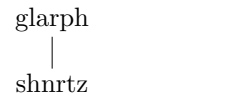
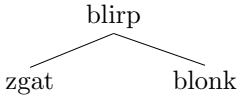
2.2.2 Categories in $\overline{X}$-theory

We have seen that there are reasons to believe that only two kinds of structures are found in natural language (unary and binary branching). This doesn't say anything about categories yet, though. In principle anything goes:

(74) a. unary branching



b. binary branching



(75) We can also cast this as rules:
a. glarph → schnrtz
b. blirp → zgat blonk

(76) . . . or labelled bracketings:
a. [$_{glarph}$ schnrtz]
b. [$_{blirp}$ zgat blonk]

(77) This system allows pathological rules like these:
a. VP → N PP
b. N → A V
c. S → V Det

(78) A modified noun behaves still very much like a noun, for example.
a. I like these dogs.
b. I like these wild dogs.
c. I like these old wild dogs.
d. *I seem this dog.
e. *I seem this wild dog.
f. *I seem this old wild dog.
g. The dogs scared me.
h. The wild dogs scared me.
i. The old wild dogs scared me.
j. *A dogs scared me.
k. *A wild dogs scared me.
l. *A(n) old wild dogs scared me.
m. etc. also for other categories.
n. I like his/Steven's/the professor's town.
o. I like the *his, *Steven's, *the professor's town.
p. . . .
Somehow all of these constituents behave 'nouminally'.

(79) A verb with complements and one without complement can occupy the same range of positions.
a. I will eat (your food).
b. *I will ate (your food).

c. I read a book about eating (other people's food).
d. *I read a book about eat (other people's food).
e. To eat (your food) is fun.
f. *eat (your food) is fun.
g. Eat (your food)!
h. etc. also for other categories
With or without the complements, these constituents behave 'verbally'.

(80) We need to restrict the theory of categories: A word enters the syntax and through its category determines the category of its immediate neighborhood. [20] The idea is that in every phrase (neighborhood) somebody is the boss (a head), that only terminals (words or morphemes can be heads) and that no no neighborhood has two heads.

(81) Apart from the head, it is clear that the sister of the head has a particular role to play in a phrase. It is called the complement. We will return to the complement next week.

(82) This is clearly a step in the right direction, because it leads, intuitively, to a more compositional theory of categories.[21]

(83) The system does not put restrictions on the category of the non-projecting item. This was viewed as a justified move in light of examples as the following. The freedom is not total, of course.[22] Exactly which type of complement a word takes depends very much on lexical properties and must be learned in some form.

(84) Prepositions:
a. on [$_{NP}$ the table]
b. about [$_{S}$ whether Paul had eaten his dinner]
c. from [$_{PP}$ under the table]
d. up (as in: look it up)
e. from [$_{?VP/?NP}$ hiking to the top]

(85) Verbs:
a. eat [$_{NP}$ the food]
b. think [$_{S}$ that Paul has eaten his dinner], want [$_{S}$ to eat]
c. wonder [$_{PP}$ about intricate questions]
d. cry
e. start [$_{VP}$ moving], dare [$_{VP}$ move]
f. become [$_{AP}$ jealous of my ex-girlfriend's new lover]

(86) Nouns:

[20] Initially (in the early 70ies) it was assumed that only nouns, verbs, adjectives – adverbs are often lumped together with adjectives –, and prepositions form these neighborhoods. In addition there were sentences.

[21] See Kracht (2003) for an attempt to grapple formally with such intuitions about compositionality.

[22] See Pesetsky and Torrego (to appear) for an attempt to explain these patterns

a. the claim [$_S$ that Paul has eaten his dinner], his wish [$_S$ to eat]
b. the student [$_{PP}$ of physics], the though [$_{PP}$ about you]
c. the book

(87) Adjectives:

a. likely [$_S$ that he will leave], likely [$_S$ to leave]
b. jealous [$_{PP}$ of my ex-girlfriend's new lover]
c. red

Some notation and terminology:

(88) The members of these families of categories were unified by a common category symbol and distinguished by the number of bar-levels.

a. If X (also written X^0) is a category, then $\overline{X}$ (also written X' or X^1) is also a category and so is $\overline{\overline{X}}$ (also written X" or X^2) and $\overline{\overline{\overline{X}}}$ (also written X"' or X^3) is a category, etc. X is said to project the family of categories. The X^0 element is called the head.

