

Language Development



What is language?

- A system of symbols and rules that enable us to communicate (Harley, 2014).
- Arbitrary rules that we master by the age of 5.
- A social activity – a form of joint action where people collaborate to achieve a common aim (Clark, 1996).
 - **Communication**: the exchange of information or ideas.
 - **Language**: a symbol system with rules that govern the use of the symbols.
 - **Speech**: the production of vocal sound patterns.

The importance of language...

- Language skills are related to academic performance.
- Language delays or disorders may be the earliest indicator of other problems.
- Most young children with disabilities have a need for intervention in the area of speech or language.
- Preschool environment offers (almost) continuous language learning opportunities.

Different fields within language research

- **Phonology** refers to our sound system
- **Phonemes** are segments of sound
- The study of meaning is known as **semantics**
- The study of word formation is **morphology (morphemes)**
- **Syntax** is the use of rules to combine words
- The use of language is known as **pragmatics**
- An act of speaking or writing which in itself effects or constitutes the intended action is known as **illocution**

Human Language

- Complex communicative system.
- Yet infants typically master language with surprising ease.
- How is this possible?
- Are we biologically prepared for language?
 - Speech sounds through the first months (cooing and babbling).
 - Experiment with sounds.
 - Innate disposition.

Human Language

- Generally assumed three stages in language acquisition:
 - Prelinguistic stage – 0 – 12 months
 - One-word stage – 12-18 months (context bound)
 - Two-word sentences – 18 months onwards
 - (i) 18-30 months (telegraphic speech – simply to convey meaning)
 - (ii) 30 months – 5 years rapid explosion of new words

Sharing attention and the development of vocabulary

- 9 months - sharing attention: Looking where the other looks, pointing to draw the other's attention.
- Vital to the discovery of word meanings.
- E.g., I point at a; you say “banana”. I can learn the word banana, and its meaning.
- Word meanings are discovered long before the baby produces words.
- The first word is typically produced at 10 to 15 months.
- 18 months - vocabulary takes off and by the end of infancy - typically know hundreds, or even thousands of words.
- We go on learning new words throughout life, albeit more slowly (e.g., COVID-19).

Nature or nurture?

- Is language natural to humans?
or
- Is language something humans happened to have learned?
- Studies of language are dominated by two approaches (although there are others too):
 - Learning theory – Skinner (1957); Bandura (1989).
 - Nativist theory – Chomsky (1959).

Empiricism vs Nativism

- Empiricism - This extreme experience-based perspective argues that the mind at birth is like a blank slate (*tabula rasa*) to be written on by experience (Locke, 1690)
- Nativism - The assertion that knowledge cannot come from experience alone. The mind must have some structure in order to organise and interpret experience (Gleitman, 1995; Pinker, 1994).

The Nativist Perspective

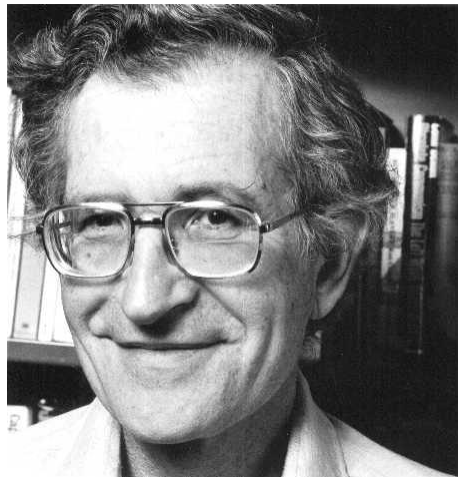
Nativist theories claim children

- learn language rapidly;
- learn language effortlessly;
- acquire language without direct instruction.

The Nativist Perspective

“Language learning is not really something that the child does; it is something that happens to the child placed in an appropriate environment, much as the child’s body grows and matures in a predetermined way when provided with appropriate nutrition and environmental stimulation.”

(Chomsky, 1987, p.519)



Nativist theory

- Shares three main elements:
- Grammatical concepts are common to all languages (so are innate).
- Children are biologically predisposed to learning language.
- Children come to acquire language with a set of innate hypotheses that guide attempts to abstract the principles governing their language.

