

Syntax 2

Meaning and the Structure of Sentences

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Topics

- Recursion
- Transformations
- Effects of Structure on Meaning

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How Long is the Longest Sentence?

There is no longest sentence.
For any sentence that you might think is the longest, we can make it longer.

Mary is coming to dinner tonight
It's raining and Mary is coming to dinner tonight
There's nothing in the refrigerator and it's raining and Mary's coming to dinner tonight etc.

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How Long is the Longest Sentence?

Bill won the election
The newspaper reported that Bill won the election
The senator stated that the newspaper reported that Bill won the election
The congressman claimed that the senator stated that the newspaper reported that Bill won the election

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The number of sentences in a language is not finite

- Since there is no longest sentence, the number of sentences is infinite
- It follows that we cannot learn sentences by memorizing them!
- We must employ a mental grammar to generate and understand them

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How is it possible to generate an infinite set of sentences?

The answer is "recursion"

[_S Bill won the election]

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How is it possible to generate an infinite set of sentences?

The answer is “recursion”

[_S The newspaper reported that
[_S Bill won the election]]

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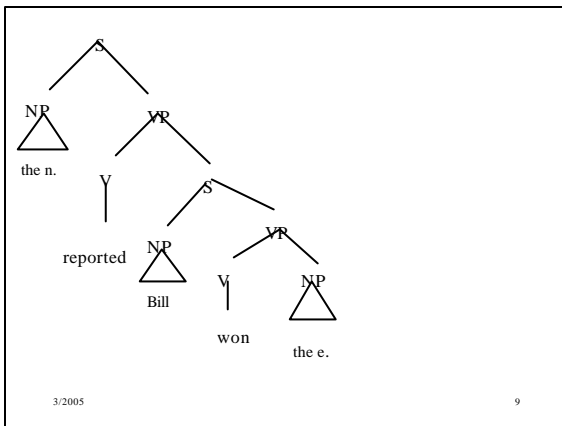
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How is it possible to generate an infinite set of sentences?

A sentence can contain a sentence (which can contain a sentence))

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Phrase Structure Rules for Recursion

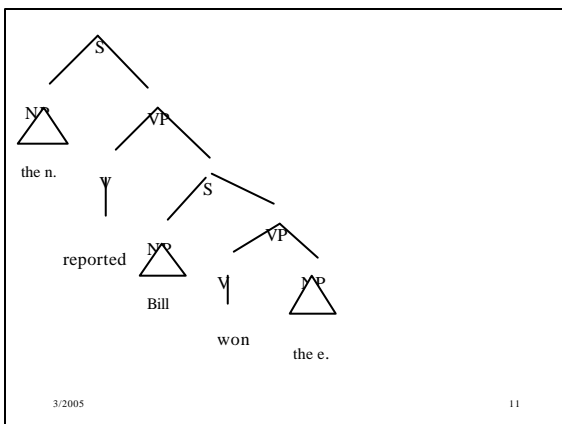
$VP \rightarrow V (NP) (PP) (S)$

The reporter told the anchorman [_S that Bill won the election]

The reporter explained to the anchorman [_S that Bill won the election]

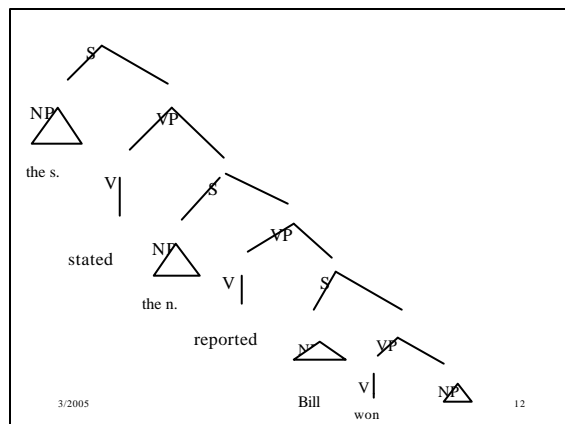
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Phrase Structure Rules for Recursion

With this rule in it, the grammar generates an infinite set of sentences

$VP \rightarrow V (NP) (PP) (S)$

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What about *that*?

For our purposes, *that*, as in:

“The woman thinks that the building is beautiful”

is a word which extends the sentence, makes it bigger.

