Outline

Structural Relations

Binding
The parts of a tree

Example

Nodes

**Branch** A line connecting two parts of a tree.

**Node** The end of a branch.

**Label** The name given to a node.
The parts of a tree (cont)

Example

```
    M
   / \
  N   O
 /|   |
D E F H I J
```

Rules
- M → N O
- N → D E F
- O → H I J

Concepts

- **Root node** The node with no line on top of it.
- **Terminal node** Any node with no branch underneath it.
- **Non-terminal node** Any node with a branch underneath it.
Domination

Example

Trees show a hierarchy of constituents.
Some nodes are higher in the tree than others.

Domination

Node A dominates node B if and only if A is higher up in the tree than B and if you can trace a line from A to B going only downwards.

- M dominates all the other nodes (N, O, D, E, F, H, I, J).
- N dominates D, E, and F.
- O dominates H, I, J.
Exhaustive domination

A exhaustively dominates a set of terminal nodes, provided
- it dominates all the members of the set and
- there is no terminal node G dominated by A that is not a member of the set.

▶ M exhaustively dominates \{D, E, F, H, I, J\}.
Immediate domination

Example

Node A immediately dominates node B if there is no intervening node G that is dominated by A, but dominates B.

- M dominates all the other nodes in the tree, but it only immediately dominates N and O.
Immediate domination

**Example**

```
M

N       O
        D   E   F   H   I   J
```

**Mother, daughter, sister**

- **Mother/Parent**: A is the mother of B if A immediately dominates B.
- **Daughter/Child**: B is the daughter of A if B is immediately dominated by A.
- **Sister/Sibling**: Two nodes that share the same mother.
Precedence

Example

```
M
 /   \
N   O
 / \   /
D  E  F  H  I  J
```

**Precedence**

- **Sister precedence:** Node A sister-precedes node B if and only if both are immediately dominated by the same node, and A appears to the left of B.

- **Precedence:** Node A precedes node B if and only if neither A dominates B nor B dominates A and A or some node dominating A sister-precedes B or some node dominating A sister-precedes B or some node dominating B.
Precedence

Example

No crossing branches constraint
If one node $X$ precedes another node $Y$ then $X$ and all nodes dominated by $X$ must precede $Y$ and all nodes dominated by $Y$. 
C-command

**Definition (C-command)**

Node A c-commands node B if every node dominating A also dominates B, and neither A nor B dominate the other.

**Example**

A node c-commands its sisters and all the descendants of its sisters.
C-command (cont)

Symmetric vs. Asymmetric

Symmetric c-command A symmetrically c-commands B, if A c-commands B and B c-commands A

Asymmetric c-command A asymmetrically c-commands B if A c-commands B but B does not c-command A.

Example

- N and O symmetrically c-command each other.
- N asymmetrically c-commands A, B, C, D, E, F, G, H.
Outline

Structural Relations

Binding
R-expression, anaphor and pronoun

**Definition**

- **R-expression**: A DP that gets its meaning by referring to an entity in the world.
- **Anaphor**: A DP that obligatorily gets its meaning from another DP in the sentence.
- **Pronoun**: A DP that may (but need not) get its meaning from another DP in the sentence.

**Example**

- Typical anaphors are *himself, herself, themselves, myself, yourself* (reflexive pronouns), and *each other* (reciprocals).
- Typical pronouns include: *he, she, it, I, you, me, we, they, us, him, her, them, his, her, your, my, our, their, one.*
R-expression, anaphor and pronoun

(1) a. Felicia wrote a fine paper on Zapotec. (R-expression)
    b. Heidi bopped herself on the head with a zucchini. (Anaphor)
    c. Aaron said that he played basketball. (Pronoun)

Key observations
Anaphors, R-expressions, and pronouns can only appear in specific parts of the sentence.

(2) *Herself bopped Heidi on the head with a zucchini.

Binding Theory
The theory of the syntactic restrictions on where these different DP types can appear in a sentence is called Binding Theory.
Definition (Antecedent)

A DP that gives its meaning to another DP.