Nativist theory

- Structures-
- Language Acquisition Device (LAD) - Chomsky (1968).
- Lenneberg (1967) – `Critical or Sensitive period`.
- However, Bruner (1983) do not forget about socio-cultural influences – LASS (language acquisition support system).

Behaviourism

- Imitation and reinforcement

But.....

- 'I goed', 'mouses'

- Skinner
 - systematic reinforcement (shaping)
- Role of the environment
 - impact of poverty

Interactionism

Interactionism claims;

Children-

- possess some innate cognitive skills which are required for language development but are not specifically linguistic.
- learn language through social interaction (e.g. Snow, 1989).

- *‘We on the other side think learning is a long slog, which requires from the child a lot of work. We think it requires a relationship with an adult and a whole set of cognitive skills’*

(Snow, quoted in Rymer, 1993, p.37).

Constructivism

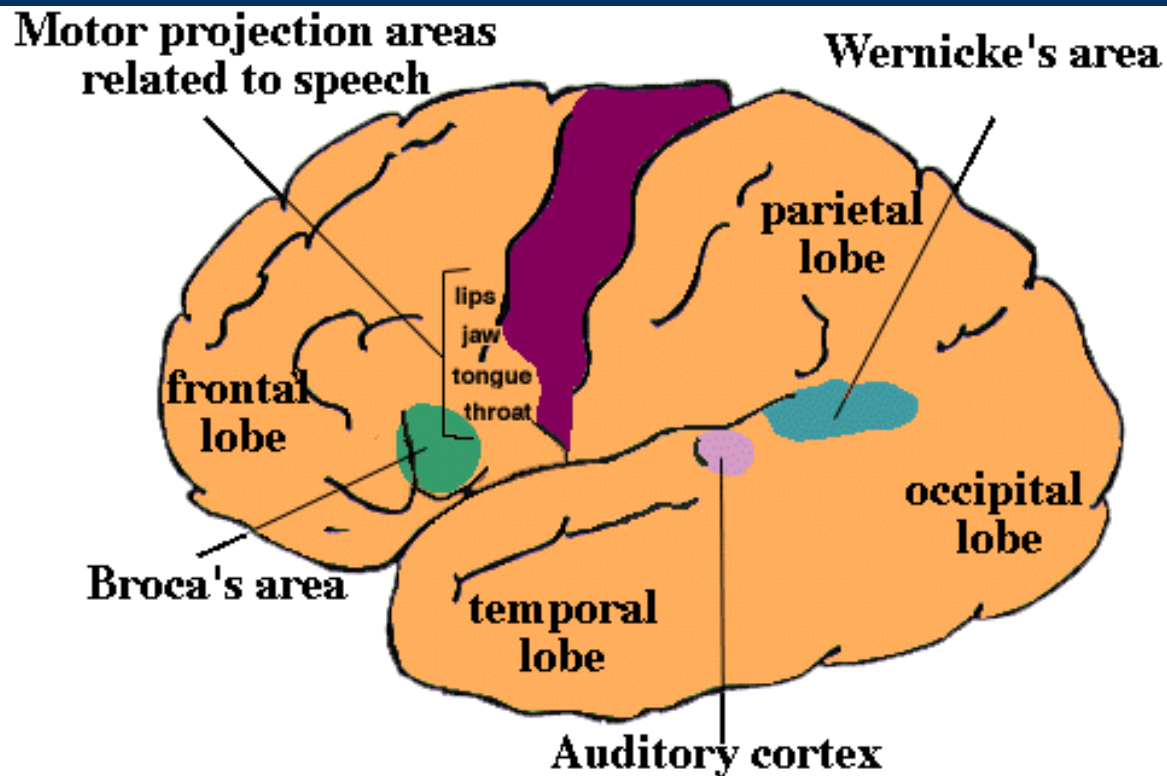
- According to constructivist theories, language is constructed by the child using general cognitive processes but operating on information provided by the environment
- ‘When language starts to come in, it does not introduce new meanings to the child. Rather it is used to express only those meanings the child has already formulated independently of language’ (Bowerman, 1985, p.372)*