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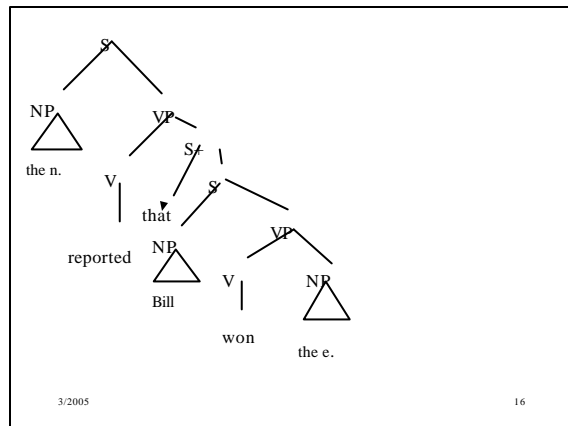
Revised Phrase Structure Rules

$VP \rightarrow V (NP) (PP) (S+)$

$S+ \rightarrow (that) S$

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Auxiliary (“helping”) verbs in English

e.g. the “progressive”, used for the present

Bill is winning the election

e.g. “will”, the future

Bill will win the election

Auxiliary verbs precede the main verb

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VP+

Hypothesis:

VP has a bigger version: VP+

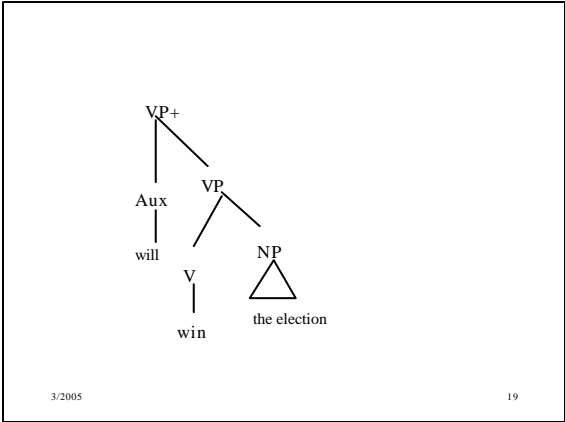
as S has a bigger version: S+

$VP+ \rightarrow (Aux) VP$

$S+ \rightarrow (that) S$

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- ### P S Rules updated
- S+ → (that) S
 - S → NP Aux VP+
 - VP+ → (Aux) VP
 - VP → V (NP) (PP) (S+)
 - NP → (Art) (Adj) N
 - PP → P (NP)
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Questions: another pattern

The man will win the election
 Will the man win the election?

Where is *will* in the two examples?

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Questions: another pattern

Statement:
 Will is inside VP+
 The man will win the election

Question:
 Will is inside S+
 Will the man win the election?

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The Structure of Questions

The man will [win the election]
 Aux in VP+
 VP → VP+

Will [the man win the election]?
 Aux in S+
 S+ → (Aux) S

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More Questions

The man will win the election
 What is "the election"

Which election will the man win?
 Which is the Article and election is the N

We know that:
 "will the man win" is an S+
 Where is *which election*?

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S+

Hypothesis:

which election is part of S+, like will

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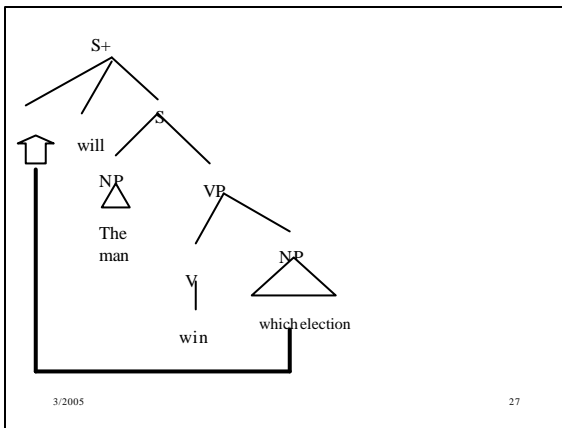
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Which Election has moved

- Which election is the object of win
Reasons:
- Which election is not in the right place for the object of win
Conclusion: it is the object of win but has moved up to the S+

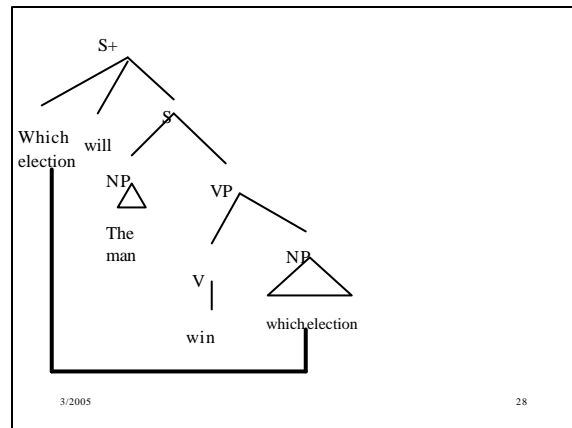
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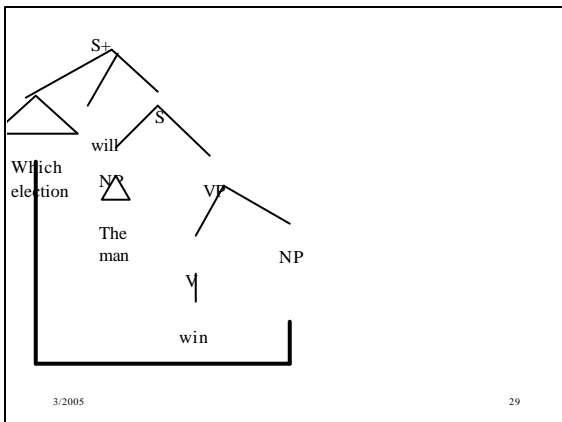
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Wh Movement

This is a kind of rule often called a "Transformation"

This kind of theory of grammar is known as "Transformational Grammar" or "Generative Grammar"

It posits phrase structure rules and transformations in order to explain how grammatical sentences are generated/constructed.

