# The Anatomy of the SSW

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**Auditory Processing Service**

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# Who Knew that SSW had Anatomy?

1:30 – 2:30

# As We'll See

- **Many parts of the auditory system are closely associated with SSW, so**
- **Figuratively, maybe they're SSWs anatomy.**
- **Why is this very important???**
- **Most CAPD tests cannot identify a variety of regions of the brain, or brainstem, or peripheral malfunctions.**
- **The SSW can**
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# Reasons why SSW can identify them

- SSW is a complex task that challenges many central functions.
- Enables multidimensional (M-D) scoring
- After many years of careful evaluation of 100s of patients with localized lesions
- Certain M-D factors found to relate to parts of the CANS
- Helpful for identifying impaired regions

# Is that all????

- Heavens no.
- When we started testing for CAPD mid-60s
- Found the same patterns, generally not so severe, in those with processing issues
- Sure enough, the characteristics (e.g., receptive language, memory) – similar
- Combining this info led to the 4 B-M cats
- Very importantly, 'CAP, No Gold Standard'
- Anatomical Validity, 'Silver Standard'

# Fortunate: Peripheral & Central Data

- As you'll see we can go up & down auditory system following changes in SSW++
- Let's start with the localization of the 4 B-M categories
- The second half of the presentation will go into the auditory signs of these various levels

# The 4 Buffalo-Model Categories

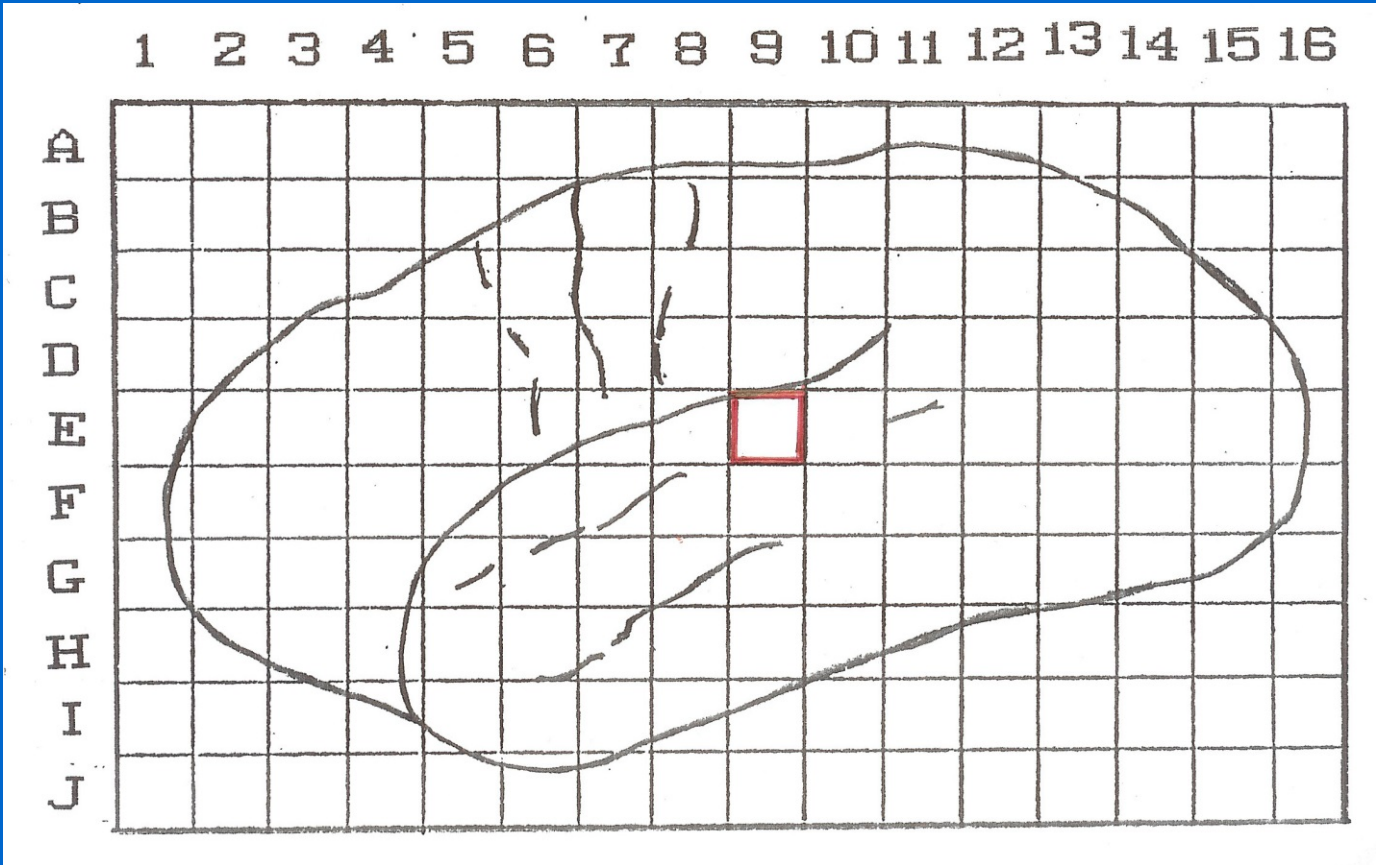
- **DEC:**
  - **Primary Auditory Reception (Heschl's Gyrus #41,42)**
  - **Secondary Auditory Reception (auditory cortex #22)**
- **TFM:**
  - **Anterior Temporal: Amygdala, Hippocampus,**
  - **Pre-Frontal: executive functions**
- **INT:**
  - **Corpus Callosum, Anterior Commissure**
  - **Angular Gyrus**
- **ORG:**
  - **Middle & Lower Rolandic Region & Pre-Motor**
  - **Upper portion of Anterior Temporal Lobe**

