LNGT0101
Introduction to Linguistics

Lecture #11
Oct 15th, 2014

Announcements

- HW3 is now posted. It's due Wed Oct 22 by 5pm.
- Today is a sociolinguistics talk by Toni Cook at 4:30 at Hillcrest 103. Extra credit for attendance. More extra credit for a 150-word summary. Attach the summary to your answers to HW3 and indicate extra credit on it.

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Announcements

- Presentation of Myth 5 on Wed Oct 22: "English spelling is kattastroffik ." (Emma and Maddie?)

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Summary of Syntax so far

- Syntax is the study of sentence structure.
- They key notion to understanding sentence structure in human language is "**constituency**."
- Constituency of a string of words can be determined by objective diagnostics: the **substitution**, **movement**, **clefting,** and **stand-alone** tests.

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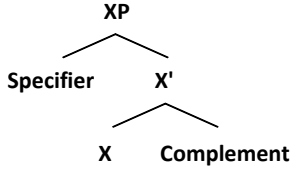
Summary of Syntax so far

- Constituents are phrases. A phrase is a string of one or more words composed of a syntactic head, its complement (if needed), and its specifier (if any).
- All phrases follow the X'-schema:



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Summary of Syntax so far

- The syntactic categories we talked about so far are: NP, VP, PP, AP, AuxP, and CP.
- Our grammar thus far has two types of rules:

(i) Phrase structure rules (PSRs) of the form

A → B C, and

(ii) Lexical insertion rules, which insert words into syntactic structures generated by PSRs.

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How adequate is this basic theory of syntax?

- Revisiting some syntactic puzzles:
  - Recursiveness
  - Ambiguity
  - Cross-linguistic variation in word order between English and Japanese
  - Sentence relatedness

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Recursiveness revisited

- Can we account for the fact that a sentence, in principle, can be infinitely long?
  a. *The linguist knows that this language has become extinct.*
  b. *The biologist believes that the linguist knows that this language has become extinct.*
  c. *The neuroscientist claims that the biologist believes that the linguist knows that this language has become extinct.*
  d. *etc.*

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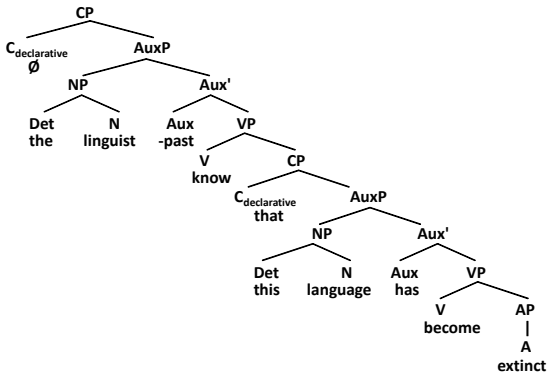

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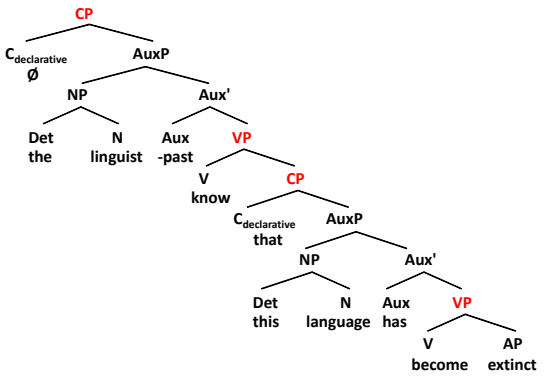

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Ambiguity revisited

- The following sentence is two-way ambiguous:
  Anne hit the man with an umbrella.
- Can our phrase structure grammar account for that fact?
- Well, let's look at the mini-grammar we constructed so far for English, and see if we can find an answer.

