

Ling 240: Language and Mind

Instructor

- Akira Omaki

Course Web Page

- http://www.ling.umd.edu/~omaki/teaching/Ling240_Winter09/Ling240_winter09.htm
- Check frequently!

Readings

- Jackendoff 1994 *Patterns in the mind*
- Chapters from *Language Files*
- Journal articles / book chapters

Student Responsibilities

- Attendance
- Keep up with homeworks and exercises
- Communicate! (in a timely way)
- Avoid being disruptive/distracting

Evaluation

- 5 Homeworks
- 3 Exams & 2 Quizzes
- Make-ups and late homeworks – ONLY IF you contact the instructor in advance
- NO extra credit

Academic Honesty

- All work must be completed BY YOURSELF and in your own words
- In cases of suspicious overlap, all assignments involved receive a zero and the case is reported to the Honor Council.

Experiments

Experiment requirement

Course requirement to participate in one linguistics experiment and learn about linguistics research

...more information coming soon.

Any questions at this point?

Linguistics:

the study of human language

Linguistics as Cognitive Science

- Human nature
- *What is the nature of the human mind?*

Why Language?

- Universality across human species
- Distinguishing feature between humans and other species
- Highly fruitful (past 50 years)

Facts or fiction? Part 1

- There are "primitive" languages with only a few hundred words.
- The more words you know in a language, the better you know the language.

Linguistics as Cognitive Science

Questions:

- 1) What is it that we know when we know a language? i.e., what does it mean to know a language?

Facts or fiction? Part 2

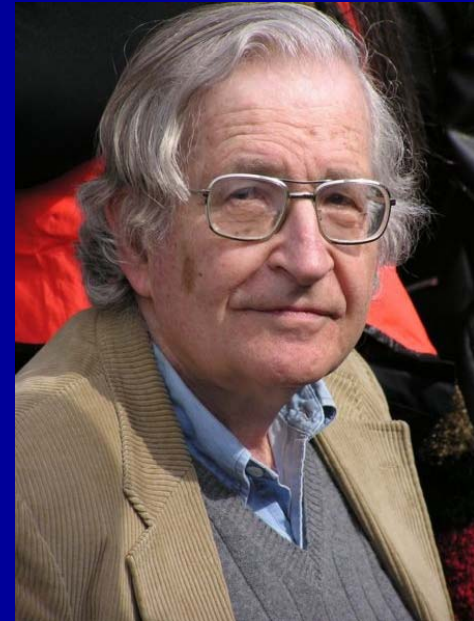
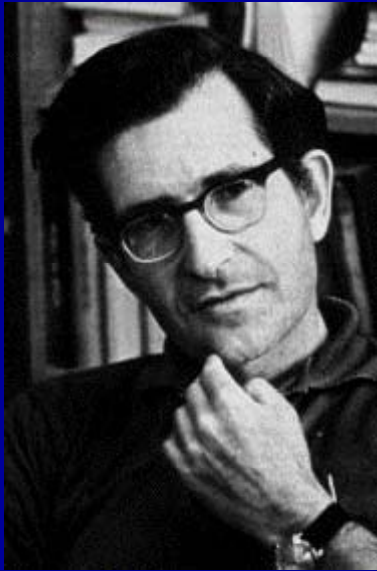
- Kids need to study for years in school to learn to speak their language.
- It's easier to learn Chinese if your ancestry is Chinese.
- The more time parents spend teaching their children their language, the better the children will speak it.

Linguistics as Cognitive Science

Questions:

- 1) What is it that we know when we know a language?
- 2) How do children acquire that knowledge?

Noam Chomsky. 1957.
Syntactic Structures.



Main themes of the class

- Nature of mental grammar
- Arguments for innate knowledge

Mental Grammar:

the system of rules stored in the mind of a speaker that generates the words and sentences of that speaker's language.

Argument for Mental Grammar

The *creativity* or *expressivity* of language use implies that a language user's mind contains a set of **unconscious grammatical principles** or rules.

Linguist's grammar

A system of rules that the linguist constructs as a **model of the speaker's knowledge of language.**

The Argument for Innate Knowledge

The way that children learn language implies that the human mind/brain contains a **genetically determined specialization for language.**

Sketch of the course

- mental grammar & innate knowledge
- components of mental grammar
 1. sound system
 2. words
 3. sentences
- how children learn language

Mental grammar in a little
more detail

Linguistics as Cognitive Science

Questions:

- 1) *What is it that we know when we know a language?*
- 2) How do children acquire that knowledge?

