CAS LX 522
Syntax I

7

Binding theory, NPIs, c-command
(4.3)

Mary saw him

- A pronoun like *him* refers to somebody in (our mental model of) the world.

- A pronoun refers to somebody or something that's been part of the conversation, or that you are pointing at.

- When you hear a pronoun and want to interpret it, you have to resolve its reference.

John arrived.
Mary saw him.

- Here, *him* is likely to refer to John.

- Though we could be pointing at Bill, in which case *him* refers to Bill.

- The person who *hears* this has to figure it out.

- The person who *says* this knows who they meant.

- And had the grammar that generated the sentence.

Indices

- To describe what the speaker intended (that is, which sentence the speaker actually used), we use an *index* on each referent.

  1) John$_i$ arrived. Mary$_j$ saw him$_i$.

  2) John$_i$ arrived. Mary$_j$ saw him$_k$.

- The index represents what you are "pointing at" (perhaps just mentally).

- Two noun phrases that share an index *necessarily* share the same reference. They are coreferential.

Seeing him in the mirror

- Regard: Ike$_i$, Jim$_j$, Kristin$_k$.

  1) There's Ike$_i$. Kristin$_k$ saw him$_j$ in the mirror.

  2) There's Jim$_j$. Kristin$_k$ saw him$_j$ in the mirror.

  3) There's Ike$_i$. Jim$_j$ saw him$_i$ in the mirror.

  4) There's Jim$_j$. *Jim$_j$ saw him$_j$ in the mirror.

- What's wrong with that last one?

Seeing himself in the mirror

- Right, ok. Jim$_j$ saw *himself$_j$* in the mirror.

- For some reason, when *Jim* is the subject and *him* is an object, *him* can't refer to *Jim*. Furthermore:

  1) Jim$_j$'s father$_k$ saw him$_{i/j/*k}$ in the mirror.

  2) Jim$_j$'s father$_k$ saw himself$_{k/*j/*i}$ in the mirror.

  3) Jim$_j$'s father$_k$ said that Mary$_m$ saw him$_{i/j/k}$ in the mirror.

  4) Mary$_m$ introduced Jim$_j$ to him$_{i/*j}$.

  5) Mary$_m$ introduced Jim$_j$'s father$_k$ to him$_{i/j/*k}$.

Binding Theory

- **Binding Theory** consists of three Principles that govern the allowed distribution of NPs.

- Pronouns: *he, her, it, she, ...*
- Anaphors: *himself, herself, itself, ...*
- R-expressions: *Pat, the student, ...*

R-expressions and anaphors

- R-expressions are NPs like *Pat*, or *the professor*, or *an unlucky farmer*, which get their meaning by referring to something in the world. Most NPs are like this.

- An anaphor does *not* get its meaning from something in the world—it depends on something else in the sentence.

  1) John saw himself in the mirror.

  2) Mary bought herself a sandwich.

Pronouns

- A pronoun is similar to an anaphor in that it doesn't refer to something in the world but gets its reference from somewhere else.

  1) John told Mary that he likes pizza.

  2) Mary wondered if she agreed.

- ...but it doesn't *need* to be something in the sentence.

  1) Mary concluded that he was crazy.

Constraints on coreference

  1) John$_i$ saw himself$_i$.

  2) *Himself$_i$ saw John$_i$.

  3) *John$_i$'s mother saw himself$_i$.

- It is impossible to assign the same referent to *John* and *himself* in the (2) and (3). What is different between the good and bad sentences?

John's mother

- *John's mother* is an NP.

  1) [John's mother]$_i$ saw herself$_i$.

  2) She saw John.

- But it's an NP that is made up of smaller pieces (*John's* and *mother*).

- So what is the internal structure of the NP *John's mother*?

[$_{NP}$ John's mother]

- Remember that pronouns come in three distinguishable forms (in English):
  - *I, he, she*   nominative
  - *Me, him, her*   accusative
  - *My, his, her*   genitive

- The genitive case forms seem to have pretty much the same kind of "possessive" meaning that *John's* does.

- So, let's suppose that *John's* is the genitive case form of *John*.

[NP John's mother]

- Another point about *John's mother* is that it seems that the head should be *mother*.

- *John's* sort of modifies *mother*.

- Sort of like an adjective does… sort of like an adverb does for a verb…

- Let's suppose that *John's* is just adjoined to the NP *mother*.

  - Only for now! To be revised in ch. 7.
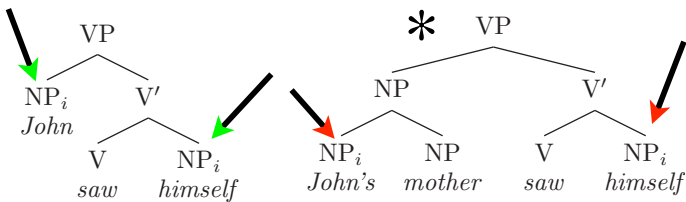
  - This is kind of hard to draw clearly.

