Language & the Mind
LING240
Summer Session II 2005

Lecture 3

Sentences

Creativity of Human Language

- Ability to combine signs with simple meanings to create utterances with complex meanings
- Novel expressions
- *Infinitely* many

Linguistic Creativity

- **Sentences never heard before...**
  - "Some purple tulips are starting to samba on the chessboard."
- **Sentences of prodigious length...**
  - "Hoggle said that he thought that the odiferous leader of the goblins had it in mind to tell the unfortunate princess that the cries that she made during her kidnapping from the nearby kingdom of Dirindwell that the goblins themselves thought was a general waste of countryside ..."

An Account That **Won't** Work

- "You just string words together in an order that makes sense"

in other words...

"***Syntax*** is determined by ***Meaning***"

Syntax is More than Meaning

- **Nonsense sentences with clear syntax**

Colorless green ideas sleep furiously. (Chomsky)
A verb crumpled the ocean.
I gave the question a goblin-shimmying egg.

*Furiously sleep ideas green colorless.
Ocean the crumpled verb a.
*The question I an egg goblin-shimmying gave.

Syntax is More than Meaning

- **Nonsense sentences with clear syntax**

'Twas brillig and the slithy toves
Did gyre and gimble in the wabe;
All mimsy were the borogroves,
And the mome raths outgrabe

Beware the Jabberwock, my son!
The jaws that bite, the claws that catch!
Beware the Jujub bird, and shun
The frumious Bandersnatch!"

Lewis Carroll, *Jabberwocky*

Syntax is More than Meaning

'It seems very pretty,' she said when she had finished it, 'but it's RATHER hard to understand!' (You see she didn't like to confess, ever to herself, that she couldn't make it out at all.) 'Somehow it seems to fill my head with ideas -- only I don't exactly know what they are! However, SOMEBODY killed SOMETHING: that's clear, at any rate -- '

Syntax is More than Meaning

- Nonsense sentences with nonsense syntax

'Toves slithy the and brillig 'twas wabe the in gimble and gyre did...

Syntax is More than Meaning

- **Ungrammatical sentences that make perfect sense**

Jareth put the cape on.
Jareth put on the cape.

Jareth put it on.
*Jareth put on it.

Syntax is More than Meaning

- **Ungrammatical sentences that make perfect sense**

Sarah gave a ring to the Wiseman.
Sarah gave him a ring.

Sarah donated a ring to the Wiseman.
*Sarah donated him a ring.

Syntax is More than Meaning

- **Ungrammatical sentences that make perfect sense**

Jareth made Hoggle leave.
Jareth let Hoggle leave.
Jareth saw Hoggle leave.
*Jareth wanted Hoggle leave.

*Jareth made Hoggle to leave.
*Jareth let Hoggle to leave.
*Jareth saw Hoggle to leave.
Jareth wanted Hoggle to leave.

Syntax is More than Meaning

- **Cross-language Variation**
  If syntax was entirely determined by meaning, then we should not expect to find syntactic differences between languages of the world.

English: Sarah sees that book.

Korean: Sarah ku chayk poata.
Sarah that book see

Syntax is More than Meaning

- **Cross-language Variation**
  If syntax was entirely determined by meaning, then we should not expect to find syntactic differences between languages of the world.

  English: Sarah speaks with Hoggle.

  Korean: Sarah Hoggle-hako malhata.
  Sarah Hoggle with speak

Syntax is More than Meaning

- **Cross-language Variation**
  If syntax was entirely determined by meaning, then we should not expect to find syntactic differences between languages of the world.

  English: Baso put the money in the cupboard.

  Selayerese:
  Lataroi doe injo ri lamari injo i Baso.
  put money the in cupboard the Baso

So…what DOES determine how you string words together?

Answer: Syntax!
(That is, our knowledge of the possible FORMS of sentences in our language)

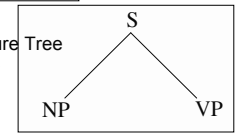
Goals of Syntactic Theory

- Build a grammar that generates *all possible* sentences of English ***Generative Grammar***
- Explain cross-language ***universals*** and cross-language ***variation***
- Explain how children successfully attain adult grammatical knowledge

A Template

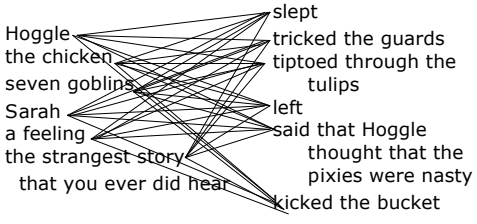
- A sentence consists of a Noun Phrase followed by a Verb Phrase
- S --> NP VP ⟵ Phrase Structure Rule

