

Unbounded Dependencies

Phenomena

- I. Filler-gap-constuctions / strong udc's
(overt constituent in a non-argument-position)
 - a. Topicalization
Kim₁, Sandy loves __₁
 - b. WH-Question
I wonder, who₁ Sandy loves __₁
 - c. WH-Relative Clause
This is the politician₁ Sandy loves __₁
 - d. It-Cleft
It's Kim who₁ Sandy loves __₁
 - e. Pseudocleft
What₁ Kim loves __₁ is Sandy

- GPSG: single WH-feature

II. Weak udc's (coreferential constituent in an argument-position)

- a. Purpose Infinitive
I bought it₁ for Sandy to eat __₁
- b. Tough "Movement"
Sandy₁ is hard to love __₁
- c. Relative Clause
This is the politician₁ Sandy loves __₁
- d. It-Cleft
It' s Kim₁ Sandy loves __₁

Basic properties of udc's

1. unbounded extension of dependency
 - a. *Kim, Sandy trusts* __
 - b. *Kim, Chris knows Sandy trusts* __
 - c. *Kim, Dana believes Chris knows Sandy trusts* __

2. syntactic matching condition (syntactic dependency) between filler and gap
 - a. *On Kim, Sandy depends* __
 - b. * *On Kim Kim, Sandy trusts* __

NONLOCAL features

QUE-feature (interrogatives)

REL-feature (relatives)

Motivation: distributional differences (e.g. pied piping)

- a. *this is the farmer pictures of whom appeared in Newsweek*
- b. ** pictures of whom appeared in newsweek?*

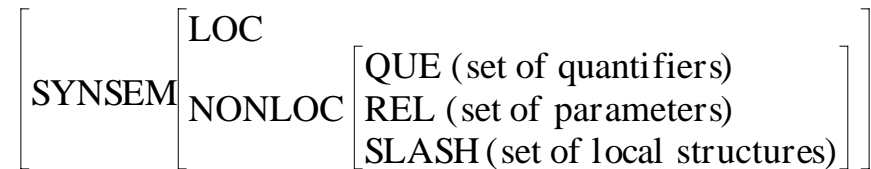
sets as values for nonlocal features

Motivation: multiple unbounded dependencies

[A violin this well crafted]₁, even [the most difficult sonata]₂ will be easy to play __₂ on __₁

This is a problem [which]₁ [John]₂ is difficult to talk to __₂ about __₁

NONLOCAL feature (preliminary version):



QUE: interrogative quantifier corresponding to WH-phrase

REL: referential parameter associated with relative pronoun

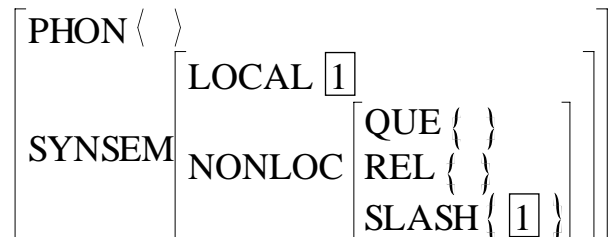
Analysis I

Three parts of udc descriptions: **bottom, middle** and **top**

- bottom

- introduction of dependency by a special sign
relative construction: **relative word** (nonempty REL)
wh-question: **interrogative pronoun** (nonempty QUE)
topicalization: **trace** (nonempty SLASH)

lexical entry for "trace" (preliminary version)



- middle

- successively passing the dependency up the tree
- mechanism:

Nonlocal Feature Principle

The value of each nonlocal feature on a phrasal sign is the union of the values on the daughter