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Ambiguity revisited

1. CP → C AuxP
2. AuxP → NP Aux'
3. Aux' → Aux VP
4. VP → V (NP) (PP)
5. VP → V (CP)
6. NP → (Det) N (PP)
7. PP → (Deg) P NP
8. AP → (Deg) A (PP)

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Ambiguity revisited

1.
2.
3.
4. VP → V (NP) (**PP**)
5.
6. NP → (Det) N (**PP**)
7.
8.

Ambiguity revisited

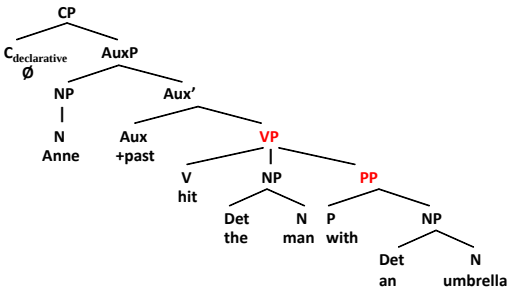
- The two crucial rules for this particular case of ambiguity are rules 4 and 6 for expanding VP and NP, respectively:

  VP → V (NP) (PP)

  NP → (Det) N (PP)
- Notice that a PP may "attach" to either a V or an N, and it is this ambiguity of PP-attachment that creates the ambiguity of the sentence. Let's see that in tree format.

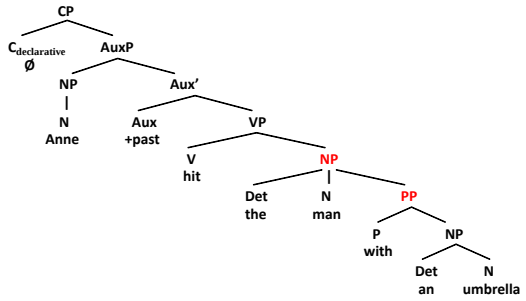
Anne hit the man with an umbrella.

"Meaning: *Anne held an umbrella and hit the man with it*."



Anne hit the man with an umbrella.

"Meaning: *Anne hit the man who was holding an umbrella*."



Cross-linguistic variation in word order

- Also, phrase structure grammar can explain to us why English and Japanese are so different in their word order.
- Before we see how, let's have a quick overview of word order in human languages.

Variation in basic word order

- Even though languages may allow several word orders in sentences, each language typically has one order that is used in "neutral" contexts. This is what is called "**basic word order**."
- Consider English, for example: Which of these do you think represents the basic word order in English?

  Seafood I like. (OSV)

  Believe you me. (VSO)

  John plays the piano. (SVO)

Basic word order

- If we confine ourselves to transitive clauses with three elements: Subject, Verb and Object (S, V, O), then we should expect **six** possible basic word orders in human language:

  SVO, SOV, VSO, VOS, OVS, OSV

- Do we find these attested in natural languages? Anyone know?
- Actually, we do, but with clear differences in statistical frequencies.

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Basic word order

- SVO: English

  John loves Mary.

- SOV: Japanese

  John-ga Mary-o butta
  John-SU Mary-OB hit
  "John hit Mary."

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Basic word order

- VSO: Welsh (Celtic)

  Darllenais I y llyfr
  read I the book
  "I read the book."

- VOS: Malagasy (Austronesian)

  manasa ni lamba ny vihavavy
  wash the clothes the woman
  "The woman is washing the clothes."

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Basic word order

- OVS: Hixkaryana (Carib)

  Kanawa yano toto
  canoe took person
  "The man took the canoe."

- OSV: Nadëb (Kaburi)

  samũũy yi qa-wùh
  howler-monkey people eat
  "People eat howler-monkeys."

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Distribution of basic word order types in the world's languages

- As it turns out, typological studies reveal preferences for certain word orders than others.
- Consider the frequencies reported in Tomlin's (1986) language sample, for example:

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Distribution of basic word order types in the world's languages

Word order	# of Languages	%
SOV	180	45
SVO	168	42
VSO	37	9
VOS	12	3
OVS	5	1
OSV	0	0

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Distribution of basic word order types in the world's languages

- With greater than chance frequency, then, SVO and SOV orders indicate a clear preference for word order in natural languages.
- But what's even more interesting is that each of these two common orders has a set of ***correlates*** that go with it. To see what this means, let's compare English and Japanese.

