

Syntax summary updated to 11/19/2012

1. Syntactic hierarchy and constituency

- We began by reviewing basic, somewhat crude evidence that sentences are not formed by taking words from the lexicon and arranging them like beads on a string ...
- ...but instead are hierarchically arranged in nested groups called *constituents* (or *phrases*) that can be represented as a tree (of the sort familiar from the textbook chapter).
- Our initial "crude evidence" (repeated from the first class of the semester) involved the substrings of a sentence that can be repeated as a coherent "surprise reaction":

(1) The "surprise reaction" test for constituents

Speaker 1: "Guess what? The quick brown fox will jump over the lazy dog."

Speaker 2: "You're kidding!"

a. Jump over the lazy dog?"

b. *Will jump over the?"

etc.

- The structures for sentences revealed by this test and others are built from words by the recursive rule **Merge** —the same simple rule that built words out of morphemes:

(2) Merge

Form a set whose members are two elements α and β , either or both of which may be

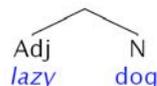
- words from the lexicon, or
- a set previously formed by Merge

- ...So we expect to see Merge applying in three different ways: combining a lexical item with another lexical item; combining a lexical item with a set formed by Merge; and combining a set formed by Merge with another set formed by Merge. We do indeed find all three:

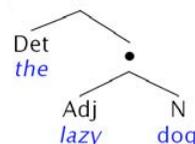
(3) The three faces of Merge:

The quick brown fox will jump over the lazy dog.

a. Merge two lexical items: *lazy + dog*

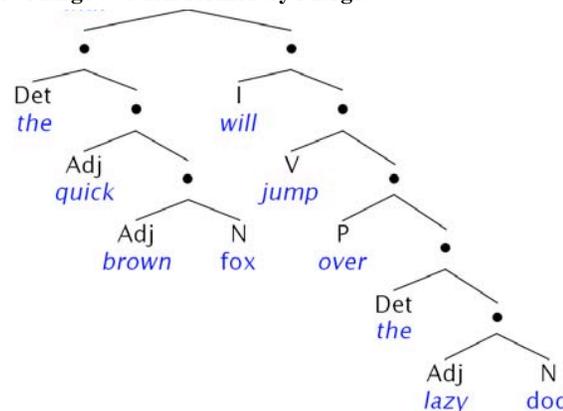


b. Merge a lexical item with a set formed by Merge: *the + lazy dog*



Then, once the derivation has built *will jump over the lazy dog* and separately built *the quick brown fox ...*

c. Merge two sets formed by Merge:



- We then introduced some terminology useful for discussing syntactic structures. I did not define these terms in class, and I won't do that here — since in my experience, their meaning is easy to pick up by example. If you have questions about these terms, however, do not hesitate to ask:

(4) Terminology for referring to tree structures

node, immediately dominates, dominates, mother, daughter, sister, root node, terminal node

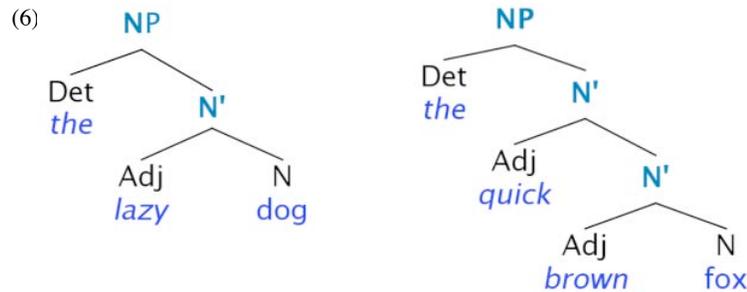
2. Labeling the nodes: the notions *head* and *projection*

- Syntactic structures contain more information than just patterns of sisterhood and immediate domination among nodes. In each constituent, one element is especially important (and gives the constituent its name). That element is called the **head** of the constituent.
- For example, consider what is allowed to be the sister to a preposition. It turns out that the sister to a preposition may contain a wide variety of miscellaneous things — but it

must contain a noun. The noun does not have to be pronounced adjacent to the preposition — a determiner and any number of adjectives may linearly intervene — but the noun must be there! This can be seen in the contrast between (5a-e) and (5f-h) below:

- (5) *The quick brown fox will jump ...*
- ... over the lazy dog.
 - ... over the dog.
 - ... over lazy dogs.
 - ... over dogs.
 - ... over the ridiculous lazy green dog.
 - ... *over the.
 - ... *over the lazy.
 - ... *over of.

- Because the noun is the indispensable element in the sister that a preposition like *over* takes, we call it the *head* of this sister, and we label the phrase **NP** ("Noun Phrase") in its honor.
- Any other nodes that dominate N and are dominated by NP are labeled **N'** ("N-bar"), since N is also the head of these nodes:



- Terminology:** We call N' and NP *projections* of their head N. NP is the *maximal projection* of its head N, since it is not dominated by any further projections of that N.

3. Subcategorization as a tool for finding heads

- The fact about P seen above is more general. When a word W merges with something to form a phrase that is a projection of W, it is picky! It cares about what it merges with it. A particular choice of sister may be *obligatory*, *optional* or *forbidden*.
- For example, most prepositions merge with an NP to form a PP, but prepositions differ in whether this NP is obligatory or optional:

- (7) a. Mary walked in the room.
 b. Mary walked in.

- c. Mary walked into the room
 d. *Mary walked into.

- Verbs offer a particularly rich array of pickiness possibilities. Contrast *vanish* with *erase*, *eat* with *devour*, and *throw* with *put*, for example:

- (8) a. Bill has vanished.
 b. *Bill has vanished the blackboard.

- c. *Bill has erased.
 d. Bill has erased the blackboard.

- (9) a. Mary has eaten.
 b. Mary has eaten the pizza.

- c. *Mary has devoured.
 d. Mary has devoured the pizza.

- (10) a. John will throw. [but limited to sports context]
 b. John will throw the ball.
 c. John will throw the ball to Tom.
 d. [?]John will throw to Tom. [but limited to sports context]

- e. *John will put.
 f. *John will put the book.
 g. John will put the book under the desk.
 h. *John will put under the desk.

- Adjectives are not quite as rich in differences, but *fond* (which requires a PP) contrasts instructively with *proud* (which allows, but does not require one):

- (11) a. *Mary is fond.
 b. Mary is fond of her friends.

- c. Mary is proud.
 d. Mary is proud of her friends.

- This information forms part of the lexical entry for the prepositions, verbs and adjectives seen above — and is to a great extent arbitrary (as far as we know). It is called the **subcategorization** property of the word (e.g. "*devour* subcategorizes for a NP") — a property we discussed earlier in the section on **morphology** (when we observed that *-ness*, for example, must attach to an adjective).

