LNGT0101
Introduction to Linguistics

Lecture #4
Sept 28th, 2015

Discussion of the 'frosh' article

- http://chronicle.com/blogs/linguafranca/2015/09/21/frosh/

Transition from last class

- Human language has at least 3 design features that we do not seem to find in other animal communication systems: displacement, creativity, and recursiveness.
- Attempts to teach human language to animals do not show real learning; rather, they show stimulus-response associations or effects of dressage.
- One influential hypothesis: The language faculty is a biologically-endowed species-specific ability.

Transition from last class

- Evidence:
- The poverty of the stimulus argument: Plato's paradox.
- Uniformity of language acquisition by children.
- Today we discuss further aspects of the biological basis of language.

Why do children have it easy?

- Ever wondered why you're having hard time learning a foreign language, even though you had no trouble whatsoever learning your first language?
- A critical period?

A critical period for language acquisition?

- So, if language has a biological component, we have an answer: Certain biological abilities follow a timetable and then get either "turned off" or "degrade" considerably, as Eric Lenneberg suggested for language in 1967.
- How do we test this hypothesis?

A critical period for language acquisition?

- The cases of so-called "wild children".
- **Isabelle** discovered at the age of 6 with no language skills, but within a year she learned to speak and was able to function normally in school.
- **Genie** discovered at the age of 13, but her language development never matched what normal children do ("bathroom have big mirror").
- **Chelsea** misdiagnosed as mentally ill, fitted with hearing aids at 31, but after 12 years of training her language level remained that of a 2 and ½ year old ("hit ball," "cupboard put food").

But …

- But why should we assume a separate faculty for language? Couldn't language be simply part of our general intelligence as human beings.

Language and intelligence

- The main argument typically cited against language being part of our general intelligence is the so-called "***double dissociation***" argument.
- Put simply, there are cases where general intelligence is affected but language ability remains intact. And there are cases where linguistic ability is affected, but other cognitive abilities remain intact.

Language and intelligence

- ***Turner's Syndrome*** **and** ***Williams Syndrome***.
- ***Savants***: Cf. the discussion of the cases of Laura and Christopher in Chapter 10 of the textbook.
- ***Specific language impairments*** *(SLIs)*: The case of the KE family (first studied by Myrna Gopnik and associates).

The KE family

Grandparents		*F(76)*—M (deceased)			
	|	|	|	|	|
Parents	***F(48)***–M	M(47)–F	***F(45)***–M	***M(42)***–F	***F(40)***–M
	|	|	|	|	|
Children	F(19) ***M(18)*** F(14) ***M(10)***	M(22) F(20)	F(23) F(19) ***F(14)*** ***F(13)*** ***M(10)***	M(12) F(9) ***F(7)*** ***F(4)***	***M(19)*** M(17) M(16) F(14) ***M(12)*** M(10) ***F(9)*** M(8) ***F(8)***

The KE family

- The linguistic performance of members of the KE family who had the SLI was characterized by:
- Slow speech,
- frequent stoppage for corrections, and
- absence of inflections like plural and tense.
  - The boy ***eat*** three ***cookie***.
  - Every day he walks 8 miles. Yesterday he …
    Response: ***Walk***.
- Language therapy did not help.
- Notice, however, that all cognitive abilities remained intact.

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So, …

- We thus seem to have good evidence for:
- A mental subconscious grammar.
- Uniform acquisition of language by children.
- A critical/sensitive period for learning a language natively (with the caveat we mentioned in discussion).
- Dissociation between language and intelligence.

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Language and the brain

- Language is neurophysiologically represented in the brain.
- For one thing, for most right-handed individuals, language is represented in the left cerebral hemisphere of the brain.

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Language and the brain

- Since we cannot operate on the brain directly, we look for opportunities when this becomes possible.
  - Cases of language impairment due to head injury.
  - Making use of technology that allows us access to how the brain functions when it comes to language (measuring blood flow, or electric and magnetic fields associated with certain linguistic tasks).

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Aphasia

- Aphasia is a language impairment that results from damage to certain areas in the brain, due to a stroke, trauma to the head, brain infection, etc.
- There are multiple types of aphasia, depending on where the trauma takes place.

