**REVIEW:**

**To function, language draws on diverse brain areas**;

**To function, language needs all of the brain to be functional**; damage in a seemingly unrelated region affects how and whether tasks are carried out (e.g. split brain condition);

To understand language usage implies taking it apart into 100s of simultaneously performed functions;

Language-listening tasks engage cortex areas that deal with auditory stimuli, focus, analysis, intonation, etc.

 and neural tracks converge (convergence zones) to comprehend, produce, repeat… language

e.g., intonation is processed cognitively or affectively

…….. sentences heard are processed to have words memorized or to remember an event

…….. utterances are processes depending on whether to routine or complex

*Base-line brain condition vs. critical brain condition*

**fMR images show how language flows in neural tracks and into convergence zones in response to tasks;**

**fMR images** correlate thinking and speaking/signing w hemodynamic images of blood oxygenation through which brain responds to tasks and stimuli and thus…

reveal language areas engaged by cognitive tasks of deciding, seeing and reporting on it, etc.;

show that brain areas function, overlap and interconnect thru neural pathways > FUNCTIONAL NEURAL ANATOMY.

FUNCTIONAL disconnect: moving lips for articulating (or hands for signing) vs. kissing

 Speaking fluently vs. making sense

 Understanding instructions and carrying them out vs. repeating them

FUNCTIONAL integration: explaining the spiral engages visual cortex, too

Representative SCANS/images of listening, hearing, etc. are composites of images gained from patients undergoing identical task-targeted screening.

* **A new sort of MAP = web of neural connective tissues**

Typical patterns = language functions that are linked with reading words

 hearing words

thinking abt words

saying words

processing ir/regular verbs or common vs. abstract nouns, etc.

Language functions are performed simultaneously, SCATTERED/ distributed but COORDINATED.

To produce a word/sentence – unfinished products (e.g. morphemes, words, etc.) are shuttled in-btw regions until they become final products/ words or sentences.

QUESTIONS:

What specific neural tracks have a control of what specific functions?

e.g., remembering particular words or a message?

identifying the mood of a speaker or…

WHERE IS BLOOD OXYGENIZED WHEN THE MIND HANDLES TASKS and responds to stimuli?

WHAT MAKES SENSE IN TERMS OF BRAIN ORGANIZATION INTO CENTERS OF NEURAL CONTROL?

WHAT ARE THE POINTS OF INTERCONNECTION (CONVERGENCE ZONES) THAT HOLD THE WEB TOGETHER?

Language map is gradually built-up, based in **functional anatomy** where… Box 3.5

STG and STS areas are in charge of accessing and integrating syntactic structures and semantic information

**word meaning** involves diverse tasks distributed throughout the cortex:

MTG, ITG, STS are in charge of mapping sound to meaning

MTG are in charge of accessing meaning of written words

STG and SMG take care of integrating what’s heard with sequencing sounds

Spt takes care of integrating motor aspects of sounds and sensory aspects of sounds

 of vocal tract-produced linguistic and non-ling sounds

 of producing and imagining sounds

region for learning new words

region for short-term verbal memory

Speech perception is distributed over both hemispheres in auditory areas but speech production is left-lateralized.

***A look inside the brain in real time***, TED Talk by Christopher deCharms 2008

<https://www.ted.com/talks/christopher_decharms_a_look_inside_the_brain_in_real_time>

technology enabling self-control of one’s brain – pain, depression, love, anxiety we “feel”

65000 or more points of activation are generated in the brain by the seen, heard or remembered; memories form deep channels in the brain.

3D models

[*Convergence zones in cortex: Brain Yields New Clues On Its Organization For Language*](file:///C%3A%5CUsers%5Cdell%5CDesktop%5CConvergence%20zones%20in%20cortex%3A%20Brain%20Yields%20New%20Clues%20On%20Its%20Organization%20For%20Language), A. Damasio, 1991 <http://www.nytimes.com/1991/09/10/science/brain-yields-new-clues-on-its-organization-for-language.html>

TED Talk by Jill Bolte Taylor's description of her massive stroke affecting motion, speech and self-awareness          <https://www.ted.com/talks/jill_bolte_taylor_s_powerful_stroke_of_insight>