# Primary Auditory Reception Center

- **Primary AR = Heschl's Gyrus (#41, 42)**

# First Map for Recording Lesions

- 2 Neurologists indicated that E-9 best Represents Heshel's Gyrus




- Next version photo: 12 vertical 1 cm slices
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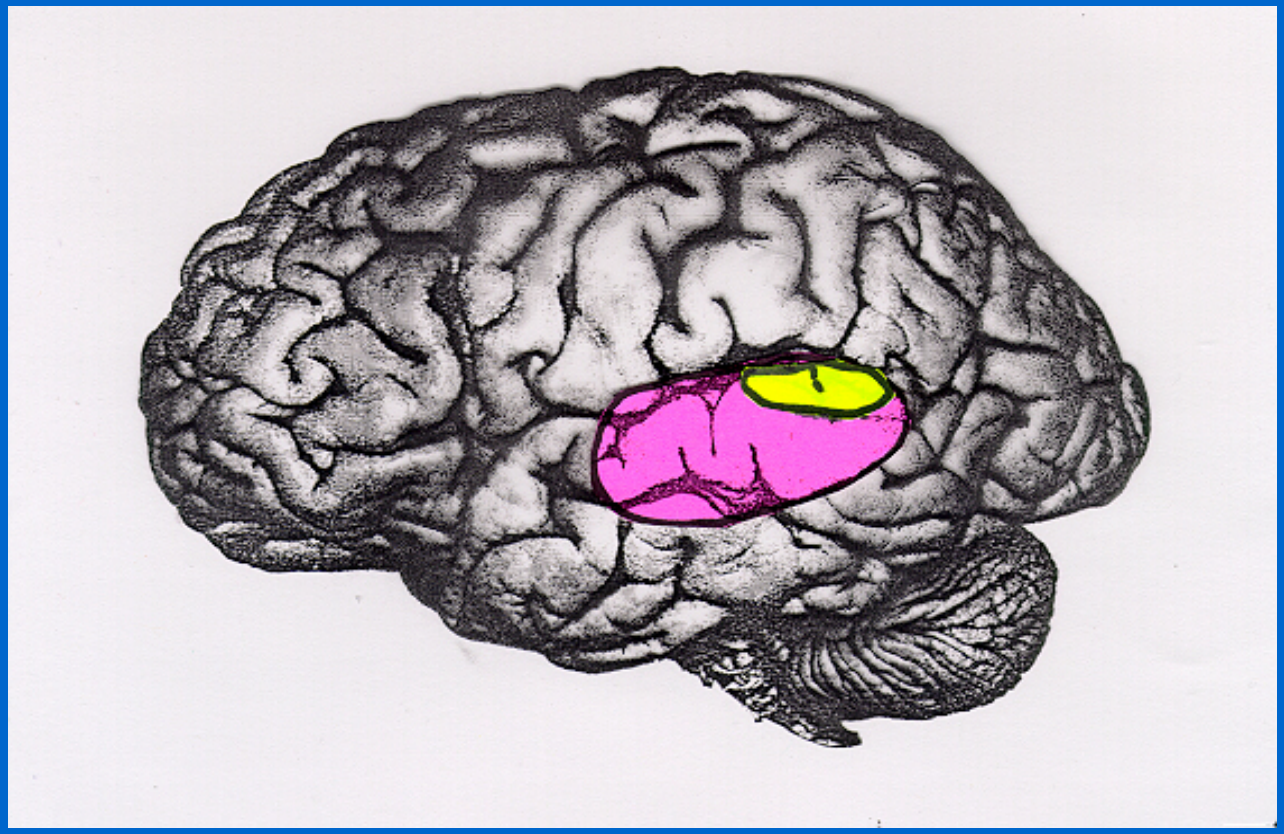
# Secondary Auditory Reception Center

