Ling 3701H / Psych 3371H: Lecture Notes 11
From Semantics to Comprehension

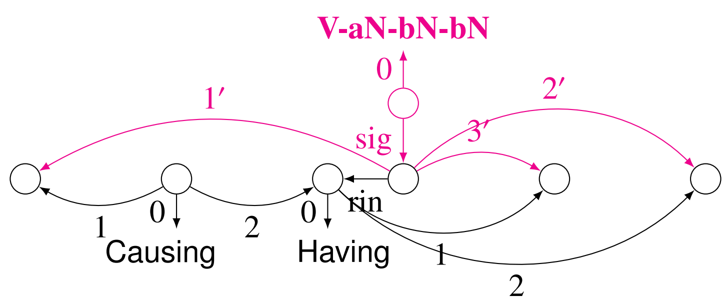
11.1 Signs

So far, we've seen a formal representation of rules that can be used in planning.

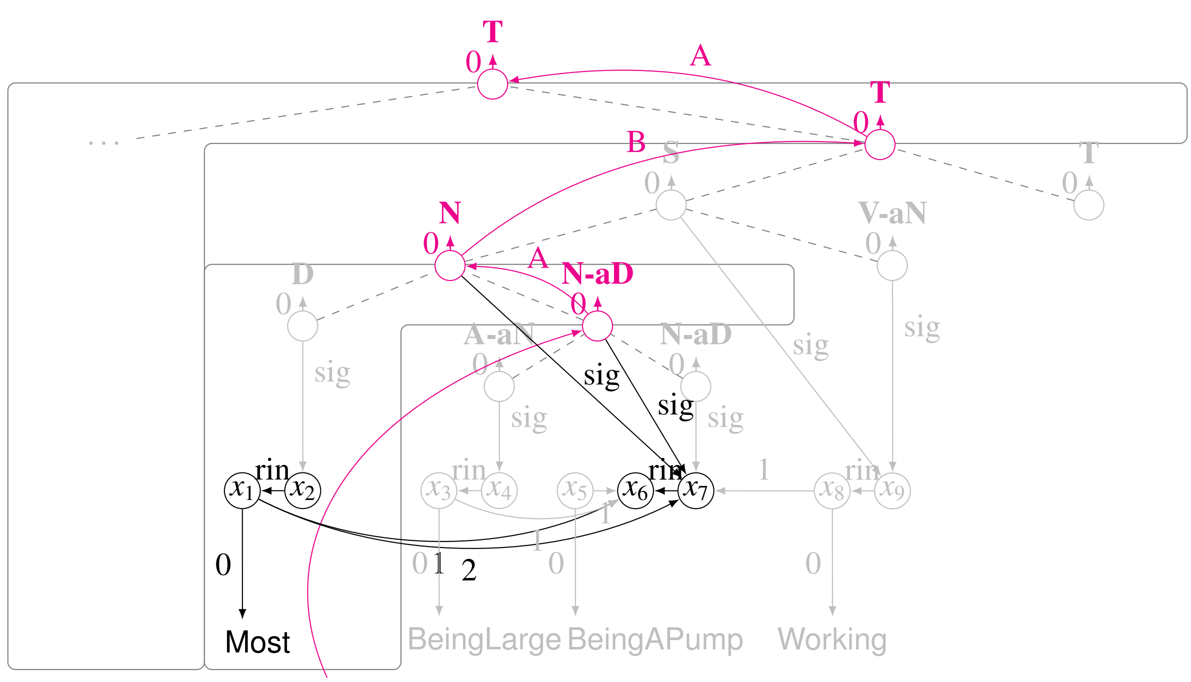
To obtain these from natural language sentences, we'll need to define **signs**, which have:

- **signified** structures (edges labeled sig) – these are our planning rules;
- **syntactic categories** (edges labeled 0) – we've seen these already (**N-aD**, **V-aN**, etc.);
- **syntactic arguments** (labeled 1′, 2′, etc., from signified), connecting semantic arguments;
- **apex/base** associations (labeled A, and B), connecting derivation fragments on the store.

For example, here's a lexical sign for the word *give*, defined to mean *cause to have*:



And here's a store of signs after the word *Most* in the sentence *Most large pumps work*:

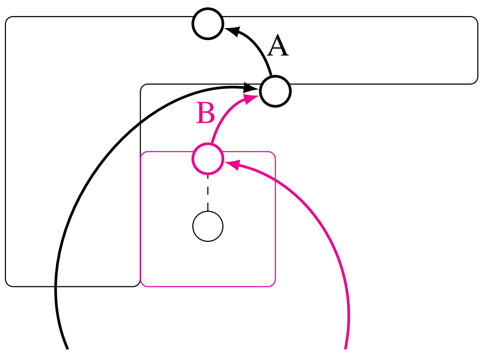


11.2 Processing

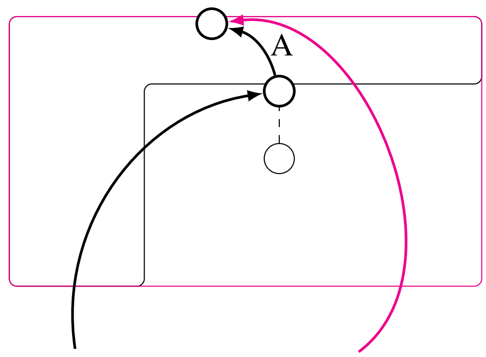
Comprehension proceeds as follows, using simplified pushdown automaton operations:

1. a **lexical** decision is made about whether to **match** store elements at the next word, and a **lexical inference rule** is applied (choose a meaning for the next word).

