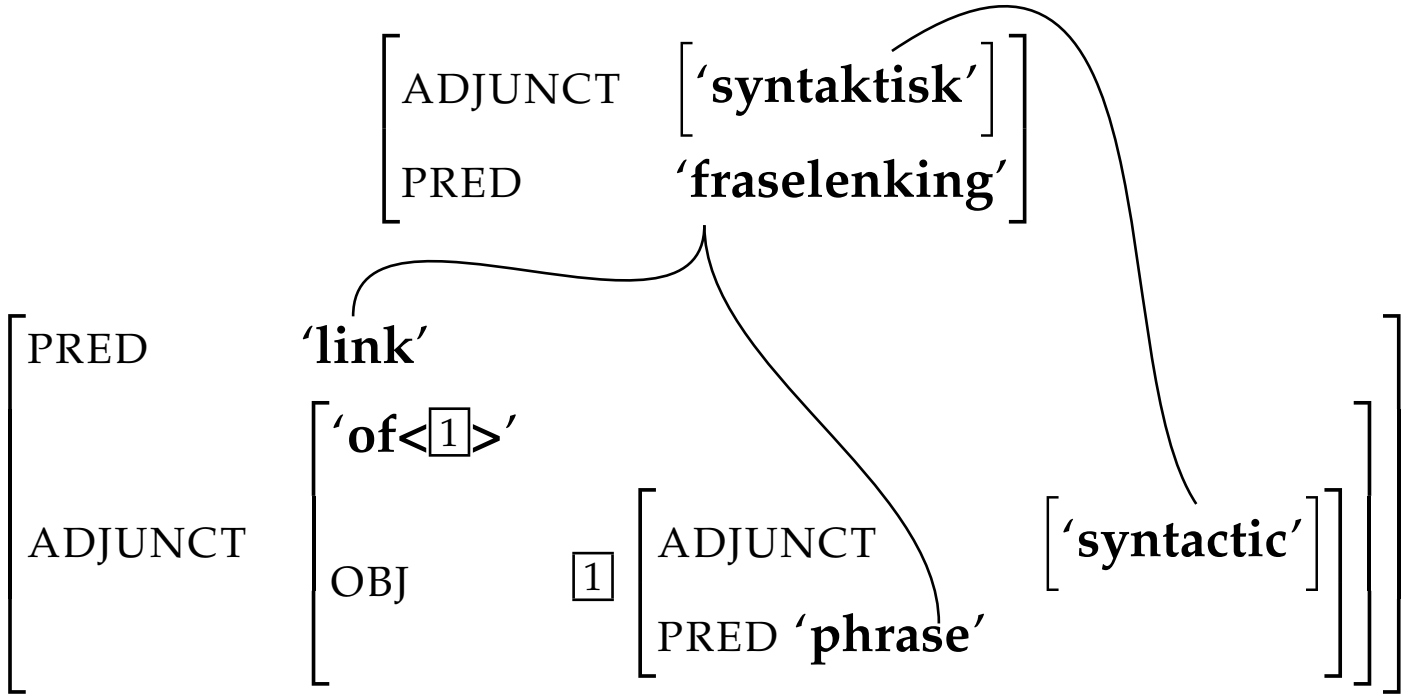


Kevin Brubeck Unhammer

Universitetet i Bergen

10. desember 2010

FRASELENKING

- Kva og kvifor
- Standardmetoden: N-grambasert

LENKINGSKRAV

- F-strukturlenkjer
- Rangering
- C-strukturlenkjer

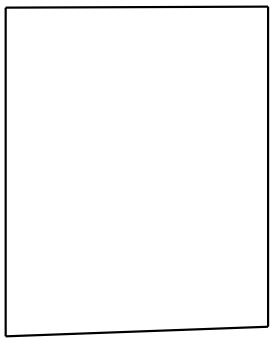
VANSKAR

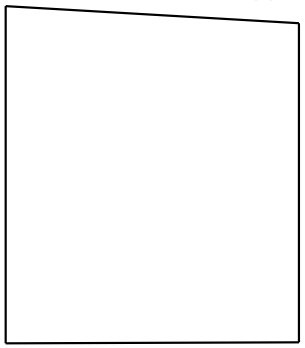
- Dårleg inndata
- Generalisering til nye grammatikkar
- Når predikat ikkje korresponderer 1-til-1

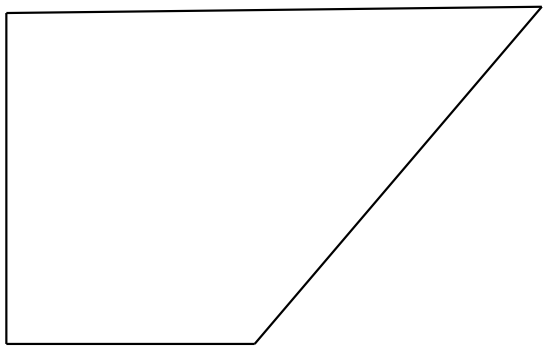
FRASELENKING

- Finne frasar som korresponderer i omsetjingar
  - «frase» = konstituent? dependenseining? syntaktisk funksjon? N-gram? chunk?
- Data: vanlegvis N-gramtabellar frå statistisk samanstilling, reint korpusbasert
- Formål: vanlegvis statistisk maskinomsetjing

