

- Topicalization
- Wh-extraction
- Relative clauses

### Unbounded dependency:

The dependency between an extracted constituent and its trace may extend **across arbitrarily many clause boundaries**.

- (14) a. Kim<sub>i</sub>, Sandy loves \_\_<sub>i</sub> .  
 b. Kim<sub>i</sub>, Chris knows [Sandy loves \_\_<sub>i</sub>].  
 c. Kim<sub>i</sub>, Dana believes [Chris knows [Sandy loves \_\_<sub>i</sub>]].

### The movement metaphor:

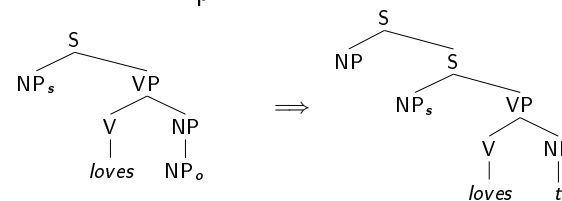
- Relating syntactic configurations in a derivational hierarchy.
- **Traces** and **coindexation** are used to express derivational subordination.

### Topicalization/Extraction:

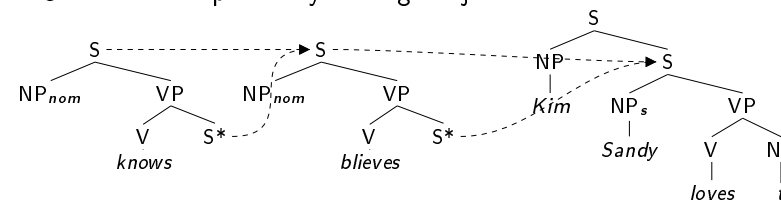
Placing a post-verbal constituent into a sentence-initial position.

- (13) a. Sandy loves Kim. (base configuration)  
 b. Kim<sub>i</sub>, Sandy loves \_\_<sub>i</sub> . (NP-topicalization)  
 c. On Kim<sub>i</sub>, Sandy depends \_\_<sub>i</sub> . (PP-topicalization)

Extra tree for topicalization:



Unbounded dependency through adjunction:



⇒ extended domain of locality and factoring of recursion

## Wh-Extraction:

Placing a constituent as **wh-phrase** into a clause-initial position.

- (15) a. I wonder [who<sub>i</sub> Sandy loves \_\_\_\_]. (indirect question)  
 b. Who<sub>i</sub> does Sandy love \_\_\_\_]. (direct question)  
 c. Sandy loves Kim<sub>i</sub> [who<sub>i</sub> Irmgard hates \_\_\_\_]. (relative clause)

- **wh-pronoun**: *who, which, what, whom, whose, that, when,...*
- **wh-phrase**: phrase that contains a wh-pronoun.

- (16) Here's the minister<sub>i</sub> [[in the middle of whose<sub>i</sub> sermon] the dog barked].

## Unbounded dependency:

The dependency between an extracted **wh-phrase** and its trace may extend **across arbitrarily many clause boundaries**.

- (21) a. I wonder [who<sub>i</sub> Sandy loves \_\_\_\_].  
 b. I wonder [who<sub>i</sub> Chris knows [Sandy loves \_\_\_\_]].  
 c. I wonder [who<sub>i</sub> Dana believes Chris knows [Sandy loves \_\_\_\_]].

## Pied piping:

Additional material along with wh-pronouns is fronted.  
 (The fronted wh-phrase may be larger than the wh-pronoun.)

- (17) This is the book [[for which]<sub>i</sub> Peter has been waiting \_\_\_\_].  
 (18) This is the book [[the covers of which]<sub>i</sub> I have designed \_\_\_\_].

## Preposition stranding:

Material from the wh-phrase is left in base position.

- (19) This is the book [which<sub>i</sub> Peter has been waiting for \_\_\_\_].  
 (20) This is the book [which<sub>i</sub> I have designed the covers of \_\_\_\_].

## • Adjuncts:

- (22) \*[Which movie]<sub>i</sub> did Gorgette fall asleep [after watching \_\_\_\_].