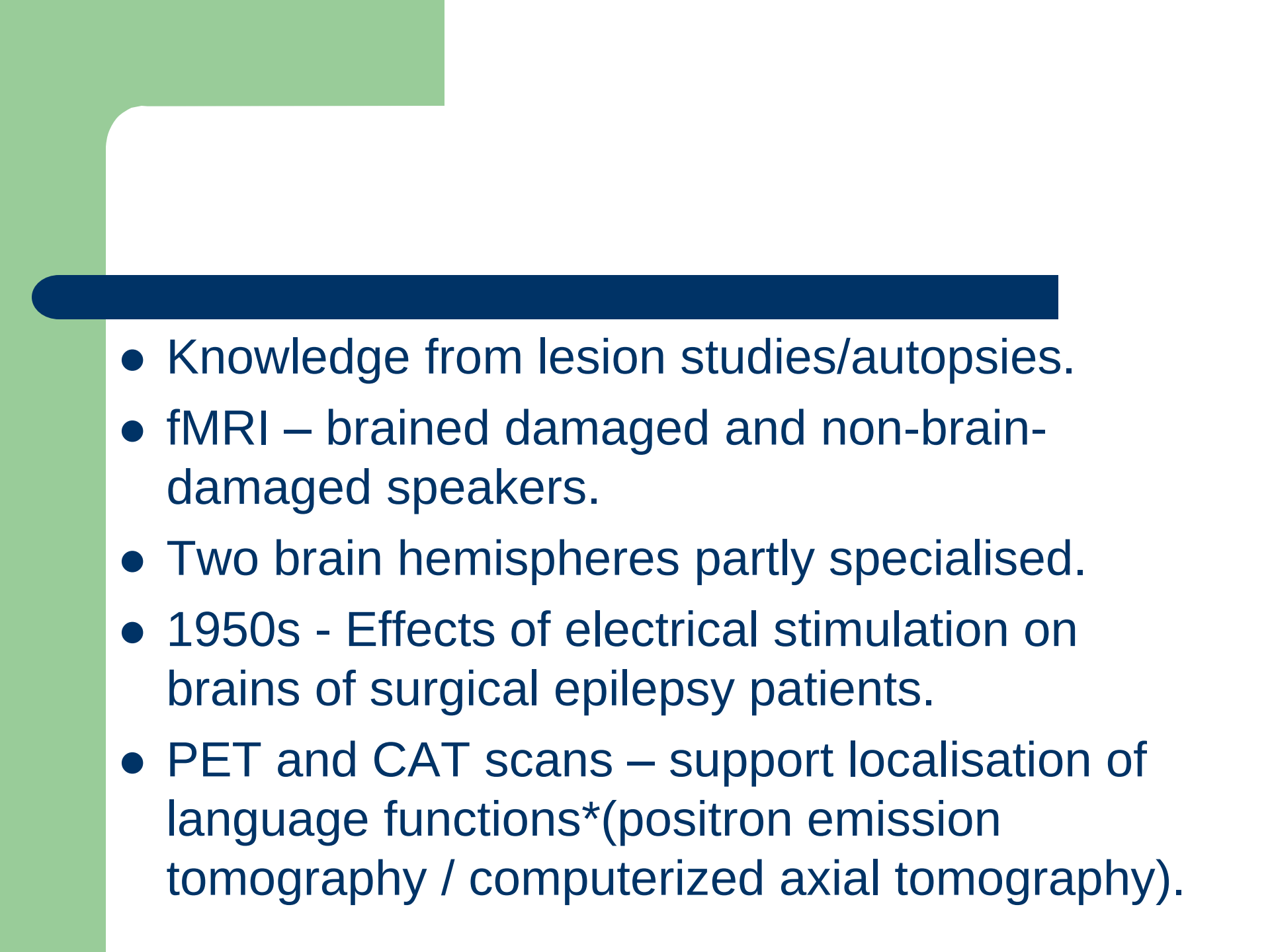
- *Piaget saw the human child – and his mind – as an active, constructive agent that slowly inches forward in a perpetual bootstrap operation, Chomsky viewed the mind as a set of essentially preprogrammed units, each equipped from the first to realize its full complement of rules and needing only the most modest environmental trigger to exhibit its intellectual wares (Gardner, 1980, p.xxiii).*

The biological basis of language

- Is language lateralised?
- 96% right-handed people/70% left-handed people – language functions predominantly localized in the left hemisphere (Rasmussen and Milner, 1977).
- Same left-hemisphere regions implicated in use of sign language with either hand (Corina et al., 2003).

