Word order and scope of adjuncts in Dutch

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Overview

- The Scope of Adjuncts:
  - ⋆ Adjuncts and Quantified NPs,
  - ⋆ Multiple Adjuncts,
  - ⋆ Adjuncts and Verb Clusters.
- Technicalities:
  - ⋆ Adjuncts Structure Extension, Argument Inheritance,
  - ⋆ Lexical Resource Semantics.
- Account of the Data:
  - ⋆ A constraint on Word Order and Scope

Adjuncts may precede or follow argument NPs

(1) a. dat Kim **regelmatig** haar moeder bezoekt
that Kim regularly her mother visits
that Kim visits her mother regularly

b. dat Kim haar moeder **regelmatig** bezoekt

But NP - Adv Order constrains Semantics

(2) a. dat Kim **regelmatig** twee pcs verplaatst
that Kim regularly two pcs moves
that Kim regularly moves two pcs
that there are two pcs which Kim moves regularly

b. dat Kim twee pcs **regelmatig** verplaatst
that there are two pcs which Kim moves regularly

But NP - Adv Order constrains Semantics (2)

(3) a. dat Jan **vaak** een meisje zoekt
that John often a girl seeks

de dicto: *that John often seeks a girl*

de re: *that there is a girl which John often seeks*

b. dat Jan een meisje **vaak** zoekt

de re: *that there is a girl which John often seeks*

(Ruys, 2001)

Adjunct Scope follows Linear Order

(4) a. dat Jan **met tegenzin vaak** pizza eet
that John unwillingly often pizza eats
that John unwillingly often eats pizza

b. dat Jan **vaak met tegenzin** pizza eet
that John often unwillingly eats pizza

Scope-taking Adjuncts and Verb Clusters

(5) Ik heb Johan nooit horen klagen over geld
I have Johan never heard complain about money
I have never heard Johan complain about money

(6) Zuid-Afrika is een staat die zich niet laat intimideren
South Africa is a state which self not lets intimidated
door dreigementen
by threats
South Africa, is a state which doesn't let itself be intimidated by threats

Manner Adverbs and Verb Clusters

(7) dat Cathy hen wild zag zwaaien
that Cathy them wild saw wave
that Cathy saw them waving wildly

(8) Ik heb de minister schouderophalend horen zeggen dat
I have the minister shruggingly hear say that
er een grens is.
there a border is
I heard the minister say shruggingly that there is a limit

(9) ... dat Stegemann Schubert uitvoerig laat praten
... that Stegemann Schubert extensively allow talk
... that Stegemann allows Schubert to talk extensively

Ambiguous Cases: Scope-taking adverbs

(10) dat Kim de boeken **nooit** wil controleren
that Kim the books never wants check
that Kim never wants to check the books
that Kim wants to never check the books

(11) dat Kim het verslag **wekelijks** wil ontvangen
that Kim the report weekly wants to receive
that Kim weekly wants to receive the report
that Kim wants to receive the report weekly

Multiple Adjuncts and Verb Clusters

(12) a. dat ik Jan het project **regelmatig gedurende een**
that I Jan the project regularly for some
tijdje zag hinderen
time saw hamper
that I regularly saw Jan hamper the project for some time

b. *that I saw Jan regularly for some time hamper the project*

c. *that I regularly saw Jan for some time hamper the project*

d. ? *that I regularly for some time saw J hamper the project*

e. **that, for some time, I regularly saw J hamper the project*

f. **that I saw J for some time regularly hamper the project*

g. **that I for some time saw J regularly hamper the project*

(Ackema & Neeleman, 2003)

Summary of the Data

- Adv - NP order is ambiguous,
- NP - Adv order follows linear order,
- Adv - Adv interpretation follows linear order
- Adv - Vmodal - Vmain ambiguous
- (NP_2) Adv_1 Adv_2 $Vmodal_1$ $Vmain_2$ grammatical
- (NP_2) Adv_2 Adv_1 $Vmodal_1$ $Vmain_2$ ungrammatical

Previous Work: Scrambling

- NPs may move (scramble) (long-distance) across adjuncts,
  - ⋆ Operation triggered by semantics/has semantic effects
- Webelhuth, 92, de Hoop, 92, de Hoop & van der Does, 98
- Contra Scrambling:
  - ⋆ Ruys 2001: Semantic effects are preferences only or not existing or scope effects.
  - ⋆ Neeleman 1994: Fixed NP Word Order in Dutch unaccounted for.