- See pp.162-167 of the textbook for their presentation of this topic.

In a 1965 book called *Aspects of the Theory of Syntax*, Noam Chomsky suggested that the following generalization restricts the type of information that subcategorization makes use of:

- (12) **Chomsky's Generalization concerning subcategorization**
(to be criticized as not quite right — see below)
 The lexical entry for a word contains *subcategorization* information only about its sister.
- Exemplifying Chomsky's principle: no verb, for example, requires that its sister be an NP that itself contains an adjective, and no verb requires that its subject contain a PP. Such a verb might be the imaginary verb *glork*, for which we would have the (imaginary) data in (13):
- (13) **The imaginary verb *glork* that would counterexemplify Chomsky's Generalization**
- The queen of England has glorked a purple chair.
 - *The queen of England has glorked a chair. [no adjective in its sister NP]
 - *The queen has glorked a chair. [no PP in its subject]

What's right about Chomsky's Generalization?

The significance of Chomsky's Generalization for language acquisition:

- If the generalization is just the way language works — part of *Universal Grammar*, our genetic endowment for language...
- ...then a child who is acquiring language does not have to pay attention to the entire phrase structure tree when learning the subcategorization requirements of a word. Makes the task of language acquisition easier, because lots of data may simply be *ignored* by the child.

What's wrong about Chomsky's Principle?

Here's one example: a verb may subcategorize not just for a PP, but for the specific preposition in a sister PP:

English	vs.	Russian	
<i>depend on</i>		<i>zaviset' ot</i>	lit. 'depend from'
<i>speak to</i>		<i>govorit' s</i>	lit. 'speak with'
<i>look at</i>		<i>smotret' na</i>	lit. 'watch on'
<i>look for</i>		<i>iskat' knigu</i>	lit. 'seek'

English dialect 1	vs.	English dialect 2
<i>wait for</i> 'actively anticipate the arrival of'		<i>wait on</i> [!] 'actively anticipate the arrival of'
<i>wait on</i> 'serve, in a restaurant'		<i>wait on</i> 'serve food to, in a restaurant'

- These are facts learned by the child from the linguistic environment. The very fact that languages differ (apparently arbitrarily) tells us this. Thus, for example, English does not allow **Mary depends from her computer*, even though Russian does. But Russian, in turn does not allow the equivalent of 'depend on' (**zaviset' na*), even though English

does. So the lexical entry for the verb *depend* must care about more than just the fact that its sister is a PP. It has to be able to look *inside* its sister.

- But it still shouldn't be allowed to look *anywhere it wants* within its sister! There are still no verbs that take an NP but care about the adjective inside it. So we need to *modify* Chomsky's Principle, not throw it away!

The necessary modification of Chomsky's Principle:

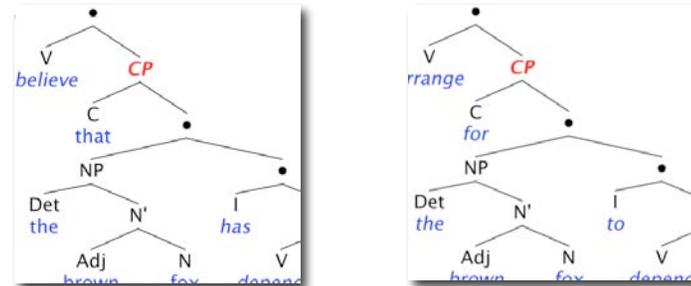
- (14) **Chomsky's Principle, Revised**
 The lexical entry for a word contains subcategorization information about the **head** of its sister.

We can now use the revised principle (assuming it is correct) to probe for heads of all sorts of phrases:

V subcategorizes for the complementizer of its complement when that complement is a clause (*that vs. for*):

- (15) a. Mary will **believe**
 [that the brown fox has depended on the lazy dog].
- b. Mary will **arrange**
 [for the brown fox to depend on the lazy dog].
- (16) a. *Mary will **believe**
 [for the brown fox to depend on the lazy dog].
- b. *Mary will **arrange**
 [that the brown fox has depended on the lazy book].

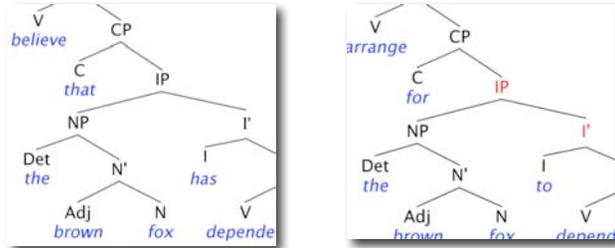
- So C is the head of the sister of V in these examples. Embedded clauses are CPs.



C subcategorizes for the I of its sister (to vs. [±past, ±future]):

- (17) a. *Mary will believe
 [that the brown fox to depend on the lazy dog].
- b. Mary will arrange
 [for the brown fox to depend on the lazy dog].
- c. Mary will believe
 [that the brown fox has depended on the lazy dog].
- d. *Mary will arrange
 [for the brown fox has depended on the lazy dog].

• So I is the head of the sister of C. Sentences are IPs.



I subcategorizes for the V-morphology of its VP complement (tensed vs. bare-stem)

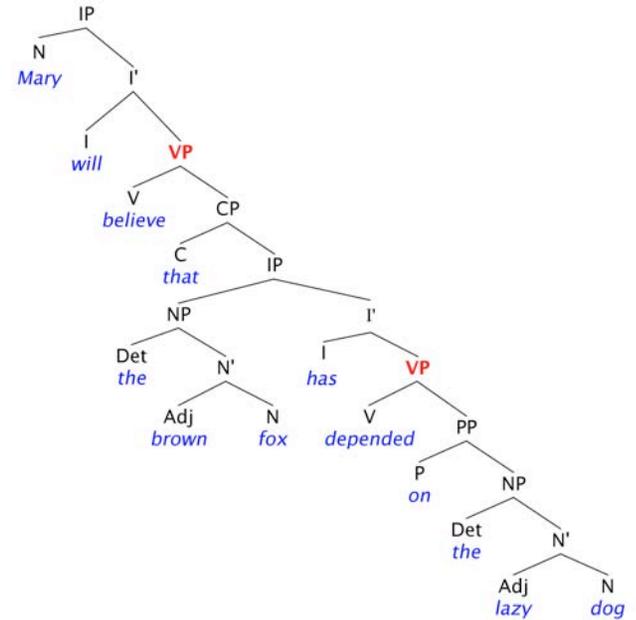
- (18) a. ... [for the quick brown fox to depend on the lazy dog].
- b. *...[for the quick brown fox to depended on the lazy dog].
- (19) a. ... [that the quick brown fox will depend on the lazy dog].
- b. *... [that the quick brown fox will depended on the lazy dog].
- (20) a. *... [that the quick brown fox has depend on the lazy dog].
- b. ... [that the quick brown fox has depended on the lazy dog].