What do you know about your
language?

Example 1

WORDS

What do you know about your language?

Example 2

Which of these are possible words of English?

flum

lfum

sproke

tlim

worpz

What do you know about your language?

Example 2b

cat cats [s]

dog dogs [z]

tick ticks [s]

pole poles [z]

car cars [z]

What do you know about your language? Example 3

happiness = happy + ness

What do you know about your language? Example 3

happiness = happy + ness

X + -ness

what other possibilities?

rough

roughness

bright

brightness

run

*runness

friend

*friendness

happily

*happilyness

What do you know about your language? Example 4

Make up a sentence that you think no one has ever said before in the history of the universe. Write it down.

Here's one

- * *The wearily traveler early stopped coffee
some for.*

Here's another one

Colorless green ideas sleep furiously.

Compare this to...

*Furiously sleep ideas green colorless.

Linguistic Competence

1. Words (meaning and pronunciation)
2. How to pronounce sounds in combination with others
3. How to build complex words out of parts
4. How to combine words into sentences

Linguistic Competence

Words (meaning and pronunciation)

How to pronounce sounds in combination with others (PHONOLOGY)

How to build complex words out of parts (MORPHOLOGY)

How to combine words into sentences (SYNTAX)

Mental Grammar = “How to”

the **system of rules** stored in the mind of a speaker that generates the words and sentences of that speaker’s language.

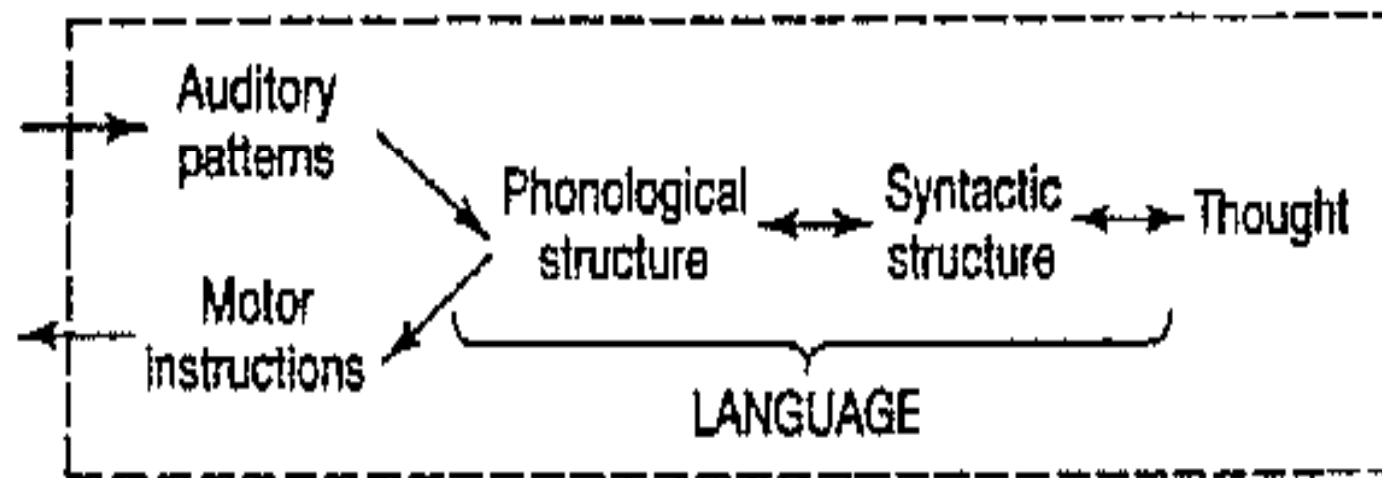


Figure 4.4 *Information flow in the brain of a combined speaker-hearer*

Arguments for Mental Grammar

Mental grammar
Rules

vs. ???

Arguments for Mental Grammar

Mental grammar

vs.

memorizing or storing the list of possible sentences

Argument for Mental Grammar

A numeral is not a numbskull.

A numeral is not a nun.

...

A numbskull is not a numeral.

A numbskull is not a nun.

...

Argument for Mental Grammar

An X is not a Y.

10,000 nouns

= 100,000,000 sentences

Argument for Mental Grammar

Now, combine these...

Since a numeral is not a numbskull, a numbskull is not a nun.

$$10^8 \times 10^8 = 10^{16}$$

Argument for Mental Grammar

Human brain contains $\approx 10^{10}$ neurons
 10^{16} sentences

One million sentences per neuron

Argument for Mental Grammar #1

- The number of sentences we are capable of using is too large to store them all

Argument for Mental Grammar #2

BUT, it's not just that the possible number
of sentences is enormous

It's infinite.