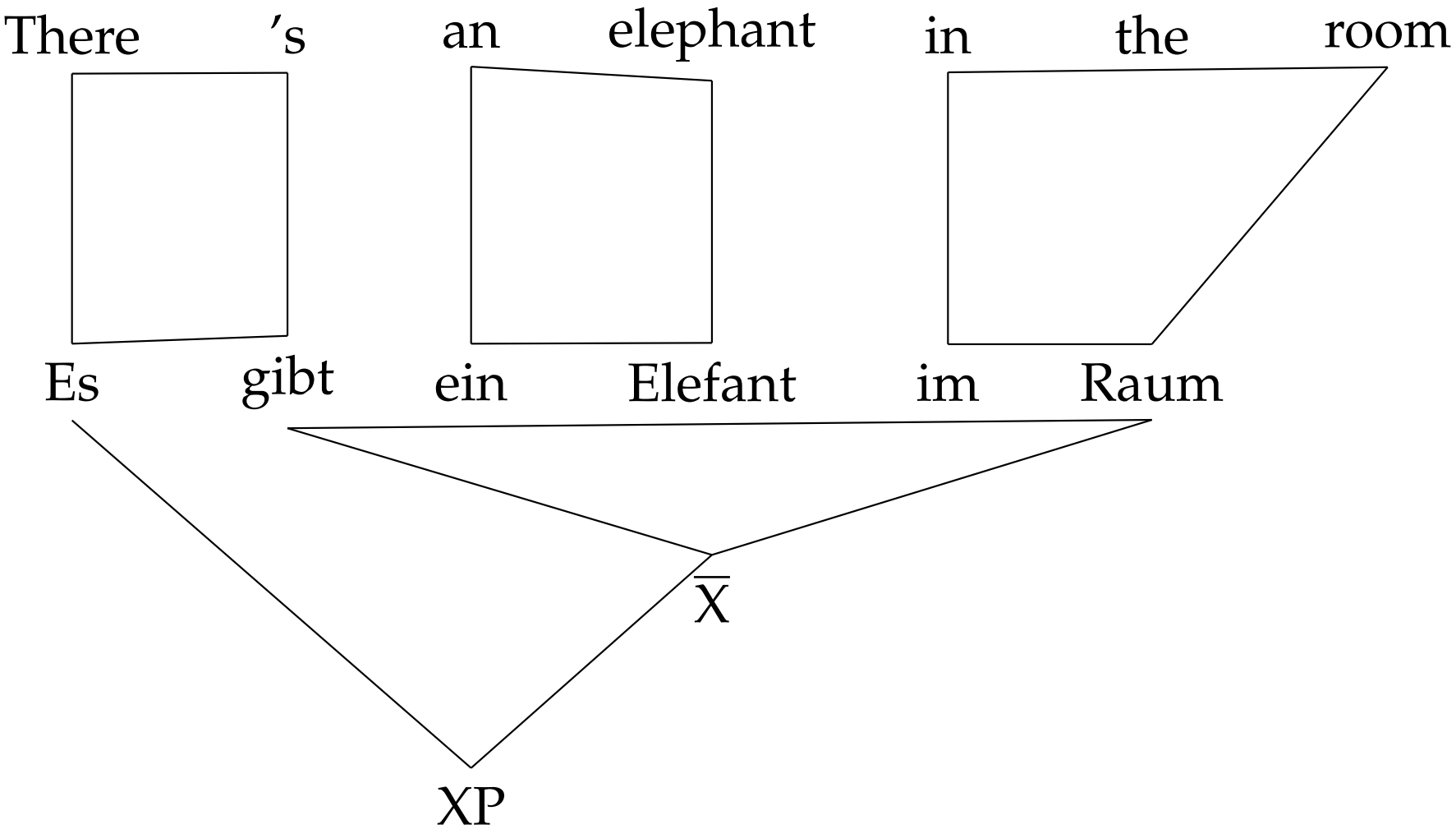
There ’s an elephant in the room







Es gibt ein Elefant im Raum


There
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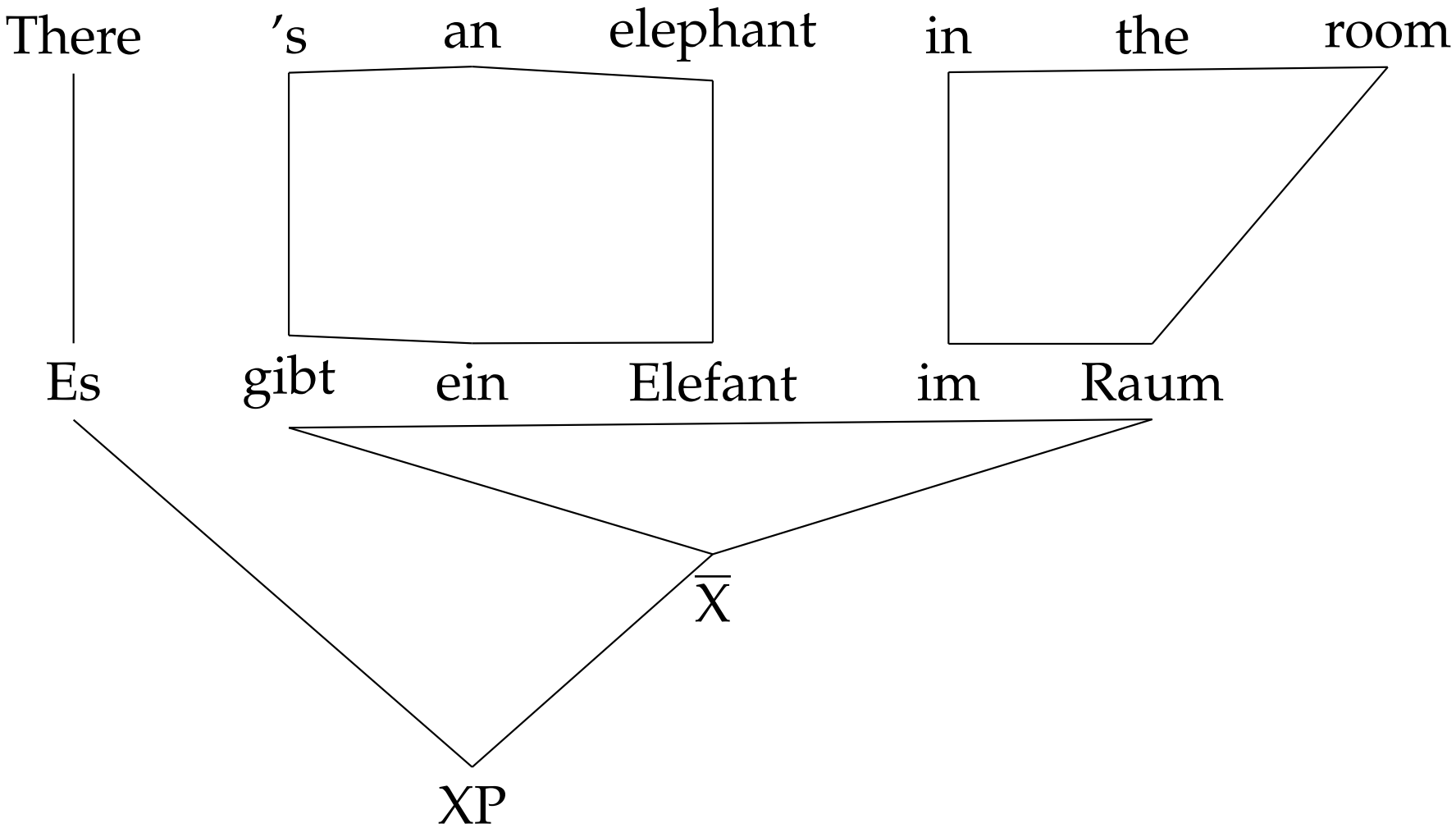
There
's
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Es
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ein
Elefant
im
Raum
X̄
XP

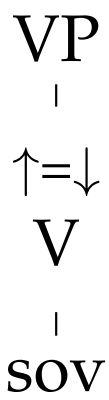
CAT N-GRAMTABELL | FRASELENKING | SYNTAKS

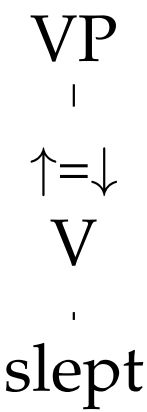
- N-grambasert (datadriven/korpusbasert) lenking kan filtrerast med kunnskap
  - berre lenkjer som samsvarer med *syntaktiske nodar* (Samuelsson & Volk, 2007)
  - berre lenkjer som samsvarer med ein *dependensanalyse* (Hearne mfl., 2008)
  - berre lenkjer som samsvarer med ein *f-strukturanalyse* (Graham & Genabith, 2009)