- top

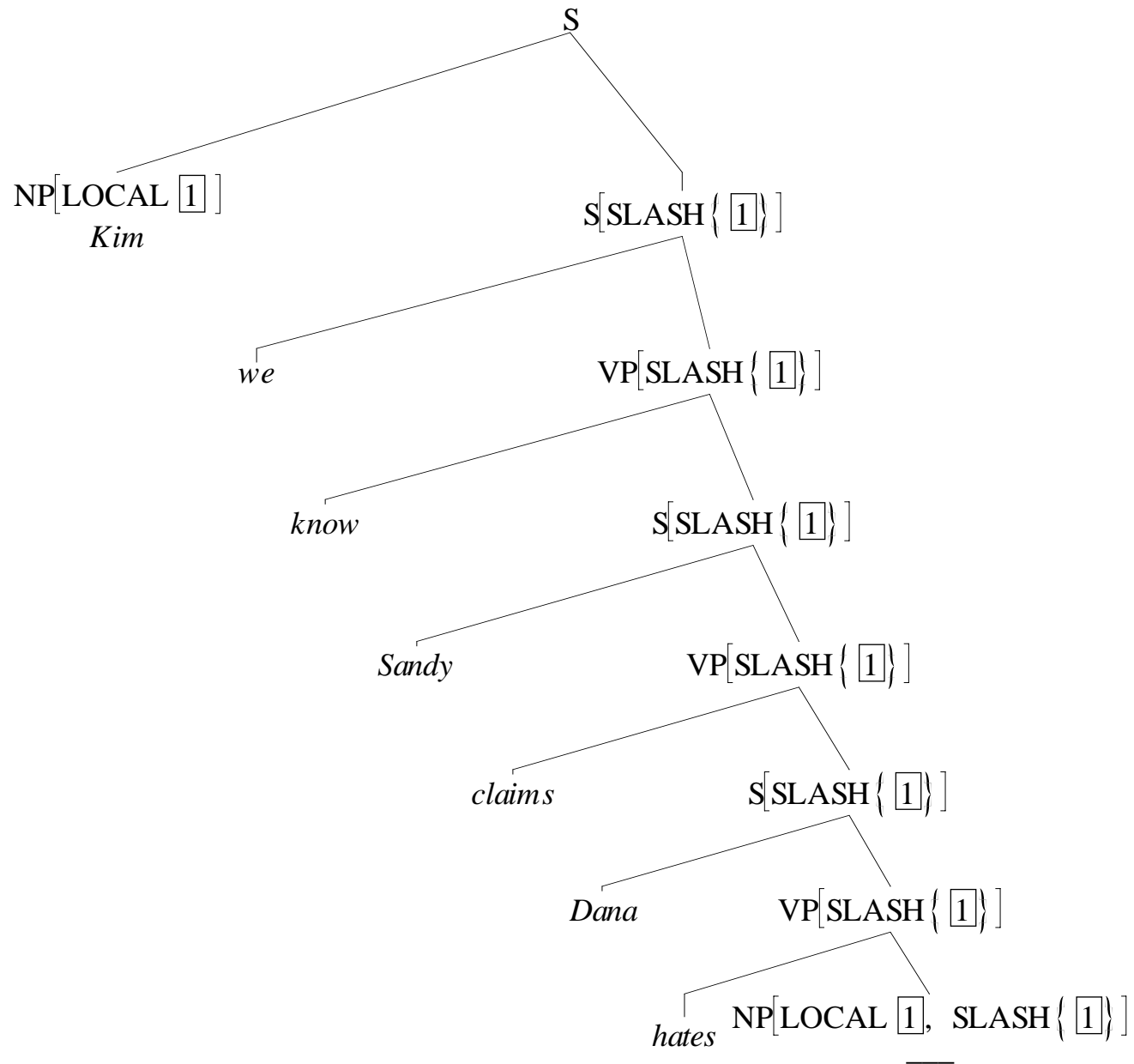
- discharging the dependency
- identification of SLASH value with local features of the filler
- mechanism:

Filler-Head Rule (preliminary version)

$$\left[\begin{array}{l} \text{DTRS} \left[\begin{array}{l} \text{FILLER-DTR} \mid \text{SYNSEM} \mid \text{LOCAL} \boxed{1} \\ \text{COMPL-DTRS} < > \\ \text{HEAD-DTR} \mid \text{SYNSEM} \left[\begin{array}{l} \text{LOCAL} \mid \text{CAT} \left[\text{HEAD verb} \left[\begin{array}{l} \text{VFORM fin} \\ \text{SUBCAT} < > \end{array} \right] \right] \\ \text{NONLOCAL} \mid \text{SLASH} \{ \boxed{1}, \dots \} \end{array} \right] \end{array} \right] \end{array} \right]$$

- Example / Summary:

Kim, we know Sandy claims Dana hates ___



Analysis II

- problem:

SLASH-value must not be passed up the tree *after* the trace has been bound!!

