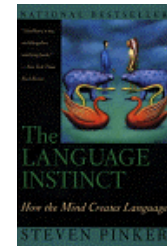


Language

Language as a Human Instinct

“Man has an instinctive tendency to speak, as we see in the babble of our young children, while no child has an instinctive tendency to bake, brew, or write.”

--Charles Darwin



Language as a Human Instinct

- Universality of complex language within, across societies.
 - Within: Black English Vernacular (“Ebonics”):
 - Double negative, *ain’t* (“You ain’t going’ to no heaven”) are **not** “ignorant”
 - In many cases **more** complex than Standard English: *He be workin’* vs. *He workin’*.
 - Across: 6000 languages, all complex!

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Language as a Human Instinct

- Universality across, within societies.
- Standard design: Chomsky's "Universal Grammar"



- Learnability and Child Language Acquisition



Language as a Human Instinct

- Double dissociation of language and cognition:
 - Aphasia (e.g., Broca's Aphasia)
 - Retardation sparing language (Williams Syndrome).

In describing her future aspirations, Crystal, a 16-year-old adolescent, states: "You're looking at a professional book writer. My books will be filled with drama, action, and excitement. And everyone will want to read them. I'm going to write books, page after page, stack after stack . . . I'll start on Monday." Crystal describes a meal as "a scrumptious buffet," an older friend as "quite elegant," and her boyfriend as "my sweet petunia"; when asked if someone could borrow her watch, she replies "My watch is always available for service." Crystal can spontaneously create original stories---she weaves a tale of a chocolate princess who changes the sun color to save the chocolate world from melting; she recounts with detail a dream in which an alien from a different planet emerges from a television. Her creativity extends to music; she has composed the lyrics to a love song.

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Williams Syndrome

- Deletion of 10 adjacent genes on Chromosome 7: Elastin, LIM-Kinase1
- Retarded, poor spatial cognition, social
- Excellent language



How Language Works: Two Tricks

1. Memorized words (Saussure: the “arbitrary sign”)
 - an entry in the mental dictionary:

duck

sound: “duk”

meaning:



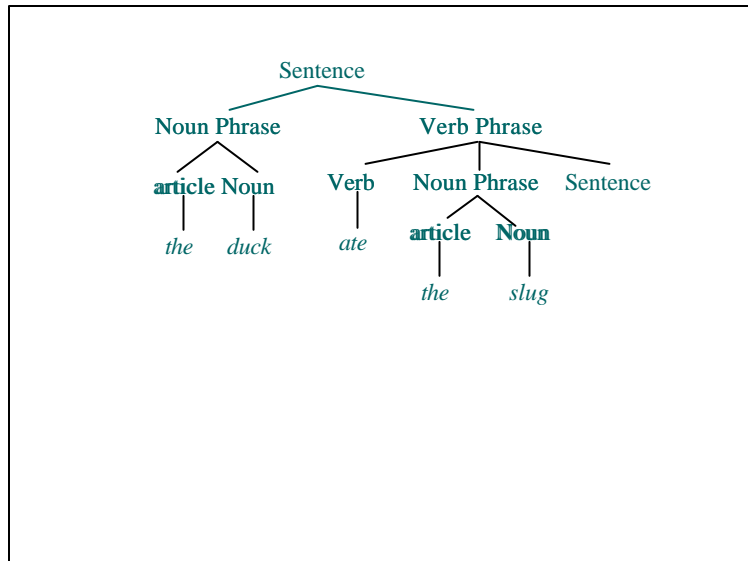
Words cont.