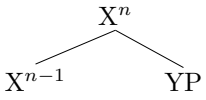
b. Some people distinguish only X^0, $\overline{X}$, which can iterate, and $\overline{\overline{X}}$ (which is then also written as XP: X Phrase, the maximal projection of X). Another convention following Muysken (1982) is to label all projections of a head identically and to distinguish the minimal projection X^0=X^{min} and the maximal projection XP=X^{max} geometrically. Both the terminology and the significance that is to be attached to these various notations is in flux (see Cann (1999), Chomsky (1995), Cormack (1999), Duffield (1999), Kayne (1994), Riemsdijk (1998), Starke (2001), among many others).

(89) One more detail is that only maximal categories can combine in a non-projecting fashion.[a]

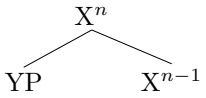
(90) We can now put some meat on our theory of cateogires:

a. unary branching

b. binary branching



c. binary branching



(91) ...or as rules:

a. $X^n \rightarrow X^{n-1}$
b. $X^n \rightarrow X^{n-1}$ YP
c. $X^n \rightarrow$ YP X^{n-1}

(92) ...or labelled bracketings:

a. $[_{X^n}\ X^{n-1}\ ]$
b. $[_{X^n}\ X^{n-1}$ YP $]$
c. $[_{X^n}$ YP $X^{n-1}]$

[a] Whether this adds any restrictions depends on the theoretical status of the bar-level diacritics.

3 Categories: The functional sequence

Consider the following simple fact: Given any four words there are twenty four possible orders they can come in. Here are a demonstrative (DEM), a numeral (NUM), an adjective (A), and a noun (N) in English in all their permutations.

(93) a. (i) these five young lads
(ii) *these five lads young
(iii) *these lads five young
(iv) *lads these five young
b. (i) *these young five lads
(ii) *these young lads five
(iii) *these lads young five
(iv) *lads these young five
c. (i) *five these young lads
(ii) *five these lads young
(iii) *five lads these young
(iv) *lads five these young
d. (i) *five young these lads
(ii) *five young lads these
(iii) *five lads young these
(iv) *lads five young these
e. (i) *young these five lads
(ii) *young these lads five
(iii) *young lads these five
(iv) *lads young these five
f. (i) *young five these lads
(ii) *young five lads these
(iii) *young lads five these
(iv) *lads young five these

(94) Only one out of 24 permutations is acceptable in English but $\overline{X}$-theory has virtually nothing to say about this.[23]

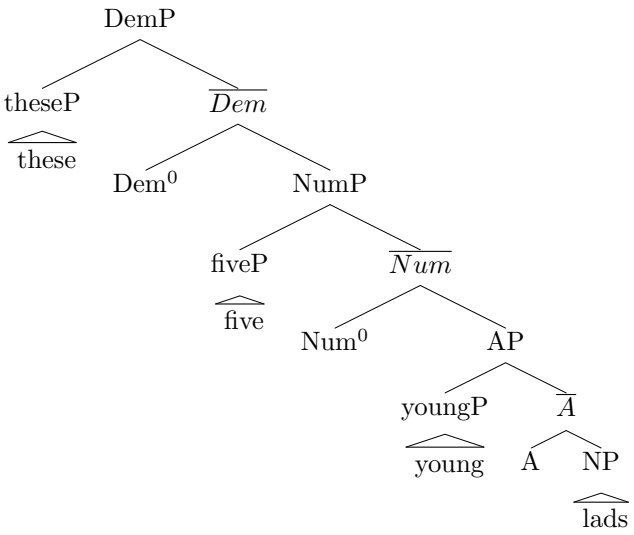
It turns out that crosslinguistically the most common patterns are the patterns in (93-a-i), 3, and (93-f-iv).[24]

(95) Suppose that the English order represents the universal sequence of complementation: Dem $\gg$ Num $\gg$ A $\gg$ N. Then the English order can be generated by creating the following structure.

[23] It might be an interesting exercise to see how far $\overline{X}$-theory can actually be pushed. One could try to encode lexically that all of these items must attach to the left; one could also try to stipulate lexically that the demonstrative must be the highest element (i.e. daughter of N^{max}). That would reduce the possibilities to two (93-a-i) and (93-b-i) - which is better but not complete. Moreover, it fails to capture the cross-linguistic facts discussed immediately below.