Scrambling Multiple NPs long-distance

(13) a. dat Kim de spelers$_i$ de bal$_j$ **niet eerder** zo hard t_i
that Kim the players the ball not before so hard
t_j zag raken
saw hit
that Kim never before saw the players hit the ball so hard

b. dat Kim **niet eerder** de spelers de bal zo hard zag raken

c. dat Kim de spelers **niet eerder** de bal zo hard zag raken

d. *dat Kim de bal$_i$ **niet eerder** de spelers zo hard t_i zag raken

e. *dat Kim de bal$_i$ de spelers$_j$ **niet eerder** zo hard t_j t_i zag raken

(Neeleman, 1994)

Adjuncts as Complements

- Adjuncts are added lexically to the valence list of the head they modify (van Noord & Bouma 1994),

- Arguments of Embedded Verb are Inherited by the Matrix Verb (Argument Inheritance, Hinrichs & Nakazawa, 94)

  - ⋆ Accounts for Adjunct Scope Ambiguity w.r.t. Matrix Verb,
  - ⋆ Overgenerates: Does not account for Adv - Adv scope constraints.
  - ⋆ Undergenerates: Does not account for NP - Adv data,
  - ⋆ Lacks explicit semantics

Underspecified Semantics for Adjuncts as Complements

- Argument Inheritance and Argument Realization,
- Adjunct Semantics in Lexical Resource Semantics,
- Constraint on Adjunct Scope.

Adjuncts as Complements (BMS Remix)

- Argument Structure Extension

$$\left[\text{HEAD} \quad \textit{verb}\right] \Rightarrow \left[\begin{array}{ll} \text{HEAD} & \boxed{2} \\ \text{DEPS} & \boxed{1} \bigcirc \textit{list}\left(\left[\text{MOD} \mid \text{HEAD} \quad \boxed{2}\right]\right) \\ \text{ARG-ST} & \boxed{1} \end{array}\right]$$

- Argument Realization (ignoring extraction)

$$\left[\text{HEAD} \quad \textit{verb}\right] \Rightarrow \left[\begin{array}{ll} \text{SUBJ} & \boxed{1} \\ \text{COMPS} & \boxed{2} \\ \text{DEPS} & \boxed{1} \oplus \boxed{2} \end{array}\right]$$

Argument Inheritance (Hinrichs & Nakazawa)

- Value of COMPS list directly constrained to contain *inherited* arguments.

$$\left[\begin{array}{ll} \textsc{phon} & \textit{moet} \\ \textsc{comps} & \boxed{1} \oplus \left\langle \left[\begin{array}{ll} \textsc{head} & \textit{verb} \\ \textsc{comps} & \boxed{1} \end{array}\right] \right\rangle \end{array}\right]$$

Argument Realization + Inheritance

- Argument Realization incorporates Argument Inheritance as a constraint (de Kuthy & Meurers, 2000)

$$\left[\text{HEAD} \quad \textit{verb}\right] \Rightarrow \left[\begin{array}{ll} \text{SUBJ} & \boxed{1} \\ \text{COMPS} & \boxed{3} \\ \text{DEPS} & \boxed{1} \oplus \boxed{2} \\ \& & \textit{arg-inheritance}(\boxed{2},\boxed{3}) \end{array}\right]$$

