

Introduction: Language and Grammar. Syntax.

1. Grammar.

- A language is a set of strings --finite sequences of minimal units (words, for the purposes of this course)-- with meaning. The "machine" that generates those strings and their corresponding meanings is its *grammar*. A grammar must specify the following three components:
 - a *lexicon* which contains every minimal unit with meaning (= every word, for this course) and its grammatical category;
 - a *syntax*, that is, a set of rules that tells you how the minimal units combine to form longer units, how this longer units combine to form yet longer units, and so forth until we form full complex sentences; and
 - a *semantics*, which determines what semantic operation or function corresponds to each syntactic rule and combines the “atomic” word meanings to build the meaning of the complete sentence.

- Lexicon for (a fragment of) English:

Grammatical Category	Lexical Units
Proper Nouns	Joan, Pat, Philadelphia
Pronouns	he, she, it, they, him
Nouns	dog, chair, table, water
Intransitive Verbs	sleep, snore, swim, jump
Transitive Verbs	see, find, kiss, hug
Ditransitive Verbs	give, put, send
Propositional Verbs	know, claim, believe
Auxiliary Verbs	will, would, could, must, might
Determiners	the, a, some, every, each, most, my, their
Prepositions	with, without, in, on, to, after, before
Adjectives	sad, happy, tall, green, vegetarian, former
Adverbs	quickly, carefully, very
Complementizers	when, if, whether, although, that
Conjunctions	and, or, but

■ Syntax.

Syntax gives rules governing how to build sentences. E.g., it contains rules similar to (1) and (2), abbreviated in (1') and (2') respectively.

- (1) If ϕ is a proper noun and ψ is an intransitive verb, then the sequence $\phi\psi$ (disregarding inflection) is a sentence.
- (1') $S \rightarrow N_{pr} V_{intr}$
- (2) If ω is a proper noun, ϕ is an auxiliary verb and ψ is an intransitive verb, then the sequence $\omega\phi\psi$ (disregarding inflection) is a sentence.
- (2') $S \rightarrow N_{pr} AUX V_{intr}$
- (3) a. Bill walks.
 b. Bill will walk.
 c. * Bill walk will.

■ Descriptive vs. prescriptive grammar.

Note that we are using the notion of English grammar (in particular, English syntax) in a descriptive and not in a prescriptive way. The job of a linguist is to construct a grammar that generates all and only the utterances that a given group of speakers consider well formed in their dialect. This grammar may coincide or not with prescriptive grammaticality. Also, grammaticality has to be distinguished from mere semantic anomaly (the form of the sentence is fine, though the meaning is strange) and processing difficulty.

- (4) a. The cat the nice is saw.
 b. Who do you wonder whether Mary arrived?
 c. Who do you think that saw Joanne?
 d. Who do you think that Joanne saw?
 e. Do you wanna come for lunch?
 f. Pat didn't see nobody.
 g. The child played with Sam and I yesterday.
 h. Colorless green ideas sleep furiously.
 i. The building is nice.
 j. The building the guy built is nice.
 k. The building the guy the woman hired built is nice.
 l. The building the guy the woman John met hired built is nice.

■ Semantics:

Semantics specifies a semantic operation for each syntactic rule. The notation $[[.]]$ stands for "the meaning of" or "the denotation of". That is, semantics is built in tandem with syntax.

- (5) If ϕ is a proper noun and ψ is an intransitive verb, then $[[\phi\psi]]$ is true if and only if (iff) $[[\phi]] \dots [[\psi]] \dots$
- (6) If ω is a proper noun, ϕ is an auxiliary verb and ψ is an intransitive verb, then $[[\omega\phi\psi]]$ is true if and only if (iff) $[[\omega]] \dots [[\phi]] \dots [[\psi]] \dots$

2. Syntax.

- The following is the set of syntactic rules we start with. During the semester, some modifications will be made as we cover more types of sentences.

