# Ling 566
# Oct 26, 2017

## Lexical Types

# Overview

- Motivation for lexical hierarchy
- Default inheritance
- Tour of the lexeme hierarchy
- The Case Constraint
- *pos* vs. *lexeme*
- Reading Questions

# 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 SPR value of instances of the subtype is what?

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

- That is, default constraints are ‘pushed down’

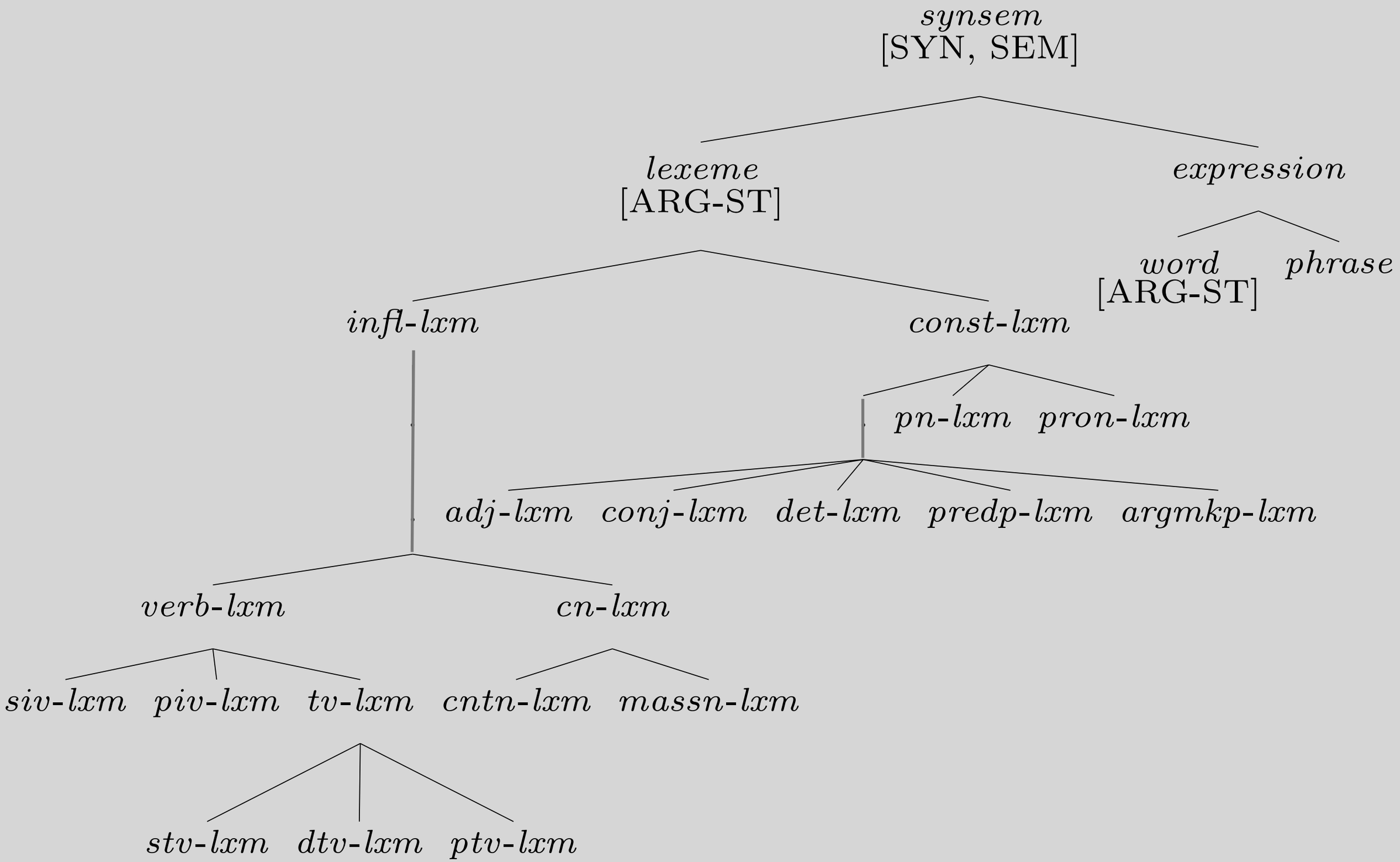
# Question on Default Inheritance

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.