- **Auditory Cortex – DEC center of brain**



# Angular Gyrus

- Auditory-Visual Integration center = INT
- Only cortical INT (that I know of…)
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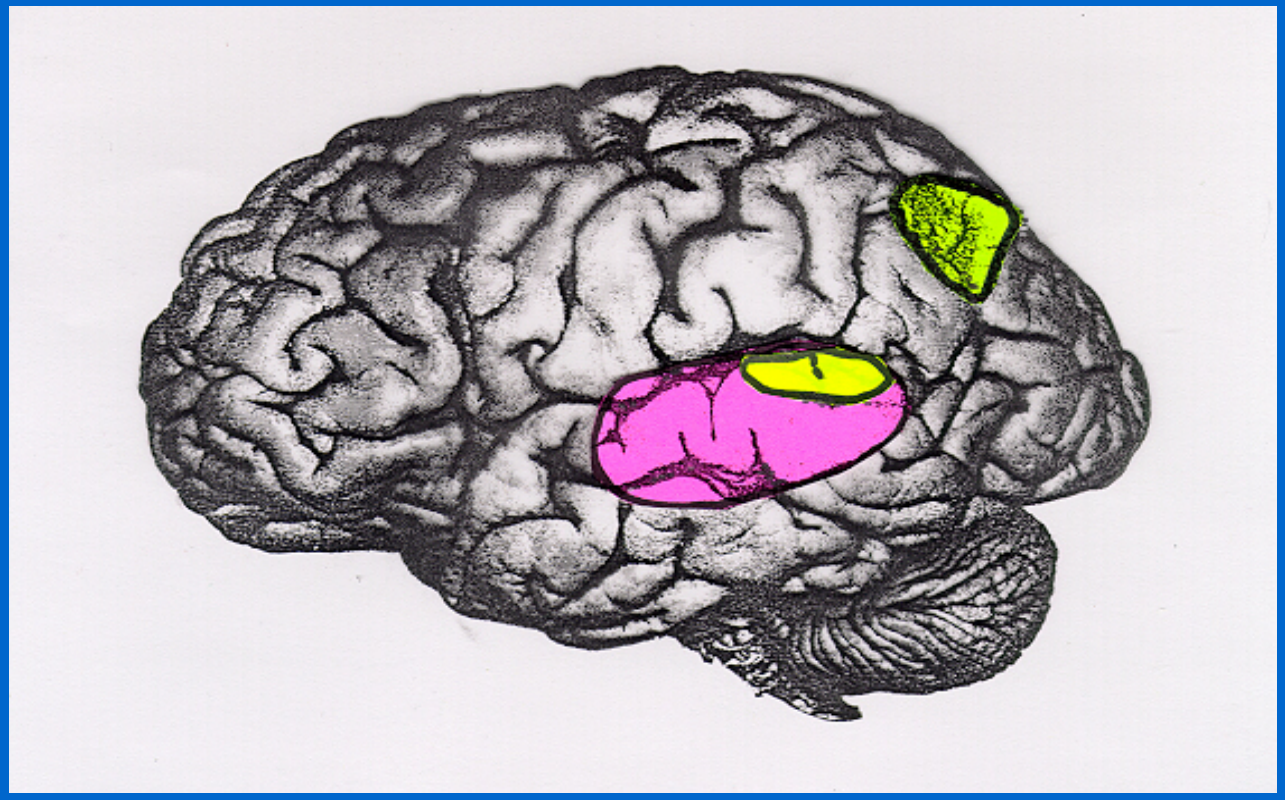
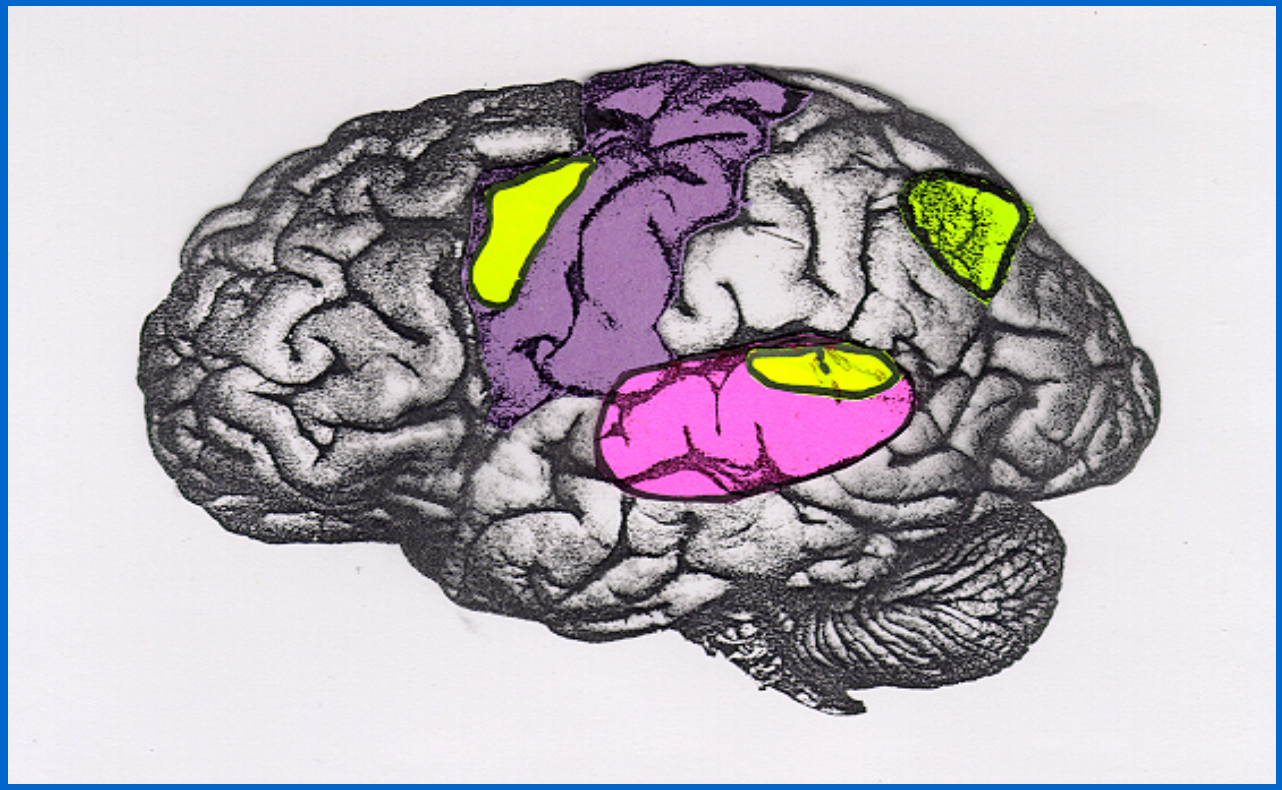


- Heavily connected Aud, less Vis (Luria, ‘66)

# Rolandic and Pre-Motor Areas

- ORG region importantly pre-motor (motor planning region)