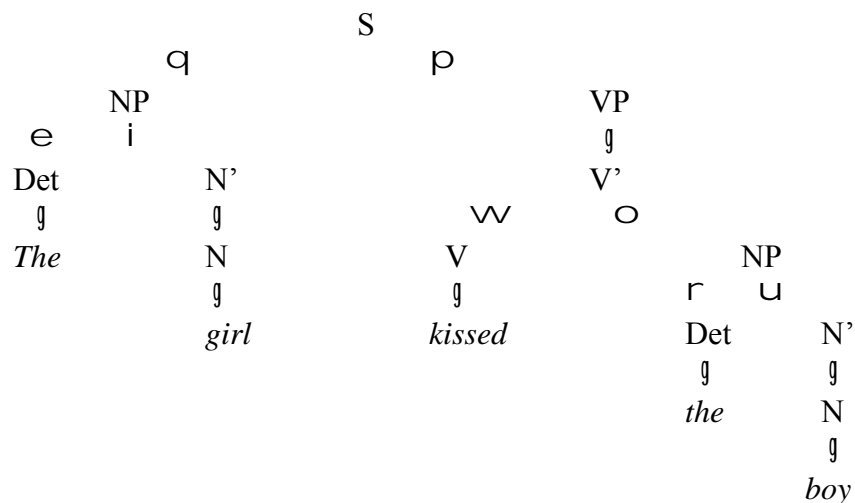
Diacritics: X* means that you can have as many X as you want (including none whatsoever).

(7)

S	→	NP VP
NP	→	N _{pr}
NP	→	Det N'
N'	→	Adj* N' PP*
N'	→	N' Conj N'
N'	→	N
VP	→	Adv* V' PP*
V'	→	V _{trans} NP
V'	→	V _{intrans}
PP	→	P NP
N _{pr}	→	John, Bill, Philadelphia, ...
N	→	cat, dog, boy, pig, table, binoculars...
Det	→	a, the, some, my, ...
Adj	→	tall, nice, green, ...
P	→	on, from, with, ...
V _{trans}	→	see, like, help, kiss
V _{intr}	→	run, sleep
Adv	→	quickly, soon
Conj	→	and, or, but

- Running an example sentence:

(8) The girl kissed the boy.



■ Trees and syntactico-semantic units:

- Every lexical item or word is a syntactico-semantic unit (minimal units).
- Every complete sentence is a syntactico-semantic unit (maximal unit).
- The tree structure of a sentence specifies all its intermediate syntactico-semantic units.

(9)

Every mother node α in a tree is a syntactico-semantic unit. In other words, for any node α , all the lexical material under its daughter branches forms a syntactico-semantic unit that excludes material under other non-daughter branches.

The tree structure in (8) makes the following claims wrt the sentence *The girl kissed the boy*:

- *The girl kissed the boy* is a unit (in particular, a S).
- *The girl* is a unit (a NP).
- *The boy* is a unit (a NP).
- *Kiss(ed) the boy* is a unit (a VP).
- *The girl kiss(ed)* is NOT a unit in this sentence.
- *Girl kiss(ed) the* is NOT a unit in this sentence.
- Etc.

■ QUESTION: Draw the syntactic tree for the following sentence according to our grammar. Discuss what strings form a syntactico-semantic unit and what strings do not.

(10) The tall man from Philadelphia helped the small boy.

■ QUESTION: For each of the following sentences, our grammar allows us to generate more than one tree. Each of those trees makes different claims about what the syntactico-semantic units of the sentence may be, and, in fact, each tree corresponds to a different meaning of the sentence. For each sentence, draw all the possible trees and explain in your own words the meaning that each tree attributes to the sentence.

(11) The boy saw the girl with the binoculars.

(12) John called a woman from my favorite country in Europe.

(13) Some curious men and women from Philadelphia attended the meeting.

■ Other ambiguities:

(14) Only John likes his teacher.

(15) Mary defended herself, and Sue did ▲ too.

(16) Mary defended herself better than Sue did ▲.