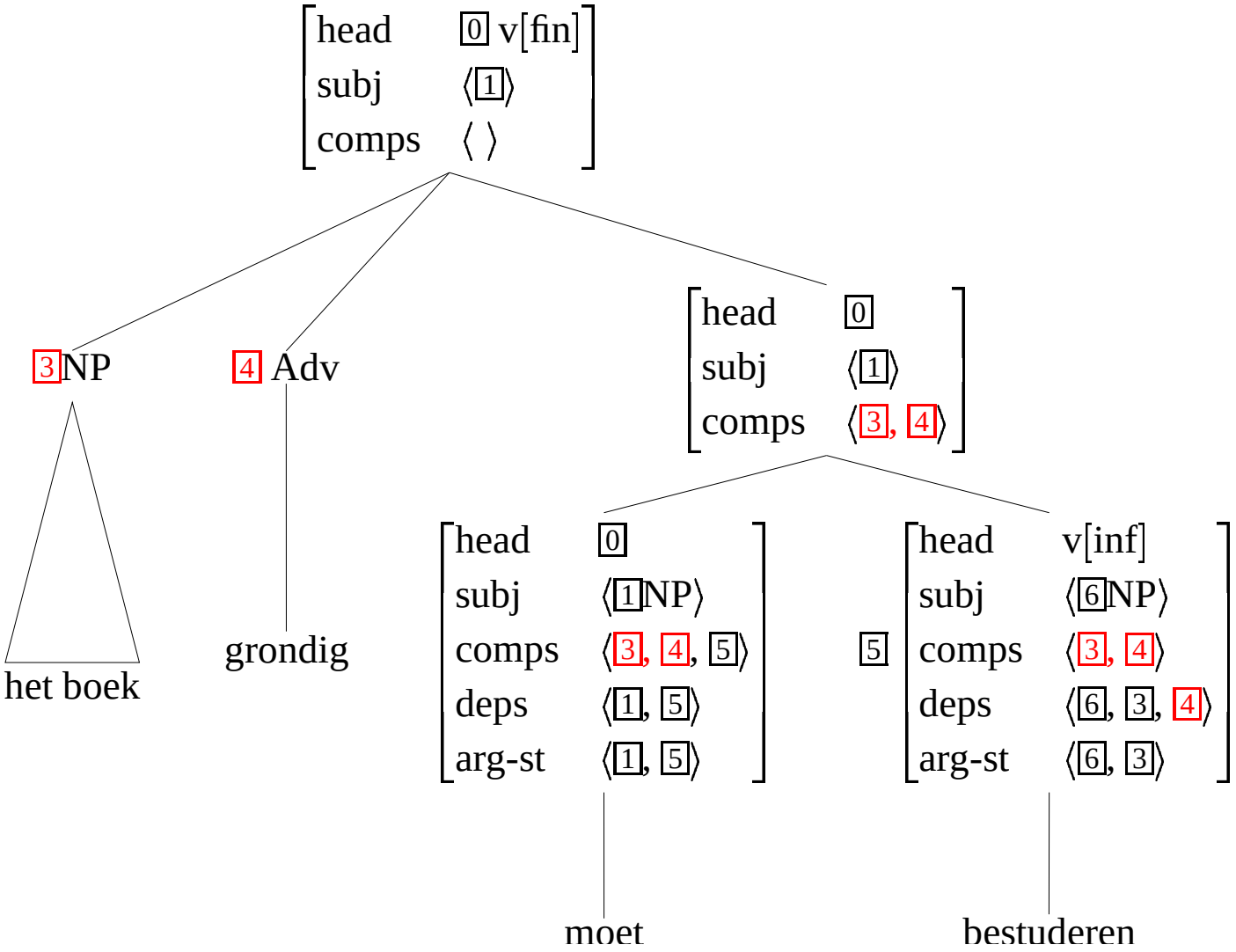
$$\textit{arg-inheritance}(\boxed{2'} \oplus \boxed{2''} \left\langle \left[\begin{array}{ll} \text{HD} \mid \text{INHER} & + \\ \text{COMPS} & \boxed{4} \end{array}\right] \right\rangle, \ (\boxed{2'} \oplus \boxed{2''}) \bigcirc \boxed{4})$$

$$\textit{arg-inheritance}(\boxed{2},\boxed{2}) \leftarrow \textit{no-inher-arg}(\boxed{2})$$

