Homework 2
11-721: Grammars and Lexicons, Fall 2010
Due Monday, October 11, 2010

1 Structural Ambiguity: Based on Radford, Exercise XVI, page 225

In class we briefly talked about X-bar theory. You don't need to know X-bar theory in order to do this exercise. You only need to understand how to use context free phrase structure rules in order to draw trees for sentences.

Just as a reminder, the following examples are evidence for the existence of `N'`.

(1) a. I saw those students of linguistics and teachers of chemistry.

b. I saw this student of linguistics and you saw that student of linguistics.

c. I saw this student of linguistics and you saw that one.

The goals of this exercise are:

1. You will parse phrases and sentences using a given set of phrase structure rules.
2. When there is structural ambiguity, you will identify which tree corresponds to which meaning.

If this is the first time you have parsed sentences with context free phrase structure rules, just think of it as a puzzle. You don't need to know linguistics to do this. The node labels are just symbols. All you have to do is make sure that each node of the tree matches one of the rules. Send me email if you want to meet and go over some simple examples as practice.

The phrase structure rules for this exercise are on the next page. The questions are on the page after that.

Note that N’ is pronounced "N bar" and N’’ is pronounced "N double bar".

S --> N’’ VP

VP --> V’
VP --> V’ PP
V’ --> V
V’ --> V N’’

PP --> P N’’

N’’ --> (Det) N’
N’ --> N’ PP
N’’ --> N’’ PP
N’ --> N (PP)

N --> N CONJ N
N’ --> N’ CONJ N’
N’’ --> N’’ CONJ N’’

Det --> that
Det --> his
Det --> the
CONJ --> and

V --> like
VP --> just don’t get on

N --> picture
N --> pushchair
N --> workers
N --> managers
N --> factory
N’’ --> I
N’’ --> him
P --> of
P --> in

Question 1: Note that *I* and *him* are `N''` and not N. Write an ungrammatical sentence that would be generated if *I* and *him* were N and not `N''`. This grammar generates a lot of ungrammatical sentences, so be sure to write one that is ungrammatical for the right reason.

Question 2: Note that *his* is a determiner. Write an ungrammatical sentence that would be generated if *his* were an N. Write a sentence that could not be generated if *his* were an `N''`.

Question 3: There is an attachment ambiguity in *that picture of him in his pushchair***. What are the two meanings?**

Question 4: Draw two phrase structure trees, one corresponding to each meaning. Note that the root of the tree will be `N''`, not `S`. Indicate which meaning goes with which tree. You must use only the phrase structure rules on the previous page.

Question 5: There is also an attachment ambiguity in *The workers and the managers in the factory just don't get on*. What are the two meanings?

Question 6: Draw two phrase structure trees, one corresponding to each meaning. The root of the trees should be S. Indicate which meaning goes with which tree. You must use only the phrase structure rules on the previous page.

2 Possessive Noun Phrases

In the last problem, possessive pronouns like *his* were treated as determiners. However, possessors can be full noun phrases as in *the boy across the street's toy* where the possessor is *the boy across the street*.

The *'s* is a *clitic*, not a full word, but not a prefix or suffix. One of the things that makes it different from prefixes or suffixes is that it attaches to words that aren't related to it. In *the boy across the street's toy* the *'s* indicates that the boy is a possessor, but it attaches to *street*. In the phrase structure rules below, the *'s* is treated as a terminal symbol that is a daughter of `N''`.

Task 1: Using the phrase structure rules below, draw two trees for *the wife of your friend's brother*, which has two different meanings. Assume that *of your friend* is an argument (sister to `N`), not an adjunct (sister to `N'`). For the sake of simplicity, *your* is still treated as a determiner because it does not occur with *'s*.

Task 2: Using the phrase structure rules below, draw two trees for *We gave her dog biscuits*. The verb *give* should have three arguments: agent, theme, and recipient.

```
S --> N''  VP

VP -->  V  N''  N''

PP -->  P  N''

N'' --> (Det) N'
N'  -->  N  (PP)
N'' -->  NP  's   N'

In the previous rule, the N'' has three daughters, NP, 's, and N'.

Det --> the
Det --> your
Det --> her
N'' --> her
N'' --> we

N -->  N   N
```

3 Two types of sentences embedded inside noun phrases

This is based on an exercise from Santorini and Kroch (http://www.ling.upenn.edu/ beatrice/syntax-textbook/index.html). An *embedded sentence* or *embedded clause* is an S that is inside another S. The sentences below show two types embedded sentences that modify nouns.

(2) a. The fact *that you like linguistics* surprised me.

b. I am surprised by the fact *that you like linguistics*.

(3) a. The story *that you told* surprised me.

b. I was surprised by the story *that you told*.

There are also many types of embedded sentences such as (4) that do not modify nouns. This exercise is about embedded sentences that modify nouns.

(4) I believe *that it is raining*

Embedded sentences are sometimes called *complement clauses* or just *complements*. For this reason, words like *that* at the beginning of an embedded sentence are called *complementizers*. They turn sentences into complements.

In (2), *the fact that you like linguistics* is a noun phrase. *that you like linguistics* is called an `S'` (S bar). An `S'` is an S with a *complementizer*. In this exercise, *that you like linguistics* will be refered to as a *noun complement*.

In (3), *the story that you told* is a noun phrase. *that you told* is an S-bar of a particular type called a *relative clause*. In this exercise, *that you told* will be refered to as a relative clause.

How to tell a noun complement from a relative clause: In a relative clause, the word *that* can usually be replaced by *which* or some other appropriate word like *what*, *who*, etc. But *that* cannot be replace by *which* in a noun complement.

(5) a. The story which you told surprised me.

b.* The fact which you like linguistics surprised me.

Another difference between noun complements and relative clauses is that relative clauses contain a *gap* – a hole where something is understood, but isn't there. In the relative clause *that you told*, the gap is after *told*. It is understood that you told the story, but *the story* isn't there. In other words, if you just look at the `S'` *that you told*, you will see that the verb *told* is missing one of its

arguments. In contrast, in the noun complement *that you like linguistics*, the verb *like* has all of its arguments.

After all of that explanation, the questions are actually very short. Assume that *one* can substitute for an N-bar, but not an N.

Question 1: Based on (6), which phrase structure rule is the correct one for *the fact that you like linguistics*?

```
a. N-bar -->  N   S-bar

b. N-bar -->  N-bar S-bar
```

(6) * I was surprised by the fact that you like linguistics and Sam was surprised by the one that you like chemistry.

Question 2: Based on (7), which phrase structure rule is the correct one for *the story that you told*?

```
a. N-bar -->  N   S-bar

b. N-bar -->  N-bar S-bar
```

(7) I was surprised by the story that you told and Sam was surprised by the one that Sue told.

Question 3: Based on your answers to Questions 1 and 2, what would you predict about a noun phrase that had both a noun complement and a relative clause? Which one would be predicted to come first?
Question 4: Make up a noun phrase that has both a noun complement and a relative clause. It will be a big messy noun phrase, but you should be able to do it. Try both orders: "Det N noun-complement relative-clause" and "Det N relative-clause noun-complement". Are they both good?

Relative clauses are important for the rest of the course, so don't forget what they are.