Ling 566
Dec 10, 2015

Sign-Based Construction Grammar

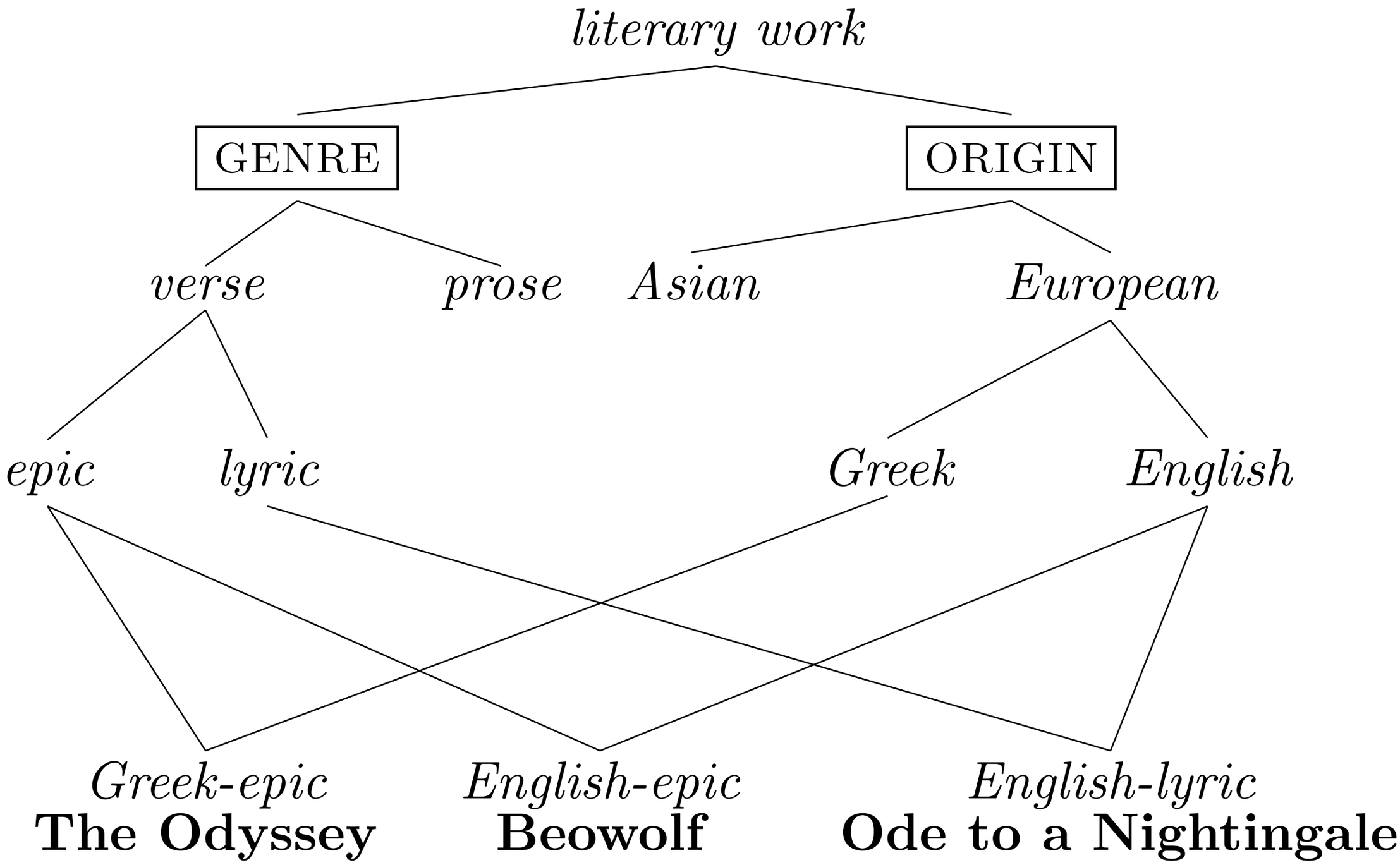
Overview

- Chapter 16 framework (same analyses, different underlying system)
- Reading questions
- Untangle this
- General wrap up

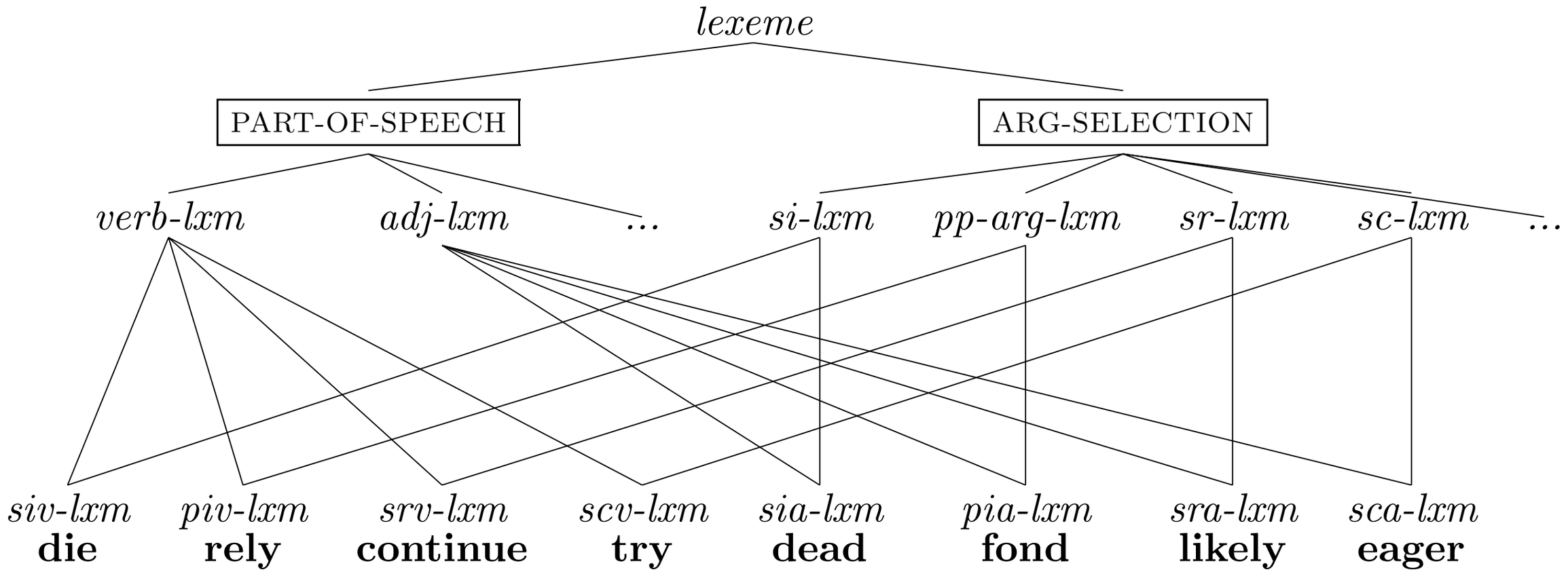
Overview of Differences

- Multiple Inheritance
- Signs
- Grammar rules form a hierarchy
- Every tree node has its own phonology
- Many principles become constraints on grammar rules
- The definition of well-formedness is simplified

Multiple Inheritance Hierarchies



Lexeme Hierarchy



Lexeme Abbreviations

- *si-lxm* : *strict-intransitive-lexeme*
- *pp-arg-lxm* : *PP-argument-lexeme*
- *sr-lxm* : *subject-raising-lexeme*
- *sc-lxm* : *subject-control-lexeme*
- *siv-lxm* : *strict-intransitive-verb-lexeme*
- *piv-lxm* : *PP-intransitive-verb-lexeme*
- *srv-lxm* : *subject-raising-verb-lexeme*
- *scv-lxm* : *subject-control-verb-lexeme*
- *sia-lxm* : *strict-intransitive-adjective-lexeme*
- *pia-lxm* : *PP-intransitive-adjective-lexeme*
- *sra-lxm* : *subject-raising-adjective-lexeme*
- *sca-lxm* : *subject-control-adjective-lexeme*

Lexeme Constraints

- *si-lxm* : $\left[\text{ARG-ST} \quad \langle\ \text{X}\ \rangle\right]$
- *pp-arg-lxm* : $\left[\text{ARG-ST} \quad \langle\ \text{X}\ ,\ \text{PP}\ \rangle\right]$
- *sr-lxm* : $\left[\text{ARG-ST} \quad \left\langle\ \boxed{1}\ ,\ \left[\text{SPR} \quad \langle\ \boxed{1}\ \rangle\right]\right\rangle\right]$
- *sc-lxm* : $\left[\text{ARG-ST} \quad \left\langle\ \text{NP}_i\ ,\ \left[\text{SPR} \quad \langle\ \text{NP}_i\ \rangle\right]\right\rangle\right]$

