Binding Theory

Describing Relationships between Nouns

(slides by Andrew Carnie)

Binding Theory

- Describes the conditions on the structural relations between nouns.

- Concerned with three types of nouns:
  - R-expressions (proper names, common nouns)
  - Pronouns. (he, she, it, his, one, them, him etc)
  - Anaphors. (eg. himself, herself, themselves)

- These NPs are semantically□ distinct, but they also have different syntactic distributions.

R-expressions

- Express content

- An NP that gets it meaning by referring to an entity in the world.

- e.g. Bill Clinton, Travis, The woman in the blue suit, a teddy bear, purple shoes.

Anaphors

- An NP that obligatorily gets its meaning from another NP in the sentence.

- <u>Heidi</u> bopped <u>herself</u> on the head with a zucchini

- myself, yourself, himself, herself, itself, oneself, ourselves, yourselves, themselves, each other.

Pronouns

- *Pronoun*: An NP that may (but need not) get its meaning from another word in the sentence. It can also get its meaning from a noun previously mentioned in the discourse, or by context.

- Art said that he played basketball
  - Art said that Art played basketball
  - Art said that David played basketball

- I, me, you, he, him, she, her, it, one, we, us, they, them, his, her, our, my, its, your, their.

Antecedent

☐ *Antecedent:* An NP that gives its meaning to a pronoun or anaphor.

☐ Heidi bopped herself on the head with a zucchini

antecedent   anaphor

Indexing

- Means of representing the meaning of an NP
- Each index (plural: indices) represents a different reference.

      a) [Colin]$_i$ gave [Andrea]$_j$ [a basketball]$_k$

      b) [Art]$_i$ said that [he]$_j$ played [basketball]$_k$ in [the dark]$_l$

      c) [Art]$_i$ said that [he]$_i$ played [basketball]$_k$ in [the dark]$_l$

      d) [Heidi]$_i$ bopped [herself]$_i$ on [the head]$_j$ with [a zucchini]$_k$

- Start at the left and assign each NP an index starting with $_i$ and working down the alphabet.

Co-indexing & Co-reference
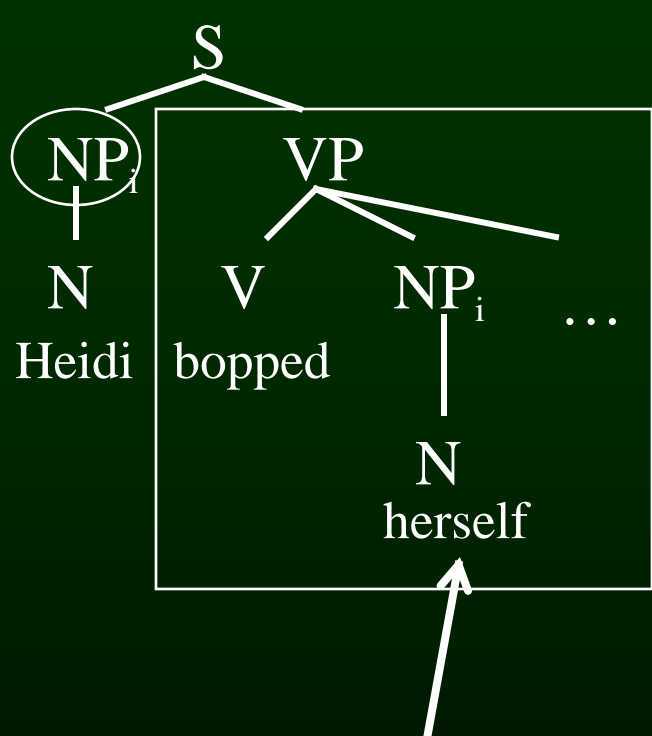
□ Two NPs that have the same index are said to be co-indexed.