Phrase Structure Tree ⇨



A Template

- Noun Phrase
- Verb Phrase

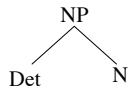


36 Sentences

A Template

- Noun Phrase

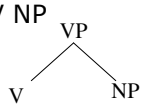
NP --> Det N



NP --> N

- Verb Phrase

VP --> V NP



VP --> V

A Tiny Little Grammar

- 5 Rules

S --> NP VP
NP--> Det N
NP--> N
VP--> V NP
VP--> V

- 9 Words

Det: *the, four, some*

N: *goblins, crystals, peaches*

V: *understood, ate, approached*

468 Sentences

A Tiny Little Grammar

- 5 Rules

S --> NP VP
NP--> Det N
NP--> N
VP--> V NP
VP--> V

- 30 Words

Det: 10

N: 10

V: 10

122,100 Sentences

The Grammar So Far…

- 5 Rules

S --> NP VP
NP--> Det N
NP--> N
VP--> V NP
VP--> V

- Sentences

Jareth intimidated Hoggle

The goblin stole the crystal.

Ludo laughed.

Justifying Structure: Coordination

- **Noun Phrase coordination**

1. The goblin chased [the chicken] and [the rat].
2. [The knight] and [his dog] chased the goblin.

- **Verb Phrase coordination**

3. The goblin [chased the rat] and [drank the beer].

- **Impossible coordination of [N V]**

4. *The [goblin chased] and [fairy caught] the rat.

Embedded Sentences

- Additional VP Rule

Hoggle thought Sarah ate the peach.
VP → V S

Sentence-inside-a-sentence
Recursion

Ludo said Hoggle thought Sarah ate the peach.
The fairy claimed Ludo said Hoggle thought Sarah ate the peach.
The Wiseman's birdhat hoped the fairy claimed Ludo said Hoggle thought Sarah ate the peach.

Infinitely many sentences can be generated!

Complementizer

- Complementizer: words like THAT, IF, and WHETHER that allow one sentence to be the subject or object of another sentence
- Hoggle realized **that** Sarah ate the peach.
- **Whether** Sarah ate the peach didn't matter.
- S' → Comp S
- VP → V S'
- S → S' VP

Our Mini Grammar So Far…

- 9 Rules

S --> NP VP
S --> S' VP

NP --> Det N
NP --> N

VP --> V NP
VP --> V
VP --> V S
VP --> V S'

S' --> Comp S

Optional & Obligatory Phrases

- English sentences require a subject

Sarah ate the peach.
*Ate the peach.
Hoggle fears Jareth.
*Fears Jareth.

- English sentences do not require an object

Ludo slept.
Sir Didymus sang.

Optional & Obligatory Phrases

- **Obligatory phrases**

a. *Hoggle feared.
b. *Sarah hit.
c. *The fairy mentioned.
d. *Sarah put the book.
e. *Ludo devoured.

Requirement for direct object comes from the specific verbs used

f. Hoggle feared Jareth.
g. Sarah hit the wall.
h. The fairy mentioned she didn't grant wishes.
i. Sarah put the book on the table.
j. Ludo devoured the pizza.

Optional & Obligatory Phrases

- **Optional Phrases**

Sarah sang a song in the forest.

Hoggle slept all evening.

Sarah arrived at thirteen o'clock.

But what about ambiguous sentences?

Jack saw the giant with the mirror.
The lifeguard rescued the swimmer with no clothes on.

Flying X-wings can be dangerous.
Visiting relatives can be boring.

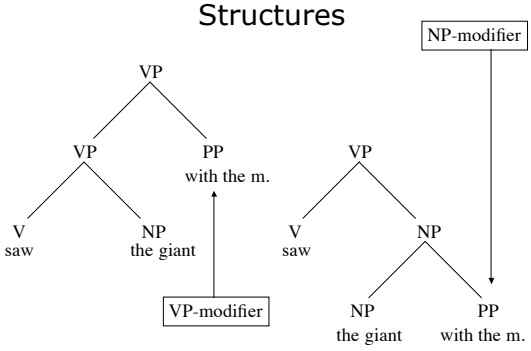
Hoggle claimed Sarah left a moment ago.
Ludo decided to visit Sir Didymus in the Bog of Eternal Stench.

Ambiguous Sentences

Jack saw the giant with the mirror.
VP --> V NP
NP --> NP PP
PP --> P NP

Jack saw the giant with the mirror.
VP --> V PP
VP --> V NP
PP --> P NP

Structures



Our Mini Grammar So Far…

S --> NP VP
S --> S' VP
PP --> P NP
NP --> Det N
NP --> N
NP --> NP PP (NP modifier rule)
VP --> V NP
VP --> V
VP --> V S
VP --> V S'
VP --> VP PP (VP modifier rule)
S' --> Comp S

"Ditransitive" Verbs

VP → V NP NP
VP → V NP PP

Jareth gave the peach to Sarah.
Jareth gave Sarah the peach.
Hoggle brought Sarah the peach.