Argument Inheritance and Argument Structure Extension

$$\begin{bmatrix}
\text{PHON} & \langle moet \rangle \\
\text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{MAIN} \quad \text{must}(e, i, \alpha) \end{bmatrix} \\
\text{ARG-ST} & \left\langle \begin{bmatrix} \text{HD} & \begin{bmatrix} \textit{noun} \\ \text{CASE} \quad nom \\ \text{INDEX} \quad i \end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{HD} & \begin{bmatrix} \textit{verb} \\ \text{INHER} \quad + \\ \text{TOP} \quad \alpha \end{bmatrix} \\ \text{SUBJ} & \left\langle \begin{bmatrix} \text{INDEX} \quad i \end{bmatrix} \right\rangle \end{bmatrix} \right\rangle
\end{bmatrix}$$

An example


head 0 v[fin]
subj ⟨1⟩
comps ⟨ ⟩
3 NP
4 Adv
head 0
subj ⟨1⟩
comps ⟨3, 4⟩
het boek
grondig
head 0
subj ⟨1 NP⟩
comps ⟨3, 4, 5⟩
deps ⟨1, 5⟩
arg-st ⟨1, 5⟩
5
head v[inf]
subj ⟨6 NP⟩
comps ⟨3, 4⟩
deps ⟨6, 3, 4⟩
arg-st ⟨6, 3⟩
moet
bestuderen

Lexical Resource Semantics (Richter & Sailer)

$$\begin{bmatrix} \text{SYNSEM} \mid \text{HEAD} & \begin{bmatrix} \text{TOP} & \mathit{lf} \\ \text{MAIN} & \mathit{term} \\ \text{INDEX} & \mathit{i} \end{bmatrix} \\ \text{CONT} \mid \text{PARTS} & \mathit{list\text{-}of(term)} \end{bmatrix}$$

- The TOP of a clause is a logical form consisting of all and only the terms in PARTS,
- MAIN is semantic contribution of the lexical head of a phrase,
- MAIN must always be a component of TOP.
- INDEX is a logical variable (for events or individuals),

Lexical Resource Semantics

$$\begin{bmatrix} \textsc{synsem} \mid \textsc{head} & \begin{bmatrix} \textsc{top} & \mathit{lf} \\ \textsc{main} & \mathit{term} \\ \textsc{index} & \mathit{i} \end{bmatrix} \\ \textsc{cont} \mid \textsc{parts} & \mathit{list\text{-}of(term)} \end{bmatrix}$$

- In *headed structures*,
  - ⋆ the values of TOP, MAIN and INDEX are identical on mother and head daughter,
  - ⋆ the value of PARTS is the concatenation of the PARTS values of the daughters.

Adv - NP Ambiguity

(14) dat Kim regelmatig een arts bezoekt
that Kim regularly a doctor visits
that Kim regularly visits a doctor
that there is a doctor which Kim regularly visits

