Ling 130 Notes: English syntax

Sophia A. Malamud
March 13, 2014

1 Introduction: syntactic composition

A formal language is a set of strings - finite sequences of minimal units (words/morphemes, for natural languages) - 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.

For example, Predicate Logic has lexicon, syntax, and semantics (see previous handout). Recall: Montagues thesis: Natural languages can be treated as interpreted formal languages.

2 Lexicon

In the following lexicon for (a fragment of) English I omit the lexical semantics:

<table>
<thead>
<tr>
<th>Grammatical Category</th>
<th>Abbreviation</th>
<th>Lexical Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Names</td>
<td>$N_{pr}$</td>
<td>Joan, Bill, Pat, Waltham, Brandeis University...</td>
</tr>
<tr>
<td>Pronouns</td>
<td>$N_{pr}$</td>
<td>he, she, it, I, they, him...</td>
</tr>
<tr>
<td>Common Nouns (count)</td>
<td>$N_c$ or $N$</td>
<td>cat, dog, chair, table, boy...</td>
</tr>
<tr>
<td>Common Nouns (mass and plural)</td>
<td>$N_m$ or $N$</td>
<td>water, binoculars...</td>
</tr>
<tr>
<td>Intransitive Verbs</td>
<td>$V_{intr}$</td>
<td>sleep, snore, swim, jump, laugh...</td>
</tr>
<tr>
<td>Transitive Verbs</td>
<td>$V_{trans}$</td>
<td>see, like, find, kiss, hug...</td>
</tr>
<tr>
<td>Ditransitive Verbs</td>
<td>$V_{ditrans}$</td>
<td>give, send, assign, introduce...</td>
</tr>
<tr>
<td>Propositional/Clausal Verbs</td>
<td>$V_{cl}$</td>
<td>know, claim, believe...</td>
</tr>
<tr>
<td>Auxiliary Verbs</td>
<td>$V_{aux}$</td>
<td>will, would, could, must, might...</td>
</tr>
<tr>
<td>Determiners</td>
<td>$D$</td>
<td>the, a, some, every, each, most, more, my, their...</td>
</tr>
<tr>
<td>Prepositions</td>
<td>$P$</td>
<td>with, without, in, on, from, to, after, before...</td>
</tr>
<tr>
<td>Predicative Adjectives</td>
<td>$Adj$</td>
<td>sad, happy, tall, green, vegetarian, former, nice...</td>
</tr>
<tr>
<td>Manner Adverbs</td>
<td>$Adv_m$</td>
<td>quickly, carefully, curiously, willingly, soon...</td>
</tr>
</tbody>
</table>
3 Syntax

Syntax gives rules governing how to build sentences:

(1) If expression A is a proper name and expression B is an intransitive verb, then the sequence AB (disregarding inflection) is a sentence.

(2) a. Bill walks.
   b. *Walks Bill.

   QUESTION 1.

(3) Grammatical sentences of English?¹

   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 works with syntax: it specifies a semantic operation for each syntactic rule. The notation \([.]\) which we have been using stands for “the meaning of” or “the denotation of”. That is, semantics is built in tandem with syntax (we will run into problems later).

(4) If expression A is a proper name and expression B is an intransitive verb, then \([AB] = 1\) if and only if (iff) \([A] ... [B]...\)

¹Descriptive 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.
This means that the way a sentence is put together affects meaning. Structural ambiguity is an example of that. Here’s an example from Groucho Marx in Animal Crackers:

(5) a. One morning I shot an elephant in my pajamas.
   b. How he got into my pajamas I dunno.

Syntactico-semantic units = constituents.

We can express these meanings by grouping the words together in a particular way:

(5) c. One morning I (shot (an elephant in my pajamas)). ⇒ the elephant was in my pajamas
d. One morning I ((shot (an elephant)) in my pajamas). ⇒ I shot while wearing my pajamas

This grouping reflects how the pieces of the sentence were put together by syntactic rules. 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.

(6) \( S \rightarrow DP \ VP \)
\( S \rightarrow S \ Conj \ S \)
\( DP \rightarrow N_{pr} \)
\( DP \rightarrow Det \ NP \)
\( NP \rightarrow N \)
\( NP \rightarrow AdjP \ NP \)
\( NP \rightarrow NP \ PP \)
\( NP \rightarrow NP \ Conj \ NP \)
\( AdjP \rightarrow Adj \)
\( AdjP \rightarrow Adv_d \ Adj \)
\( VP \rightarrow Adv_m \ VP \)
\( VP \rightarrow VP \ PP \)
\( VP \rightarrow V_{trans} \ DP \)
\( VP \rightarrow V_{intrans} \)
\( VP \rightarrow V_{cl} \ that \ S \)
\( VP \rightarrow V^{shell} \ to \ DP \)
\( V^{shell} \rightarrow V_{dtrans} \ NP \)
\( PP \rightarrow P \ DP \)

4 Parsing example sentences

(7a) 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 units.

Every mother node in a tree is a syntactico-semantic unit. In other words, for any node, 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 (7b) 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 2: 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.

(8) The tall man from Waltham helped the small boy.

QUESTION 3: For each of the following sentences, our grammar allows us to generate more than one tree. For each sentence, draw all the possible trees and explain in your own words the meaning that each tree attributes to the sentence.

(9) I shot an elephant in my pajamas.

(10) John called a woman from my favourite country in Europe.

(11) Some curious men and women from Waltham attended the meeting.
For the sentence (12), draw a tree that corresponds to each picture, below the picture:

(12) I saw an owl with a telescope

Other ambiguities:

(13) Only John likes his teacher.
(14) Mary defended herself, and Sue did ▲ too.
(15) Mary defended herself better than Sue did ▲.