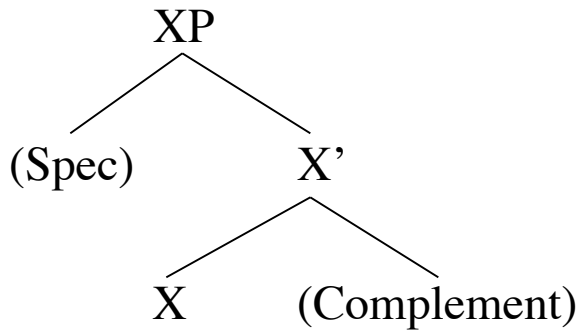
Principles, Constraints, and Generalizing Rules

March 4, 2004

Overview

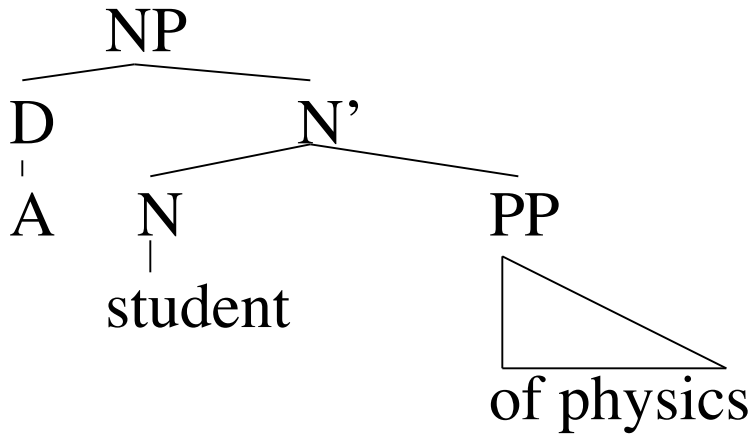
- Quick review of categorical phrase structures
- More possibilities for adjuncts
- Principles and constraints
- From NP, VP, AP, and PP to XP