• So V is the head of the sister of I. Verbs head VPs.

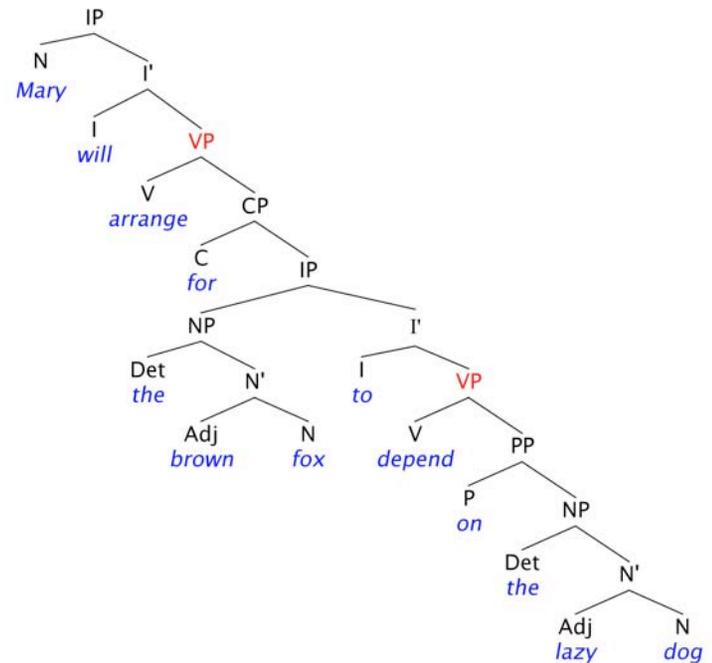
...Which of course is why we called them CP, IP and VP in the first place!

[Terminology: We call the sister of the head of a phrase its complement.]

(21)



(22)

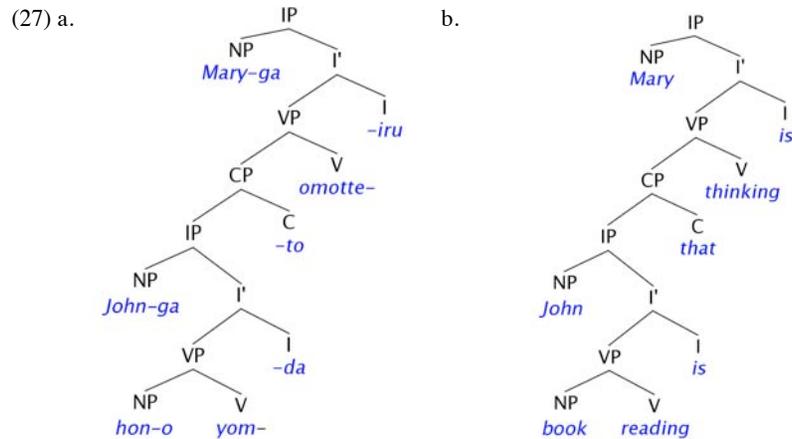


4. Converging evidence for the concept "head": head-final vs. head-initial languages

- Some Japanese sentences:

- (23) John-ga hon-o yon da
 John-SUBJ book-DO read PAST
 'John has read the book'/'John read the book'
- (24) John-ga Mary-ni kono hon-o age ta
 John-SUBJ Mary to that book-DO give PAST
 'John has given that book to Mary/John gave Mary that book'
- (25) Mary-ga kono Nihon kara-no kagaku no gakusei-o korosi ta
 Mary-SUBJ this Japan from chemistry of student-DO kill PAST
 'Mary killed/has killed this student of chemistry from Japan'
- (26) Mary-ga John-ga hon-o yon da to omotte ru
 Mary-SUBJ John-SUBJ book-DO read PAST that think PRESENT
 'Mary thinks that John is reading the book'

- Japanese word order is different from English — but if we run the same kinds of tests for constituency that we run in English, we come up with a structure for a complex sentence like (21) that looks like (27a) — in which C follows (rather than precedes) its IP sister, and I follows (rather than precedes) its VP sister. Compare its English counterpart in (27b):¹



- ... and structures for sentences like (24) and (25) with PPs in which P follows, rather than precedes its sister. We call such instances of P *postpositions* (vs. *prepositions*):



¹ I am using the "progressive forms" *is thinking* and *is reading* so the position of I is visible in English.

- The word order of Japanese is actually the same as English, *except* that the **head of each phrase precedes its complement in English, and follows it in Japanese**. We thus call English **head-initial** and call Japanese **head-final**.
- The fact that Japanese and English differ in whether heads precede or follow their complements tells us that "head first" vs. "head last" is not innate, and is something that a child acquiring just learns. It is a "**parameter of variation**" among languages, or **parameter**, for short.²
- Notice that the English/Japanese difference gives us **converging evidence** for the notion **head** — because it is the C of CP, the I of IP, the V of VP (also the P of PP and the N of NP) that switches position as we move between Japanese and English. The subject of the sentence, as well as words like *this*, do not switch position.

5. A digression worth reading: for as an English complementizer

Here is why I am calling 'for' a complementizer in some cases (not discussed in class)

- I have been calling *for* a complementizer in English sentences like (14b) — that is, a C taking an IP as its complement. How do we know that *for* really is a complementizer? How do we know, for example, that it is not actually a P taking the following NP as its complement?
 - ...After all, there does exist a *for* that functions in this way, of course, as in *I made the cake for Sue* — which means something like "I made the cake so that Sue would have it and benefit from it". What makes us think that what follows *for* in the sentence *Mary arranged for Sue to read the book* really is an IP, as in (14b)? Here's one good argument in favor of that view:
 - There is a special use of the word *it* when it is the subject of verbs that describe the weather. For this reason, it is generally called "**weather it**":
- (29) a. It was raining today.
 b. It rarely snows in July.

This use of *it* looks like a pronoun, but unlike a normal pronoun, it does not refer to anything, and does not require you to know what the speaker has in mind when using the word. For example, if I enter the room and say, out of the blue...

- (30) I baked a cake for it.

...you will be puzzled, since you don't know what the word *it* referred to. You might respond "You baked a cake for what?".

² What the book by Baker is all about!.

Now suppose instead I enter the room and say (29a) Would you be puzzled by the meaning of "it"? You might wonder why I decided to talk about the weather, but you will *not* reply by asking "What was raining today?" This is because you recognize the special *it* of weather sentences for what it is!

This *it* is always used as a subject. We never find it as the object of indisputable prepositions. But, lo and behold, it can be used following *for* in sentences like (31):

(31) Mary arranged for it to rain (during the festival).