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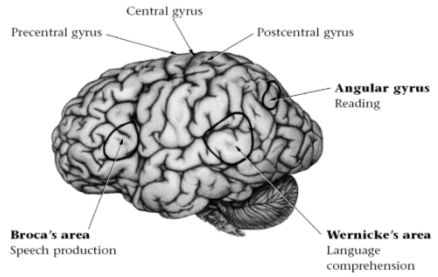

Figure 14.4 Language processes in the left hemisphere. Damage to Broca's area is usually associated with nonfluent speech and difficulty processing complex syntactic patterns. Damage to Wernicke's area (see Section 3.2) is usually associated with comprehension disturbances. Damage to the area around the angular gyrus results in reading impairment.

From O'Grady et al, 2005.

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Broca's aphasia

- Broca's aphasics typically have difficulty producing speech:

  … har eat … wit … poon

  (Intended sentence: '*It is hard to eat with a spoon.*')
- They typically have problems with ***function words***, e.g., articles, pronouns, prepositions, auxiliary verbs, and inflectional suffixes, from the sentence. Example1 Example2

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Wernicke's aphasia

- In *Wernicke's aphasia*, patients' speech sounds very good: There are no long pauses, sentence intonation is normal, function words are used, and word order is syntactically correct. The problem is that their speech rarely makes any sense:

  I could if I can help these this like you know … to make it. We are seeing for him. That is my father.
- Example1 Example2

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Using technology to study language and the brain

- CT scanning → static image
- PET → invasive
- fMRI → less invasive but expensive
- MEG → high time resolution but also expensive

- Cf. the relevant sections in Chapter 10 of the textbook.

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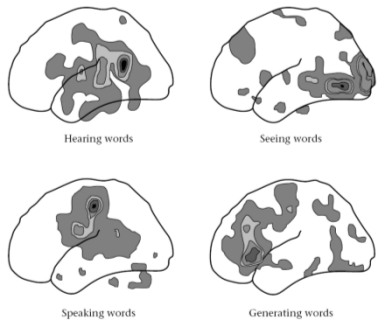

Figure 14.5 PET scans show how blood flow to the brain shifts to different locations depending on which task is being performed.

From O'Grady et al, 2005.

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PET

- Watch a PET experiment for language processing here:
- https://www.youtube.com/watch?v=5KXIDUo18aA

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Goals of linguistic theory

- There are three main questions that linguists are primarily concerned with:
  a. What is it that we know when we know a language?
  b. How does this knowledge arise in the mind of the native speaker?
  c. How is this knowledge put to use?

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Grammar is a 'mental' entity

- The answer to the first question is to study language as a system of knowledge in the mind of the speaker/hearer, that is, a ***grammar***.
- Linguists typically break down a grammar into subcomponents and work on each:

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Main subfields of linguistics

- **Phonetics**: The study of the articulation and perception of speech sounds.
- **Phonology**: The study of the sound system in a language.
- **Morphology**: The study of word structure.
- **Syntax**: The study of sentence structure.
- **Semantics**: The study of meaning of words and sentences.

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Other subfields within linguistics

- The answer to the second question is in the study of **first language acquisition**.
- When language is put to use, other phenomena arise that are equally worthy of investigation.
- So, linguists raise questions for the mutability of linguistic knowledge, i.e., the fact that language changes over time. This is the domain of **historical linguistics**.
- Linguists also raise questions for how we come to use language in social contexts and how people's forms of speech vary (the so-called *dialects*). This is the domain of **sociolinguistics**.

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Other subfields within linguistics

- **Psycholinguistics**, on the other hand, studies the cognitive processes that we engage in in the production and perception of language.
- **Neurolinguistics** deals with how language is physiologically represented in the brain.
- **Computational linguistics** is concerned with ways to model natural languages so they can be used by machines.

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Course plan henceforward

- We will cover most of these (check the syllabus), though you have to remember this is primarily an introduction to the study of language as a system, so all of the first six weeks of the semester and perhaps a lecture or two in the second half will be devoted to the study of the five main components of linguistic knowledge.
- Importantly, though, understanding these is crucial to understanding other areas of linguistics, hence the way the syllabus is organized.

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Next class agenda

- We figure out the system underlying word-structure in human language.
- Finish reading Chapter 2, pp. 33-49.
- Also take a look at the exercises from the textbook on Zulu (pp. 67-68), Swedish (pp. 68), Cebuano (p. 69), and Turkish (p. 73).

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