** Bagels₁, I know that bagels₁, they like __₁*

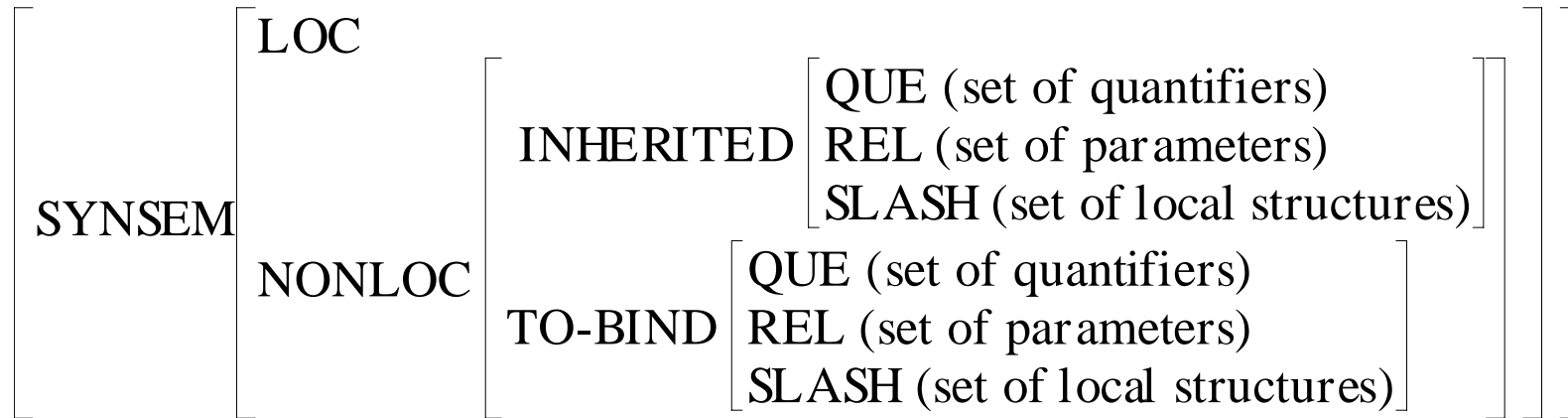
- solution:

distinction between

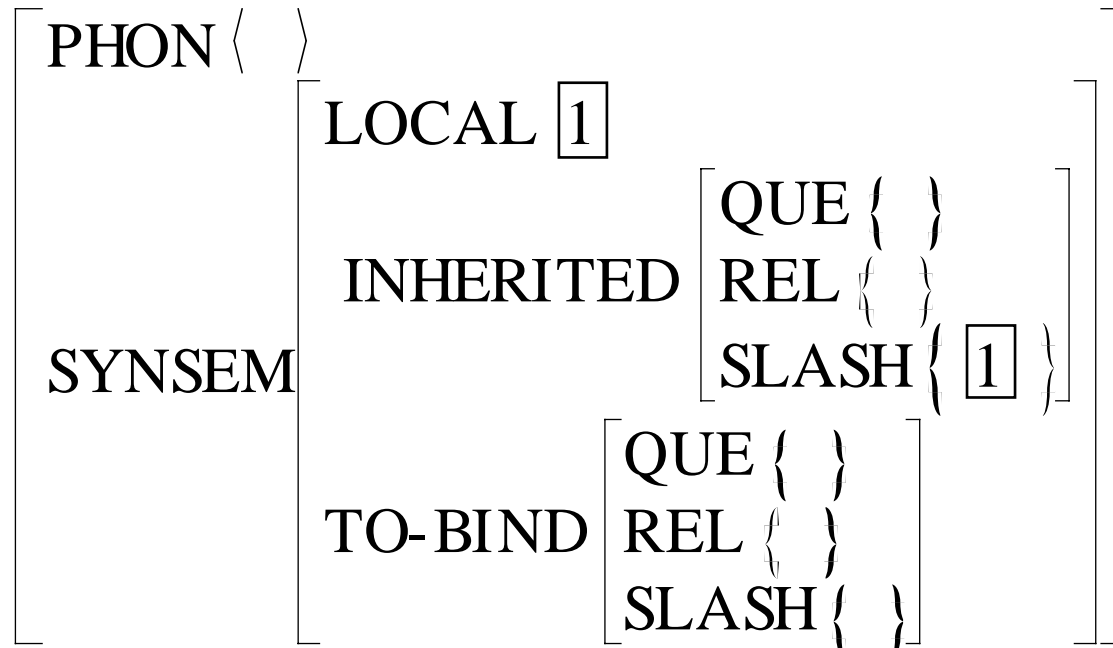
- ud that are required by the grammar to become bound
(TO-BIND)

