Scope and binding

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1   Coreference and binding

- QR and LF afford a rich theory of binding, which seems to make basically good predictions down the line:

  1. Quantificational binding: *every woman$_i$ who married her$_i$ prom date was at the reunion* [QR, PA, and apparatus for traces and pronouns predicts possible].

  2. Roofing: *every candidate$_i$ submitted two papers she$_i$ wrote* [inverse-scope reading correctly predicted ungrammatical since it brings the object QP outside the scope of the subject QP].

  3. Binding requires scope: *a member of each committee$_i$ voted to abolish it$_i$* [surface-scope reading correctly predicted ungrammatical since *each committee* can't scope within the subject QP and over the object pronoun].

- **Semantic binding**: α sem-binds β iff α's trace and β co-indexed and c-commanded by a co-indexed abstraction operator.

- Coreference without binding:

  (1) Barack$_i$ came in. He$_i$ sat down.

  (2) Everyone who thinks Clinton$_i$ deserves to win will vote for her$_i$.

1.1   The role of surface c-command

- This picture is fairly unconstrained. However, semantic binding is often assumed to be more tightly regulated by the grammar. In particular, folks often assume that binding is possible only when **surface c-command** obtains.

- **Syntactic binding**: α syn-binds β iff α and β are co-indexed, α is in an A-position and c-commands β (and α doesn't c-command any other expression in an A-position that c-commands and is co-indexed with β).

- **Binding Principle**: There is syntactic binding iff there is semantic binding.

- One consequence: a lot more sem-binding than you might have thought. In the following sentence, *Bill$_4$* syn-binds *he$_4$*, which in turn syn-binds *his$_4$*. Since, per the Binding Principle, there is a one-to-one correspondence between instances of syn- and sem- binding, we'll need a lot more QR and sem-binding than is strictly necessary to assign this string the correct interpretation.

  (3) Bill$_4$ swore he$_4$'d seen a mosquito on his$_4$ arm.

- Of more interest for us today is another prediction, namely that sem-binding is possible only if there is surface c-command! Importantly, the surface c-command constraint really doesn't fall out of the theory without the Binding Principle—though people often talk as if it does.

- Why think this? Weak crossover (WCO):

  (4) *[The shark next to him$_i$] attacked every diver$_i$.

  (5) *[His$_i$ mother] praised no man$_i$.

- Though there is no *semantic* reason that LFs deriving these interpretations should be ruled out, they are correctly ruled out by the Binding Principle: since no surface c-command obtains

- Notice that the Binding Principle imposes a *purely hierarchical* constraint on binding. Precedence's got nothin' to do with it. But can this be correct?

  (6) [[Every boy$_i$]'s mother] praises him$_i$.

  (7) [[[[Every boy$_i$]'s mother]'s aunt]'s granddaughter] praised him$_i$.

  (8) John [$_?$ introduced every man here$_i$] to his$_i$ wife.

  (9) We will [$_?$ sell no wine$_i$] before its$_i$ time.

  (10) I asked to [borrow each book$_i$] before you asked to borrow it$_i$.

- Seems to me there's ample reason to doubt that hierarchy really matters for quantificational binding. See Barker 2013 ("Quantificational Binding Does Not Require C-Command") for a terrific and in-depth discussion.

- It's difficult to test the other prong of the Binding Principle with respect to precedence—namely what happens when there is no precedence but there is c-command. Would that we could!

1.2 Binding and the Binding Theory

- Syntactic binding is the sort of binding relevant for stating principles of the Binding Theory:

  Condition A: reflexives must be locally syn-bound.

  Condition B: non-reflexive pronouns mustn't be locally syn-bound.

  Condition C: referring expressions mustn't be syn-bound.

- But the situation is more complicated than these principles let on. Suppose we had an assignment function g such that $g(2) =$ Simon. Then the following LFs derive illicit interpretations, even though they do not disrespect the principles of the Binding Theory. This is known as the problem of **"accidental" coreference**.

  (11) He$_2$ praised Simon.

  (12) Simon praised him$_2$.

- Reinhart influentially proposes: if there's an LF with binding, you have to use it. Thus, both of the above are impossible because there is an LF of the form [Simon [2 t$_2$ praised himself$_2$]] with binding and the same meaning (which corresponds, of course, to the grammatical surface string *Simon praised himself*).