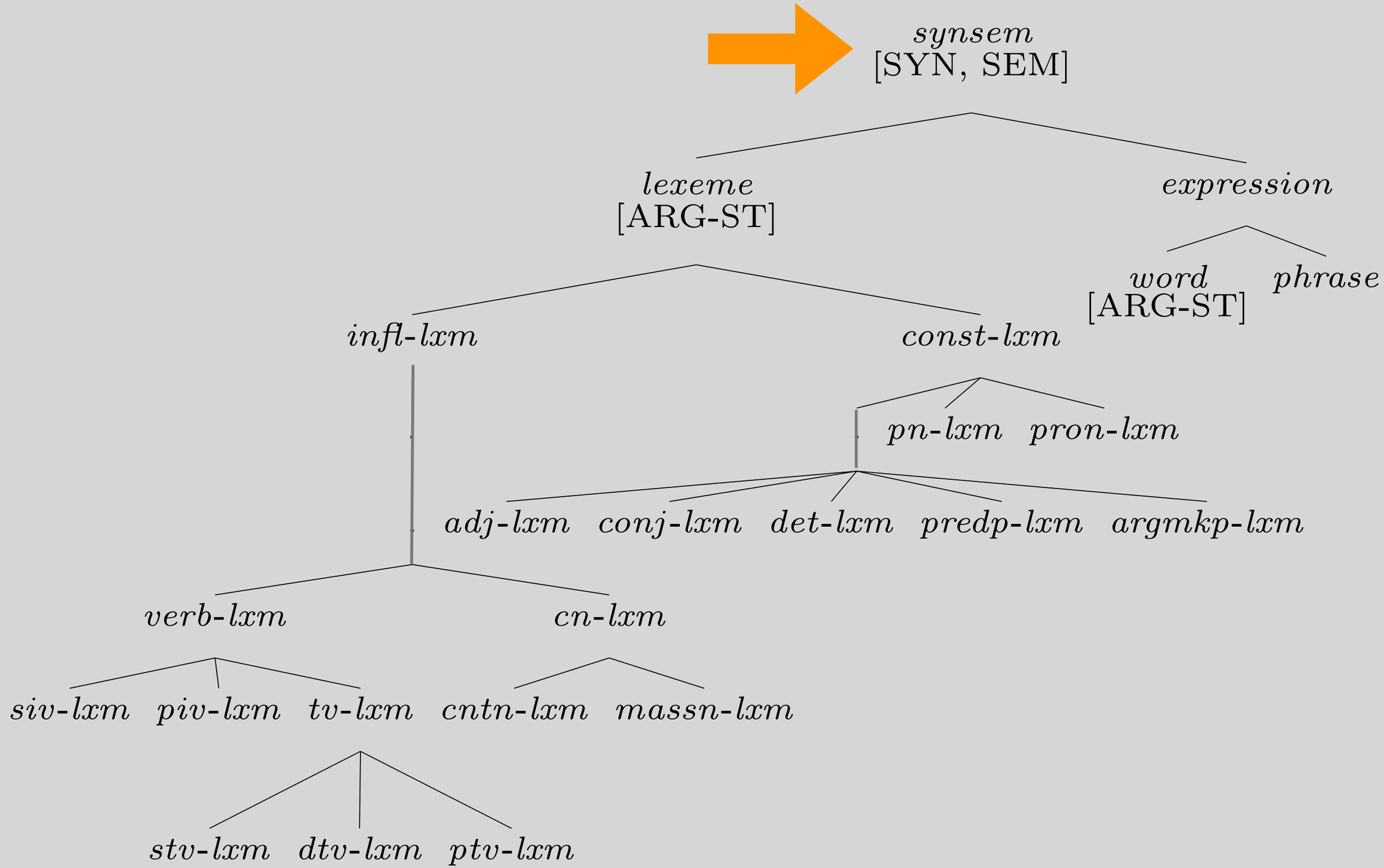
# Our Lexeme Hierarchy



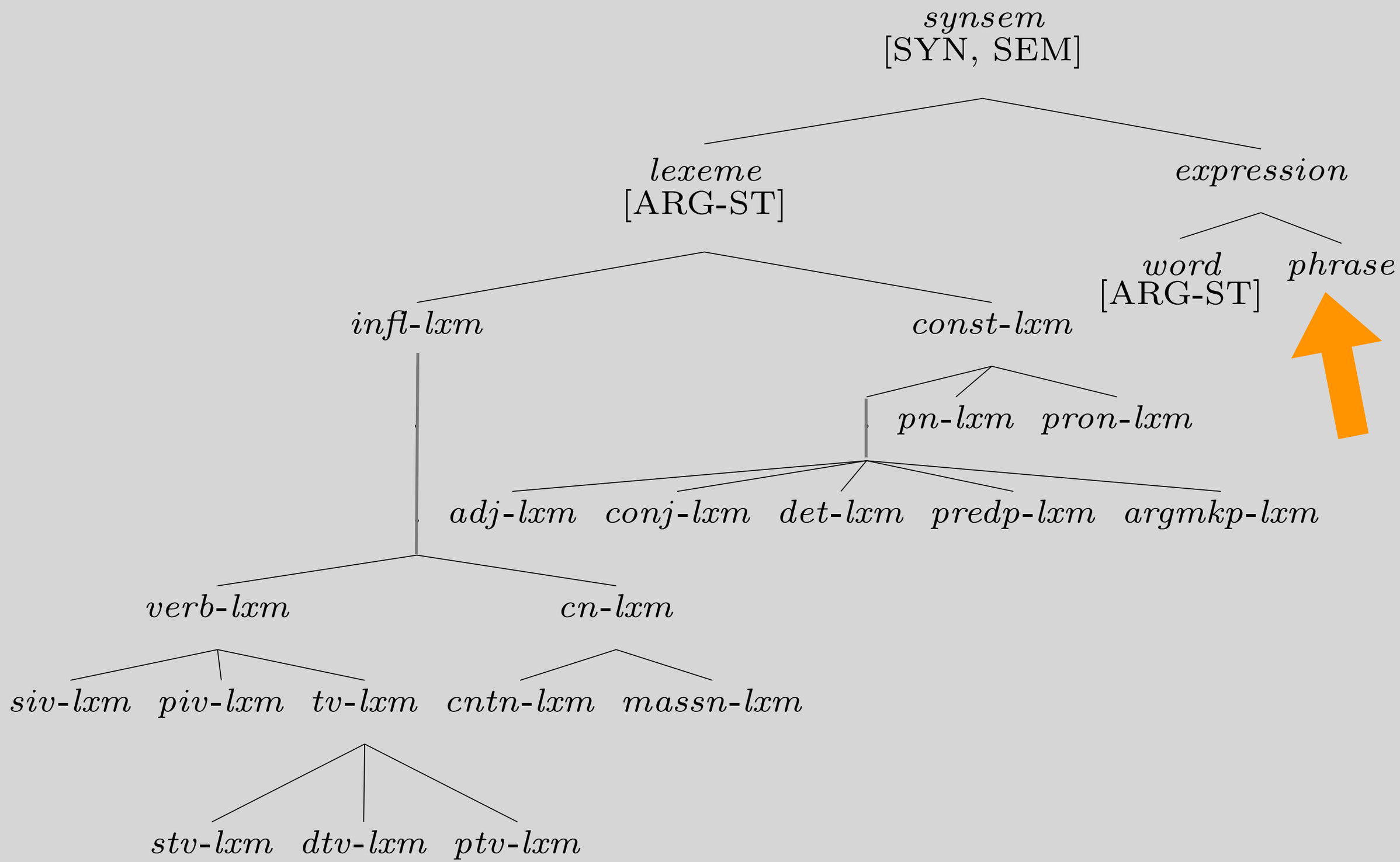
# Functions of Types

- 