- ud that continue to be inherited upward
(INHERITED)

NONLOCAL feature (final version)



lexical entry for "trace" (final version)

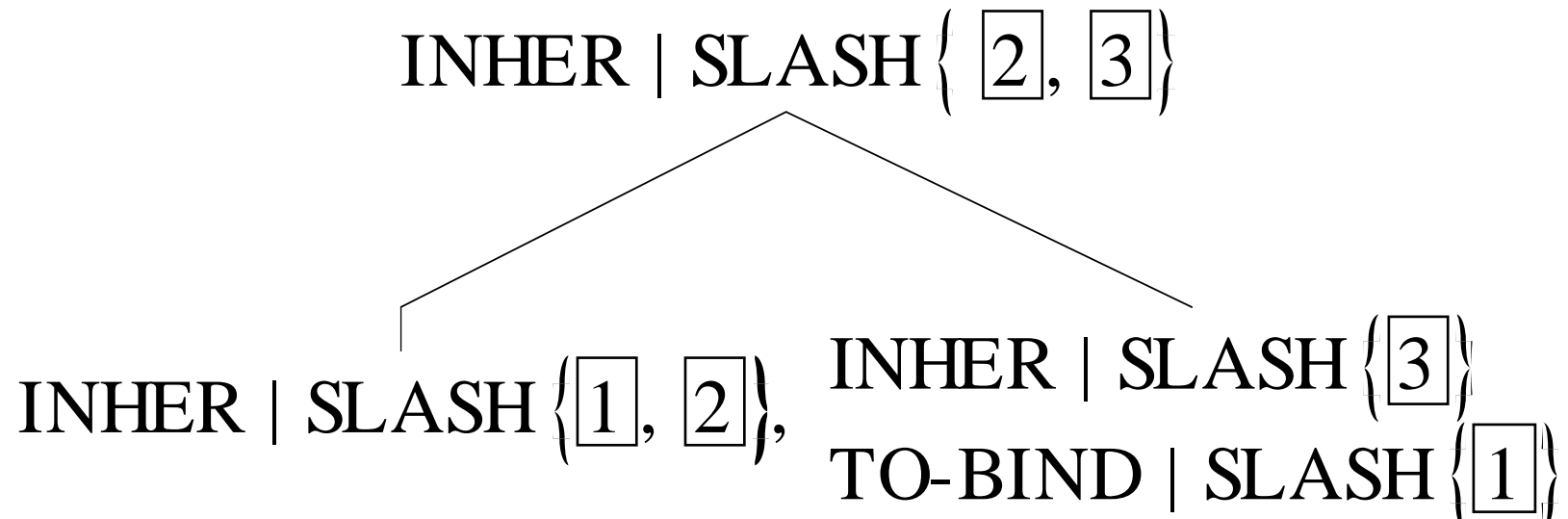


- TO-BIND dependencies are subtracted from INHERITED dependencies

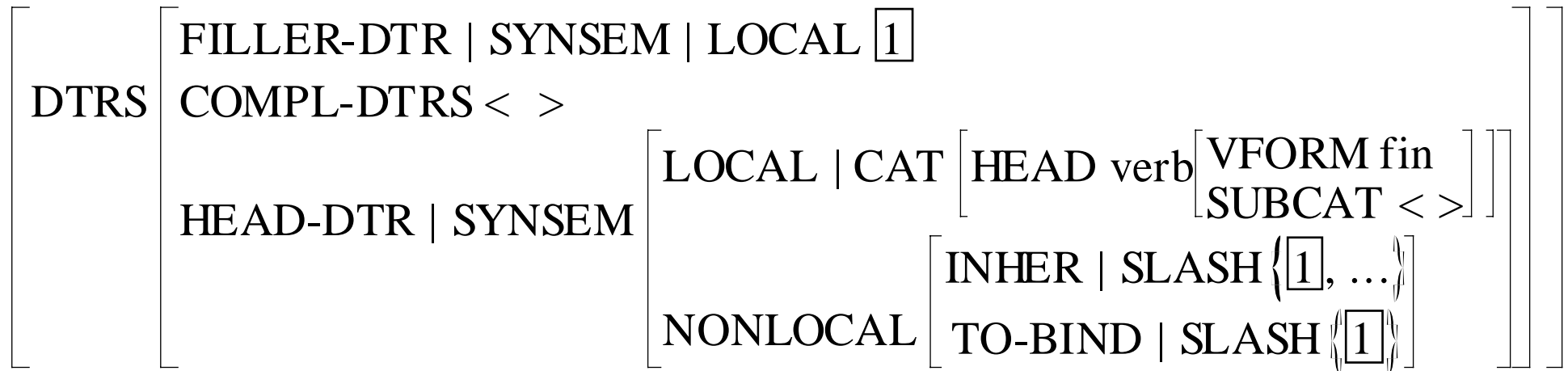
- mechanism:

Nonlocal Feature Principle (final version)

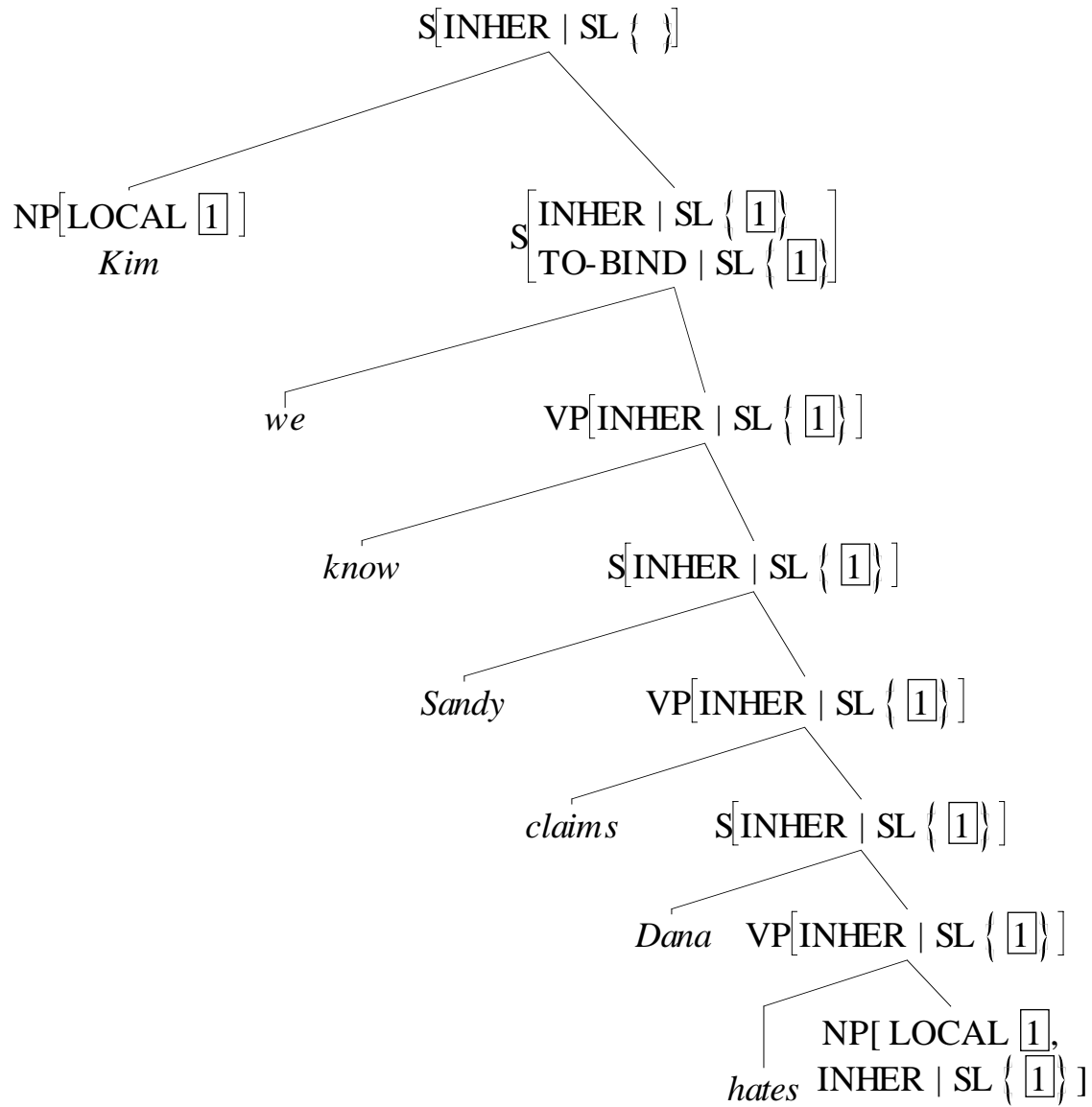
For each nonlocal feature, the INHERITED value on the mother is the union of the INHERITED values on the daughter minus the TO-BIND value on the head daughter