How do we know that speakers
can produce and understand an
infinite # of sentences?

Because we can do this:

This is the house [that Jackie built].

This is the door [that leads to the house [that Jackie built]].

This is the mold [that grew on the cheese [that fell out of the fridge [that stood in the house [that Jackie built]]]].

Recursion

We can produce (and understand)
potentially infinitely long sentences.

Therefore, there are an infinite number of
sentences.

Argument for Mental Grammar #2

Given that our brains are finite, there is no way we can store all of the possible sentences of our language

Is there anything that we **do** store
(memorize)?

Lexicon

Lexicon = internal dictionary

Words

Pronunciation

Meaning

Mental Grammar

LEXICON

RULES

Output=Sentences!


Computational theory of mind

Mind consists of special-purpose computers (vision, attention, memory, etc.)

The linguist's goal

Build a **model** of the speaker's
knowledge of language

Methodology: Scientific Method

- 
- Examine **data**
 - Make **generalizations** (describe observable patterns)
 - Make **hypotheses** to explain observed generalizations
 - **Test predictions** of hypotheses against more data

Examples

Pronunciation of plural:

cats [s]

dogs [z]

Word formation

Adj + -ness = N (happiness, roughness,
*friendness, *happiliness)

What is the nature of that knowledge?

- Due to rules?
- Or memorized example by example?

Pronunciation of the plural

[s]

cats

ticks

trips

[z]

dogs

poles

cars

tabs

toes

doves

If it's a rule, what's the rule?

Pronunciation of the plural

[.....X]_N

If **X is voiceless**, then plural => [s]

If **X is voiced**, then plural => [z]

Hypothesis A: Complex forms stored in memory

Lexicon

Cat [kæt]

Cats [kæts]

Dog

Dogs

PREDICTIONS?

Hypothesis B: complex forms derived by rule

Lexicon

Cat [kæt]

Dog

Rules

$N + PL = N_{pl}$

$PL \rightarrow [s]$ if $[...-VC]_N$
 $\rightarrow [z]$ if $[...+VC]_N$

PREDICTIONS?

Evidence for Rules

- Novel forms

Smick

Plural: Smicks [s]

Evidence for rules

child

childish

childishness

elf

elfish

elfishness

Evidence for Rules

Novel forms

smick	N
smickish	Adj
smickishness	N

Pronunciation of the plural

- *Could the plural –s pronunciation “rule” be just a consequence of the physical properties of human vocal tract?*

Evidence?

Pronunciation of the plural

[s]

cats

ticks

trips

[z]

dogs

poles

cars

tabs

toes

doves

Mental rule or physical necessity?

“s” after [r]

Doors [z]

Horse [s] NOT [z]

Rule only applies to the plural “s”

Conclusion: mental rule

Also, evidence from other languages

English: toes

Spanish: libros

Also, evidence from other languages

English: toes [t^oz]

Spanish: libros [libros]

Conclusion:

Pronunciation of plural as [s] or [z] is not a necessary consequence of vocal tract

Rather: pronunciation of plural \leq **mental rule** extracted from patterns in the input language

Rules

Not conscious

Extracted from the patterns that exist in
the input


Some rules might be innate

The linguist's job

Build a model of the speaker's
knowledge of language.

Discover what the rules are

Methodology: Scientific Method

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Methodology: Scientific Method

- Examine **data**
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Data

Data = speakers' judgements about
grammatical and ungrammatical forms
(sentences)

But what counts as
“grammatical”?

Grammaticality = meaningfulness?

One often-heard statement:

A sentence is grammatical if it makes sense. If we can understand the meaning, then the sentence is grammatical.

But what counts as
“grammatical”?

My toothbrush is pregnant.

versus:

*My toothbrush are pregnant.

*Toothbrush my pregnant is.

Grammatical?

Me Tarzan. You Jane.

Grammatical \neq meaningful

- Grammaticality is independent from meaning
- Recall the “Colorless green ideas” sentence

Grammatical?

- a) John is taller than me.
- b) John is taller than I.

Compare: *John is taller than my.

Rule: after “than” one should use the nominative form of the pronoun (“I” rather than “me”)

Where did this rule come from?

Is this a rule of mental grammar?