NP_j
NP_i NP_j
John's *mother*
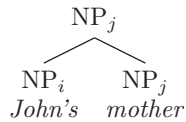
Command domains

- What is the difference between the relationship between *John* and *himself* in the first case and in the second case?

VP
NP_i V′
John
V NP_i
saw *himself*

∗ VP
NP V′
NP_i NP V NP_i
*John's* *mother* *saw* *himself*
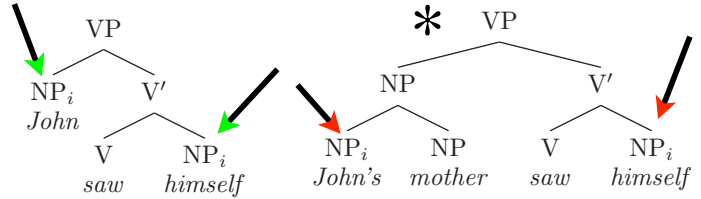
Command domains

- We think of the position that *John* occupies in in the first tree as being a position from which it "commands" the rest of the tree. It is hierarchically superior in a particular way. (Really, "non-inferior")

VP
NP_i V′
John
V NP_i
saw *himself*

∗ VP
NP V′
NP_i NP V NP_i
John's *mother* *saw* *himself*

Tree relations

A
B C
D E

- A node X c-commands its sisters and the nodes dominated by its sisters.

  - B c-commands C, D, E.

  - D c-commands E.

  - E c-commands D.

  - C c-commands B.
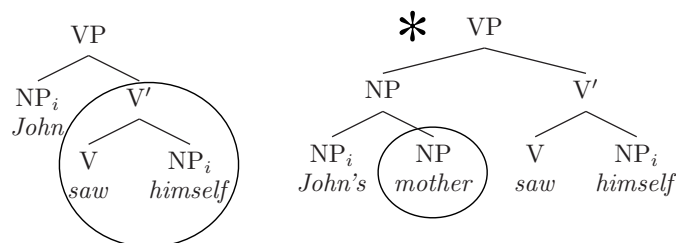
  - A c-commands nothing.
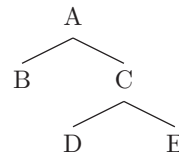
C-command domains

- So, again, what is the difference between the relationship between *John* and *himself* in the first case and in the second case?

VP
NP_i V′
John
V NP_i
saw *himself*

∗ VP
NP V′
NP_i NP V NP_i
John's *mother* *saw* *himself*
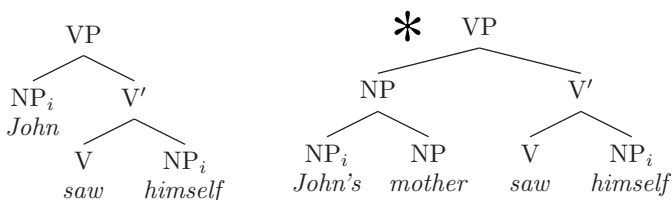
C-command domains

- In the first case, the NP *John* c-commands the NP *himself*. But not in the second case.

VP
NP_i V′
John
V NP_i
saw *himself*

∗ VP
NP V′
NP_i NP V NP_i
John's *mother* *saw* *himself*

Binding

A binds B iff ← *"if and only if"*

- A c-commands B
- A is coindexed with B

VP
 NP$_i$ (*John*) — V'
  V (*saw*) — NP$_i$ (*himself*)

* VP
 NP — V'
  NP$_i$ (*John's*) — NP (*mother*)
  V (*saw*) — NP$_i$ (*himself*)
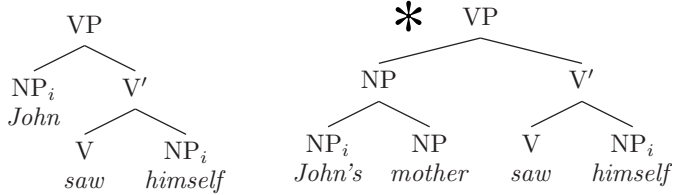
Principle A

Principle A of the Binding Theory (preliminary)
An anaphor must be bound.