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English vs. Japanese

- English:
  The child might think that she will show Mary's picture of John to Chris.
- Japanese:
  Taroo-ga Hiro-ga Hanako-ni zibun-no
  Taroo-SUB Hiro-SUB Hanako-to self-POSS
  syasin-o miseta to omette iru
  picture-OBJ showed that thinking be
  "Taro thinks (literally, is thinking) that Hiro showed a picture of himself to Hanako."

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Word order correlates

Element A	Element B	English	Japanese
V	NP	A precedes B	A follows B
V	PP	A precedes B	A follows B
V	embedded CP	A precedes B	A follows B
P	NP	A precedes B	A follows B
N	PP	A precedes B	A follows B
C	embedded AuxP	A precedes B	A follows B
Aux	VP	A precedes B	A follows B

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Phrase structure: English vs. Japanese

- How do we express the difference between English and Japanese in terms of the X'-schema for phrase structure then?
- Obviously, in English, heads precede their complements; in Japanese heads follow their complements.

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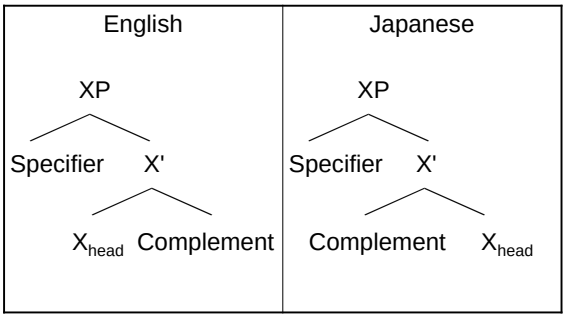
The X'-schema in English vs. Japanese



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The head directionality parameter

- The difference between English and Japanese thus comes down to the "directionality" of the head within the phrase: heads are initial in English, but final in Japanese. This is typically referred to as the ***head directionality (HD) parameter:***

  Heads occur initially (i.e., before their complements) or finally (i.e., after their complements) within phrase structure.

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The head directionality parameter

- The head-initial setting of the HD parameter holds in English, Edo, Thai, Khmer, Indonesian, Zapotec and Salish, while the head-final setting holds in Japanese, Lakhota, Turkish, Basque, Navajo, the languages of the Eskimos, and Quechua.

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How about subjects?

- Notice that the HD parameter does not say anything about the position of subjects in sentences, since these are not complements (they are specifiers, remember?).
- This is actually good, since English and Japanese are both subject-initial. We don't want to parameterize that. Rather, in both languages, the subject is the specifier of Aux:

  AuxP → NP Aux'

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So, why do English and Japanese look dramatically different in word order?

- Now, let's try to make things more interesting and see how and why English and Japanese do really look dramatically different on the surface.
- That's where trees can help for sure. Here are some PSRs for both languages:

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English vs. Japanese

English	Japanese
CP → **C** AuxP	CP → AuxP **C**
AuxP → NP Aux'	AuxP → NP Aux'
Aux' → **Aux** VP	Aux' → VP **Aux**
VP → **V** (NP)	VP → (NP) **V**
VP → **V** (PP)	VP → (PP) **V**
VP → **V** (CP)	VP → (CP) **V**
PP → **P** NP	PP → NP **P**
NP → **N** (PP)	NP → PP **N**

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So, why do English and Japanese look dramatically different then?

- Compare English and Japanese again:

  John said that Mary read the book.

  John-ga Mary-ga hon-o yon-da-tu it-ta

  JOHN-SUB Mary-SUB book-OBJ read-PAST-COMP say-PAST

- Given the PSRs for both English and Japanese, the structural trees will look as follows:

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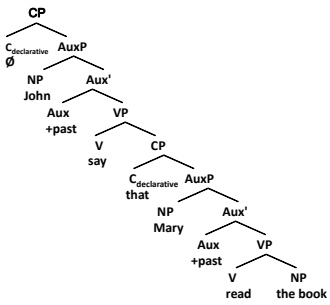
John said that Mary read the book.



