Lecture 3 **Roberts pp. 1-29: first pass** Sept. 3, 2002

NEXT TUESDAY (Sept. 10th) we will have class in the Social Sciences building, in the SBS Instructional Computing Laboratory, SSCI 224. Regular time, of course.

1. Where were we?

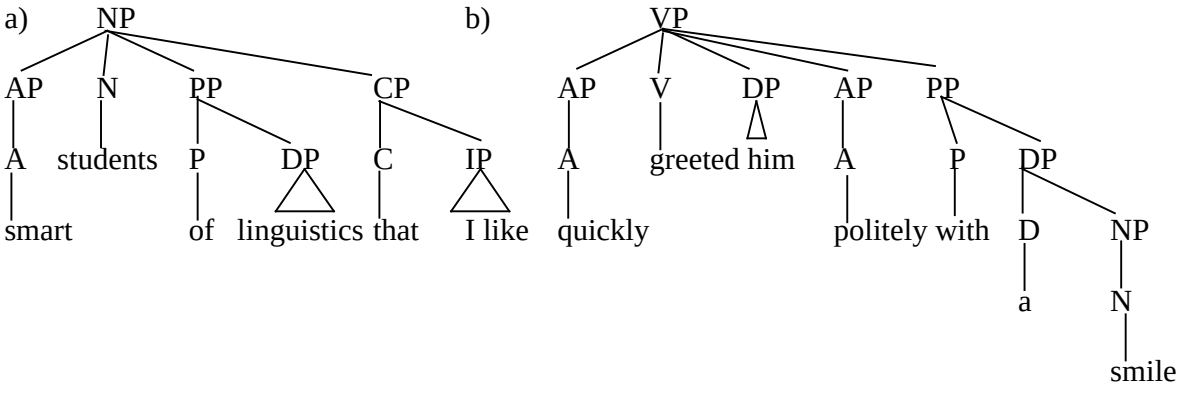
1. So, last time we'd gotten to the point of including DP and CP, and renaming S "IP" in our inventory of rules, which now look something like this:

CP → Comp IP	e.g. *that I like cookies*
IP → {DP/CP} I (VP)	e.g. *I might like cookies*
VP → (AP+) V (DP/CP) (AP+) (PP+)	e.g. *quickly greeted him politely with a smile*
PP → (AP) P (DP)	e.g. *straight to the cookie jar*
DP → (DP) D (NP)	e.g. *Mom's big cookies that I like in the jar*
NP → (AP+) N (PP) (CP)	e.g. *smart students of linguistics that I like*
AP → (AP) A	e.g. *very quickly*

2. Recall that we'd decided that I, D and Comp were probably heads of their phrases based on the evidence from headedness: in typically head-initial languages like English, they are on the left of other phrasal material, while in typical head-final languages like Lakhota, they are on the right.

➔ BUT, we had a big blot on our theory: in just about every phrase up there, it's possible ALSO to have something to the left of the head! if English is a left-headed language, the head should be the leftmost thing in its phrase, shouldn't it?

3. Consider the NP and VP trees below, built according to the phrase structure rules above:



2 X-bar theory: constituency inside our PS rules

4. Now, according to our trees, AP, N, PP and CP are sisters in (a), and AP, V, DP, AP and PP are sisters in (b). They ought to be independent of each other. But when we try a battery

of our constituency tests — particularly 'replacement with a single item' (what Roberts calls 'pronominalizaton') we find that in fact there's evidence that, for instance, the V+DP belong together to the exclusion of the initial AP:

a) **What** did you quickly **do** politely?
Greet him

b) **Greet him** is what I did.

c) *__What__ did you **do** him politely?
*__Quickly greet.__

d) **How** did you greet him politely?
Quickly

e) **How** did you quickly greet him?
Politely

f) **How** did you greet him? (Compare: I quickly politely greeted him
*__Quickly politely.__ (but ok: "Quickly *and* politely")

So for 3(b), we can conclude that the internal structure of VP is a bit more complex: the V+DP (verb + object) form a constituent, to the exclusion of the other items. In particular, when two adverbs are stacked up at the beginning of a VP (as in 4f), they do *not* form a constituent, according to this test.

