

Syntax: Preliminary ideas

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Linguistics 522
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Outline

- 1 Introduction
- 2 Form-Meaning mapping
- 3 Constituency

Regularities

How do you make an English Yes-No Question?

Declarative	Yes-No Question
Jane can skate.	Can Jane skate?
Jane is dancing	?
Jane has been eating meat.	?
Jane will keep her promise	?
Jane likes beans	?
Jane flew to Pago Pago	?

The rule?

Regularities

How do you make an English Yes-No Question?

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Yes-No Question

Can Jane skate?

Is Jane dancing?

Has Jane been eating meat?

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Regularities

How do you make an English Yes-No Question?

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Jane can skate.

Jane is dancing

Jane has been eating meat.

Jane will keep her promise

Jane likes beans

Jane flew to Pago Pago

Yes-No Question

Can Jane skate?

Is Jane dancing?

Has Jane been eating meat?

Will Jane keep her promise?

Does Jane like beans?

Did Jane fly to Pago Pago?

The rule?

Rule: first pass

English yes-no questions

Move the verb to the front of the sentence.

Rule: second pass

English yes-no questions

Move the first Auxiliary to the front of the sentence. If there is no auxiliary, place *did* at the front of the sentence.

Rule: third pass

English yes-no questions

Move the first auxiliary to the front of the sentence. If there is no auxiliary, place a form of the auxiliary *do* at the front of the sentence. The form of *do* used should have the same tense as the main verb of the declarative. Change the form of the main verb to be untensed.

Still allows some ungrammatical sentences. Can you find one?

Regularities

How do you negate an English sentence?

Declarative	Negation
Jane can skate.	Jane can not skate
Jane is dancing	?
Jane is happy.	?
Jane has been eating meat.	?
Jane will keep his promise	?
Jane likes beans	?
Jane flew to Pago Pago	?

The rule?

Rule

English negation

Insert *not* after the first auxiliary. If there is no auxiliary, place a form of the auxiliary *do* with the same tense as the main verb in front of the main verb. Change the form of the main verb to be untensed. Insert *not* after *do*.

Still allows some ungrammatical sentences. Can you find one?

Factoring out redundancies

Do-insertion Optionally insert a form of *do* with the same tense as the main verb in front of a main verb with no auxiliary.

Negation Optionally insert *not* after the first auxiliary.

Yes no question Optionally move the first auxiliary to the front of the sentence.

Q1 Do I need to think of these rules as ordered?

Q2 What if I do *do*-insertion but neither of the other two?

What did we learn?

- 1 Formulating a syntactic rule can be tricky. We still haven't got it quite right.
- 2 There are some redundancies it would be nice to iron out between the rules (tense on *do* and non tense of main verb). Working with a set of rules as a **system** provides insight.
- 3 Rules make reference to syntactic categories (lexical categories) here, such as verb and auxiliary.

Homework questions I

Auxiliary: Definition

An auxiliary must be able to pass two tests:

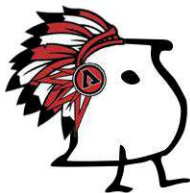
- 1 It can occur fronted in a yes-no question.
 - 2 It can immediately be followed by *not* in a negated sentence.
-
- 1 Come up with 5 auxiliaries (auxes, for short) not used in these slides, and **demonstrate they are auxes** by using each one in a yes-no question and a negated sentence (5 auxes found means 10 demonstration sentences required).
 - 2 We know from examples like *Jane likes beans* that main verbs can occur without auxes. Can auxes occur without main verbs? [According to the definition of aux above]

Homework questions II

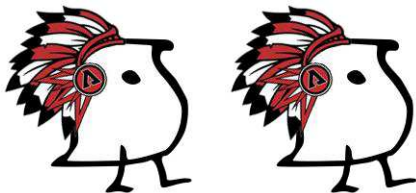
- 3 Is *did* an aux in the following example:
(i) *John did his homework.*

- 4 Is *must* an aux? Demonstrate. Is *dare* an aux? Demonstrate.

Rules



This is a wug



There are two of them.

There are two _____

The verb *wug*

- (i) Jane wugged her Cheerios.
- (ii) Yes no question?
- (iii) Negated sentence?

Even though it is difficult for us to explicitly formulate syntactic rules, we **implicitly** know them.

Some sentences

- 1 The agency used widespread opposition to the measure as an excuse for ignoring the rapidly growing mail volume and failing to control labor costs.
- 2 The agency sees widespread opposition to the measure as an excuse.
- 3 The doctor examined the man with the stethoscope.
- 4 Police found the man with the murder weapon.