- Left out is anterior temporal (later)
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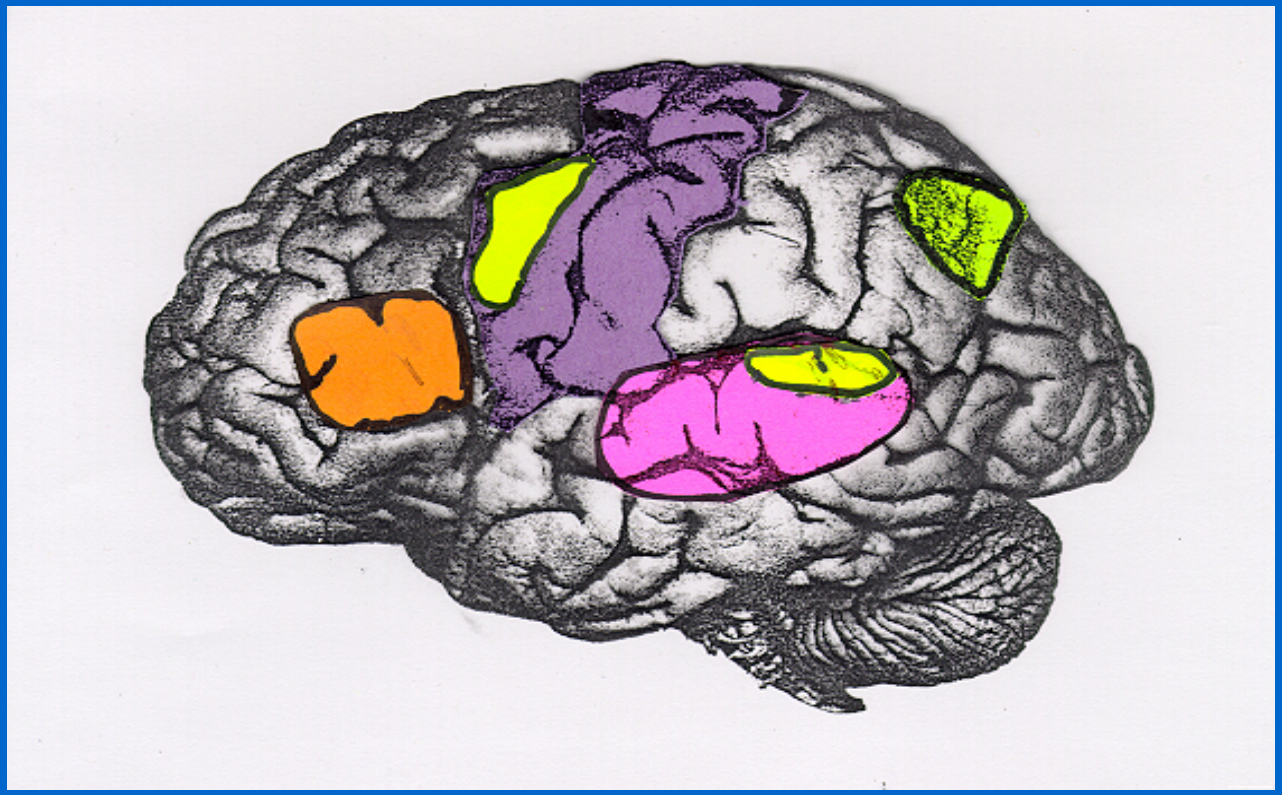
# Boca's Area

- Portion of TFM region, which is much larger

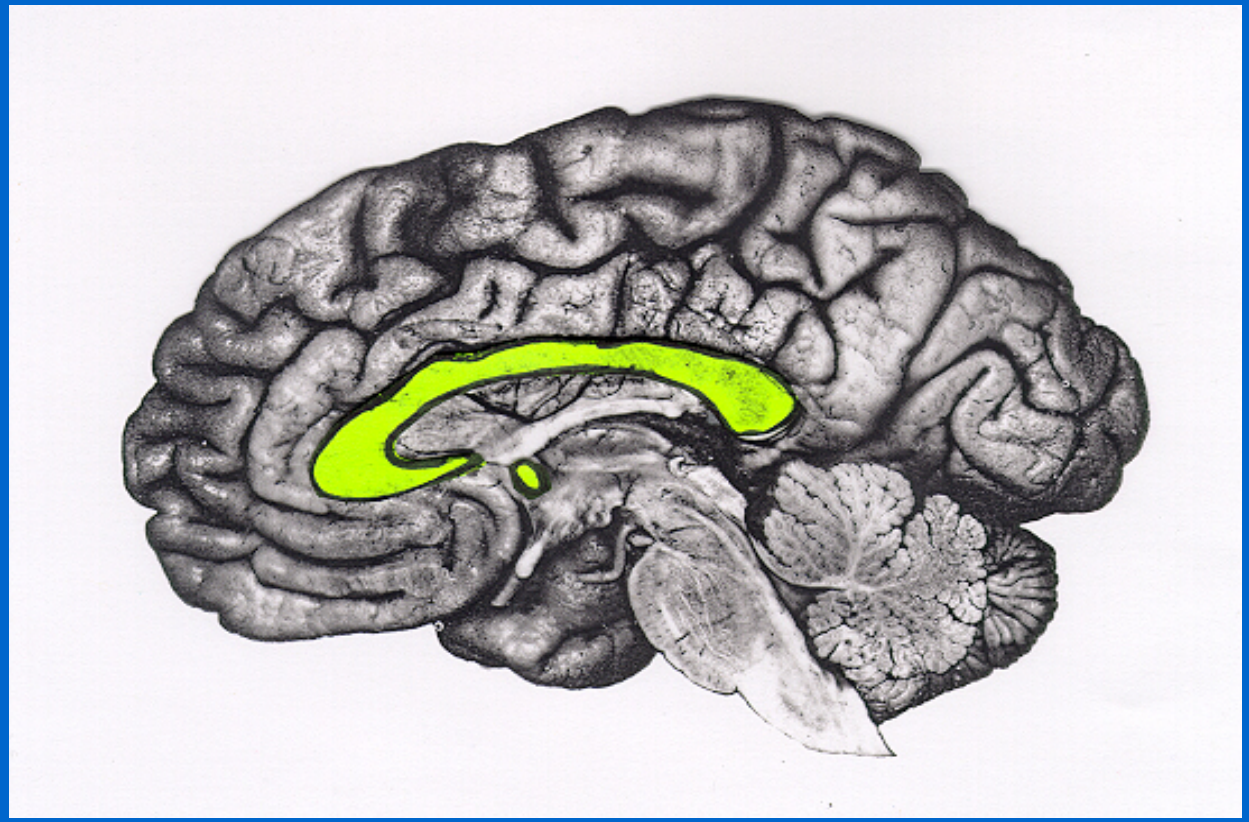


# Corpus Callosum & Anterior Comm.

- **2 sub-cortical contributors that show up in our studies associated with INT**

Ant. to Post.

