Drawing Trees & Ambiguity in Trees
Some Phrase Structure
Rules of English
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CP \rightarrow (C) TP

TP \rightarrow \{NP/CP\} (T) VP

VP \rightarrow (AdvP+) V (NP)\{NP/CP\} (AdvP+) (PP+) (AdvP+)

NP \rightarrow (D) (AdjP+) N (PP+) (CP)

PP \rightarrow P (NP)

AdjP \rightarrow (AdvP) Adj

AdvP \rightarrow (AdvP) Adv
Drawing trees
Drawing trees

*Step 1:* Identify the parts of speech for all the words in the sentence
Drawing trees

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Step 2: try to figure out what words "go together in phrases" (i.e. figure out what the constituents are)
Drawing trees

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Step 3: apply the rules backwards (bottom up) to build the tree.
Drawing trees

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Start with AdvP & AdjPs
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Step 3: apply the rules backwards (bottom up) to build the tree.
   Start with AdvP & AdjPs
   Next do NPs, then PPs, then VPs
Drawing trees

Step 1: Identify the parts of speech for all the words in the sentence

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Step 3: apply the rules backwards (bottom up) to build the tree.
   Start with AdvP & AdjPs
   Next do NPs, then PPs, then VPs
   Generally, start at the RIGHT edge of the tree and work leftwards apply the TP rule last.
Drawing trees

Step 1: Identify the parts of speech for all the words in the sentence

Step 2: try to figure out what words "go together in phrases" (i.e. figure out what the constituents are)

Step 3: apply the rules backwards (bottom up) to build the tree. Start with AdvP & AdjPs
Next do NPs, then PPs, then VPs
Generally, start at the RIGHT edge of the tree and work leftwards apply the TP rule last.

Step 4: now check your tree against your rules. Start at the top, and check that each set of lines can be generated by the rules.
Drawing trees
Drawing trees

Important:
Important:

- Nothing can be left dangling in space.
Drawing trees

Important:

- Nothing can be left dangling in space.
- Everything has to be attached to something higher up.
Drawing trees

**Important:**

- Nothing can be left dangling in space.
- Everything has to be attached to something higher up.
- Lines can't cross one another.
Some trees

The very big man gave the marble to his son
Some trees

The very big man gave the marble to his son
Some trees

The very big man gave the marble to his son
Some trees

The very big man gave the marble to his son.
The very big man gave the marble to his son.
The very big man gave the marble to his son.
Some trees

The very big man gave the marble to his son
Some trees

The very big man gave the marble to his son

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Some trees

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Some trees

The big lazy dog bit a mouthful of food
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Some trees

I will finish an assignment about trees
Some trees

I will finish an assignment about trees
Some trees

I will finish an assignment about trees

N  T  V  D  N  P  N  NP

NP

I will finish an assignment about trees
Some trees

I will finish an assignment about trees.
Some trees

I will finish an assignment about trees
Some trees

I will finish an assignment about trees
I will finish an assignment about trees.
I will finish an assignment about trees.
A Personal Pet-peeve

The line in a tree represents the application of a PSR, so there is no line between a word and its category:
A Personal Pet-peeve

The line in a tree represents the application of a PSR, so there is no line between a word and its category:

NP
| N
| Peanuts
A Personal Pet-peeve

The line in a tree represents the application of a PSR, so there is no line between a word and its category:
A Personal Pet-peeve

The line in a tree represents the application of a PSR, so there is no line between a word and its category:
Ambiguity: when a sentence has two meanings

Paraphrase: A restatement of the meaning of a sentence, used to disambiguate ambiguous sentences.

- John went to the bank.
- Paraphrase 1: John went to the financial institution
- Paraphrase 2: John went to the side of the river

We use paraphrases to disambiguate. But be sure that when you draw trees you draw them of the ORIGINAL sentence, not the paraphrase.
Ambiguity

Two kinds:

- **Lexical ambiguity** uses words with more than one meaning.
- **Structural ambiguity** ambiguous due to the structure of the tree.
Lexically Ambiguous Headlines

Safety Experts Say School Bus Passengers Should Be Belted
Drunk Gets Nine Months in Violin Case
Iraqi Head Seeks Arms
Farmer Bill Dies in House
Stud Tires Out
Prostitutes Appeal to Pope
British Left Waffles on Falkland Islands
Reagan Wins on Budget, But More Lies Ahead
Red Tape Holds Up New Bridge
Deer Kill 17,000
Man Struck by Lightning Faces Battery Charge
Ban on Soliciting Dead in Trotwood
Structurally Ambiguous Headlines

Two Sisters Reunited after 18 Years in Checkout Counter
Enraged Cow Injures Farmer With Ax
Hospitals are Sued by 7 Foot Doctors
Killer Sentenced to Die for Second Time in 10 Years.
The Principle of Modification
“The Golden Rule”

If an XP modifies a head Y then XP must be Y’s sister (be the daughter of YP)
The Principle of Modification
“The Golden Rule”

If an XP modifies a head Y then XP must be Y’s sister (be the daughter of YP)
Ambiguity in Structure
Ambiguity in Structure

The man put the book in the box on the table
Ambiguity in Structure

The man put the book in the box on the table

Meaning 1: put the book (currently in the box) on the table. The box isn’t on the table.
The man put the book in the box on the table

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VP
  V   NP  PP
    put  the book  on
      D N PP P NP
        the box

in the table
D N
the box
VP
V put NP the book PP on the table

VP
V put NP the book PP in the box

D N PP P NP the box

D N PP

D N NP

D N
Ambiguity in Structure
Ambiguity in Structure

I killed the king with the knife
Ambiguity in Structure

I killed the king with the knife

**easy reading:** “used a knife for the killing”
I killed the king with the knife

- easy reading: “used a knife for the killing”
- harder reading: “king holding a knife”
Ambiguity in Structure

I killed the king with the knife

**easy reading:** “used a knife for the killing”

**harder reading:** “king holding a knife”

I killed the king with the red hair
Ambiguity in Structure

I killed the king with the knife

- **easy reading:** “used a knife for the killing”
- **harder reading:** “king holding a knife”

I killed the king with the red hair

- **easy reading:** “king who has red hair”
Ambiguity in Structure

I killed the king with the knife

- **easy reading:** “used a knife for the killing”
- **harder reading:** “king holding a knife”

I killed the king with the red hair

- **easy reading:** “king who has red hair”
- **harder reading:** “used red hair to kill him”
I killed the king with a knife

killed using a knife

king holding a knife
I killed the king with red hair

killed using red hair

red-headed king

[Diagram showing the syntactic structure of the sentences]
Summary
Summary

- Tree drawing
  - practice, practice, practice
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- Apply rules from bottom up, start with AdjPs, AdvPs, NPs, PPs first. Start from right edge.
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  - practice, practice, practice

- Apply rules from bottom up, start with AdjPs, AdvPs, NPs, PPs first. Start from right edge.

- Make sure everything is connected, no crossing lines.
Summary

- Tree drawing
  - practice, practice, practice
- Apply rules from bottom up, start with AdjPs, AdvPs, NPs, PPs first. Start from right edge.
- Make sure everything is connected, no crossing lines.
- CHECK your trees against the phrase structure rules.
Summary

- Structurally vs. Lexically ambiguous.
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- Structurally ambiguous:
  - different meanings have different trees.
  - relies on the principle of modification!
Summary

- Structurally vs. Lexically ambiguous.
- Structurally ambiguous
  - different meanings have different trees.
  - relies on the principle of modification!
- A paraphrase is a restatement of meaning. *Don’t draw trees for the paraphrase* -- draw them for the actual sentence.