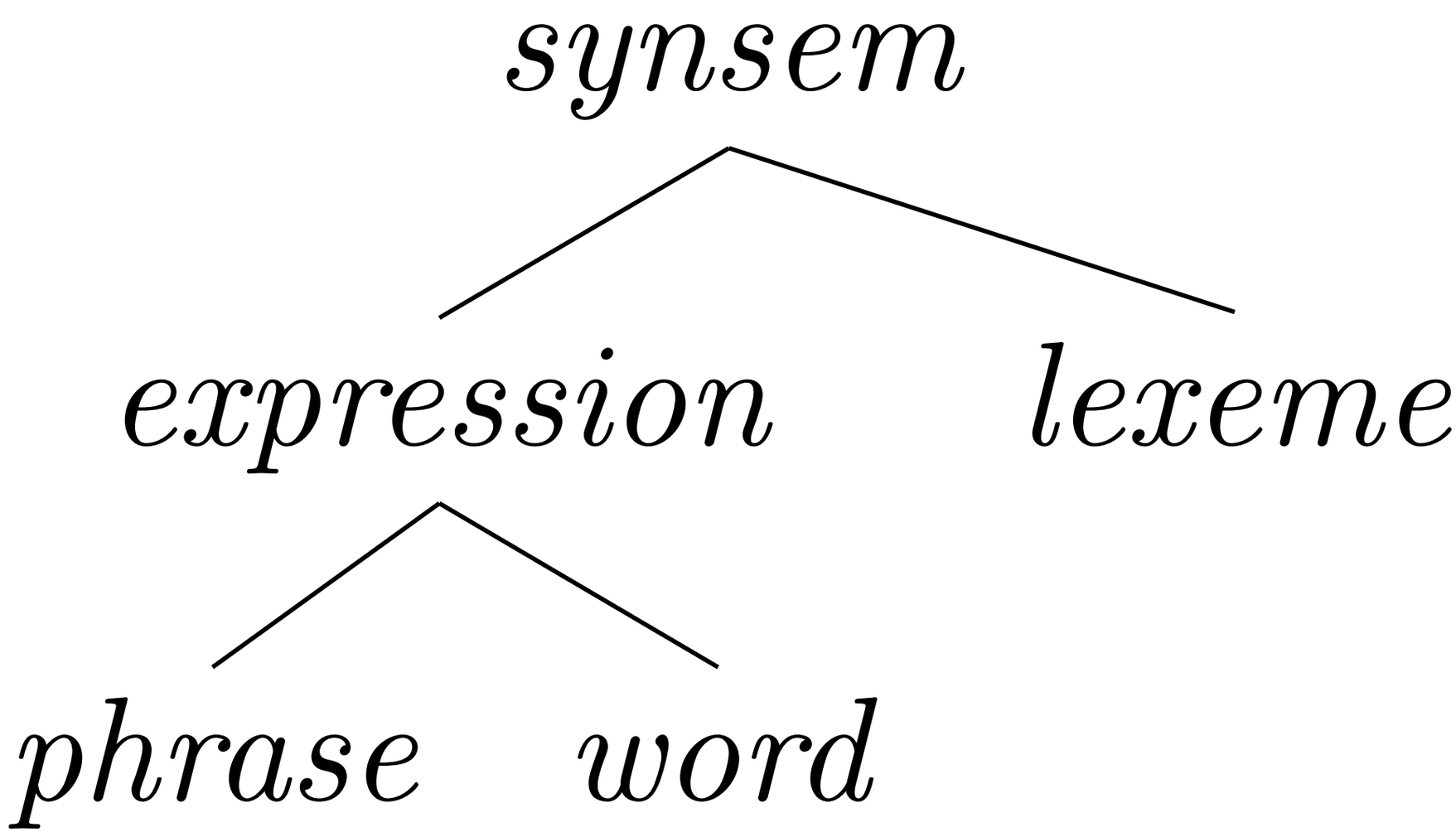
Another Lexeme Constraint

$$
\textit{verb-lxm}: \left[\begin{array}{ll}
\text{SYN} & \left[\begin{array}{ll}
\text{HEAD} & \left[\begin{array}{ll}
\textit{verb} & \\
\text{PRED} & - \\
\text{INF} & / - \\
\text{AUX} & / - \\
\text{POL} & -
\end{array}\right] \\
\text{ARG-ST} & \left\langle \left[\begin{array}{ll}
\text{HEAD} & \textit{nominal} \\
\text{VAL} & \left[\begin{array}{ll}
\text{SPR} & \langle\,\rangle \\
\text{COMPS} & \langle\,\rangle
\end{array}\right]
\end{array}\right], \ldots \right\rangle \\
\text{SEM} & \left[\text{MODE} \quad \text{prop}\right]
\end{array}\right]
\end{array}\right]
$$

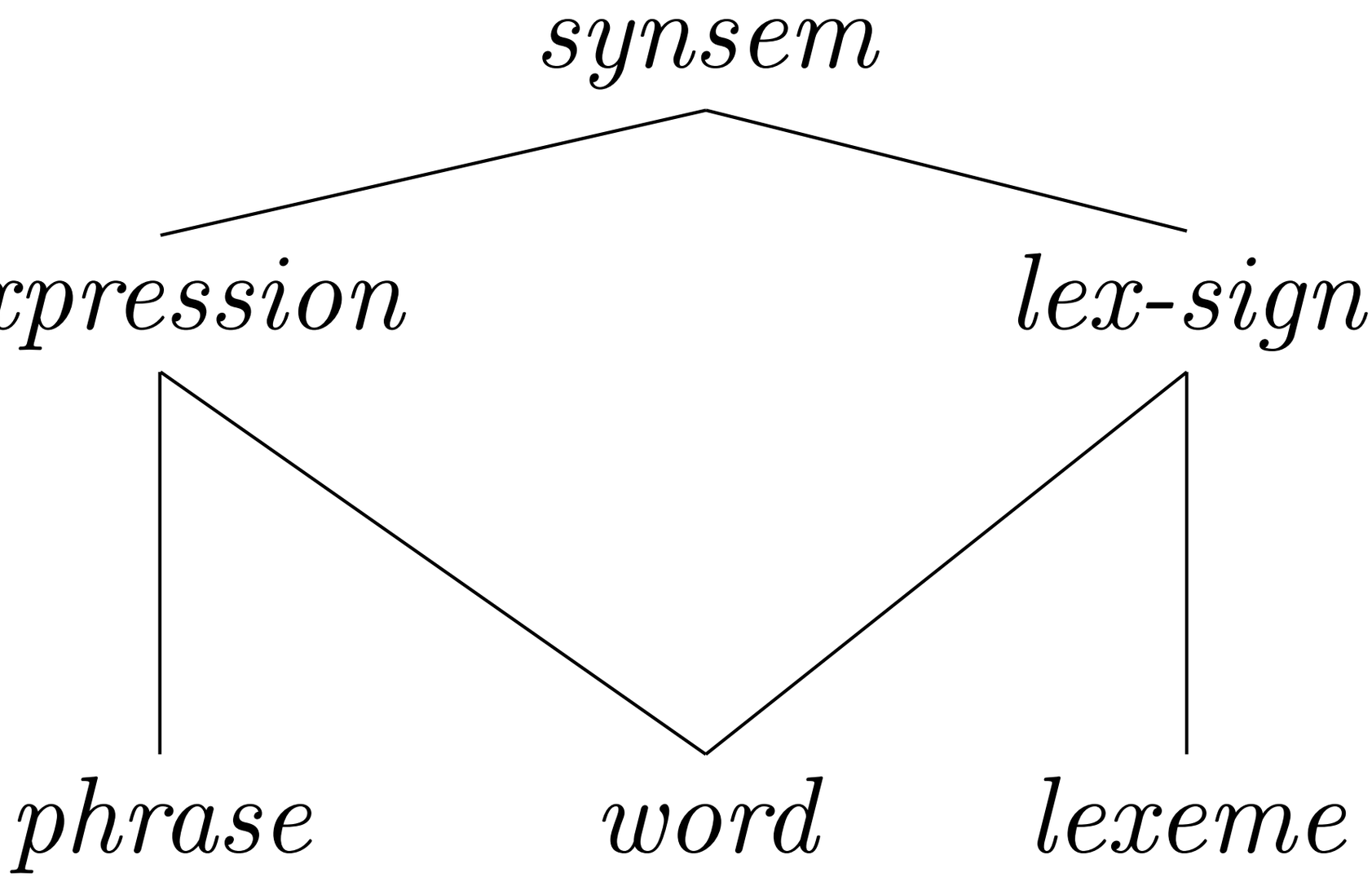
And Another

$$
\textit{adj-lxm} : \left[\begin{array}{ll}
\text{SYN} & \left[\begin{array}{ll}
\text{HEAD} & adj \\
\text{VAL} & \left[\begin{array}{ll}
\text{SPR} & \langle\ \text{X}\ \rangle \\
\text{MOD} & \langle\ [\text{HEAD}\ \ noun]\ \rangle
\end{array}\right]
\end{array}\right] \\
\text{ARG-ST} & \left\langle \left[\begin{array}{ll}
\text{HEAD} & nominal \\
\text{VAL} & \left[\begin{array}{ll}
\text{SPR} & \langle\ \rangle \\
\text{COMPS} & \langle\ \rangle
\end{array}\right]
\end{array}\right], \ldots \right\rangle \\
\text{SEM} & \left[\text{MODE}\ \ \text{prop}\right]
\end{array}\right]
$$