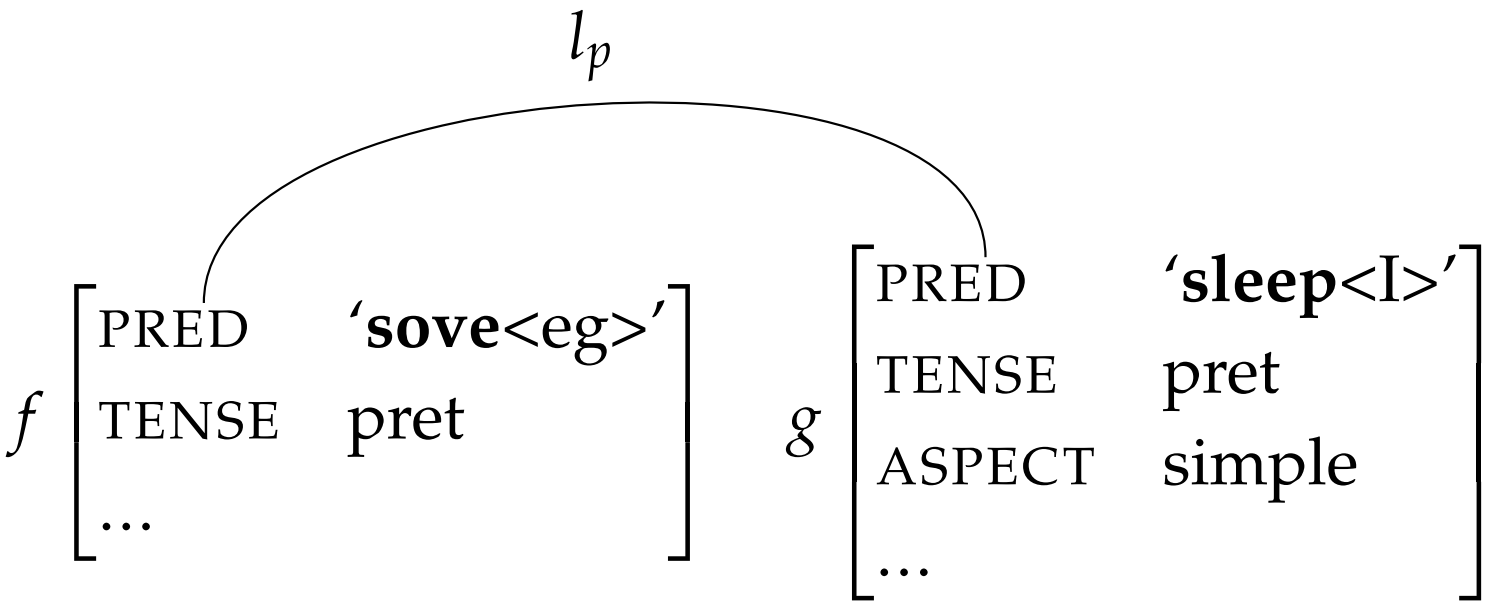
CAT SYNTAKS | FRASELENKING | N-GRAMTABELL

- Men me kan au gå andre vegen
  - Data: LFG-analysar
  - Formål: annotert trebank
  - Kunnskapsdriven lenking, kan ev. filtrerast med N-gramtabell (eller omsetjingsordbok)

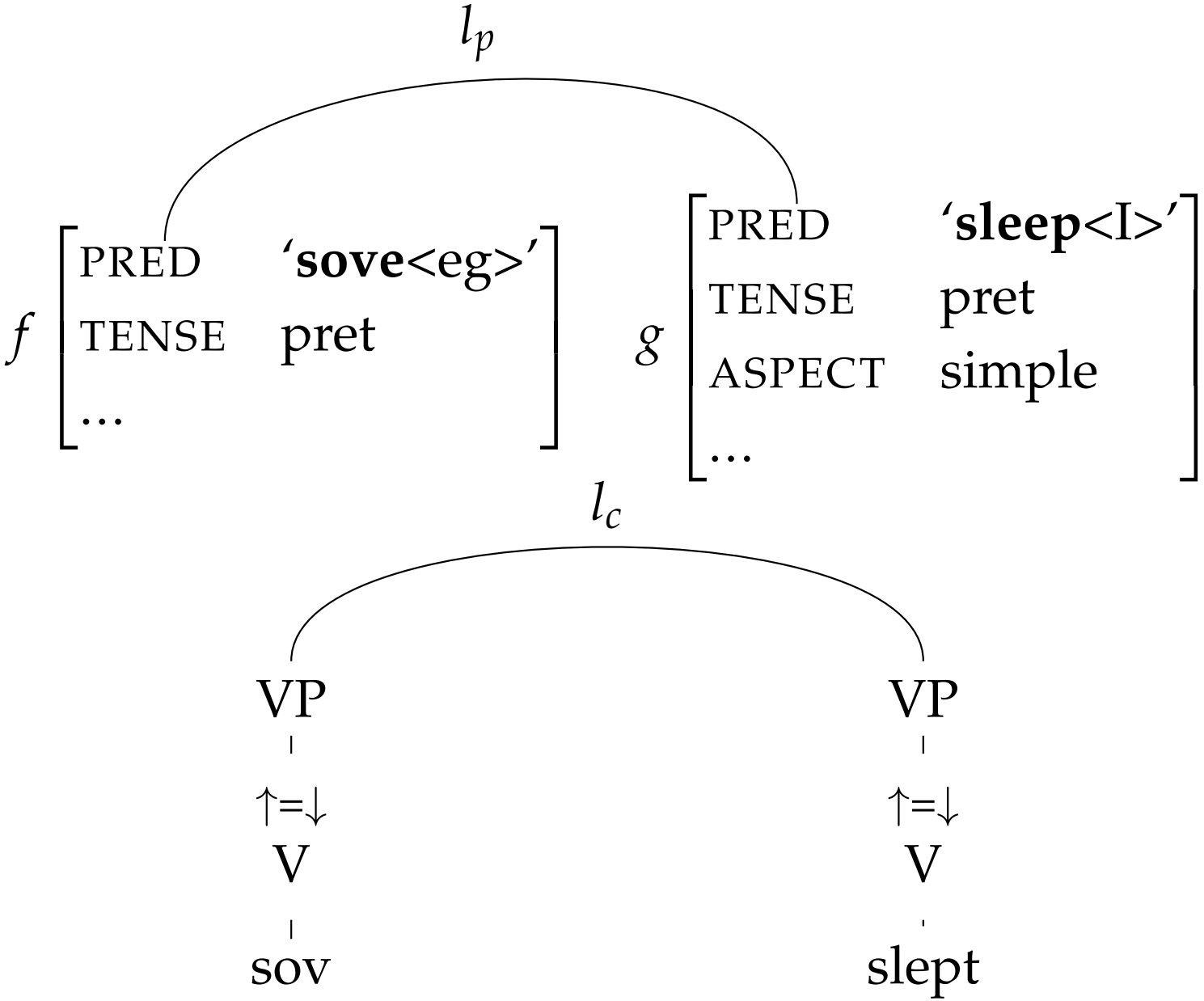
$$f\begin{bmatrix}\text{PRED} & \text{‘}\textbf{sove}\text{<eg>’}\\ \text{TENSE} & \text{pret}\\ \ldots & \end{bmatrix} \qquad g\begin{bmatrix}\text{PRED} & \text{‘}\textbf{sleep}\text{<I>’}\\ \text{TENSE} & \text{pret}\\ \text{ASPECT} & \text{simple}\\ \ldots & \end{bmatrix}$$






