Ling 566
Dec 7, 2011

Sign-Based Construction Grammar

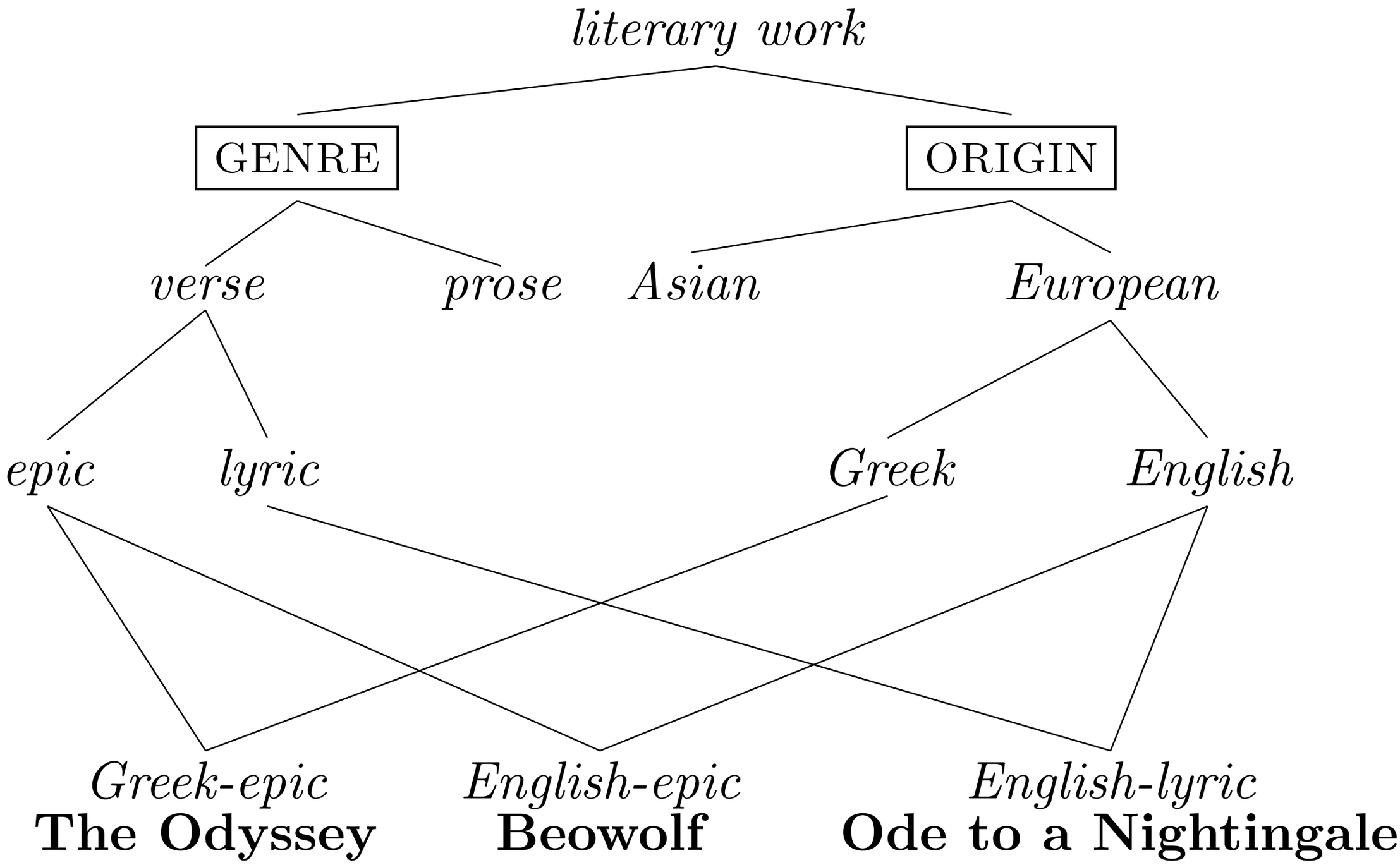
Overview

- Chapter 16 framework (same analyses, different underlying system)
- General wrap up