   (a) no-match (L$\downarrow$):

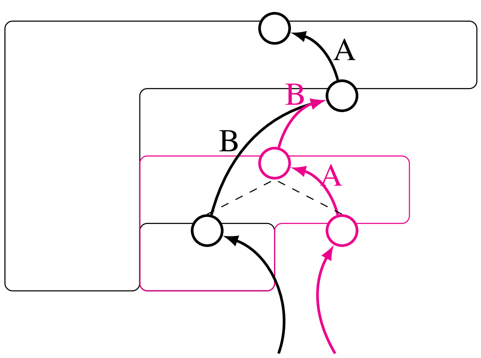


   (b) yes-match (L$\uparrow$):

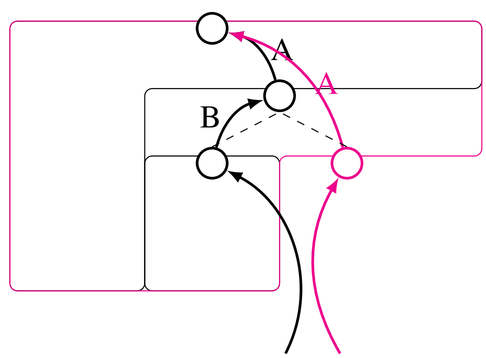


2. a **grammatical** decision is made about whether to **match** store elements at the next rule, and a **grammatical inference rule** is applied (choose a rule to compose the next subtree).

   (c) no-match (G$\downarrow$):



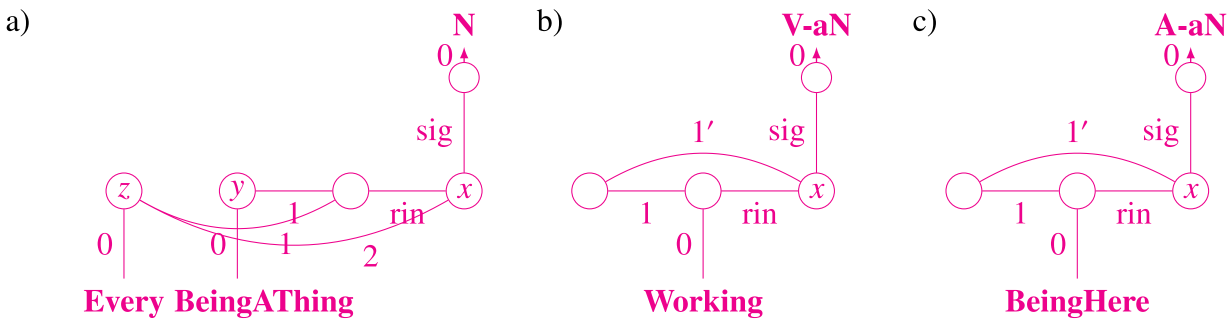
   (d) yes-match (G$\uparrow$):



11.3 Lexical inference rules

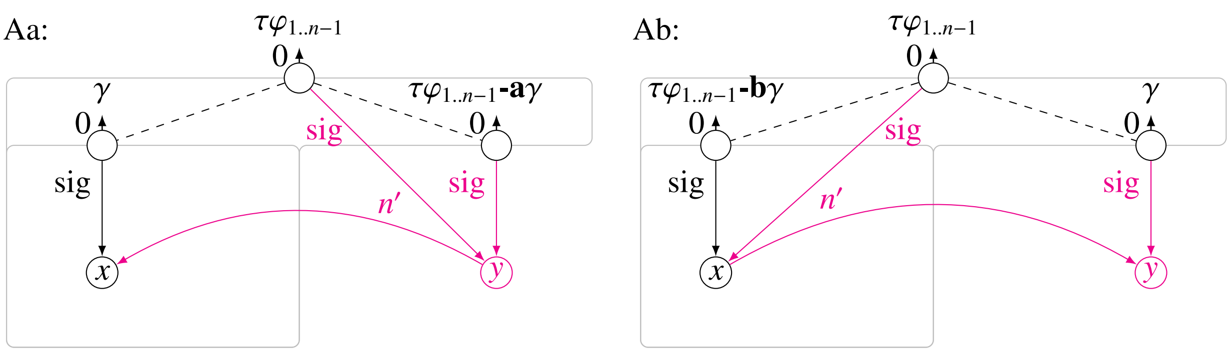
Lexical inference rules add lexical signs.

(Quantified noun ‘everything’ highlights how constraints are applied in modifiers and arguments.)

