

# Syntactic Theory

## Head-driven Phrase Structure Grammar (HPSG)

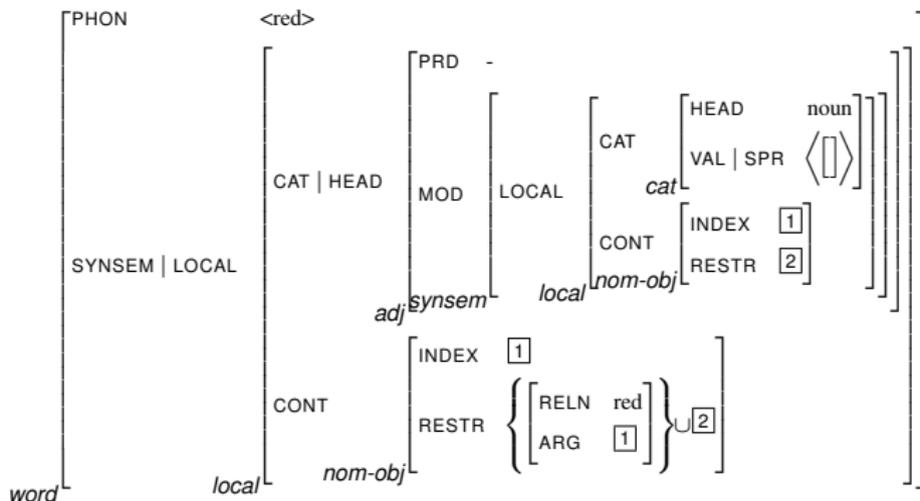
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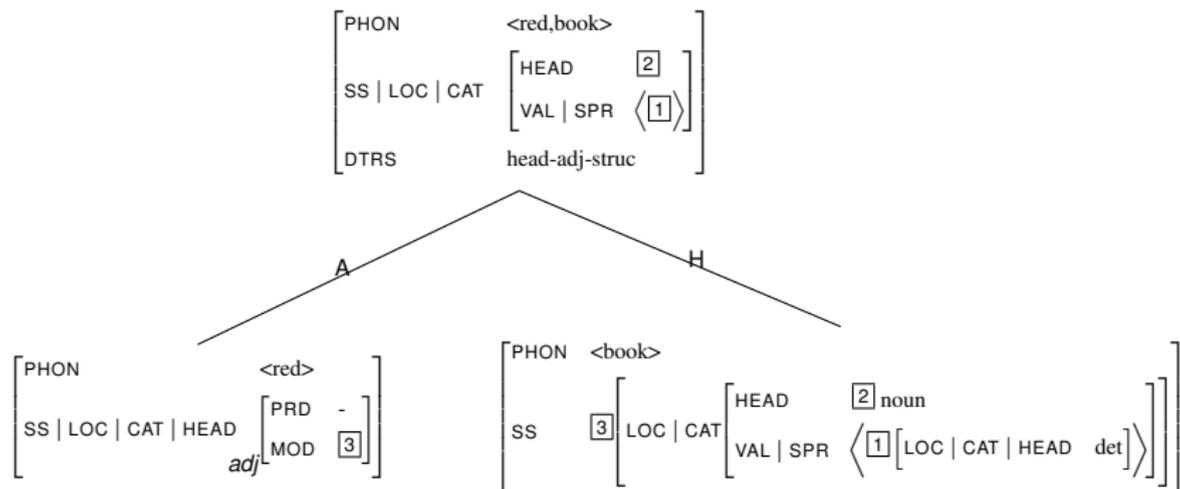
Jan 5th, 2010