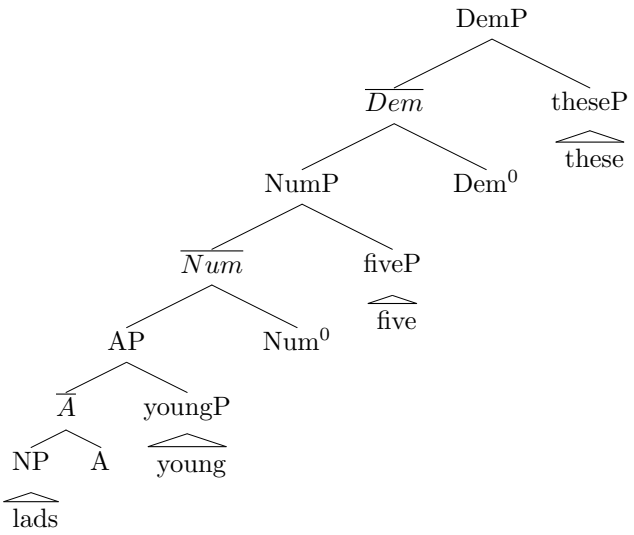
[24] See Cinque (2000), Cinque (2004)

(96)



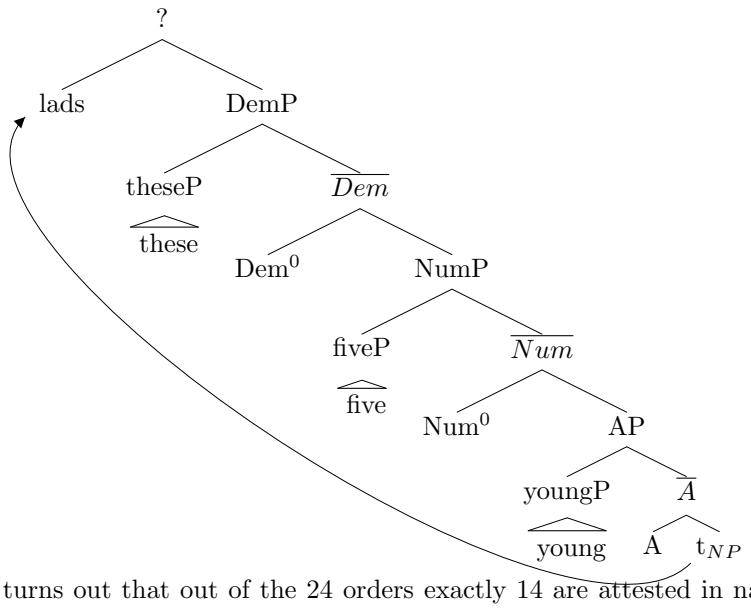
(97) The opposite order can be created using the same structure, just re-ordering it as follows:

(98)



(99) The remaining common order can be derived by *moving* the NP and attaching it at the top of the English-style.

(100)



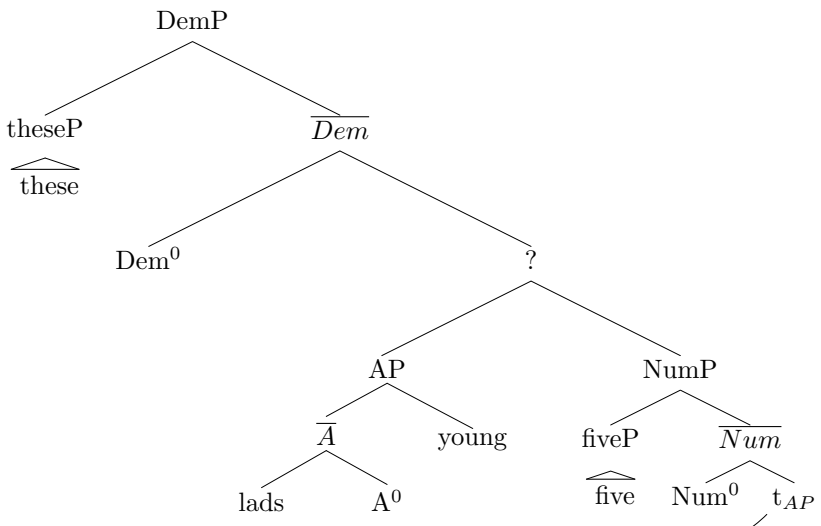
(101) It turns out that out of the 24 orders exactly 14 are attested in natural languages - 10 aren't (Cinque (2004)). How can we explain this. Assume as before that the hierarchical order (the order of complementation) is fixed by the sequence given above.

a. Now 8 orders can be derived by switching the direction of the branches in the basic tree diagram.
b. 6 more orders can be derive by moving some constituent that contains the NP some way to the left.