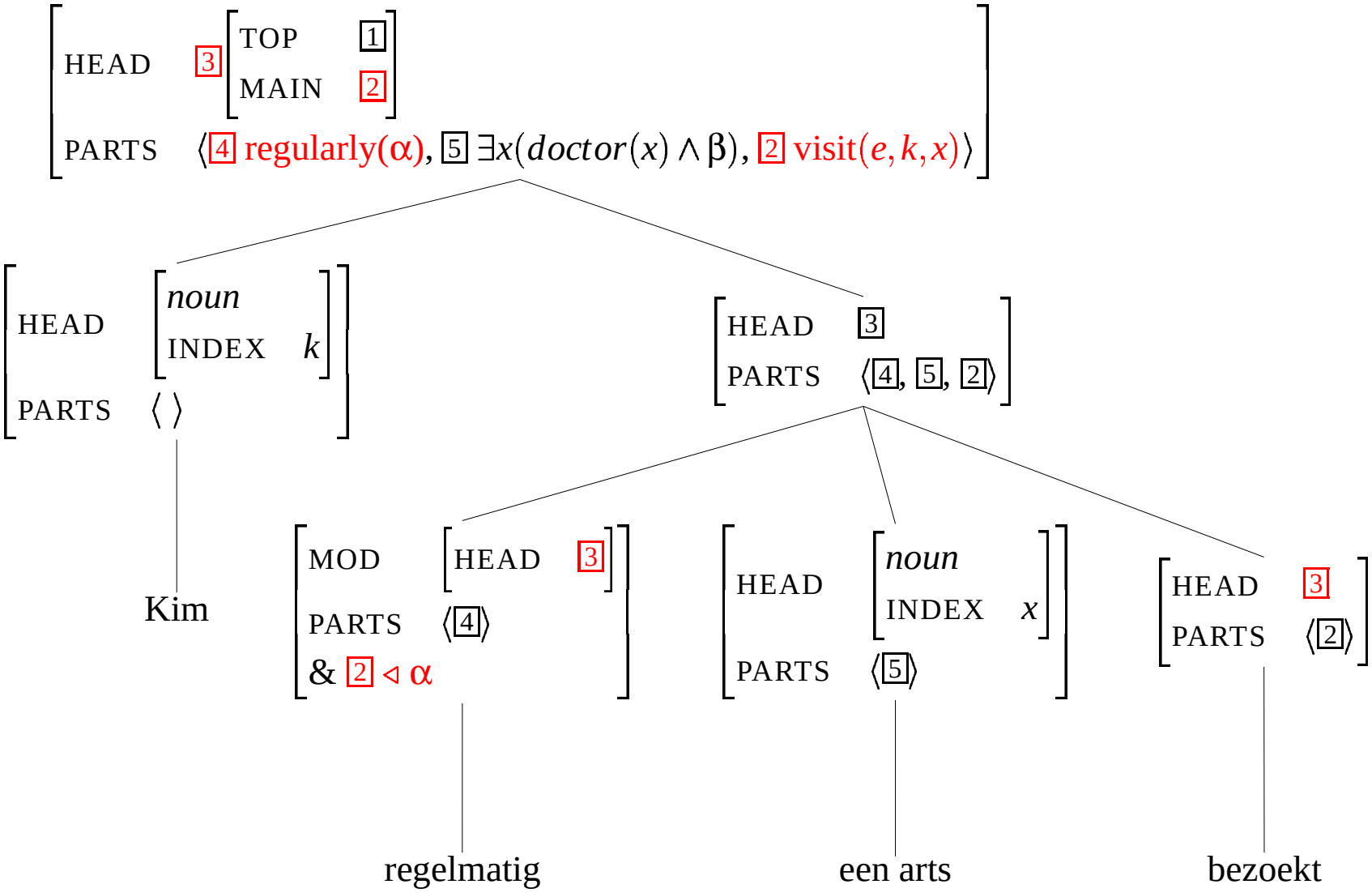
(15) a. $\text{regularly}(\ \exists x(\text{doctor}(x) \wedge \text{visit}(e, k, x)))$
b. $\exists x(\text{doctor}(x) \wedge \text{regularly}(\text{visit}(e, k, x)))$

Adv - NP Ambiguity

$$\begin{bmatrix}
\text{PHON} & \langle \textit{regelmatig} \rangle \\
\text{HD} & \begin{bmatrix} \text{TOP} & \boxed{1} \\ \text{MAIN} & \boxed{3} \end{bmatrix} \\
\text{MOD} \mid \text{HD} & \begin{bmatrix} \textit{verb} & \\ \text{TOP} & \boxed{1} \\ \text{MAIN} & \boxed{2} \end{bmatrix} \\
\text{PARTS} & \langle \boxed{3}\text{regularly}(\alpha) \rangle \\
\& \ \boxed{2} \lhd \alpha &
\end{bmatrix}$$

