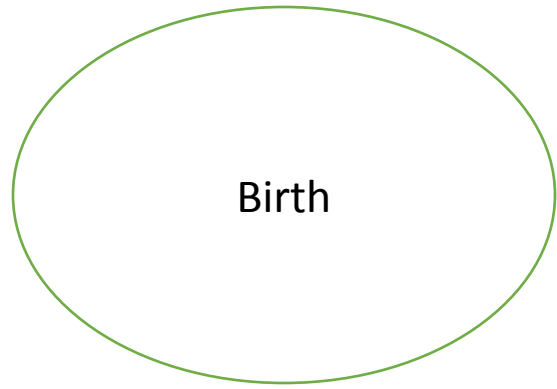
Malleable Brain



Critical Language Learning
Period



Aging=More difficult to
reconfigure neural circuitry



Auditory processing, when compared to other sensory processing mechanisms, takes the longest to develop (Moore & Lithincum, 2007)

But What's Really Happening by Adolescents?



Improvements in more
complex listening
environments



Better interhemispheric
communication



Many Auditory Skills Exist At
Much Earlier Ages



Let's Name Some....

Early Auditory Skills



Sound awareness



Startle responses



**Responses to
name being
called**



**Voice
discrimination**

Familiar
Environmental
Voice style



Acoustic rituals



**Sound
identification**



**Following
instructions**

Can Be Observed in Early Childhood

Third trimester magic

- Body movement in response to sound
- Elevated heart rate in response to sound
- Orienting reflex
- Auditory habituation

