Ling 566
Feb 2, 2006
Lexical Types

Overview

- Motivation for lexical hierachy
- Default inheritance
- Tour of the lexeme hierarchy
- The Case Constraint
- *pos* vs. *lexeme*
- Guest appearance by Will

Motivation

- We've streamlined our grammar rules...
  - ...by stating some constraints as general principles
  - ...and locating lots of information in the lexicon.
  - Our lexical entries currently stipulate a lot of information that is common across many entries and should be stated only once.
- Examples?
- Ideally, particular lexical entries need only give phonological form, the semantic contribution, and any constraints truly idiosyncratic to the lexical entry.

Lexemes and Words

- **Lexeme**: An abstract proto-word which gives rise to genuine words. We refer to lexemes by their 'dictionary form', e.g. 'the lexeme *run*' or 'the lexeme *dog*'.
- **Word:** A particular pairing of form and meaning. *Running* and *ran* are different words

Lexical Types & Lexical Rules

- Lexemes capture the similarities among *run, runs, running,* and *run*.
- The lexical type hierarchy captures the similarities among *run, sleep,* and *laugh*, among those and other verbs like *devour* and *hand*, and among those and other words like *book*.

  Q: What do *devour* and *book* have in common?

  A: The SHAC
- Lexical rules capture the similarities among *runs*, *sleeps, devours, hands*,...

Default Inheritance

Q: Why do we have default inheritance?

A: Generalizations with exceptions are common:

- Most nouns in English aren't marked for CASE, but pronouns are.
- Most verbs in English only distinguish two agreement categories (*3sing* and *non-3sing*), but *be* distinguishes more.
- Most prepositions in English are transitive, but *here* and *there* are intransitive.
- Most nominal words in English are 3rd person, but some (all of them pronouns) are 1st or 2nd person.
- Most proper nouns in English are singular, but some (mountain range names, sports team names) are plural.

Default Inheritance, Technicalities

If a type says ARG-ST / < NP >, and one of its subtypes says ARG-ST < >, then the ARG-ST value of instances of the subtype is < >.

If a type says ARG-ST < NP >, and one of its subtypes says ARG-ST < >, then this subtype can have no instances, since they would have to satisfy contradictory constraints.

Default Inheritance, More Technicalities

- If a type says MOD / < S >,

  and one of its subtypes says MOD <[SPR < NP>] >,

  then the ARG-ST value of instances of the subtype is

$$\left[\text{MOD} \left\langle \left[\begin{array}{ll}\text{HEAD} & / \; verb \\ \text{SPR} & / \left\langle \text{NP} \right\rangle \\ \text{COMPS} & / \left\langle\ \right\rangle\end{array}\right] \right\rangle\right]$$

- That is, default constraints are ‘pushed down’