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

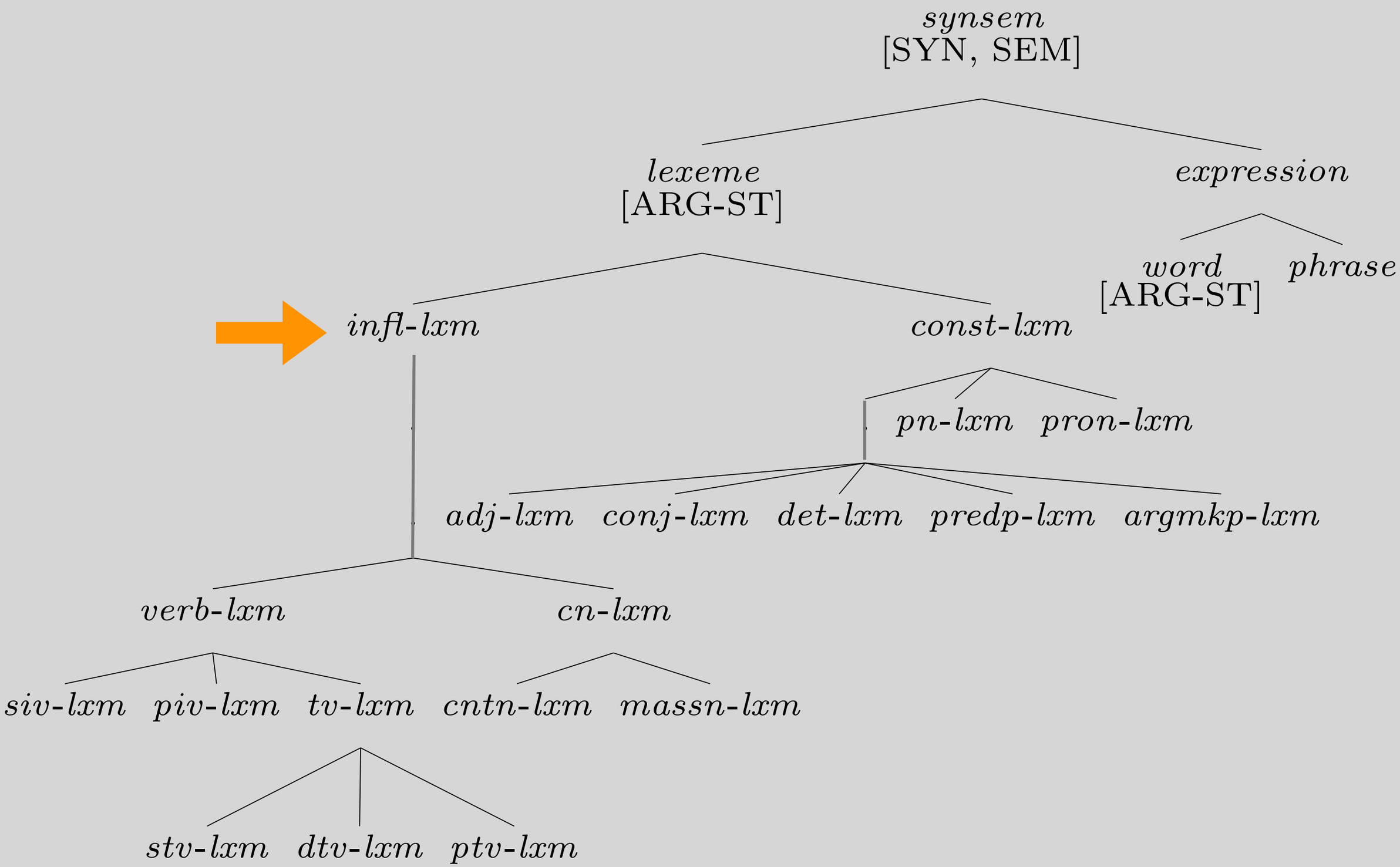
# Every *synsem* has the features SYN and SEM