2 Covert binding

2.1 Ellipsis

- Coreference *or* binding? Sometimes hard to pick apart or imagine what the difference would amount to.

S
S   CoordP
John Λ   and S
1 νP   Bill Λ
t_1 VP   2 νP
likes DP t_2 VP
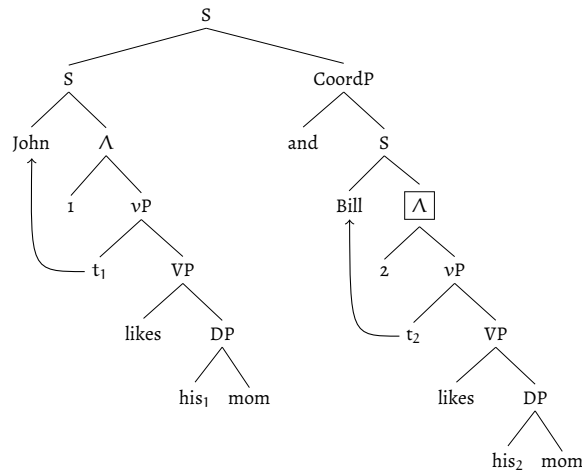his_1 mom   likes DP
his_2 mom

Figure 1: LF for the sloppy reading of *John likes his mom, and Bill does too.*

- With or without the Binding Principle, we predict that sentences like *John likes his mom* have multiple LFs with the same semantic upshot. One with binding and one with simple coreference. Turns out that **ellipsis** gives some evidence that this is correct.

- Some background on ellipsis. It's usually taken to involve some sort of identity relation (either syntactic or semantic) between antecedent and unpronounced VPs. Reasons for this include that ambiguity is generally resolved the same way across ellipses, as are pronominal interpretations and scope ambiguities:

  (13) I went to the bank, and then you did.

  (14) I like him, but you don't.

  (15) I gave a book to every child, and Bill did too.

- One way to think about what happens here: the antecedent VP is somehow "copied into" the elided VP's position and left unpronounced.

- A slightly more precise characterization of the **Condition on Ellipsis**: a constituent can be deleted (i.e. unpronounced at PF) iff there is an LF with the same interpretation.

- Exercise: see how this applies to previous examples (esp quantificational ones! think: VP-internal subjects!).

- Datum: the following is ambiguous! Can either mean that Bill likes John's mom, or that Bill likes *Bill*'s mom.

  (16) John$_i$ likes his$_i$ mom, but Bill$_j$ really doesn't ~~like his$_{i/j}$ mom~~.

- How can this be so, given the Condition on Ellipsis? In fact, our theory predicts exactly this, and it provides evidence that binding happens in these cases, even if it doesn't need to in order to derive the correct interpretation. See Figure 1.

- Bare argument ellipsis example. Again predicted possible. See Figure 2 (ignoring VP-internal subjects).

  (17) Laura drank the milk, or perhaps the juice.

- An over-generation worry:

  (18) *On Roman$_i$'s birthday, Philipp went to his$_i$ office. Marcel$_j$ didn't ~~go to his$_j$~~ office.

S
S · CoordP
the milk · ∧ · or · S
1 · S · perhaps · S
Laura · VP · the juice · ⟨∧⟩
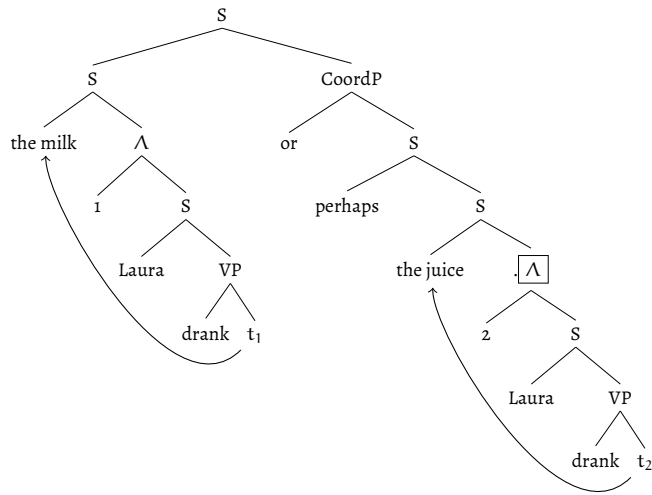drank t₁ · 2 · S
Laura · VP
drank t₂

Figure 2: LF for the sloppy reading of *Laura drank the milk, or perhaps the juice.*

- H&K: "Unfortunately, however, there is another possible LF which we do not yet exclude and which also expresses one of the unavailable readings.". Namely, an LF where the overt and elided pronouns are accidentally co-indexed.