CP → C AuxP
AuxP → NP Aux'
Aux' → Aux VP
VP → V (NP)
VP → V (PP)
VP → V (CP)
PP → P NP
NP → N (PP)

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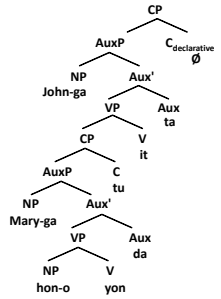
John-ga Mary-ga hon-o yon-da-tu it-ta
JOHN-SUB Mary-SUB book-OBJ read-PAST-COMP say-PAST

CP → AuxP C
AuxP → NP Aux'
Aux' → VP Aux
VP → (NP) V
VP → (PP) V
VP → (CP) V
PP → NP P
NP → PP N



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So, …

- A simple difference in head directionality leads to a dramatic variation on the surface, due to its cumulative effect on all heads and complements in a language.
- In addition, since the HD parameter does not apply to specifiers, it follows that both English and Japanese will behave the same with regard to the position of subjects in sentences.

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And …

- Finally, since the HD parameter has two settings only, it predicts two types of languages, SOV and SVO, which is exactly what we find in language samples: these two orders represent about 90% of human languages.
- We still need to account for the remaining language types but we won't do this in this class.

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Sentence relatedness: Introducing transformations

- It remains to show how our theory of syntax can account for sentence relatedness.
- We do this with regard to the relationship between statements and questions.

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Sentence relatedness revisited

- As we said before, some sentences are intuitively "felt" to be related, e.g.,
  a. Your friend can play the piano.
  b. Can your friend play the piano?
- We know that a phrase structure grammar can generate the (a) sentence, but the question now is: Can it also generate the sentence in (b)?

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Sentence relatedness revisited

- Here's the mini PSG again. Can it generate the structure of a question?

1. CP → C AuxP
2. AuxP → NP Aux'
3. Aux' → Aux VP
4. VP → V (NP) (PP)
5. VP → V (CP)
6. VP → V (AP)
7. NP → (Det) N (PP)
8. PP → (Deg) P NP
9. AP → (Deg) A (PP)

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Sentence relatedness revisited

- The answer then is probably not. There is no PSR that will allow the Aux "can" to appear at the beginning of the sentence.
- But why can't we just add one more rule?
  AuxP → Aux NP VP
- Can this rule help?

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Sentence relatedness revisited

- The additional rule can help, but at a high cost: Now, we simply have no direct explanation for why a statement and a corresponding question are felt to be related.
- If we want to account for sentence-relatedness, we need to enrich our grammar.

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Transformational rules

- A solution, first proposed by Chomsky in the 1950s, is to include another type of rules in the grammar in addition to the phrase structure rules: ***transformational rules***.
- A transformational rule is a syntactic operation that takes one (deep) syntactic structure as input, operates on it, and returns a modified (surface) syntactic structure as output.

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Deep and surface structure

- For this purpose, a fundamental distinction in the grammar has to be made between two separate levels of structure:
  (a) a pre-transformational structure, which is called ***deep structure*** (or D-structure) and is derived by phrase structure rules, and
  (b) a post-transformational structure, which is called ***surface structure*** (or S-structure) and is derived through the application of transformational rules.

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Syntax: The grammar model

Phrase structure grammar (X'-theory)
↓
D-structure
↓
Transformations (primarily Movement)
↓
S-structure

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Deriving English yes-no questions

- So, let's now get back to the yes-no question "*Can your friend play the piano?*" and see how we can implement a transformational analysis.
- Now, instead of drawing a tree for the yes-no question directly, we actually draw a tree for the corresponding statement "*Your friend can play the piano*."
- The only difference is that such structure will be marked as interrogative. We can do that, say by adding a [Q] feature on C in the tree.