Synsem Types



Give ARG-ST a Unique Home



Words and Phrases as Saussurean Signs

$$\begin{bmatrix} \textit{word} & & \\ \text{PHON} & \langle\ \text{Kim}\ \rangle & \\ \text{SEM} & \begin{bmatrix} \text{MODE} & \text{ref} \\ \text{INDEX} & i \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \textbf{name} \\ \text{SIT} & s \\ \text{NAME} & \text{Kim} \\ \text{NAMED} & i \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix}$$

Augmented Signs

$$\begin{bmatrix} word & & \\ \text{PHON} & \langle\ \text{Kim}\ \rangle & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} noun & \\ \text{AGR} & 3sing \end{bmatrix} \end{bmatrix} & \\ \text{ARG-ST} & \langle\ \ \rangle & \\ \text{SEM} & \begin{bmatrix} \text{MODE} & \text{ref} & \\ \text{INDEX} & i & \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \textbf{name} \\ \text{SIT} & s \\ \text{NAME} & \text{Kim} \\ \text{NAMED} & i \end{bmatrix} \right\rangle & \end{bmatrix} & \end{bmatrix}$$

Phrases as Signs

$$\begin{bmatrix} \textit{phrase} & & \\ \text{PHON} & \langle\ \text{Kim}\ ,\ \text{walks}\ \rangle & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} & \\ \text{FORM} & \text{fin} \end{bmatrix} \\ \text{SPR} & \langle\ \ \rangle \\ \text{COMPS} & \langle\ \ \rangle \end{bmatrix} & \\ \text{SEM} & \begin{bmatrix} \text{MODE} & \text{prop} & \\ \text{INDEX} & s & \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \textbf{name} \\ \text{NAME} & \text{Kim} \\ \text{NAMED} & i \end{bmatrix}, \begin{bmatrix} \text{RELN} & \textbf{walk} \\ \text{SIT} & s \\ \text{WALKER} & i \end{bmatrix}, \ldots \right\rangle & \end{bmatrix} & \end{bmatrix}$$

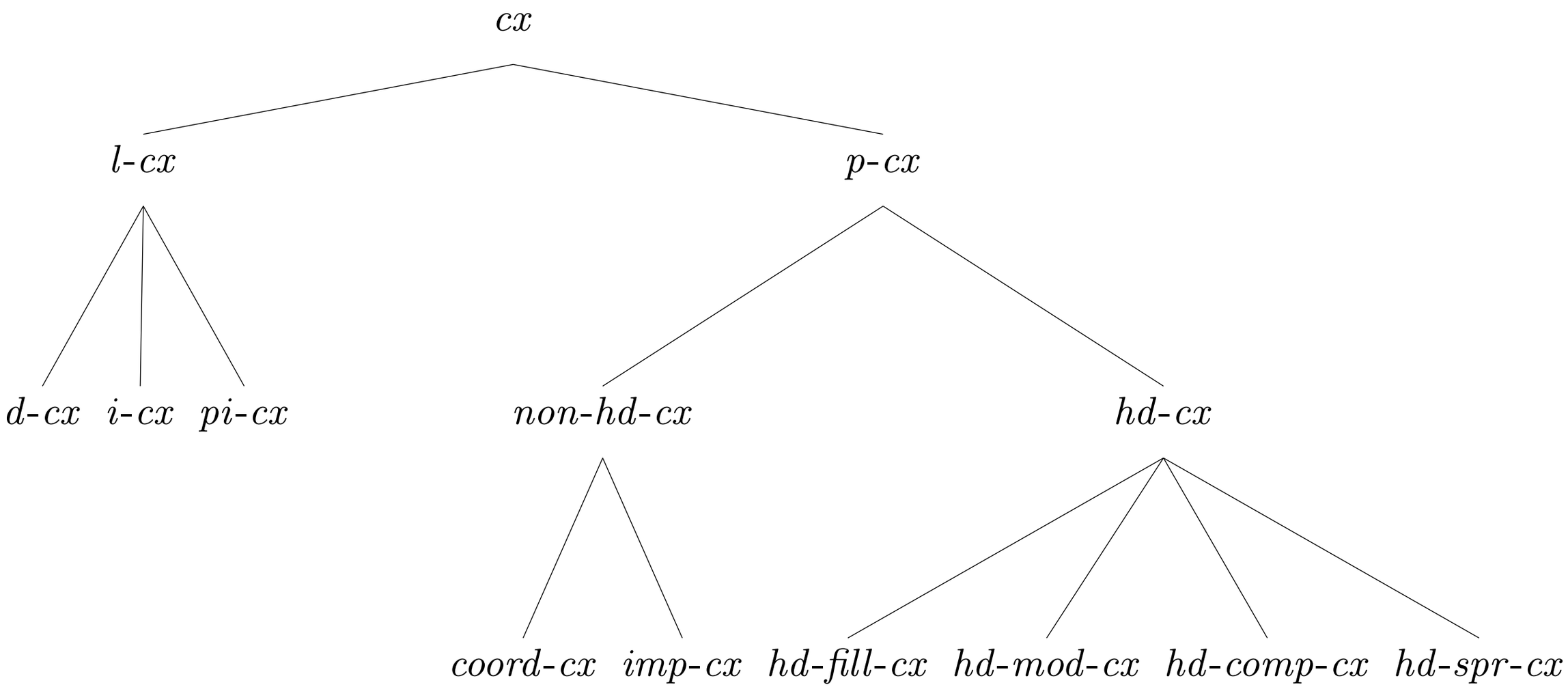
Types and Constraints

TYPE	FEATURES/VALUE TYPES	IST
sign	$\begin{bmatrix} \text{PHON} & \textit{list}(\textit{form}) \\ \text{SYN} & \textit{syn-cat} \\ \text{SEM} & \textit{sem-cat} \end{bmatrix}$	*feat-struc*
expression		*sign*
lex-sign	$[\text{ARG-ST} \quad \textit{list}(\textit{expression})]$	*sign*
phrase		*expression*
word		*expression* & *lex-sign*
lexeme		*lex-sign*

Constructions: Some Abbreviations

cx	*construction*
l-cx	*lexical-construction*
d-cx	*derivational-construction*
i-cx	*inflectional-construction*
pi-cx	*postinflectional-construction*
p-cx	*phrasal-construction*
non-hd-cx	*non-headed-construction*
hd-cx	*headed-construction*
coord-cx	*coordinate-construction*
imp-cx	*imperative-construction*
hd-fill-cx	*head-filler-construction*
hd-comp-cx	*head-complement-construction*
hd-spr-cx	*head-specifier-construction*
hd-mod-cx	*head-modifier-construction*

The World of Constructions



Properties of Constructions

TYPE	FEATURES/VALUE TYPES	IST
cx	$\begin{bmatrix} \text{MOTHER} & \textit{sign} \\ \text{DTRS} & \textit{list}(\textit{sign}) \end{bmatrix}$	*feat-struc*
l-cx	$\begin{bmatrix} \text{MOTHER} & \textit{lex-sign} \\ \text{DTRS} & \langle\ \textit{lex-sign}\ \rangle \end{bmatrix}$	*cx*
p-cx	$\begin{bmatrix} \text{MOTHER} & \textit{phrase} \\ \text{DTRS} & \textit{list}(\textit{expression}) \end{bmatrix}$	*cx*

Well-Formed Tree Structure

Φ is a Well-Formed Structure according to a grammar G if and only if

1. there is some construction C in G, such that
2. there is a feature structure I that is an instantiation of C, such that Φ is the value of the MOTHER feature of I.