- Solution: "No LF representation (for a sentence or multisentential text) must contain both bound occurrences and free occurrences of the same index."

- What about strict readings? Are they inconsistent with the preference for binding?

2.2 ACD

- Elliptical constructions like the following are known as ACD (short for "antecedent-contained deletion"):

(19) John read everything Bill did.

- But where is the antecedent in ACD constructions? Copying the VP here into the silent slot *e* would create another copy of *e*! And so on, ad infinitum: we end up with an infinite regress.

S
John · VP
read · DP
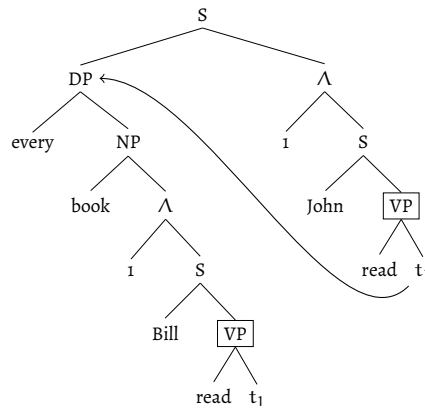every · NP
book · ∧
1 · S
Bill · e
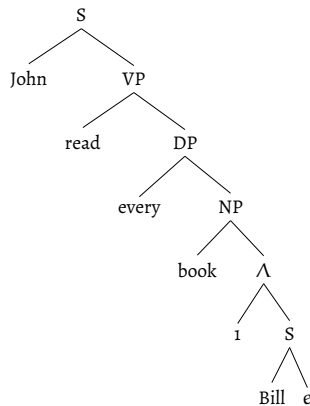
- Notice that this argument presupposes that ACD is really a species of VP ellipsis. That isn't obvious from the get-go. It could be that we're just copying the transitive verb *read* into the ellipsis site, rather than elided an entire VP.

- But there are countervailing forces that make this approach less than plausible. For one, the antecedent can be complex. For another, the antecedent can be discontinuous!
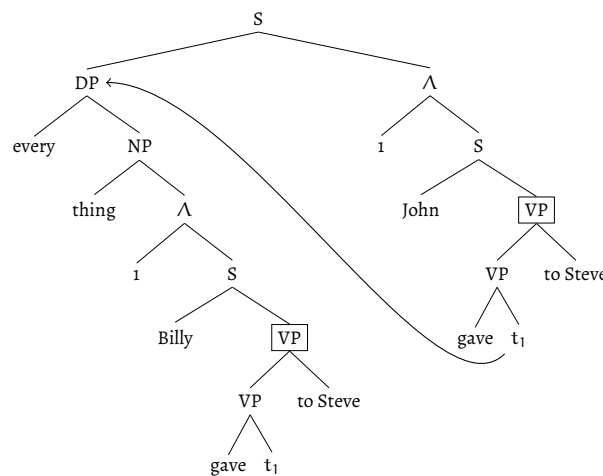
(20) Mary wanted to read everything Billy did.

(21) Mary gave everything Billy did to Steve.

- The answer is in fact already given by our general framework: the antecedent to the VP exists not on the surface, but at LF! That is, QRing the object DP creates a configuration in which the antecedent and elliptical VPs are "identical enough":

```
                          S
              ┌───────────┴───────────┐
            DP ←                       Λ
         ┌────┴────┐              ┌─────┴─────┐
       every      NP             1           S
              ┌────┴────┐               ┌─────┴─────┐
            book        Λ             John        [VP]
                   ┌─────┴─────┐              ┌─────┴─────┐
                   1           S            read        t₁
                          ┌─────┴─────┐
                        Bill        [VP]
                               ┌─────┴─────┐
                             read        t₁
```

- The trace in the object DP's relative clause corresponds to the trace in the VP left behind by the QR'd object. Antecedent containment is resolved, and there is no problem of an infinite regress.