# Towards Head Adjunct Structures

## An attributive adjective lexical entry



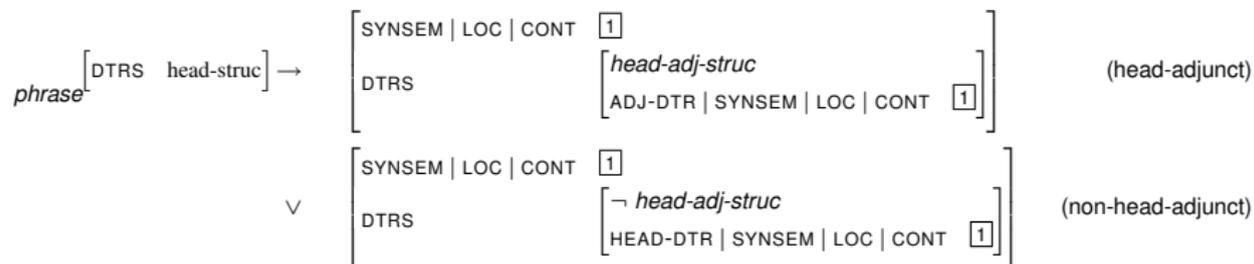
# A Sketch of Head-Adjunct Structure



# Semantic Principle

## Semantic principle

- The CONTENT value of a headed phrase is token identical to the CONTENT value of the semantic head daughter
- The semantic head daughter is identified as
  - The ADJ-DTR in a head-adjunct phrase
  - The HEAD-DTR in other headed phrases



# SPEC Principle

## SPEC principle

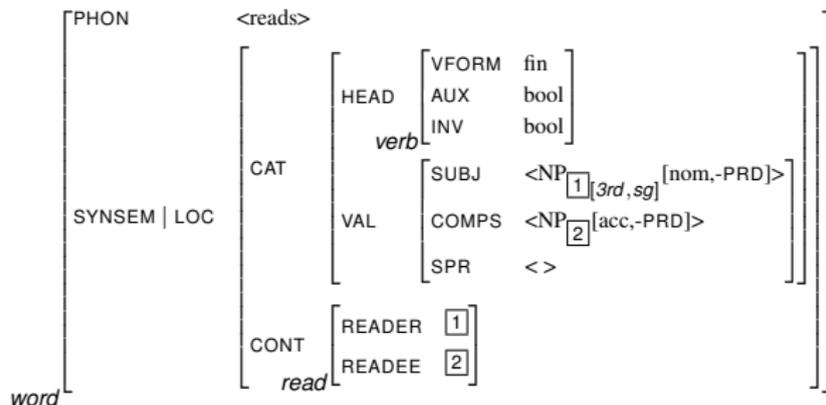
In a headed phrase whose non-head daughter (either the MARK-DTR or COMP-DTR|FIRST) has a SYNSEM|LOCAL|CATEGORY|HEAD value of type *functional*, the *spec* value of that value must be token-identical with the phrase's DTRS|HEAD-DTR|SYNSEM value

$$\begin{array}{l} \text{phrase} \left[ \begin{array}{l} \text{DTRS} \left[ \begin{array}{l} \textit{head-struct} \\ \text{NONHEAD-DTR} \mid \text{SYNSEM} \mid \text{LOCAL} \mid \text{CAT} \mid \text{HEAD} \mid \textit{functional} \end{array} \right] \end{array} \right] \\ \rightarrow \left[ \begin{array}{l} \text{DTRS} \left[ \begin{array}{l} \text{HEAD-DTR} \mid \text{SYNSEM} \quad \boxed{1} \\ \text{NONHEAD-DTR} \mid \text{SYNSEM} \mid \text{LOCAL} \mid \text{CAT} \mid \text{HEAD} \mid \text{SPEC} \quad \boxed{1} \end{array} \right] \end{array} \right] \end{array}$$