- Size of vocabulary: ~ 60,000 words
- Learning rate: 1 every 2 hours

The Second Trick: Combinatorial Grammar

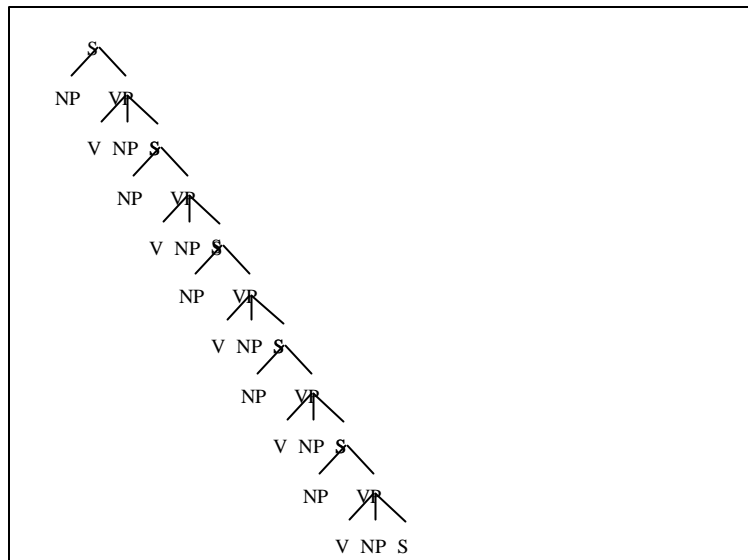
- A Sentence consists of a Noun Phrase (the subject) followed by a Verb Phrase (the predicate).
 $S \rightarrow NP VP$
- A Noun phrase consists of a Determiner (article) followed by an Adjective followed by a Noun.
 $NP \rightarrow det A N$
- A Verb Phrase consists of a Verb followed by a Noun Phrase (the object) followed by a Sentence (a complement).
 $VP \rightarrow V NP S$

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What Grammar Gives Us

- 1. Expressiveness:
 - Dog bites man.
 - Man bites dog.
- 2. Vastness:
 - Number of sentences =
 $(\# \text{ Words possible at a position})^{\text{Length of sentence}}$
- 3. Infinity through *recursion*



- *They both bore it as though in deliberate flagellant exaltation...*
- *Faulkner wrote "they both bore it as though in deliberate flagellant exaltation ..."*
- *Guinness noted that Faulkner wrote ...*
- *Pinker mentioned that Guinness noted that Faulkner wrote ...*
- *Who cares that Pinker mentioned that Guinness noted that ...*

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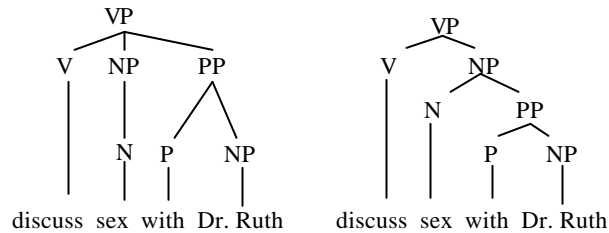
Major Components of Grammar:

• 1. Syntax

– Order: *Dog bites man* versus *Man bites dog*.

– Constituency:

- *On tonight's program, David Letterman will discuss sex with Dr. Ruth*



Syntax, cont.

• Predicate-Argument Structure:

– *Man Fears Dog* vs. *Man Frightens Dog*

– *fear*: “subject = experiencer, object = cause”

– *frighten*: “subject = cause, object = experiencer”

Syntax, cont.

• Transformations (movement):

Man is bitten by dog

– Deep structure:

is bitten man by dog

– Transformation: “Move NP to empty slot”

man_i is bitten [~~man~~_i] by dog
man man

Components of Grammar, cont.: Morphology

English:

duck, ducks

quack, quacks, quacked, quacking

Latin:

– *is*: Nominative (Subject)

– *em*: Accusative (Object)

• *Canis hominem mordet.*

• *Hominem canis mordet.* (not news)

• *Homo canem mordet.*

• *Canem homo mordet.* (news)

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Components of Grammar, Continued Phonology

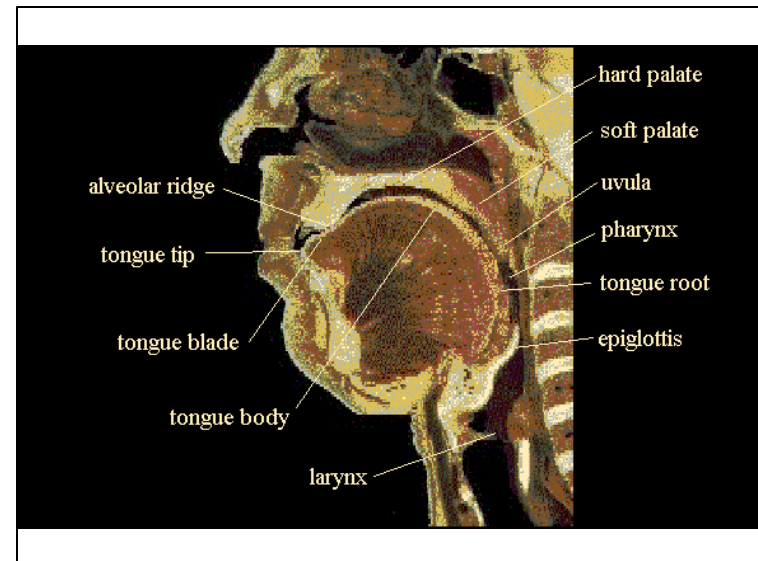
Duality of patterning.