l_p
f
PRED ‘**sove**<eg>’
TENSE pret
…
g
PRED ‘**sleep**<I>’
TENSE pret
ASPECT simple
…


VP
↑=↓
V
sov
VP
↑=↓
V
slept


l_p
f
PRED ‘**sove**<eg>’
TENSE pret
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TENSE pret
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l_c
VP
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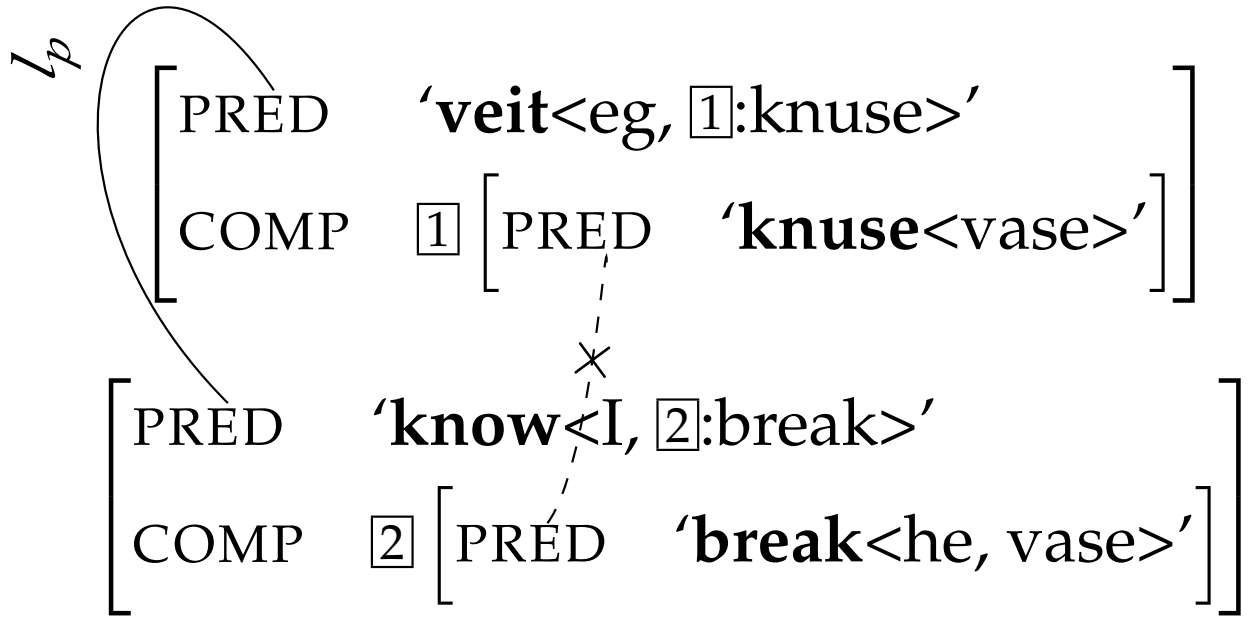


For å lenkje p til q må alle argument av p ha omsetjingar i f-strukturen av q, og omvendt

(1) a. der Tonfall gefällt mir nicht

$$\begin{bmatrix} \text{PRED} & \text{`}\textbf{gefallen}\text{<Tonfall, ich}_i\text{>'} \ldots \end{bmatrix}$$

b. jeg liker ikke tonen

$$\begin{bmatrix} \text{PRED} & \text{`}\textbf{like}\text{<jeg}_i\text{, tonen>'} \ldots \end{bmatrix}$$

(2) a. Adams veddet en sigarett med Browne på at det regnet.

$$\begin{bmatrix} \text{PRED} & \text{‘}\textbf{vedde}\text{<Abrams, sigarett, Browne, regne>’} \\ \text{ADJUNCT} & \{\} \end{bmatrix}$$

b. abramsi brouns daenajleva sigaretze, rom cvimda.

$$\begin{bmatrix} \text{PRED} & \text{‘}\textbf{da-najleveba}\text{<Abrams, Browne, cvima>’} \\ \text{ADJUNCT} & \left\{ \text{sigareti} \right\} \end{bmatrix}$$

«ORDOMSETJING»

- LPT = Linguistically Predictable Translations
- Her: bottom-up-informasjon (omsetjingsordbøker, 1-gramtabell, ...)