# No ARG-ST on *phrase*



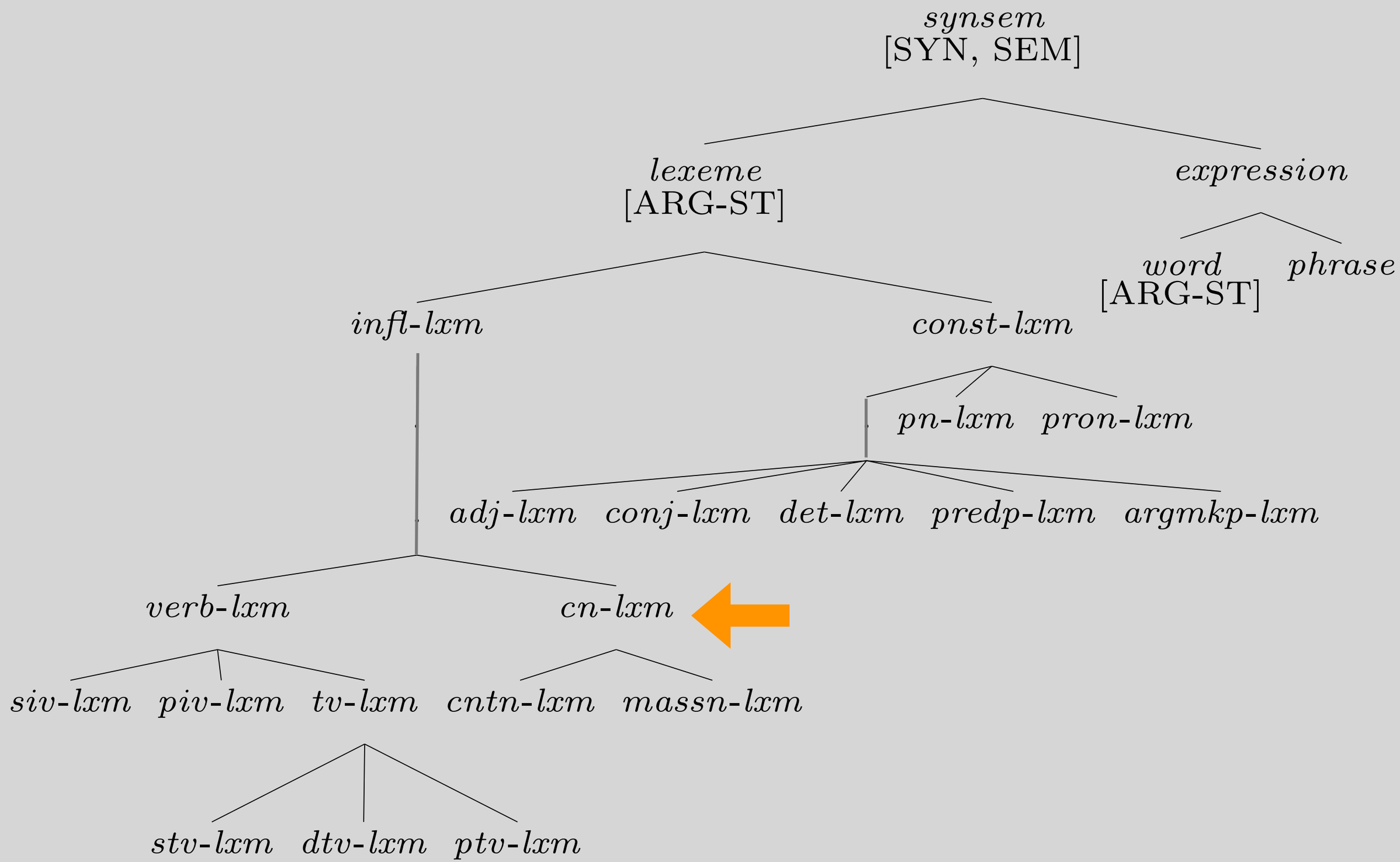
# A Constraint on *infl-lxm*: the SHAC



# A Constraint on *infl-lxm*: the SHAC

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

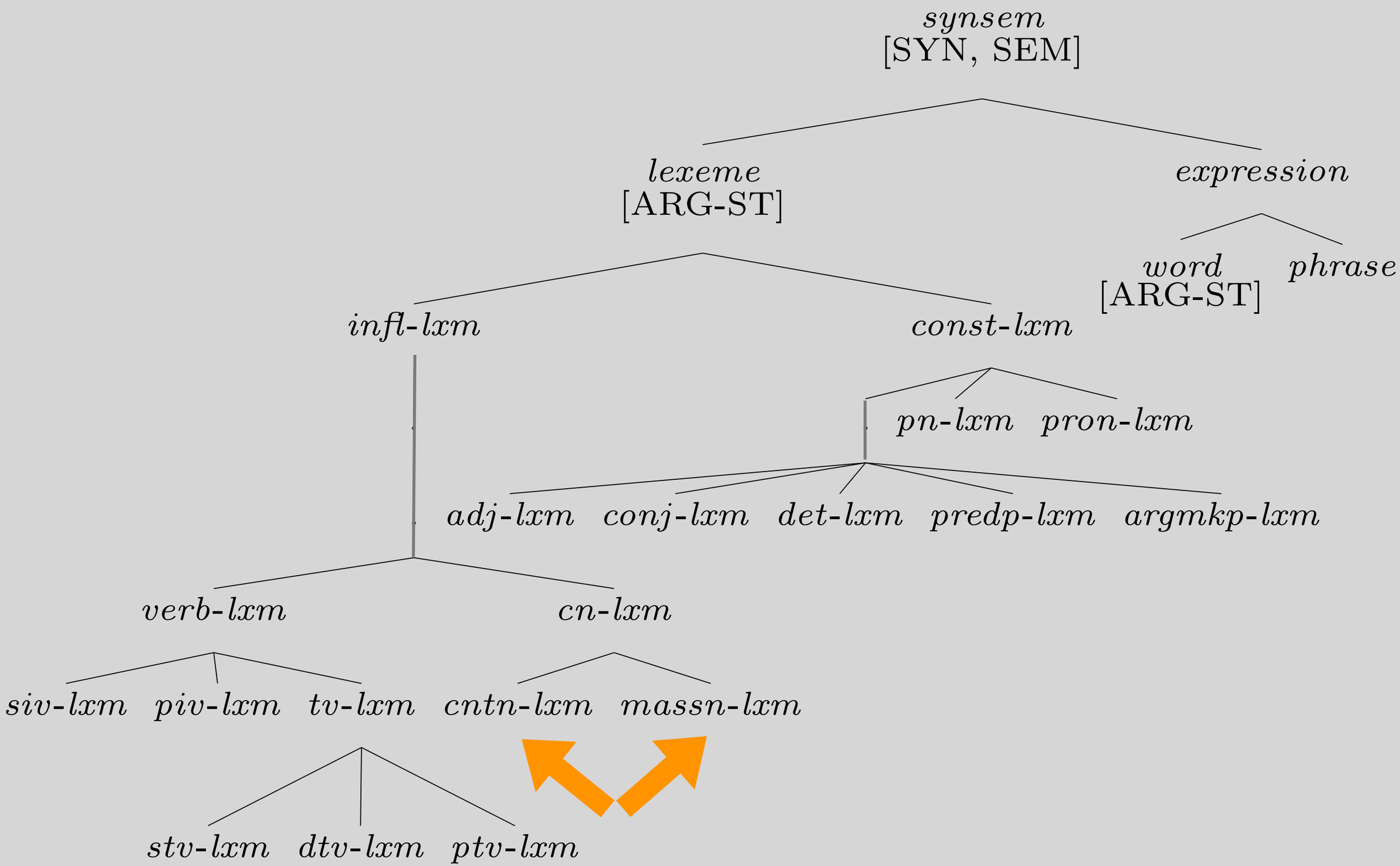
