

Paul Broca
1824 -1880



Carl Wernicke
1848 -1905

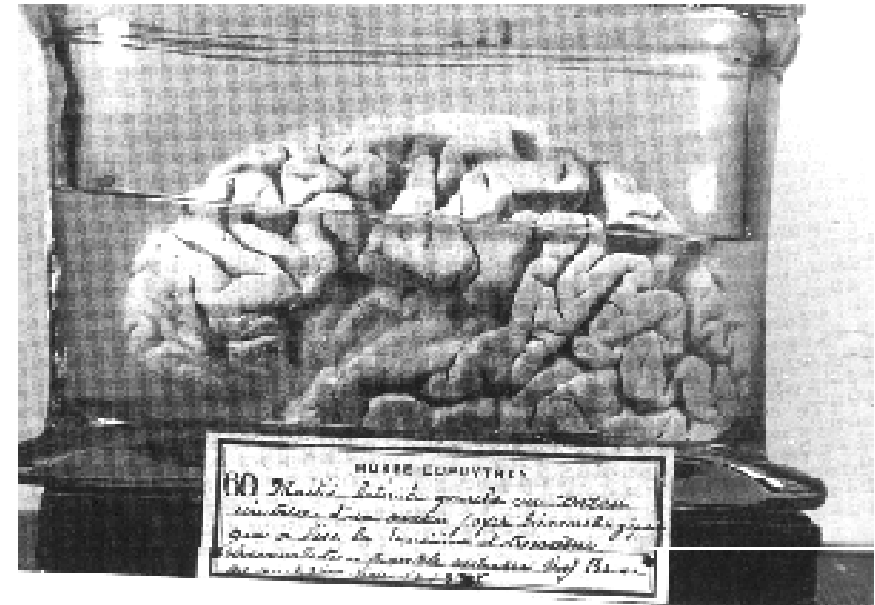


Broca, Wernicke, and the birth of the “Classic model”

Paul Broca & Broca's aphasia



- First localization of language function (1861).
- Patient could only produce a single syllable “tan”.
- Severe production problem.
 - **Broca's aphasia**
- Lesion in the posterior part of the left inferior frontal gyrus
 - **Broca's area**



Paul Broca & Broca's aphasia

- First localization of language function (1861).
- Patient could only produce a single syllable “tan”.
- Severe production problem.
 - **Broca's aphasia**
- Lesion in the posterior part of the left inferior frontal gyrus
 - **Broca's area**



Production problems of Broca's aphasia

- Slow, laborious, **non-fluent** speech. Output limited to short utterances of less than four words.
- Speech understanding and reading relatively intact, but writing is limited.
- Speech samples:
 - <https://www.youtube.com/watch?v=JWC-cVQmEmY>

COOKIES JAR'S FALLING
~~ON~~ SWING ROLLING
FALLING OFF STOOD
MOM QAGATE ADD

Broca's aphasic writing sample

<https://duncanlakespeechtherapy.com/dlst-blog/strokes-and-communication-aphasia/>