The Human Brain and Language



- 
- Knowledge from lesion studies/autopsies.
 - fMRI – brain-damaged and non-brain-damaged speakers.
 - Two brain hemispheres partly specialised.
 - 1950s - Effects of electrical stimulation on brains of surgical epilepsy patients.
 - PET and CAT scans – support localisation of language functions*(positron emission tomography / computerized axial tomography).

- Early research on brain damaged patients.
- Broca (1860s) - identified the existence of a “language centre” in posterior portion of frontal lobe of left hemisphere.
- Aphasia:
- Partial or total loss of the ability to articulate ideas or comprehend spoken or written language, resulting from damage to the brain caused by injury or disease.

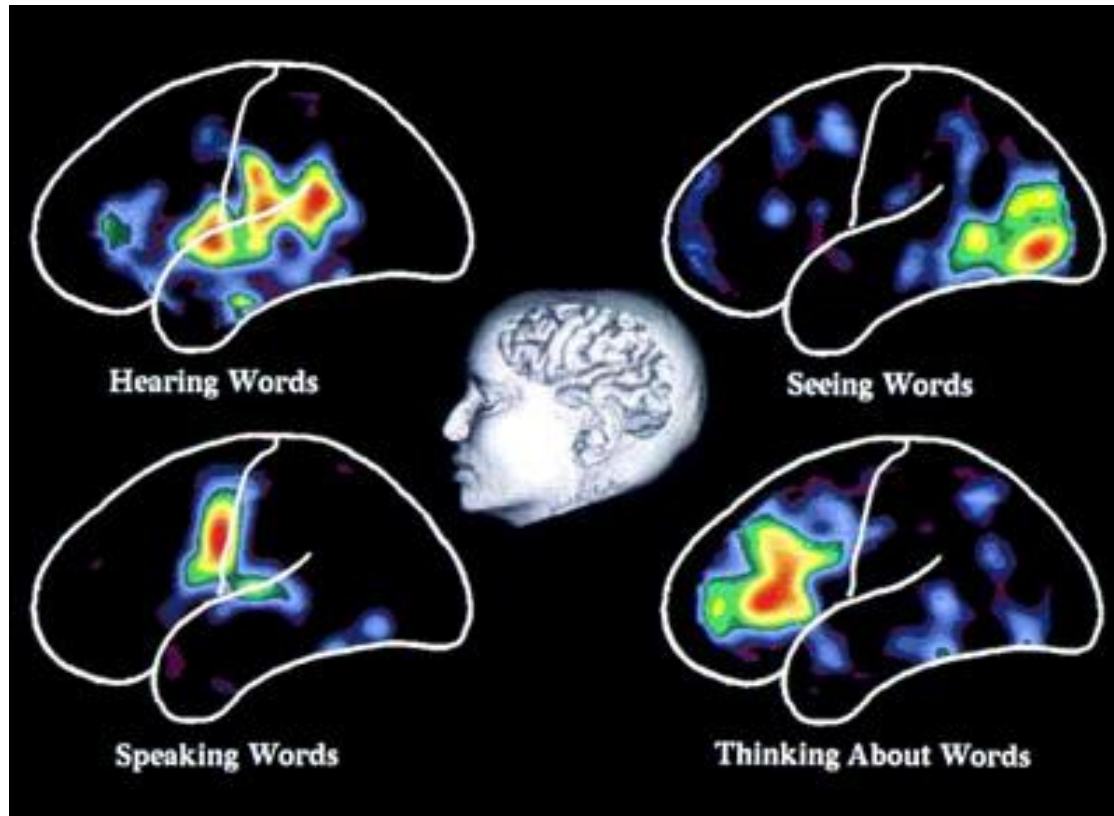
Methods of Neurolinguistic Investigation

- Lesion method (e.g. Damasio, 1988)
- Split brain patients
- Dichotic listening tasks (e.g. Kimura, 1967)
- Event-related brain potentials (ERPs)
- Brain imaging techniques (e.g. PET; fMRI;)

Event related brain potentials (ERPs)



