Psycholinguistics

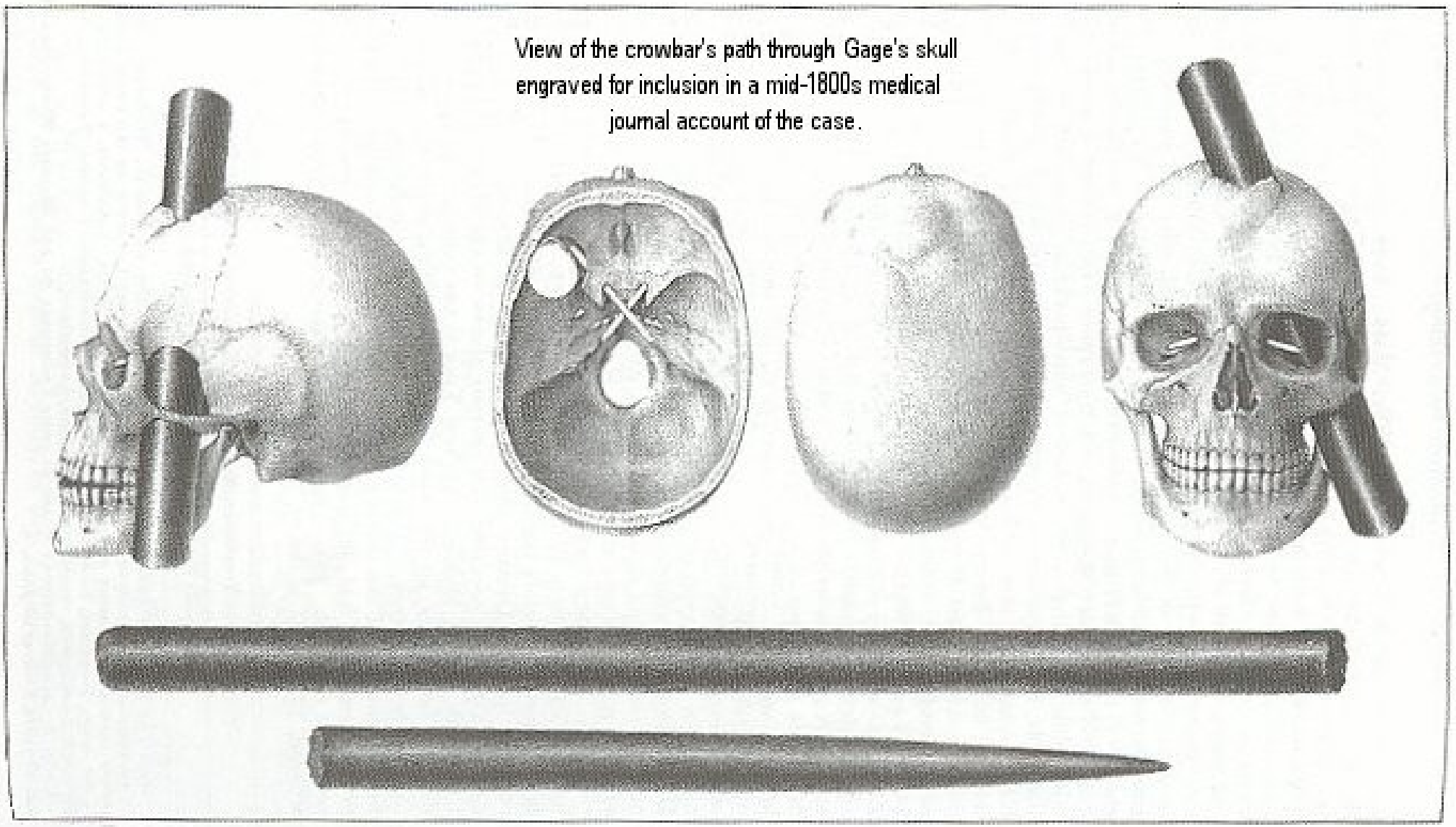
Brain specialization

Brain contains several language centers (in most of the people in the left hemisphere), for Example:

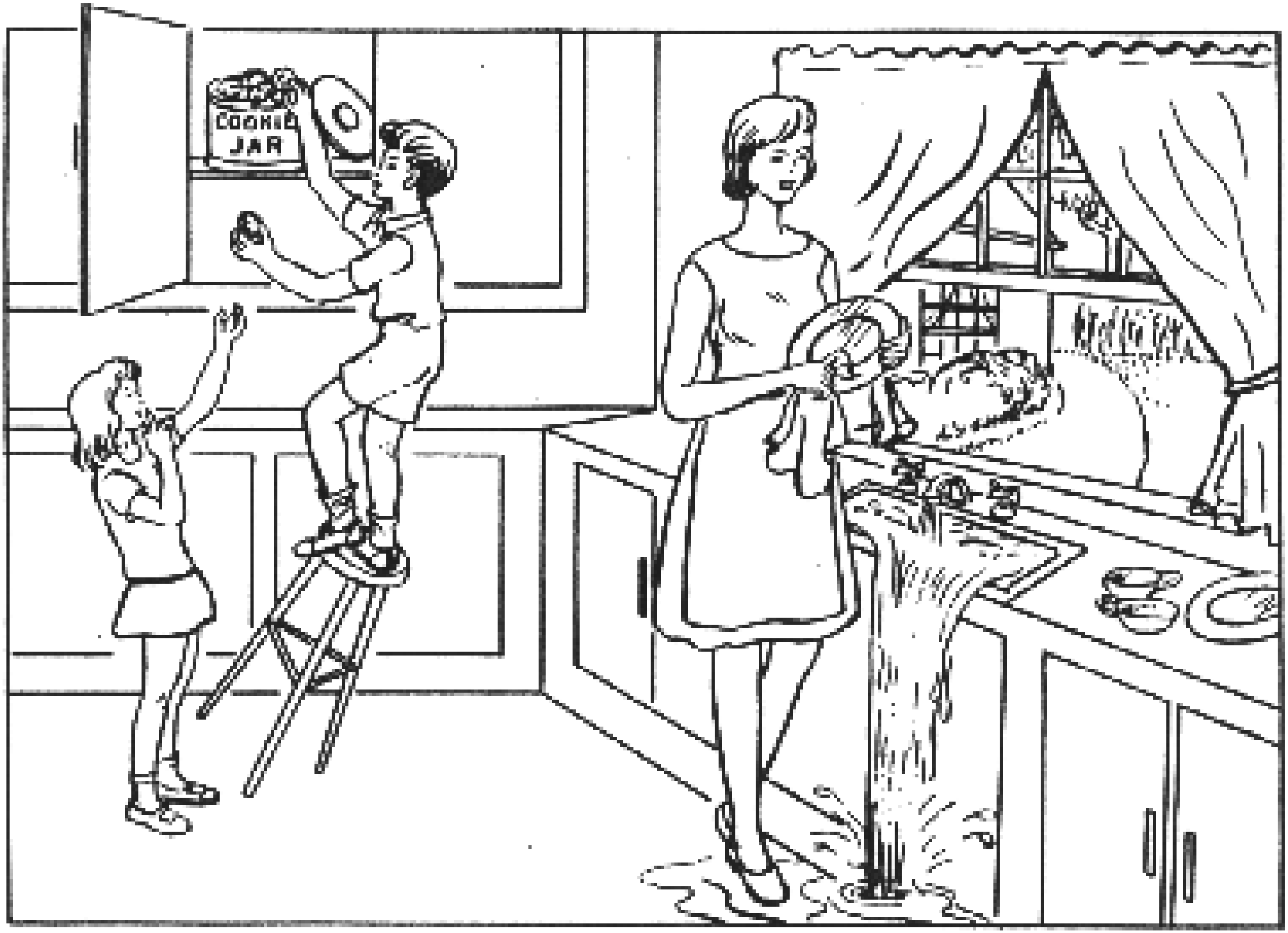
- Broca's area – responsible for
  - articulation (moving one's tongue, jaw, etc.)
  - expressing grammatical functions – expressed by morphemes (plural) or words (determiners)

- Wernicke's area – "lexicon"; responsible for understanding and selection of words

Phineas Gage 1848 accident



Aphasias


COOKIE
JAR

Broca's aphasia

B.L.: Wife is dry dishes. Water down! Oh boy! Okay Awright. Okay ... Cookie is down ... fall, and girl, okay, girl ... boy ... um ...

Examiner: What is the boy doing?

B.L.: Cookie is ... um ... catch

Examiner: Who is getting the cookies?

B.L.: Girl, girl

Examiner: Who is about to fall down?

B.L.: Boy ... fall down!

Wernicke's aphasia

C.B.: Uh, well this is the ... the [dödöü] of this. This and this and this and this. These things going in there like that. This is [sen] things here. This one here, these two things here. And the other one here, back in this one, this one [gös] look at this one.

Examiner: Yeah, what's happening there?

C.B.: I can't tell you what that is, but I know what it is, but I don't now where it is. But I don't know what's under. I know it's you couldn't say it's ... I couldn't say what it is. I couldn't say what that is. This shu– that should be right in here. That's very bad in there. Anyway, this one here, and that, and that's it. This is the getting in here and that's the getting around here, and that, and that's it. This is getting in here and that's the getting around here, this one and one with this one. And this one, and that's it, isn't it? I don't know what else you'd want.

Aphasias

- Broca's aphasia – Agrammatic speech – telegraphic, no function words, no morphological inflection, with a lot of pronunciation errors. Word order usually correct. The sentences have meaning.
- Wernicke's aphasia – Fluent but meaningless speech. It is normal from the grammar point of view (normal intonation, inflection, preposition, auxiliaries, etc.), but they have problems with content words (esp. nouns), they also often create new words.

