

Weeks 1-2 summary: 24.902

1. Diagnosing sentence structure

1. The **sentence fragment test** reveals structure: the sentence fragments that may be uttered in surprise or shock are phrases (constituents) of syntactic structure.

- (1) "The tall student will put the book on the little table on Friday."
 a. Put the book on the little table?!
 b. On Friday?!
 c. On the little table?
 d. The little table?!
 e. Little table?!
 f. *Book on the?!
 g. *Put the book?!
 [etc.]

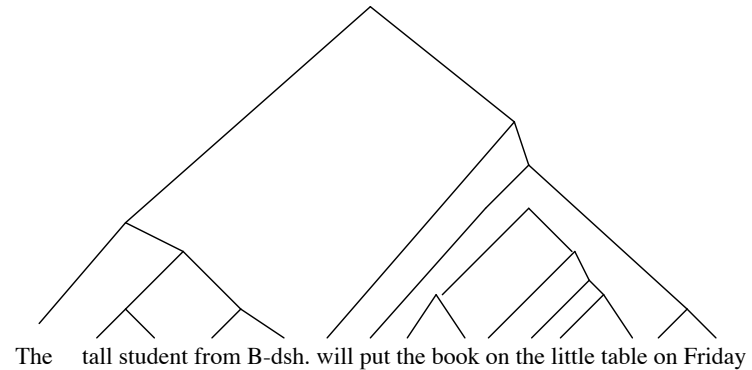
2. The availability of a pro-form also reveals (or suggests) structure: pro-forms take only phrases ((constituents) as their antecedents

- (2) The tall student from Bangladesh will put the book on the little table on Friday...
 a.and she will rejoice. [*she = the tall student*]
 b. ...and the short one will rejoice. [*one = student from Bangladesh*]
 c. ...and I will do that/so/it on Saturday [*do that etc. = put the book on the little table*]
 d. ...and I will do that/so/it too [*do that etc. = put the book on the little table on Friday*]
 e. *...and the zyzyzyzyz also put the book on the big table on Saturday
 [*zyzyzyzyz = tall student from Bangladesh will*]

2. What does syntactic structure look like?

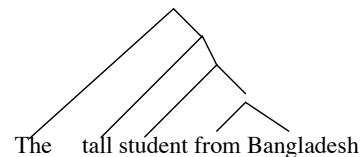
Putting the question of node labels aside, the structure that comes out of our tests looks something like (3):¹

(3)



The initial phrase *the tall student from Bangladesh* could also look like (4):

(4)



(5) **Evidence that both structures (3) and (4) are possible:**

- a. The tall student from Bangladesh was happier than the one from Nigeria.
 (=*the short student from Nigeria*)
 b. The tall student from Bangladesh was happier than the short one.
 (=*the short student from Bangladesh*).

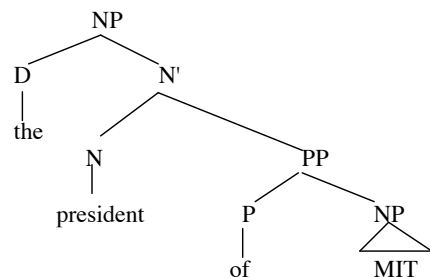
Example (5a) corresponds to (3) and example (5b) corresponds to (4). [Make sure you know why!]

¹ We took shortcuts in class, and didn't actually motivate every piece of this structure -- on the assumption that you did something like this in 24.900.

3. The structure of NP: complements

We give the constituent formed by N and certain PPs (called *complements of the N*) the name N' ("N-bar"). We will give the constituent formed by D, N and the complement of N (plus modifiers N' -- coming up shortly!) the name NP (= *Noun Phrase*).

(6) A structure for simple Noun Phrases



The fact that we as speakers assign the structure in (6) to the NP *the president of MIT* means that we have a mechanism in our minds (in our brains) that assigns structure to sequences of words. This mechanism is called a *grammar*. The following fragment of a grammar does the trick for (6). The names of the rules are for convenience only. We interpret the arrow as "may immediately dominate". The parentheses enclose optional elements. Thus, the complement rule tells us that N' may immediately dominate N and PP together, or just N.

