

Coordination

- Introduction and Background
- Definitions and Terminology
- Typology of Coordination
- Implementation in the Matrix

Introduction

- Coordination is a phenomenon that exists in every language, but it varies a lot across languages. Capturing it in the Matrix is an interesting problem, and I'm working on it.
- I wrote a thesis about the typology of coordination (a survey of 30 languages' coordination strategies), and Emily asked me to write a coordination module for the Matrix that covers a broad range of the attested strategies. The idea is to give grammar developers a head start on coordination syntax and semantics, then let them implement all the gory details.
- Coordination has been looked at from many different theoretical points of view, and what you'll see here is only one (rather descriptively-oriented). In some ways, coordination poses challenges to syntactic theory, and there doesn't seem to be a settled consensus on how to handle it.

Definition

- There's at least two. Here's the obvious one:
- **Syntactic coordination** is the combining of two or more elements of some category into a larger phrase with the same category. E.g. NP \rightarrow NP and NP, such as:
“the cat” + “the dog” = “the cat and the dog”
- This covers the straightforward kind of coordination marked by *and* (and *or*) in English, but it excludes some other constructions:
 - Non-identical categories: “quickly and without a sound”
 - Non-constituents: “Mary built and John bought the house”
 - Gapping: “Mary ate a sandwich and John a salad”
(My favorite example: “As Virgil guided Dante through Inferno, the Sibyl Aeneas Avernus.” Roger D. Scott)

Definition (cont'd)

- In order to cover more types of structures, we need a semantic definition that makes no reference to syntax. Here's an attempt:
- **Semantic coordination** is the combining of two or more sentences into a single sentence, possibly with some repeated material deleted, where the combined sentence entails the meanings of the component sentences.
- Based in part on the idea of **coordination deletion** (also **reduction**).
- This definition covers the problem cases from the previous slide, but it may be too broad. Consider:
 - “John went to the movie with Mary”
 - “John, who likes chocolate, also likes vanilla.”
- This definition also doesn't cover coordination with *or* or *but*.
- We'll only be dealing with same-category syntactic coordination.

Terminology

- Important both for our discussions and for finding the right phenomena in your languages.
- *Coordination* is what we'll call the phenomenon. The coordinated parts are *coordinands*.
- You'll also see *conjunction* and *conjuncts*; however, this refers to a specific kind of syntactic structure and is also mixed up with *subordination* (e.g. *subordinating conjunction*), which is a different phenomenon.
- Coordination constructions can be categorized by meaning: *conjunctive*, *additive*, *coordinative*, *cumulative*... (“and”), *disjunctive* (“or”), *adversative* (“but”).

Terminology (cont'd)

- Coordinating constructions can also be categorized by how they are marked:
- asyndeton: no coordinator (also called juxtaposition)
Ex: Amharic (Afro-Asiatic) NPs:
 kä-gäbäya čäw bärbärre amäṭṭawh
 from-market salt pepper I-brought
 'I brought salt and pepper from the market.'
- monosyndeton: one coordinator per coordinated construction
Ex: Ono (Trans-New Guinea) NPs:
 koya so kezoŋ-no numa len-gi
 rain and clouds-erg. way block-3sDS
 'Rain and clouds block the way...'
- polysyndeton: more than one coordinator per construction
Ex: Telugu (Dravidian) NPs:
 kamalaa wimalaa poDugu.
 'Kamala and Vimala are tall.'
- The marking can be a separate lexical item (conjunction), an affix of some kind, a change in inflection, or phonological (Telugu, juxtaposition).

Typology of Coordination

- Situations arise in which language users want to express coordinated meanings; whatever construction they use in such situations is a **coordination strategy**. It may not be syntactic coordination.
- Some languages (including all Indo-European) have an AND-strategy: a coordinator that can combine items of all (or nearly all) categories into larger phrases of the same category.
- Other languages have different strategies for different phrase types. E.g. Japanese:
NPs: taroo-to hanako-ga de-ta
 Taro-(and) Hanako-NOM leave-PAST
 ‘Taro and Hanako left’
VPs: taroo-ga tabe-te non-da
 Taro-NOM eat-(and) drink-PAST
 ‘Taro ate and drank’
- Some languages lack an AND-strategy, instead using a construction with **comitative** meaning (“with”). Sometimes called **WITH-languages**.