# Constraint Interaction - An Example

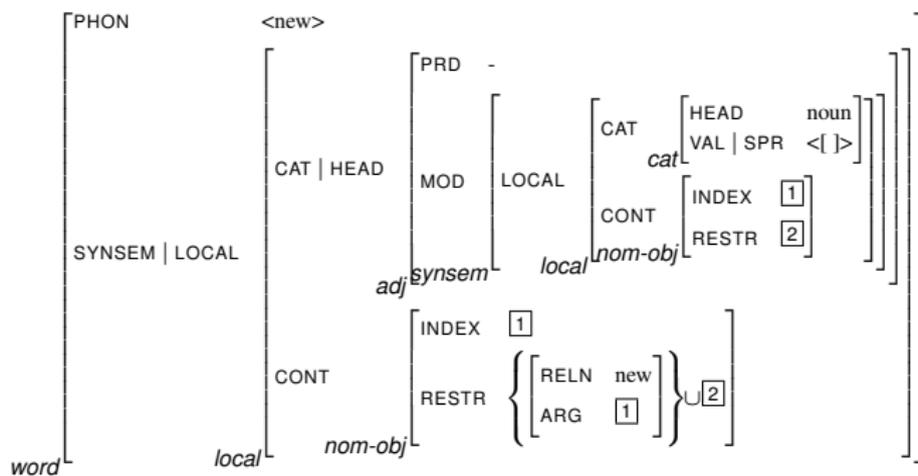
(1) John reads a new book.