Filler-Head Rule (final version)



- Example / Summary: *Kim, we know Sandy claims Dana hates* —



Tough constructions

- Examples:

a. *Kim*₁ would be easy to bribe __₁

b. *Kim*₁ would be easy to prove Sandy bribed __₁

c. [*this theorem*]₁ will take only five minutes to prove —₁

- Relation constituent / trace:

- no filler / gap relation

- same referential index

e.g. not necessarily same case:

I (nom) am easy to please (acc)

• Analysis:

- no WH-movement (constituent in argument position!)
- no NP-movement (trace in case assigned position!)

lexical entry for 'easy'

$$\left[\begin{array}{l} \text{LOC} \mid \text{CAT} \left[\begin{array}{l} \text{HEAD adj} \\ \text{SUBCAT} \langle \text{NP}_{[1]}, \text{VP}[\text{inf}, \text{INHER} \mid \text{SLASH} \{ \text{NP}[\text{acc}]_{\text{ppro}_{[1]}, \dots} \}] \rangle \end{array} \right] \\ \text{NONLOCAL} \mid \text{TO-BIND} \mid \text{SLASH} \{ \text{NP}_{[2]} \} \end{array} \right]$$

The subject of *easy* receives a semantic role.
Thus no violation of the Raising Principle

** There is easy to believe to be a unicorn in the garden.*

Kim is hard to talk to but Sandy is easy.

This sonata is easy to play on that violin.

That violin is easy to play this sonata on.

Subject Gaps

Trace Principle

Every trace must be subcategorized by a substantive head.

but: **Who did Kim claim that left.*

Trace Principle (parametrized for English)

Every trace must be strictly subcategorized by a substantive head.

May not be first member of a SUBCAT list.

But: *Who did Kim claim left?*

Subject Extraction Lexical Rule

X
[SUBCAT ⟨Y, ..., S [unmarked], ...⟩]



X
[
INHER [SLASH { [1] }]
SUBCAT ⟨ Y, ..., VP [SUBCAT ⟨ [LOC [1]] ⟩], ... ⟩]

Parasitic Gaps

That was the rebel leader₁ who rivals of ₁ shot ₁ .

The two traces have the same LOCAL value. Therefore they are represented by a single member of INHER SLASH.

*That was the rebel leader who₁ rivals of ₁ shot the British consul.

Subject Condition (English)

A lexical head's SUBCAT list may contain a slashed subject only if it also contains another slashed element.

Constraints on Coordinate Structures

Here is the student, whose mother and whose father both attended the match.

*Here is the student, Hilary and whose father both attended the match.

Coordination Principle (Strong Version)

In a coordinate structure, the CATEGORY and NONLOCAL value of each conjunct daughter is identical to that of the mother.

But:

Francis arrived late today and will be on time tomorrow

Leslie likes that picture and is trying to buy it.

Coordination Principle (Weak Version)

In a coordinate structure, the CATEGORY and NONLOCAL value of each conjunct daughter is subsumed by that of the mother.

HPSG Binding Theory

local o-command

Let Y and Z be referential objects with distinct LOCAL values. Then Y *locally o-commands* Z just in case Y is less oblique than Z.

o-command

Let Y and Z be referential synsem objects. Then Y *o-commands* Z just in case Y locally o-commands X dominating Z.

o-binding

Y (*locally*) *o-binds* Z just in case Y and Z are coindexed and Y (locally) o-commands Z. If Z is not (locally) o-bound, then it is said to be (*locally*) *o-free*.

Principle A:

A locally o-commanded anaphor must be locally o-bound.

Principle B:

A personal pronoun must be locally o-free.

Principle C:

A non-pronoun must be o-free.