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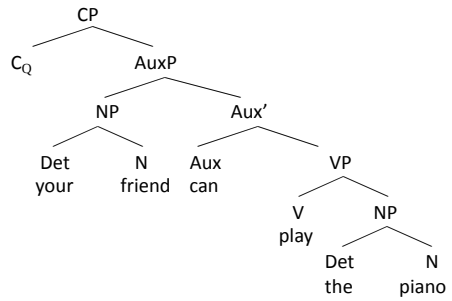
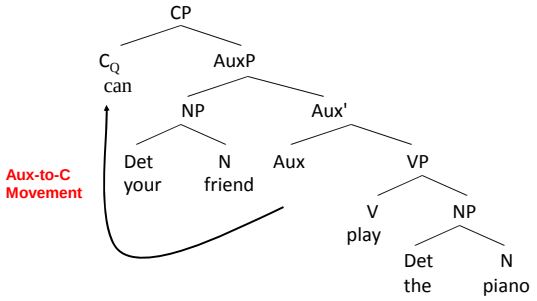
D-structure: Your friend can play the piano



(Note: [Q] indicates this sentence is interrogative. After all, we do not want to say that both sentences are identical. They obviously are not.)

Now, a simple transformation moves Aux to C, thereby deriving the **S-structure**: *Can your friend play the piano?*



Evidence for Aux-to-C movement

- But how do we prove that there is actually Aux-to-C movement in English yes-no questions?
- Well, consider:

  He asked if your friend could play the piano.

  **He asked if could your friend play the piano.*

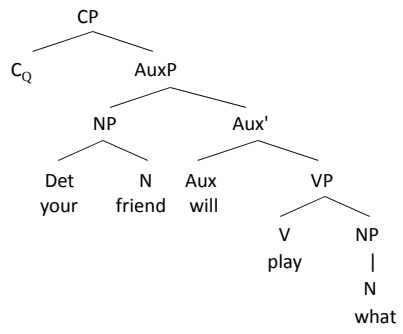
Deriving wh-questions

- Ok, let's try another kind of question, the so-called ***wh-questions***, e.g.,

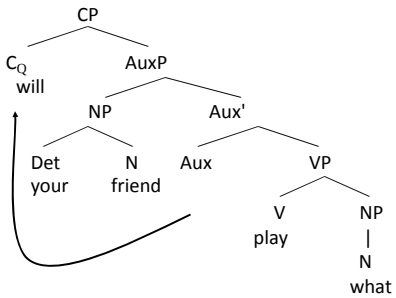
  What will your friend play?
- Since "what" is interpreted as the object of "play," we assume that this is where it starts at D-structure:

  your friend will play what

We apply PSRs to derive the D-structure:



Now, since this is a question, we apply Aux-to-C movement to derive the S-structure below:



- But does that give us the desired sentence?

Where do wh-phrases end up?

- To get the desired surface structure, we need to move the wh-phrase "what" to the front of the sentence.
- The question now is: Where does the wh-phrase move to?
- There is a restriction, however. It's called ***structure perseveration***: *Phrases can move only to specifier positions, and heads can only move to head positions*.

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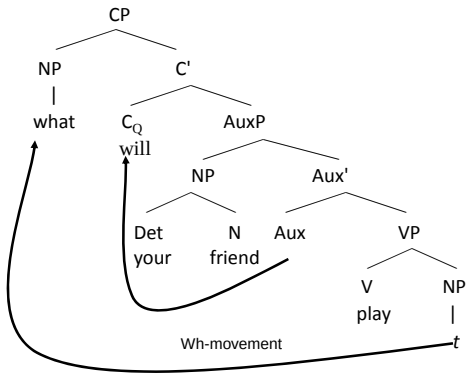

*("t" stands for **trace** of the moved phrase.)*

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A parameter for question-formation

- Notice that not all languages are like English when it comes to wh-questions.
- Some languages like English form a question by fronting the wh-word:

  What did you see _?
- These are typically referred to as **wh-fronting** languages.