Example

Heidi bopped herself on the head with a zucchini.

↑ ↑
antecedent anaphor
Coindexation

Index a DP with a subscript letter:

(3)  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 \([a\ zucchini]_k\).

**Definition (Coindex)**

**Coindexed**  Two DPs are said to be coindexed if they have the same index.

**Corefer**  DPs that are coindexed with each other are said to corefer.
Key observations

The relations between an antecedent and a pronoun/anaphor must bear particular structural relations.

(4) a. Heidi$_i$ bopped herself$_i$ on the head with a zucchini.
   b. [Heidi$_i$’s mother]$_j$ bopped herself$_j$ on the head with a zucchini.
   c. *[Heidi$_i$’s mother]$_j$ bopped herself$_i$ on the head with a zucchini.
   d. [The mother of Heidi$_i$]$_j$ bopped herself$_j$ on the head with a zucchini.
   e. *[The mother of Heidi$_i$]$_j$ bopped herself$_i$ on the head with a zucchini.
Structural Relations Binding

**Binding (2)**

\[
\text{Heidi} \quad \text{bop} \quad \text{herself} \quad \text{on the head}
\]

\[
\text{with a zucchini}
\]

C-command
Structural Relations Binding

Binding (3)

C-command

Heidi -ed her mother's head with a zucchini.
Binding (4)

Heidi's mother bopped herself on the head with a zucchini.

```
TP
  /\       /
 /  \     /  
DP   T'   VP
   /\     /\  
  /  \   /  \  
 DP_i D' T -ed V'  PP
   /\   /\  |   |
  /  \ /  \  |   |
 N N' 's NP -ed V'  PP
   /\   /\  |   |
  /  \ /  \  |   |
 N N' 's NP -ed V'  PP
   /\   /\  |   |
  /  \ /  \  |   |
 mother N V DP_i PP
   /\   |   |
  /  \  |   |
 bop herself on the head
```

C-command
Structural Relations

Binding (5)

The binding of the pronoun "herself" to the DP "i" shows C-command.

The sentence: "The mother of Heidi bopped herself on the head with a zucchini."
Structural Relations

**Binding (6)**

```
The mother of Heidi bop herself on the head with a zucchini.
```

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**C-command**
Binding principle

**Definition (Bind)**

A binds B if and only if A c-commands B and A and B are coindexed.

- Binding is a kind of coindexation that happens when one of the two DPs c-commands the other.
- The binder must do the c-commanding of the bindee.

**Proposal**

Principle A: An anaphor must be bound.
(5) *Heidi said that herself discoed with Art.
Locality conditions (cont)

Key observations

▶ The anaphor is bound by its antecedent.
▶ The anaphor seems to need to find its antecedent in the same clause.

Proposal

▶ Binding domain: The clause containing the DP (anaphor, pronoun, or R-expression).
▶ Binding Principle A (revised): An anaphor must be bound in its binding domain.
The distribution of pronouns

Key observations

Pronouns may not be bound.

(6) a. Heidi$_i$ bopped her$_j$ on the head with the zucchini.
    b. *Heidi$_i$ bopped her$_i$ on the head with the zucchini.

(7) a. Heidi$_i$ said [CP that she$_i$ discoed with Art].
    b. Heidi$_i$ said [CP that she$_k$ discoed with Art].

Proposal

- Free: Not bound.
- Principle B: A pronoun must be free in its binding domain.
The distribution of R-expressions

Key observations

R-expressions don’t seem to allow any instances of binding at all, not within the binding domain and not outside it either.

▶ R-expressions receive their meaning from outside the sentence.

(8) a. *Heidi\textsubscript{i} kissed Miriam\textsubscript{i}.
   b. *Art\textsubscript{i} kissed Geoff\textsubscript{i}.
   c. *She\textsubscript{i} kissed Heidi\textsubscript{i}.
   d. *She\textsubscript{i} said that Heidi\textsubscript{i} was a disco queen.

Proposal

Principle C: An R-expression must be free.
Reading

- Syntax: A Generative Introduction.
  - § 4, 5.