A Well-Formed Feature Structure

The grammar licenses a feature structure of type *phrase* whose PHON value is < *ate* , *a* , *pizza* > because there is a feature structure instantiating the head-complement construction that has that feature structure as its MOTHER value. This phrasal construct satisfies the following description:

$$\begin{bmatrix} \textit{phrase} \\ \text{PHON} \quad \langle\, \text{ate} \,,\, \text{a} \,,\, \text{pizza} \,\rangle \\ \text{SYN} \quad \begin{bmatrix} \text{HEAD} \quad \begin{bmatrix} \textit{verb} \\ \text{FORM} \quad \text{fin} \end{bmatrix} \\ \text{VAL} \quad \begin{bmatrix} \text{SPR} \quad \langle\, \text{NP} \,\rangle \\ \text{COMPS} \quad \langle\, \rangle \\ \text{MOD} \quad \langle\, \rangle \end{bmatrix} \\ \text{GAP} \quad \langle\, \rangle \end{bmatrix} \\ \text{SEM} \quad \begin{bmatrix} \text{MODE} \quad \text{prop} \\ \text{INDEX} \quad s \\ \text{RESTR} \quad \left\langle \begin{bmatrix} \text{RELN} \quad \mathbf{eat} \\ \text{SIT} \quad s \\ \text{EATER} \quad i \\ \text{EATEN} \quad j \end{bmatrix}, \begin{bmatrix} \text{RELN} \quad \mathbf{a} \\ \text{BV} \quad j \end{bmatrix}, \begin{bmatrix} \text{RELN} \quad \mathbf{pizza} \\ \text{INST} \quad j \end{bmatrix}, \right\rangle \end{bmatrix} \end{bmatrix}$$

Another Well-Formed Feature Structure

$$\begin{bmatrix} \textit{lexeme} & & \\ \text{PHON} & \langle\ \text{driver}\ \rangle & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{noun} & \\ \text{AGR} & [\text{PER} \quad \text{3rd}] \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR} & \langle\ \text{DP}\ \rangle \\ \text{COMPS} & \langle\ \rangle \\ \text{MOD} & \langle\ \rangle \end{bmatrix} \\ \text{GAP} & \langle\ \rangle \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{MODE} & \text{ref} \\ \text{INDEX} & i \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \textbf{drive} \\ \text{SIT} & s \\ \text{DRIVER} & i \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix}$$

Two Constraints

Root Constraint:

$$\begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{FORM} \quad \text{fin} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{COMPS} \quad \langle\ \rangle \\ \text{SPR} \quad \langle\ \rangle \end{bmatrix} \\ \text{GAP} \quad \langle\ \rangle \end{bmatrix} \end{bmatrix}$$

Principle of Order:

$$cx: \begin{bmatrix} \text{MOTHER} & [\text{PHON} \ \boxed{\text{A1}} \oplus \ldots \oplus \boxed{\text{An}}\ ] \\ \text{DTRS} & \langle\ [\text{PHON}\ \boxed{\text{A1}}]\ ,\ \ldots\ ,\ [\text{PHON}\ \boxed{\text{An}}]\ \rangle \end{bmatrix}$$

Semantic Compositionality Principle

$$cx: \begin{bmatrix} \text{MOTHER} & [\text{SEM } [\text{RESTR } \boxed{\text{A1}} \oplus ... \oplus \boxed{\text{An}} \,]] \\ \text{DTRS} & \langle\, [\text{SEM } [\text{RESTR } \boxed{\text{A1}}]] \;,\; ... \;,\; [\text{SEM } [\text{RESTR } \boxed{\text{An}}]] \,\rangle \end{bmatrix}$$

Alternative Version:

$$cx: \begin{bmatrix} \text{MOTHER} & [\text{SEM } [\text{RESTR } \boxed{\text{A0}} \oplus \boxed{\text{A1}} \oplus ... \oplus \boxed{\text{An}} \,]] \\ \text{DTRS} & \langle\, [\text{SEM } [\text{RESTR } \boxed{\text{A1}}]] \;,\; ... \;,\; [\text{SEM } [\text{RESTR } \boxed{\text{An}}]] \,\rangle \\ \text{CX-SEM} & \boxed{\text{A0}} \end{bmatrix}$$

Headed Constructions

TYPE	FEATURES/VALUE TYPES	IST
hd-cx	[HD-DTR *sign*]	*cx*

Head Feature Principle:

$$hd\text{-}cx : \begin{bmatrix} \text{MOTHER} & [\text{SYN} & [\text{HEAD} & \boxed{1}]] \\ \text{HD-DTR} & [\text{SYN} & [\text{HEAD} & \boxed{1}]] \end{bmatrix}$$

Two More Principles

Semantic Inheritance Principle:

$$hd\text{-}cx: \begin{bmatrix} \text{MOTHER} & \begin{bmatrix} \text{SEM} & \begin{bmatrix} \text{MODE} & \boxed{1} \\ \text{INDEX} & \boxed{2} \end{bmatrix} \end{bmatrix} \\ \text{HD-DTR} & \begin{bmatrix} \text{SEM} & \begin{bmatrix} \text{MODE} & \boxed{1} \\ \text{INDEX} & \boxed{2} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

Valence Principle:

$$hd\text{-}cx: \begin{bmatrix} \text{MOTHER} & [\text{SYN} & [\text{VAL} & / \boxed{1}]] \\ \text{HD-DTR} & [\text{SYN} & [\text{VAL} & / \boxed{1}]] \end{bmatrix}$$

The GAP Principle

hd-cx:

$$\begin{bmatrix} \text{MOTHER} & [\text{SYN}\ [\text{GAP}\ \ (\ \boxed{\text{A1}} \oplus \ldots \oplus \boxed{\text{An}}\ )\ \ominus\ \boxed{\text{A0}}\ ]\ ] \\ \text{HD-DTR} & [\text{SYN}\ [\text{STOP-GAP}\ \ \boxed{\text{A0}}\ ]] \\ \text{DTRS} & \langle\ [\text{SYN}\ [\text{GAP}\ \boxed{\text{A1}}\ ]]\ ,\ \ \ldots\ \ ,\ [\text{SYN}\ [\text{GAP}\ \boxed{\text{An}}\ ]]\ \rangle \end{bmatrix}$$

The Head-Complement Construction

$$hd\text{-}comp\text{-}cx : \begin{bmatrix} \text{MOTHER} & [\text{SYN} \; [\text{VAL} \; [\text{COMPS} \; \langle \; \rangle \;]\;]] \\ \text{HD-DTR} & \boxed{0}\begin{bmatrix} word \\ \text{SYN} \; [\text{VAL} \; [\text{COMPS} \; \boxed{A} \;]] \end{bmatrix} \\ \text{DTRS} & \langle \; \boxed{0} \; \rangle \; \oplus \; \boxed{A}nelist \end{bmatrix}$$

And with inherited constraints....

$$\left[\begin{array}{ll}
\text{MOTHER} & \left[\begin{array}{ll}
\text{PHON} & \boxed{\text{A1}} \oplus \ldots \oplus \boxed{\text{An}} \\
\text{SYN} & \left[\begin{array}{ll}
\text{HEAD} & \boxed{1} \\
\text{VAL} & \left[\begin{array}{ll}
\text{COMPS} & \langle\ \rangle \\
\text{SPR} & \boxed{\text{D}} \\
\text{MOD} & \boxed{\text{E}}
\end{array}\right]
\end{array}\right] \\
\text{SEM} & \left[\begin{array}{ll}
\text{MODE} & \boxed{2} \\
\text{INDEX} & \boxed{3} \\
\text{RESTR} & \boxed{\text{C1}} \oplus \ldots \oplus \boxed{\text{Cn}}
\end{array}\right]
\end{array}\right] \\
\text{HD-DTR} & \boxed{4}\left[\begin{array}{ll}
\textit{word} & \\
\text{SYN} & \left[\begin{array}{ll}
\text{HEAD} & \boxed{1} \\
\text{VAL} & \left[\begin{array}{ll}
\text{COMPS} & \langle\ \boxed{5}\ ,\ \ldots\ ,\ \boxed{\text{m}}\ \rangle \\
\text{SPR} & \boxed{\text{D}} \\
\text{MOD} & \boxed{\text{E}}
\end{array}\right]
\end{array}\right] \\
\text{SEM} & \left[\begin{array}{ll}
\text{MODE} & \boxed{2} \\
\text{INDEX} & \boxed{3}
\end{array}\right]
\end{array}\right] \\
\text{DTRS} & \left\langle \boxed{4}\left[\begin{array}{ll}\text{PHON} & \boxed{\text{A1}} \\ \text{RESTR} & \boxed{\text{C1}}\end{array}\right], \boxed{5}\left[\begin{array}{ll}\text{PHON} & \boxed{\text{A2}} \\ \text{RESTR} & \boxed{\text{C2}}\end{array}\right], \ldots, \boxed{\text{m}}\left[\begin{array}{ll}\text{PHON} & \boxed{\text{An}} \\ \text{RESTR} & \boxed{\text{Cn}}\end{array}\right] \right\rangle
\end{array}\right]$$