Phrase structures

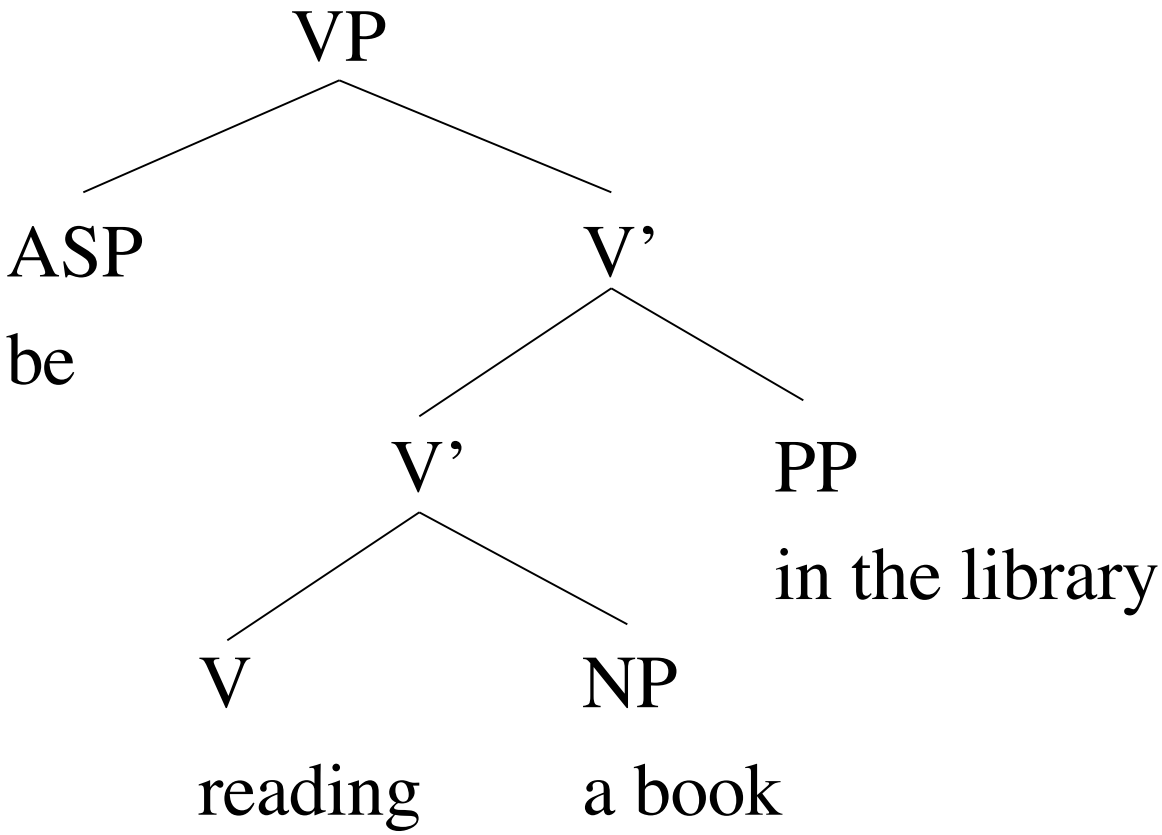


- Last time we saw that we could generalize phrases of different categories with this basic scheme

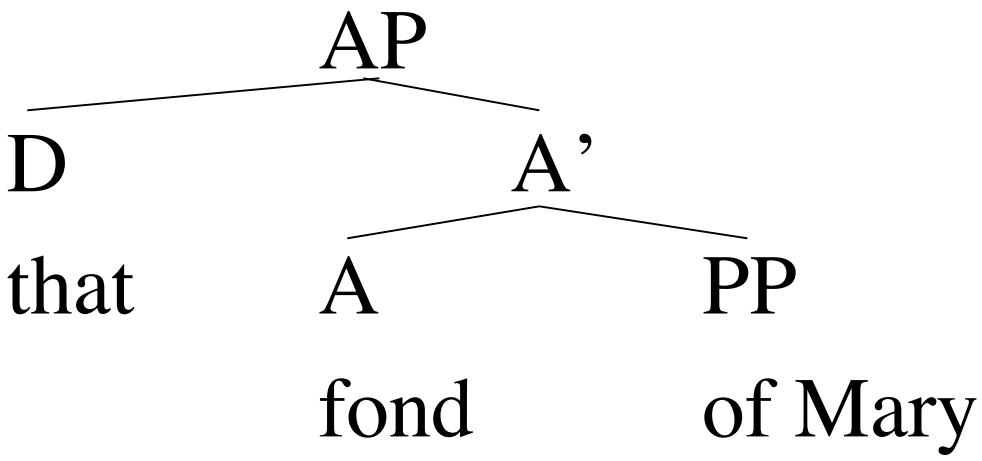
Noun Phrases



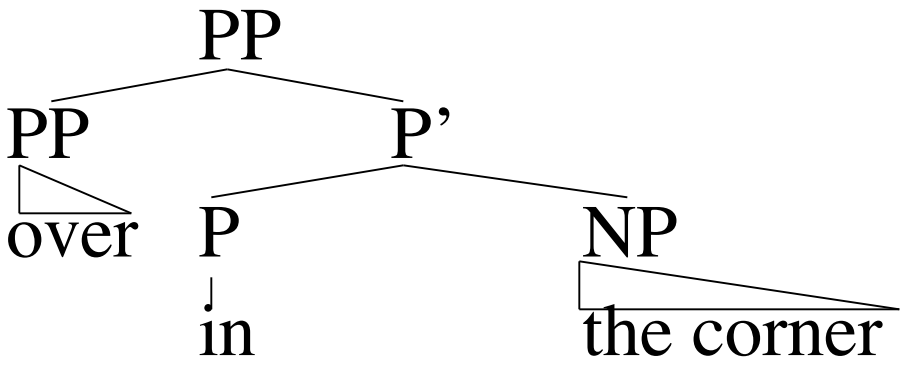
Verb Phrases



Adjective Phrases



Prepositional Phrases



(Remember that PPs like this can be ambiguous. Make sure you apply all of your relevant diagnostics before assigning structures to PPs… and *any* category for that matter.)