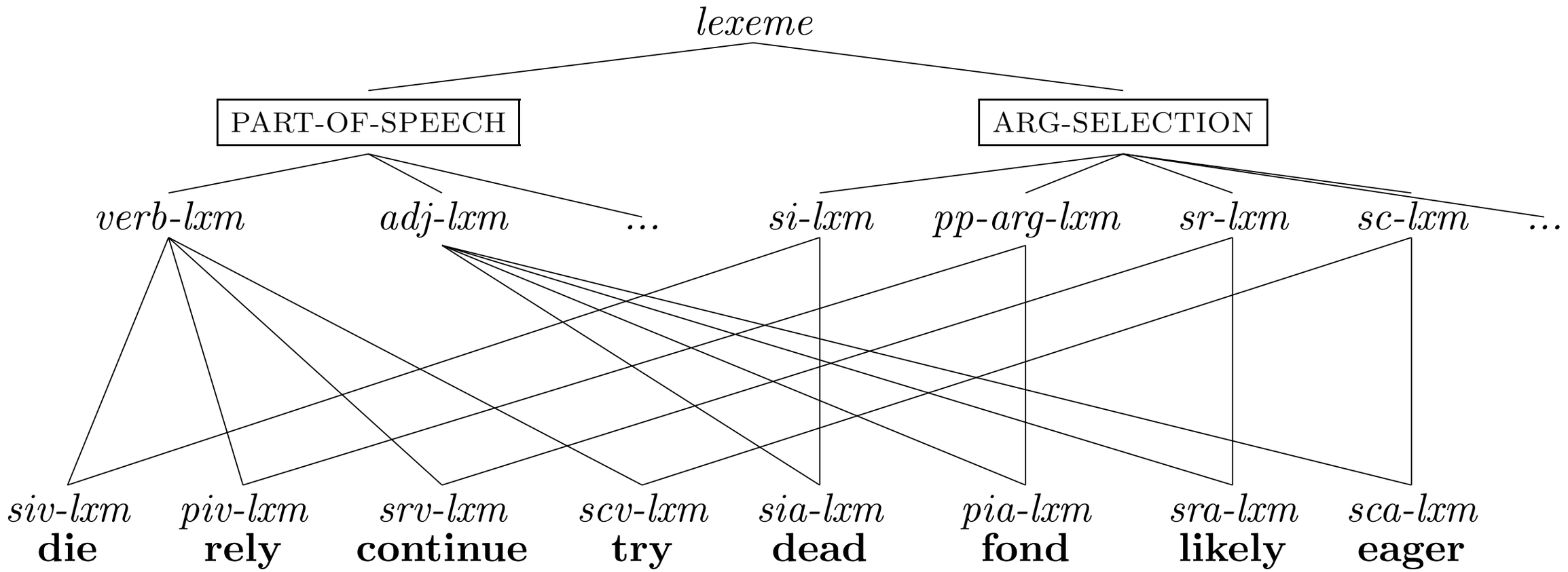
Overview of Differences

- 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* : $\left[\text{ARG-ST} \quad \left\langle\ \text{NP}_i\ ,\ \left[\text{SPR} \quad \langle\ \text{NP}_i\ \rangle\right]\right\rangle\right]$