□ Two NPs that are co-indexed are said to co-refer (that is, refer to the same entity in the world)

    a) $[Art]_i$ said that $[he]_j$ played $[basketball]_k$ in $[the\ dark]_l$

    b) $[Art]_i$ said that $[he]_i$ played $[basketball]_k$ in $[the\ dark]_l$
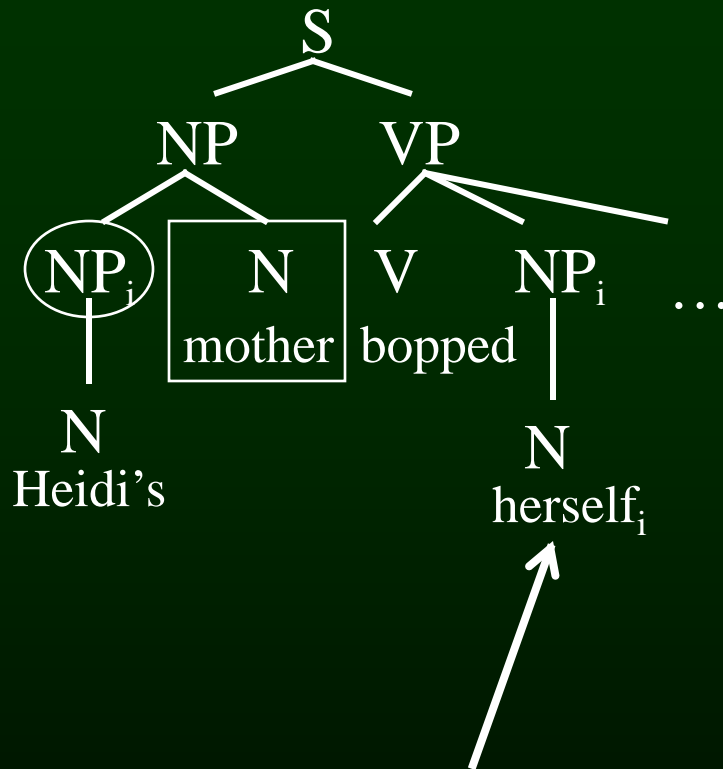
Syntactic Restrictions on Anaphors

□ Heidi$_i$ bopped herself$_i$ on the head with a zucchini:

□ [Heidi$_i$'s mother]$_k$ bopped herself$_k$ on the head with a zucchini.

□ *[Heidi$_i$'s mother]$_k$ bopped herself$_i$ on the head with a zucchini.

The antecedent for an anaphor can be the subject of the sentence, but not an NP *inside* the subject.

let's look at this distinction in terms of structural relations

S

NP$_i$ VP

N   V   NP$_i$ …

Heidi   bopped

N

herself

C-commanded by NP

S

NP   VP

NP$_i$ N   V   NP$_i$ …

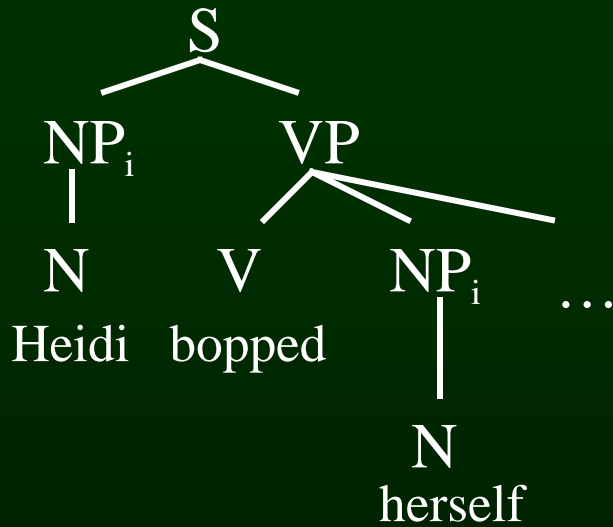mother   bopped

N   N

Heidi's   herself$_i$

Not C-commanded by NP

Binding

☐ This fact is captured by binding.

☐ *Binds*:

   ☐ A binds B if and only if

   ☐ A c-commands B *AND*

   ☐ A and B are co-indexed.

☐ Note: binding is not the same as co-indexing!!! (co-indexing has same index; binding requires a c–command relationship between the co-indexed elements.)