5. We can do a similar test on the NP:

a) I saw the tall, smart **student of linguistics** that I like.
I saw the tall smart **one** that I like

b) I saw the tall **smart student** of linguistics that I like.
??I saw the tall **one** of linguistics that I like.

c) **Which student** did you see?
??The **one** of linguistics.
The smart **one**.

d) I saw the tall smart student **of linguistics that I like**
*I saw the tall smart student of **one**.

So here, we seem to have evidence that [student of linguistics] belong together as a constituent, while the adjectival and clausal (and prepositional … *students that I like in the department*) modifiers are somehow separate).

6. It's a little trickier with PPs, but we can devise at least one test:

a) I went straight [to the store] and [into the back room].
b) I went straight **there**.

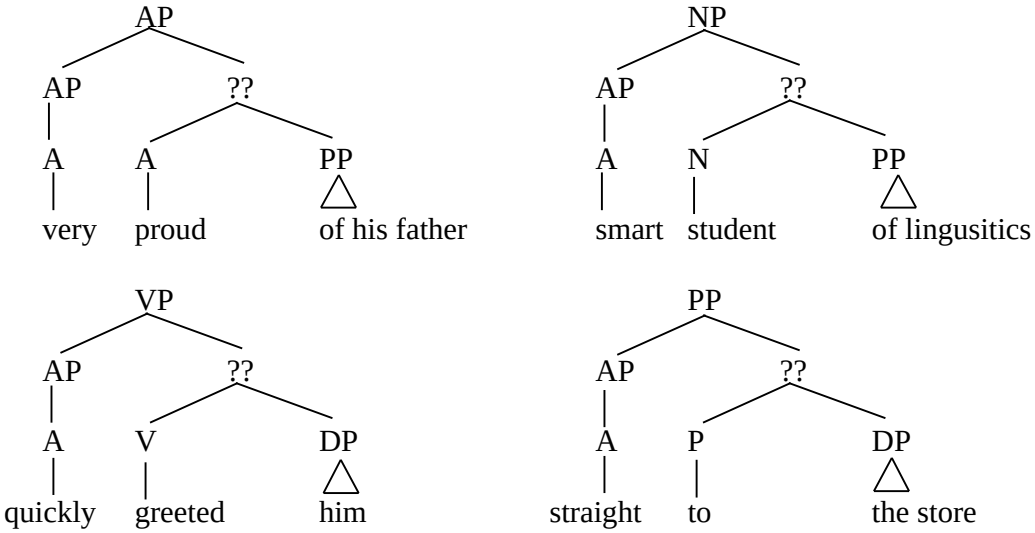
So, if *there* is standing in for *to the store*, we can again see that *to the store* goes together to the exclusion of *straight*.

7. Finally, with APs, it's even more elusive, but again we can at least suggest one test:
   a) John is very **proud of his father**
   b) Bill is also very **much so**
   c) *Bill is also very **much so** of his father

Whatever 'much so' is standing in for, it's not just the adjective *proud*, but rather the whole constituent *proud of his father*.

So it seems like what we've really got going on, in all these cases, is that there can be some intermediate phrase, between the constituent that's just the head by itself and the constituent that's the whole phrase with modifiers.

8.



9. We'll call this intermediate phrase level a *bar-level*; in the original notation, the idea was that each level up from the head would be named after the head plus one bar, like this:

N, $\overline{N}$, $\overline{\overline{N}}$… and so on, or like this, if you couldn't arrange for bars over the letters in your word processor (actually, in those days, typewriters): N, N', N"…