Example of a Prescriptive Rule

- Remember: The job of the linguist is to determine what the rules are that allow people to speak and understand novel sentences in their native language
- Study of the human mind

- Linguists study how people really speak (**describe** patterns that exist in the data)
- They do not try to tell people how to speak

From this point on,

grammatical = native speaker would say

How to be a descriptivist (and not a prescriptivist)

Step 1: Observe pattern (gather data)

1) I went

4) *Me went

2) We went

5) *Us went

3) She went

6) *Her went

Pronouns

Nominative			Accusative		
	sg	pl		sg	pl
1	<i>I</i>	<i>we</i>		<i>me</i>	<i>us</i>
2	<i>you</i>	<i>you</i>		<i>you</i>	<i>you</i>
3	<i>he, she</i> <i>it</i>	<i>they</i>		<i>him, her</i> <i>it</i>	<i>them</i>

How to be a descriptivist

Step 2: Make a generalization
(posit a rule)

Nominative pron \Leftrightarrow subject position

Accusative pron \Leftrightarrow object position

How to be a descriptivist

Step 3: Test the generalization (rule)

- 1) *Sammy and me went.*
- 2) *Sammy and her went.*
- 3) *Sammy and us went.*

Are these grammatical?

Prescriptivist's Perspective

“These people are using an ungrammatical construction”

Maintain rule: nominative \Leftrightarrow subject

Descriptivist's perspective

Revise the original generalization (rule):

Pronouns in non-conjoined subject position are nominative.

Pronouns in conjoined positions can be accusative.

Exercise 1

Data: sentential negation

John can jump very high.

→ Neg:


John will eat the cake.

→ Neg:

John is doing his homework now.

→ Neg:

Methodology: Scientific Method

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Exercise 1'

More data: negation

We go to school everyday.

→ Neg:

John and Mary like the turtle.

→ Neg:

Exercise 2

Hypothesis:

When an adjective becomes a noun by adding an affix, the stress position doesn't change.

happy → happiness (happy + ness)

sad → sadness (sad + ness)

Exercise 3

Japanese verbs and past tense:

kasegu (earn) → kasei-da (earned)

kasu (lend) → kashi-ta (lent)

tataku (hit) → tatai-ta (hit (past))

tobu (fly) → ton-da (flew)

tatu (stand) → tat-ta (stood)

Exercise 3

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Innateness

Mental grammar

- How did it get there?

How do children learn language?

- Parents teach them?
- Imitation? (i.e., copy & memorize)

How do children learn language?

Child: *Nobody don't like me.*

Mother: *No, say "nobody likes me."*

Child: *Nobody don't like me.*

x 8

Mother: *Now listen carefully; say, "nobody likes me."*

Child: *Oh! Nobody don't likes me.*

How do children learn language?

- a) Joan appeared to Moira to like herself
- b) Joan appeared to Moira to like her
- c) Joan appealed to Moira to like herself
- d) Joan appealed to Moira to like her

Who likes who?

How do children learn language?

- a) manu-fuckin-facturer (manufacturer)
- b) cali-fuckin-fornia (California)
- c) *Chom-funckin-sky (Chomsky)
- d) *ele-fuckin-phant (elephant)

cf. <http://www.cafepress.com/tvtee.41728115>

How do children learn language?

- Figure out patterns
- construct own mental grammar

How do children learn language?

Compare learning language to other things that we learn....

- times tables, long division
- playing a musical instrument
- walking
- winking
- ...

How do children learn language?

- Not taught
- Not conscious

A Paradox

Language is unbelievably hard to figure out

- Engineers and computer scientists trying to solve problems of machine translation and AI for 50 years
- Linguists studying grammatical principles underlying language

A Paradox

- Children become fluent speakers by 5-8 years old without explicit training
- How do they do it?

Innateness Hypothesis

The human brain contains a genetically determined specialization for language.

Language learning = natural ability

Part of human biology

- Just like the ability to walk
- Just like using sonar to echolocate is part of bat biology

Question 1

- If language is innate, why aren't children born speaking their language?

Question 2

- How could it be that language is innate to the human species?
Humans speak all different languages.

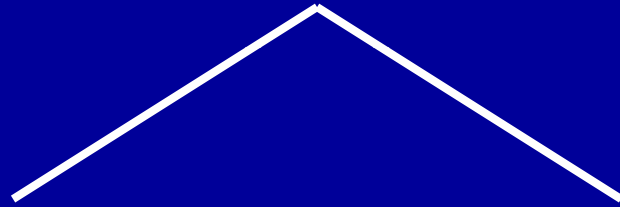
cf. frog/martian

Innateness Hypothesis

Mental Grammar

Innate part

Learned part



Arguments for innateness

- Uniformity throughout the species
- Species-specificity
- Poverty of the stimulus: children create grammar beyond what they have evidence for
- Critical period

What could a baby possibly have in her brain that could help her acquire any language that she might end up being exposed to?

