1. Some Hints on Studying Linguistics

Here are four hints on studying linguistics, which may require different approaches than other subjects. I hope you will finding them helpful if you’re experiencing frustration. If you’re already doing well on the homeworks, you’ve probably carried over appropriate learning methods from your previous training and don’t need to change them.

- Beware the “passive understanding” fallacy.

Students often say that when they are in class, they feel like they are following perfectly, but when they get the homework (which includes similar material), they feel lost. Evidently, there is a difference between passive and active understanding. One goal of study is to convert your passive understanding into active understanding. While studying, you want to assess carefully whether your understanding is still passive or has become active.

To elaborate a bit: when the lecturer in a course is having a good day, and expresses the material very clearly and articulately, that’s actually a danger to the students, because it makes them more likely to fall victim to the passive understanding fallacy.

- Copy the formalism.

When you read the text, keep pencils and yellow pads nearby and copy the rules and derivations. One fairly intense way to study is to first copy the rules and derivations from sight, then do it by memory. Many people who study, professors included, copy rules and derivations in order to learn them properly.

- Read the text more than once.

In my experience, the first reading orients your mind to the problems, and lets you partially memorize the material. This sets you up for a later second reading, which reaches full understanding. It’s good to wait a while between readings, to let the material mentally settle a bit.
• Write down questions.

If you get stuck, ideally you want to prepare in advance to make your visit to office hours effective. Clarify to yourself what you do understand, and try to formulate as clearly as possible what you don’t understand. Then, when you give these questions to your TA or me in office hours, we’ll be able to provide clear, directed answers.

2. Updating the Grammar

The idea here is that we can gradually increase the scope and accuracy of the grammar by adding rules. Here is a more substantial grammar. (I’ve put all the cases of conjunction, which are not especially interesting, together at the end.)

\[
\begin{align*}
S & \to \text{NP (Aux) VP} \\
\text{NP} & \to \text{Art NP (A) N (PP) (S)} \\
\text{NP} & \to \text{Pronoun} \\
\text{VP} & \to \text{V (NP) (NP) (PP) (S)} \\
\text{PP} & \to \text{P NP} \\
\text{S} & \to \text{(Comp) S} \\
\text{NP} & \to \text{NP Conj NP} \\
\text{VP} & \to \text{VP Conj VP} \\
\text{PP} & \to \text{PP Conj PP} \\
\text{S} & \to \text{S Conj S} \\
\bar{S} & \to \text{S Conj } \bar{S}
\end{align*}
\]

A few of these phrase structure rules need clarification.

2.1 Curly Brackets

These mean: “in applying the rule, pick one (but not more than one).” So, for the rule that includes \[ \text{Art NP} \], you can expand as an article (the book), or as an NP (Sue’s book), but not both (*the Sue’s book, *Sue’s the book).

2.2 NP → Pronoun.

This is straightforward: pronouns can be Noun Phrases, as in She saw him. Typically they do not admit modifiers, except in special circumstances we’ll defer for now.1

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1 Examples: Poor me, a “frozen” memorized expression; He who dares to go..., with a relative clause.
2.3 Complementizers and subordinate clauses

Much of the most intricate syntax arises when one “puts a sentence inside a sentence”; that is, when one uses a subordinate clause. This showed up early in the course when we looked briefly at the patterning of each other. Thus, *[John and Bill think [I like each other.]] is impossible, because each other is allowed to refer only to Noun Phrases that are within its own clause—in this case, [ I like each other ]. Subordinate clauses typically occur when the verb of the main clause is a verb of saying or belief—the subordinate clauses serves to express the content of the thought that is said or believed.

To analyse subordinate clauses, we need to provide a spot for the grammatical words that often introduce them—*that* in sentences like “I think that John and Bill like each other”; or less commonly *for*, as in “I would prefer for John and Bill to like each other.” Such words are called subordinating conjunctions in traditional grammar, but are usually called complementizers (abbreviation: Comp) by linguists.