VP
 NP$_i$ (*John*) — V'
  V (*saw*) — (NP$_i$ *himself*)

* VP
 NP — V'
  NP$_i$ (*John's*) — NP (*mother*)
  V (*saw*) — (NP$_i$ *himself*)
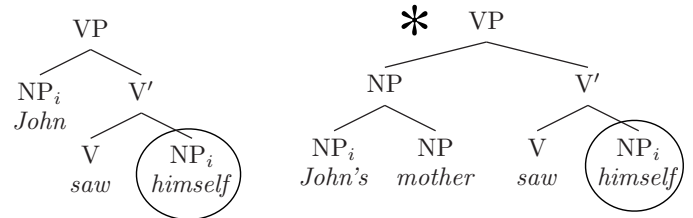
A is for anaphor? That's good enough for me.

Principle A

- We now know why these are ungrammatical too:

  1) *Himself$_i$ saw John$_i$ in the mirror.

  2) *Herself$_i$ likes Mary$_i$'s father.

  3) *Himself$_i$ likes Mary's father$_i$.

  - There is nothing that c-commands and is coindexed with *himself* and *herself*.

  - The anaphors are not bound, which violates Principle A.

Binding domains

- But this is not the end of the story; consider

  1) *John$_i$ said that himself$_i$ likes pizza.

  2) *John$_i$ said that Mary called himself$_i$.

- In these sentences the NP *John* c-commands and is coindexed with (=binds) *himself*, satisfying our preliminary version of Principle A—but the sentences are ungrammatical.

Binding domains

  1) John$_i$ saw himself$_i$ in the mirror.

  2) John$_i$ gave a book to himself$_i$.

  3) *John$_i$ said that himself$_i$ is a genius.

  4) *John$_i$ said that Mary dislikes himself$_i$.

- What is wrong? *John* binds *himself* in each case. What is different?

- In the ungrammatical cases, *himself* is in an embedded clause.

Binding domains

Principle A of the Binding Theory (revised)
An anaphor must be bound in its binding domain.

Binding Domain (preliminary)
The binding domain of an anaphor is the smallest clause containing it.

- It seems that not only does an anaphor need to be bound, it needs to be bound nearby (or locally).

Pronouns

1) *John$_i$ saw him$_i$ in the mirror.

2) John$_i$ said that he$_i$ is a genius.

3) John$_i$ said that Mary dislikes him$_i$.

4) John$_i$ saw him$_j$ in the mirror.

- How does the distribution of pronouns differ from the distribution of anaphors?

- It looks like it is just the *opposite*.

Principle B

Principle B of the Binding Theory
A pronoun must be free in its binding domain.

Free
Not bound

1) *John$_i$ saw him$_i$.

2) John$_i$'s mother saw him$_i$.

B is for bpronoun, that's good enough for me.

Principle C

- We now know where pronouns and anaphors are allowed. Consider the following.

- *Stuart$_i$ saw him$_i$ in the mirror.
- Stuart$_i$'s mother saw him in the mirror.
- *He$_i$ saw Stuart$_i$ in the mirror.
- His$_i$ mother saw Stuart$_i$ in the mirror.

Principle C

- What's going wrong with these sentences? The pronouns are unbound as needed for Principle B. What are the binding relations here?

- *He$_i$ likes John$_i$.
- *She$_i$ said that Mary$_i$ fears clowns.
- His$_i$ mother likes John$_i$.
- His$_i$ mother said that John$_i$ fears clowns.

Principle C

- Binding is a means of assigning reference.

- R-expressions have intrinsic reference; they can't be assigned their reference from somewhere else.

- R-expressions can't be bound, at all.

Principle C of the Binding Theory
An R-expression must be free.

C is for r-eCspression, that's... oh, never mind.

Binding Theory

Principle A
An anaphor must be bound in its binding domain.

Principle B
A pronoun must be free in its binding domain.

Principle C
An R-expression must be free.

Binding
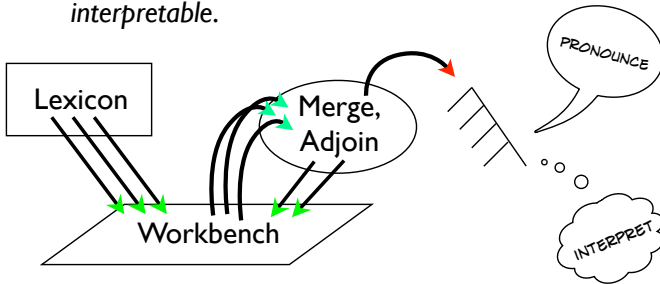X binds Y iff X c-commands Y and X and Y are coindexed (a.k.a.:"Y is bound by X").

Free
Not bound

Binding Domain
The binding domain of an anaphor is the smallest clause containing it.

Constraints on interpretation

- Binding Theory is about interpretation.
- Only a structure that satisfies Binding Theory is *interpretable*.

Lexicon → Workbench → Merge, Adjoin → PRONOUNCE / INTERPRET

Constraints on interpretation

- If we put together a tree that isn't interpretable, the process (derivation) is sometimes said to **crash**.