- Genu
- Body
- Splenium



- **Posterior portion of Ant. Comm. (later)**
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# 4 Buffalo-Model Categories

- Approximate regions associated with the 4 categories
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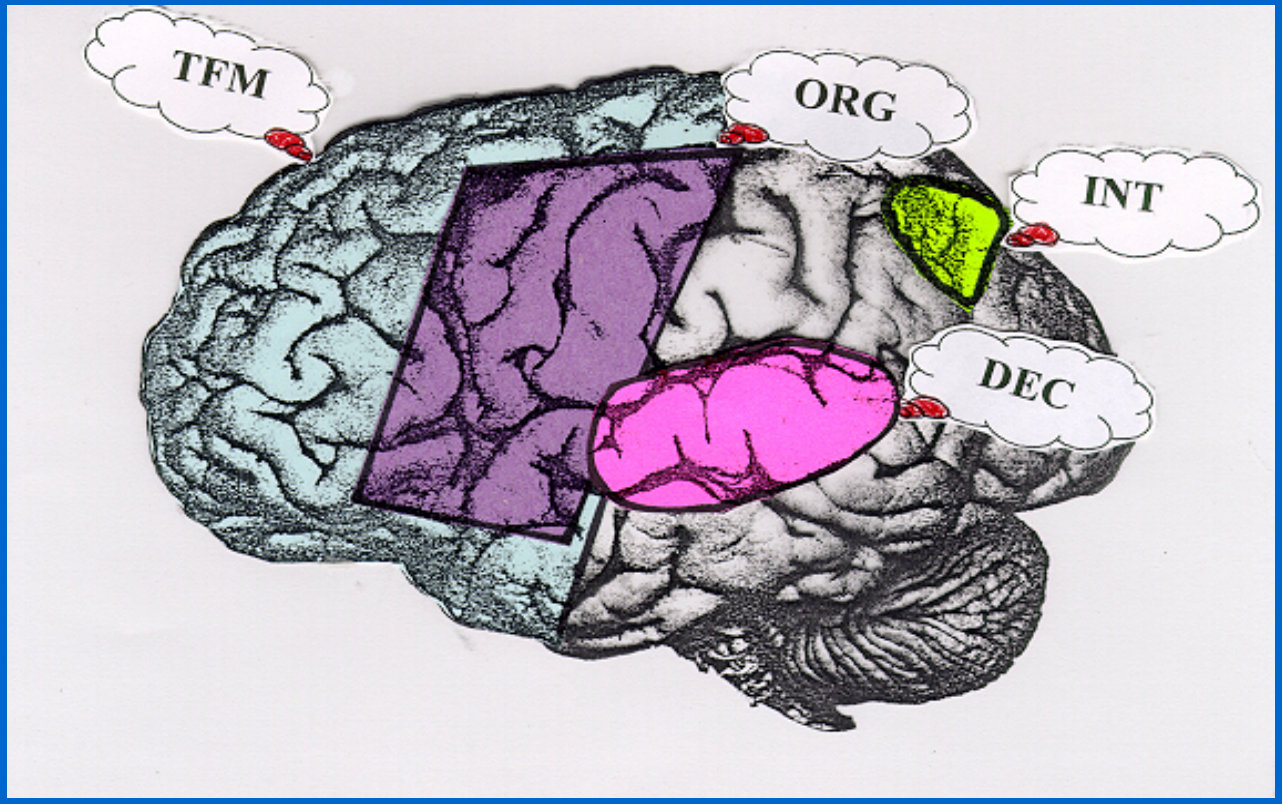

# Lesions & SSW++ Results

1:30 – 2:30

# Connecting Central Tests to Sites-of-Lesion

- Spent about 30 years studying performance esp. on SSW with both peripheral & disorders
- Looked at Conductive, Cochlear, VIII N, Brainstem, Auditory Reception, NAR, parts of CC, anterior commissure and associated them with signs of the 4 categories
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# Auditory Reception

- Originally we thought that we could measure temporal lobe
- The way we did that was to see a lot of errors in the ear opposite the temporal lesion.
- We weren't looking for norms just a lot of errors in the opposite ear.
- We did (NIU) in 1st SSW study, 1961-2 (no medical Dx)… also studied
- Conductive, cochlear and elderly, & found...

# More Data & Understanding

- Starting in 1963 @ Tulane NIH grant with ENT and Neurology support-confirmation
- After that always had medical input.
- Next Menorah Medical Ctr in KC, then U at Buffalo and back in KC at KUMC one semester.
- The data kept building up
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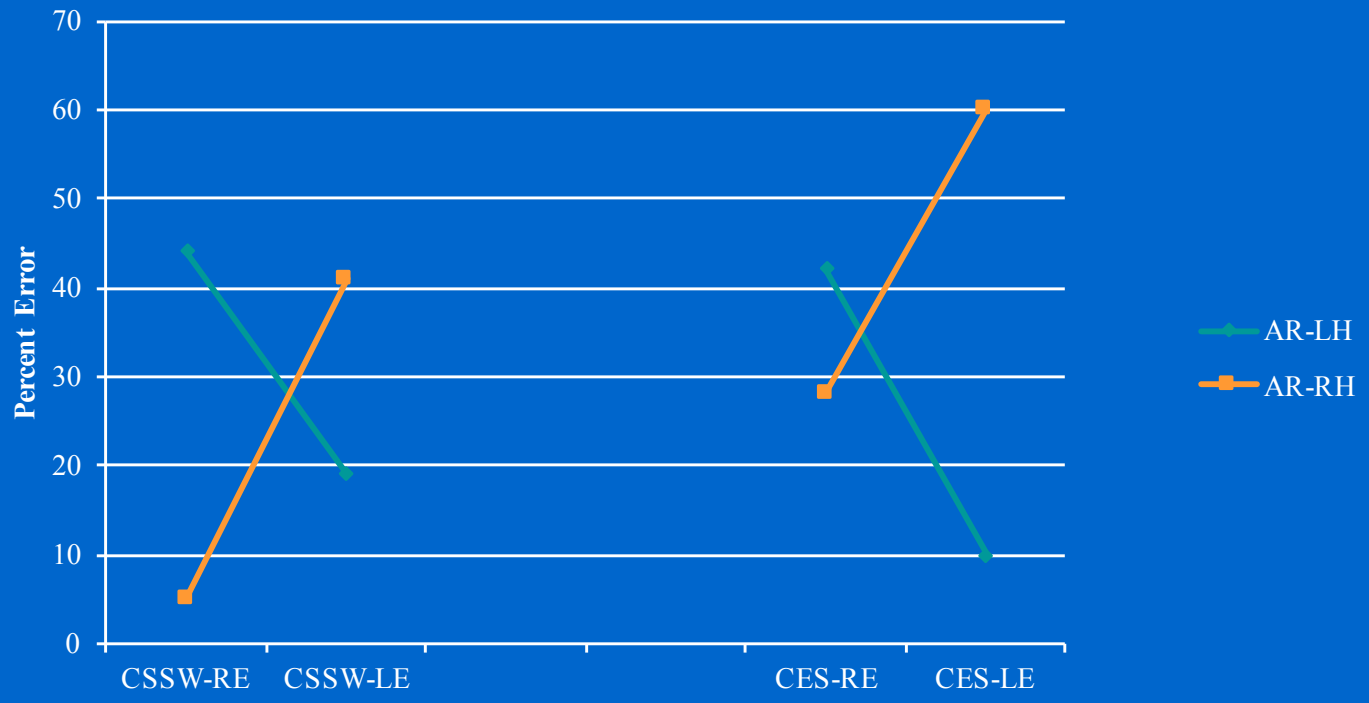
# Auditory Reception Lesion Patients
# Left vs. Right Hemisphere