Cross-categorical structural symmetry

- Not only do all phrases seem to share the same basic structure (the X-bar structure), all categories seem to share some other features:
  - Some types of PP can function as complements to any major lexical category:
    - Peter is a *student* [of linguistics] (N + PP)
    - She is *proud* [of her son] (A + PP)
    - She discovered it *independently* [of me] (Adv + PP)
    - The thief fell right *out* [of the window] (P + PP)
    - You must be *thinking* [of her] (V + PP)

Symmetry (cont'd)

- Also, some types of determiners in English can act as specifiers for any major single-bar category:
  - I don't like *that* [$_{N'}$picture of you]
  - I'm not *that* [$_{A'}$fond of candy corn]
  - She doesn't act *that* [$_{Adv'}$independently of you]
  - She is not *that* [$_{P'}$in demand]
  - I don't *that* [$_{V'}$dislike her]

Symmetry (cont’)

- What generalizations can we make about adjuncts?

- What are the structural specifications for adjuncts to any kind of phrase?

Symmetry (cont'd)

- It seems that there may be other types of adjuncts, but that meet the same general structural description (I.e., they expand a particular expansion of a phrasal type into another node of that same type)
  - XP → Adjunct XP
  - X' → Adjunct X'
  - X' → Adjunct X
- But is there evidence for this?
  - [$_{??}$Even [$_{NP}$the older residents]] were surprised.
  - [$_{??}$[$_{NP}$The older residents] even] were surprised.

Symmetry (cont'd)

- Radford posits that in these sentences *even* is adjoined as a phrase-level adjunct (what he calls a double-bar adjunct), as opposed to the X'-adjuncts (single-bar adjuncts) that we've seen so far.
- Can you think of another way these might be represented?

Symmetry (cont'd)

- How about these sentences?
  - He is [$_{AP}$competent *enough*]
  - He isn't [$_{AP}$proud *enough* of his country]
  - *He isn't [$_{AP}$proud of his country *enough*]
- If we presume *enough* to be an adjunct, why can't we place it after the complement PP *of his country*?
- How might we fit phrasal/particle verb constructions into this format?

Constraining Rules

- Why do these rules seem counterintuitive?

  NP → V VP

  VP → AdvP NP N

Constraining Rules (cont'd)

- Phrase structure rules are intuitively constrained. The constraints are in our innate language faculty, telling us what kind of rules are possible.
- What kind of constraint would we need to rules out those bad PSRs from the previous slide?

Endocentricity

- All constituent Structure Rules are of the form:

  $X^n \rightarrow \ldots X^m \ldots (n \geq m)$

  (where $m \neq n$ if … is null)

- So what does this actually mean?
- Have we seen any nodes so far that don't obey this?

Modifier Maximality

- Modifier Maximality Constraint

  Every non-head term in the expansion of a rule must itself be a maximal projection of some category.

- What does this mean for some of the categories we've discussed that haven't been maximal projections?

- FYI, these are the first of several principles and constraints on syntactic formulations that we'll be covering. Many more will come next quarter and will have interesting implications for our theory.

Generalizing Rules

- Recall the set of rules we developed for expanding NPs:
  - NP→ (D) N’
  - N’ → N’ PP | S [Adjunct Rule]
  - N’ → N (PP | S) [Complement Rule]
  - N’ → NP | AP N’ [Attribute Rule]
  - N’ → (NP) N [Complement Rule]

A sample subset of our new rules:

- NP → (D) N’
- N’ → N’ PP | S
- N’ → N (PP | S)
- N’ → NP | AP N’
- N’ → (NP) N
- VP→ (ASP) V’
- V’ → V’ PP | AdvP
- V’ → V (NP | S)
- V’ → AdvP V’
- AP→ (D) A’
- A’ → A’ PP | AdvP
- A’ → A PP | S
- A’ → AdvP A’
- PP→ (D | AdvP | PP | NP | AP) P’
- P” → P’ PP | AdvP
- P’ → P NP | PP

… And this is just the beginning…

Generalizing Category Rules

- What is problematic about expanding the number of rules like this?
- Why should a theory about language discourage huge numbers of rules like this?
- How might we go about conflating rules?