# Constraints on *cn-lxm*



# Constraints on *cn-lxm*

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

# Formally Distinguishing Count vs. Mass Nouns

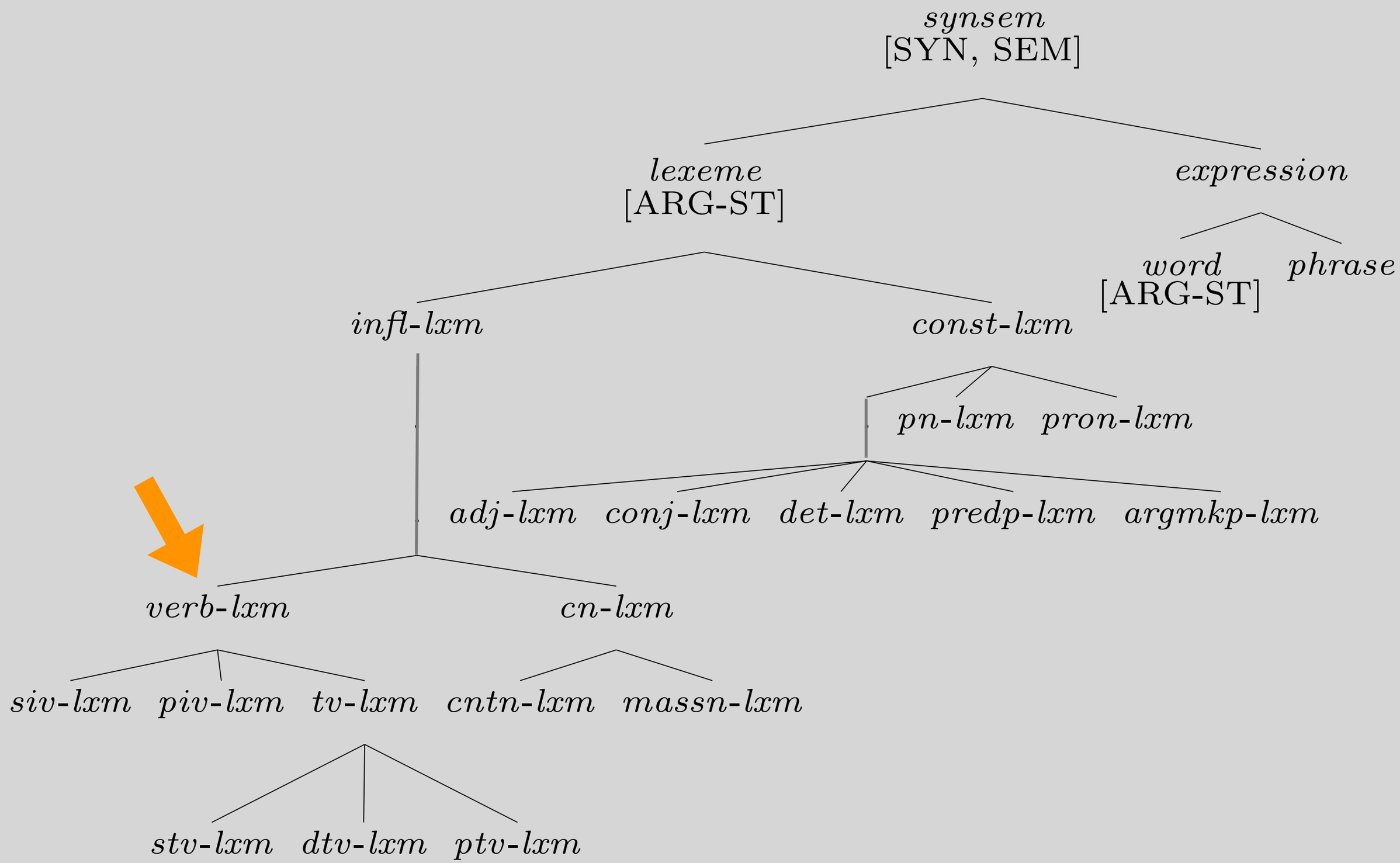


# Formally Distinguishing Count vs. Mass Nouns