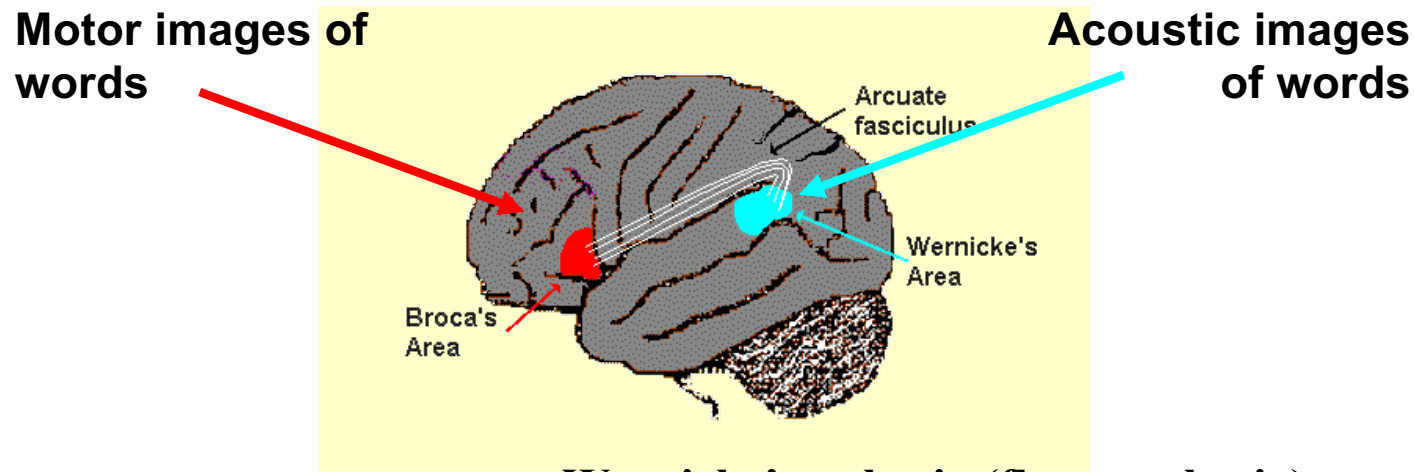
Wernicke's aphasia

- A language problem distinct from Broca's aphasia first described by Carl Wernicke (1874).
- Damage to the boundary of the temporal and parietal lobes → Wernicke's area.
- Fluent but disordered speech. Similar writing.
- Impaired understanding of speech. Impaired reading.
- Speech sample:

□ <https://www.youtube.com/watch?v=3oef68YabD0>



The classic model



Broca's aphasia (non-fluent aphasia):

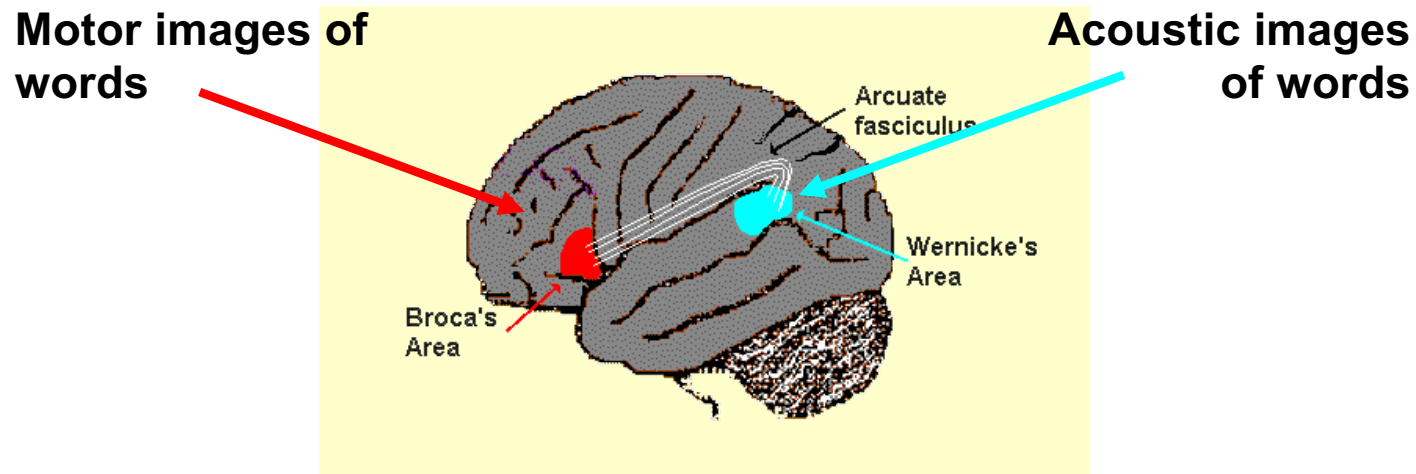
Ah ... Monday ... ah Dad and Paul [patient's name] ... and Dad ... hospital. Two ... ah doctors ..., and ah ... thirty minutes ... and yes ... ah ... hospital. And, er Wednesday ... nine o'clock. And er Thursday, ten o'clock ... doctors. Two doctors ... and ah ... teeth. Yeah, ..., fine. (Goodglass, 1976)

Wernicke's aphasia (fluent aphasia):

Examiner: What kind of work did you do before you came into the hospital?