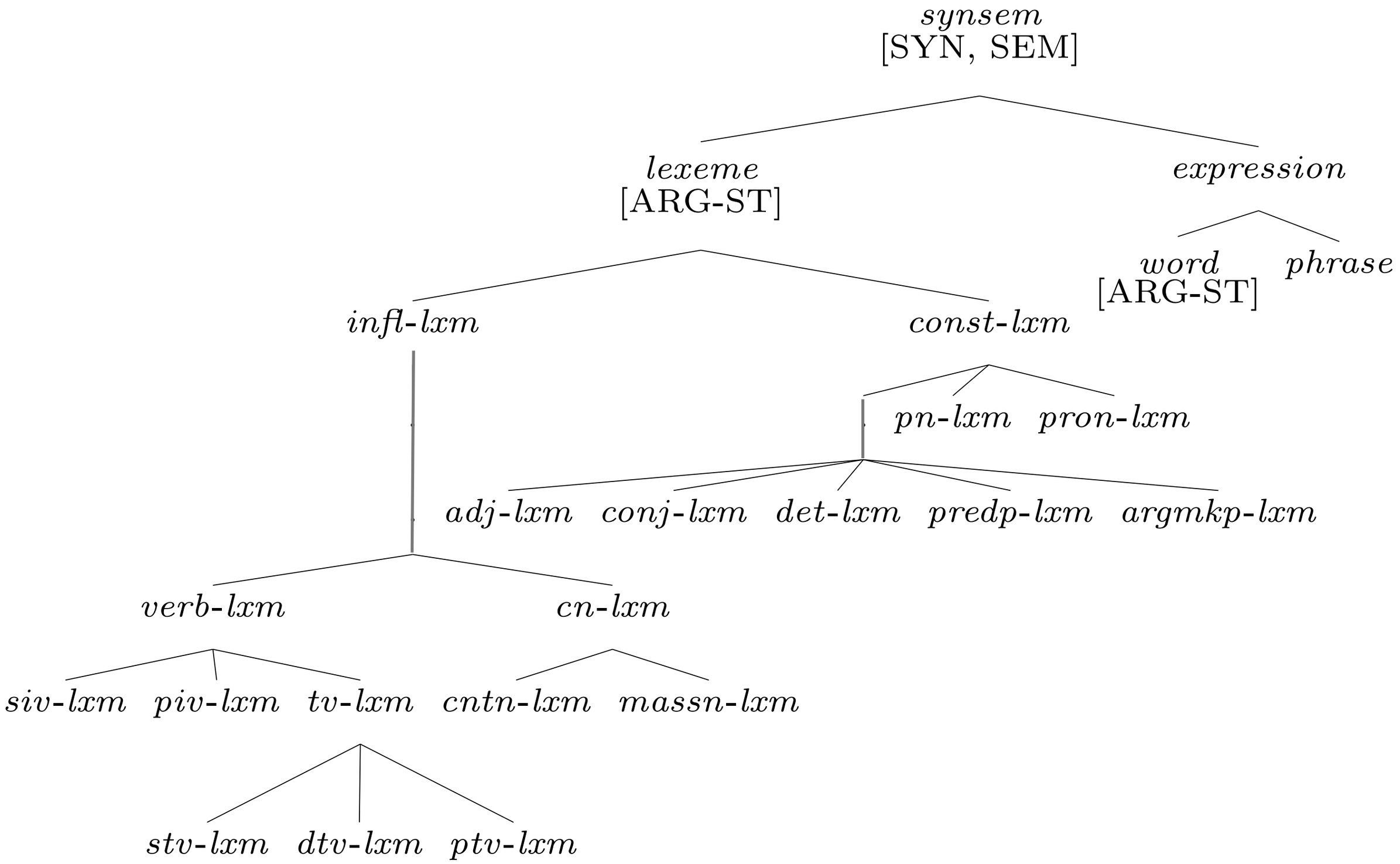
Question on Default Inheritance

Q: Can a grammar rule override a default constraint on a word?

A: No. Defaults are all 'cached out' in the lexicon.

- Words as used to build sentences have only inviolable constraints.