Voice discrimination

Familiar language discrimination

Phonemic discrimination

Erber's (1985) Model of Auditory Development

Awareness

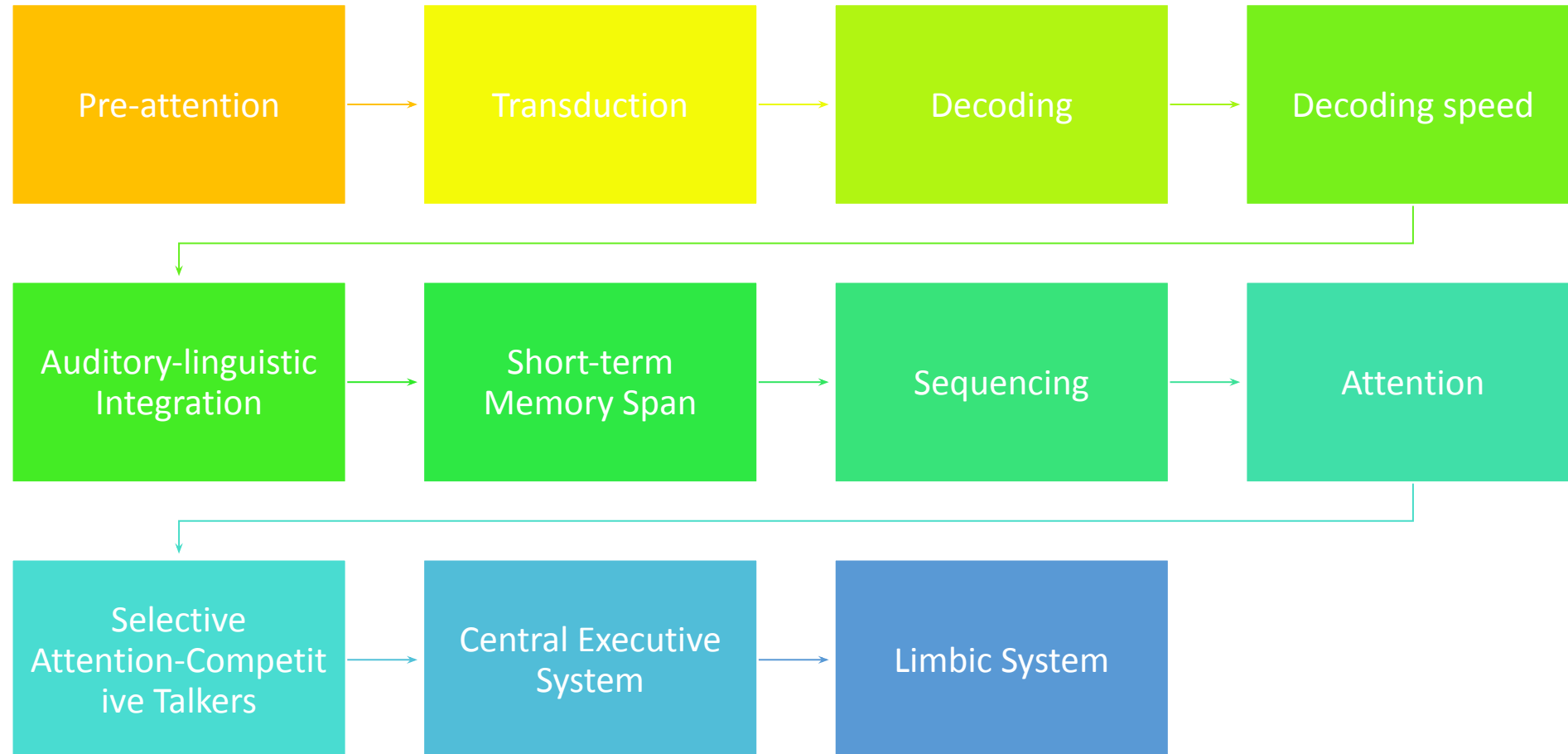
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graph TD; A[Awareness] --> B[Discrimination]; B --> C[Identification]; C --> D[Comprehension];
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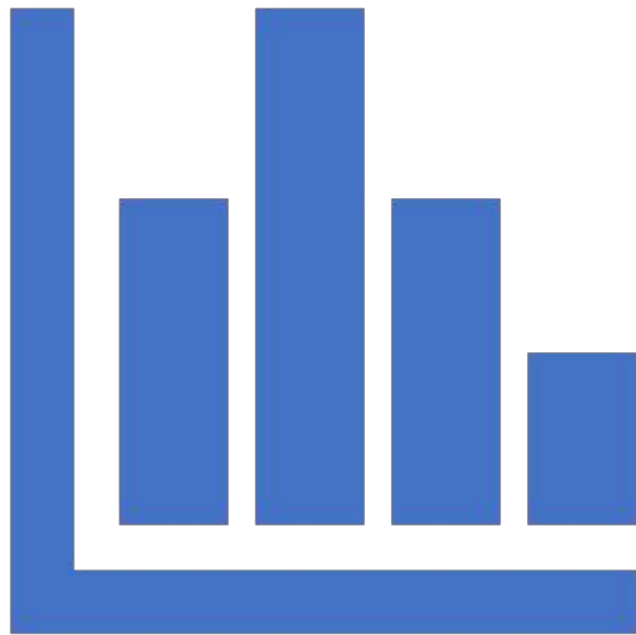
Discrimination

Identification

Comprehension

Medwetsky's (2018) Spoken Language Processing Model





How Do We Go About
Quantifying These?

Deducing Auditory Capabilities through Standard Testing



Behavior Observation
Audiometry



Visually Reinforced
Audiometry



Conditioned Play
Audiometry



Conventional
Audiometry

Choo, Creighton, Meinzen-Derr, & Wiley, 2005

- Parent/Teacher observation
- Clinician- or parent-administered
- No norms
- Followed Erber's model closely
- Can be used in intervals to monitor changes in listening behaviors

Auditory Skills Checklist



Coninx et al., 2009

- Parent/Guardian response
- Normed on typically-hearing, age-matched peers
- Ages birth to 4 years

LittleEARS Questionnaire

The logo for the LittleEARS Auditory Questionnaire is set against a dark purple circular background with a lighter purple outer ring. The word "LittleEARS" is written in a white, cursive script font, with a registered trademark symbol (®) at the end. Below it, the words "Auditory Questionnaire" are written in a white, clean, sans-serif font, stacked on two lines.