Positron Emission Tomography (PET)



Functional Magnetic Resonance Imaging (fMRI)

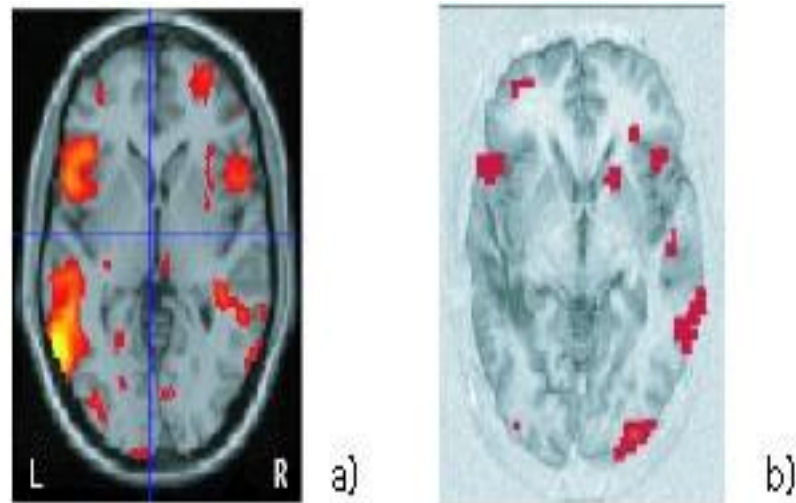


Fig.1 Activation from a sentence reading and word generation task in healthy subject (a) and in patient after a stroke in left temporal lobe (b).

Evidence of language as a left-hemisphere function

- Brain injury and aphasia.
- Split brain patients.
- Studies of undamaged adults.

Brain injury and aphasia

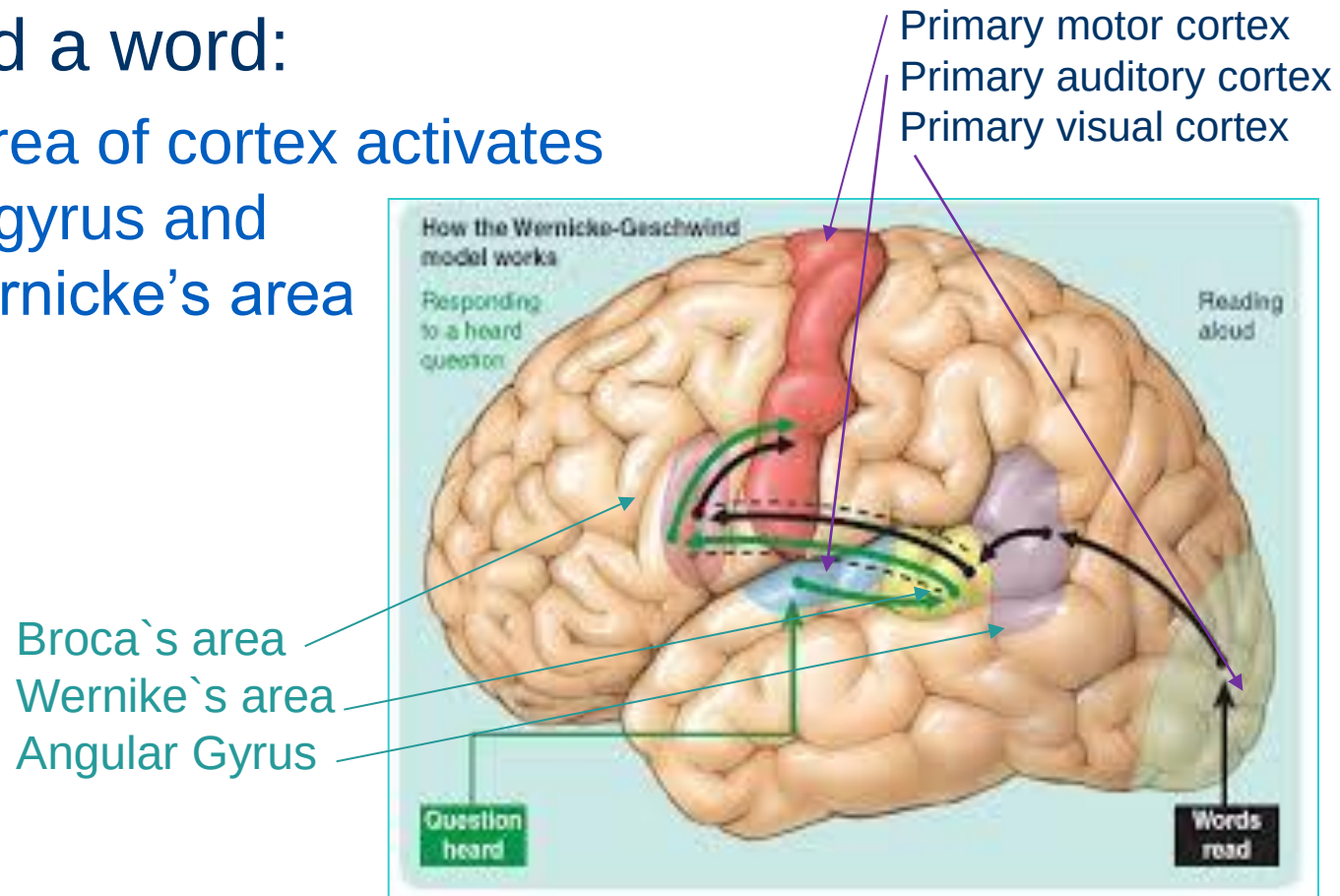
- Aphasia refers to a condition in which language functions are severely impaired.
 - Many different types of aphasia (e.g. Broca's aphasia; Wernicke's aphasia).
- Broca's aphasia – speech that consists of short strings of content words without grammatical morphemes.
Yes...ah...Monday...er...Dad and Peter H...and Dad...er...hospital...and...ah...Wednesday...Wednesday, nine o'clock...(Goodglass, 1979, p. 256)
 - Wernicke's aphasia – speech that is 'syntactically full but semantically empty' (Blumstein, 1988. p.203). *'I feel very well. My hearing, writing been doing well. Things that I couldn't hear from. In other words I used to be able to work cigarettes I didn't know how...Chesterfeela, for 20 years I can write it (Goodglass, 1993, p.86)*