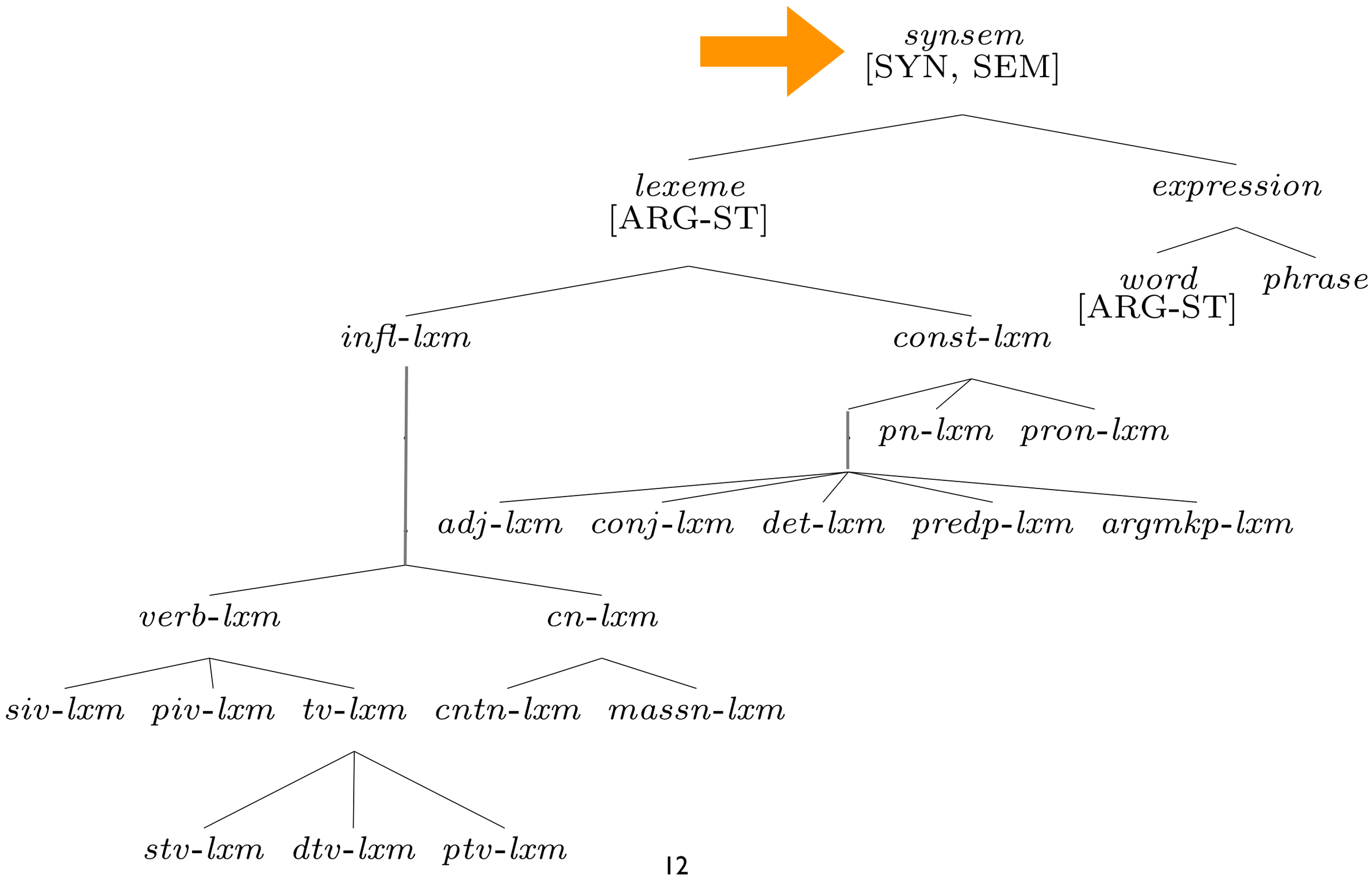
Our Lexeme Hierarchy



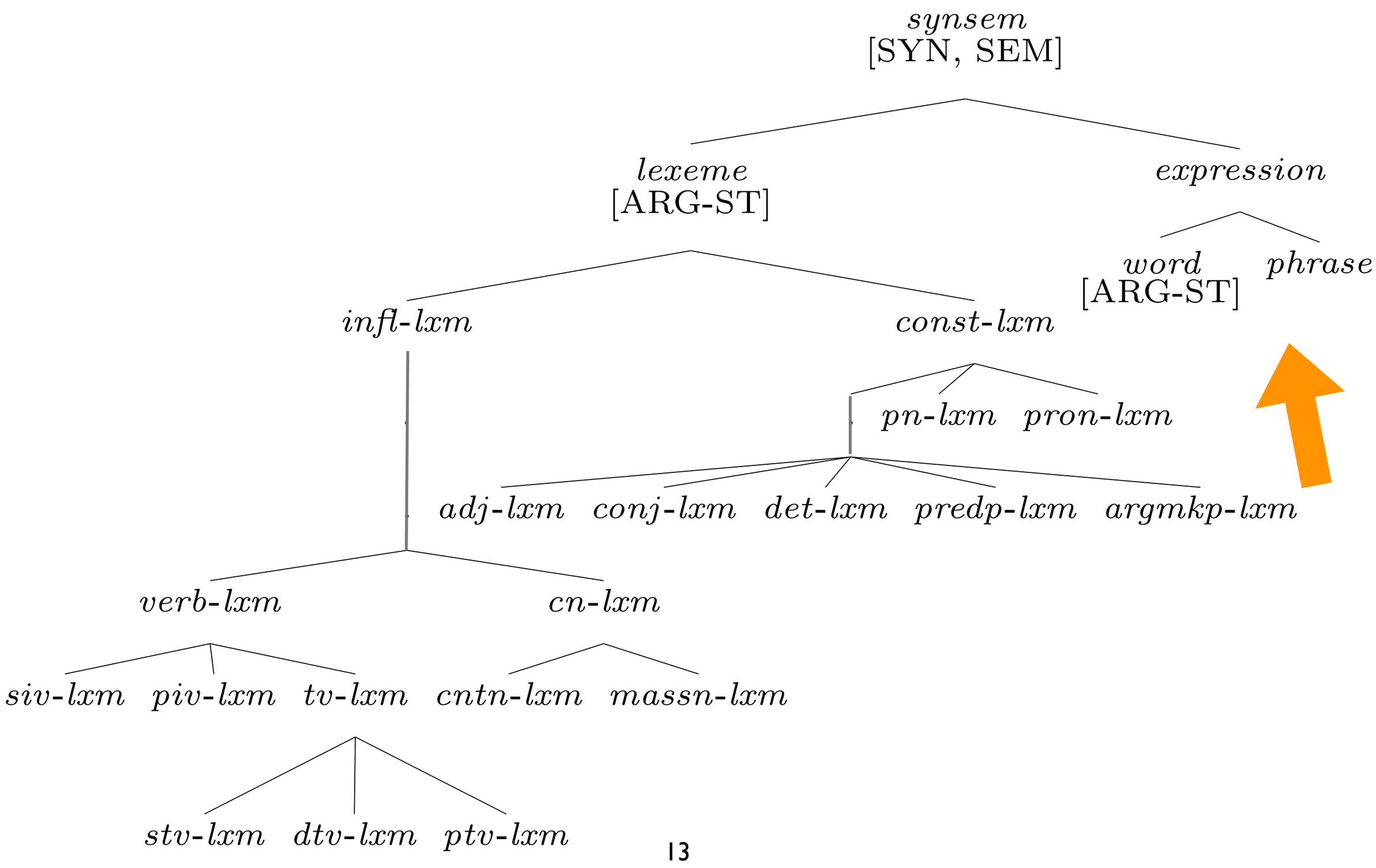
Functions of Types

- Stating what features are appropriate for what categories
- Stating generalizations
  - Constraints that apply to (almost) all instances
  - Generalizations about selection -- where instances of that type can appear