LittleEARS[®]
Auditory
Questionnaire



Osberger, Geier, Zimmerman-Phillips, et al., 1997

- Parent interview format
- Assesses child's spontaneous responses to environmental sounds
 - Vocalization behavior
 - Alerting to sounds
 - Deriving meaning from sounds
- Clinician-administered
- Used for Infants and Toddlers
- Normed on children with cochlear implants

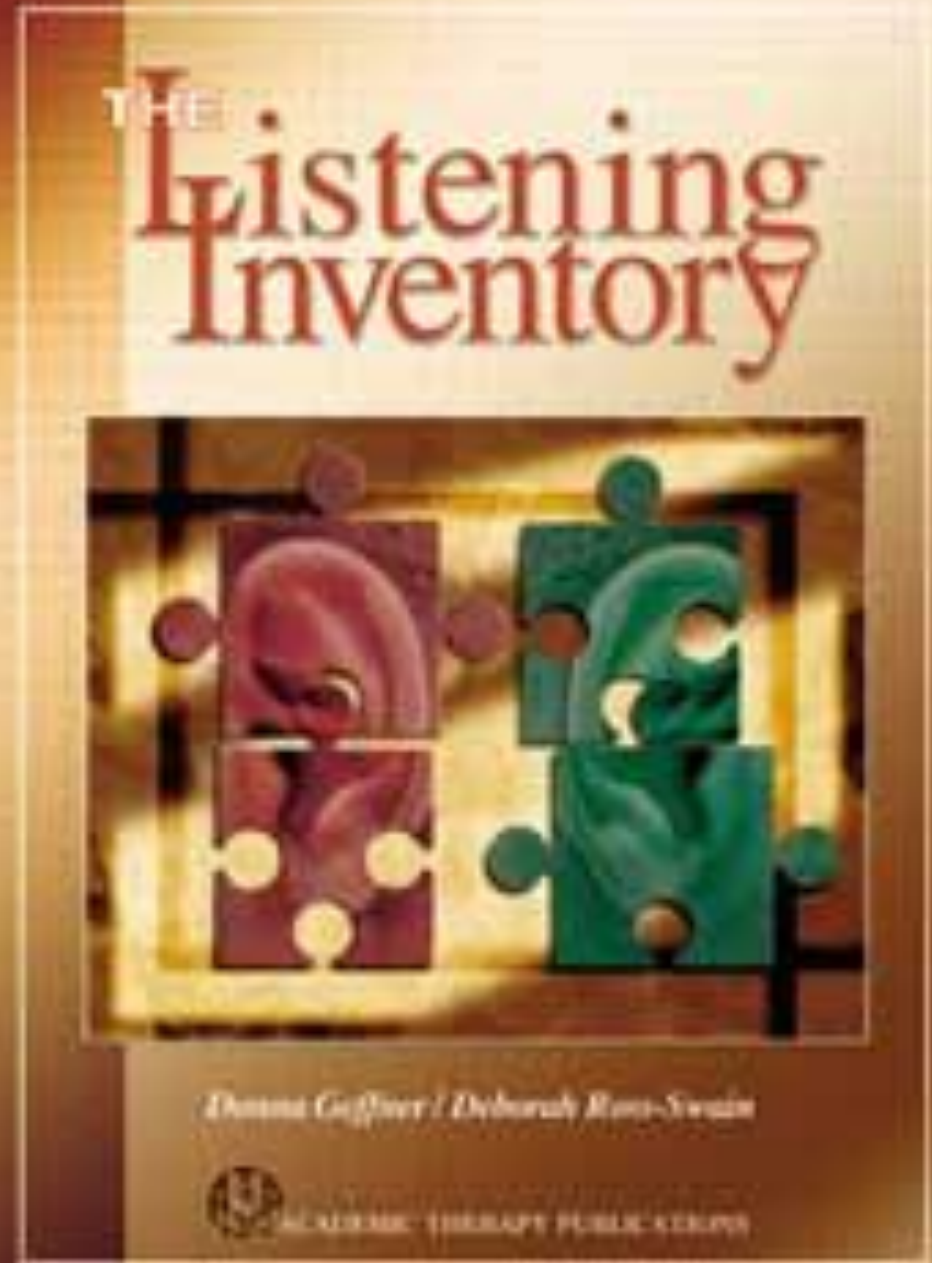
Geffner & Goldman, 2010