- kaffi $=_{LPT}$ coffee
- kaffi $\neq_{LPT}$ tea
- $\text{han}_i =_{LPT} \text{Joe}_i$
- kaffi $\neq_{LPT}$ Bob

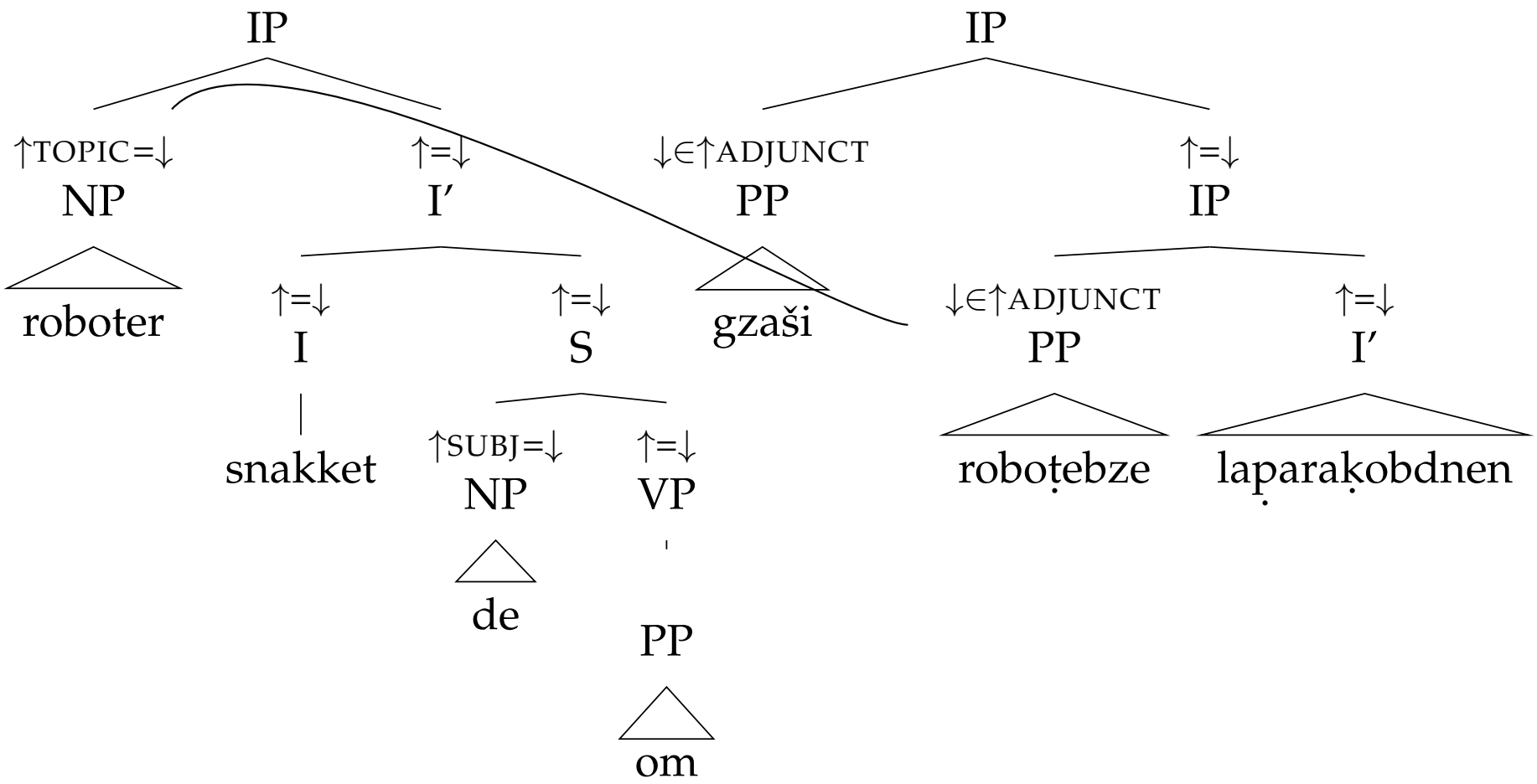
- (kaffi $=_{LPT}$ Joe)