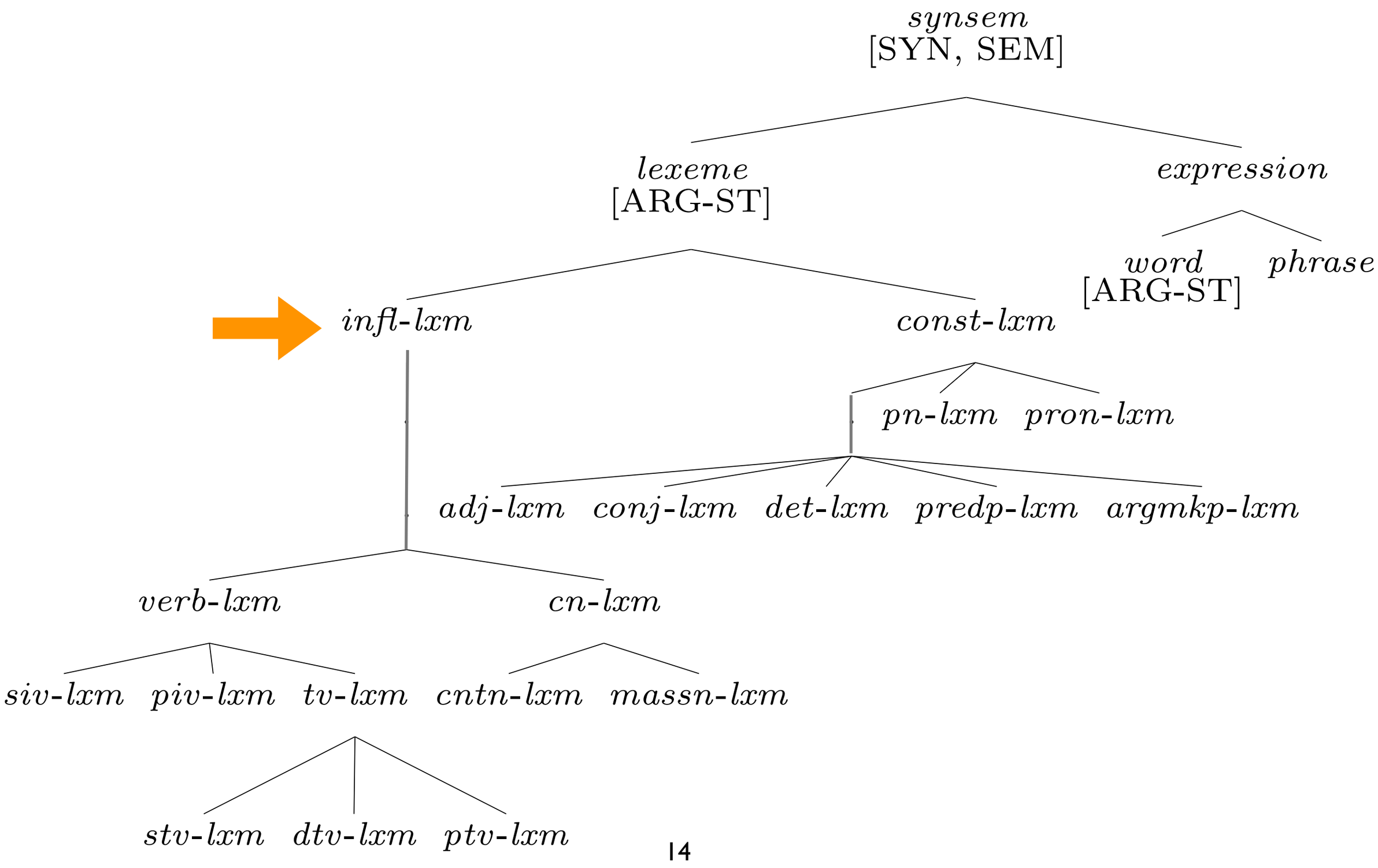
Every *synsem* has the features SYN and SEM