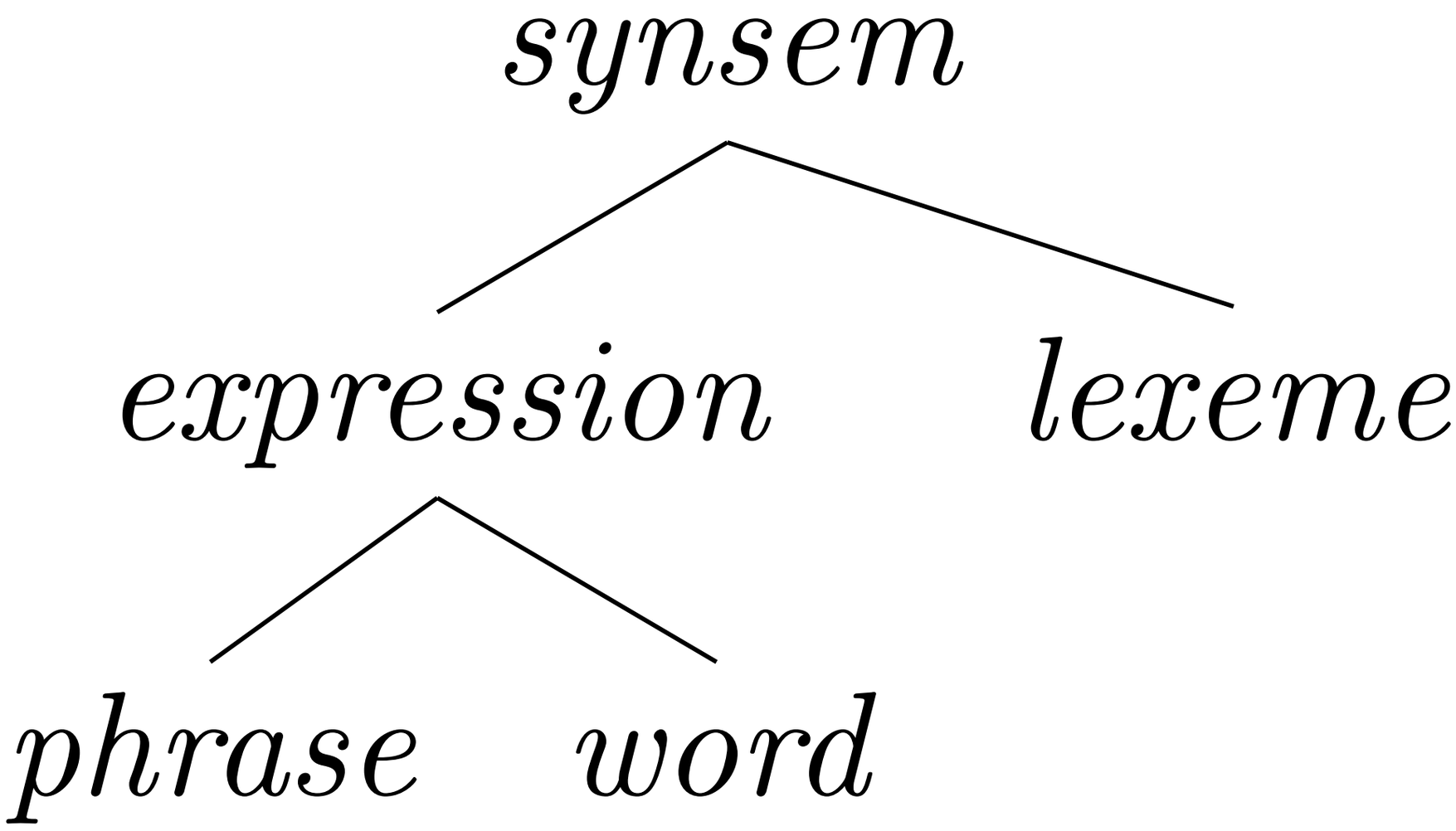
Another Lexeme Constraint

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

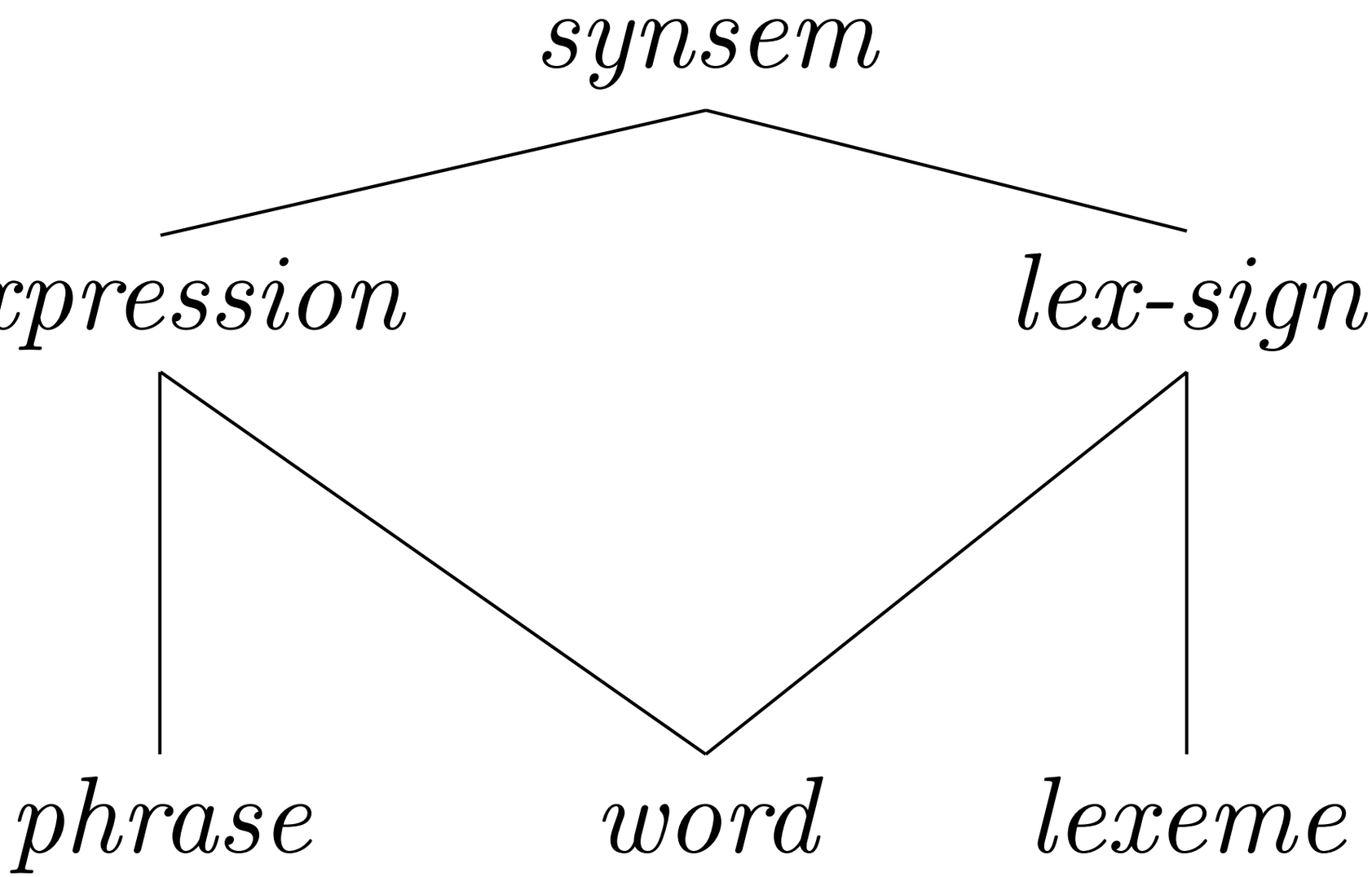
And Another

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