With this apparatus, we can set up rules like these (I’m omitting optional material; see above grammar for the full rules):

\[
\begin{align*}
VP & \rightarrow \ V \ S \\
S & \rightarrow \ Comp \ S
\end{align*}
\]

*S* is read “S-bar”, and is simply the category that provides the syntactic “slot” for the complementizer.\(^2\) Here is an example sentence that can be generated by these rules:

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\(^2\) *S* is a nuisance to type on a word processor, but please don’t feel obliged; an apostrophe (S’) is considered a perfectly acceptable substitute. If you enjoy exotic word processing, you can learn to type S at http://wtonline.vitalnews.com/Pages/Tip0127.html.
3. **Terminology for Tree structure**

[ included in Readings 4, but discussed orally in Lecture 5 due to delay. I suggest you review the previous readings, to get the terms “dominate”, “directly dominate”, “daughter”, “sister,” and the formal definition of “head”. ]

4. **More on Diagramming Sentences**

We did more practice in diagramming sentences. To bear in mind are the following principles:

- semantic modifiers of the head are sisters of the head; thus the things that modify N must occur as part of the NP of which N is head; and similarly for VP, PP, AP
- Clauses consist of a subject NP and its predicate VP
- Verify all trees you draw against the current grammar. If you can’t justify the content of each node with a rule, then either
  - draw a different structure
  - claim, explicitly, that the grammar is wrong and specify how it should be revised

We did these examples:

Alice owns the book on the table
Alice placed the book on the table
Bill put those long letters to the president in the wastebasket

which you might want to review without looking at the trees below.
Trees:

Here, *on the table* specifies what book it is; thus modifies *book* and must be part of NP. As we verified, all structure is licensed by the grammar given above.

Here, *on the table* specifies the location that was the goal of the act of placing; thus it modifies *placed* and must be part of VP. As we verified, all structure is licensed by the grammar given above.

The following sentence has two PP’s, which get placed in different positions according to what they modify:

*Bill put those long letters to the president in the wastebasket*
Thus, *to the president* specifies the kind of letters; *in the wastebasket* indicates the locational goal of putting.

5. **Recursive Application of Phrase Structure Rules**

At the start of the discussion of syntax, I mentioned that the speaker’s knowledge of syntax is large but finite (that is, it fits somehow encoded in a single brain). Yet it permits the creation of an infinite number of sentences, of which the following partial list was meant as a demonstration:

Alice likes Fred  
John said that Alice likes Fred  
Bill believes that John said that Alice likes Fred  
…etc.

This infinity results, by and large, from a particular property of phrase structure rules, namely that they permit application in loops.

Below, I demonstrate one of these loops, taken from the phrase structure rules on page 2 above. With this more interesting grammar, we arrive at an interesting and crucial property: the rules in our grammar can apply recursively. That is, by following the appropriate procedure it is possible to make the same rule apply over and over. The procedure requires finding a repeating loop, such as the following:

If we employ this loop and insert appropriate words into the resulting syntactic structure, we can generate a sentence as long as we like:
Observe that there an infinite number of places where we could stop the loop. Thus there are an infinite number of possible sentences that the grammar can generate.

As far as we know, every human language allows an infinite number of sentences. In every case, the principal reason is the same: the phrase structure rules of all languages contain recursive loops, which allow infinitely long syntactic trees to be generated. The recursive loop of phrase structure rules is the device that allows a finite number of rules to generate an infinite number of structures.

6. An Example of Phrase Structure Rules in Another Language

Languages differ quite a bit in their word order, a fact which can be describe in grammars by writing different phrase structure rules. The data below, solved Socratically in class, involve sentence in Hittite, taken from work by Jay Jasanoff, a leading scholar of this language.