Typology (cont'd)

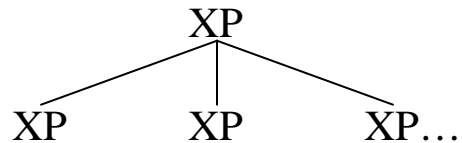
- In surveying coordination strategies for my thesis (Drellishak 2004), in addition to a variety of strategies in both AND- and WITH-languages, I ran into some interesting things:
 - Odd ways of marking coordination (Telugu)
 - Some languages lack some common word categories (NP AP merger), or split them (two classes of adjectives). Problem for my hypothesis, but also for the Matrix.
 - Sometimes it's hard to determine what's being coordinated. S vs. VP in null-subject languages, case-marked NPs vs. PPs.
 - Attributive APs can very commonly be juxtaposed, but is that coordination or multiple adjuncts? (In two languages, APs could not even be juxtaposed—that is, you have to say “the big dog that is red” instead of “the big red dog”.)

Implementation in the Matrix

- The plan is to provide a language-independent coordination module for the Grammar Matrix. A simple interface will ask a few questions, then an appropriately-configured set of rules will be written out. From this starting point, the grammar developer can customize further.
- The coordination implementation is based on the English Resource Grammar.
- So far, I've got NPs, VPs, APs, and (possibly) sentences working with “and”. Only syntactic coordination is supported (i.e. no special support for WITH-languages).
- There is no question-asking script yet, so you'll need to pick and choose the rules that are appropriate for your language.
- This week's lab will be the first test of this implementation, and it's bound to break. Then we'll fix it together, and I'll incorporate the changes.

Implementation (cont'd)

- We are agnostic about the shape of coordination structures. Some people propose left- or right-branching trees, but we don't know for sure.
- We therefore want flat trees:

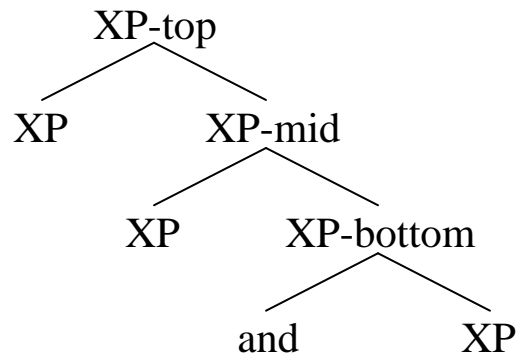


...but that would require an infinite set of rules:

$XP \rightarrow XP\ XP$

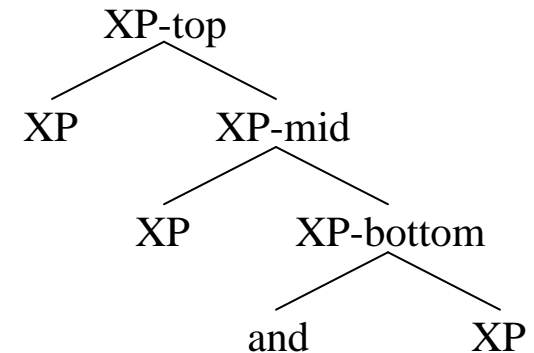
$XP \rightarrow XP\ XP\ XP...$

- Instead we fake flat trees with right-branching binary trees:



Implementation (cont'd)

- There are three new rules for each phrase type: XP-bottom marks an XP as coordinated (doesn't have to be with “and”). Any number of XP-mids fill in the middle of the structure. The topmost node is an XP-top.
- These rules are non-headed, and have (what amounts to) left and right daughters. (Of course, bottom can be unary.)
- Two new features control the shape of this structure:
SYNSEM.LOCAL.COORD
SYNSEM.LOCAL.COORD-REL
- COORD is Boolean. The rules specify:
top: COORD –, LEFT..COORD –, RIGHT..COORD +
mid: COORD +, LEFT..COORD –, RIGHT..COORD +
bottom: COORD +, RIGHT..COORD –
- Headed phrases (i.e. everything else) all specify that they and their children are COORD –, and all lexical items and lexical rules are also COORD –. This means **only** coordination rules participate in this structure, which is what we want.
- This handles “A and B and C” **and** “A B and C”. How?