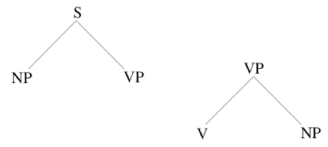
*Sarah donated the Wiseman a ring.
*The fairy mentioned Jack a secret.

Our Not-So-Mini Grammar

S --> NP VP
S --> S' VP
PP --> P NP
NP --> Det N
NP --> N
NP --> NP PP (NP modifier rule)
VP --> V NP
VP --> V
VP --> V S
VP --> V S'
VP --> V NP NP
VP --> V NP PP
VP --> VP PP (VP modifier rule)
S' --> Comp S
VP --> **Adv**erb VP (VP modifier rule)
N --> **Adj**ective**P** N (N modifier rule)
Adjective**P** --> **Adv**erb **Adj**ective**P** (AdjP modifier rule)
Adjective**P** --> **Adj**ective

Tree-Drawing Practice

Plugging these little trees together like puzzle pieces…



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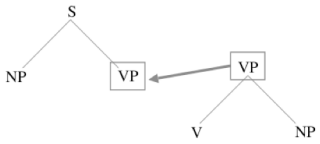

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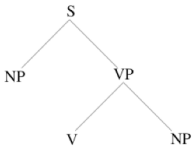


Arguments & Modifiers

- Subjects

  a.*Feared Jareth
  b. *Slept

- Objects

  a.Hoggle feared *(Jareth)
  b.Jareth gave Hoggle *(the peach)

Arguments & Modifiers

a. The fairy sat
b. The fairy sat on the mat.

VP → VP PP
can apply to itself

b. The fairy sat on the mat in the sun
c. The fairy sat on the mat in the sun at thirteen o'clock…

Arguments & Modifiers

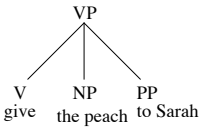
a. The fairy sat
b. The fairy sat on the mat

VP → VP PP
can apply to itself

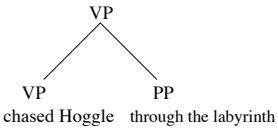
Goes with any kind of VP
d. The guards chased Hoggle in the morning
e. The guards chased Hoggle through the labyrinth in the morning

Different VP Rules

Argument:
VP --> V NP PP



Modifier
VP --> VP PP



verb specific vs. verb independent
non-recursive vs. recursive
inside vs. outside *minimal VP constituent*

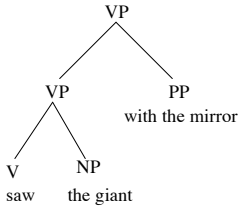
Arguments & Modifiers

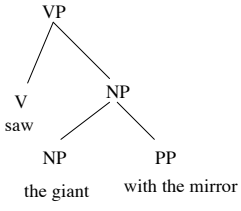
NP → NP PP
can apply to itself

The bird on his head
The man with a birdhat

Another look at Ambiguity

Jack saw the giant with the mirror.





Distinguishing Arguments & Modifiers

- Obligatory phrases are arguments

  Hoggle feared Jareth in the beginning.
  Sarah put the book on her dresser after dinner.

- Arguments are implied by 'core' meaning of verb

  fear
  eat
  send
  think
  give

Distinguishing Arguments & Modifiers

The "Do So" Substitution Test

Hoggle caught fairies, and Ludo did so (too).

did so = 'caught fairies'

*Hoggle caught fairies, and Ludo did so pixies.

*did so = 'caught'

Distinguishing Arguments & Modifiers

Sarah put a book on her dresser, and Jack did so (too).

did so = 'put a book on her dresser'

*Sarah put a book on her dresser, and Jack did so on the tree stump.

*did so = 'put a book'

Distinguishing Arguments & Modifiers

Jareth kicked a goblin in the morning, and Ludo did so in the afternoon.

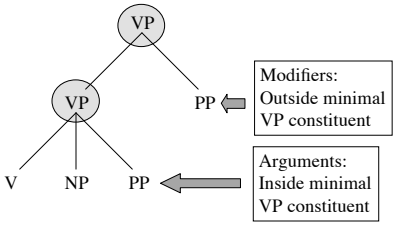
did so = 'kicked a goblin'

*Jareth kicked a goblin in the morning, and Ludo did so a chicken in the afternoon.