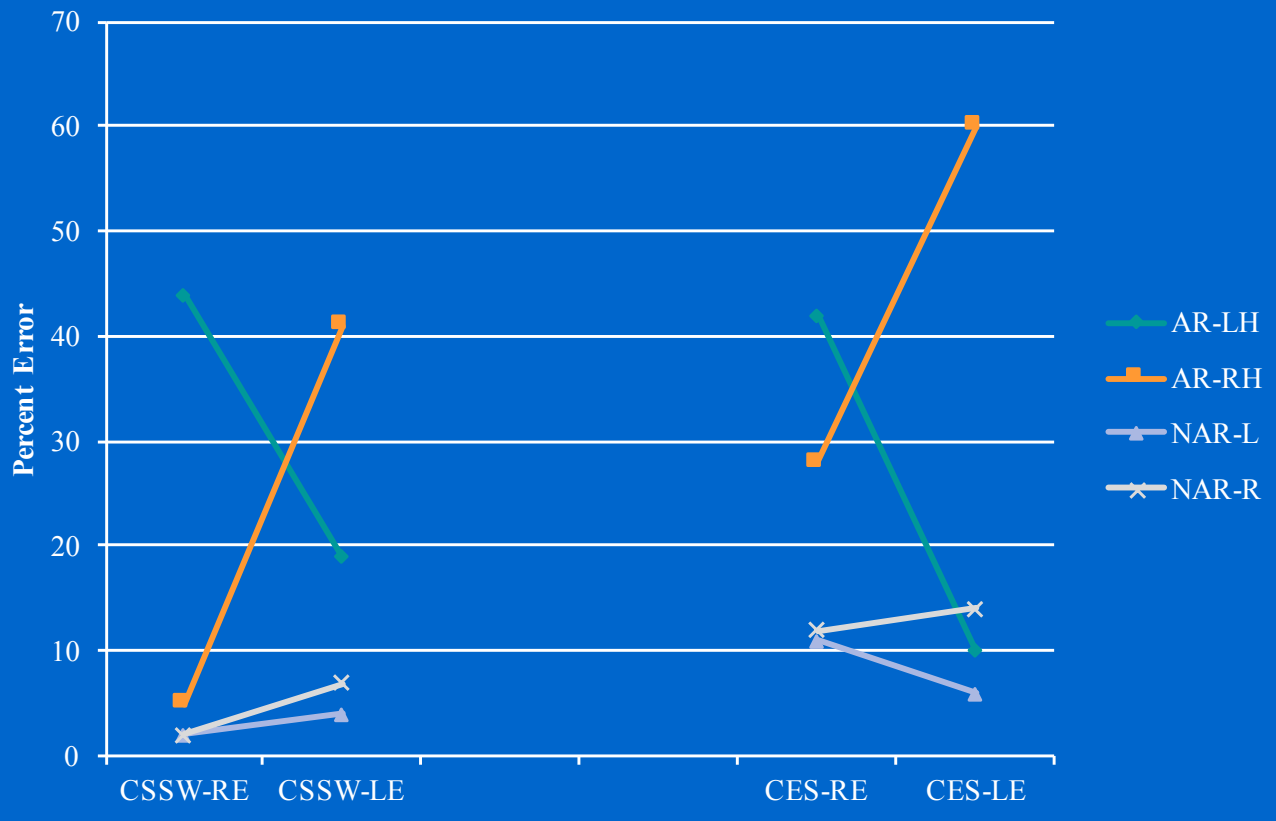
| | N= | Age= |
|---|---|---|
| Left: | 27 | 45 |
| Right | 11 | 60 |