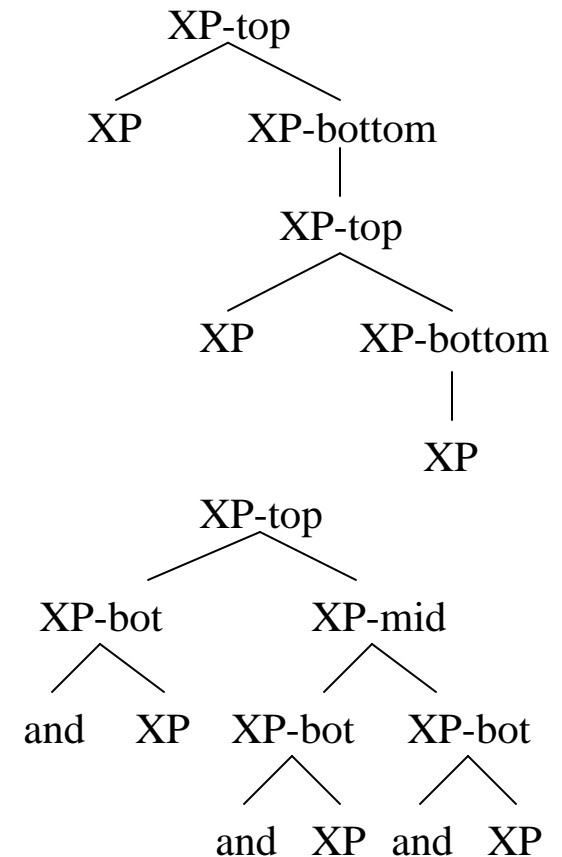


Implementation (cont'd)

- In addition to English-style mono/polysyndeton, we can get the other patterns by varying the rules.
- N-1 polysyndeton (“A and B and C”): **no** mid rule. (Why? What does the resulting structure look like?)
- Asyndeton: no mid rule and unary bottom rule. (Why? What does the resulting structure look like?)
- N polysyndeton (“A and B and C and”): This one’s tricky. We need to have a coordinator on each XP, but that coordinator may come either before or after, and might be just a morpheme of some kind.

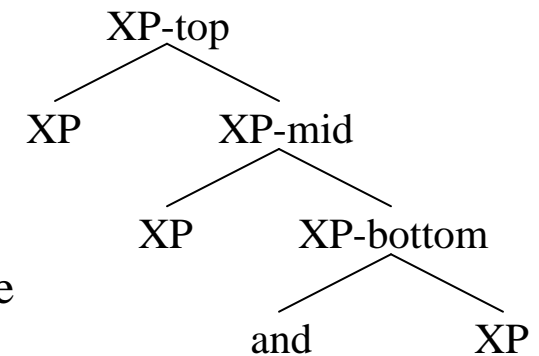
Implementation (cont'd)

- N polysyndeton is surprisingly different from the other types. It might seem closest to asyndeton, but not much. In the top tree is asyndeton (with a unary branching bottom rule): one bottom rule per coordinated XP.
- In the bottom tree, we see N polysyndeton: a different structure (note: mid rule) but with a binary bottom rule to give us one *and* per coordinand.
- Which one to use can be pretty subtle. It depends on whether the coordinator involved is a separate lexical item or some kind of morpheme (or zero).
- Interestingly, the XP-top and XP-mid rules need to **require** not just COORD + on their left children, but specifically that they be XP-bottoms. This kind of thing is ordinarily a no-no, but since we're inside of the coordinated structure, it's OK to constrain it that way.



Implementation (cont'd)

- So far, we've talked about COORD, but what about COORD-REL?
- COORD-REL contains a coordination relation, which has five arguments: its INDEX (event or individual), a left handle and INDEX, and a right handle and INDEX.
- COORD-REL is used to pass the coordination relation one step up the tree to get its left argument. Consider the tree at the right. The lexical item *and* contributes a coordination relation. The XP-bottom constrains the R-HNDL and R-INDEX of that relation to those of the lowest XP, and identifies the relation with COORD-REL. The XP-mid identifies the L-HNDL and L-INDEX of the COORD-REL of its right daughter with the handle and index of its left daughter. It also contributes an *implicit_coord_rel* and places it in COORD-REL.
- Interesting questions: where do the coordination relations come from in asyndeton? N polysyndeton?



Implementation

- Finally, you need to know how you'll use these rules.
- The rules will be factored into general rules you'll derive your rules from. They will include:
 - Phrase rules: top-coord, mid-coord, and unary and binary bottom-coord.
 - Marking rules: optional mono/polysyndeton, N-1 polysyndeton, N polysyndeton, asyndeton.
 - Part of speech rules: a top, mid, and bottom rule for each phrase type. You'll need these even if your language has a single general-purpose *and*, because the semantics and what's identified between coordinands still differs between phrase types.
- You will derive your own part-of-speech-specific rules by multiple inheritance from the above rules, and also add any necessary lexical items (using a provided conj-lex type).

What You'll Need to Know

- How does your language mark coordination?
- How many marks are there in each coordinated structure?
- Does your language have different coordination strategies for different phrase types?
- (Don't worry about AND- vs. WITH-languages—we're all going to pretend we have AND-languages for the purposes of the lab. WITH-language semantics are...interesting.)