- Here, I have chosen the *same index* for both VPs. An incredibly vexed question: does this really matter? Could I have chosen one set of indices for the relative clause and another set for the sister of the QR'd DP? This would plainly yield the correct interpretation, but would ellipsis be licensed in that case?? (Recall that pronouns cannot in general vary between antecedent and elided VPs.)

- Notice that this solution also allows us to assemble complex and discontinuous predicates for ACD to target. Here is an example with a discontinuous antecedent:

```
                          S
              ┌───────────┴───────────┐
            DP ←                       Λ
         ┌────┴────┐              ┌─────┴─────┐
       every      NP             1           S
              ┌────┴────┐               ┌─────┴─────┐
            thing       Λ             John        [VP]
                   ┌─────┴─────┐              ┌─────┴─────┐
                   1           S             VP        to Steve
                          ┌─────┴─────┐         ┌────┴────┐
                        Billy       [VP]      gave       t₁
                               ┌─────┴─────┐
                              VP        to Steve
                          ┌────┴────┐
                        gave       t₁
```

- In fact, something like this picture (i.e. where the relevant identity relation holds at LF/has access to something closer to meanings than what the surface provides) was already suggested by an earlier example, where scope relations between quantifiers in the VP had to stay constant between antecedent and elided VPs.

- Thus, our theory is *consistent with* ACD. Can we find additional evidence that our proposal for ACD is *correct*? Indeed, we can. Consider the following:

  (22) My mom told me to read everything my teacher did.

- This construction is ambiguous. It can mean that my mom told me "read everything your teacher read". Call this a "low" reading. Alternatively, it can mean that the things my mom and teacher told me to read were the same. Call this the "high" reading.

- We are interested in the high reading, which doesn't implicate the teacher in the mom's thoughts. In other words, on the low reading, my mom might have told me something that has to do with my teacher. However, the high reading can make no such claim. The teacher cannot be implicated in what my mom told me (or at least, what's claimed about what my mom told me).

- Consider in this light the following two structures:
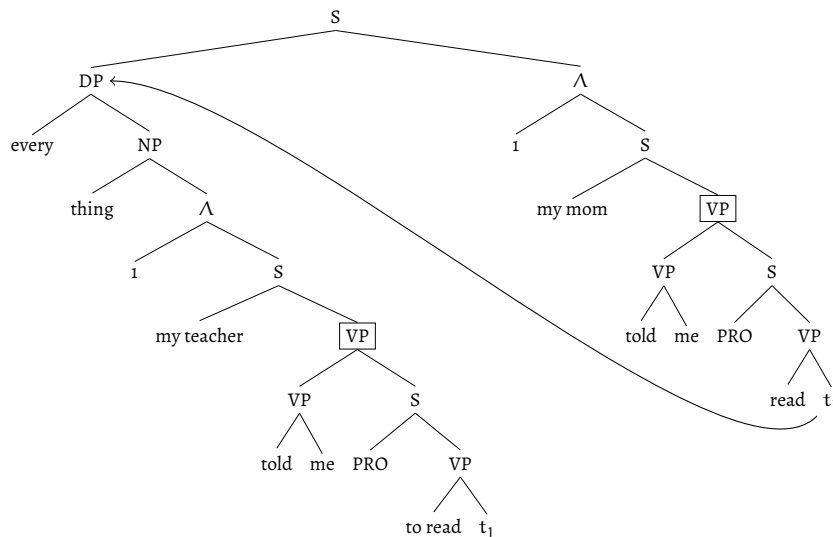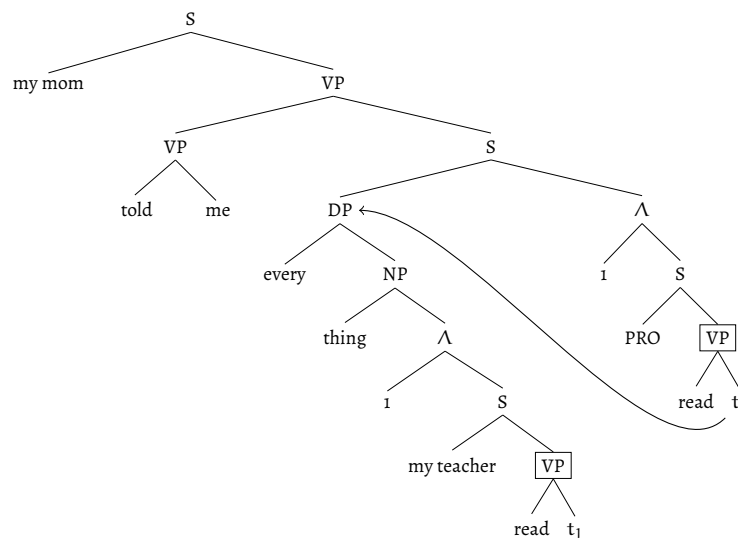
- We do not have the tools we need to give a semantics for verbs like *told*, but these trees still make the point. On the low ACD reading, it's possible for the QR'd DP to be within the scope of *told*. On the high ACD reading, it's