Lexicon → Workbench → Merge, Adjoin → PRONOUNCE / INTERPRET
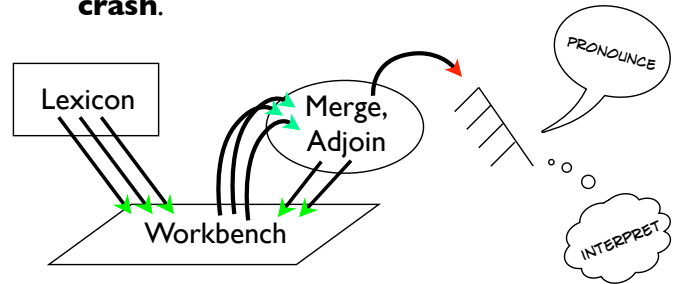
Constraints on interpretation

- If we succeed in putting together a tree that is interpretable (satisfying the constraints), we say the process (derivation) **converges**.

Lexicon → Workbench → Merge, Adjoin → PRONOUNCE / INTERPRET
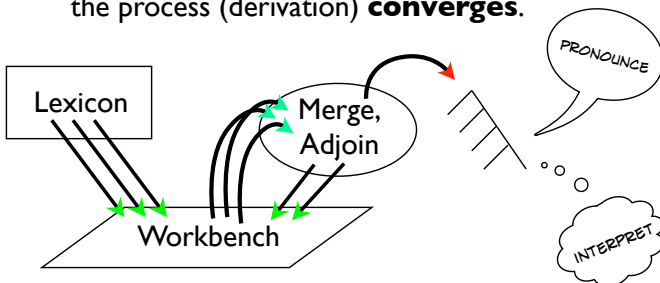
I hadn't seen anyone ever lift a finger yet.

1) Pat didn't invite anyone to the party.
2) Pat does not know anything about syntax.
3) Pat hasn't ever been to London.
4) Pat hasn't seen *Forrest Gump* yet.
5) Pat didn't lift a finger to help.
6) Pat didn't have a red cent.
7) *Pat invited anyone to the party.
8) *Pat knows anything about syntax.
9) *Pat has ever been to London.
10) *Pat has seen *Forrest Gump* yet.
11) *Pat lifted a finger to help.
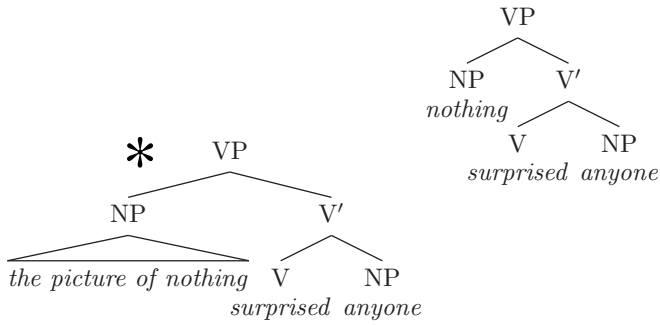12) *Pat had a red cent.

Licensing

- NPIs (Negative Polarity Items) are permitted, given "license to appear" by a negative expression. Without a licensor, an NPI is not possible.
  1) John didn't invite Mary/anyone to the party (, did he?)
  2) John invited Mary/*anyone to the party (, didn't he?)
  3) Nobody invited Mary/anyone to the party (, did they?)

- NPIs are licensed by negation in a sentence.

Negative Polarity Items

- But it isn't quite as simple as that. Consider:
  1) I didn't see anyone.
  2) *I saw anyone.
  3) *Anyone didn't see me.
  4) *Anyone saw me.

- It seems that simply having negation in the sentence isn't *by itself* enough to license the use of an NPI.

- Negation has to precede the NPI?
  5) *The picture of nobody pleased anyone.

Negative Polarity Items

```
                              VP
                          ┌────┴────┐
                         NP         V′
                       nothing    ┌──┴──┐
                                  V      NP
                              surprised  anyone

        *       VP
            ┌───┴────┐
           NP        V′
        ┌───┴───┐  ┌──┴──┐
 the picture of nothing  V    NP
                     surprised  anyone
```

Pondering some apparent early disobedience

- Young kids (5-6 years) seem to accept sentences like (1) as meaning what (2) means for adults.

  1) Mama Bear is pointing to her.

  2) Mama Bear is pointing to herself.

- Suppose that, contrary to appearances, kids *do* know and obey Principle B. Look carefully at the definitions of Binding Theory. If Principle B isn't the problem, what do you think kids are getting wrong to allow (1) to have the meaning of (2)?

- Think in particular about how you decide which index to assign to *her*. What is the implication of having the same index? What is the implication of having different indices?