☐ Binding is a SPECIAL kind of c-command. It is c-command with co-indexing.
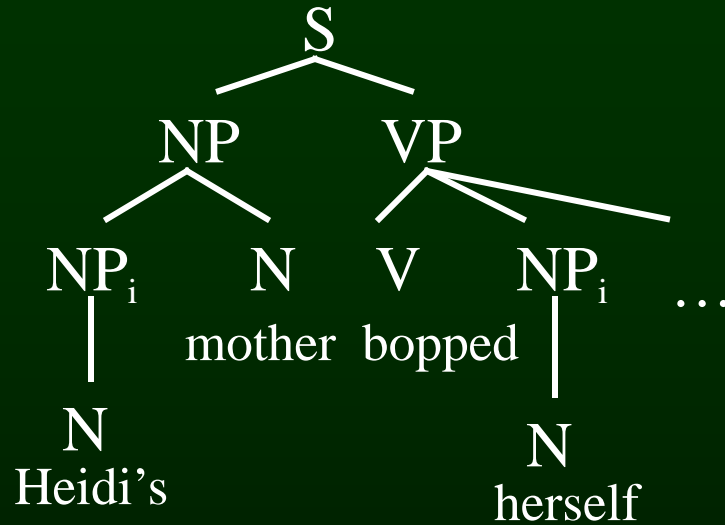
The Principle that deals with anaphors

- Principle A (to be revised): An anaphor must be bound

- In English: An anaphor must be c-commanded and co-indexed by an antecedent.

Tree 1

S
- NP$_i$
  - N
    - Heidi
- VP
  - V
    - bopped
  - NP$_i$
    - N
      - herself
  - …

Tree 2

S
- NP
  - NP$_i$
    - N
      - Heidi's
  - N
    - mother
- VP
  - V
    - bopped
  - NP$_i$
    - N
      - herself
  - …