*did so = 'kicked'

A Little Picture

- Generalization: *do so* is used to replace a Verb Phrase



Distinguishing Arguments & Modifiers

a. The goblin chased the chicken,
   and the rat did so too.
   did so = chased the chicken

b. The goblin chased the chicken around the castle,
   and the rat did so too.
   did so = chased the chicken around the castle

c. The goblin chased the chicken around the castle,
   and the rat did so around the moat.
   did so = chased the chicken

Distinguishing Arguments & Modifiers

d. The goblin chased the chicken around the castle in the morning, and the rat did so around the moat in the afternoon.

   did so = chased the chicken

e. The goblin chased the chicken around the castle in the morning, and the rat did so in the afternoon.

   did so = chased the chicken around the castle

Distinguishing Arguments & Modifiers

What about the following…

Sarah went to the castle at the center of the Labyrinth

Jareth sent a crystal to Sarah

Jareth sang the song to Tobey

Summary: The "Do So" Test

- The "do so" test is a tool we can use to determine if a sequence of words is a VP or not
- Can help us distinguish between arguments and modifiers of a VP
  - All phrases inside minimal VP are arguments
  - All phrases outside minimal VP are modifiers

Structures

- Represent the way in which speakers group words in their heads
- Explain word-order regularities
- Framework for *creativity*
- Built from information in the mental dictionary (i.e. which verbs take how many arguments)

Structural Relations

a. Nobody said anything.
b. Hoggle didn't say anything.

c. *Somebody said anything.
d. *Anybody left.

e. Nobody said that anybody left.
f. Hoggle didn't think that somebody said anything.

Structural Relations

When is *anything* possible in English?

Similar terms: *any*, *anybody*, *ever*, *a damn thing, lift a finger, give a sh*t, give a flying f**k, budge an inch*

'Negative Polarity Items'

Structural Relations

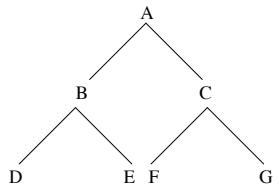
*Anybody read nothing.

*A person who has nothing pleases anybody.

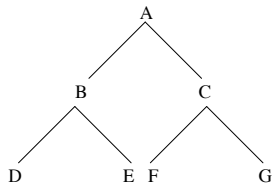
*Because nobody came, anybody left.

*After the goblin king said nothing, the goblins said anything.

Structural Relations

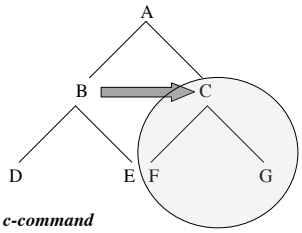


Structural Relations



c-command
A node c-commands only its sister(s), and any nodes contained inside its sister(s)

Structural Relations



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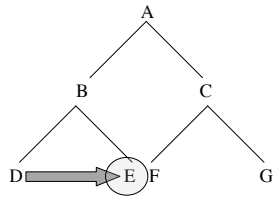

c-command
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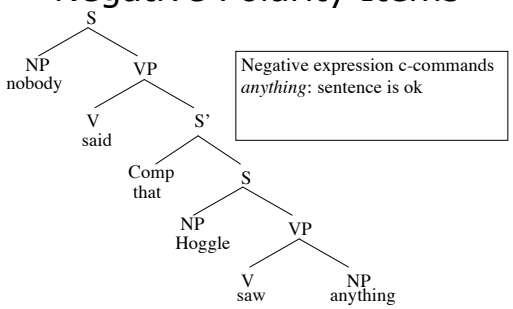
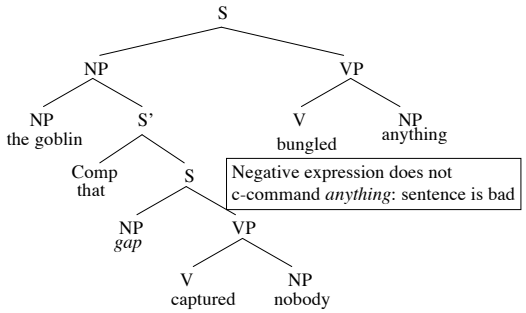
Negative Polarity Items



Negative expression c-commands *anything*: sentence is ok

Negative Polarity Items



Negative expression does not c-command *anything*: sentence is bad

Structural Relations

Negative Polarity Items, e.g. *any*, must be c–commanded by a negative element

Structural Relations

a. Nobody said anything.
b. Hoggle didn't say anything.

c. *Somebody said anything.
d. *Anybody left.

e. Nobody said that anybody left.
f. Hoggle didn't think that Ludo said anything.

The simple structural relation of *c-command* can account for the distribution of negative polarity items like *any*.

Structural Relations

g. *Anybody read nothing.

h. *A person who has nothing pleases anybody.
i. Nothing pleases anybody.
j. *Because nobody came, anybody left.
k. *A fairy with nothing pleases anybody.

The simple structural relation of *c-command* can account for the distribution of negative polarity items like *any*.

Structural Generalizations

- Coordination with *and*
  - coordinate *constituents*
- *do so* substitution
  - *do so* = VP
- licensing *any, ever, a damn thing,* etc.
  - Negative element must c-command *any*, etc.