An Instance of the HCC

$$\left[\begin{array}{l} \textit{hd-comp-cx} \\ \text{MOTHER} \left[\begin{array}{l} \textit{phrase} \\ \text{PHON} \langle \text{ talked , to , Kim } \rangle \\ \text{SYN} \left[\begin{array}{ll} \text{HEAD} & \textit{verb} \\ \text{VAL} & \left[\begin{array}{ll} \text{SPR} & \boxed{\text{A}}\langle \text{ NP } \rangle \\ \text{COMPS} & \langle\ \rangle \end{array}\right] \end{array}\right] \\ \text{SEM} \left[\text{ ... } \right] \end{array}\right] \\ \text{HD-DTR} \ \boxed{0} \\ \text{DTRS} \left\langle \boxed{0}\left[\begin{array}{l} \textit{word} \\ \text{PHON} \ \langle \text{ talked } \rangle \\ \text{SYN} \left[\begin{array}{ll} \text{HEAD} & \textit{verb} \\ \text{VAL} & \left[\begin{array}{ll} \text{SPR} & \boxed{\text{A}} \\ \text{COMPS} & \langle\ \boxed{1}\ \rangle \end{array}\right] \end{array}\right] \\ \text{SEM} \left[\text{ ... } \right] \end{array}\right] , \boxed{1}\left[\begin{array}{l} \textit{phrase} \\ \text{PHON} \ \langle \text{ to , Kim } \rangle \\ \text{SYN} \left[\begin{array}{ll} \text{HEAD} & \textit{prep} \\ \text{VAL} & \left[\begin{array}{ll} \text{SPR} & \langle\ \rangle \\ \text{COMPS} & \langle\ \rangle \end{array}\right] \end{array}\right] \\ \text{SEM} \left[\text{ ... } \right] \end{array}\right] \right\rangle \end{array}\right]$$

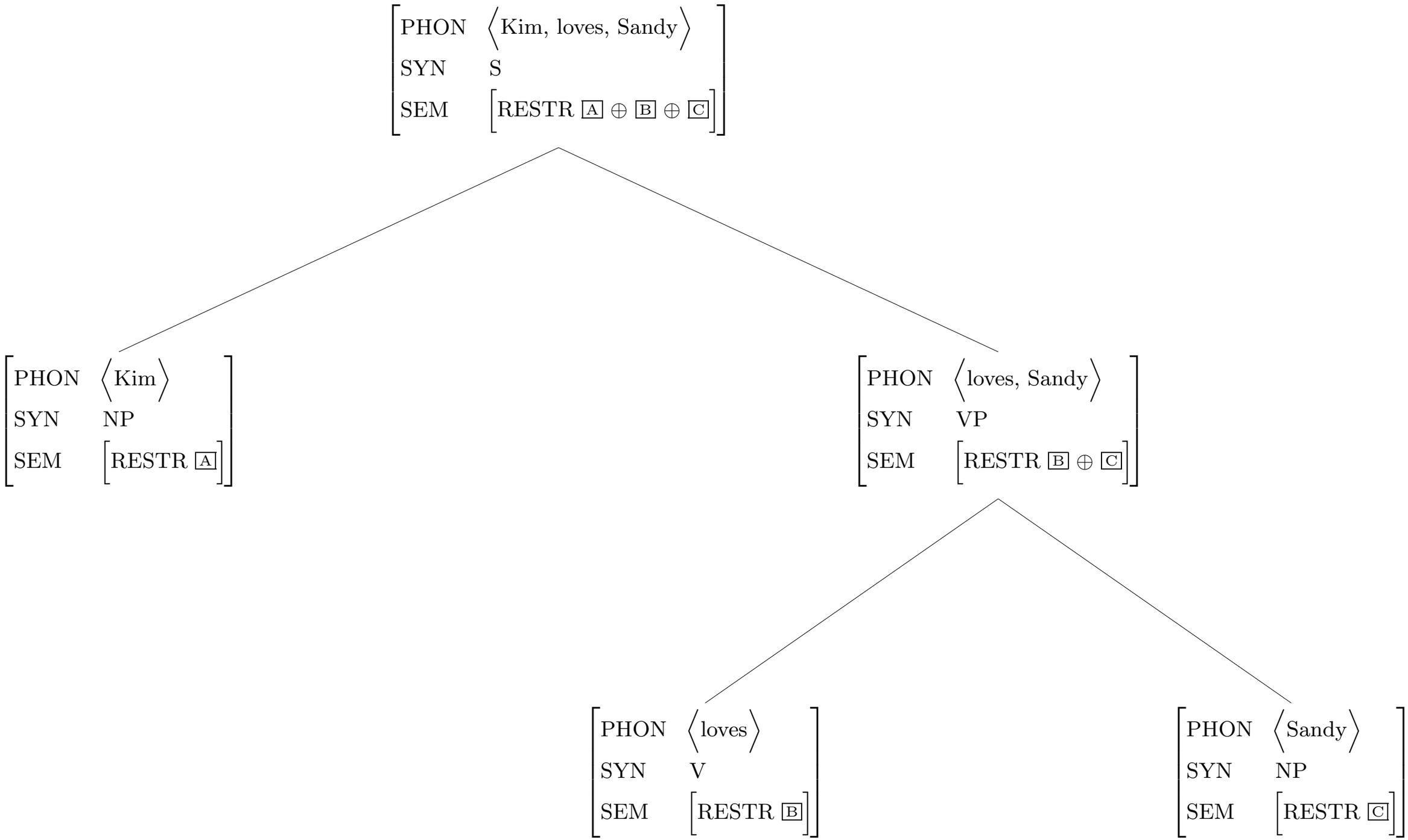
$$\left[\begin{array}{l}
\textit{hd-comp-cx} \\
\text{MOTHER} \left[\begin{array}{l}
\textit{phrase} \\
\text{PHON} \quad \langle\ \text{in}\ ,\ \text{Seattle}\ \rangle \\
\text{SYN} \left[\begin{array}{ll}
\text{HEAD} & \textit{prep} \\
\text{VAL} & \left[\begin{array}{ll}
\text{SPR} & \boxed{\text{A}} \\
\text{COMPS} & \langle\ \rangle \\
\text{MOD} & \boxed{\text{B}}
\end{array}\right]
\end{array}\right] \\
\text{SEM}\ [\ \ldots\ ]
\end{array}\right] \\
\text{HD-DTR}\ \ \boxed{0} \\
\text{DTRS} \left\langle \boxed{0} \left[\begin{array}{l}
\textit{word} \\
\text{PHON}\ \langle\ \text{in}\ \rangle \\
\text{SYN} \left[\begin{array}{ll}
\text{HEAD} & \textit{prep} \\
\text{VAL} & \left[\begin{array}{ll}
\text{SPR} & \boxed{\text{A}} \\
\text{COMPS} & \langle\ \boxed{1}\ \rangle \\
\text{MOD} & \boxed{\text{B}}
\end{array}\right]
\end{array}\right] \\
\text{SEM}\ [\ \ldots\ ]
\end{array}\right] , \boxed{1} \left[\begin{array}{l}
\textit{word} \\
\text{PHON}\ \langle\ \text{Seattle}\ \rangle \\
\text{SYN} \left[\begin{array}{ll}
\text{HEAD} & \textit{noun} \\
\text{VAL} & \left[\begin{array}{ll}
\text{SPR} & \langle\ \rangle \\
\text{COMPS} & \langle\ \rangle
\end{array}\right]
\end{array}\right] \\
\text{SEM}\ [\ \ldots\ ]
\end{array}\right] \right\rangle
\end{array}\right]$$

Two More Constructions

$$\textit{hd-spr-cx}: \begin{bmatrix} \text{MOTHER} & \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{SPR} & \langle\,\rangle \end{bmatrix} \end{bmatrix} \\ \text{HD-DTR} & \boxed{0}\begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{SPR} & \langle\,\boxed{1}\,\rangle \\ \text{COMPS} & \langle\,\rangle \\ \text{STOP-GAP} & \langle\,\rangle \end{bmatrix} \end{bmatrix} \\ \text{DTRS} & \langle\,\boxed{1}\,,\,\boxed{0}\,\rangle \end{bmatrix}$$

$$\textit{hd-mod-cx}: \begin{bmatrix} \text{HD-DTR} & \boxed{1}\begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{VAL} & \begin{bmatrix} \text{COMPS} & \langle\,\rangle \end{bmatrix} \\ \text{STOP-GAP} & \langle\,\rangle \end{bmatrix} \end{bmatrix} \\ \text{DTRS} & \left\langle\,\boxed{1}\,,\begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{VAL} & \begin{bmatrix} \text{COMPS} & \langle\,\rangle \\ \text{MOD} & \langle\,\boxed{1}\,\rangle \end{bmatrix} \end{bmatrix} \end{bmatrix}\right\rangle \end{bmatrix}$$