This is a good argument that *for* has an alternative life as a complementizer, taking an IP as its sister, since its complement is a clause (an IP) — not the NP that immediately follows it, which turns out to be the subject of that clause)

...and what about the word *to* in sentences with complementizer *for*? Why is it being called an instance of I? Why isn't it just a preposition?

- Well...it follows the subject and precedes the VP. Also it is in complementary distribution (remember that word?) with finite auxiliary verbs like *will*, *have* and *must*, suggesting that it is just another instance of I, despite its distinct "look".

(32) *Mary arranged for Sue to will take the quiz early.

What's with all of these complementizers and instances of I that have "other lives" as prepositions and other stuff?

- Across the languages of the world, it is very common for "function words" (complementizers and I-elements especially) to be made of "spare parts", words used elsewhere with other, more robust meanings. Thus *that* is a C, but also a Det used for objects remote from the speaker (as in *that book*); *for* is a C, but also a P; and *to* is an I, but also a P.
- This fact is the result of a common process by which languages change, called **grammaticalization**. Similar phenomena are very common. In many West African languages, for example, the word corresponding to the complementizer *that* is also the verb 'say', or can be shown to be historically derived from such a word. It is also very common for words that mean 'who' or 'what' to be recycled as 'that'. The modern Romance languages did that when they developed from Latin (which had no *that*-word).

End of digression (from what we discussed in class).

6. A possible universal of syntax: the *Final-over-Final Constraint*

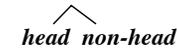
- We observed that the relative order of a *head* and the element that it merges with varies systematically across languages. In particular:
- English is a uniformly head-first language. The lexical item that heads a phrase always precedes its sister within that phrase.
- Japanese is a uniformly head-final language. The lexical item that heads a phrase always follows its sister within that phrase.

But postulating a uniform "head-first/head-last" parameter across entire languages oversimplifies the picture. Certain kinds of mixed languages do exist:

(33) **Kinds of languages that exist:**

a. **head-initial languages:**

In languages like *English*, a head of a phrase systematically precedes its sister (the element it merged with):



...*that Mary will read books*

b. **head-final languages:**

In languages like *Japanese*, a head of a phrase systematically follows its sister (the element it merged with).



...*Mary books read will that*

c. **mixed languages type 1**

German (head-final V and I, head-initial C):

...*that Mary the book read will*.

VP: *head-final*
 ... [VP [NP das Buch] lesen]
 the book read

IP: *head-final*
 ... [IP [VP das Buch lesen] *wird*]
 the book read FUT

CP: *head-initial !!*
 ... [CP *dass* [IP Marie das Buch lesen hat]
 that Marie the book read FUT

d. **mixed languages type 2**

Spoken Afrikaans (head-final V, head-initial T and C)
 ...that Mary will books read.
 ...that she has often Chopin played.³

VP: *head-final*
 [_{VP} [_{NP} Chopin] *gespeel*]
 Chopin played

IP: *head-initial !!*
 [_{TP} *het* [_{VP} dikwels [_{NP} Chopin] gespeel]
 has often Chopin played

CP: *head-initial !!*
 [_{CP} *dat* [_{TP} sy het dikwels Chopin gespeel]]
 that she has often Chopin played
 (Biberauer, Newton, Sheehan 2009)

- ...but other kinds of mixed languages appear not to exist:

(34)a. **mixed languages type 3**

Literary Martian (head-initial V and T, head-final C):
 ... *Mary will read books that.* (does not exist on Earth!)

b. **mixed languages type 3**

Old High Venusian (head-initial V, head-final T and C)
 ... *Mary read books will that* (does not exist on Earth!)

- This is called the **Final-over-Final Constraint (FOFC)**:

(35) **The "Final-over-Final Constraint" (FOFC): a linguistic universal**
 (Holmberg 2000; Biberauer, Holmberg & Roberts 2010)

- Within a single clause or noun-phrase, if a phrase is head-initial, the phrase that immediately contains it must also be head-initial...
- ...but if a phrase is head-final, the phrase that immediately contains it may be head-final or head-initial.

- **If correct, FOFC is (or is a by-product of) a principle of Universal Grammar — a principle that restricts the ways in which languages vary (and restricts the "search space" for a child acquiring language).**

Is Mandarin Chinese a counterexample?

- Mandarin Chinese has sentence-final particles that signal that the clause is a question — above a VP and IP that generally look head-initial:

(36) Ni yao kan zhe-ben shu **ma**? (Mandarin, Aldridge 2009)
 you want read this-CL book Q
 'Do you want to read this book?'

- Is Mandarin Chinese "Literary Martian" — i.e. a language that's not supposed to exist (but does)?

As the team of researchers investigating FOFC note, however, we do not find this kind of apparent counterexample to FOFC with complementizers analogous to the English complementizers *that* or *for* (or German *dass* and Afrikaans *dat*).

So it is possible that elements like *ma* in (36) are not instances of C, but modifiers of C that are allowed to be found on the right side in an otherwise head-initial CP.

- Mandarin has other small "particles" (the traditional term) that occur CP-finally, and raise similar problems. For example, there is a clause-final particle *le* that can mark the completion of an action (a notion often encoded in I), and has other effects on the use of the sentence in discourse as well. Counterexamples to FOFC? Not really instances of C I don't have a good answer, and it is worth thinking about.
- Mandarin Chinese is also puzzling because its verbs precede their objects (as we expect in a head-initial language) — but in NP, relative clauses precede the noun they modify. So it's a language that gives syntacticians lots to worry about ...

7. Structure and meaning: Principle C

- Consider the following pair of good English sentences:

(37)a. Hillary claims that she likes pizza.
 b. She claims that Hillary likes pizza.

Both are acceptable, but in the first sentence, *Hillary* and *she* may corefer — i.e. they may pick out the same individual in the world. In the second sentence, however, this is impossible. We can indicate coreference with identity of subscript indices, and present the data as follows:

(38)a. Hillary_i claims that she_i likes pizza.
 b. *She_j claims that Hillary_i likes pizza.

- The asterisk on (38b) means that the sentence is *bad with the interpretation given by the indices*. The minute *she* and *Hillary* are understood as referring to two different individuals, both sentences are fine — and we would represent that by using some index other than *i* on one of these NPs (and leaving out the asterisk).

Now let's get down to business.

- An obvious idea about why (38b) is bad:

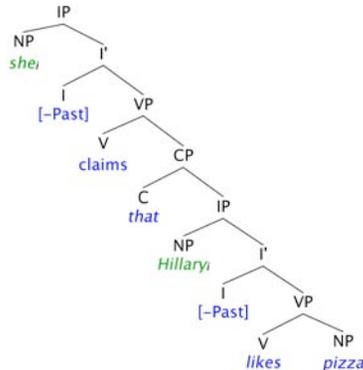
³ The real-life example I have involves playing Chopin, not reading books. Go figure ...