Coindexed?   yes
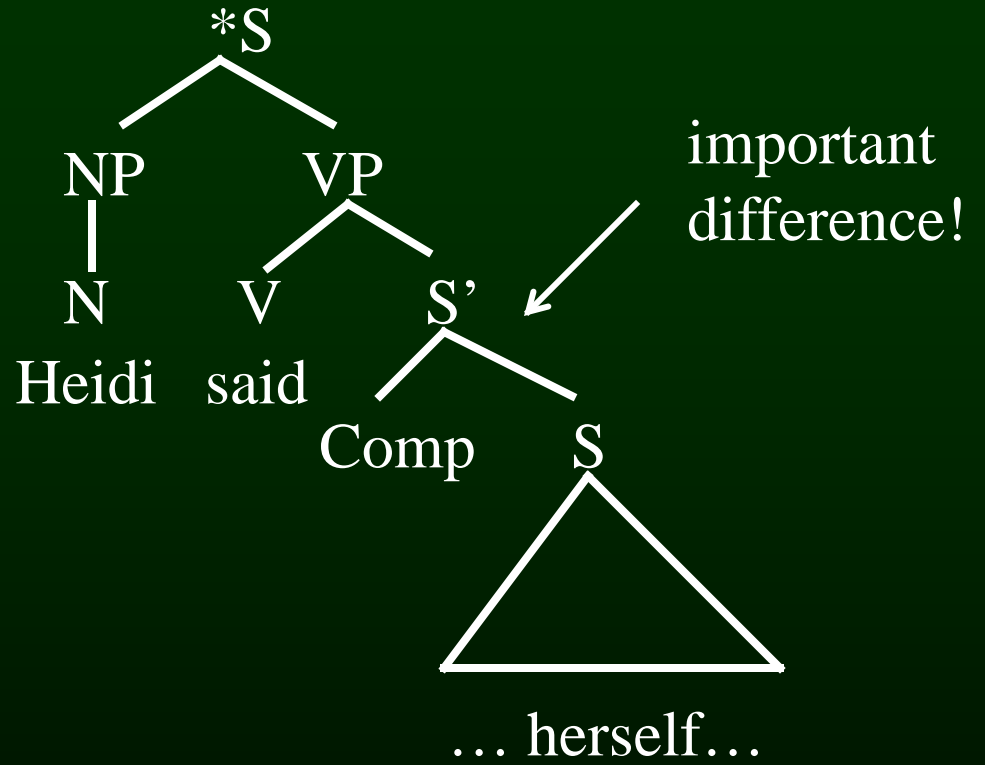
C-command?   yes

∴ Bound
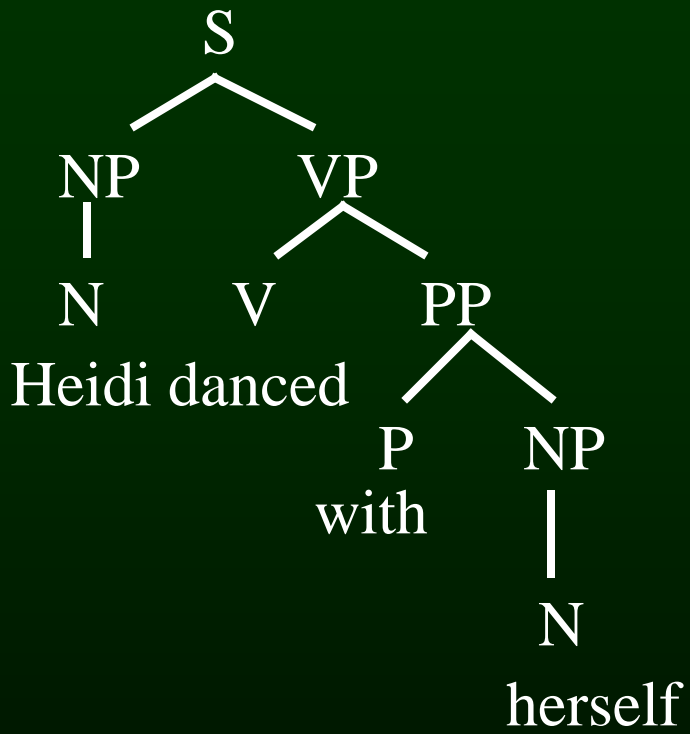
Coindexed?   yes

C-command?   no

∴ NOT Bound

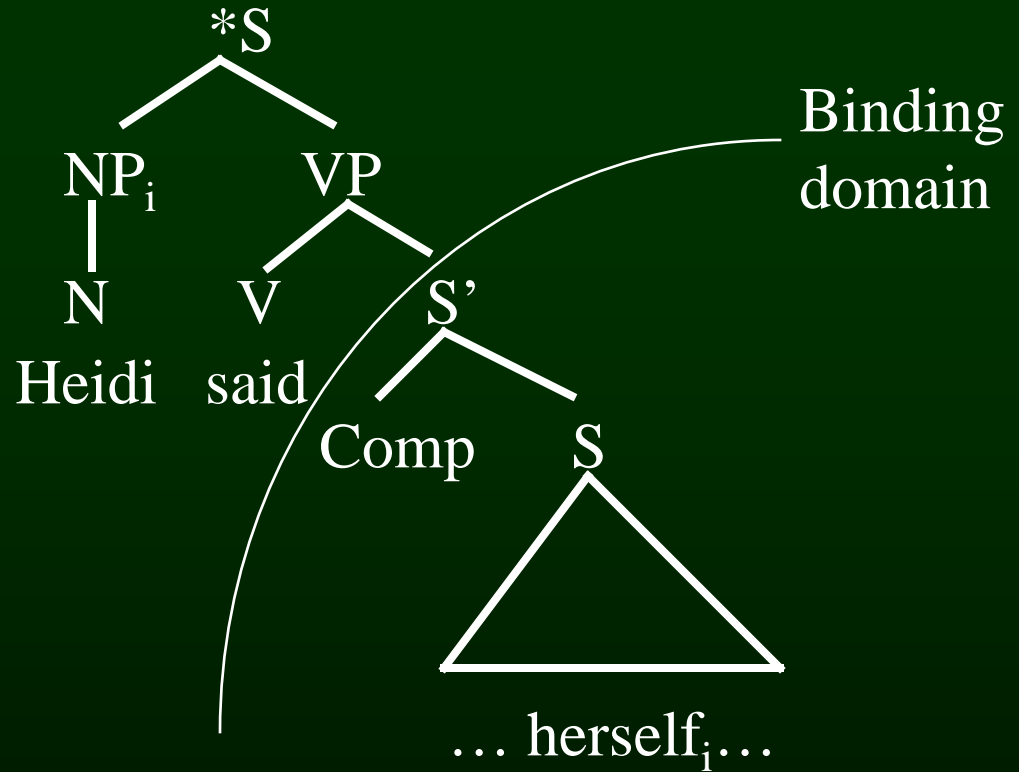VIOLATES PRINCIPLE A

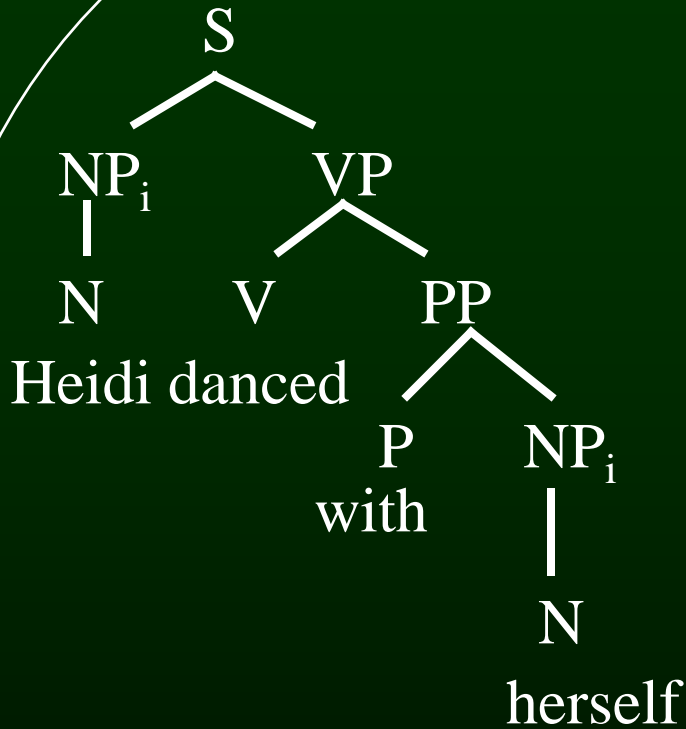# Locality restrictions on anaphor binding

□ Heidi$_i$ danced with herself$_i$

□ *Heidi$_i$ said that Art danced with herself$_i$

  □ (cf. Heidi$_i$ said that Art danced with her$_i$.)

□ *Heidi$_i$ said that herself$_i$ danced with Art

  □ (cf. Heidi$_i$ said that she$_i$ danced with Art)

S

NP VP

N V PP

Heidi danced

P NP

with

N

herself

*S

NP VP

N V S'

Heidi said

Comp S

… herself…

important
difference!

Binding domain

□ Binding domain: The clause containing the anaphor

　　□ This definition is overly simplistic, and not really accurate at all. But it will do for the purposes of this course.

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

Binding domain for anaphor

S

NP$_i$　　　VP

N　　V　　PP

Heidi danced

P　　NP$_i$

with

N

herself

*S

NP$_i$　　VP

N　　V　　S'

Heidi　said

Comp　　S

Binding domain

… herself$_i$…

Coindexed?　　yes

C-command?　　yes ∴Bound

Bound in domain?　yes

Coindexed?　　yes

C-command?　　yes ∴Bound

Bound in domain?　no

VIOLATES PRINCIPLE A

A (more) intuitive characterization???

☐ Principle A imposes TWO restrictions:

1) The anaphor must be bound

= both c-commanded and coindexed

2) AND The anaphor must be bound (find its antecedent) within its own clause (the binding domain)