A Tree



The Head-Filler Construction

$$
\textit{hd-fill-cx}: \left[\begin{array}{ll}
\text{HD-DTR} & \boxed{0}\left[\begin{array}{ll}
\text{SYN} & \left[\begin{array}{ll}
\text{HEAD} & \left[\begin{array}{ll} \textit{verb} & \\ \text{FORM} & \text{fin} \end{array}\right] \\
\text{VAL} & \left[\begin{array}{ll} \text{SPR} & \langle\ \rangle \\ \text{COMPS} & \langle\ \rangle \end{array}\right] \\
\text{GAP} & \langle\ \boxed{1}\ \rangle \\
\text{STOP-GAP} & \langle\ \boxed{1}\ \rangle
\end{array}\right]
\end{array}\right] \\
\text{DTRS} & \langle\ \boxed{1}[\text{GAP}\ \langle\ \rangle]\ ,\ \boxed{0}\ \rangle
\end{array}\right]
$$

$$\left[\begin{array}{l} \textit{hd-fill-cx} \\ \\ \text{MOTHER} \left[\begin{array}{ll} \text{PHON} & \langle\ \text{Bagels , I , think , she , likes}\ \rangle \\ \text{SYN} & \left[\begin{array}{ll} \text{HEAD} & \boxed{2}\left[\begin{array}{ll} \textit{verb} & \\ \text{FORM} & \text{fin} \end{array}\right] \\ \text{VAL} & \left[\begin{array}{ll} \text{SPR} & \langle\ \rangle \\ \text{COMPS} & \langle\ \rangle \end{array}\right] \\ \text{GAP} & \langle\ \rangle \end{array}\right] \\ \text{SEM} & [\ \ldots\ ] \end{array}\right] \\ \\ \text{HD-DTR}\ \boxed{0} \\ \\ \text{DTRS}\ \left\langle \boxed{1}\left[\begin{array}{ll} \text{PHON} & \langle\ \text{Bagels}\ \rangle \\ \text{SYN} & \left[\begin{array}{ll} \text{HEAD} & \textit{noun} \\ \text{VAL} & \left[\begin{array}{ll} \text{SPR} & \langle\ \rangle \\ \text{COMPS} & \langle\ \rangle \end{array}\right] \end{array}\right] \\ \text{SEM} & [\ \ldots\ ] \end{array}\right] , \boxed{0}\left[\begin{array}{ll} \text{PHON} & \langle\ \text{I, think, she, likes}\rangle \\ \text{SYN} & \left[\begin{array}{ll} \text{HEAD} & \boxed{2} \\ \text{VAL} & \left[\begin{array}{ll} \text{SPR} & \langle\ \rangle \\ \text{COMPS} & \langle\ \rangle \end{array}\right] \\ \text{GAP} & \langle\ \boxed{1}\ \rangle \\ \text{STOP-GAP} & \langle\ \boxed{1}\ \rangle \end{array}\right] \\ \text{SEM} & [\ \ldots\ ] \end{array}\right] \right\rangle \end{array}\right]$$

The Imperative Construction

$$
\textit{imp-cx}: \left[\begin{array}{l}
\text{MOTHER} \left[\begin{array}{ll}
\text{SYN} & \left[\begin{array}{ll}
\text{HEAD} & \textit{verb} \\
\text{VAL} & \left[\text{SPR} \quad \langle\ \rangle\right] \\
\text{GAP} & \boxed{\text{A}}
\end{array}\right] \\
\text{SEM} & \left[\begin{array}{ll}
\text{MODE} & \text{dir} \\
\text{INDEX} & s
\end{array}\right]
\end{array}\right] \\
\text{DTRS} \left\langle \left[\begin{array}{ll}
\text{SYN} & \left[\begin{array}{ll}
\text{HEAD} & \left[\begin{array}{ll}
\textit{verb} & \\
\text{INF} & - \\
\text{FORM} & \text{base}
\end{array}\right] \\
\text{VAL} & \left[\begin{array}{ll}
\text{SPR} & \langle\ \text{NP[PER 2nd]}\ \rangle \\
\text{COMPS} & \langle\ \rangle
\end{array}\right] \\
\text{GAP} & \boxed{\text{A}}
\end{array}\right] \\
\text{SEM} & [\text{INDEX} \quad s\ ]
\end{array}\right] \right\rangle
\end{array}\right]
$$

Coordination Construction

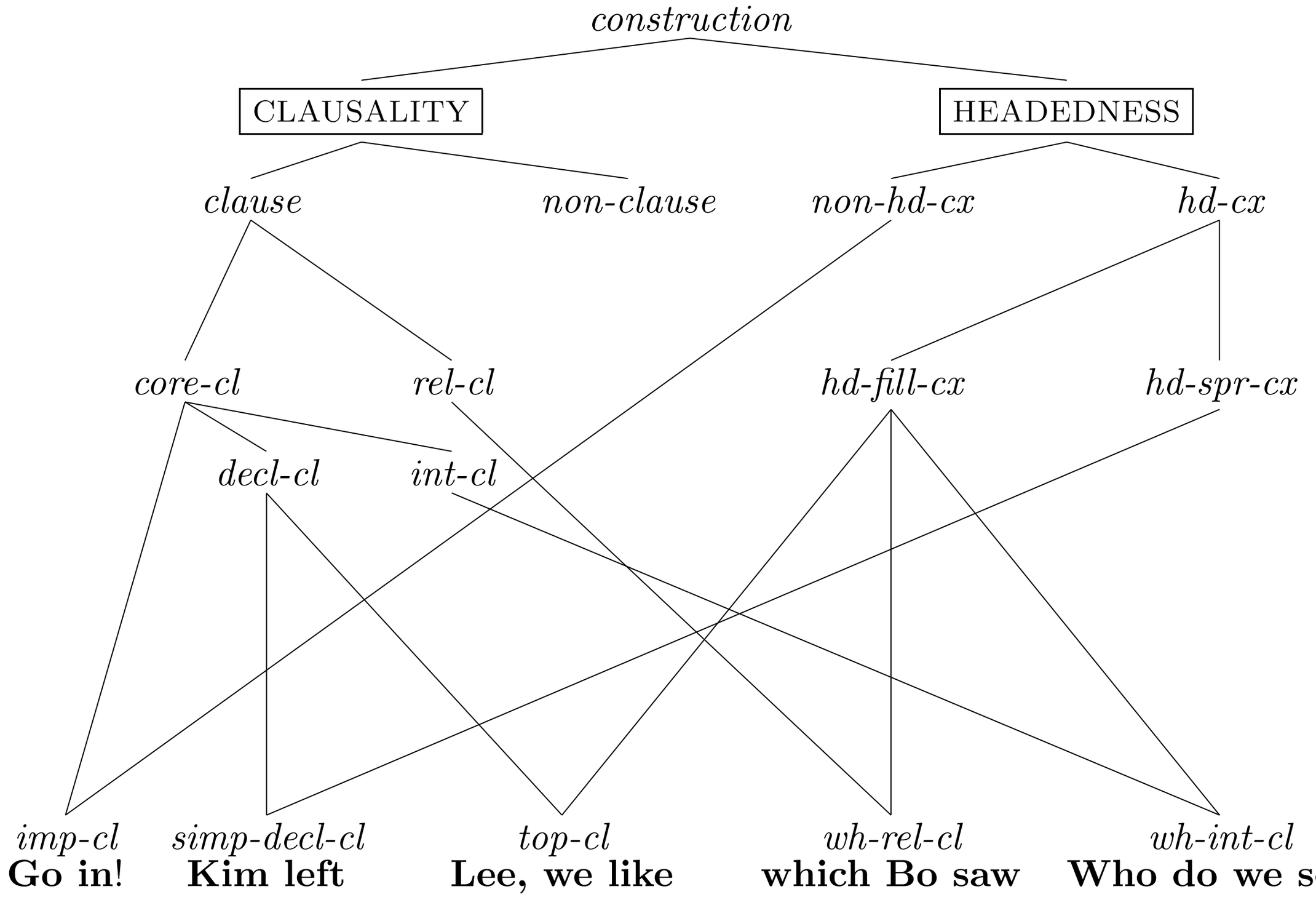
$$\left[\begin{array}{l}
\text{MOTHER} \left[\begin{array}{ll} \text{SYN} & \left[\begin{array}{ll} \text{HEAD} & [\text{FORM } \boxed{1}] \\ \text{VAL} & \boxed{2} \\ \text{GAP} & \boxed{A} \end{array}\right] \\ \text{SEM} & [\text{IND} \quad s_0] \end{array}\right] \\
\text{DTRS} \left\langle \left[\begin{array}{ll} \text{SYN} & \left[\begin{array}{ll} \text{HEAD} & [\text{FORM } \boxed{1}] \\ \text{VAL} & \boxed{2} \\ \text{GAP} & \boxed{A} \end{array}\right] \\ \text{SEM} & [\text{IND} \quad s_1] \end{array}\right], \ldots, \left[\begin{array}{ll} \text{SYN} & \left[\begin{array}{ll} \text{HEAD} & [\text{FORM } \boxed{1}] \\ \text{VAL} & \boxed{2} \\ \text{GAP} & \boxed{A} \end{array}\right] \\ \text{SEM} & [\text{IND} \quad s_{n-1}] \end{array}\right], \right. \\
\left. \left[\begin{array}{l} \text{HEAD } \textit{conj} \\ \text{IND} \quad s_0 \\ \text{RESTR} \left\langle [\text{ARGS } \langle s_1 \ldots s_n \rangle] \right\rangle \end{array}\right], \left[\begin{array}{ll} \text{SYN} & \left[\begin{array}{ll} \text{HEAD} & [\text{FORM } \boxed{1}] \\ \text{VAL} & \boxed{2} \\ \text{GAP} & \boxed{A} \end{array}\right] \\ \text{SEM} & [\text{IND} \quad s_n] \end{array}\right] \right\rangle
\end{array}\right]$$