# Auditory Reception vs. NAR

NAR: Left: N= 20 Age= 40

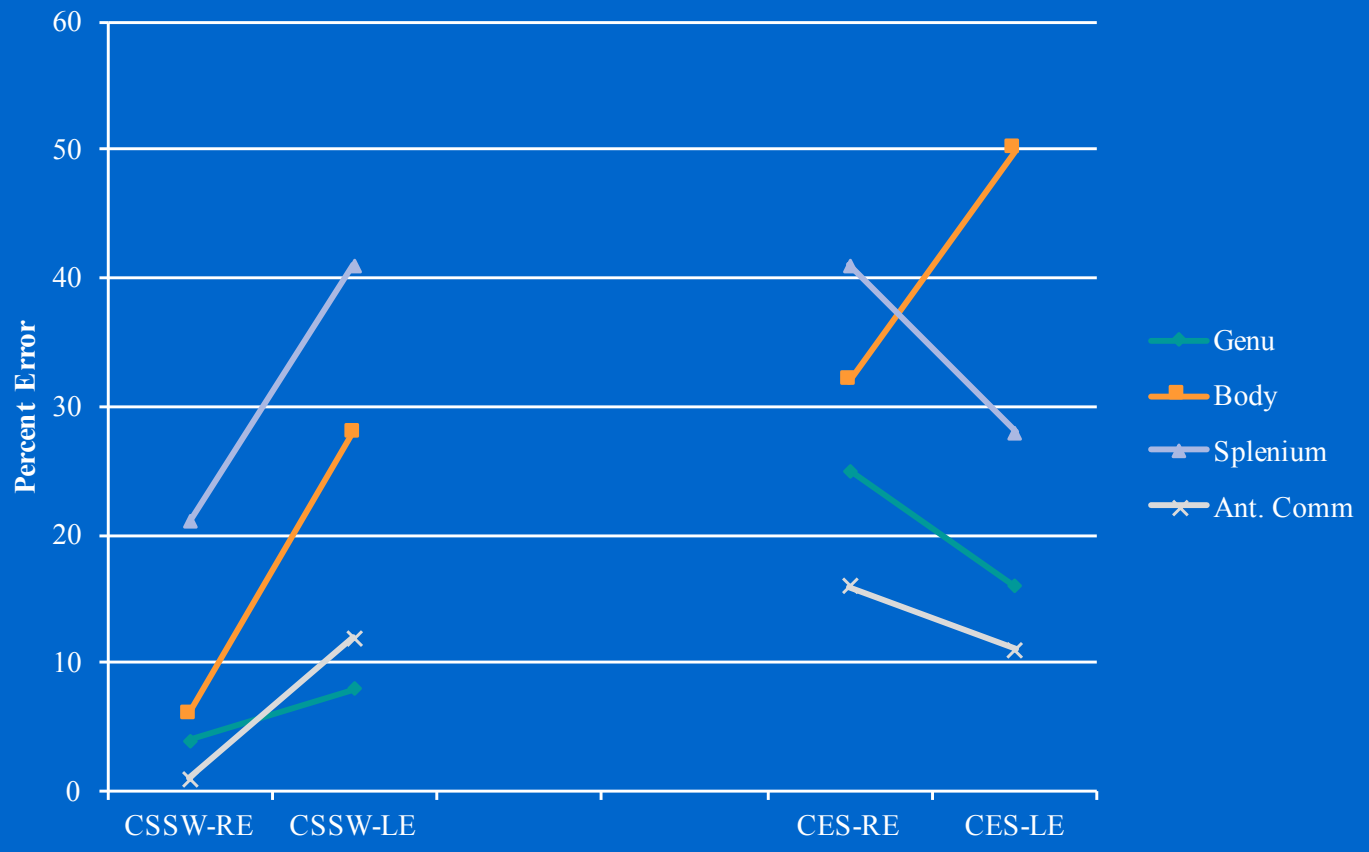
Right 22 42



# Corpus Callosum & Anterior Commissure

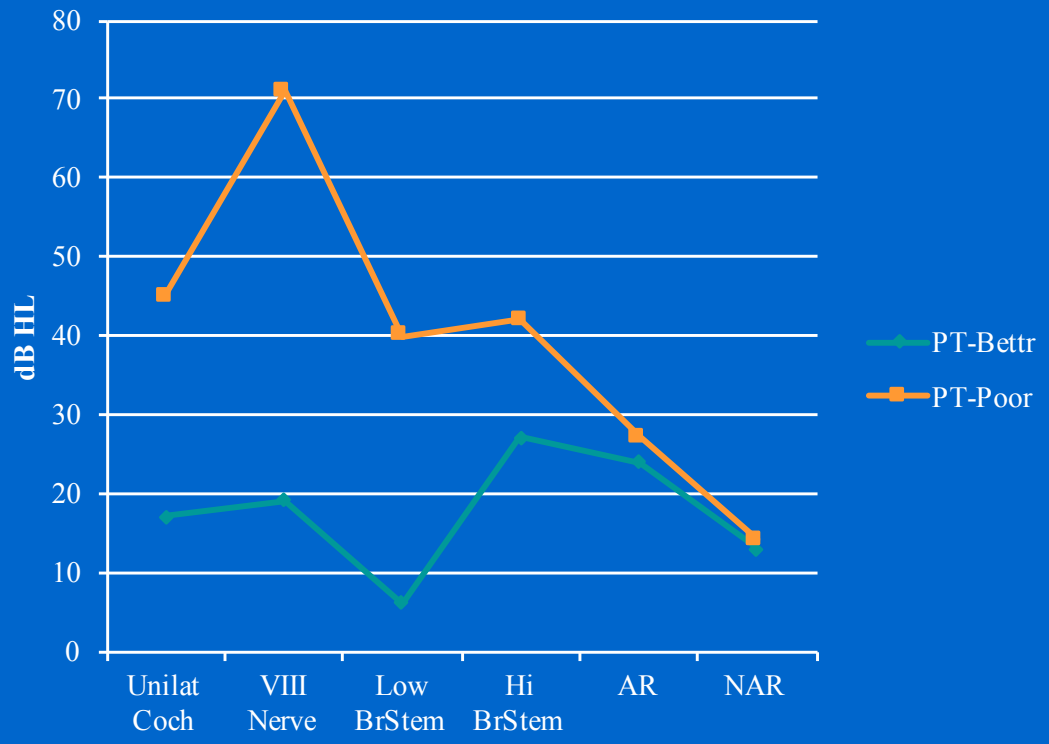
Genu: N= 12 Age= 42 Body: N= 5 Age= 46

Splen: N= 13 Age= 57 Ant C: N= 23 Age= 46



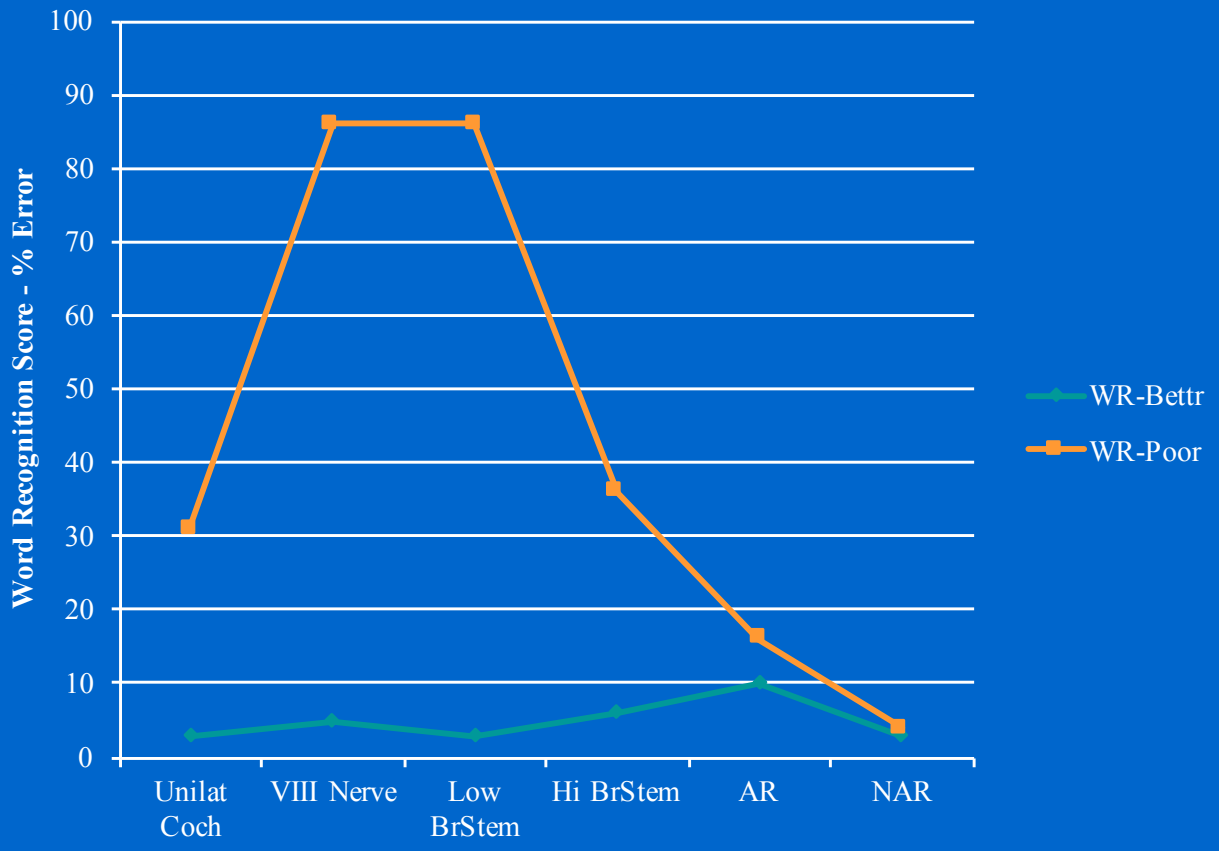
# 6-Frequency Puretone Average

- Better baseline vs. poorer ear =severity of HL
- VIII N difference between ears greatest (52dB)
- Peripheral > difference- High BrStem between



# Word Recognition Score - % Error

- VIII N & LoStem very severe (14% correct),