• Finite sentences with complementizer (*that, whether*)

- (23) \*Who<sub>i</sub> did the elephant whisper [that the emu saw \_\_\_\_] ?  
 Who<sub>i</sub> did the elephant say [that the emu saw \_\_\_\_] ?

## • Subjects from finite sentences with complementizer

(→ In GB: Empty Category Principle/Subjacency):

- (24) \*Who<sub>i</sub> did Alice say [that \_\_\_\_ left].  
 Who<sub>i</sub> did Alice say [\_\_\_\_ left].

## • Coordination

- (25) \*I wonder who<sub>i</sub> Sandy loves [\_\_\_\_ and Kim].

## Wh-extraction - Multiple traces

- **Parasitic gaps:**

(26) That was the rebel leader who<sub>i</sub> rivals of    <sub>j</sub> shot    <sub>j</sub>.

\*That was the rebel leader who<sub>i</sub> rivals of    <sub>j</sub> shot the British consul.

That was the rebel leader who<sub>i</sub> agents of foreign powers shot    <sub>j</sub>.

- **tough movement:**

(27) Kim<sub>i</sub> would be easy to bribe    <sub>j</sub>.

Kim<sub>i</sub> would be easy to prove Sandy bribed    <sub>j</sub>.

This is a problem which<sub>1</sub> John<sub>2</sub> is difficult to talk to    <sub>2</sub> about    <sub>1</sub>.

- **Multiple wh-extraction is forbidden in English:**

(28) \*Who<sub>i</sub> do you wonder who<sub>j</sub>    <sub>j</sub> loves    <sub>i</sub>.

## Wh-extraction - Lexical restrictions

- **Lexical restrictions** on extraction in sentential complements:

(29) a. The jury wondered [ who<sub>i</sub> Simpson killed    <sub>j</sub> ]?

b. \*The jury thought [ who<sub>i</sub> Simpson killed    <sub>j</sub> ]?

⇒ 'thought' governs sentential complements without wh-extraction.

(30) \*John wants [ Bill<sub>i</sub>; PRO to see    <sub>j</sub> ].

⇒ 'wants' governs sentential complements without topicalization.

## Wh-extraction - Subject-auxiliary inversion

### Subject-auxiliary inversion

The auxiliary verb ('do', 'have', 'be', 'can', ...) precedes the subject.

- **Obligatory subject-auxiliary inversion** in direct questions with object extraction:

(31) a. What<sub>i</sub> **has/does** John read    <sub>j</sub>?

b. \*What<sub>i</sub>; John **has/does** read    <sub>j</sub>?

c. \*What<sub>i</sub>; John reads    <sub>j</sub>?

- **No subject-auxiliary inversion** in embedded wh-questions:

(32) I wonder [what<sub>i</sub> John reads    <sub>j</sub>].

- **No subject-auxiliary inversion** in topicalization:

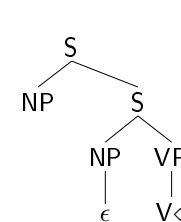
(33) a. This report<sub>i</sub>; John **has/doesn't** read    <sub>j</sub>.

b. \*This report<sub>i</sub>; **has/doesn't** John read    <sub>j</sub>.

## Wh-extraction - XTAG-analysis (1) - Tree templates

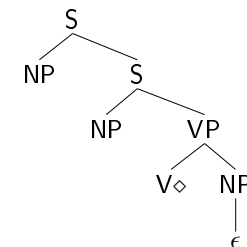
### Tree template for topicalization and wh-extraction:

$\alpha W0nx0V$ :



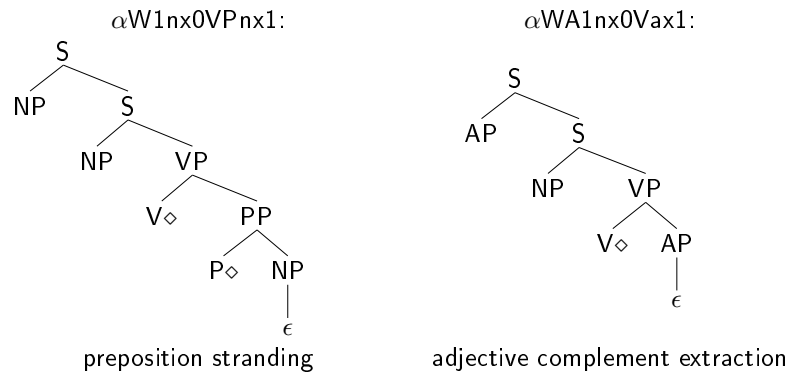
subject extraction

$\alpha W1nx0Vnx1$ :