$$\left[\begin{array}{ll}
\text{MOTHER} & \left[\begin{array}{ll}
\text{PHON} & \langle\ \text{Kim , sleeps , and , Pat , works}\ \rangle \\
\text{SYN} & \left[\begin{array}{ll}
\text{HEAD} & \textit{verb} \\
\text{VAL} & \left[\begin{array}{ll}
\text{SPR} & \langle\ \rangle \\
\text{COMPS} & \langle\ \rangle
\end{array}\right]
\end{array}\right] \\
\text{SEM} & [\ \ldots\ ]
\end{array}\right] \\
\text{DTRS} \langle & \left[\begin{array}{ll}
\text{PHON} & \langle\ \text{Kim , sleeps}\ \rangle \\
\text{SYN} & \left[\begin{array}{ll}
\text{HEAD} & \textit{verb} \\
\text{VAL} & \left[\begin{array}{ll}
\text{SPR} & \langle\ \rangle \\
\text{COMPS} & \langle\ \rangle
\end{array}\right]
\end{array}\right] \\
\text{SEM} & [\ \ldots\ ]
\end{array}\right], \left[\begin{array}{ll}
\text{PHON} & \langle\ \text{and}\ \rangle \\
\text{SYN} & \left[\text{HEAD}\ \textit{conj}\right] \\
\text{SEM} & [\ \ldots\ ]
\end{array}\right], \\
& \left[\begin{array}{ll}
\text{PHON} & \langle\ \text{Pat , works}\ \rangle \\
\text{SYN} & \left[\begin{array}{ll}
\text{HEAD} & \textit{verb} \\
\text{VAL} & \left[\begin{array}{ll}
\text{SPR} & \langle\ \rangle \\
\text{COMPS} & \langle\ \rangle
\end{array}\right]
\end{array}\right] \\
\text{SEM} & [\ \ldots\ ]
\end{array}\right] \rangle
\end{array}\right]$$

Some More Abbreviations

imp-cl	*imperative-clause*
decl-cl	*declarative-clause*
simp-decl-cl	*simple-declarative-clause*
top-cl	*topicalized-clause*
wh-rel-cl	*wh-relative-clause*
wh-int-cl	*wh-interrogative-clause*
core-cl	*core-clause*

A Construction Hierarchy



Locality

- Like CFG rules, constructions involve only mothers and daughters.
- A lexical head can place constraints on its sisters or on an appropriate maternal dependent.
- Unbounded dependencies are localized.

  Sandy is hard ((for us) to continue) to please___

  Getting it done is hard for us to imagine them considering___
- Our principles provide a theory of what information (reflected in terms of HEAD,VAL, GAP, etc.) is passed up within the domain projected by a lexical head (including subjects and modifiers) and hence a theory of what information is locally accessible at any given point in a tree.

Reading Questions

- It seems in this chapter that the suggestion is that sign based grammars could replace trees by using sign-based constructors and feature structures for phrases. Is this actually the case? If so, what would be the benefit of using the sign-based grammar over a tree? It seems that the tree would be easier to parse and could still hold all of the same information.

Reading Questions

- I suppose I don't see why one would want to (1) include PHON on phrasal constructions and (2) make PHON a list. This feature just seems quite specific to individual words. What do we gain by including them in phrasal constructions?

- It seems to me that PHON list is just a copy of the words in the tree. So, what is the purpose of the PHON in our lexical sequence?

Reading Questions

- The phonological information presented in this chapter seems to be noted in conventional orthographic form. In practical application, is this information presented in a more descriptive manner, i.e., using phonetic transcriptions?

- Is PHON usually represented by a single field, like in the Chapter 16 examples, or is there more to it?

Reading Questions

- The text mentions in summary that syntax is a rapidly changing field, and future revision of specific analyses is likely. Have there been a lot of major changes to HPSG in the 12 years since this book (2nd edition) was published? Are we likely to see a 3rd edition in the future?

- It looks like it has been just over 10 years since this textbook was initially published. What would you consider the most interesting addition or revision to HPSG in this time?

Reading Questions

- This seems much easier to implement. What are the drawbacks of this method?
- How do the material in Ch 16 and what we have learned throughout the rest of the book fit together? Is the sign-based construction considered part of current HPSG theory? It seems like the Ch 16 material provides a powerful enhancement to the theory. Is it a necessary one? That is, is the material in Chapters 1-15 complete without the Ch 16 adaptations?

Reading Questions

- In theory multiple inheritance sounds reasonable, but I was wondering if there are any drawbacks to multiple inheritance in actual practice/implementation? In other fields (like OOP) there are advantages with having tree-based hierarchies. For example, there is no ambiguity over the 'ancestry' of a type, less chance of bugs, an so forth. Do these challenges exist in HPSG as well?

Reading Questions

- Is it possible to go over how the terminology of "signs" was derived? Intuitively, this terminology didn't quite click, but would be interesting to know how this terminology came about.
- I'm curious, as Saussure lived in the late-19th and early-20th centuries, did these concepts experience a sort of rediscovery more recently in the syntax field? Or have these ideas stayed fairly active this whole time?

Reading Questions

- What are some specific examples of semantic predications that are contributed by the constructions themselves, and not the daughters?
- What's an example of the kind of predication you would find on the Constructional Semantics list if it were part of the Semantic Compositionality Principle? How would the predications here differ from what's on SEM?

- Apposition: ‘appos’,
- Compounding: ‘compound’, ‘compound_name’, including titles and N-ed (J-N_CRD-T_C cuts acrc
- Conditionals: ‘if_x_then’
- Coordination: ‘conj’
- Foreign Expressions: ‘fw_seq’
- Fragments: ‘unknown’
- Imperatives: ‘pron’ (plus SFORCE)
- Implicit Locatives: (‘today’, ‘every time he arrives’): ‘loc_nonsp’
- Implicit Nominals: ‘generic_entity’
- Implicit Quantification: 'udef_q', ‘proper_q’, ‘pronoun_q', 'number_q'
- Instrumental Relatives: ‘with_p_rel’
- Measure Phrases: ‘measure_rel’
- Nominalization: ‘nominalization’, including verbal and nominal gerunds as well as some non-gerur
- Non-Adverbial Clausal Modifiers: ‘subord’ (including depictives and absolutives)
- Number Sequences: ‘num_seq’ (for numeral juxtaposition)
- Parentheticals: ‘parenthetical’
- Partitives: ‘part_of’
- Quasi-Modal Infinitivals: ‘eventuality’

http://moin.delph-in.net/ErgSemantics/Inventory

Reading Questions

- So Sign-Based Construction Grammar allows for the interactions of pragmatics, semantics, syntax, and phonology. Where does morphology fit into this? I realize this is obviously not the focus of this grammar---or grammar in general---but does it just fall under the phonology part because of its association with final word forms? And would morphology-heavy languages pose a problem to this set-up?

Reading Questions

- I'm interested in knowing what kinds of efforts are currently being made to include pragmatic information in feature structures? Is this an active area of research?
- The chapter summary mentions that a natural extension of this grammatical theory would be to include pragmatic information. This sounds really tricky. What would this look like?

Untangle This

- What phenomena are illustrated by this sentence?
- What rules or interesting lexical types are involved in our analysis of it?
- What tree structure does our grammar assign?