The lexical entry for “reads” looks like the following



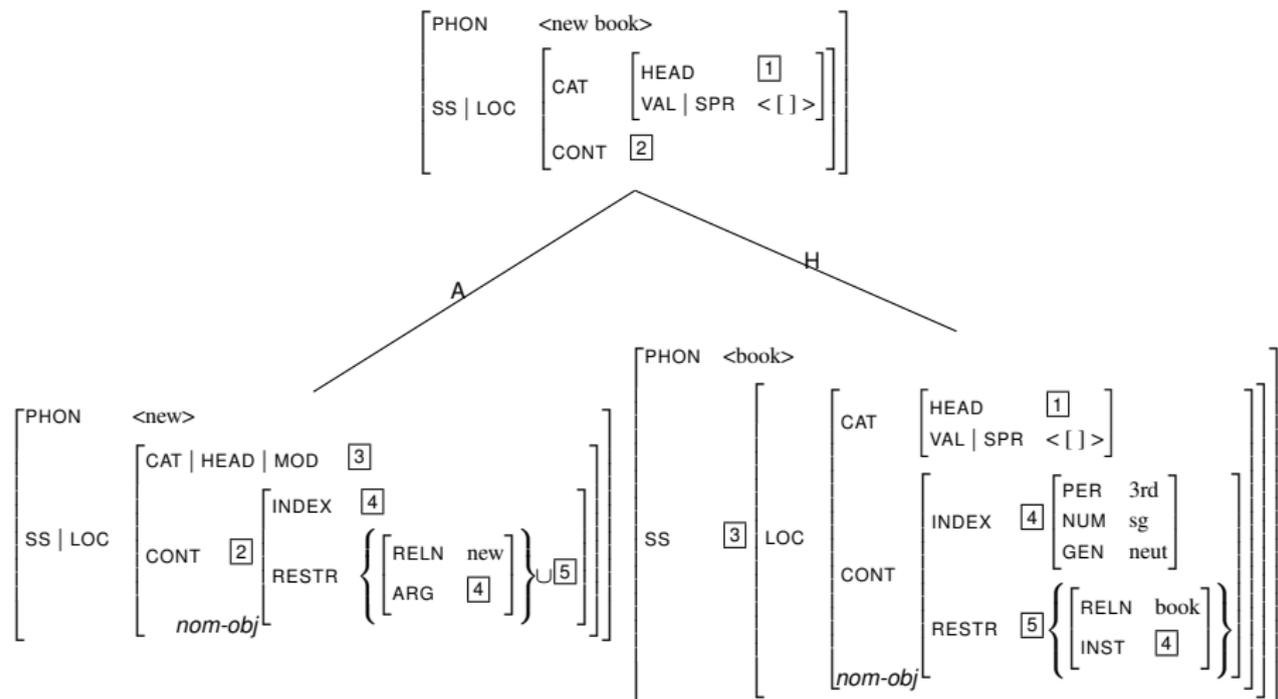
# Constraint Interaction - An Example

The lexical entry for “new” looks like the following



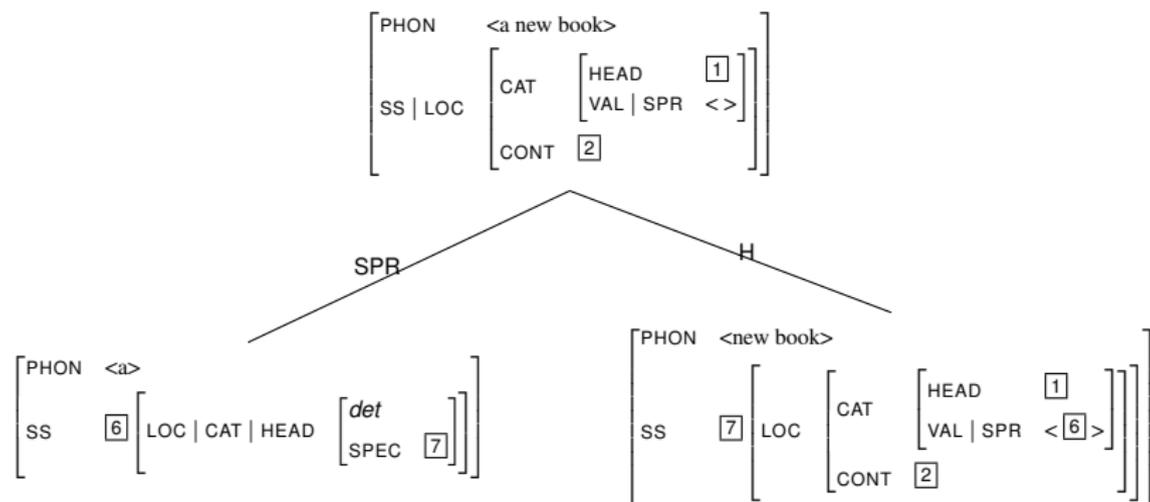
# Constraint Interaction - An Example

For “*new book*”, *head-adjunct* schema is applied



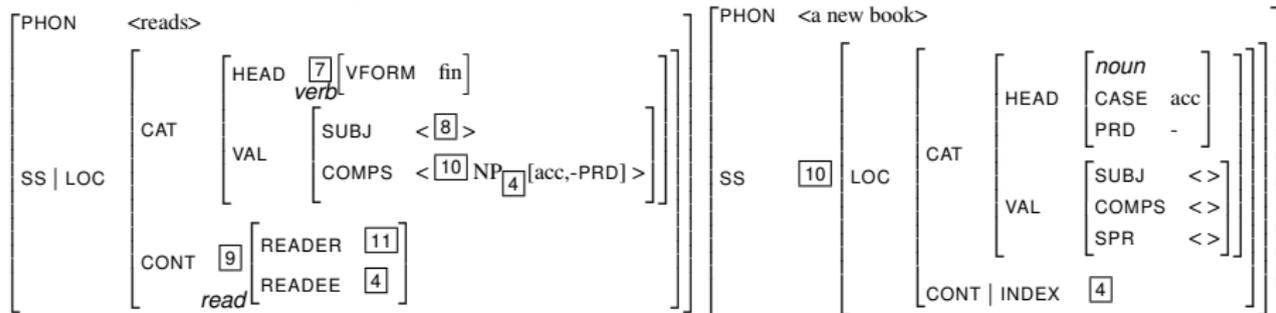
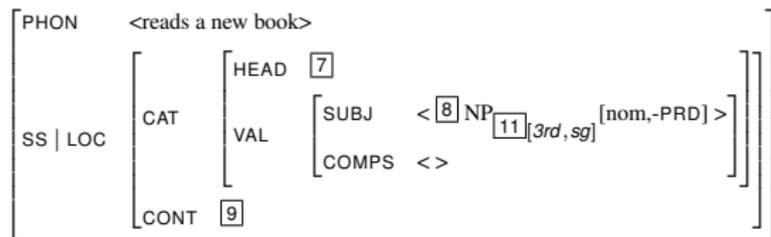
# Constraint Interaction - An Example