Steps

- a) The agency used widespread opposition of the measure as an excuse.
 Det N V A N P Det N P Det N.
- b) [_{NP} The agency]_{NP} used widespread opposition to the measure as an excuse.
 Determiners modify nouns (part of the phrase the noun heads)
- c)
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- d)
- Adjectives modify nouns (part of the phrase the noun heads)

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Steps, ctd.

e)

NPs modify prepositions (part of the phrase the preposition heads)

f)

NPs modify prepositions (part of the phrase the preposition heads)

g)

PPs modify nouns (part of the phrase the noun heads)

Steps, ctd.

- e) $[_{NP} \text{ The agency}]_{NP}$ used $[_{NP} \text{ widespread opposition}]_{NP}$ $[_{PP} \text{ to } [_{NP} \text{ the measure}]_{NP}]_{PP}$ as $[_{NP} \text{ an excuse}]_{NP}$.

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PPs modify nouns (part of the phrase the noun heads)

Steps, ctd.

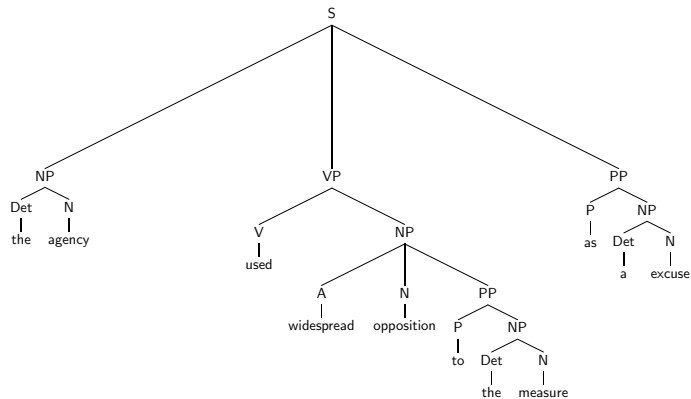
h)

NPs modify Verbs

Steps, ctd.

- h) [NP The agency] [VP used [NP widespread opposition [PP to [NP the measure]_{NP}]_{PP}]_{NP}]_{VP} [PP as [NP an excuse]_{NP}]_{PP} .
NPs modify Verbs

Tree picture



What we did

- 1 We started with parts of speech
- 2 We added some modification assumptions:
 - Determiners, adjectives modify nouns.
 - NPs modify prepositions & verbs
 - PPs modify nouns
- 3 We got hierarchical structure

A couple more assumptions

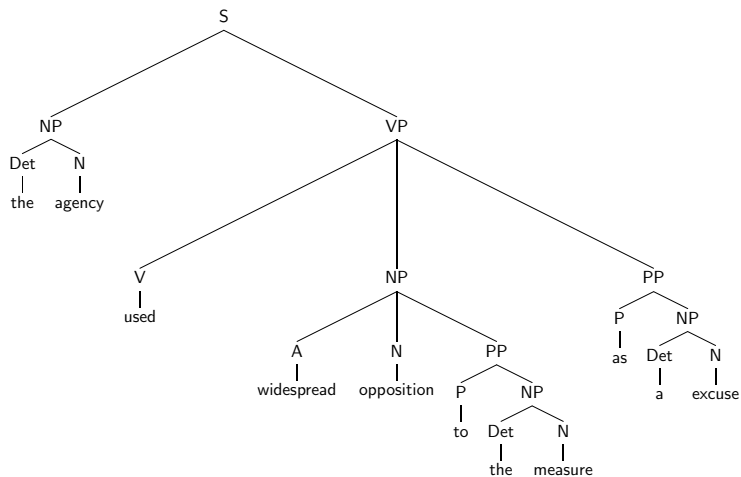
- 1 The subject phrase and the phrase containing the main verb don't modify anything. They are the two pieces that make up the main thought (the subject and predicate)
- 2 Everything else modifies something. When we consider examples like:

Example

John walks with a cane.

We conclude: Preposition phrases modify verbs.

Tree picture 2



Evidence for NP modification of V

Modification (Dependency) principle

The presence of a modifier **depends on** the presence of the **head** it modifies.

Whether an NP can follow a verb **depends on** the kind of verb.