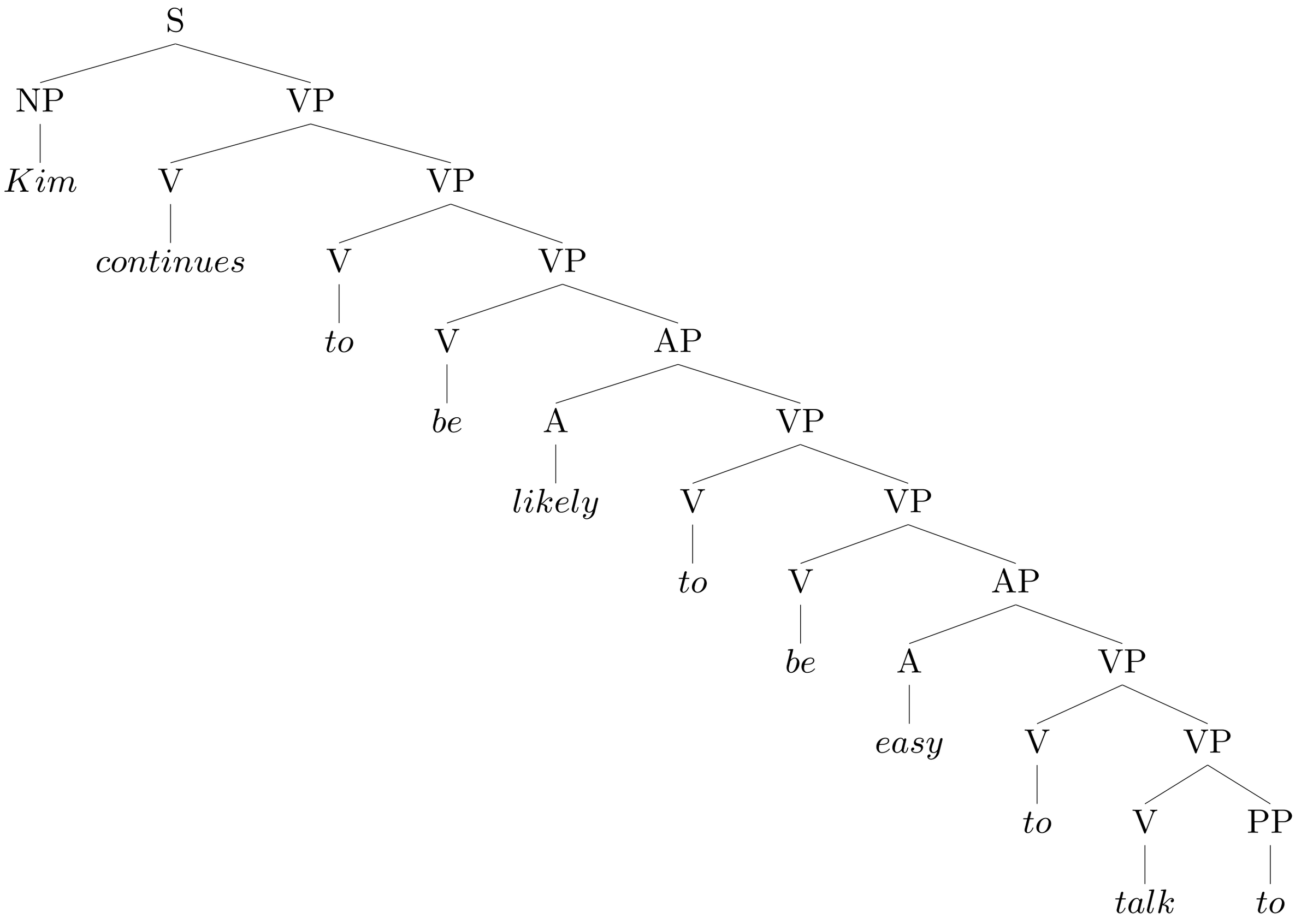
Complicated example #6

Kim continues to be likely to be easy to talk to.

**Kim continue to be likely to be easy to talk to.*

**Kim continues to be likely to is easy to talk to.*

**Kim continues to Kim be likely to be easy to talk to.*



Complicated example #7

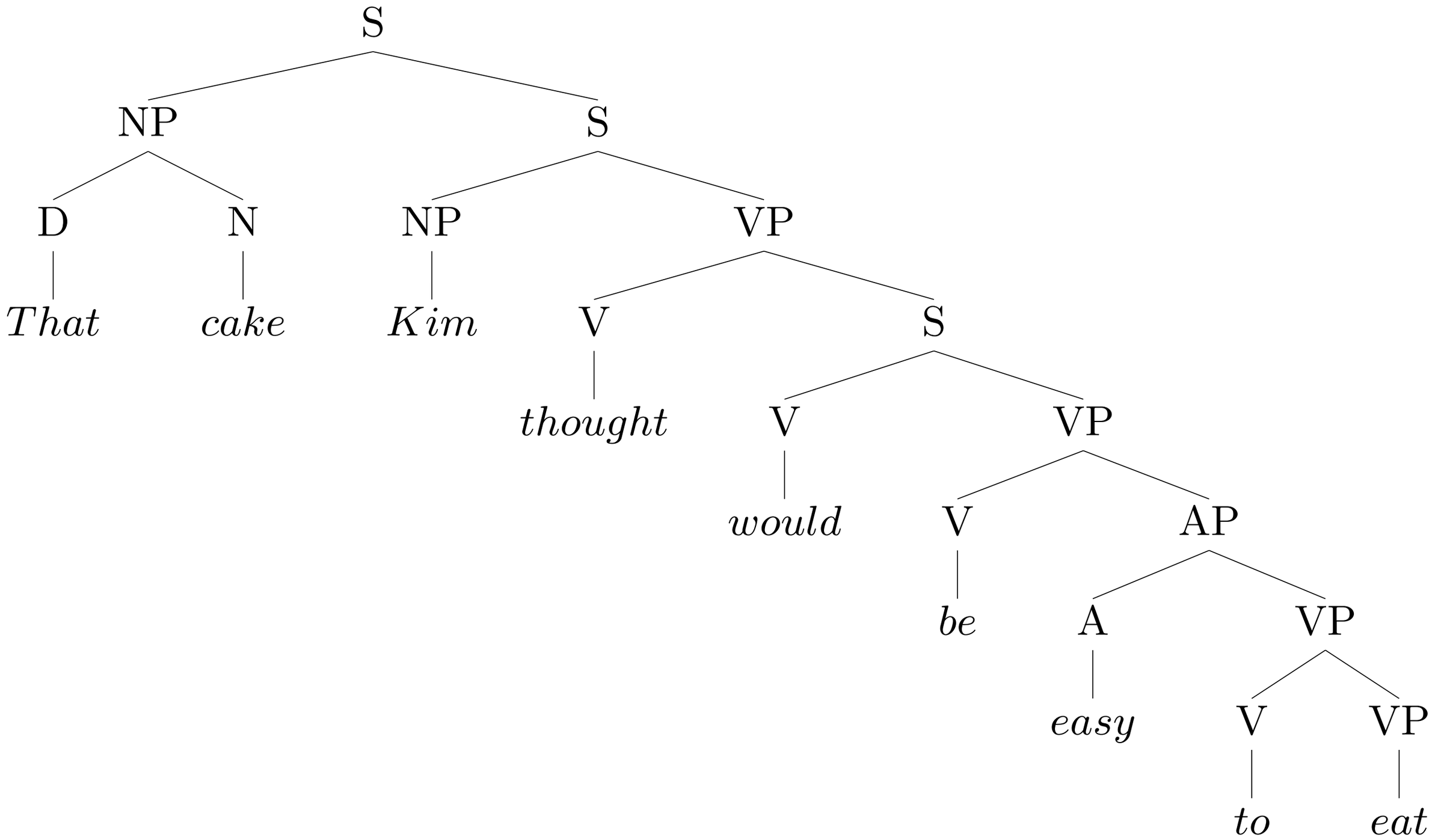
That cake, Kim thought would be easy to eat.

**That cake, Kim thought would be easy to eat pie.*

**That cake, Kim thought would be easy to eaten.*

**Cupcake, Kim thought would be easy to eat.*

**That cake, Kim thought that would be easy to eat.*



Course overview

- Survey of some phenomena central to syntactic theory
- Introduction to the HPSG framework
- Process over product: How to build a grammar fragment
- Value of precise formulation (and of getting a computer to do the tedious part for you!)

Reflection

- What was the most surprising thing in this class?
- What do you think is most likely wrong?
- What do you think is the coolest result?
- What do you think you're most likely to remember?
- How do you think this course will influence your work as a computational linguist?

Overview

- Chapter 16 framework (same analyses, different underlying system)
- Reading questions
- Untangle this
- General wrap up