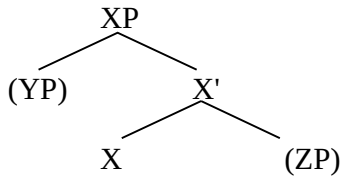
But people were so used to calling the top level the "phrase" (NP, VP, etc.) that only the intermediate levels got named using the bar-convention, and we now speak of 'bar-levels' pretty much to mean exclusively the constituents that are smaller than the phrase and bigger

than the head alone. So the ?? in the diagrams above should be labelled A', N', V' and P'… and since all phrases seem to basically follow the same schema, the idea arose (from Chomsky, Jackendoff) that there was basically one template for phrase-formation, independent of category — that is, basically just one set of category-neutral rules, that you could use to form phrases of any category. This template was called X-bar theory, and it looks like this:

XP → (YP) X'
X' → X (ZP)

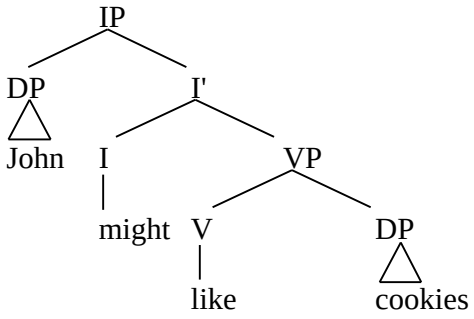
Roberts follows Chomsky's convention of using Greek letters to stand in for 'constituents of arbitrary category and level,' so in his rules where I'm using "YP" and "ZP" you'll see α and β. It's useful to know the names of the most commonly used Greek letters for ease of reading syntactic papers, and even more so in semantics; I've appended a list of them to this handout.

These rules produce trees that look like this:



Whatever is in the YP position is called the **specifier** of the phrase
Whatever is in the ZP position is called the **complement** of the head.

10. So IP and CP, too, will have bar-levels; the usual schema you will use for drawing sentential trees now is something like the following:



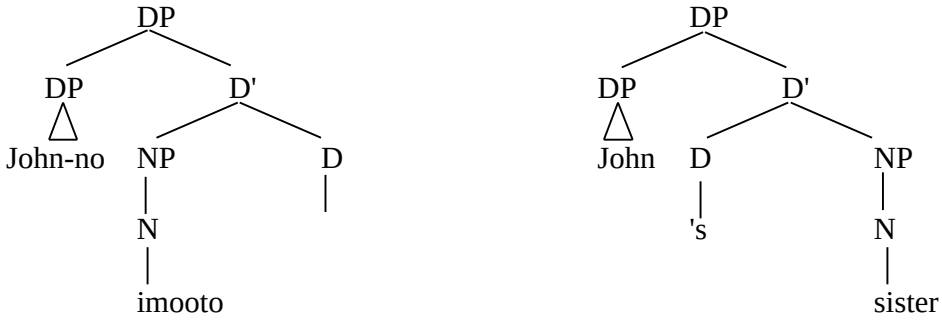
3. X-bar theory and headedness:

So, as Baker explains very cogently, (p 73) the Head Directionality Parameter applies only when you're talking about a head and its *complement*: heads appear to the left of their complements in English, and to the right of their complements in Japanese.

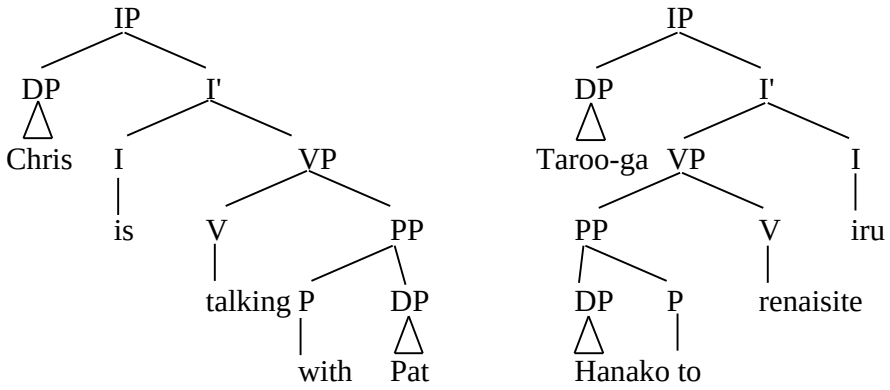
Why doesn't the headedness parameter affect specifiers? Because specifiers are phrases added to phrases — the headedness parameter doesn't say anything about what order two *phrases* are supposed to come in. It just says that a *head* comes before its sister phrase.