Other aphasias

- Alexia – inability to read. Looks like more severe dyslexia, but has different reasons.
  - Alexia – result of a brain damage; cannot be corrected by training.
  - Dyslexia – result of innate structural brain difference; with special training, can be almost always overcome.
- Agraphia – inability to write.

To learn more

- William H. Calvin and George A. Ojemann: Conversations with Neils Brain
  - http://williamcalvin.com/bk7/bk7.htm
- Oliver Sacks: The Man who Mistook his Wife for a Hat (Ch. 9) and An Anthropologist on Mars
- The Secret Life of the Brain at PBS
  - http://www.pbs.org/wnet/brain/

Online or offline processing?

Garden path sentences

- The horse raced past the barn fell.
- The cotton clothing is made of grows in Mississippi.
- I convinced her children are noisy.
- While the man hunted the deer that was brown and furry ran into the woods.
- The doctor told the woman that he was in love with to leave

Garden path sentences

- The horse [raced past the barn] fell.
- The cotton [clothing is made of] grows in Mississippi.
- I convinced her [children are noisy].
- [While the man hunted] [the deer that was brown and furry ran into the woods].
- The doctor told the woman [that he was in love with] to leave

Acquisition theories

- Imitation Theory
- Reinforcement Theory
- Active Construction of a Grammar Theory

Imitation Theory

“Children learn language by hearing and imitating what they hear”

Buts of the Imitation theory

- Many things they say, they never hear around.
  - a my pencil
  - two foots
  - Cowboy did fighting me.
  - Cat stand up table.

Buts of the Imitation theory

- They are not good at imitating

Parent	Child
He’s going out	He go out.
That’s an old-time train.	Old-time train.
Where can I put them?	Where I can put them?

Reinforcement Theory

“Children figure out what’s correct because parents reward proper uses of language and discourage improper uses.”

Buts of Reinforcement Theory

- Parents seldom correct the form of child's utterances, usually just content.
- Even if they (sometimes) do, it does not have much effect.

Buts of Reinforcement Theory

Child: Want other one spoon, Daddy.
Father: You mean, you want “the other spoon”.
Child: Yes, I want other one spoon, please, Daddy.
Father: Can you say “the other spoon”?
Child: Other ... one ... spoon.
Father: Say ... “other”.
Child: Other.
Father: Spoon.
Child: Spoon.
Father: Other ... spoon.
Child: Other ... spoon. Now give me other one spoon?

Active Construction of a Grammar Theory

"Children create grammars and continually modify them until they are identical to adult grammars."

Active Construction of a Grammar Theory

- The most promising theory.
- Children look for general patterns, systematic occurrences in language around them, deriving rules from them.
- At every point in time, children have a fully functional grammar (set of rules) in their heads.
- They start with simple grammar (overgeneralize or undergeneralize) slowly increasing complexity.

ACG – overgeneralizations

- Morphological rule overgeneralizations
- Word meaning overgeneralizations – words denote more than they do to adults, but there is a general characteristics which all objects share.
  - e.g. doggie = any animal, moon = anything round (cakes, letter o, etc.)
- Word meaning undegeneralizations – Words denote less than they do to adults.
  - e.g. ball = a ball under the sofa

Stages of Acquisition

1. The Babbling Stage – around 6 months
2. The One-Word stage – around 1 year
3. The Two-Word stage – around 2 years
4. The Telegraphic Speech stage

The age connected with each stage can be slightly different for different children. Surprisingly, no connection with the child's IQ.

The Babbling Stage

- Children begin to babble regardless of what linguistic environment they are growing up in.
- Even deaf children babble. Their early babbling is very similar to that of normal children.
- Easy to produce sounds ([b], [p], [m], [a]) are most common.
- But they produce many different sounds, and many of them are not found in the environment around them.
- There is no link between sound and meaning.
- There is no biological need for babbling.
- Children babble for social reasons. They learn to interact with others by the responses their babbling receives.
- Children who are neglected and receive no encouragement from parents stop babbling.

The One-Word stage

- The same sequence of sounds (“words”) begins to mean the same thing.
- Children can understand multi-word utterances, but they utter only single words.
- They use words like *cookie, drink, bad, no,* but never functional words like *in, the, and.*

The Two-Word stage

- First, just putting two words next to another (each has it's own intonation)
- Later, the two words form a simple sentence
  - word-order expresses semantic roles
  - intonation contour extends over both of them
- Virtually no syntactic markers, i.e. no inflection for number, tense, etc.
- Pronouns are rare (*me* being the most frequent, sometimes *you*)
- Examples: *hi Mommy, baby sleep, byebye doggie, here pretty, allgone doggie, ...*

The Telegraphic Speech stage

- There is no specific three-word stage.
- Usually function words are missing
- Almost always the correct SVO word-order (in English)
- Function words and morphemes come in gradually.
- There tends to be a specific order in which function morphemes are acquired.
- Children seem to constantly change/add rules.