Patient: Never, now mista oyge I wanna tell you this happened when happened when he rent. His - his kell come down here and is - he got ren something. It happened. In these ropiers were with him for hi - is friend - like was. And it just happened so I don't know, he did not bring around anything. And he did not pay it. And he roden all o these arranjen from the pedis on from iss pescid. (Kertesz, 1981)

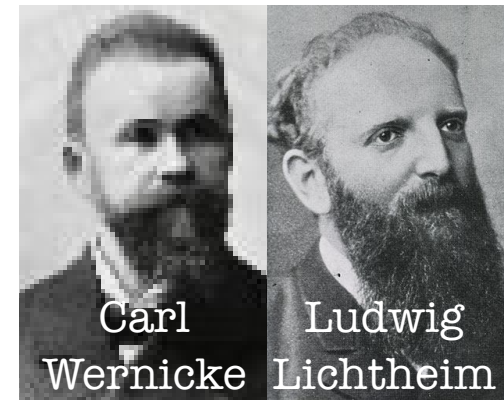
The classic model: Conduction aphasia



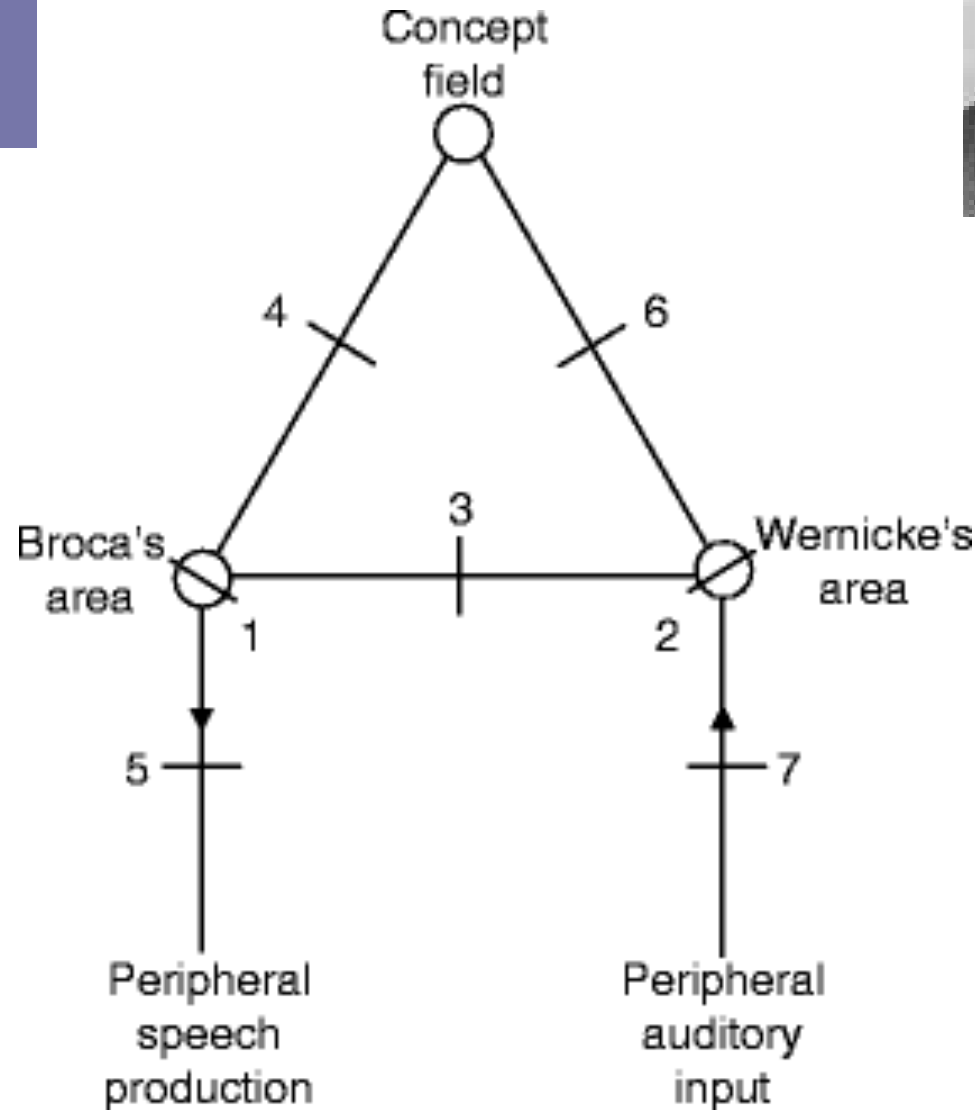
- Lesion to the arcuate fasciculus (= the bundle of nerves connecting Wernicke's and Broca's areas).
- Results in inability to repeat words, especially nonwords.

Wernicke-Lichtheim model (aka “Classic model”)

Neurally distributed
semantic representations



Articulatory
representations
in left inferior
frontal cortex



Phonological
representations
in posterior
temporal gyrus

Connection between Broca's & Wernicke's areas:
arcuate fasciculus (3)