No ARG-ST on *phrase*



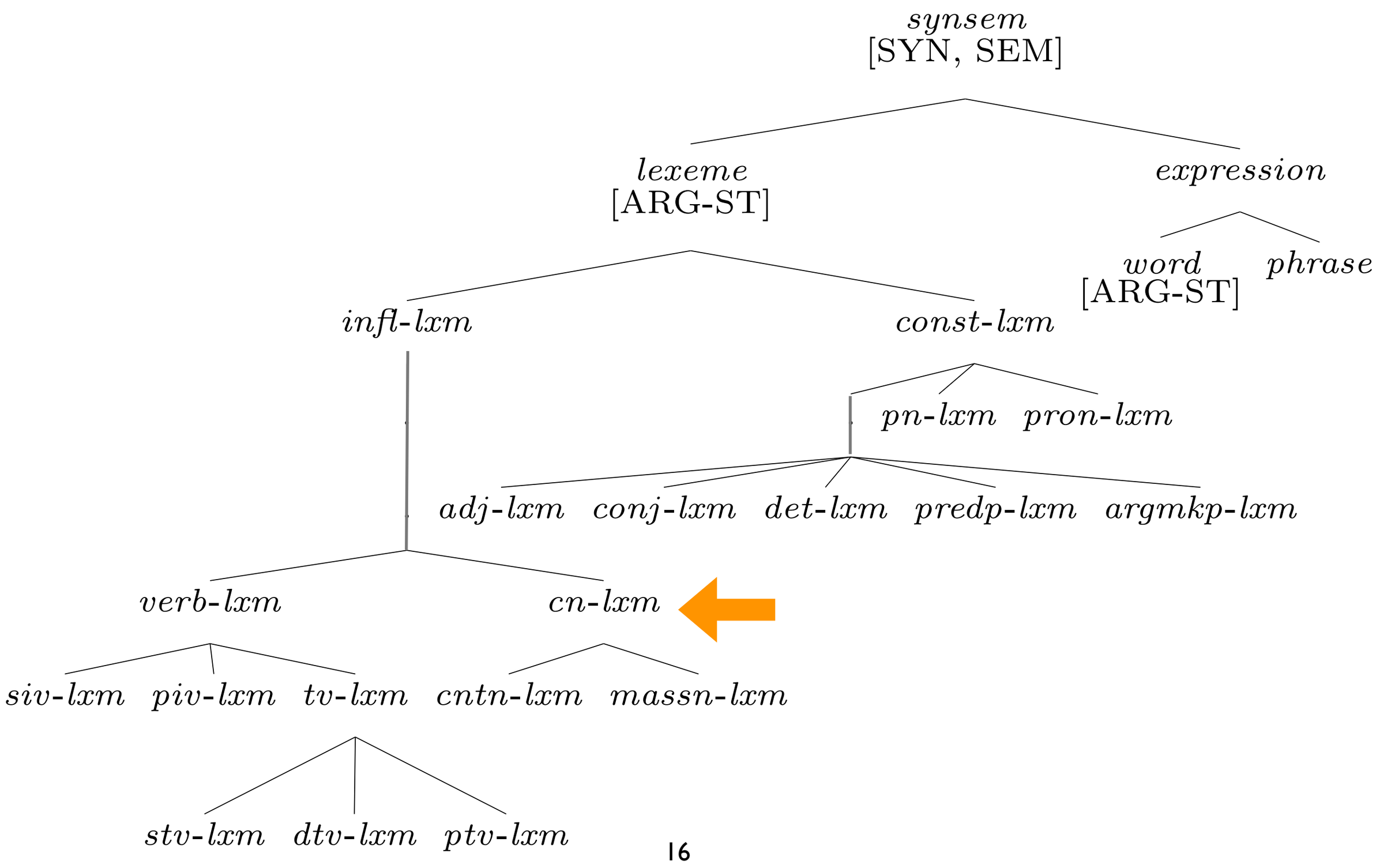
A Constraint on *infl-lxm*: the SHAC



A Constraint on *infl-lxm*: the SHAC

$$\textit{infl-lxm}: \left[\text{SYN} \left[\begin{array}{ll}\text{VAL} & \left[\text{SPR} \left\langle [\text{AGR} \quad \boxed{1}\,] \right\rangle\right] \\ \text{HEAD} & [\,\text{AGR} \quad \boxed{1}\,]\end{array}\right]\right]$$