Synsem Types



Give ARG-ST a Unique Home



Words and Phrases as Saussurean Signs

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

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

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

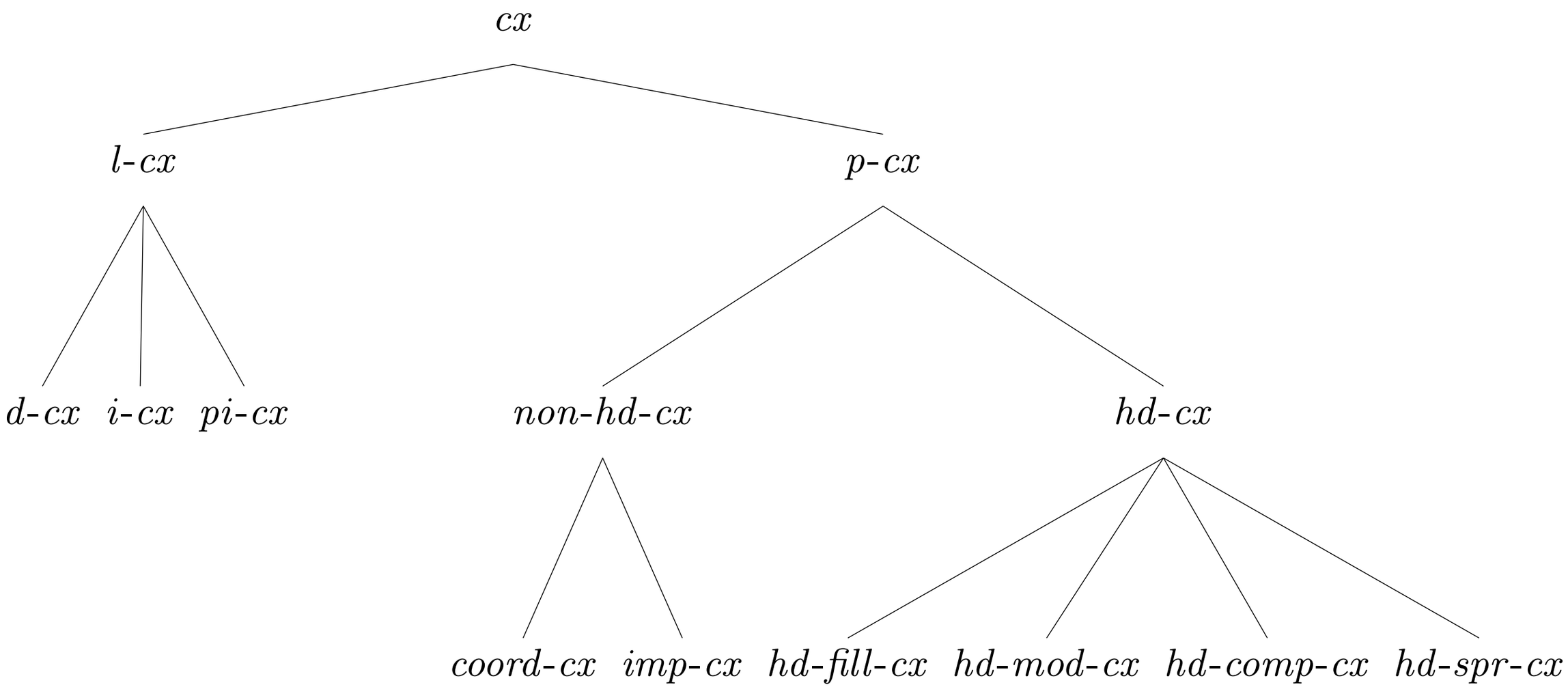
Types and Constraints

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:

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

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:

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

The Head-Complement Construction

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

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

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

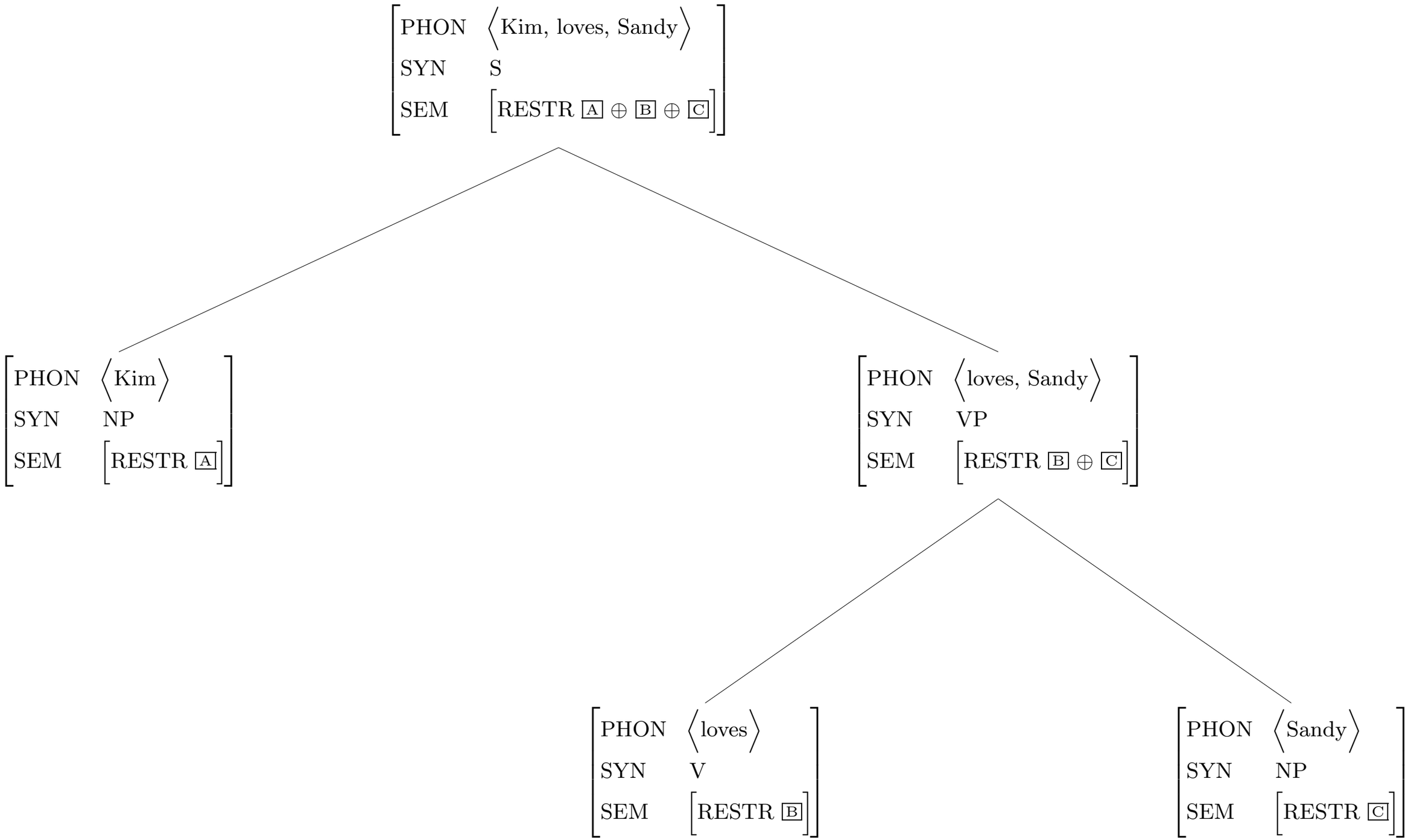
$$\left[\begin{array}{l}
\textit{hd-comp-cx} \\
\text{MOTHER} \left[\begin{array}{l}
\textit{phrase} \\
\text{PHON} \quad \langle\ \text{in}\ ,\ \text{Seattle}\ \rangle \\
\text{SYN} \left[\begin{array}{ll}
\text{HEAD} & \textit{prep} \\
\text{VAL} & \left[\begin{array}{ll}
\text{SPR} & \boxed{\text{A}}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