Generalizing rules (cont'd)

- We've noted that many types of phrases can take PP complements:
  - Peter is a *student* [of linguistics] (N + PP)
  - She is *proud* [of her son] (A + PP)
  - She discovered it *independently* [of me] (Adv + PP)
  - The thief fell right *out* [of the window] (P + PP)
  - You must be *thinking* [of her] (V + PP)
- We should be able to generalize these structures into a single rule:

  X' → X (PP)

Generalizing rules (cont'd)

- A single category can also take a whole range of phrasal categories as complements:
  - He can't have [$_{V'}$enjoyed blue films] (V + NP)
  - She may be [$_{V'}$suffering from a throat infection] (V + PP)
  - It would be [$_{V'}$been quite convenient] (V + AP)
  - You shouldn't have [$_{V'}$behaved so badly] (V +Adv)

Generalizing rules (cont'd)

- So we can generalize our complement rule even further:

  X' → X (YP)

- Does this rule account for sentences like :
  - John will [$_{V'}$give the book to Mary]

Generalizing rules (cont'd)

- We need to make an even **more** general rule:

  X' → X YP*

  (YP* = any number of phrases of any type)

- How about generalizing our other rules?

Generalizing rules (cont'd)

- XP → (YP) X' (Generalized Specifier Rule)
- X' → YP X' (Generalized Attribute Rule)
- X' → X' YP (Generalized Adjunct Rule)
- X' → X YP* (Generalized Complement Rule)

Generalizing Rules (cont'd)

- Since we know that adjunct/attribute rules can iterate, do we need to posit a * operator in our adjunct/attribute rules, like we did for our complement rule? Why or why not?

Eliminating Categorical Rules

- The rules on the previous slide were formulated in category neutral terms (XP and YP)
- Since we want our theory of syntax to be universal, we don't want to specify category types for complement, adjunct, and specifier phrases, since restrictions on these are idiosyncratic by language
- Selectional/subcategorization frames vary widely, not just within the lexicon of one language, but across languages

Eliminating Categorical Rules

- Thus, we can posit the Category Neutrality Constraint:

  All Categorical Rules must be formulated entirely in terms of ***category variables***.

Rule Constraints vs. Rule Schemas

- Rule constraints (I.e. the endocentricity constraint) are *universal*. They hold for all languages, and are not ideosyncratic of any particular language.
- Rule schemas, on the other hand, are clearly language-specific…

Branching Directionality

- In English, heads generally precede their complements:
  - I know that I [$_{VP}$like fish] (V + complement NP)
- Other languages have head-final constructions:
  - Ich weiß, daß ich [$_{VP}$Fisch mag] (complement NP + V)

    I know that I fish like

    (Also examine the Korean example in the text)

Branching Directionality

- English is a ‘head-first’ language
- Korean (and certain constructions in German) are head-final
- The members of each pair of rule-schemas differ only in respect to the relative ordering of constituents. This is one example of *parametric variation*.

Branching Directionality

- Thus it seems we have the following two structures:

- And it seems as though we need to posit new rules to account for these:
  - X' → X YP* (head first complement rule)
  - X' → YP* X (head final complement rule)

Branching Directionality

- The task of the child acquiring the grammar of a particular language is thus to determin which ordering options are selected in the language he/she is acquiring.
- The child must simply ‘set’ the relevant word-order parameter for complements, specifiers, adjuncts, and so on.
- Some languages, however, permit more than one ordering (German, for example)

Branching Directionality

- Is there a way to make our current set of rules account for multiple orders then?
- Perhaps Universal Grammar contains a set of universal constituency rules:
  - XP → (YP), X'
  - X' → X', (YP)
  - X' → X, YP*

    (x, y) represents an unordered pair of constituents

Meta-theoretical Generalizations

- The above rules can be read as *The immediate constituents of XP are X' and an optional specifier phrase*.
- The rules impose no linear ordering on constituents.
- They are 'metagrammatical' in that they are statements about the theory of grammar, and not about a particular grammar.

Meta-theory (cont'd)

- Particular grammars will superimpose specific linearization conditions on unordered universal schemas.
- These will flesh out the meta-theory into particular ordering rules.
- What other generalizations have we made that are meta-theoretic?

Summary

- We've noticed that different phrases behave similarly, so we can conflate our construction-specific rules to more general, universal rules
- Phrase structure rules supplied by UG, along with a few parameter settings, can constrain the language learning burden for children
- Meta-theoretic generalizations can help constrain the number and type of rules in the grammar, while at the same time making it more powerful.
- Please read the Ch 6 assignments BEFORE coming to class. There's a LOT of information in there and we want to maximize classtime. :)