- 1 John stuffed [_{NP} the duck].
- 2 *John fainted [_{NP} the duck].
- 3 * John thought the duck.
- 4 John denied [_{NP} the accusation].
- 5 * John denied. (head **requires** the modifier)

Evidence for PP modification of N

- 1 The agency used widespread *opposition* to the measure as an excuse.
- 2 *The agency used widespread *condemnation* to the measure as an excuse.
- 3 *The agency used widespread *rejection* to the measure as an excuse.
- 4 *The agency used widespread *support* to the measure as an excuse.
- 5 The agency used widespread *condemnation* of the measure as an excuse.
- 6 The agency used widespread *rejection* of the measure as an excuse.
- 7 The agency used widespread *support* for the measure as an excuse.

Generalization

Occurrence of the PP depends on the choice of the appropriate Noun.

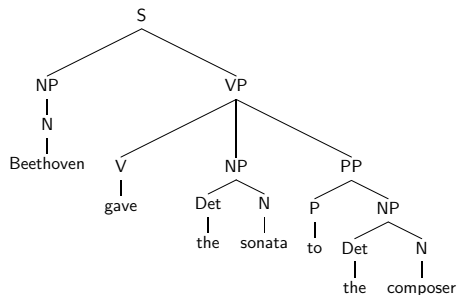
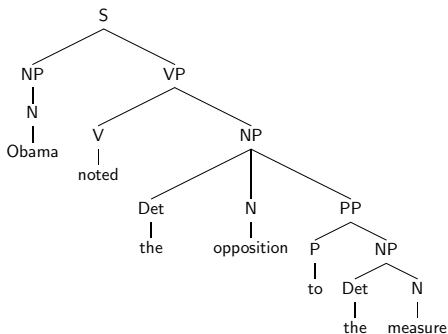
Evidence for PP modification of V

- 1 Beethoven gave the quartet to Haydn.
- 2 Beethoven sent the quartet to Haydn.
- 3 Billie Bob threw the quartet to the floor.
- 4 Martin nailed the theses to the door.
- 5 * The sonata resembled the quartet to the third movement.
- 6 * Haydn received the quartet to Beethoven.
- 7 * Itzak Perlman practiced the quartet to Mary.

Generalization

Occurrence of the PP depends on the choice of the appropriate Verb.

Hypothesis: Phrase structure rules



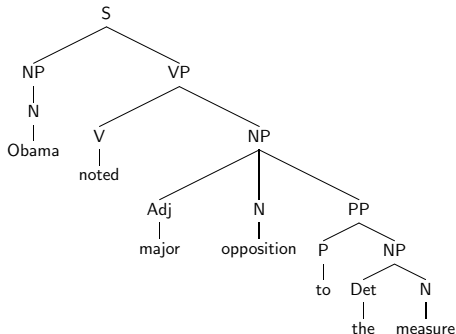
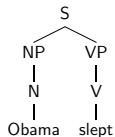
S	→	NP VP	NP	→	Det N
NP	→	N	NP	→	Det N PP
VP	→	V NP	VP	→	V NP PP

The key assumption lurking behind PS-rules

Context-freeness Principle

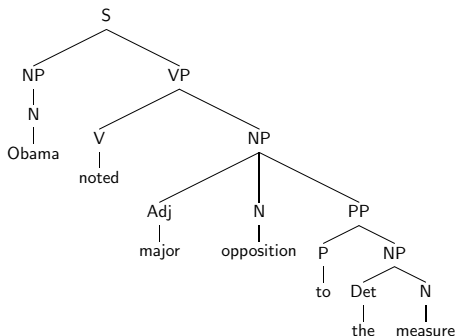
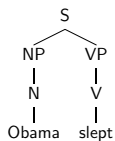
Whether an NP can consist of a Determiner followed by an NP is independent of where it is in the sentence. For instance all of NPs can take the form [Det N] in all of the following places: Subject of sentence, object of verb, and object of preposition.

Testing: Disallowed trees



S	→	NP VP	NP	→	Det N
NP	→	N	NP	→	Det N PP
VP	→	V NP	VP	→	V NP PP

Revising



S	→	NP VP	NP	→	Det N
NP	→	N	NP	→	Det N PP
VP	→	V NP	VP	→	V NP PP
NP	→	Adj N PP	VP	→	V

Lexicon

V	N	Adj	Det	P	CC
noted	Obama	the	major	to	and
slept	opposition	a(n)	widespread	as	or
used	measure				
gave	agency				
	excuse				
	sonata				
	composer				
	Beethoven				