$$\begin{bmatrix}
\text{PHON} & \langle \textit{bezoekt} \rangle & \\
\text{HEAD} & \boxed{3} \begin{bmatrix} \textit{verb} & \\ \text{TOP} & \boxed{1} \\ \text{MAIN} & \boxed{2} \end{bmatrix} & \\
\text{SUBJ} & \langle \ \boxed{4} \begin{bmatrix} \textit{noun} & \\ \text{INDX} & i \end{bmatrix} \rangle & \\
\text{COMPS} & \langle \ \boxed{5} \begin{bmatrix} \textit{adv} & \\ \text{MOD} \mid \text{HD} & \boxed{3} \end{bmatrix}, \ \boxed{6} \begin{bmatrix} \textit{noun} & \\ \text{INDX} & j \end{bmatrix} \rangle & \\
\text{DEPS} & \langle \boxed{4}, \boxed{5}, \boxed{6} \rangle & \\
\text{ARG-ST} & \langle \boxed{4}, \boxed{6} \rangle & \\
\text{PARTS} & \langle \boxed{2} \ \text{visit}(e, i, j) \rangle &
\end{bmatrix}$$

Adv - NP Ambiguity

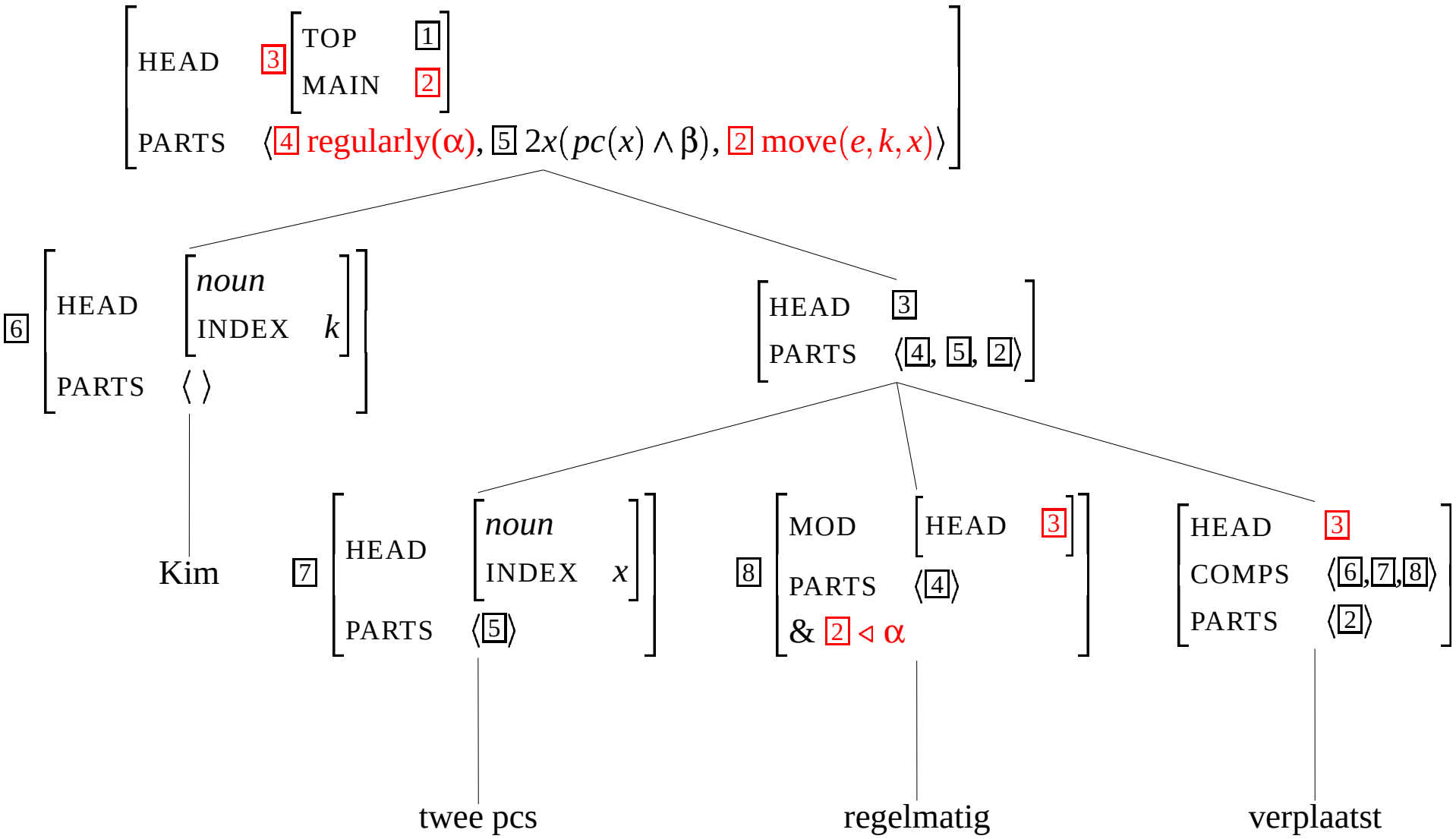


NP - Adv Non-ambiguity

(16) a. dat Kim **regelmatig** twee pcs verplaatst
that Kim regularly two pcs moves
that Kim regularly moves two pcs
that there are two pcs which Kim moves regularly

b. dat Kim twee pcs **regelmatig** verplaatst
that there are two pcs which Kim moves regularly

NP - Adv Non-ambiguity

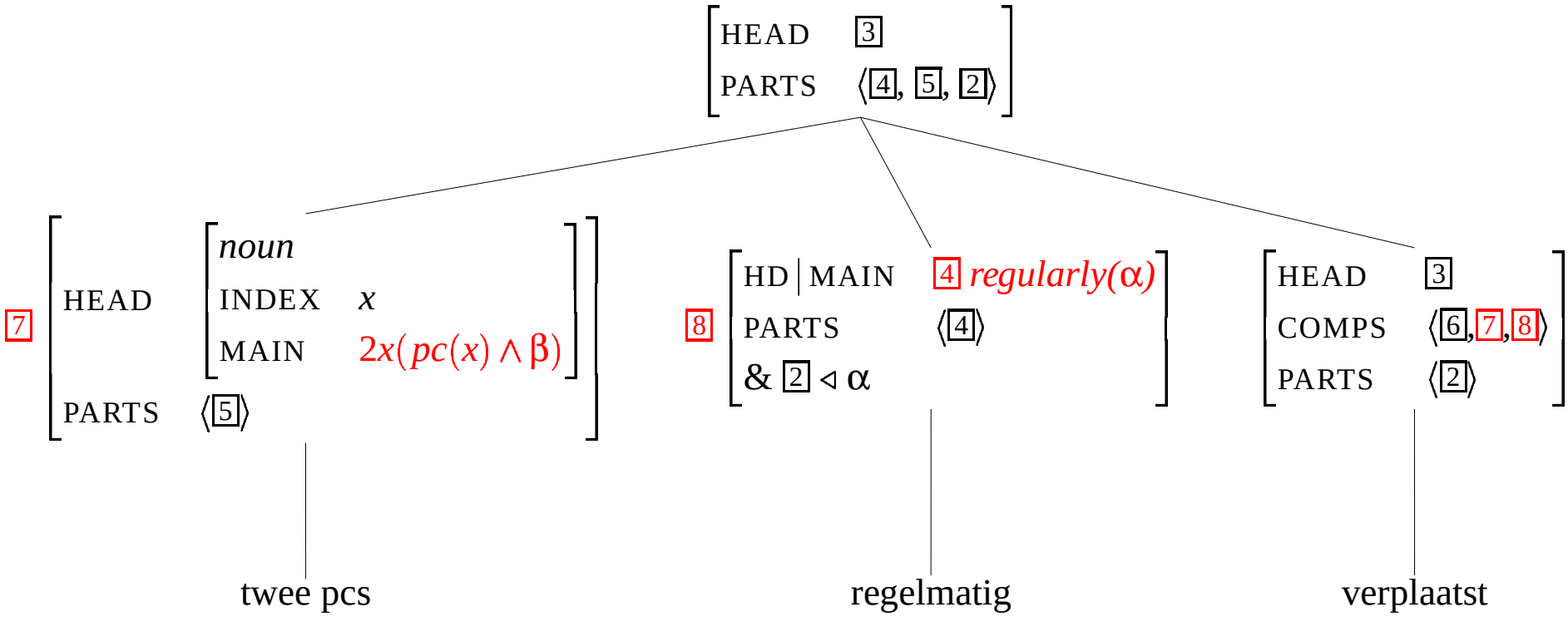


Constraining Adverb Scope

$$\left[\begin{array}{l} \textit{verb} \\ \textsc{comps} \quad \left\langle \ldots, \left[\textsc{hd} \mid \textsc{main} \ \boxed{1}\right], \ldots, \boxed{2}\left[\textsc{hd} \mid \textsc{main} \ \boxed{3}\right], \ldots \right\rangle \\ \& \ \boxed{1} \lhd \boxed{3} \end{array}\right] \rightarrow \quad \text{argument}(\boxed{2})$$