Hittite was spoken in early ancient times in what is now Turkey. It is known from a hoard of about 25,000 cuneiform tablets discovered early in the last century and deciphered in the decades that followed. Some of the texts date back to about 1700 B.C. and thus count as the oldest attestation of any Indo-European language. We accept here on Jasanoff’s authority that the sentences below, which he made up, would be grammatical to real Hittite speakers if we could bring them back.
To solve this, we reduced each sentence to its outline of constituents (verb and other major constituents), checking for a consistent overall order. Each individual constituent type was also checked for order. The resulting phrase structure rules (very tentative, since there are so few data) are:

\[
S \rightarrow NP \ VP \\
VP \rightarrow (NP)(NP)(PP)(PP)(Adv) \ V \\
NP \rightarrow (Art) \ (A) \ N \\
PP \rightarrow NP \ P
\]

For the last of these, “P” must be read “postposition”, which is the term for words that act like prepositions but occur at the end of the PP.
Here are the trees generated by these rules for #5. If you find it useful, try doing one or more of the others on your own.

Hittite, at least with these data, emerges as a typical example of a **head-final** language: the verb is at the end of VP, the noun at the end of NP, and the P at the end of PP. Such languages are not uncommon: Japanese, Korean, Bengali, and Turkish are all head-final. Bantu languages, such as Swahili, tend to be fairly rigorously head-initial. English is a “conflicted” case, tending towards head-initial but with head-medial cases like this NP:

\[
[ \text{the long [ book ]}_N \text{ about linguistics } ]_{NP}
\]

### 7. Case Marking

Now that we have some syntax in hand, we can return to the description of case, a topic we first encountered in morphology.

Case is widely found as an inflectional category in languages of many different families, though it is only poorly attested in English. To define case, it is:

- an inflectional category (hence, appears obligatorily on nouns)
- is used to identify the roles of the participants in a clause; intuitively, who is doing what to whom
You can see the various case endings in the Hittite data above. With some unexplained variation (we have too few data to tell), the endings seem to be:

- nominative: -aʃ, -ʃ
- accusative: -an, -n
- dative: -i

As in many languages, case in Hittite appears to be at least in part syntactically predictable: subjects take nominative, objects of verbs take accusative (if there is just one object) and dative (for the first of two objects). Objects of prepositions take dative case. The assignment of case can be done with syntactic rules; for instance, a rule of nominative case marking (valid for quite a few languages) is the following:

**Nominative Case Marking**

In the configuration

```
S
 NP   VP
```

add [Case:Nominative] to the morphosyntactic representation of the head of NP.

In the sentence above, this rule would apply like this:
Dative case, when assigned in Hittite by postpositions, can be attached by a similar rule:

**Dative Case Marking**

In the configuration

```
    PP
   /\  
P  NP
```

add [Case:Dative] to the morphosyntactic representation of the head of NP.

Getting Accusative and Dative object right is trickier, and we also have very few data, so the following is really something of a wild guess:
Case Marking for Objects

In the configuration

\[
\begin{array}{c}
  \text{VP} \\
  \text{NP} \quad \ldots \quad V
\end{array}
\]

- add [Case:Dative] to the morphosyntactic representation of the head of NP, if VP contains another NP.
- otherwise add [Case:Accusative]

There are many complications to case marking in various languages. In German, for instance, particular exceptional verbs (such as *folgen* ‘follow’) take just one object, but assign Dative, not Accusative, case to their object:

Sie folgte ihm.
She followed him-dative

NOT

Sie folgte ihn.
She followed him-accusative

German (like many other languages) also has case idiosyncrasies related to prepositions: some prepositions take dative objects (like *nach* ‘except’), others take Accusative (*gegen* ‘against’), and still others take Genitive (*während* ‘during’):

<table>
<thead>
<tr>
<th>German Word</th>
<th>Case</th>
<th>English Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>nach dem</td>
<td>dative</td>
<td>after the-masculine dative war</td>
</tr>
<tr>
<td>gegen den</td>
<td>accusative</td>
<td>against the-masculine accusative war</td>
</tr>
<tr>
<td>während des</td>
<td>genitive</td>
<td>during the-masculine-genitive war-genitive</td>
</tr>
</tbody>
</table>

In general, case, when predictable is the result of the syntactic location in which a Noun Phrase appears, often with a contribution from the particular verb or preposition of which the NP is the object. There are other instances in which the choice of case actually expresses meaning; we’ll skip these here.