RANGERING

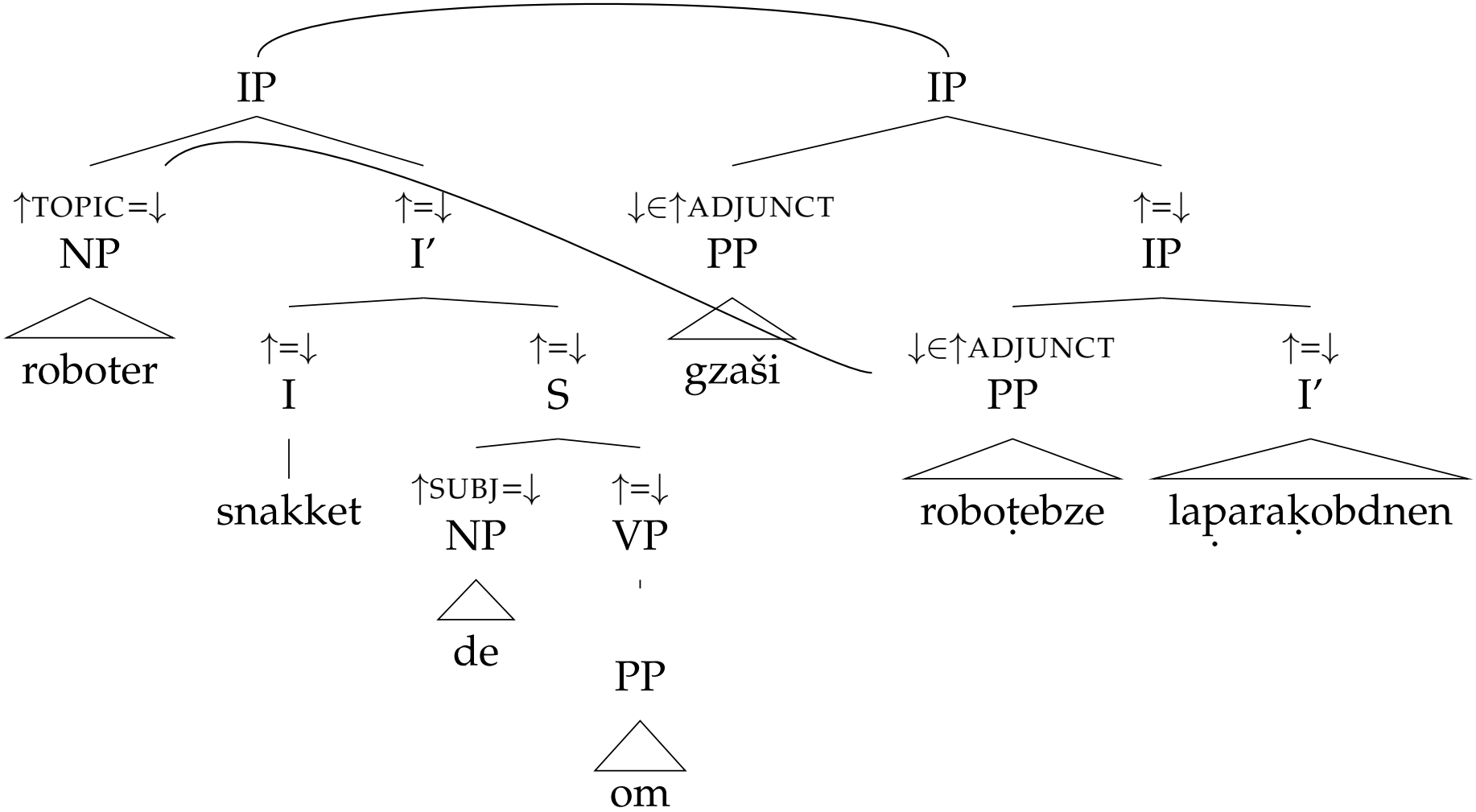
- LPT-informasjon
- Lik følgje i argumentstruktur
- Djupaste lenking:

$$\begin{bmatrix} \text{PRED} & \text{`}\textbf{veit}\text{<eg,}\boxed{1}\text{:knuse>'} \\ \text{COMP} & \boxed{1}\begin{bmatrix} \text{PRED} & \text{`}\textbf{knuse}\text{<han,vase>'} \end{bmatrix} \end{bmatrix}$$

$$\begin{bmatrix} \text{PRED} & \text{`}\textbf{know}\text{<I,}\boxed{2}\text{:break>'} \\ \text{COMP} & \boxed{2}\begin{bmatrix} \text{PRED} & \text{`}\textbf{break}\text{<he,vase>'} \end{bmatrix} \end{bmatrix}$$



(3)a. **gza-ši roboṭeb-ze laṗaraḳobdnen**
veg.DAT-til robotar.DAT-på snakka.3PL
'På vegen hadde dei snakka om robotar'