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

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

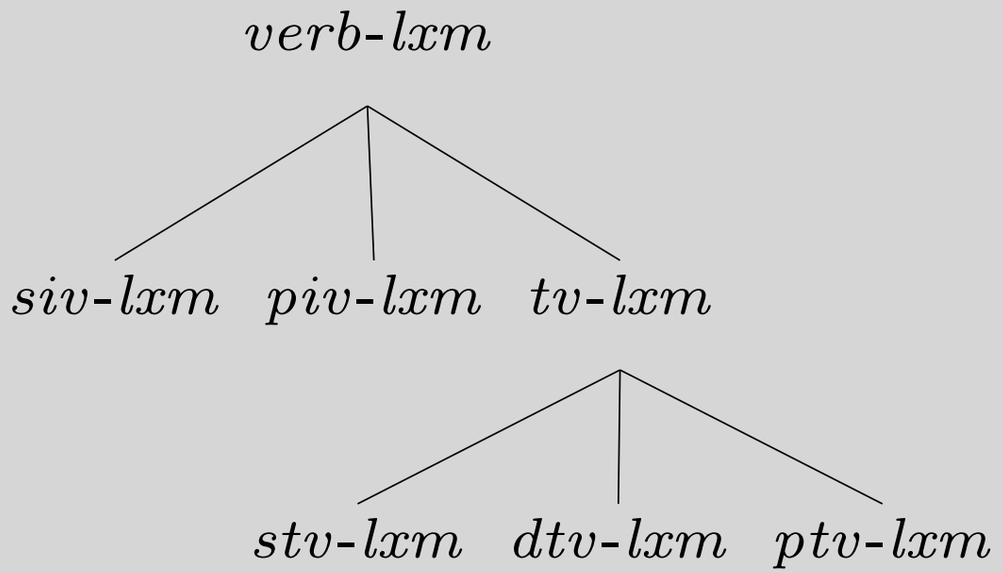
# Constraints on *verb-lxm*



# Constraints on *verb-lxm*

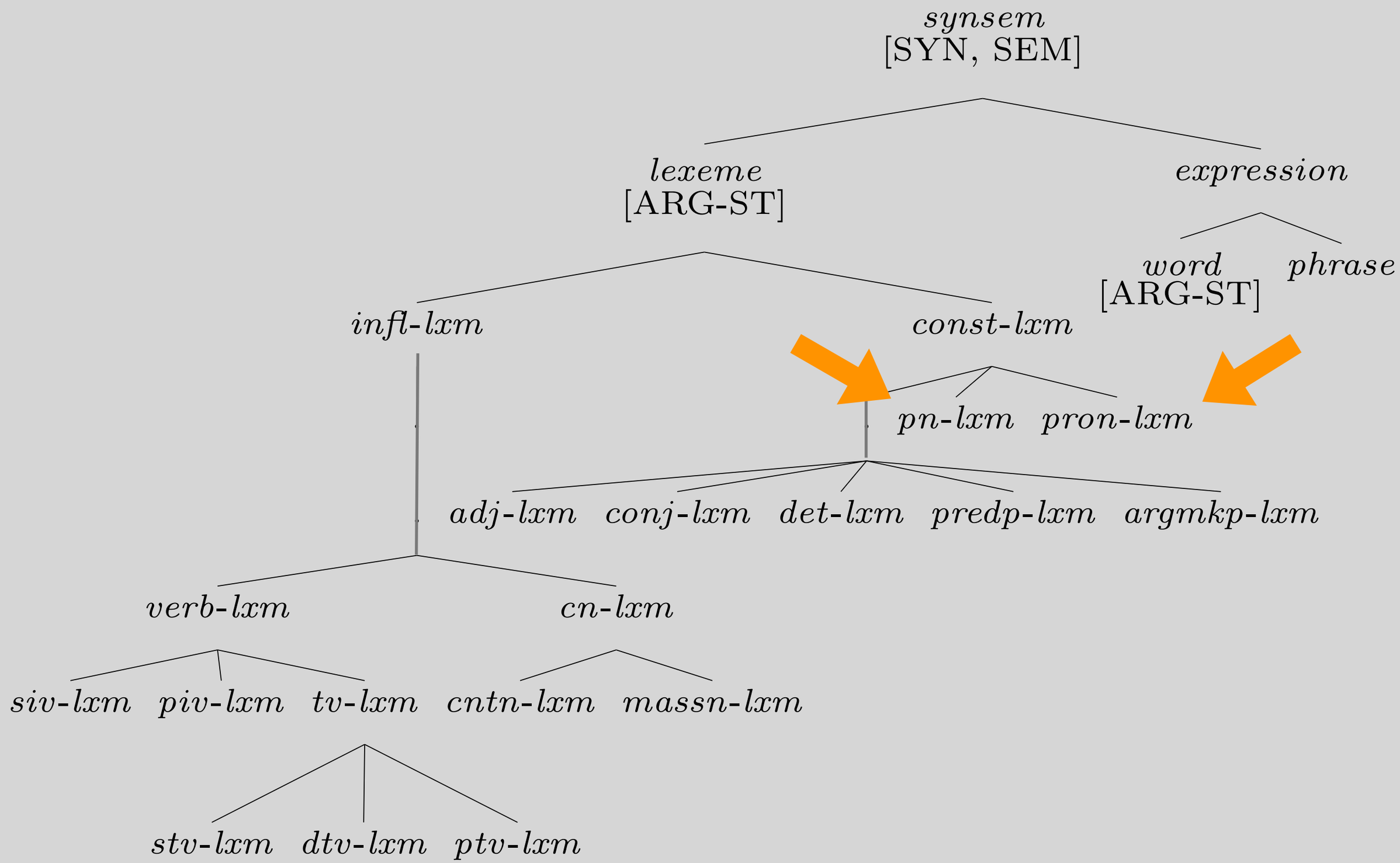
$$\textit{verb-lxm}: \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \textit{verb} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{MODE} & \text{prop} \end{bmatrix} \\ \text{ARG-ST} & / \langle\ \text{NP}, \ldots\ \rangle \end{bmatrix}$$