Note that the restriction is *not* that an anaphor needs to be bound alone. An anaphor can be bound, yet the sentence still ungrammatical, if it isn't bound locally.
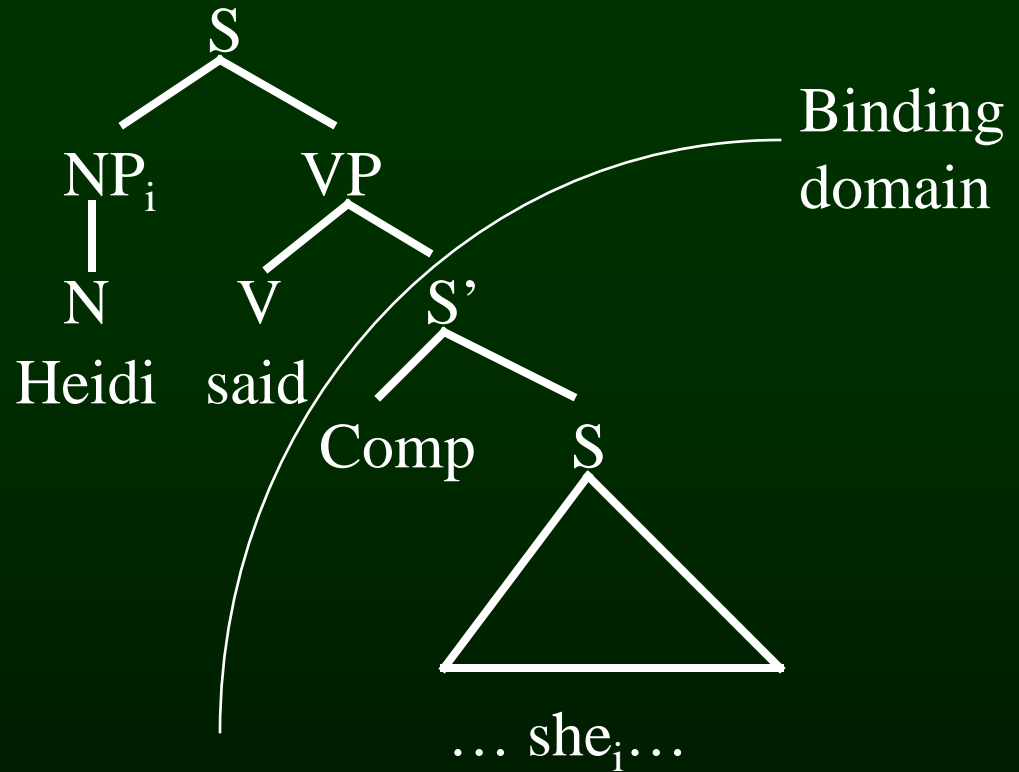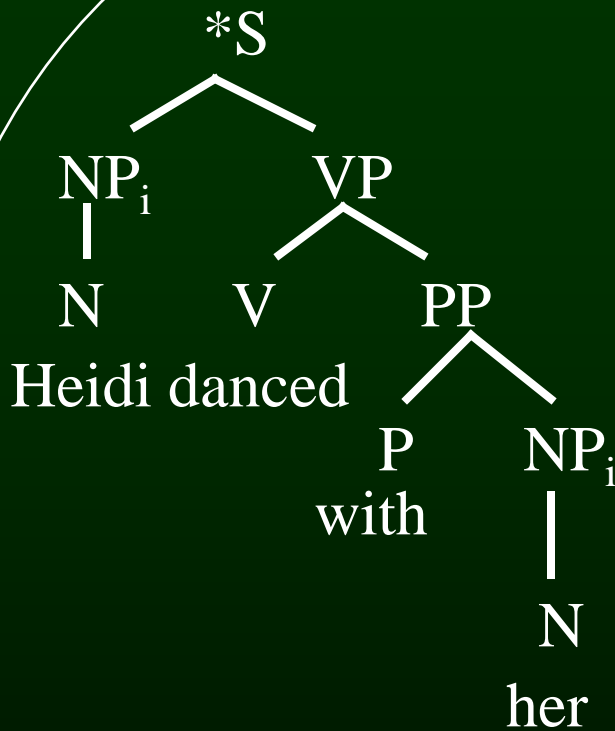
Pronouns

- Heidi$_i$ bopped her$_k$ on the head with the zucchini
- *Heidi$_i$ bopped her$_i$ on the head with the zucchini
- Heidi$_i$ said that she$_i$ danced with Art
- Heidi$_i$ said that she$_k$ danced with Art.
- *Only restriction on pronouns*: they cannot be bound within their clause

Pronouns

- Free: Not bound

- Principle B: Pronouns must be free in their Binding Domain.

Binding domain for pronoun

*S

NP_i   VP

N   V   PP

Heidi danced

P   NP_i

with

N

her

S

NP_i   VP

N   V   S'