- If
  - ⋆ A follows B on COMPS,
  - ⋆ and A takes scope over B,
- then
  - ⋆ A must be an argument.

NP - Adv Non-ambiguity



Adv - Adv scope follows linear order

(17) dat Jan **vaak met tegenzin** pizza eet

that John often unwillingly eats pizza

$$\begin{bmatrix} \textsc{phon} & \langle \text{eet} \rangle \\ \textsc{head} & \left[\textsc{main} \quad \text{eat}(e)\right] \\ \textsc{subj} & \langle \boxed{1} \rangle \\ \textsc{comps} & \langle \left[\textsc{hd} \mid \textsc{mn} \quad \text{often}(\alpha)\right], \left[\textsc{hd} \mid \textsc{mn} \quad \text{unwilling}(\beta)\right], \boxed{2} \rangle \\ \textsc{arg-st} & \langle \boxed{1}\text{NP}, \boxed{2}\text{NP} \rangle \end{bmatrix}$$

Adjuncts of Matrix V cannot follow Adjuncts of Embedded V

*dat de speler de bal **snel** **waarschijnlijk** leert afspelen
that the player the ball quickly probably learns pass

$$\begin{bmatrix}
\textsc{phon} & \langle leert \rangle \\
\textsc{hd}\,|\,\textsc{main} & learn(e,i,\beta) \\
\textsc{comps} & \langle \boxed{2},\ \boxed{3}\begin{bmatrix}\textsc{hd} & \begin{bmatrix}\textsc{top} & \beta \\ \textsc{mn} & \text{quick}(\gamma)\end{bmatrix}\end{bmatrix},\ \boxed{5}\begin{bmatrix}\textsc{hd} & \begin{bmatrix}\textsc{mn} & \text{probab}(\alpha)\end{bmatrix}\end{bmatrix},\ \boxed{4}\rangle \\
\textsc{deps} & \langle \boxed{1},\boxed{5},\boxed{4}\rangle \\
\textsc{arg-st} & \langle \boxed{1}\text{NP},\ \boxed{4}\begin{bmatrix}\textsc{hd} & \begin{bmatrix}\textsc{top} & \beta \\ \textsc{main} & \text{play}(e',i,j)\end{bmatrix} \\ \textsc{comps} & \langle\ \boxed{2}\text{NP},\ \boxed{3}\rangle\end{bmatrix}\rangle
\end{bmatrix}$$

What is an Argument?

- argument(A) if A occurs on ARG-ST of some verb.
- $\textsc{argument}(\left[\textsc{hd} \mid \textsc{mod} \quad \mathit{none}\right])$

Circumstantial Evidence

- Kiss (2002),
  - ⋆ German Mittelfeld Q-scope follows linear order or the obliqueness hierarchy,
  - ⋆ Ambiguity arises only where Order $\neq$ Obliqueness,
  - ⋆ Extends naturally to Adjuncts
- Steedman (ms)
  - ⋆ Existentials are skolem functions, not quantifiers,
  - ⋆ 'Skolemization' is a rule which applies in syntax,
  - ⋆ Only Existentials in syntactic scope of quantifier are ambiguous,
  - ⋆ Seems to predict *de dicto*/*de re* cases

Conclusion

- Adjunct Semantics using Lexical Resource Semantics,
- Constraint on Adjunct Scope and Word Order,
  - ⋆ Accounts for NP - Adjunct scope interactions,
  - ⋆ Accounts for Adjunct - Adjunct scope,
  - ⋆ Even in the Context of Verb Clusters.