2 So what is syntax?

(52) Student: So what **is** syntax?
Teacher: Syntax is the combinatorial calculus of categories.
Student: Oh, I see. Oh that's what it is. O.k., then... never mind then...

2.1 Morphosyntactic categories

We have seen that language is a compositional system of signs.

(53)

		Message				Message		
		↓				↑		
Sender	⇒	encode	→	medium	→	decode	⇐	Receiver

The minimum requirement for a sign is that it must group together an exponent (a phonology, the signifier) and a message (a meaning, the signified).

Natural languages seem to be more complex than that.[17] They have categories that are independent of the phonology and (at least partially) of the meaning.[18]

(54) **Verbs** come with very different meanings:
  (i) states, activities, achievements, ...
  (ii) they take zero, one, two, or more arguments, ...
  a. ... but they may occur with tense and number inflection (in English usually realized as -∅, -s, -ed),
  b. ... they may appear immediately after auxiliaries and modals,
  c. ... they can form the progressive form in -ing

(55) **Nouns** come with very different meanings
  (i) concrete objects, abstract objects (dreams, numbers, size), relations (brother, sister, author), states (frenzy, panic), activities
  (ii) ... they can inflect for number,
  (iii) ... they can appear with determiners,
  (iv) ... they can be modified by adjectives,
  (v) ... can be immediately preceded by and immediately followed by *enough*
  (vi) ... cannot have an NP sister to the right (*[brother [$_{NP}$ John]])

(56) **Adjectives** come with very different meanings:
  (i) they can restrict reference (the stupid Republicans - as opposed to the smart ones), express speaker attitudes (the stupid Republicans, i.e., the speaker dislikes Republicans), modify

[17] I know of no current theory of language that is explicit and does not recognize an independent syntax. Categorial grammars probably come closest since there categories are almost completely determined by semantics.

[18] This view has recently been challenged by various authors, see, e.g. Baker (2003) vs. **?**.

manners (the slow execution of the second movement), provide temporal modification (the future husband, the former girlfriend)

(ii) they can take arguments (proud of his achievements, jealous of his enemies, likely to be forgotten) or not (red, weird)

(iii) . . . can be modified by *very* and form comparative and superlative forms,

(iv) . . . can modify nouns,

(v) . . . can be modified by adverbs,

(vi) . . . can appear immediately after *seem, become* and *appear*

(57) There are of course many more categories some large some small, some extendable and some not (e.g., adverbs, prepositions, determiners, complementizers). The traditional view (both within and outside of generative grammar) is that the syntactic categories are (at least partially) independent of the meaning. Whatever the nature of the categories may be (semantically grounded or purely syntactic), there is also a combinatorial syntax

These syntactic categories have their own combinatorial system which is independent of the meaning.

(58) a. Colorless green ideas sleep furiously. (Chomsky (1957))
b. *Colorless sleep furiously ideas green.

(59) a. John is angry with the government.
b. The newspaper article angered John.
c. The newspaper article made John angry with the government.
d. *The newspaper article angered John with the government. (Pesetsky (1995))

(60) a. It is raining.
b. *is raining.

(61) a. There is a flaw in the proof.
b. *Is a flaw in the proof.

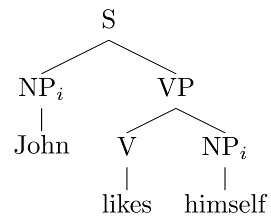
(62) a. Living it up at the hotel California
b. *Living up at the hotel California

Plainly, once we assume that the smallest elements we combine have categories and that there are rules and restrictions on what combinations are possible, then we have to assume that the results themselves must have categories, too.

If *tall* has a category and *drink* has a category, then *[tall drink]* must also have a category – otherwise it would be indistinguishable from *[extremely akwardly]*, but the two must be distinguished because ✓Klaus lumbered down the street extremely akwardly because of the tall drink vs. *Klaus lumbered down the street tall drink because of the extremely akwardly.

In that sense, the tree diagrams I used earlier ((15) and what followed) was extremely misleading and in fact wrong. I pretended there that there are only words and structure; but that his wrong, there are also categories. A very traditionally category labelling of (15) would look something like this, but we will revise it soon:

(63) a.



b. [$_{\text{S}}$ [$_{\text{NP}_i}$ John] [$_{\text{VP}}$ [$_{\text{V}}$ likes] [$_{\text{NP}_i}$ himself]]]

> So syntax is about combining simple objects with categories into larger objects with categories.

2.2 $\overline{X}$-theory

$\overline{X}$-theory (pronounced: X-bar-theory; often also written as X'-theory) is part of generative theory about categories.

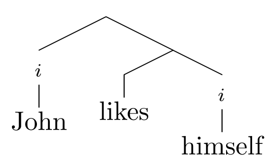
$\overline{X}$-theory has three parts to it

- a theory of structures and
- a theory of categories.
- a theory of positions or relations.

2.2.1 Structures in $\overline{X}$-theory

Consider again the familiar tree - abstracting away from categories for the moment.

