

# Language Structure

Psy 20

Prof Camerer

Why study language?

- separates humans from other species
- death blow to behaviorism
- practical importance (education)
- special methods-- e.g., eye movements

linguistics-- study nature of language, not how people speak

language is **productive** (many sentences) but **regular** (systematic)

grammar (acceptability rules)--

syntax (word order & inflection)

semantics (meaning)

phonology (pronunciation)

## Syntax

Phrase structure

hierarchical division of sentence into units

search for "rewrite rules" that generate

all acceptable sentences

no unacceptable sentences

Pause structure "marks" phrase structure (1.03 secs vs..75)

## Speech errors

"slips of the tongue" systematic, reveal structure

e.g. repeat whole phrase as if to "erase" mistake

"That's what Jack told me  
Jane told me"

"Spoonerisms"  
errors within phrases

errors of anticipation (take my bike --> bake my bike)

errors of exchange (coin toss--> toin coss)

stranded morpheme

I'm not in the read for mooding

"ing", "ed" is stranded (left behind)

do not observe

I'm not in the mooding for read

--> suggests general structure noun for verb-ing  
comes first

## **Language and thought**

What effect does language have on thinking?

behaviorists: None. No "thought".

Destroyed by Smith's curare exp.

**Whorfian hypothesis:** Language guides thought  
If you can't say it, you can't think it.

(Like umpire joke: I call them as I see them (objectivist); I see them as I call them (Whorfian); They're nothing until I call them (social constructionist))

How to test?

color words: English, 11 basic words.  
Dani Indonesians, 2-- mili (dark,cold) mola (bright, warm)

English speakers remember "focal colors" better  
Can Dani remember their two focal colors better than others after seeing them visually (despite no words)?

No. The Dani can "see" colors they cannot name. Evidence against Whorf.

## **Language Acquisition**

How does language develop?

two word utterances (reduced-form sentences)  
multi-word utterances (no special 2-word stage)

Is there a critical period for language acquisition?

Appears "yes".  
Age-of-arrival data.  
Parents of deaf children "sign" worse than their children  
Recovery of aphasia language loss easier for children

## Language universals

Claim: There is a "language instinct", innate info (e.g., Steve Pinker The Language Instinct)

Otherwise learning language would be too hard.

language universals (e.g. Subject Object Verb)

--> "natural" languages

Is there a basic set of features (parameters)?

(e.g. 100 params) Learning means "setting params"?

e.g., "**pro**(noun)-**drop**" languages

I go to the movies tonight

[Io] vado al cinema stasera

--> requires "expletive pronouns" when no subject

**It** is raining vs. Is raining

English-learning children begin with pronoun-drop.

When they learn expletive pronouns, also stop pronoun-dropping.

Prof Camerer

How is language comprehended?

Two steps:

Parsing

Utilization (extract meaning, answer Q, obey instruction...)

Studies of comprehension

- Studies of when pauses occur (Fig 12.2)

e working fewer hours oil prints are rare

Now that artists are working in oil \_\_\_\_\_

paraphrase  
as

"John was buried and died"  
"John died and was buried"

## **Modularity vs. interactive processing**

Is comprehension modular-- first syntax, then semantics--  
or interactive (both at all levels)?

Seems to be interactive

The spy saw the cop with the binoculars

The spy saw the cop with a revolver

"binoculars" read faster--> syntax helps

"The reporter exposed corruption in the article"  
(consistent with minimal attachment)

"The reporter exposed corruption in the government"  
(consistent with expectations)

"government" read faster--> semantics  
matters through expectations of what comes later

- Deciphering grammatically ambiguous sentences

**They are flying planes.**

Who (or what) are "they"?

-path model

one syntactical structure  
no role for meaning

- principles:

(fewer units preferred)

e.g., **The girl knew < the answer was wrong**

not

- ii. late closure  
(new words attached to previous phrase)

More proc'g time on ambiguous word ("seems", "was")

**al representation**

Prop'ly compact sentences easier to comprehend (p 395)  
> evidence for propositional representation of "gist"

**Inferences**

Often fill in gaps.

Bridging inference (anaphora)--

Identify noun w/ one of several previous nouns etc.

Distance effect: Further distance slows comprehension

When are inferences drawn? Quickly.

"...stabbed her with his weapon. Looked around,  
threw the knife in the bushes"

No difference in last sentence reading time if

"weapon" switched w/ "knife"

--> had figured out it was "knife" from "stabbed"

Elaborative inferences (filling in gaps).

How common?

Constructionists: Common.

Cf. minimalists (inferences not the same as "true" words):

- Inferences automatic...  
2-3 sentence comprehension in working memory  
use basic knowledge  
  
...or goal-directed (e.g., does this apply to me?)

Example: **The actress fell from the roof**

Constructionists: Presume her dead.

"Dead" should get (erroneous) recognition response

Doesn't, except when preceded by "actress", "roof" etc.

--> Constructions don't have the same status as  
original sentence.

## Inner speech

-related movements)

Phonological coding (voice in your head)

ce:

Some subvocal art'n

-- S's instructed to try not to

show reduced comprehension of hard passages

-- say "blah blah blah..."

homophonic reading (words w/ same pron'n, die/dye)

More errors on "Tie the not" or "die the cloth"

What good is it?

on this")

Aids due to prosody (rhythm, intonation)

e.g. often "hear" a letter in writer's voice (voiceover)

## Speech as communication

Cooperative Principles (Grice):

Speakers and listeners attempt to cooperate

- Maxim of quantity (max. information, don't waste)

"He is really playing well"--> doesn't usually play well

"Jack and Warren were there"

- Maxim of quality (be truthful)

"Let's have lunch"

- Maxim of relation (relevant-- no non sequiturs)

At a game:

"I have never seen anything like it"

That last play?

"No, that show on TV last night"

## Cortical structure, group size,

d w/ group size

Extrapolation → group size of 147.8 in humans

Measures of group size: Tribes (smaller), clan/village (100-200), band/camp (~1000)

Army units ~200 for 400 years (despite techno'l change)

Hutterites: 150 is optimal clan size...if grows larger they split up!

"becomes difficult to control behavior by means of peer pressure"

research subcommunities ~200 scientists

businessmen claim 150 is natural unit manageable by 1 executive

Caltech frosh class ~200

Hypothesis: Clan size is constrained by amount of cortex used to keep track of members

Why is keeping track necessary? How is track kept? Grooming!?

Clue 2: Monkey group sizes correlated with grooming time!

Grooming reinforces bonds (empathy?) & generates social accounting (shows monkeys who is "hooked up" with whom, gives private chance to rebuff or welcome others, etc.)

Problem: Groups of size 147.8 would require (extrapolation) 40% grooming time...

Solution: Language! Can "groom" more than one person simultaneously

Can achieve chimp-level grooming if "groom" 2.8 others at once...

...cafeteria measurement of audience [clique] size...peak at 3

listeners. Most discussion is about other people in the group or their own relationships etc. (very similar for males & females!)

Summarize: Human cortex is big enough to support groups of size ~150  
But support requires grooming (bonding & peer pressure). Not  
enough time (40% required)...unless you can groom many people  
simultaneously.

Verbal gossip, keeping track of status, current events, relationship  
scorekeeping, mating, outlaws...are like monkey grooming

What will happen w/ new technologies (& more leisure and fewer children →  
more time for 1-on-1 "grooming")?