(39) **A plausible but wrong idea about (38)**

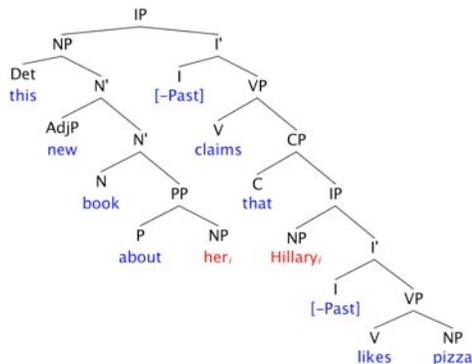
A pronoun may not corefer with a NP that it precedes.

- Evidence that (39) is wrong comes from examples like the following. In the (b) examples, the pronoun precedes an NP with which it is coreferent.
- (40) a. This new book about Hillary_i claims that she_i likes pizza.
b. This new book about her_i claims that Hillary_i likes pizza.
- (41) a. Hillary's_i enemies claim that she_i likes pizza.
b. Her_i enemies claim that Hillary_i likes pizza.
- It turns out that what distinguishes examples like (38b) from examples like (40b) and (41b) is not linear order but *structure*. Consider the relative positions of the pronoun and the NP *Hillary* in these examples:

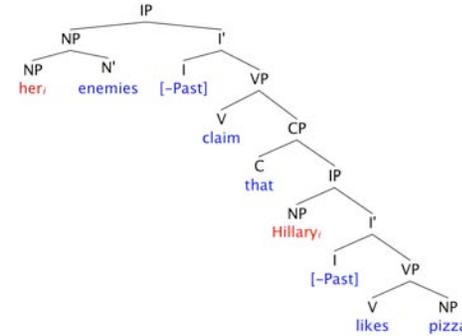
(38b)



Error! Reference source not found.b)



(41b)



- In examples like (38b) (and in response to questions, we looked at a bunch of them in class) — where *her* and *Mary* may not corefer — a very particular relation holds between the pronoun and the full NP: the node that immediately dominates the pronoun NP (*her*) also dominates the full NP (*Mary*). This relation is called *c-command* and turns out to be very important for all sorts of phenomena:

(42) **C-command**

A node α *c-commands* a node β iff:

- the mother of α dominates β , and
- α does not dominate β .⁴

- C-command relations between pronouns and full NPs constraint the choice of possible referents for the pronoun, i.e. what it may refer to. The constraint in question is called **Principle C**:

(43) **Principle C**

If a pronoun NP x c-commands a full NP y , x and y may not be coreferent.

- Principle C** is one of a group of principles that constrain coreference possibilities among NPs. (There is also a Principle A and B, which you can read about in the textbook.) We are learning about Principle C now, as an example of the relation between syntactic structure and meaning.
- Syntactic structure is *independent* of meaning in many ways. For example, we know that Chomsky's famous sentence *Colorless green ideas sleep furiously* is English, and the same sentence backwards is not (**Furiously sleep ideas green colorless*) — despite the fact that the good sentence is literally meaningless (unless understood metaphorically).
- At the same time, however, syntactic structure and meaning interact in many ways. Principle C is just one of them. In the next section, we consider another.

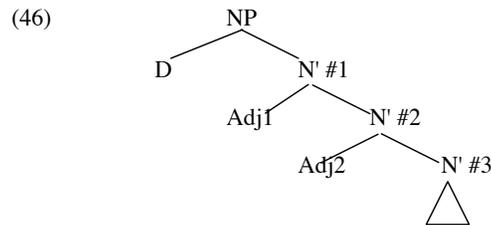
⁴ We don't really need clause (b) of this definition for the purposes of this class, but it needs to be part of the definition of c-command for other reasons (and I can't bring myself to leave it out).

8. Meaning and the structure of NP

- We saw that English and Japanese sentences have very similar structure. Sisterhood, domination relations — these are all the same in the English and Japanese sentences that we discussed in class. Only word order was different.
- What aspects of a sentence determine its meaning? Word order, or structure? In fact, even above and beyond questions of pronouns and coreference, the meaning of a sentence has a lot to do with its structure, and very little to do with word order.
- We saw this by looking at how the meaning of multiple modifiers is computed.

Consider NPs like **Error! Reference source not found.**-(49), which have two adjectives on the left side of the NP. The structure for these examples (details omitted) is (46):

- (44) a. a large small shirt
b. a small large shirt
- (45) a. a popular wrong answer
b. a wrong popular answer



The meanings of these NPs is computed by first computing the meaning of Adj2 + N', and then adding the meaning of Adj1 to the result. Thus, a *large small shirt* is a small shirt that is on the large side. A *small large shirt* is a large shirt that is on the small side. A *common wrong answer* is an answer that is common within the set of wrong answers, but a *wrong common answer* is an answer that is common within the set of *all* answers — and is wrong. Here are some similar pairs you might enjoy thinking about:

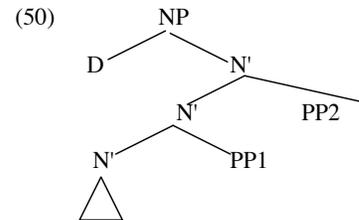
- (47) a. an alleged English baron
b. an English alleged baron
- (48) a. the priceless broken vase
b. the broken priceless vase
- (49) a. the recovered stolen property
b. the stolen recovered property

Addendum: Right-hand modifiers

We didn't spend much time at all on this additional point. (Blame the hurricane.) But it's worth paying some attention to.

With left-hand modifiers, the further to the right you are, the deeper "inside" the NP you are. Thus, Adj2 in (46) is deeper inside NP than Adj1 is.

With right-hand modifiers, just the opposite is true. The further to the *left* you are, the deeper "inside" you are. Consider, for example, the tree in (50). PP1 is to the left of PP2, but is further "inside" the tree than PP2 — unlike Adj1 in (46), which is higher in the tree than Adj2.



Consider (51), for example. *A shirt of great value* may acquire a hole (due, for example, to moths), in which case it is no longer necessarily a shirt of great value. Thus, (51a) is a perfectly normal thing to say. *A shirt of great value with a hole* is not necessarily valuable, just as an *alleged English baron* is not necessarily English. By contrast, *a shirt with a hole of great value* is a shirt that has acquired a hole and — in that state — is valuable! For example, the hole itself might have raised the value of the shirt, if (for example) it is the shirt Lincoln was wearing when he was shot. In class I suggested that Lincoln might have bought that shirt for \$1 at Walmart, but of course it is now worth millions. That is why (51b) is odd (marked by "#", which means "not ungrammatical, but weird for some other reason"):

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

Here are some other cutesy examples of the same sort. In (52a), we are talking about a man with an unusual last name, who happens to be from China. Well, *Ng* (= /ŋ/) is an unusual last name in North America, even if it's common in China, so Mr. Ng qualifies as such a man. But Mr. Smith does not. In (52b), we are talking about a man from China with an unusual last name. *Bur 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. Thus, we have the following judgments:

- (52) 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)

The examples in (53) make a similar point:

- (53) 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).