object extraction

### Tree templates for topicalization and wh-extraction:



### Root restriction

"A restriction is imposed on the **final root node** of any XTAG derivation of a tensed sentence which equates the **wh** feature and the **invlink** feature of the final root node." (XTAG-manual,p.298)

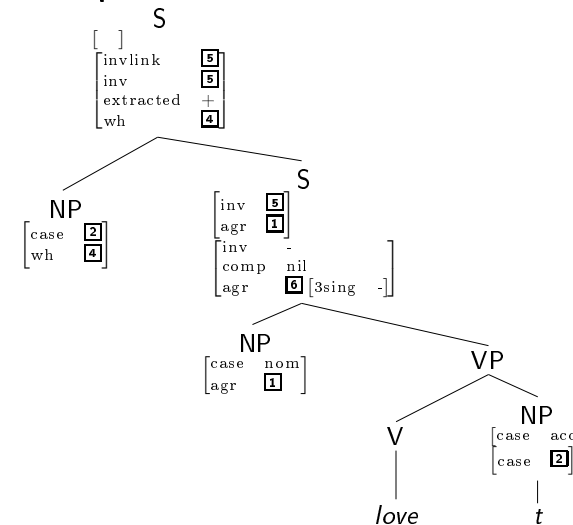
### Effects:

- Only in non-embedded object extractions the wh-pronoun depends on inversion and vice versa.
- The same tree can be used for embedded and non-embedded object extraction.

### Features for extraction:

- extracted := {+,-}
  - ⇒ to indicate extraction in the S-node
- wh := {+,-}
  - ⇒ to indicate the presence of a wh-pronoun
- inv := {+,-}
  - ⇒ to indicate inversion
- invlink := {+,-}
  - ⇒ to link wh und inv via the **root restriction**
- comp := {that,whether,if,for,rel,inf\_nil,ind\_nil,nil}
  - ⇒ to indicate the kind of complementizer

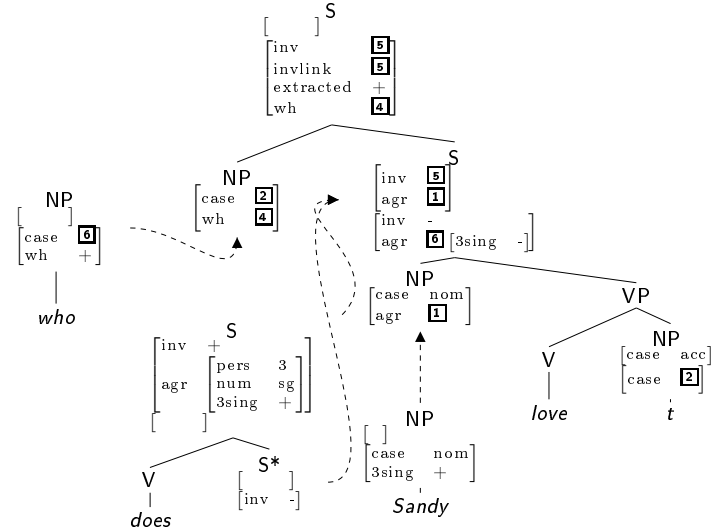
### Tree for topicalization and wh-extraction of an accusative object:



## Wh-extraction - XTAG-analysis (5)

**Direct questions:** In the root node: wh = +, inv = +

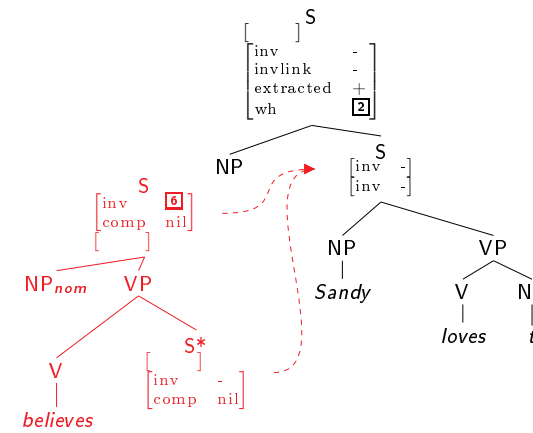
(34) Who<sub>i</sub> does Sandy love   ?