A fuller set of rules

S	→ NP VP	PP	→ P NP
	→ NP Aux VP	AP	→ A
VP	→ V NP		→ Adv A
	→ V NP PP		
	→ V PP		
	→ V		
NP	→ NP CC NP	NP	→ Det AP N PP
	→ Det N		→ AP N PP
	→ N		→ Det N N PP
	→ Det AP N		→ N N PP
	→ AP N		→ Det AP N N PP
	→ Det N PP		→ AP N N PP
	→ N PP		

Same rules (more compactly)

S → NP (Aux) VP
VP → V (NP) (PP)
NP → NP CC NP
→ (Det) (Adj) (N) N (PP)
PP → P NP
AP → (Adv) A

The experiment

1 Write a computer program that takes as input:

- a set of phrase structure rules
- A lexicon
- A sentence

Determines whether the sentence is grammatical according to the grammar, and, most importantly, **builds the structure the grammar assigns to that sentence.**

2 Test the program on data:

- The agency sees widespread opposition to the measure as an excuse.
- Obama noted the opposition to the measure.
- Beethoven gave the sonata to the composer.

Result: Ambiguity

- 1 The doctor examined the man with the stethoscope.

Principle

A PP can modify a verb.

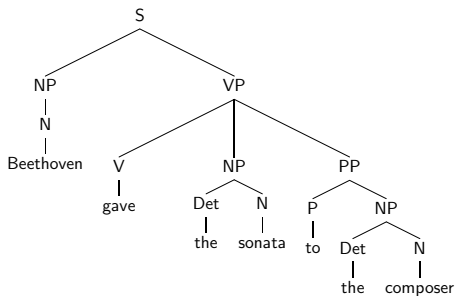
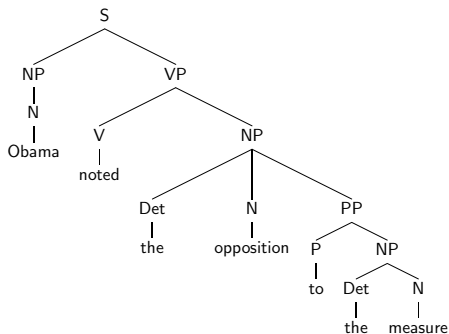
- 2 Beethoven gave the sonata to the composer.

Principle

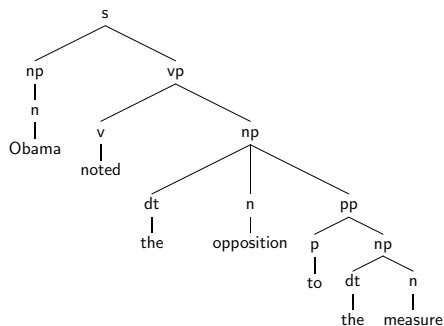
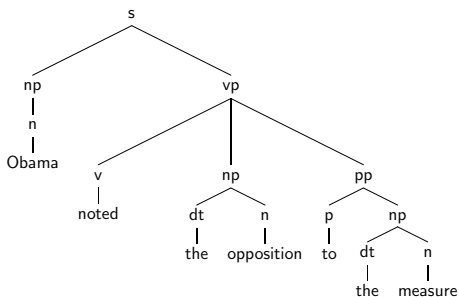
A PP can modify a Noun.

- 3 N V Det N P Det N
- 4 Conclusion: parts of speech and the grammar don't determine structure.
- 5 What does?

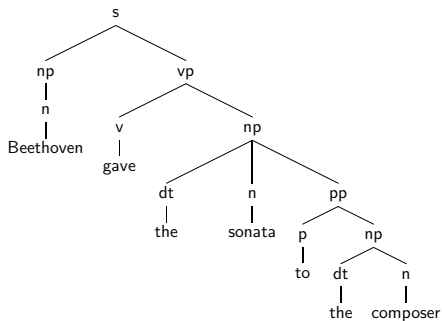
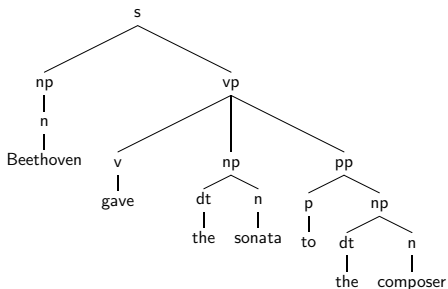
The conflict



Meaning favors a structure



Meaning favors a structure



Your textbook's approach vs. these notes

- We took the concept of one word modifying another as basic, and from that derived phrases.
- Very old and very important idea in syntax: Heads and modifiers
- Carnie uses **syntactic processes** like movement to motivate phrases.
- The two kinds of arguments converge on the same answer!