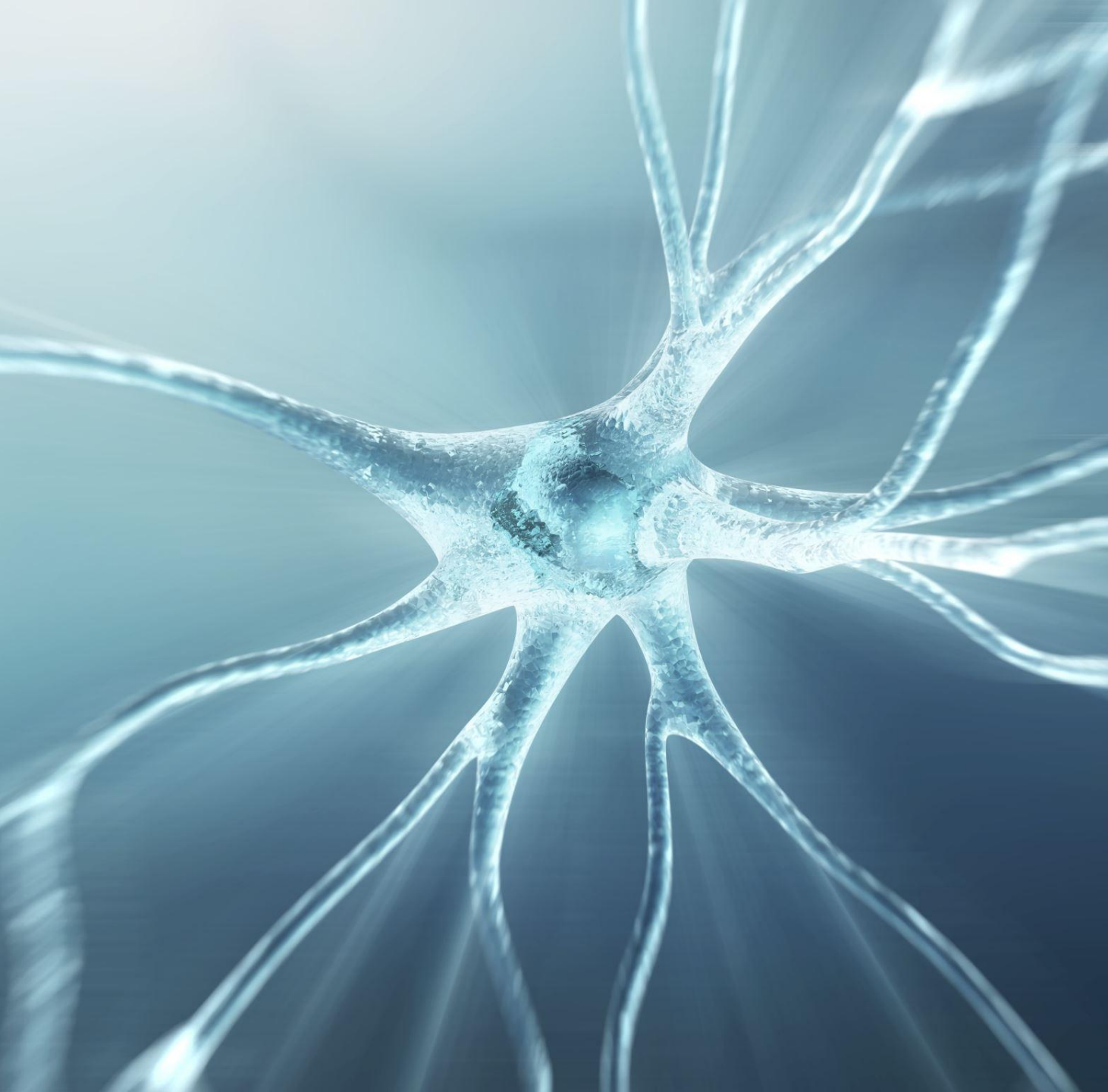
- Screener tool
- Clinician-administered
- Identifies early risk for auditory deficits and literacy deficits
- Ages 3:6-6:11

Geffner & Ross-Swain, 2006

- Parent/Teacher observation
- Criterion-referenced
- Can use starting at age 4
- Six domains explored
 - Linguistic organization
 - Decoding/language mechanics
 - Attention/organization
 - Sensory/motor
 - Social/behavioral
 - Auditory processes