For “a [new book]”, *head-specifier* schema is applied



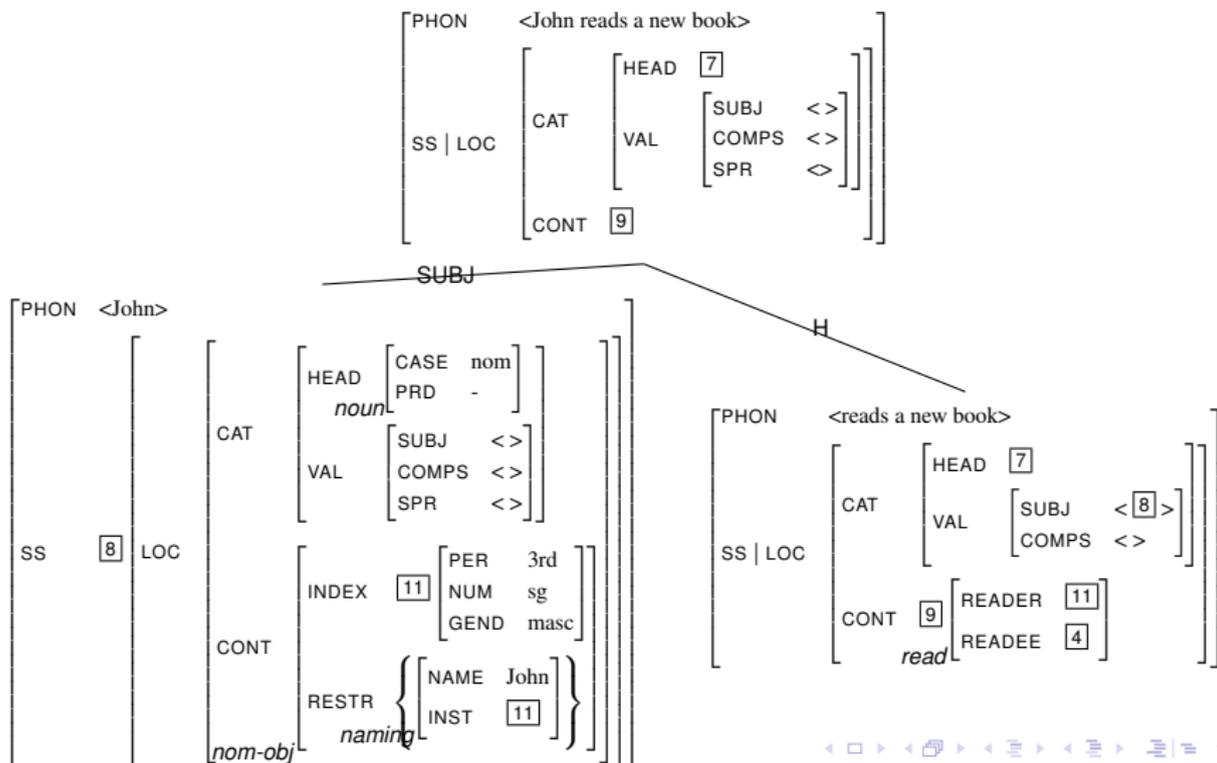
# Constraint Interaction - An Example

For “reads [a new book]”, *head-complement* schema is applied



# Constraint Interaction - An Example

For “*John [reads a new book]*”, *head-subject* schema is applied



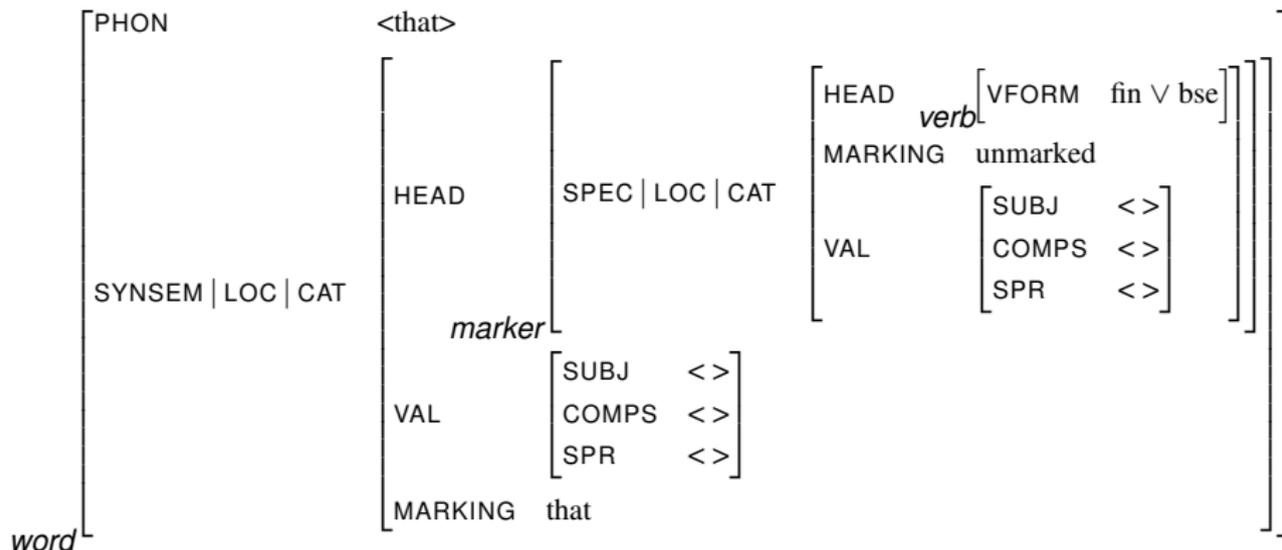
# Marking Principle

## Marking principle

In a headed phrase, the MARKING value is token-identical with that of the MARK-DTR if any, and with that of the HEAD-DTR otherwise

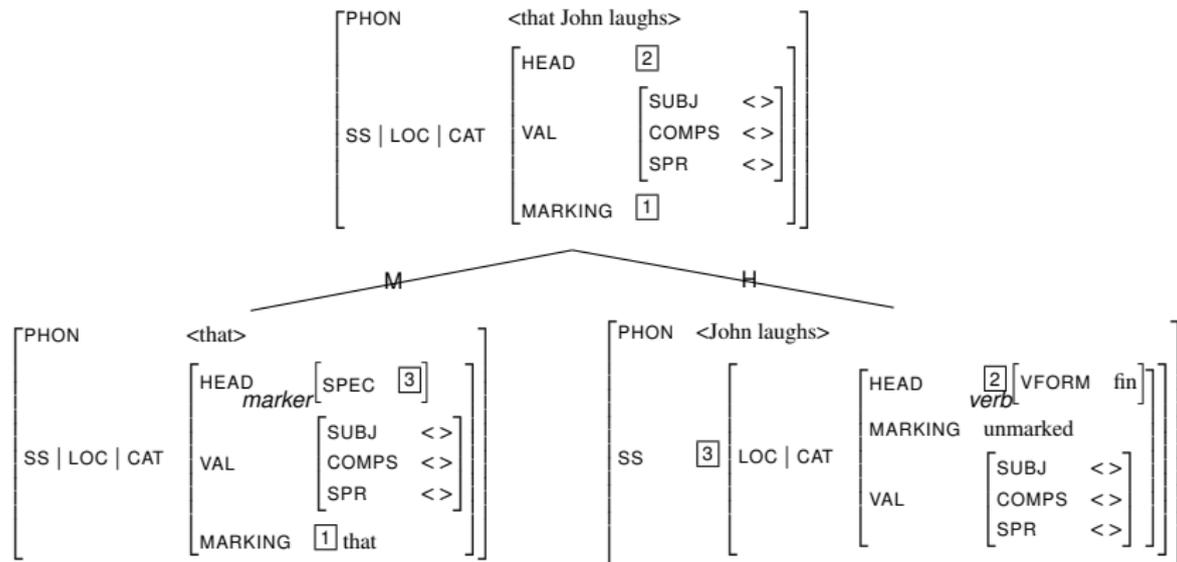
$$\begin{array}{l} \textit{phrase} \left[ \begin{array}{l} \text{DTRS} \quad \textit{head-struct} \end{array} \right] \rightarrow \left[ \begin{array}{l} \text{SYNSEM} \mid \text{LOC} \mid \text{CAT} \mid \text{MARKING} \quad \boxed{1} \\ \text{DTRS} \quad \left[ \begin{array}{l} \textit{head-mark-struct} \\ \text{MARK-DTR} \mid \text{SYNSEM} \mid \text{LOC} \mid \text{CAT} \mid \text{MARKING} \quad \boxed{1} \end{array} \right] \end{array} \right] \\ \vee \left[ \begin{array}{l} \text{SYNSEM} \mid \text{LOC} \mid \text{CAT} \mid \text{MARKING} \quad \boxed{1} \\ \text{DTRS} \quad \left[ \begin{array}{l} \neg \textit{head-mark-struct} \\ \text{HEAD-DTR} \mid \text{SYNSEM} \mid \text{LOC} \mid \text{CAT} \mid \text{MARKING} \quad \boxed{1} \end{array} \right] \end{array} \right] \end{array}$$