=> **Universal Grammar (UG)**

Language Universals

How are all languages alike?

What is the range of possible differences?

This is the research program

Language Universals

Example

- Negation English

Pos: *Mary has eaten the cookies.*

Neg: *Mary hasn't eaten the cookies.*

Mary has not eaten the cookies.

Language Universals

Example

- Negation in Quechua

nuka wawki **mana** [jatun wasi-ta chari-n-**chu**]

my brother **not** big house have-3-**NEG**

My brother doesn't have a big house

Language Universals

- No language forms negation by reversing the order of the words:

Pos: *Mary has eaten the cookies.*

Neg: *Cookies the eaten has Mary.*

Sum

Humans are born with genetically specified component for learning language

Universal Grammar: restricts range of options

All languages share common features -- due to brain structure

Exercise

1. The child's acquisition of language clearly depends on exposure to language in the environment. So, why should we believe that it is genetically determined?

Exercise

2. Why do you insist that there is a genetic component of learning that has to do specifically with language? What about saying that general-purpose learning strategies (e.g., association, analogy) are sufficient?

Homework 1

- See handout



From here on...

- We'll start investigating the details of mental grammar at sound, word and sentence levels.
- First...the SOUND level.
- Phonetics & Phonology

From here on...

- We'll start investigating the details of mental grammar at sound, word and sentence levels.
- First...the SOUND level.
- Phonetics & Phonology

Phonetics

- Study of sounds used in human language
- Acoustic phonetics
- *Articulatory phonetics*

Sound transcription

- In order to study sounds of human language, we need ways of transcribing sounds
- **International Phonetic Alphabet (IPA)**

Consonants of Standard American English

The consonants of Standard American English, written with IPA symbols, classified by voicing, place of articulation, and manner of articulation:

		Place of Articulation													
		Bilabial		Labio-dental		Inter-dental		Alveolar		Palatal		Velar		Glottal	
Manner of Articulation	Stop	p	b					t	d			k	g	ʔ	
	Fricative			f	v	θ	ð	s	z	ʃ	ʒ			h	
	Affricate									tʃ	dʒ				
	Flap								r						
	Nasal		m						n				ŋ		
	Lateral Liquid								l						
	Retroflex Liquid								ɭ						
	Glide	w	w								j				

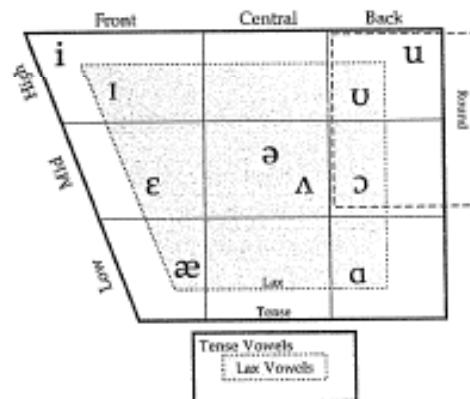
State of the Glottis: Voiceless Voiced

See back of the LF textbook.

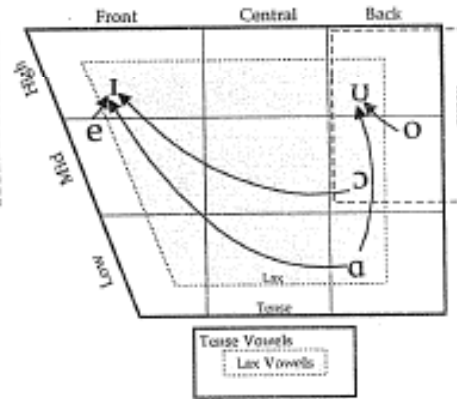
Vowels of Standard American English

The vowels of Standard American English, written with IPA symbols, presented using the traditional American classification system:

Monophthongs:



Diphthongs:



By the way...

- YOU ARE GOING TO MEMORIZE THIS!!!
- ...and hopefully by Wednesday, when you have a quiz on this 😊
- Don't worry, we'll do lots of exercises tomorrow

For next time...

- Topic for tomorrow: phonetics
- Fill out student info sheet
- **GET TEXTBOOKS NOW!!!**
- **Reading: LF phonetics**
- **Homework 1 due!**