- VIII N HL= 71 dB vs. LoStem= 40 dB
- WRS/dB HL, VIII N loses 1.2%, LoStem 2.2%



# Corrected SSW Score - % Error

- VIII N & LoStem CSSW highly Overcorrected
- ?VIII N benefits more from spondees than LoStem?
- HiStem still ipsilateral, but just as severe as AR
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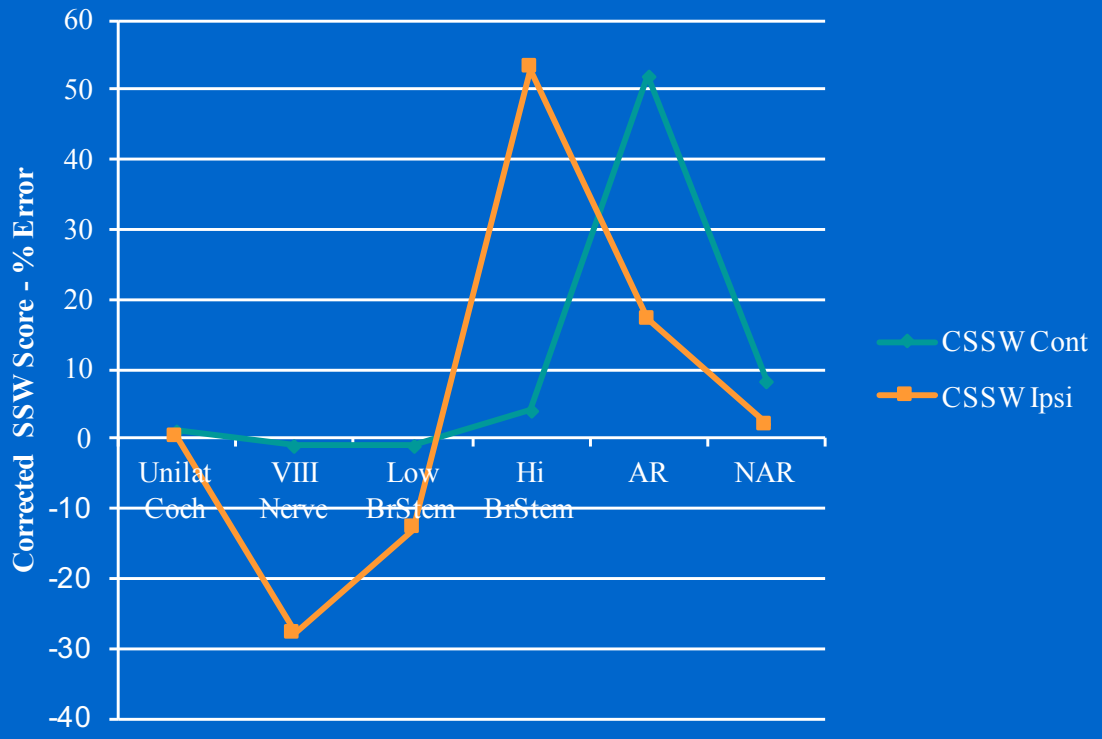

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1:30 – 2:30

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- text
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# Questions

# Thank You!