11. And finally, we can understand why Japanese subjects, for example, or possessor phrases in DP, can appear on the left side of their phrases: they're specifiers, sisters to X', not sisters to X, so the head-finality of Japanese doesn't affect their position:

a)



b)



Both English and Japanese have subjects on the left, but the heads of all their phrases are exactly mirror images of each other.

4 Binary Branching, Merge, X-bar-iteration and modifiers

One remaining problem: what about the fact that you can iterate modifiers? And modifiers can appear both to the left or the right:

12. a) the big, brown, grumpy bear in the park under the tree that John saw
    b) John kissed Mary quickly on the cheek in the park

13. Now, we could simply iterate phrases in our X-bar schema, and add some to the right of the phrasal rule, like this:

XP → (YP+) X (WP+)
X' → X (ZP)

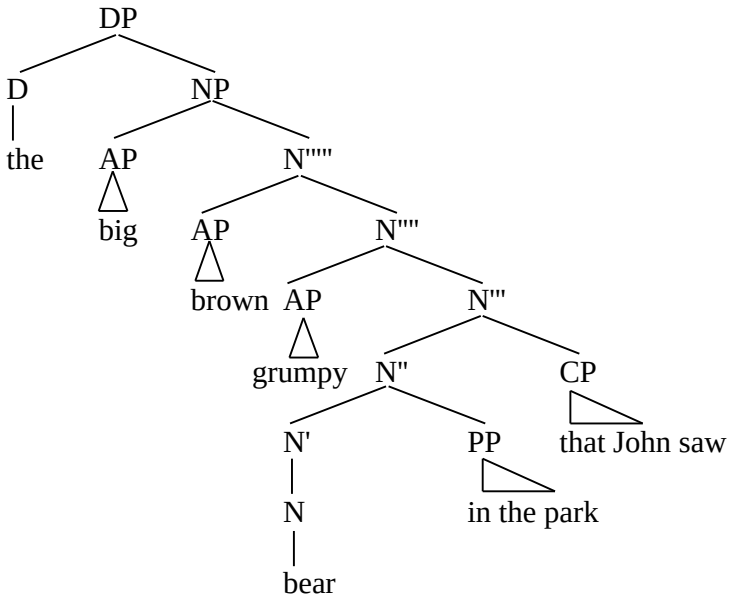
Here we're going to see our first example of a 'theoretical elegance' assumption, partially motivated by constituency tests but mainly motivated because theorists thought it would be more 'elegant':

14. *Language creates phrases by sticking two things together, or* **merging** *two things.* (The operation which accomplishes this, in modern times, is called **Merge**).

That is, phrase building is done by iterating the simples possible operation. It could merge a head and a phrase, or merge a phrase and another already-built phrase. This would mean that all complex nodes should be **binary branching**, having at most two daughters — no ternary branching (3 daughters), or bigger.

How can we accommodate this assumption in our theory?

15. Bar-levels were originally intended to iterate. All we have to do is assume that each time a new modifier is added, we create another bar-level, until we're done – then the topmost bar-level is the phrase:



The topmost element is labelled NP, but it could just as easily be labelled N''''.
We'll see that the assumption of binary branching pays off in suggesting new theoretical innovations that turn out to be right, later on.