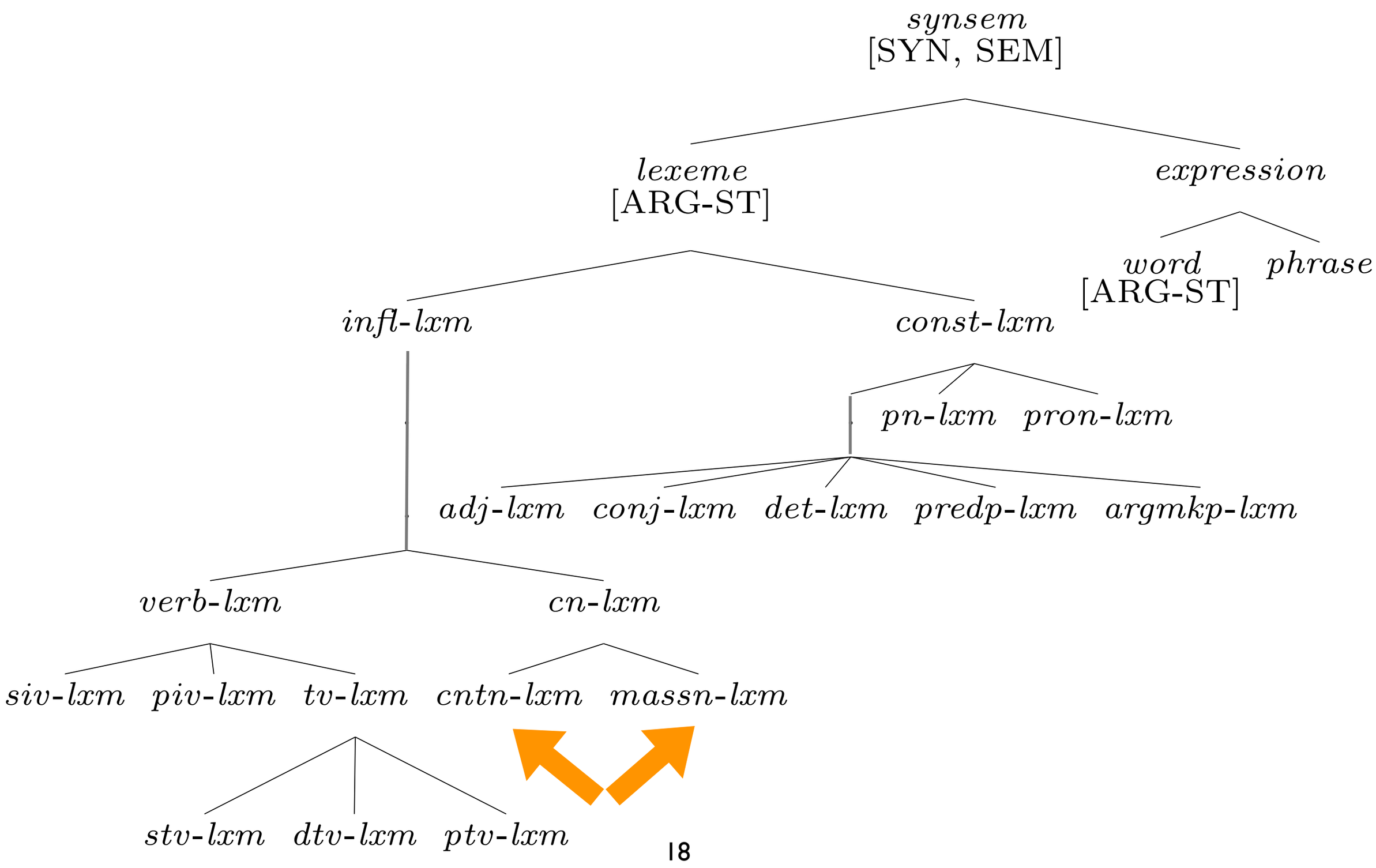
Constraints on *cn-lxm*



Constraints on *cn-lxm*

$$
cn\text{-}lxm: \begin{bmatrix}
\text{SYN} & \begin{bmatrix}
\text{HEAD} & \begin{bmatrix} noun \\ \text{AGR} & [\text{PER 3rd}] \end{bmatrix} \\
\text{VAL} & \begin{bmatrix} \text{SPR} & \langle \begin{bmatrix} \text{HEAD} & \text{det} \\ \text{INDEX} & i \end{bmatrix} \rangle \end{bmatrix}
\end{bmatrix} \\
\text{SEM} & \begin{bmatrix} \text{MODE} & / \text{ ref} \\ \text{INDEX} & i \end{bmatrix} \\
\text{ARG-ST} & \langle \text{X} \rangle \oplus /\langle\ \rangle
\end{bmatrix}
$$

