Psych 56L/ Ling 51: Acquisition of Language

Lecture 11
Development of Syntax & Morphology I

Announcements
- HW2 due today
- No office hours for Lisa on Tuesday 2/23/10 (Sorry!)
- Review questions for syntax and morphology available
- HW 3 available (begin working on it): due 3/4/10

Adult Knowledge: The Target State
Syntax

Creativity of Human Language
Ability to combine signs with simple meanings to create
(1) Utterances with complex meanings
(2) Novel expressions
(3) Infinitely many

Sentences never heard before...
"Some 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 Drindwell 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”
(The way words are put together is determined solely by what they mean)

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.

…which are incomprehensible when the syntax is nonsense
*Furiously sleep ideas green colorless.
Ocean the crumpled verb a.
*The question I an egg goblin-shimmying gave.

Syntax is More than Meaning

Famous 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, even 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
And these same nonsense sentences with nonsense syntax are incomprehensible...

'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…but we do see variation.

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…but we do see variation.

English: Baso put the money in the cupboard.
Selayarese (spoken in Indonesia): 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.)

“Syntax is determined by Meaning”
(The way words are put together is determined solely by what they mean.)

A Template

A sentence consists of a Noun Phrase followed by a Verb Phrase

\[ S \rightarrow NP \text{ VP} \]

Phrase Structure Rule

Phrase Structure Tree

\[ S \]
\[ \text{NP} \]
\[ \text{VP} \]
A Template

Noun Phrase
- Hoggle
- The chicken
- Seven goblins
- Sarah
- A feeling
- The strangest story that you ever did hear

Verb Phrase
- slept
- tricked the guards
- left
- said that Hoggle thought that pixies were nasty
- kicked the bucket
- got drunk on dwarf wine

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Verb Phrase
- NP --→ Det N
- VP --→ V NP

A Template

Noun Phrase
- 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
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30 Words
Det: the, four, some + 7 more
N: goblins, crystals, peaches + 7 more
V: understood, ate, approached + 7 more

122,100 Sentences

Embedded Sentences

Additional VP Rule

Hoggle thought Sarah ate the peach.
VP → V S

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.

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

Infinitely many sentences can be generated!
A Slightly Bigger Grammar

9 Rules

\[
\begin{align*}
S & \rightarrow NP \ VP \\
S & \rightarrow S' \ VP \\
NP & \rightarrow \text{Det} \ N \\
NP & \rightarrow N \\
VP & \rightarrow V \ NP \\
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Sentences it can generate:

- Hoggle likes jewels.

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Sentences it can generate:

**Hoggle likes jewels.**

**Sarah thought that she solved the Labyrinth.**

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Sentences it can generate:

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**Sentences it can generate:**

Sarah thought that she solved the Labyrinth.
Syntax Recap

The structure of language (syntax) involves more than simply the meaning of the words. It involves rules about how the words themselves are allowed to go together.

It isn’t enough to know the list of possible sentences in the language. Because adults can generate novel sentences and sentences of infinite length, adults need to know a generative rule system.

Adults know (unconsciously) a system of rules for generating the word orders they use. A fairly small set of rules can generate a fairly large set of sentences.

Adult Knowledge: The Target State

Morphology

Words and word parts

The smallest unit manipulated by the rules of syntax is not a single word. Instead there are units smaller than words that play a role.

One goblin.  
Two goblins.  
Morpheme = smallest unit of meaning

Morpheme = smallest unit of meaning

Bound morpheme = morpheme that can’t stand on its own - it must be attached to something
Words and word parts

The smallest unit manipulated by the rules of syntax is not a single word. Instead there are units smaller than words that play a role.

One goblin.
Two goblins.  goblins = goblin + s = plural

Free morpheme = morpheme that can stand on its own - it does not need to be attached to another morpheme

Types of Morphology

Inflectional morphology: adds grammatical information, but does not change the word’s category (nouns stay nouns, verbs stay verbs, etc.)

One goblin.  goblins = goblin + s = plural
Two goblins.

He shrugs.  shrugs = shrug + s = present tense
Types of Morphology

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- One goblin.
- Two goblins. goblins = goblin + s = plural
- He shrugs. shrugs = shrug + s = present tense
- He shrugged. shrugged = shrug + ed = past tense

Types of Morphology

Derivational morphology: forms a new word, potentially changing the word’s category (nouns become adjectives, verbs become nouns, etc.)

- goblin
- goblinish = goblin + ish = + similar to
- shrug
- shrugger = shrug + er = + one who does that action
Crosslinguistic Comparison

English does not have a rich morphological system, compared to other languages. Instead, English mostly relies on word order to indicate who did what to whom.

Languages like Hungarian, however, rely more on morphology.

“The boy gave a book to the girl.”

A fiú könyvet adott a lánynak.
The boy a book+ACC gave the girl+DAT

Inflectional morphology: ACC = accusative case = direct object (thing given)

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Morphology Recap

Morphology refers to how words are put together to convey meaning.

The smallest units of meaning are morphemes, which can be smaller than a whole word.

Some morphology can change the category of a word (derivational), while other morphology does not (inflectional).

Languages vary on how rich their system of morphology is. Children must learn how their language puts words together, and what types of meaning can be conveyed via morphology.
Questions?