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A parameter for question-formation

- In other languages like Japanese, Chinese, and Egyptian Arabic, the wh-word appears where other nouns normally appear:

  Japanese

  John-ga dare-o butta ka?
  John-Subj who-Obj hit Q-particle
  "Who did John hit?"

  Egyptian Arabic

  ʔinta ʃuft miin?
  you saw who
  "Who did you see?"
- This type is called **wh-in-situ** languages.

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Syntax: The grammar model

Phrase structure grammar (X'-theory)
↓
D-structure
↓
Transformations (primarily Movement)
↓
S-structure

- This language model is assumed to be universal, and languages differ because they choose different parameter settings.

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Universal Grammar: Principles and Parameters

- *Universal Grammar* (UG) includes two components: **principles** and **parameters**. The principles are invariant; they hold in all languages. For example, grammatical rules are all ***structure-dependent***, as discussed in Myth 12 early in the semester, and in the textbook (pp. 111-112).
- Parameters, by contrast, come in the form of (usually) **binary** options, and this is where the locus of cross-linguistic variation exists.

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UG: principles and parameters

- So, the head directionality parameter is why languages differ in their basic word order: **Heads are initial vs. heads are final**.
- Another example is the wh-parameter: **wh-phrases appear fronted in some languages, and appear in-situ in others**.
- A third parameter is the so-called ***null subject parameter***: **Subjects are obligatorily realized in some languages but optionally realized in others**.

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Another parameter: Do you need to 'verbalize' your subject?

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The null subject parameter

- Consider these examples from English, French, and Italian, all of which allow SV (=Subject-Verb) orders:

(1) John will leave.

(2) Jean arrivera. French
Jean will-arrive

(3) Gianni verrá. Italian
Gianni will-come.

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The null subject parameter

- Italian, however, allows the subject of a tensed sentence to be omitted, an option that is not available in English or French:

(5) *Will leave.

(6) *Arrivera. French
will-arrive

(7) Verrá. Italian
will-come.

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The null subject parameter

- This case of cross-linguistic variation is typically referred to as the ***null subject parameter***.

"In some languages (e.g., French, English, Edo) every tensed clause must have an overt subject. In other languages (e.g., Italian, Spanish, Romanian, Navajo, Arabic) tensed clauses need not have an overt subject."

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UG: principles and parameters

- As Chomsky notes:

"We can think of the initial state of the faculty of language as a fixed network connected to a switch box; the network is constituted of the principles of language, while the switches are the options to be determined by experience. When the switches are set one way, we have Swahili; when they are set another way, we have Japanese. Each possible human language is identified as a particular setting of the switches—a setting of parameters, in technical terminology."

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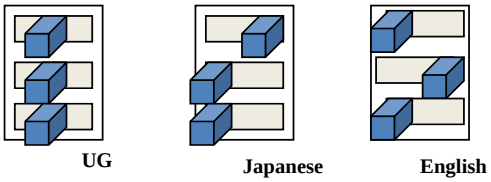
UG: principles and parameters

- Or, we can represent this graphically as follows:



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UG: principles and parameters

- We can think of UG as an initial state $\mathbf{S_0}$ that gets mapped onto a final state $\mathbf{S_F}$, through exposure to ***primary linguistic data*** (PLD).

  S_0 + PLD → S_F
- S_0 is the general system that we are born with, and S_F is what we end up referring to as English, Finnish, Tiwa, Khmer, etc.

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UG: principles and parameters

- Under this approach, a child's job is to "set" the value of each parameter on the basis of the PLD in the linguistic environment around her.
- This should explain the role of the environment in language acquisition: If you're born in Beirut, then your PLD are different from the PLD of someone born in Moscow, hence the acquired system will be different.
- Under this approach, language acquisition is the result of interaction between *nature* (principles and parameters) and *nurture* (PLD).

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More about syntax?

- Interested to learn more about syntax in general and parameters in particular?
- Warning: A shameless commercial for my spring class ☺: Sign up for LNGT 250 .

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Next class agenda

- Phonetics: Chapter 5, pp. 189-204.

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