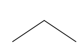
(64)



(65) A catalogue of the structures we find in this example is very short:

a. unary branching

b. binary branching



People have claimed that these are the only structures we find in natural language - and we will ignore (65-a) for the most part. The simplest version of the argument for this strong claim goes like this:

- If language allows more types of structures, then any given string can be analyzed in many more ways than if there are fewer structures available.
- We do not find the kinds of mistakes or disagreements about speakers that would be predicted if multiple analyses of structures were available.
- We know that (65-b) is a possible structure.
- Hence (65-b) is the only structure available.

Consider the following phrases:

(66) a. The fake old picture of John Paul II
This describes an object that pretends to be an old picture depicting John Paul II it doesn't have to be old itself as long as it is fake.

b. The old fake picture of John Paul II
This describes an object which is a fake picture of John Paul II and it is old.

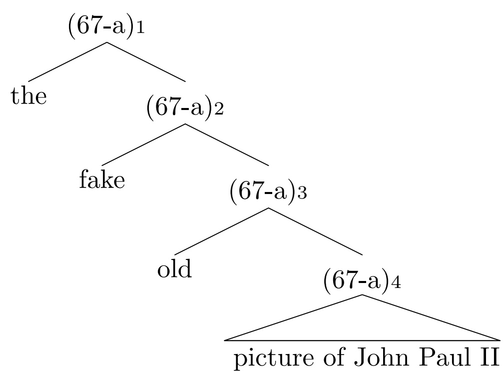
c. The fake picture of John Paul II from the last century
This sentence has both of the above readings.

The relation between *fake* and *old/from the last century* is called scope. In (66-a) *fake* takes scope over *old*, in (66-b) *old* takes scope over **??**, and (66-c) is scopally ambiguous.

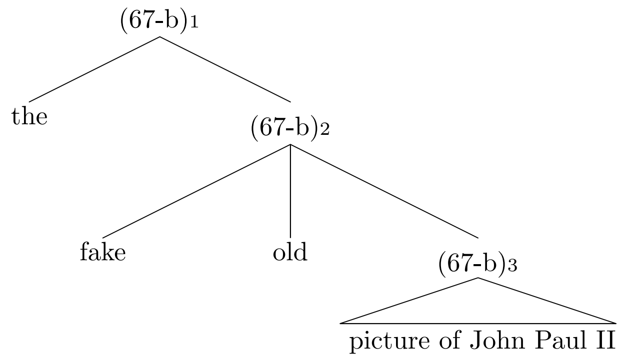
Suppose we have figured out that *the* is a determiner, that *fake* and *old* are adjectives, that *picture of John Paul II* is some kind of nominal syntagma, and that *from the last century* is a prepositional syntagma. Suppose furthermore that *old fake fake old* cannot form a syntagma for categorial reasons. Even with all of these restrictions, there are still many possible structures. We have for example:

(67) These are the trees we get for (66-a)

a.

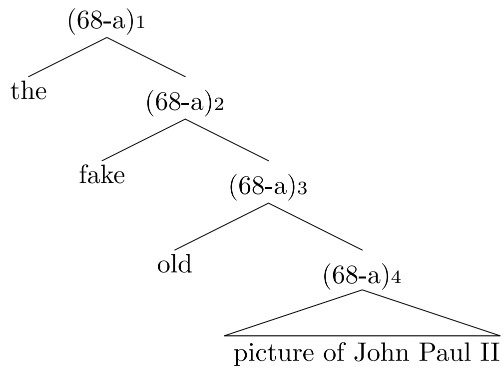


b.

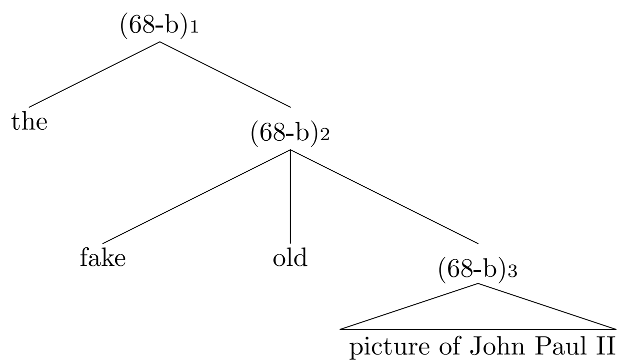


(68) These are the trees we get for (66-b)

a.



b.