- We don't want to say that sometimes meaning is computed right-to-left, and sometimes it is computed left-to right. Fortunately, we don't have to! It is the *structure* (as represented with tree diagrams) that determines how meaning is computed!

...and that in turn gives us another argument for the reality of syntactic structure

9. Movement

- Certain sentences show apparent violations of subcategorization restrictions. In particular, we see a gap where a phrase should be. Such a gap is unacceptable (see (54)-(55)) unless the gap is "filled" by a "moved" version of the missing phrase (see (56) and (57)). This phenomenon is called *movement*.

- (54) a. The lion will devour this pizza.
 b. *The lion will devour.

- (55) a. John can depend on Mary.
 b. *John can depend on.
 c. *John can depend.

- The kind of movement seen in (56) below is called **topicalization**.

- (56) **Topicalization (a kind of movement)**
- a. [This pizza] the lion will devour ____.
- b. [Mary] John can depend on ____.
- c. [On Mary] John can certainly depend ____!

- The kind of movement seen in (57) is called **wh-movement**.

- (57) **Wh-movement**
- a. I wonder [what the lion will devour ____].
 I wonder [which pizza] the lion will devour ____].
- b. I wonder [who] John can depend on ____.
- c. I wonder [on whom] John can depend ____.

Wh-movement applies to phrases that contain (usually at their left-periphery) a question-asking word — which in English spelling usually starts with *wh*. The term is used even when describing other languages as well.

- Sometimes, it is the I that is missing from its normal position, and appears elsewhere. In these cases, we have **I-to-C movement**, usually found in "yes/no" questions.

Notice that *has* in (58b) requires the participle form (*written*) of the main verb, just as if it were occupying its normal position:

- (58) **I-to-C movement**
- a. Will the lion ____ devour the pizza?
- b. Can John ____ depend on Mary?
- c. Did the children ____ go to school?

- Why think that the I is moving to C? Well, although in colloquial English (for many speakers — not all) I-to-C movement is possible in embedded clauses, as in (59) (where "%" indicates dialect variation)...

- (59) **I-to-C movement in an embedded clause (colloquial)**
- %Bill is wondering [will he ____ finish his homework on time]

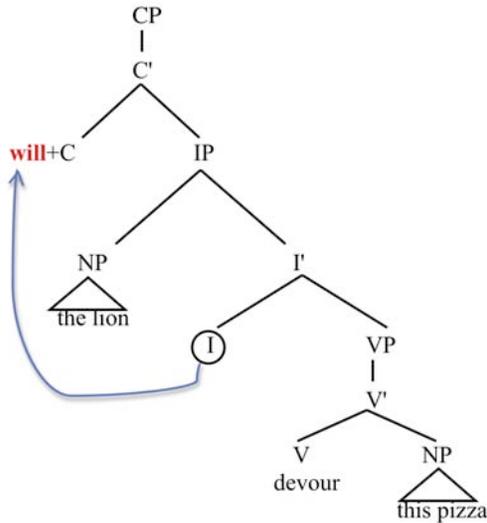
...this kind of I-to-C movement *never* cooccurs with an overt C in the embedded clause:

- (60) a. *Bill is wondering [will that he finish his homework on time].
 b. *Bill is wondering [that will he finish his homework on time].

- So C has something to do with the movement.

Hypothesis: A null C (evidence: no that) triggers I-to-C movement in English questions.

(61)



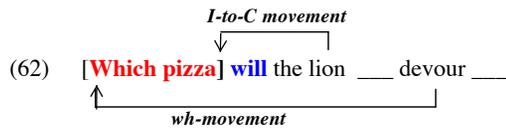
10. Specifier of CP

Specifiers: Certain heads require that the last merged element of the phrase that they label be something special — not a modifier, and certainly not a complement (by definition).

This is a bit of a mysterious requirement, and has a name, but not an explanation. We say that these heads require a **specifier**. The main example of a genuine bona fide specifier that we have seen so far is the subject position, **specifier of IP**.

• **What is the landing site for *wh*-movement?**

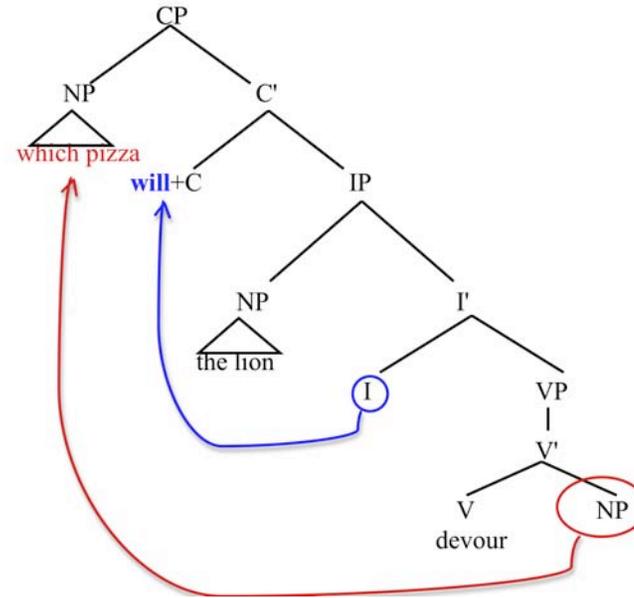
In a Standard English main clause, *wh*-movement (of anything except the subject, actually) is always accompanied by I-to-C movement.



If the position of I tells us the location of C, then we can conclude that *wh*-movement targets a position in CP just to the left of C.

Conclusion: *Wh*-movement forms a specifier of CP.

(63)



- **Side remark (not discussed in class):** In modern standard English, you only see *wh*-movement when C is null (not counting an I that moved to it). Other languages, including earlier stages of English, are different — so there is no general ban on seeing both a *wh*-phrase and a complementizer in the same CP:

(64) **Specifier of CP + overt C in other languages**

- Ik weet niet *wie of* Jan gezien heeft. [Dutch]
I know not who if John seen has
- Men shal wel knowe *who that* I am. [Middle English]
- Je me demande quand *que* Pierre est parti. [colloquial French]
I wonder when that Pierre has left

11. A way of thinking about movement: "internal merge"

Merge so far...

- **Ingredients:** *independent* lexical items or *independent* results of previous operations of Merge

Movement = Merge, where one of the ingredients is a subconstituent of another

Terminology:

- a. **External Merge** (ingredients are independent, what we've done so far)
- b. **Internal Merge** (= movement)

How phonology interprets movement.