Heidi   said

Binding
domain

Comp   S

… she_i…

Coindexed?   yes

C-command?   yes ∴ Bound

Free in domain?   no

VIOLATES PRINCIPLE B

Coindexed?   yes

C-command?   yes ∴ Bound

Free in domain?   yes

Binding domain for pronoun

S
NP_i   VP
N   V   PP
Heidi danced
P   NP_j
with
N
her

S
NP_i   VP
N   V   S'
Heidi   said   Comp   S
                        … she_j …

Binding domain
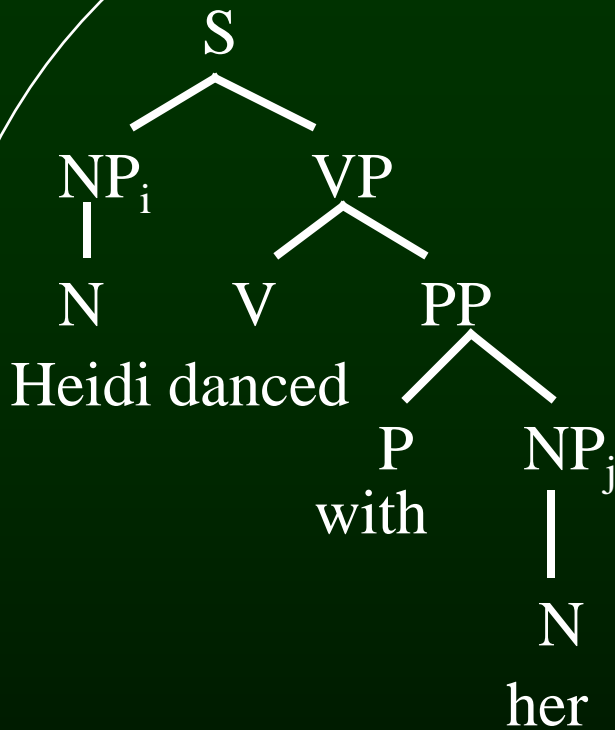
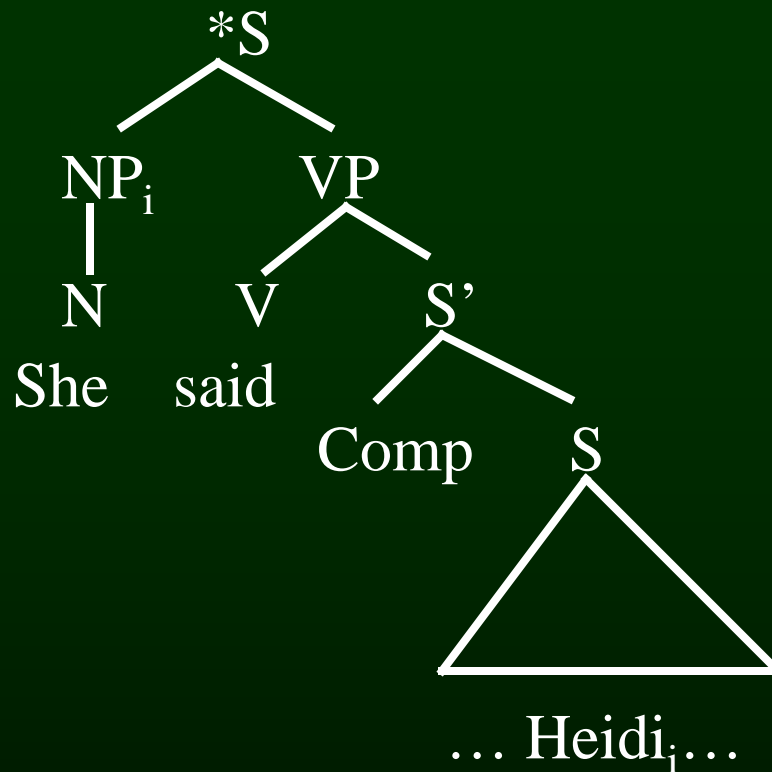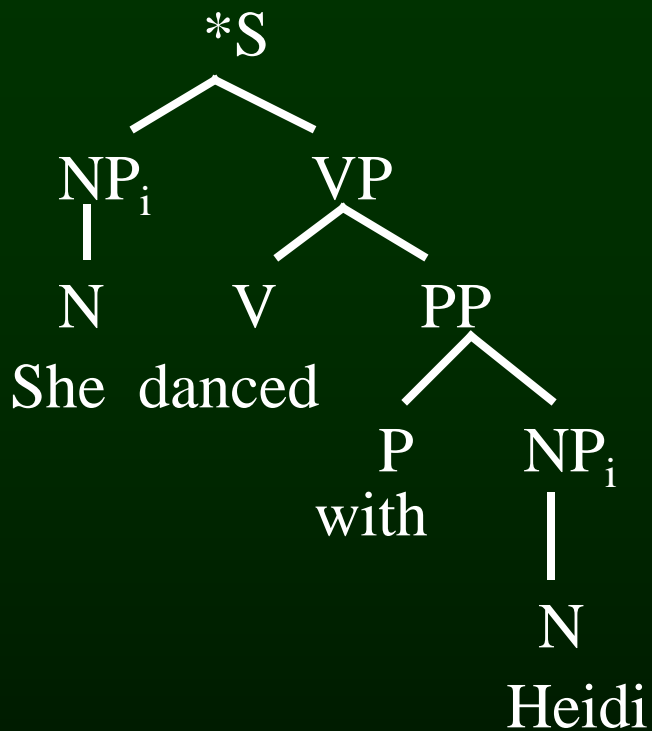Coindexed?   no ∴ not Bound
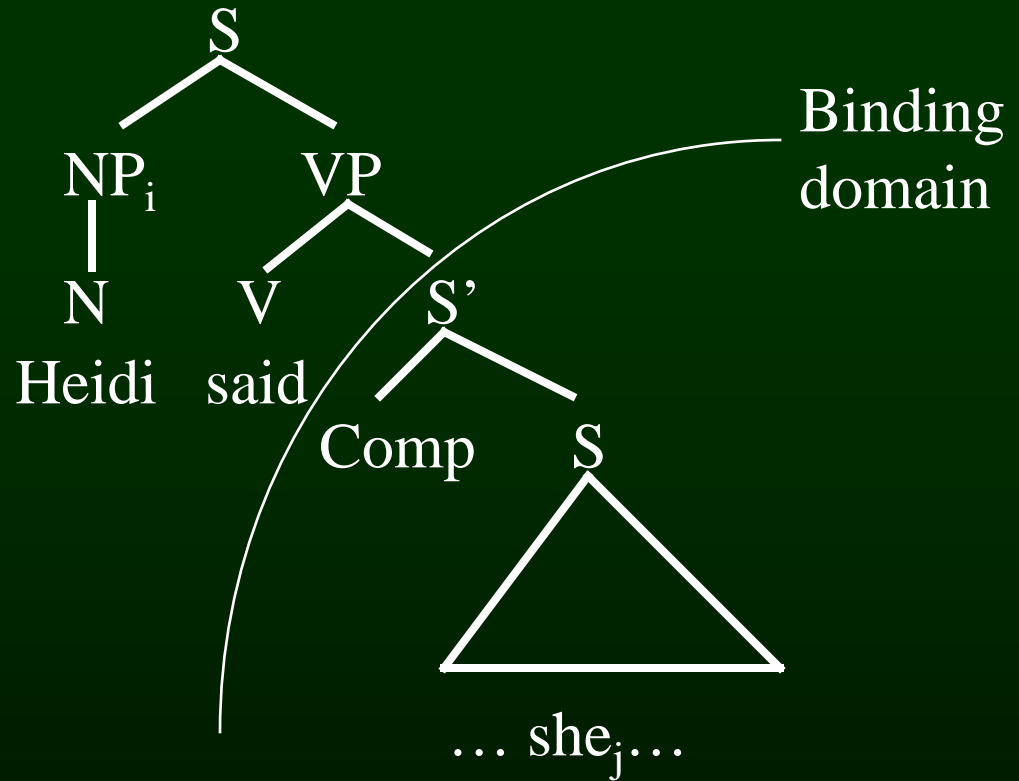
Free in domain?   Yes

Coindexed?   no ∴ not Bound

Free in domain?   Yes

R-expressions

- *Heidi$_i$ kissed Miriam$_i$
- *Art$_i$ kissed Geoff$_i$
- *She$_i$ kissed Heidi$_i$
- *She$_i$ said that Heidi$_i$ was a disco queen.

- **Principle C**: R-expressions must be free (everywhere)

*S

NP_i   VP

N   V   PP

She danced

P   NP_i

with

N

Heidi

*S

NP_i   VP

N   V   S'

She   said

Comp   S

… Heidi_i…

Coindexed?	yes
C-command?	yes ∴ Bound
Free?	no

VIOLATES PRINCIPLE C

Coindexed?	yes
C-command?	yes ∴ Bound
Free	no

VIOLATES PRINCIPLE C

Summary

- Antecedent, Anaphor, index, pronoun, R-expression, co-reference
- *Binds*:
  - A binds B if and only if
  - A c-commands B *AND*
  - A and B are co-indexed
- Free: not bound
- Binding domain: The clause containing the anaphor

Summary: The binding principles

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

- Binding Principle B: Pronouns must be free in their binding domain

- Binding Principle C: R-expressions must be free