Multiple Disabilities

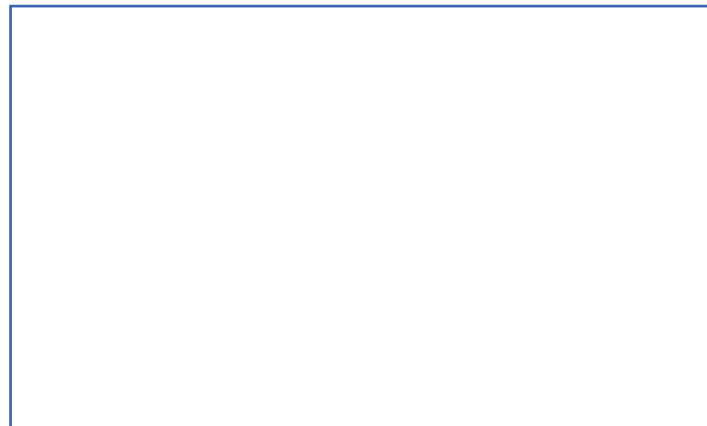


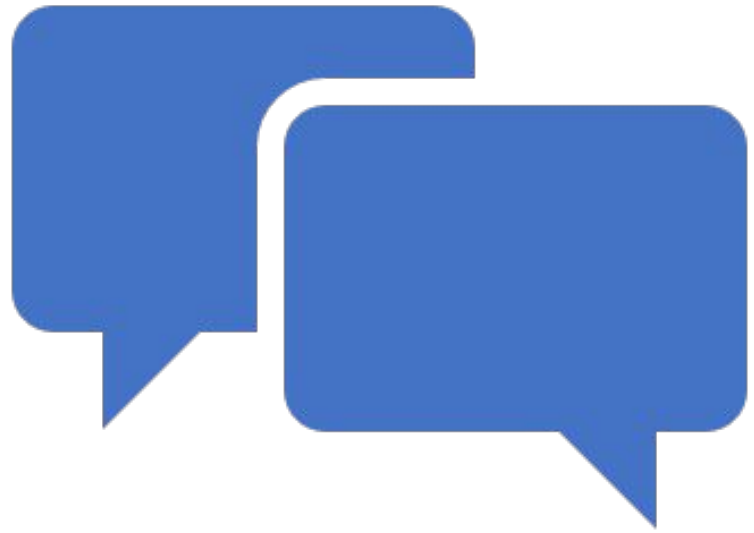
The Argument

Site-of-lesion

Transferability of Site-of-lesion

A Note on Autism





Let's Talk ADHD

Can Be Comorbid or Secondary

Ascending AND Descending Pathways (Peterson et al., 2023)

Everyone has cared about how sounds are getting to the brain

Descending pathways are crucial to auditory processing

- Modulated by learned behaviors, emotional state, and attention

Long been understood that high functions (e.g., attention, memory) affect the auditory system at the level of the cochlear nucleus

Medial geniculate body (MGB) thought to play a role in regulating attention

Memory and emotion centers are activated when listening and have strong correlations to language acquisition (Gusetta et al., 2011)

Interdisciplinary Approach



Auditory processing = pansensory (Ross-Swain et al., 2024)



Auditory stimulation is only auditory for an eighth of a second before it moves to other central domains (e.g., language; Broadbeck et al., 2018)



Started in psychology

Therapeutic Interventions

Sound Awareness/Sound Response



Sound
exploration



Attentiveness

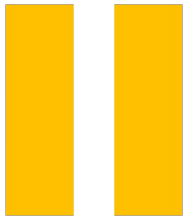


Name Response



Music

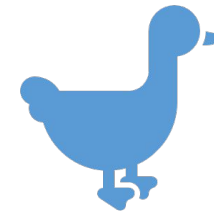
Listening Body Expectations



Pause and Listen



Listening [insert client's
name]



Teaching wiggling
outlets

Sound Discrimination/Identification



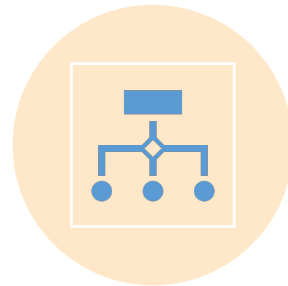
Parallel listening



Sound labeling



Sound comparisons



Single-step instructions



Auditory processing accounts for a higher variance of cognitive functioning than does peripheral hearing acuity

Q+A/Comments

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