- The syntax sends an instruction to the phonology (in many cases) to *not* pronounce the phrase in its original position.

The original position of the phrase is also known as the trace of movement.

12. Wh-movement leaves something behind

- **The wh-all construction:** Many dialects of English use *what all* and *who all* as optional plural forms of *who* and *what*. For example, if I ask *Who all did you invite ___ for dinner?*, I presuppose that you are inviting more than one person. Thus, the word *all*, when used with *who* and *what*, is a plural morpheme.
- **The West Ulster version:** The *wh-all* construction of **West Ulster English** (Northern Ireland; data from McCloskey 2000) has a special possibility not found in other dialects. The *all* may be pronounced in the position where the *wh*-phrase "would have been found" if movement had not taken place. Thus, both variants in (65)-(67) are acceptable in this dialect of English (though only the first member of each pair is acceptable in other dialects):

- (65) a. **What all** did you give ___ to the kids?
b. **What** did you give ___ **all** to the kids?
- (66) a. **Who all** did you send ___ to the shops?
b. **Who** did you send ___ **all** to the shops?
- (67) a. Tell me **what all** you got ___ for Christmas.
b. Tell me **what** you got ___ **all** for Christmas.

- **What might be going on:** A different pronunciation pattern. Optionally, part of the trace (*all*) gets pronounced, and the corresponding part "upstairs" does not get pronounced:

- (68) a. Tell me **what all** you got *what all* for Christmas.
b. Tell me **what** *all* you got *what all* for Christmas.

- It is important to make sure that the *all* is not simply free to occur anywhere -- that it really does single out the position of the "trace". The following data show this.

- (69) ***Who** did he tell ___ that he was going to resign **all**.
- (70) a. **What** did you do ___ **all** after school the day?
b. ***What** did you do ___ after school the day **all**?
c. ***What** did you do ___ after school **all** the day.

13. Verb movement in German: the "Verb-second" phenomenon

Split pronunciation after movement is not unique to wh-movement. In the next section, we see it in German V-to-C movement. First, some preliminary information about German:

Famou facts about German

- **Subordinate clauses:** In a *normal embedded clause*, the verb follows its complements. German thus looks like Japanese.
- (71) **V follows its complements in a normal embedded clause**
...dass die Frau [gestern den Mann **sah**].
...that the woman-SUBJ yesterday the man-OBJ saw
'...that the woman saw the man yesterday.'
- **Main clauses:** The *main clause* of a German sentence has two particular properties of note:
 1. one phrase is always topicalized; and
 2. the verb is found in a surprising place — immediately after the topicalized phrase.

This yields what is called the **Verb-second (V2)** property of German. **V2 arises from two different instances of movement, both of which take place in a German main clause.**

Movement 1: V-to-C

- V2 is found whenever C is not filled by the word *dass*. This is true in main clauses, but also in some subordinate clauses as well.

Hypothesis: A null C (evidence: no dass) triggers V-to-C movement in German

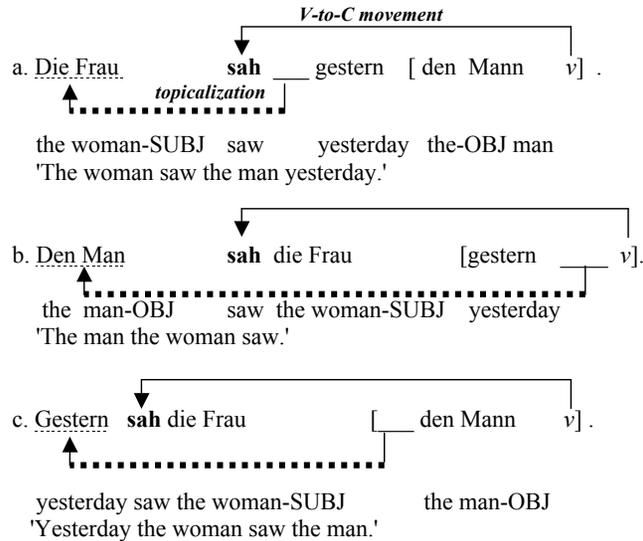
This gets us Verb-first so far. What about Verb-second?

Movement 2: Topicalization to Spec,CP (= "specifier of CP")

- When C is null, it not only requires the verb to move to its head, it also requires a specifier. That is why we always have topicalization as well.

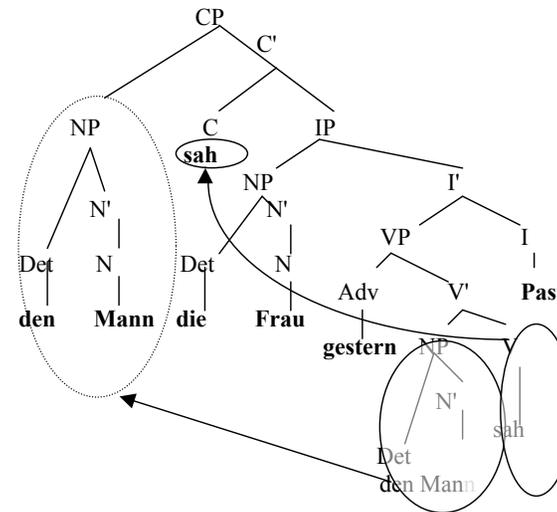
**Hypothesis: A null C also triggers movement to Spec,CP in German.
This yields Verb-second.**

(72) **Verb-second in German**



- In (72), the topicalized phrase has a dotted underline, the verb is boldfaced, and the VP is bracketed. The underline marks where the topicalized phrase came from, and the italic *v* marks where the verb came from. Here is (72b) in tree form, so you can see more explicitly how this works:

(73) **Structure for (72b)**



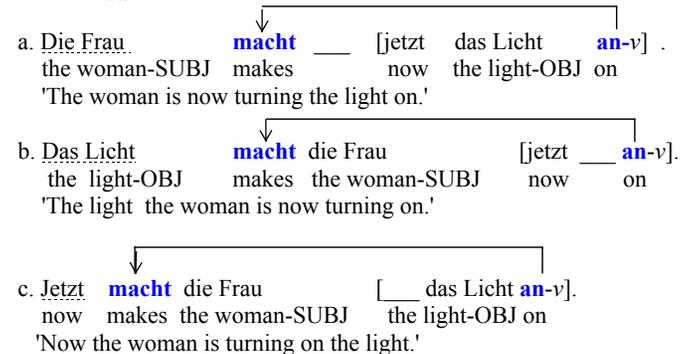
14. German Verb-second and complex phonology!

- Prefixed verbs:** In German, some verbs with prefixes, when they move, pronounce the only the root in the moved position, and pronounce the prefix in the original position.