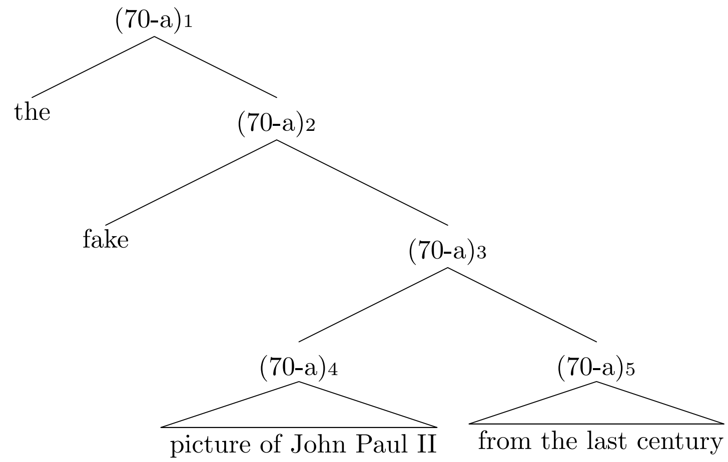


(69) Things work more or less so far. Whether we go binary or ternary, there is a structure for the examples.

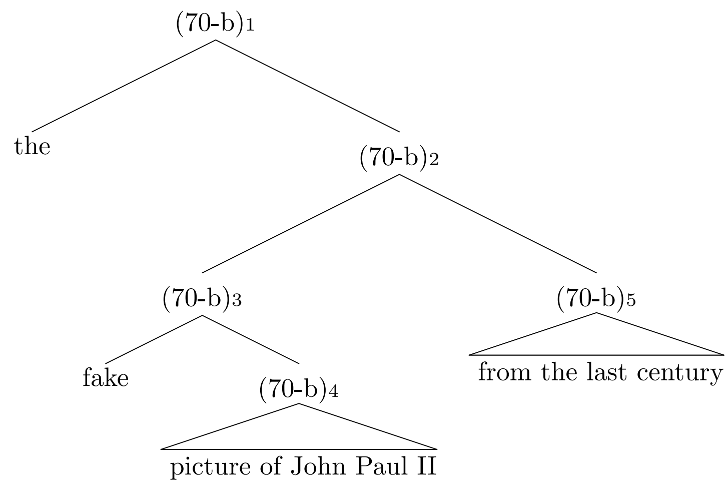
- ✓ In the binary branching world we can say that α takes scope over β iff α c-commands β.
- ! In the world of flat structures, scope will have to be determined linearly: α takes scope over β iff α precedes β. Given what we said about the learnability of binding theory, this linear condition should raise warning flags.

(70) These are the trees we get for (66-c)

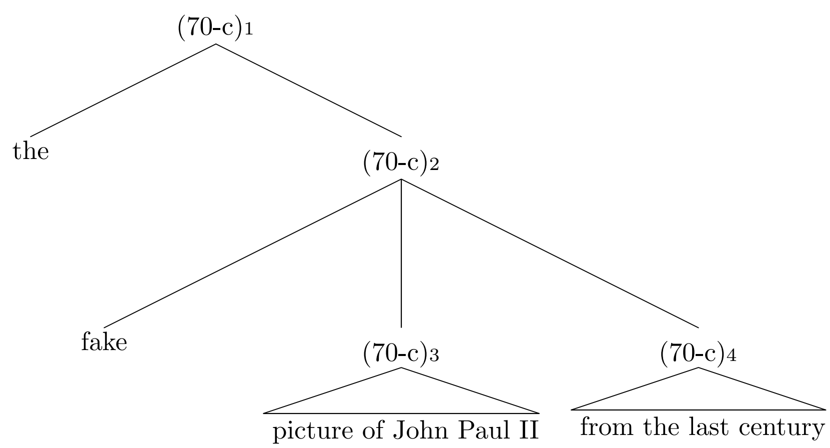
a.



b.



c.



(71) ✓ If we go strictly binary, everything is fine. There are two structures, one per reading, and our scope rule easily handles both cases.

!! In the world of flat structures, the scope rule fails: *fake* always precedes *from the last century* but it doesn't always outscope it.

(72) Finally consider the process of *one*-substitution which replaces parts of noun phrases.[19]

a. (i) Frank has bought the old fake picture of John Paul II and Mary has bought the new one.
   (ii) Frank has bought the old fake picture of John Paul II and Mary has bought the new genuine one.

b. (i) Frank has bought the fake old picture of John Paul II and Mary has bought the genuine one.
   (ii) Frank has bought the fake old picture of John Paul II and Mary has bought the genuine new one.

c. (i) Frank has bought the fake picture of John Paul II from the last century and Mary has bought the genuine one.
   fake must take scope over *from the last century* here.
   (ii) Frank has bought the fake picture of John Paul II from the last century and Mary has bought the one from this century.
   from the last century must take scope over *fake* here.
   (iii) Frank has bought the fake picture of John Paul II from the last century and Mary has bought the genuine one from this century.
   This example is ambiguous.

(73) ✓ If we go binary branching, we can easily handle all these facts: *one* can replace a constituent that contains the noun and its complement and possibly some modifiers. The scope facts fall out.

!!! We can formulate a sort-of linear (!) rule of *one*-substitution: *one* can replace a string that contains the noun, its complement (constituent!) and some adjacent modifiers (constituents!). But the scope facts cannot be predicted–!

Arguments of this type have lead to the assumption that all structures in natural language are at most binary branching.

[19] We will be much more precise later on in formulating what *one*-substitution does.