## Wh-extraction - XTAG-analysis (7)

**Unbounded dependency:**

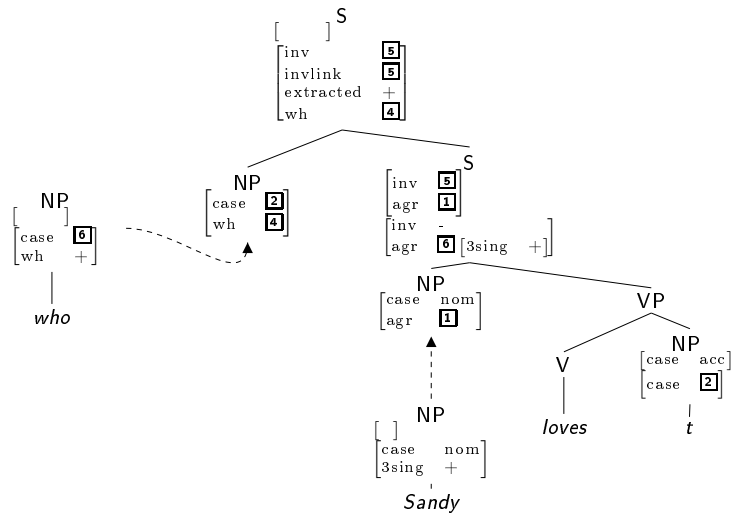
(36) I wonder [ who<sub>i</sub> Chris believes [Sandy loves   ]].



## Wh-extraction - XTAG-analysis (6)

**Indirect questions:** sentential complement with wh = +, inv = -

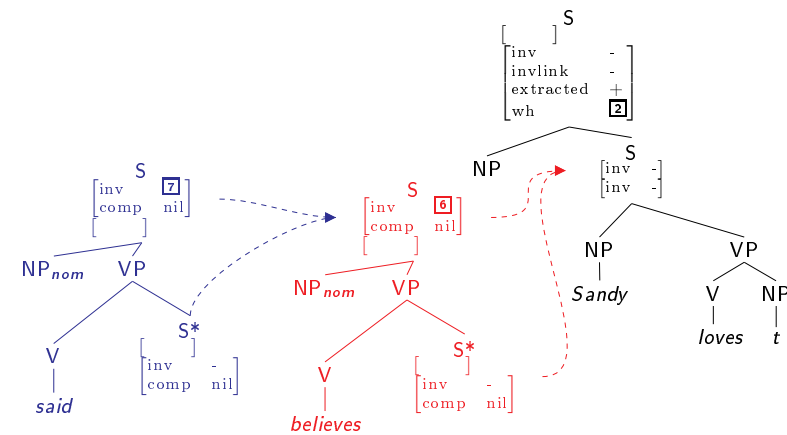
(35) I wonder [who<sub>i</sub> Sandy loves   ].



## Wh-extraction - XTAG-analysis (8)

**Unbounded dependency:**

(37) I wonder [ who<sub>i</sub> Irmgard said [Chris believes [Sandy loves   ]]].



### Extraction islands in XTAG:

⇒ Constraints for extraction and unbounded dependencies follow from the elementary trees, i.e., can be stated locally.

- **Adjuncts:**

Adjuncts are not present in elementary trees of the projections they modify (minimality of elementary trees).

- **Finite sentences with complementizer:**

comp = nil, where non-bridge verbs attach (*whisper*)

comp = nil/that, where bridge verbs attach (*say*)

- **Subjects from finite sentences with complementizer:**

Corresponding elementary tree is not given.

- **Coordination:**

Coordinated NPs are realized as one initial NP-tree that cannot split during derivation.