The Wernicke-Geschwind Model

- Asserts that - Language generation flows from areas at the back to the front of the left hemisphere.
 - Hearing a word - information is transmitted from part of the cortex responsible for processing auditory information to Wernicke's area
 - If we speak that word - information flows to Broca's area where articulatory information is activated
 - It is then passed on to the motor areas responsible for speech

The Wernicke-Geschwind Model

- If you read a word:
 - Visual area of cortex activates angular gyrus and then Wernicke's area



Evidence of language not exclusively as a left-hemisphere function

- Right hemisphere contribution to language.
 - RH appears to control language to a greater extent in left-handed individuals.
 - RH plays a dominant role with regard to intonation patterns and some aspects of pragmatics (e.g. indirect requests, understanding sarcasm and jokes).
- Individual and sex-related differences.
 - more bilateral participation shown by females.

Chomsky's explanation of language development

- Assumes that language has a structure of grammar that is independent of language use – an independent rule system that determines the sentences that are grammatical or permissible.
- Grammars consist of a finite set of rules, and this set of rules is shared by all speakers and these rules allow the generation of an infinite set of mutually comprehensible sentences.
- Chomsky – argued that language is innate, species specific and biologically pre-programmed.
- In Chomsky's approach, the component of the brain devoted to language is referred to as the **language faculty**.
- This faculty in its initial state is genetically determined and similar across the human species – with the exception of those with serious pathology (Chomsky and Place, 2000)

Universal Grammar

- The theory accounting for this initial state is known as universal grammar.
- Universal grammar contains the system of grammatical rules and categories common to all of the World`s languages.
- The majority of the world`s languages are SVO languages (subject-verb-object).
- Welsh is not, it is VSO.

Two components of the Language Faculty

- A cognitive system to store information
 - Idealised linguistic competence.
 - Our abstract knowledge of our language. The judgements we would make if we had sufficient time/memory capacity.
- Performance systems to access and use information in differing ways
 - Actual linguistic performance.
 - Limited by time/memory capacity
 - Result – errors, hesitations etc.