- Formation rules:
 - *bluck* versus *krechtz*
- Adjustment rules:
 - *walked* (t)
 - *jogged* (d)
 - *patted* (id)

Language Interfaces

Speech Articulation

- The source-filter model
 - larynx: buzzy sound source
 - pharynx (throat); mouth; lips; nose: changeable resonators



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Language Interfaces

Speech Comprehension

- The illusion of segmentation.

- I scream,
You scream,
We all scream
For ice cream.
- Mairzey doats and dozey doats
And little lamsey divey,
A kiddleydivey do,
Wouldn't you?
- Fuzzy Wuzzy was a bear,
Fuzzy Wuzzy had no hair.
Fuzzy Wuzzy wasn't very fuzzy,
Was he?

Language Interfaces, continued

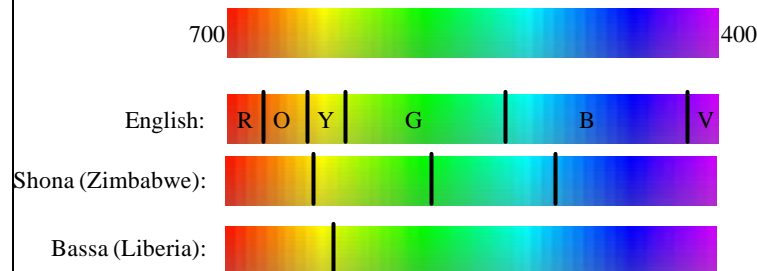
- Pragmatics and inference.
 - *Can you pass me the salt?*
 - Maxwell Smart: "Hymie, give me a hand."
 - Marsha: I'm leaving you.
John: Who is he?

Language and Thought

- Whorf-Sapir hypotheses:
- Linguistic determinism: one's language determines what one can perceive, think, remember
- Linguistic relativity: one's language *affects* what one can think, perceive, remember
- Strong (think, perceive) vs. Weak (remember) vs. Really Weak (think while using language)

Evidence for Weak Versions of Linguistic Relativity

- Crosslinguistic differences in morphology, kinship, snow, colors



Evidence for Weak Versions of Linguistic Relativity

- Crosslinguistic differences in morphology, kinship, snow, colors.
- Effects of language on sorting and remembering color chips.
- Studies in Gray textbook.

Reasons to doubt strong linguistic determinism and relativity:

- Reexamination of evidence for linguistic relativity:
 - snow: *snow, sleet, slush, hail, flurry, blizzard, powder, hardpack,*
 - color universals:

- **WHITE** **GREEN** **PURPLE**
 < **RED** < < **BLUE** < **BROWN** < **PINK**
BLACK **YELLOW** **ORANGE**
 GRAY

- focal (prototypical) vs. peripheral colors:



Thought without Lanugage:

- Thinking in nonlinguistic animals, e.g., addition and subtraction in infants & monkeys.

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Thought without Lanuage:

- Thinking in nonlinguistic animals, e.g., addition and subtraction in monkeys.
- Thinking in nonlinguistic adults: deaf adults without sign language.
- Nonlinguistic thinking in linguistic adults:
 - Imagery
 - "Gist" (abstract propositions, semantic representations, mentalese)
 - Nonlinguistic thinking underlying language: filling in between the lines; resolving ambiguity

Language is Inexplicit & Sketchy: Much has to be filled in

- Ralph is an elephant.
Elephants live in Africa.
Elephants have tusks.
- Wet hair. Lather. Rinse. Repeat.

Language is ambiguous: Intended meaning must be selected

- **Ambiguity: One String of Words, Two Meanings**
(Therefore Words ¹ Meaning)
- *Visiting professors can be boring.*
- *My son has grown another foot.*
- *Ingres liked to paint his models in the nude.*
- *Bundy Beats Date With Chair*
- *Hershey Bars Protest*
- *Stud Tires Out*
- *Stiff Opposition Expected to Casketless Funeral Plan*
- *Woman Reports Sex Taking Place Between Parked Cars*