Formally Distinguishing Count vs. Mass Nouns

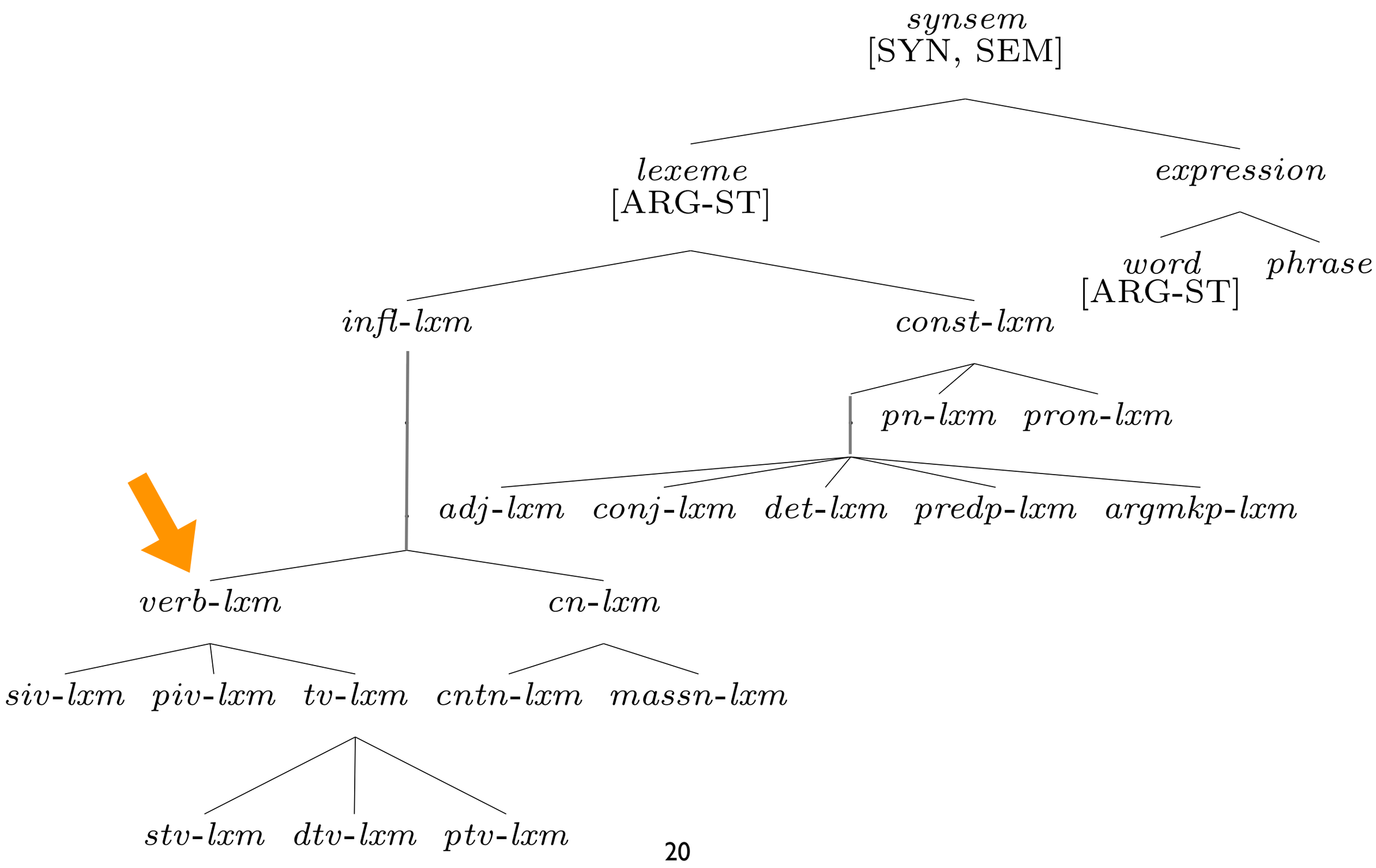


Formally Distinguishing Count vs. Mass Nouns

$$\textit{cntn-lxm} : \left[\text{SYN} \quad \left[\text{VAL} \quad \left[\text{SPR} \quad \langle\, [\text{COUNT} +] \,\rangle\right]\right]\right]$$

$$\textit{massn-lxm} : \left[\text{SYN} \quad \left[\text{VAL} \quad \left[\text{SPR} \quad \langle\, [\text{COUNT} -] \,\rangle\right]\right]\right]$$