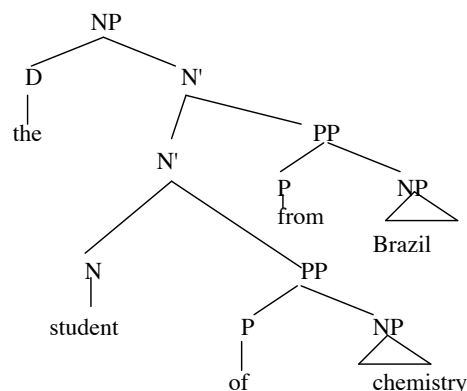
(7) First grammar fragment for NP (version #1 of 3)

NP --> D N' [specifier rule]²
 N' --> N (PP) [complement rule]

4. The structure of NP: right-hand adjuncts (modifiers)

Next, we consider *adjuncts*, otherwise known as *modifiers* (though the class of adjuncts includes elements other than modifiers -- more later). It appears that N' plus an modifier PP forms another N', as in (8):

(8) N' plus an "adjunct" (modifier) PP form another N'



One reason for distinguishing complements as sisters of N from adjuncts as sisters of N' is the behavior of *one*-pronominalization. For most English speakers, *one* is an N'-pronoun. It can be a pronoun for any size of N', but not for N. In (9a) below, *one* is "trying" to take *student* (an N) as its antecedent³, without the complement of *chemistry* -- and the result for most of the class was bad:

(9) *One* is an N'-pronoun

- *The student of chemistry praised the one of physics.
- The student of chemistry from Brazil praised the one from Rwanda.
- The student from Brazil praised the one from Rwanda.

We also noticed in class that complements precede PP adjuncts of N (unless stressed or focused). This is predicted if the complements are "inside" adjuncts:

(10) Complements precede (post-N) adjuncts

- a student of chemistry from Brazil
- ??a student from Brazil of chemistry

The following grammar fragment correctly characterizes the structure of NP, as we've seen it so far:

(11) Grammar fragment for NP (version #2 of 3)

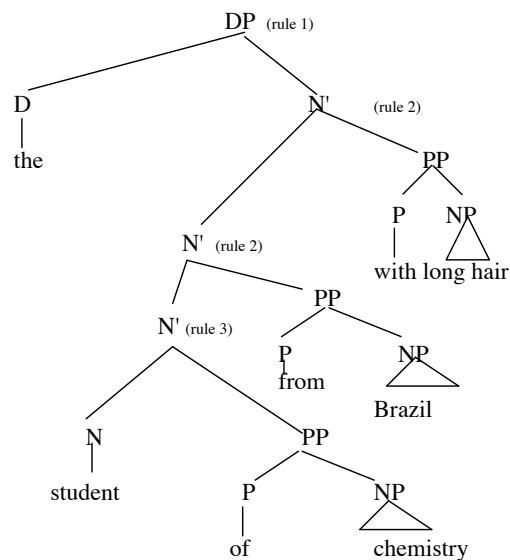
- NP --> D N' [specifier rule]
- N' --> N' (PP) [modifier rule]
- N' --> N (PP) [complement rule]

² The term "specifier" was not introduced very well in class. We'll return to it soon.

³ In class, to keep the terminology from overwhelming you, I avoided the term "antecedent" in favor of more clumsy expressions like "the phrase that X gets its meaning from". But "antecedent" is the right word.

The grammar correctly captures the fact that there can be an indefinite number of modifiers. Rule 2 in (11) can reapply to its own output, yielding multiple PPs to the right of the N and its complement:

- (12) **Recursion of modifiers**
- the student of chemistry from Brazil with long hair on a bicycle...
 - the one from Brazil with long hair on a bicycle
 - the one with long hair on a bicycle
 - the one on a bicycle
- (13) **N' recursion demonstrated: with the relevant rules indicated**



5. Left-hand modifiers of N

Adjectives appear to be modifiers on the left side of N'. Something I left out in class: the modifiers are phrases (AP), not bare adjectives. We can see this because adjectives may themselves have modifiers, e.g. *very* and *reasonably* in (14):

- (14) **Adjective Phrases**
- a very tall student
 - a reasonably nice hotel

We now add a version of the modifier rule that accommodates APs to our rules for NP:

- (15) **Grammar fragment for NP (version #3 of 3)**
- NP --> D N' [specifier rule]
 - N' --> N' (PP) [adjunct rule]
 - N' --> (AP) N' [complement rule]
 - N' --> N (PP) [complement rule]

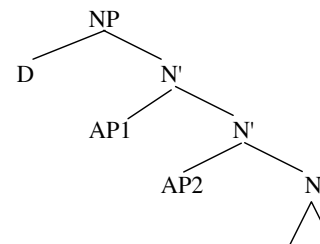
6. Semantics and the NP rules

These syntactic rules are relevant to semantic interpretation. First of all, constituents put together by rules 2a and 2b undergo semantic rules of modification, while constituents put together by rule 3 undergo semantic rules of predicate-argument (function-argument) composition. Also, the branching structure itself correlates with interpretation, especially given that outer modifiers often describe states that hold at a later moment than inner adjuncts.

Left-hand modifiers

This is the case in (16) and (17):

- (16)
 - the priceless broken vase
 - the broken priceless vase
- (17)
 - the recovered stolen property
 - the stolen recovered property
- (18)



A cute example from Radford, not discussed in class, is (19), where the outer adjective has a property called "intensionality" that allows us to see a meaning difference between "a person alleged to be an English baron" and "English person alleged to be a baron":

- (19)
 - an alleged English baron
 - an English alleged baron

Other examples from class, which I will let you ponder on your own, are (20)-(21):

- (20) a. a large small shirt
b. a small large shirt
- (21) a. a popular wrong answer
b. a wrong popular answer

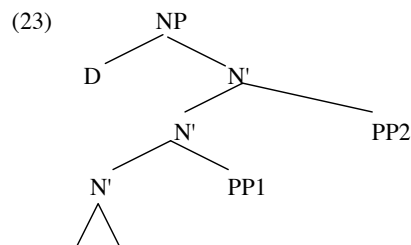
With prenominal modifiers, the further to the right you are, the deeper "inside" you are. The semantics processes "inside modifiers" before "outside modifiers". Hence the effects.

Right-hand modifiers

With *postnominal* modifiers, the further to the *left* you are, the deeper "inside" you are — just the opposite of prenominal modifiers:

- (22) a. A shirt of great value with a hole is worthless.
b. #A shirt with a hole of great value is worthless.

[A "shirt with a hole of great value" might be, for example, the shirt Lincoln was wearing when he was shot.]



In (24a), we are talking about a man with an unusual last name, who happens to be from China. Well, Ng is an unusual last name around here, even if it's common in China, so Mr. Ng qualifies as such a man. But Mr. Smith does not.

In (24b), we are talking about a man from China with an unusual last name. Well Smith is an uncommon name among men from China, so Mr. Smith qualifies for this designation. Ng is not an unusual name among men from China, so Mr. Ng does not.

Some other examples for you to ponder. Do you agree with the judgments?:

- (24) a. the man with the unusual last name from China (#Smith, ok Ng)
b. the man from China with the unusual last name (ok Smith, *Ng)
- (25) a. A vehicle with one wheel missing with three wheels used to have four (#three).
b. A vehicle with four wheels with one wheel missing used to have three (#four).

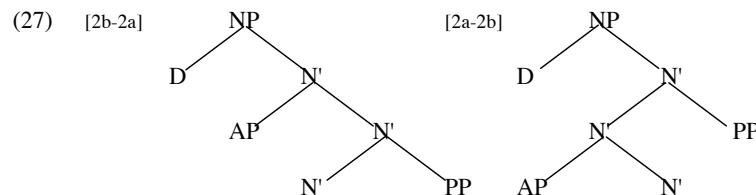
Mixtures of left-hand and right-hand modifiers

We didn't get to this in class (except a few rushed remarks), much to my regret. But we'll start with it next week.

The following examples are ambiguous. For example, (26a) could refer to a once-valuable shirt that now has a hole or to a shirt with a hole (e.g. Lincoln's) that is a valuable shirt.