The Language Faculty

- Proposes that the cognitive system interacts with two performance systems
 - The articulatory-perceptual system – (pronunciation).
 - The conceptual-intentional – (conceptual system – unique adaptation for communication).
- The innate language component traditionally labelled a 'language acquisition device' or LAD (Chomsky, 1965)
 - Bestows upon the child a host of information about grammatical classes and possible transformations.

- The LAD operates on raw linguistic data in children's language to produce the particular abstract grammar of the children's native tongue.
- The innate knowledge must consist of aspects of language that are universal to all languages.
- Children have the capacity to learn all languages so the LAD cannot be specific.
- Therefore, Chomsky's assertions relate to the **Innate nature of language acquisition**.
 - Ability of children to construct language beyond that which they hear in their social world.
 - Suggests that there is a **critical period** during which children can best learn language and that children that miss out on this will not be able to learn language to its full extent.

Criticisms of Chomsky

- Aitchison (1983) – we have an inbuilt puzzle-solving capacity, rather than grammar.
- Chomsky tends to ignore the fact that we don't all speak in grammatically correct sentences even though we're supposed to know what is and isn't correct.
- LAD? Evidence that language structure is acquired in a piecemeal fashion over many years.
- Chomsky also focuses on grammar to the detriment of semantics, disregarding meaning and the social situation in which language is normally produced. He disregards in particular the situation in which a child learns his first language.

Language Acquisition Socialization System (LASS)

- **Bruner** – interactionist theory of language development.
- Emphasized the importance of the mother-child dyad in the child's acquisition of language.
- Children learn the language that they have heard their parents speak.
- Adults:
 - Talk about events, objects
 - Question and correct linguistic errors

Critique of social interactionist explanations

- Meaningful social settings crucial for verbal interaction.
- But – explanations often rather vague and do not account for all aspects of language development.
- Evidence that innate knowledge is implicated.
- Likely that social interaction is mediated by cognitive processes. So...

The Cognitive basis of language

- Jean Piaget – nothing special about language – did not consider language a special faculty.
- Language develops along with cognitive and perceptual maturation, as a social process.
- Language needs certain cognitive precursors in order to develop (Sinclair-de-Zwart, 1973).
- E.g. Object permanence required to understand the concept of objects and names - large increase in vocabulary around 18 months.
 - emergence of relational words (e.g. up, more, gone) depend on emergence of knowledge about the ways in which object states can be transformed.
 - these words do emerge together around end of sensorimotor period (McCune-Nicolich, 1981).

Critique of Cognitive explanation

- No clear evidence to support the hypothesis and little current research on this.
- Acquisition of some language abilities before object permanence.
- Bruner (1964) argued language facilitates cognitive development.
- Also Vygotsky – believed that experience of local language sets parameters for how people are able to think.
 - But cognitive processes are implicated – as memory capacity increases so does knowledge and vocabulary.

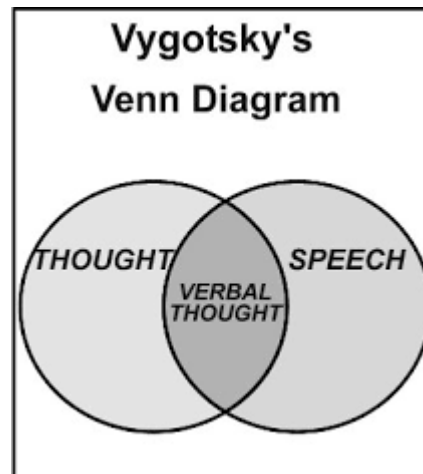
On a final note...

- What develops first, Language or Thought?
- Piaget (1950) – language is dependent on thought as it maps out our cognitive structures. We can speak, but they are just sounds without thought.
- Vygotsky (1981) – language is our most important tool, it transforms the way we think therefore it comes before thought. It enables us to form mental representations of our world to understand it.

Vygotsky (1981)

Language and Thought are initially separate, thinking is iconic (images) and language/sounds (cries) are expressive

Prelinguistic stage where perceptions and actions are via imagery



Pre-intellectual language, crying to express oneself

Verbal thought and rational speech, by age 7, two functions – internal monitoring and external communication.

<https://grammarvibe.com/>

Thank You
for
Listening



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