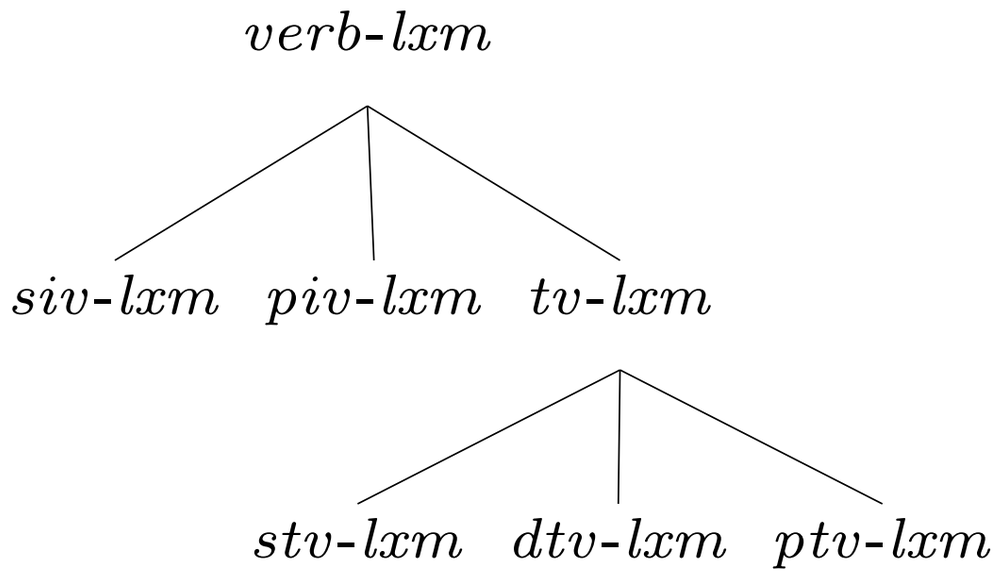
Constraints on *verb-lxm*



Constraints on *verb-lxm*

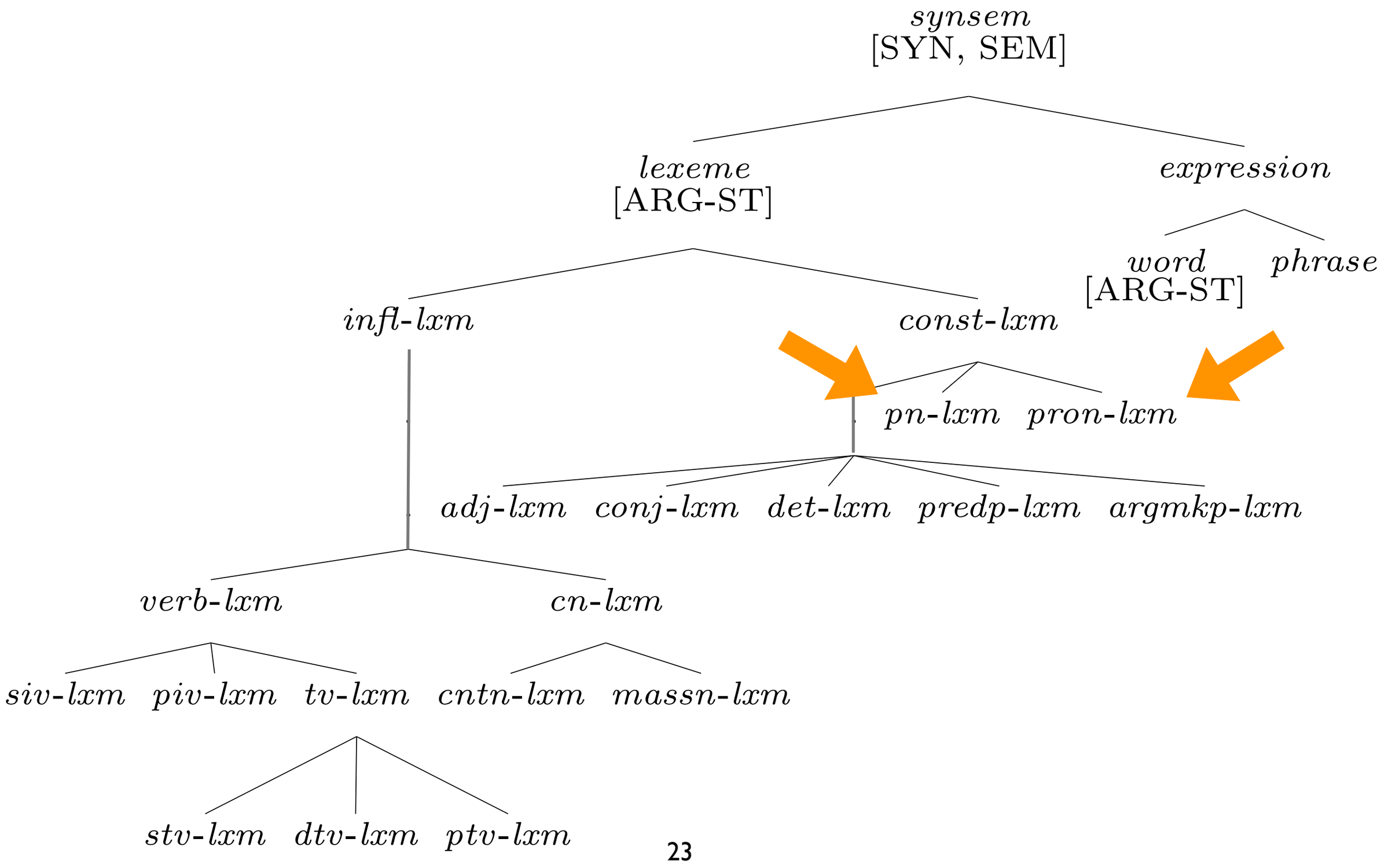
$$\textit{verb-lxm}\text{:}\quad \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \textit{verb} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{MODE} & \text{prop} \end{bmatrix} \\ \text{ARG-ST} & / \langle\ \text{NP},\ \ldots\ \rangle \end{bmatrix}$$

Subtypes of *verb-lxm*



- *verb-lxm*: [ARG-ST / < NP, ... >]
  - *siv-lxm*: [ARG-ST / < NP >]
  - *piv-lxm*: [ARG-ST / < NP, PP >]
  - *tv-lxm*: [ARG-ST / < NP, NP, ... >]
    - *stv-lxm*: [ARG-ST / < NP, NP, >]
    - *dtv-lxm*: [ARG-ST / < NP, NP, NP >]
    - *ptv-lxm*: [ARG-ST / < NP, NP, PP >]

Proper Nouns and Pronouns



Proper Nouns and Pronouns

$$\textit{pn-lxm}: \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{noun} & \\ \text{AGR} & \begin{bmatrix} \text{PER} & \text{3rd} \\ \text{NUM} & \text{/ sg} \end{bmatrix} \end{bmatrix} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{MODE} & \text{ref} \end{bmatrix} \\ \text{ARG-ST} & \text{/ } \langle\ \rangle \end{bmatrix}$$

$$\textit{pron-lxm}: \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \textit{noun} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{MODE} & \text{/ ref} \end{bmatrix} \\ \text{ARG-ST} & \langle\ \rangle \end{bmatrix}$$

The Case Constraint

An outranked NP is [CASE acc].

- object of verb ✓
- second object of verb ✓
- object of argument-marking preposition ✓
- object of predicational preposition (✓)

The Case Constraint, continued

An outranked NP is [CASE acc].

- Subjects of verbs
  - Should we add a clause to cover nominative subjects?
    - No.

      We expect them to leave. (Chapter 12)

    - Lexical rules for finite verbs will handle nominative subjects.
- Any other instances of case marking in English?
- Case systems in other languages?

  No: The Case Constraint is an English-specific constraint.

Apparent redundancy

- Why do we need both the *pos* subhierarchy and lexeme types?
  - *pos*:
    - Applies to words and phrases; models relationship between then
    - Constrains which features are appropriate (no AUX on *noun*)
  - *lexeme*:
    - Generalizations about combinations of constraints

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