# 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?
- Does it apply to 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

# Lexical Types & Lexical Rules

- Lexemes capture the similarities among *run*, *runs*, *running*, and *run*.

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- Lexical rules capture the similarities among *runs*, *sleeps*, *devours*, *hands*,...

# Overview

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# Reading Questions

- What is the difference between lexical entries and lexical sequences?
- How does "family of lexical sequences" fit in?
- How do lexical sequences relate to word structures?

# Reading Questions

- Which layer in our system hierarchy should the lexeme level be put in? Or is it something that is independent of the hierarchy?
- P.229: *lexeme* is the sister branch of *expression*, and that *word* & *phrase* are daughter branches of *expression*. If a *lexeme* can be thought of as an abstract proto-word, why isn't *lexeme* the mother branch of *word*?
- How is it that those two items (lexeme and expression) can have equal "hierarchy" or does the tree not carry that sort of meaning with it?

# Reading Questions

- How does the concept of a common lexeme relate to stemming and lemmatization, terms used in the information retrieval domain to describe the normalization of words parsed from text during indexing ? Would the common lexeme be more like stemming by reduction or lemmatization by expansion into inflected forms?

# Reading Questions

- What is the role of phonology within this notion of the lexicon?
- Does the notion of lexeme correspond to a verb that is in base form?

# Reading Questions

- For the lexeme value, when a word can have different lexeme values in different context, for example, some verbs can be both transitive and intransitive, do we assign values according to the context? Or do we under specify?
- What is the point of keeping type *word* in our expressions list, if having the lexemes is so much more powerful?

# Reading Questions

- Why did we have to add the *lexeme* type, and why we didn't just make the *pos* type as complex as the *lexeme* type described? I understand the distinction between the two, but why do we need both?

# Reading Questions

- How does overriding a defeasible constraint compare to fully specifying an underspecified feature?
- Why bother stating which constraints are defeasible rather than assuming they all are?
- How do we know which lexical entries override defeasible constraints? In other words, when do we know when we are dealing with idiosyncratic lexical entries or classes of idiosyncratic expressions? Do we use our own judgements of acceptability?

# Reading Questions

- In (25) I don't understand why only MOD is stated especially since it is a defeasible constraint. Why aren't the other defeasible constraints also listed?

(25)
$$lexeme : \begin{bmatrix} \text{ARG-ST} & list(expression) \\ \text{SYN} & \begin{bmatrix} \text{VAL} & [\text{MOD} \ / \ \langle \ \rangle] \end{bmatrix} \end{bmatrix}$$

# Reading Questions

- Type constraints for *predp-lxm*: why is SPR not empty and why can MOD also be included in this constraint? Where are Y and Z being defined from?

(41) a.

$$\textit{predp-lxm}: \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \textit{prep} \\ \text{VAL} & \begin{bmatrix} \text{SPR} & \langle\ \text{X}\ \rangle \\ \text{MOD} & \langle\ \text{Y}\ \rangle \end{bmatrix} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{MODE} & \text{prop} \\ \text{RESTR} & \langle\ \text{Z}\ \rangle \end{bmatrix} \\ \text{ARG-ST} & \langle\ \text{NP}\ ,\ \text{NP}\ \rangle \end{bmatrix}$$

# Reading Questions

- Is overriding with defeasible constraints analogous to what we saw with the Valence Principle?
- Why do we go through the process of separating out inflected lexemes from uninflected lexemes when we could use a default?