impossible for the QR'd DP to be within the scope of *told*: to resolve antecedent containment on the high reading, we have to QR the DP over *told*.

- Thus, the QR theory of ACD predicts that the high reading is incompatible with *my teacher* being within the scope of *told*! This fits the data perfectly.

- Generalized versions of ACD, extends to adverbial modifiers(!):

  (23) Room 1 wants to have dinner before Room 2 does.

- As with the previous case, this sentence is ambiguous. On the "low" reading, Room 1's desire can be of the form "to have dinner before Room 2 has dinner". As before, however, on the high reading, Room 1's desire may be of the form "to have dinner at 6PM" (and Room 2's desire may be of the form "to have dinner at 7PM"); on this reading, Room 1's desire does not implicate Room 2 in any way.

2.3 Deaccenting

- Foregoing focal stress:

  (24) John went to the park, and then BILL *went to the park*.
  (25) John introduced a dean to every professor, and then MARY *introduced a dean to every professor*.

- Seems to require that varying the focus leads to something semantically identical with an antecedent. That is, just like in elliptical constructions, ambiguity doesn't multiply in deaccenting constructions.

  (26) #John went to the park, and then BILL *went to the zoo*.

- There is an additional subtlety here not present in ellipsis. Deaccenting is acceptable to the extent that we can accommodate an entailment relationship between the antecedent and alternative:

  (27) First Bill called John a Republican, and then SUE *insulted him*.

- Again, we see a need for binding.

  (28) John said Sam likes Bill, and then MARY said *he likes him*.

- Compare:

  (29) #John thinks Bill's smart, but *he* DOESN'T *think Sam's smart*.
  (30) #John said he likes Bill, and then MARY *said she likes Sam*.

2.4 *Only* quantification

- The following is ambiguous. It can either mean that John was the only person who was asked a question that John understood (a rather unlikely set of truth conditions), or that John was the only x such that x was asked a question that x understood.

  (31) Only John was asked a question he understood.

- Again, we can tie this to a difference in LFs, quite analogously to how the strict-sloppy ambiguity was derived.

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2.5 Some more predictions

- When scope (that is, LF c-command) is impossible, binding and therefore sloppy identity should be impossible.

- Good: WCO. The following is claimed to lack a sloppy interpretation:

(32) His father spoils Roman, but not Felix.

- Good-ish(?): reflexives. Binding Theory requires syntactic binding. In turn, this requires semantic binding. Therefore, prediction is only sloppy identity is possible. (Something similar goes for many-clauses.)

(33) John cites himself often, but Bill doesn't.

- Bad: rebinding predicted impossible:

(34) Bill$_i$ says Mary likes him$_i$. John$_j$ says she doesn't ~~like him$_j$~~.

- Bad: surface c-command incorrectly predicted necessary. Even if we ditch the syn-sem-binding link, there's a problem with scope island cases such as (36), where it seems impossible to even establish LF c-command.

(35) John's mom pays for him. Bill's mom doesn't.
(36) The cop who arrested John insulted him. The cop who arrested Bill didn't.
(37) A: I heard that Bill's mom thinks he's too dumb to compete.
     B: No, only JOHN$_i$'s mom thinks he$_i$'s too dumb to compete.

- Predicts lexical material in ellipsis site should be a non-starter for sloppy readings (since sloppy ellipsis requires binding). This seems tough to square with other data:

(38) If you forgot your visa, you can get a new one ~~visa~~ at the embassy.
     If you forgot your passport, you probably can't ~~get a new passport at the embassy~~.
(39) When John has to cook, he doesn't want to ~~cook~~.
     When he has to clean, he doesn't ~~want to clean~~ either.