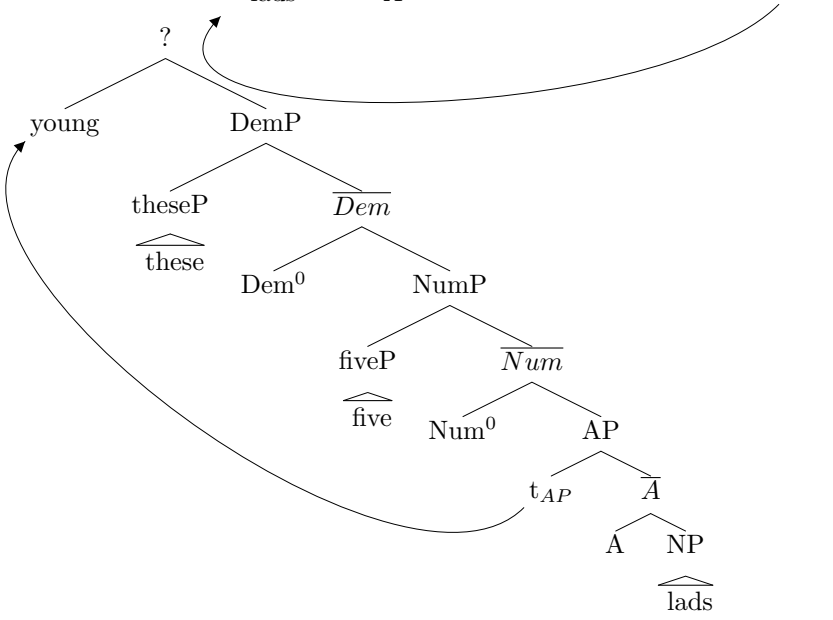
(102) The order DEM $\prec$ N $\prec$ A $\prec$ NUM for example can be derived as in (103).[25] While (104) is not derivable because a constituent that does not contain NP was moved, and (105) is underivable because of a rightward movement. Neither order is attested.

[25] Cinque (2004) cites for this order Kabardian, Warao, Burmese, Lahu, Lolo, Maru, Gambian Mandinka, Hualapai, Cuna, Adyghe, Bambara, Kaki Ae, among others.

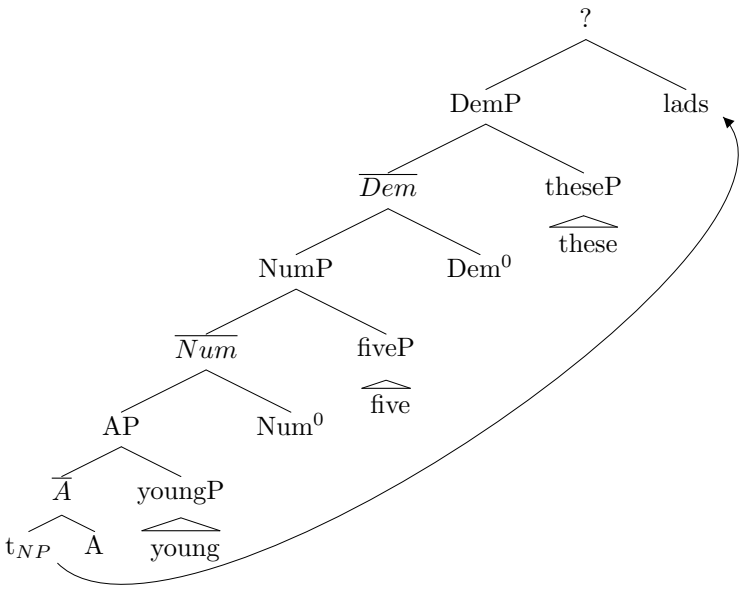
(103)


DemP
theseP
these
$\overline{Dem}$
Dem^0
?
AP
NumP
$\overline{A}$
young
fiveP
$\overline{Num}$
lads
A^0
five
Num^0
t$_{AP}$

(104)


?
young
DemP
theseP
these
$\overline{Dem}$
Dem^0
NumP
fiveP
five
$\overline{Num}$
Num^0
AP
t$_{AP}$
$\overline{A}$
A
NP
lads

(105)



The hypothesis that there is a universally fixed hierarchy of categories is called the functional sequence. It is widely held as a working hypothesis at the moment (see Cinque (1999)).