(74) **An example like (71), but with a morphologically complex verb root**

...dass die Frau [jetzt das Licht **an-macht**].
...that the woman-SUBJ now the light-OBJ on-makes
'...that the woman is now turning on the light.'

(75) **What happens to *anmacht* in a V/2 environment?**



- The verb "leaves its prefix behind" — just as *what* in W.Ulster *wh-all* can "leave *all* behind".

(76) Die Frau an-macht _____ [jetzt das Licht an-macht].
 the woman-SUBJ makes now the light-OBJ on
 'The woman is now turning the light on.'

"The Germans have another kind of parenthesis, which they make by splitting a verb in two and putting half of it at the beginning of an exciting chapter and the other half at the end of it. Can any one conceive of anything more confusing than that? These things are called "separable verbs." The German grammar is blistered all over with separable verbs; and the wider the two portions of one of them are spread apart, the better the author of the crime is pleased with his performance. A favorite one is *reiste ab* -- which means, departed. Here is an example which I culled from a novel and reduced to English:

The trunks being now ready, he DE- after kissing his mother and sisters, and once more pressing to his bosom his adored Gretchen, who, dressed in simple white muslin, with a single tuberose in the ample folds of her rich brown hair, had tottered feebly down the stairs, still pale from the terror and excitement of the past evening, but longing to lay her poor aching head yet once again upon the breast of him whom she loved more dearly than life itself, PARTED."

-Mark Twain, "The Awful German Language"

15. I-to-C in German

- Actually, the main verb moves to C only when there is no auxiliary verb in I.
- When there is an auxiliary verb in I, the auxiliary verb moves to C (and the main verb is left in VP).

(77)

a. Die Frau hat [gestern den Mann gesehen] hat.
 the woman-SUBJ has yesterday the-OBJ man seen
 'The woman saw the man yesterday.'

b. Den Man hat die Frau [gestern _____ gesehen] hat
 the man-OBJ has the woman-SUBJ yesterday seen
 'The man the woman saw.'

c. Gestern hat die Frau [_____ den Mann gesehen] hat
 yesterday saw the woman-SUBJ the man-OBJ seen
 'Yesterday the woman saw the man.'

- What is really happening in V2 is probably not V-to-C but V-to-I and then I-to-C (which takes the Verb along).

16. V/2 on four continents

EUROPE!

German (Germanic group of the Indo-European family of languages, Western Europe)

Subordinate clause: verb is at the end

Main clause: main verb follows the first phrase (or comes first), unless there's an auxiliary verb, in which case the auxiliary verb follows the first phrase and the main verb is at the end.

AFRICA!

Vata (Kru family of languages; Ivory Coast, Africa)

verb follows the first phrase (or comes first), unless there's an auxiliary verb, in which case the auxiliary verb follows the first phrase and the main verb is at the end.

[work of Hilda Koopman]

[like German, except subordinate clauses behave like main clauses]

(78) **Vata verb-second**

a. N le bi saká.

I eat now rice

b. n ká yO-O slé-e mlí saká nyÉ

I will child-the house-the in rice give

c. à la saká li

we have rice eat

'we have eaten rice'

ASIA!

Kashmiri (Indo-Aryan family of languages; Indian subcontinent)

verb follows the first phrase,
unless there's an auxiliary verb, in which case the
auxiliary verb follows the first phrase and the main verb
is at the end.

[work of Rakesh Bhatt]

(79) **Kashmiri verb-second**

a. raman dits shamas kitab.

ram+SUBJ gave sham-IO book

b. ram chu shamas kitab divan

ram+SUBJ is sham-IO book giving

c. varI-varI chu ram bat khevan.

slowly is ram rice eating

SOUTH AMERICA!

Karitiana (Arikém family of languages, Rondonia state, Brazil)

Subordinate clause: verb is at the end

Main clause: main verb follows the first phrase (or comes first),
unless there's an auxiliary verb, in which case the
auxiliary verb follows the first phrase and the main verb
is at the end.

[work of Luciana Storto]

17. The Big Picture (and how verb-second is relevant to it)

(80) **What we find:**

Languages are not all the same, but the ways in which they differ are *highly restricted*. The same peculiar bits show up again and again, all over the world.

**What's the same is called *Universal Grammar* (UG)
What's different are settings of *parameters* within UG.**

An acquisition perspective on UG and parameter setting:

- UG reflects our genetic endowment for language
- Parameter setting reflects our linguistic experience in early childhood.

- For example, though we don't find verb-second in *all* the languages of the world, we do find it popping up repeatedly — as we just saw.
- On the other hand there are some types of languages that are just as easy to describe in words as the verb-second languages, which we *never* find:

(81) **Some languages that *don't* exist anywhere (as far as we know):**

a. Like German, but patterns of embedded and main clause are reversed.

b. Main verb must follow the *second* phrase, *third* phrase, etc.

c. Not the main verb, but the direct object must follow the first phrase.

18. Some other parameters (and how they are set in a few languages)

[See Baker's book for much more,]

1. Subject *pro*-drop

(82) **Italian: +**

a. ~~I~~ parlo italiano

(I) speak Italian

b. ~~Noi~~ parliamo italiano

(we) speak Italian

(83) **Chinese: +**

Ƨa kanjian ta le.

(he) see he LE

'He saw him'.

(84) **English: -**

*(We) speak English.

2. Object *pro*-drop

(85) **Chinese: +**
Ta kanjian 他 见 le.
he see (him) LE

(86) **Italian: -**
*Gianni 见 vede.
Gianni (him) sees.

(Object pronouns generally move to the left of I in Italian.)

(87) **English: -**
*John saw him.

(92) **...in English compounding**
a. I disapprove of meat eating in here. (i.e. meat getting eaten)
b. *I disapprove of baby eating in here. (i.e. babies eating dinner)

(93) **...in Mohawk "incorporation"**
*Wahawirake' ne o'wahru.
baby-ate the meat
'The baby ate the meat.'
(compare (89))

3. Polysynthesis

(88) **English: [+ incorporation into N] (and A), but [- incorporation into V]**
a. I disapprove of *book-burning*
b. A *user-friendly* computer is a distant goal.
c. *The baby *meat-ate* last night.

(89) **Mohawk: [+ incorporation into V]**
Owira'a waha'-wahrake'.
baby meat-ate (Baker p. 91)

Mohawk:

polysynthesis (V): + ("incorporation")
subject pro-drop: +
object pro-drop: +

(90) a. Wa'eksohare'
'She dishwashed'
b. Wa'kenaktahninu'
'I bed-bought.'
c. Wahana'tarakwetare'
'He bread-cut.'

English:

polysynthesis (V): —
subject pro-drop: —
object pro-drop: —

(91) **The verb-object constraint**
The object of a verb must be the first noun (phrase) to combine with the verb; the subject cannot combine with the verb until after the object does.

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