# Lexical Entry for the Marker “that”



- The combination of *head-marker* schema and the marking principle will combine the head with the marker and set the value of MARKING features properly

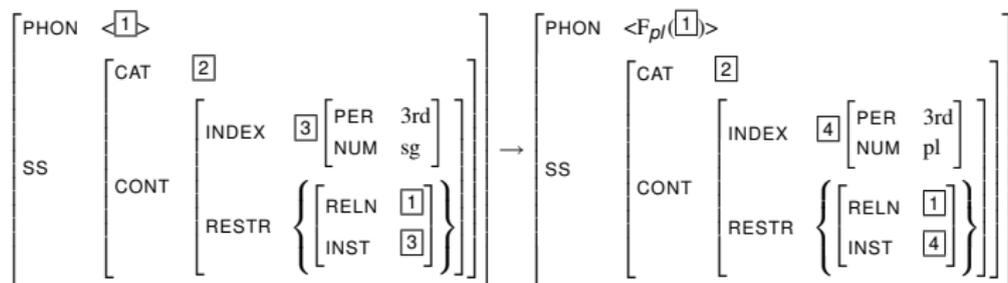
# A Sketched Example of a Head-Marker Structure



# Lexical Rules

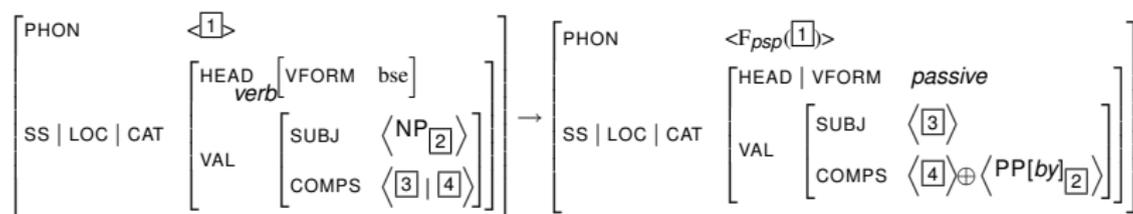
- So far we have been using surface forms of the words in the lexical entries
- In practice, lexical rules can be used to automatically derive the variations of the lexical entries, e.g. pluralization, passivization, dative alternation, etc.

## Example (Pluralization lexical rule)



# Lexical Rules

## Example (Passivization lexical rule)



- Although lexical rules are “*neutral between the declarative and procedural interpretations . . . we lack as yet any satisfactory declarative formalization.*” [Pollard and Sag, 1994]
- Many of the generalizations captured by lexical rules can also be represented directly in the lexical hierarchy

# References I



Pollard, C. J. and Sag, I. A. (1994).

*Head-Driven Phrase Structure Grammar.*

University of Chicago Press, Chicago, USA.