(3)a. **gza-ši roboṭeb-ze laṗaraḳobdnen**
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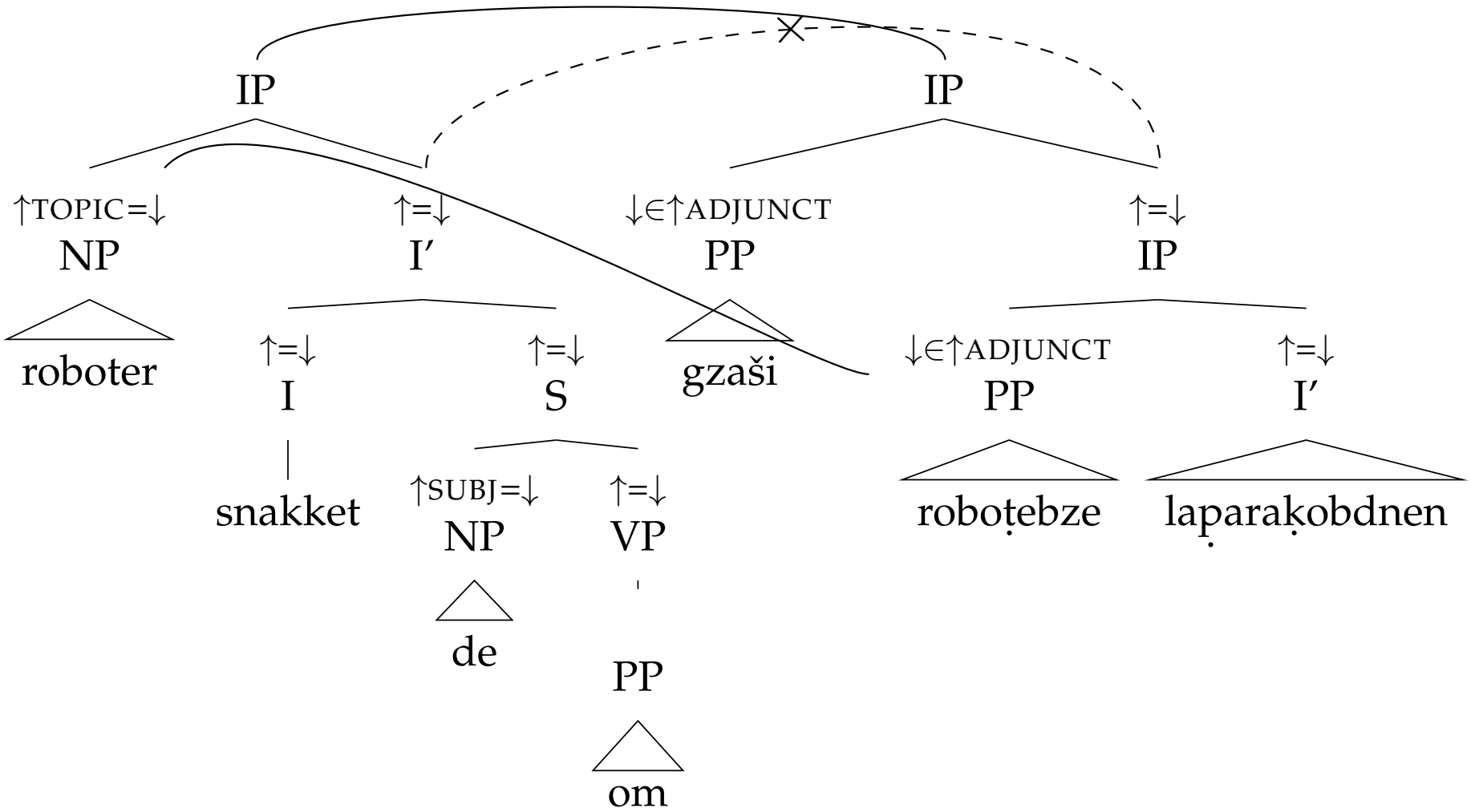

(3)a. **gza-ši** **roboṭeb-ze** **laṗaraḳobdnen**
veg.DAT-til robotar.DAT-på snakka.3PL
'På vegen hadde dei snakka om robotar'

- Kanskje eit problem å generalisere til grammatikkar utanfor Xpar-prosjektet...
- Ikkje alle predikat finst i argument/adjunkt av rotpredikatet
- Fragmentariske analysar sjølvsagt vanskeleg
  - Forventa inndata er manuelt disambiguerte analysar

$$\begin{bmatrix} \text{PRED} & \text{‘}\mathbf{perf}\langle\boxed{1}\text{:snakke*om}\rangle\boxed{2}\text{:de’} \\ \text{XCOMP} & \boxed{1}\begin{bmatrix}\text{PRED} & \text{‘}\mathbf{snakke*om}\langle\boxed{2}\mathbf{:de, robot}\rangle\text{’}\end{bmatrix} \end{bmatrix}$$

$$\begin{bmatrix} \text{PRED} & \text{‘}\mathbf{laparaki}\langle\text{pro}\rangle\text{’} \\ \text{ADJUNCT} & \left\{ \begin{bmatrix}\text{PRED} & \text{‘}\mathbf{gza}\text{’}\end{bmatrix}, \begin{bmatrix}\text{PRED} & \text{‘}\mathbf{roboti}\text{’}\end{bmatrix} \right\} \end{bmatrix}$$

(4)a. **de hadde snakket om roboter**

b. **gza-ši roboteb-ze laparakobdnen**
veg.DAT-til robotar.DAT-på snakka.3PL
‘På vegen hadde dei snakka om robotar’

$$\begin{bmatrix} \text{PRED} & \text{`}\mathbf{la}\text{<ho,skrive>}\boxed{1}\text{:eg'} \\ \text{XCOMP} & \boxed{1}\begin{bmatrix} \text{PRED} & \text{`}\mathbf{skrive}\text{<}\boxed{1}\mathbf{:eg,brev}\text{>'} \end{bmatrix} \end{bmatrix}$$

$$\begin{bmatrix} \text{PRED} & \text{`}\mathbf{daacerineb}\text{<pro,pro,cerili>'} \end{bmatrix}$$

Takk for merksemda!

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- Program/kjeldekode er tilgjengeleg frå https://github.com/unhammer/lfgalign under GNU GPL
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