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

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

Coordination Construction

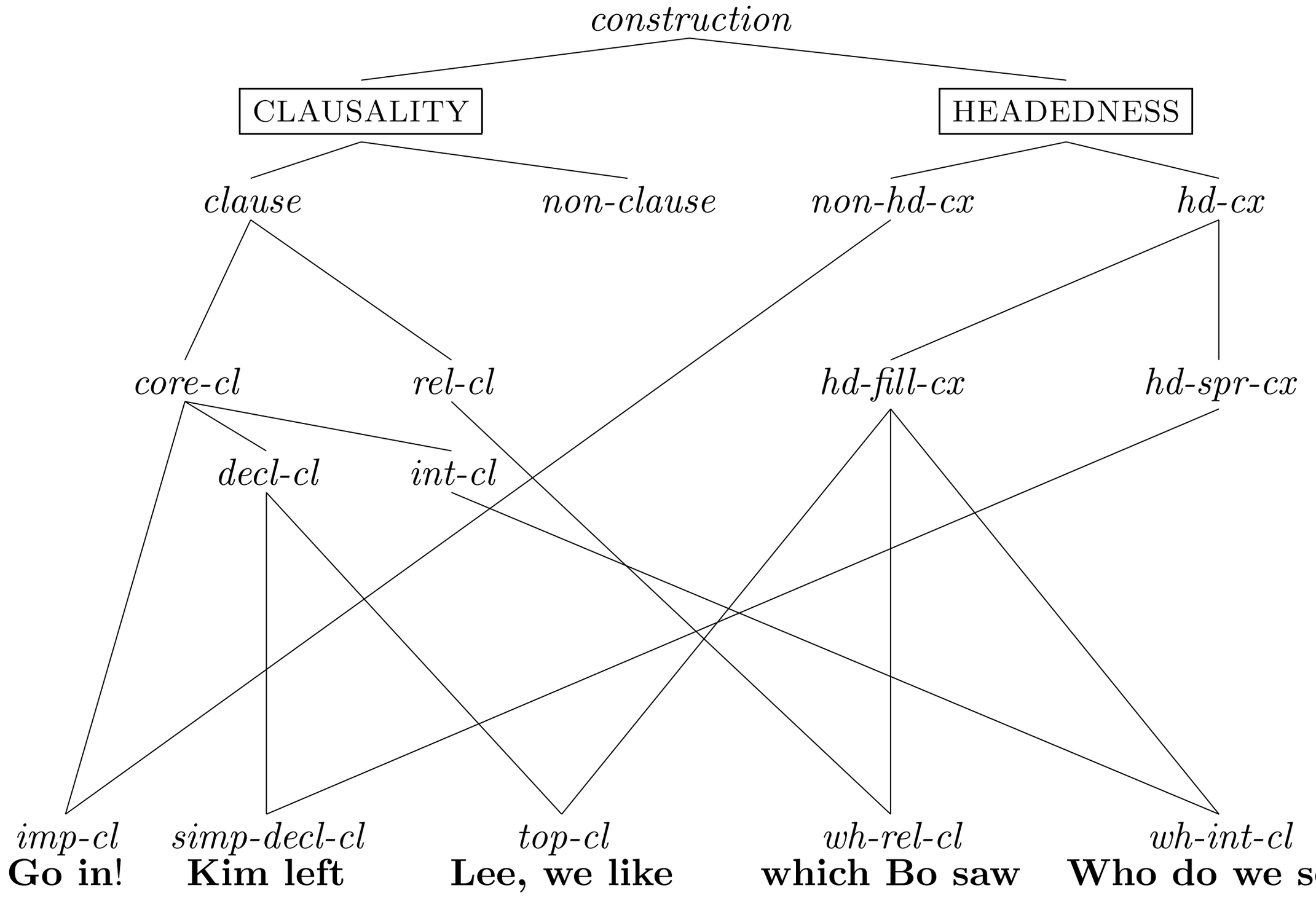
$$\left[\begin{array}{l}
\text{MOTHER} \left[\begin{array}{ll} \text{SYN} & \left[\begin{array}{ll} \text{HEAD} & [\text{FORM } \boxed{1}] \\ \text{VAL} & \boxed{2} \\ \text{GAP} & \boxed{A} \end{array}\right] \\ \text{SEM} & [\text{IND} \quad s_0] \end{array}\right] \\
\text{DTRS} \left\langle \left[\begin{array}{ll}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

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

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

- I get why we didn't have a hierarchy of grammar rules initially since it's much more complicated, but what did we get out of having lexical entries as lexical sequences? This doesn't seem simpler than the final version.

Reading questions

- I'm having a difficult time imagining a fully defined tree now using the l-cx. Would our tree now look like (starting from the bottom) phones, lexical entries, constructions (probably more constructions), start symbol? So now everything that isn't a leaf or a lexical entry would now be a construction?

Reading questions

- Why do we change such fundamental parts of how our theory works in the final chapter of the book? Will we still be using trees on the final at all or will we mostly be using this new formulation?

Reading questions

- I assume that the well formed structure condition from page 478 is recursive and that it also can apply to each daughter in the DTRS list. Does this constraint have a specific home in the grammar or is it the last remnants of the older not feature structure approach?

Reading questions

- On pg 474, the book says that the PHON value is a list to be able to include phrases. Why is it assumed that a PHON ends where a space occurs in English orthography? There's nothing distinctly against considering *kick the bucket* or *Sally loves Harry* as a single phonetic utterance in most situations.

Reading questions

- The chapter closes by drawing attention to the way in which this textbook has documented both the end and the means for the benefit of future scholars. How much attention have previous syntactic theories paid to this sort of future-proofing, for lack of a better word?

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)
- General wrap up