- (26) **Ambiguity when you mix pre-N and post-N**
a. a valuable shirt with a hole
b. an alleged baron from England
c. a wrong answer of some popularity

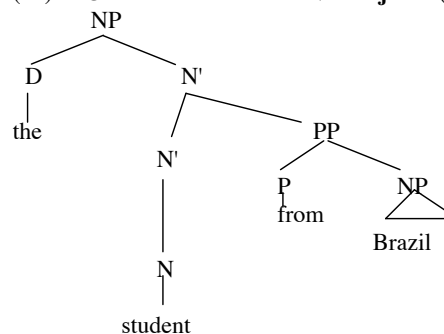
The ambiguity arises because the left-hand modifier can perfectly well be above the right-hand modifier (applying rule 2b before 2a) or the right-hand modifier can be above the left-hand modifier (applying rule 2a before 2b):



Non-branching nodes

The phrase structure grammar tells us that a noun without a complement still projects both N and N':

- (28) **Official structure for N + Adjunct (no complement)**

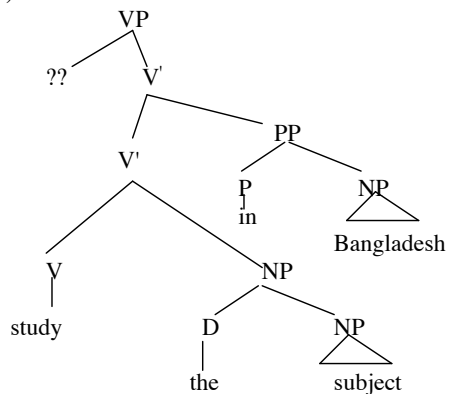


7. Structure of VP

(29) Grammar fragment for VP

1. VP --> (??) V' [specifier rule]
2. a. V' --> V' PP [adjunct rule]
 - a'. V' --> V' AdvP
 - b. V' --> (AdvP) V'
3. V' --> V (NP) (PP) (CP) [complement rule]

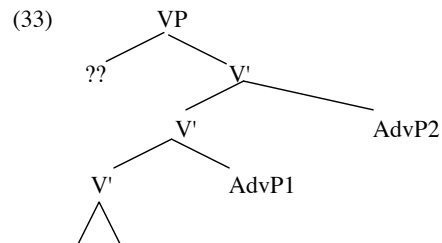
(30) Structure of VP



By the way, we have just the same sort of evidence that adjuncts are produced by rule 2a-b in (15) as we had for the corresponding rules for NP. We didn't discuss this in class, but here it is:

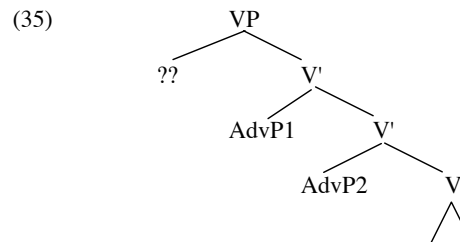
For example, the semantics seems to process "inside" adjuncts in VP before "outside" adjuncts. For post-verbal modifiers, this means that adjuncts to the left are inside adjuncts to the right:

- (31) a. John knocked on the door twice three times. [knock-knock.... knock-knock... knock-knock]
 - b. John knocked on the door three times twice. [knock-knock-knock.... knock-knock-knock]
- (32) a. John knocked on the door carefully quickly. [the careful knocking was quick]
 - b. John knocked on the door quickly carefully. [the quick knocking was careful]



For pre-verbal modifiers, adjuncts to the left are *outside* adjuncts to the right. Note that the meanings in (34) correspond to adverb orders that are the *opposite* of the orders in (34):

- (34) a. John carefully quickly knocked on the door. [the quick knocking was careful]
- b. John quickly carefully knocked on the door. [the careful knocking was quick]



As expected, mixtures of pre- and post-verbal modifiers lead to ambiguity:

- (36) a. John carefully knocked on the door quickly. [ambiguous as predicted?]
- b. John quickly knocked on the door carefully. "

Finally, we noted on Monday that *do-so*, *do-that* and *do-it* pro-forms seem to take V' -- never V -- as their antecedents. This makes these pro-forms the verbal counterparts of *one*:

- (37) ***do-so* like *one*-anaphora: takes predicate plus complement (if the VP is agentive)**
 - a. Sue will talk to Mary on Friday, and Tom will do so on Saturday.
 - b. ??Sue will talk to Mary and Tom will do so to Sue.

We'll discuss this a bit more on Monday as well.