5 Some official questions and answers:

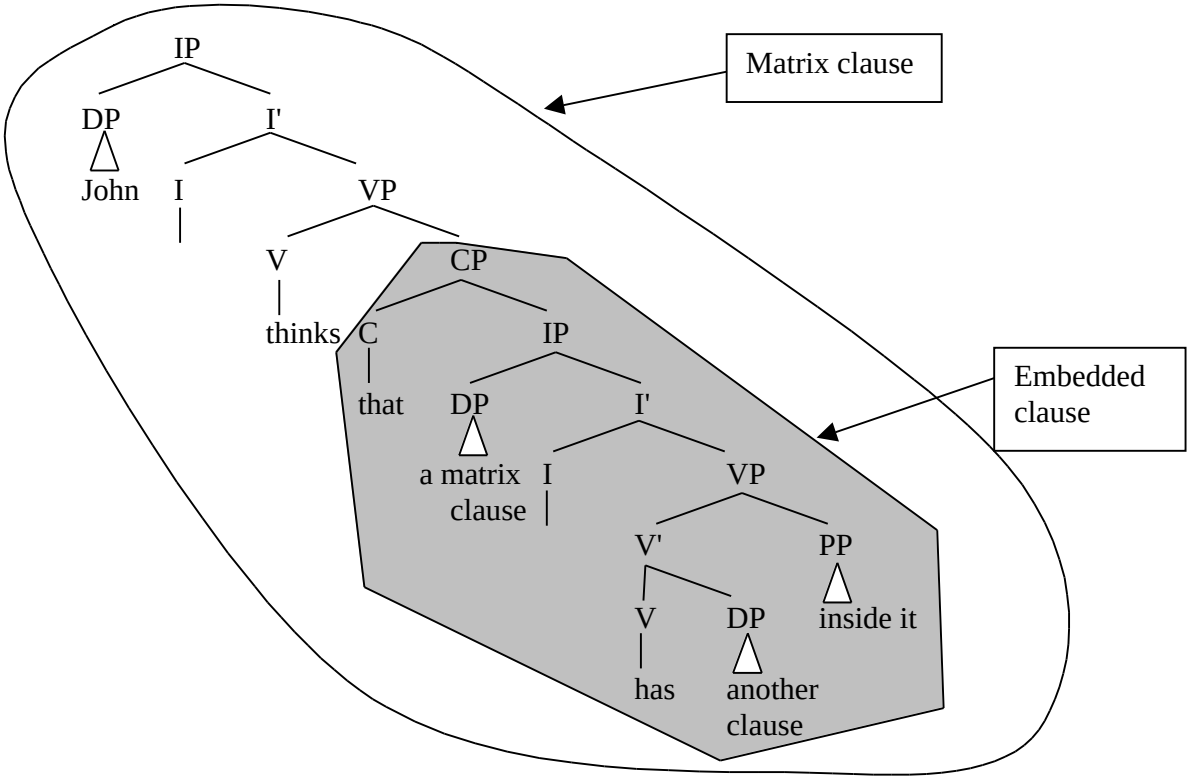
16. *My question is, what's a matrix clause?*

A matrix clause is a clause that contains another clause (just as a 'matrix' e.g. in geology is a kind of concrete-like stone with other stones embedded in it). I've used the term 'complement'

clause so far in the class, I think, but another often-used term is 'embedded' clause. So in the sentence

John thinks that a matrix clause has another clause inside it

the embedded (complement clause) clause is "that a matrix clause has another clause inside it", and the matrix clause is the one headed by the verb 'think", i.e. the top clause in the sentence. The corresponding tree would be like this:



Usually when one is discussing a matrix clause it just means "the top clause" although technically, since you can embed sentences that have embedded clauses inside ANOTHER clause, in principle each intermediate verb which takes an embedded clause would also be the matrix verb for *that* clause (e.g. "I think that Sue said that Mary believes that John went to the store", the 'believe clause' is the matrix clause for 'went', the 'say' clause is the matrix clause for 'believe', etc…). But the usual practice is just to use 'the matrix clause' to mean the topmost one (e.g. the 'think' clause in the example I just gave).

17. *Why is it that inflection governs an entire sentance? It makes more sense to me that inflection (and the auxillaries that show it) would be found in the verb phrase right next to the main verb. Furthermore, I would argue the verb itself governs the sentance, not the inflection of the verb. Even further, auxillaries, especially 'do' seem only to be assisting the verb (whatever cannot be shown in the verb is shown in the aux), not really doing*

much themselves, why do they even get their own phrase, let alone the second most dominant?