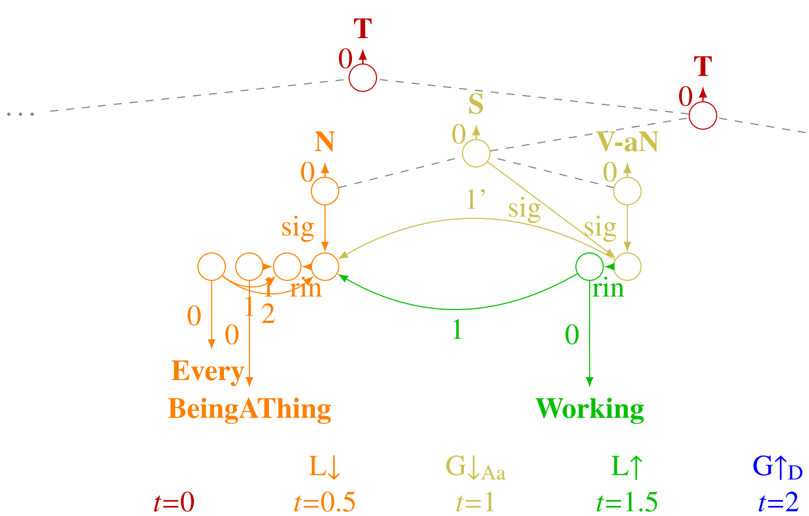


11.4 Grammatical inference rules

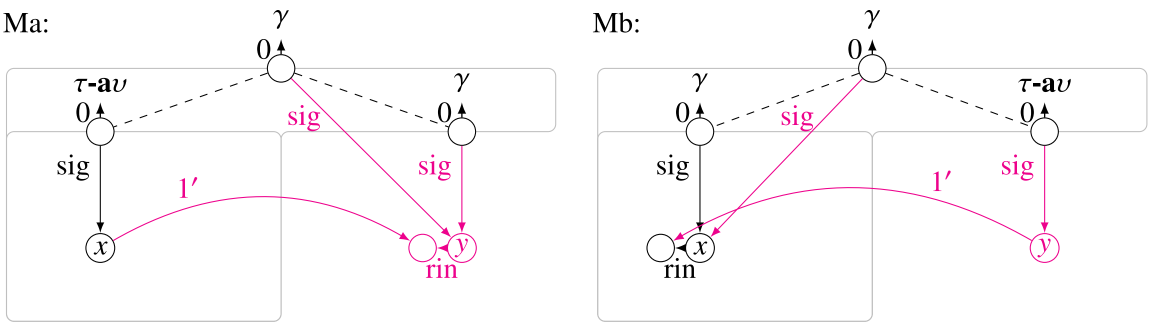
First we need rules to attach arguments:



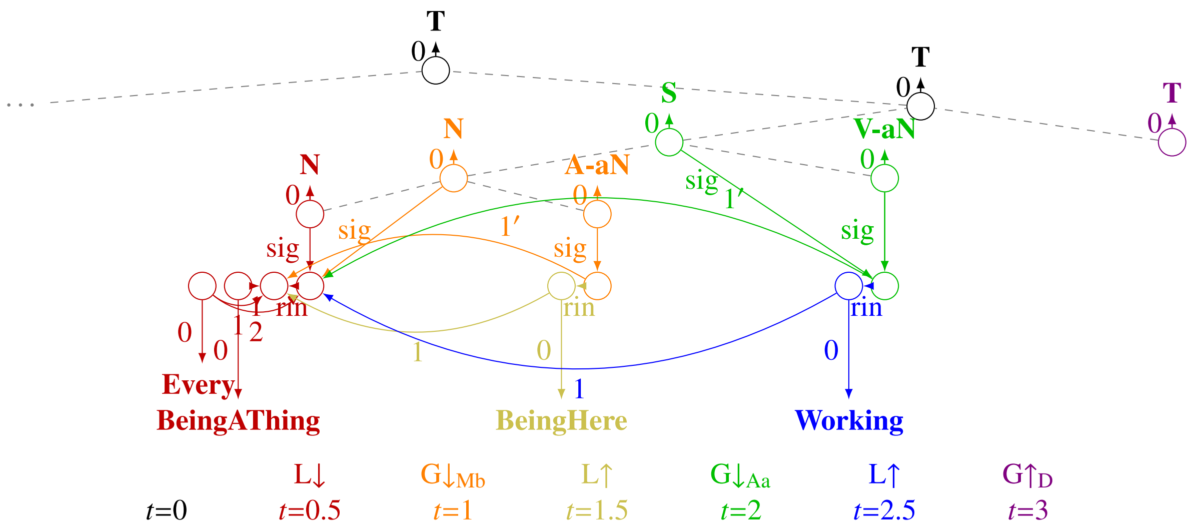
These rules attach constraints to the ‘nuclear scopes’ of the quantified noun phrase:



Then we need rules to attach modifiers:



These rules attach constraints to the ‘restrictors’ of quantified noun phrases:



There are several other rules as well, covered in more detail here:

`https://linguistics.osu.edu/sites/linguistics.osu.edu/files/tech-rept-casp_0.pdf`

References