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English Wh Questions

Involve a transformation:

Move the *Wh* phrase under S+
 “Wh Movement”

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Wh Movement can occur across long distances

The senator has stated

[that the newspaper has reported

[that Bill won the election]]

“[]” mark edge of S+

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Wh Movement can occur across long distances

The senator has stated

[that the newspaper has reported

[that Bill won which election]]

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Long distance Wh Movement

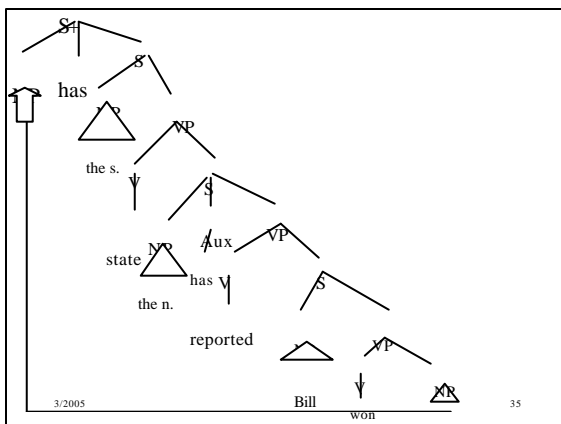
Which election has the senator stated

[that the newspaper has reported

[that Bill won which election]]

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Summary - 1

- Phrase Structure is recursive: a sentence can contain a sentence which can contain a sentence etc.

- The PS Rules we have developed which show recursion are:

S+ → (Aux) S
 S → NP Aux VP
 VP → V (NP) (PP) (S+)

S+ can contain an S+

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Summary - 2

Phrase structure rules determine the basic structure of sentences

Transformations can move phrases around

Transformations can move phrases across arbitrarily long distances

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Meaning of a Sentence

What determines the meaning of a sentence?

Most obvious answer: the words in it.

E.g. The mouse bit the cat

The dog bit the man

But: other factors are extremely important

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Meaning and The Structure of Sentences

The syntax of a sentence affects what it means

(1) Word order:

The dog bit the man

The man bit the dog

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Meaning and The Structure of Sentences

(2) Position of a word in phrase structure of a sentence

The dog will bite the man

(*will* is in VP+)

Will the dog bite the man?

(*will* is in S+)

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Meaning and The Structure of Sentences

The form of a word or phrase:

The dog bit the man vs.

The dogs bit the man

The dog bit the man vs.

which dog bit the man?

which dog is a question phrase.

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Meaning and The Structure of Sentences

The form of the phrase plus the position of a phrase in phrase structure.

Which election will the senator win?

which election has the form of a question phrase.

It is under S++ instead of under VP

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Meaning and The Structure of Sentences

A new example:

The man shot himself/*him

The man said that the woman shot
*himself/him

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Reflexives vs Pronouns

Reflexives:

must have an “antecedent” in the same S.

Pronouns:

cannot have an “antecedent” in the same S.

The man shot himself/*him

The man said that the woman shot *himself/him

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Meaning and The Structure of Sentences

What about:

The woman with the man shot * himself/him

“the man” is in the same S as “himself” and
“him”, so why is “himself” ungrammatical
and “him” grammatical?

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The Structure of the sentences

Q: What is the structure of:

The woman with the man shot himself/him

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The Structure of the sentences

The woman with the man

can occur

- As a subject – before the V
- As an object – right after the V
- Inside a PP – right after the P

So what must **The woman with the man** be?

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It must be an NP

NP → (Art) (Adj) N (PP)

Phrase Structure tree?

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Tree?

Try to draw the tree for:

“the woman with the man shot himself/him”

See if you can do it

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Back to the meaning of sentences

A reflexive must be in the same clause as its antecedent

Therefore:

The man said that John cut himself OR:

The man said that John cut himself ?

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“Command”

Within a single clause:

A reflexive must be commanded by its antecedent

Therefore

The girl with the woman cut herself OR

The girl with the woman cut herself ?

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“Command”

Within a single clause:

A pronoun cannot be commanded by its antecedent

Therefore

The girl with the woman hates her OR

The girl with the woman hates her

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