It does seem counterintuitive that an element as small as an auxiliary, or a tense marker, could head the whole sentence, especially when it's as obviously as dependent on the verb as tense markers or auxiliaries normally are. But on the other hand, it's possible to argue that really it is the tense marker/auxiliary that is the essential ingredient to a well-formed sentence, not the verb. After all, it's possible to have a well-formed sentence, which can stand alone as an utterance and which any English teacher would accept as a sentence, without any main verb:

a) I can!
b) John didn't.
c) She will.

But it's not possible to have a well-formed English sentence without an auxiliary or tense marker:

a) *She talk.
b) *John run
c) *Bill give Mary a book.

This is tarzan-speak; clearly there is something in the auxiliary/tense marker that is essential to the formation of a sentence.

I'll address this a bit more on Tuesday, because it touches on an important distinction between "functional" categories and "lexical" categories that I haven't introduced yet. Basically, 'lexical' categories are the things that spring to mind as canonical examples of 'words' -- nouns, verbs, adverbs and adjectives, and which carry the burden of meaning in a sentence -- they're definitely the things that convey the ideas we want to convey. 'functional' categories are all the little words that we think of as 'helper' words, like auxiliaries, determiners, complementizers and some prepositions -- which are not very important content-wise, but are all-important grammar-wise. Since we can demonstrate the independence of 'sentencehood' from verbs, but not from 'tense', it makes grammatical sense to characterize tense as the head of the sentence.

18. *My question for this week has to do with something mentioned on page 16 of Roberts book, on which he goes over subordinating clauses, and how the markers of subordinating conjunctions are in the functional category, and also how they are "largely synonymous" with Complementizers. One of the examples he gives is that of "for", in the sentence "We planned for there to be a party". This seems like one example of a subordinating conjunction that isn't a complementizer, because I thought complementizers are followed by an internal sentence, but "there to be a party is not a sentence that stands on it's own. Am I wrong? If it isn't a complementizer, how exactly does it work in this sentence?*

"For" in this use is indeed a complementizer, but seeing how it is one requires knowing a little extra about the possible structure of clauses. While the term "sentence" is a good first substitute for "clause", it's not 100 per cent accurate. Sentences must be *finite* clauses. The only thing that's wrong with "there to be a party" as a sentence is that it's not finite; "There was/is/will be a party" are fine sentences. So "there to be a party" is an *infinitival clause*. What complementizers (aka subordinating conjunctions) really do is introduce complement *clauses*, both finite and non-finite (not just complement sentences); hence, "for" is indeed a complementizer. In fact, it's the English complementizer that is specialized for introducing non-finite clauses.

"For" is slightly tricky in that it's homophonous with the preposition "for", as in "I baked a cake [for Mary]"; "for Mary" is of course a PP, not a CP. But it's usually pretty obvious which use of "for" is at issue in any given phrase, and we'll see a possible way in which the 'for' that is a C might have evolved out of the 'for' that is a P later in the course.

Next class:
problems with headedness
Categories
Roberts' existence-of-DP argument from Abney
c-command

The Greek Alphabet

Α	α	Alpha
Β	β	Beta
Γ	γ	Gamma
Δ	δ	Delta
Ε	ε	Epsilon
Ζ	ζ	Zeta
Η	η	Eta
Θ	θ	Theta
Ι	ι	Iota
Κ	κ	Kappa
Λ	λ	Lambda
Μ	μ	Mu
Ν	ν	Nu
Ξ	ξ	Xi (/ksai/)
Ο	ο	Omicron
Π	π	Pi
Ρ	ρ	Rho
Σ	σ	Sigma
Τ	τ	Tau
Υ	υ	Upsilon
Φ	φ	Phi
Χ	χ	Chi (/xai/)
Ψ	ψ	Psi (/sai/ or /psai/)
Ω	ω	Omega