Lexicalization of PCFGs

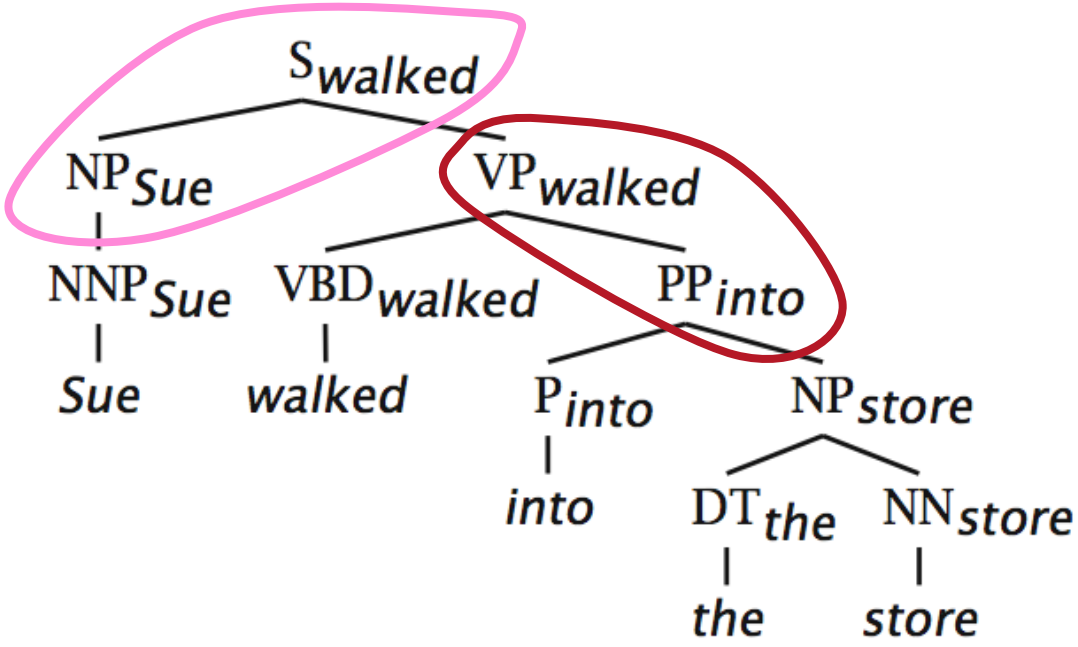
Introduction

Christopher Manning

(Head) Lexicalization of PCFGs

[Magerman 1995, Collins 1997; Charniak 1997]

- The head word of a phrase gives a good representation of the phrase's structure and meaning
- Puts the properties of words back into a PCFG



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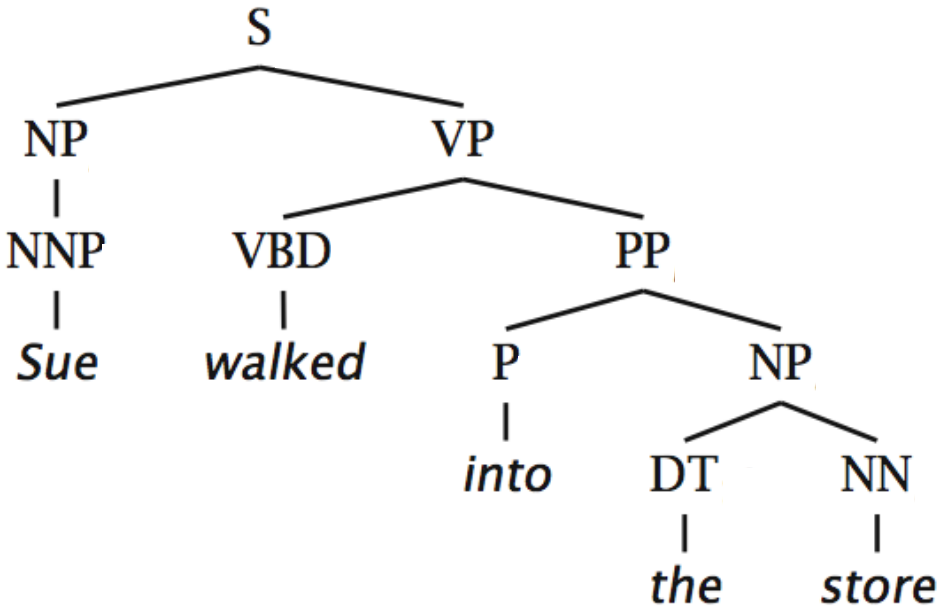

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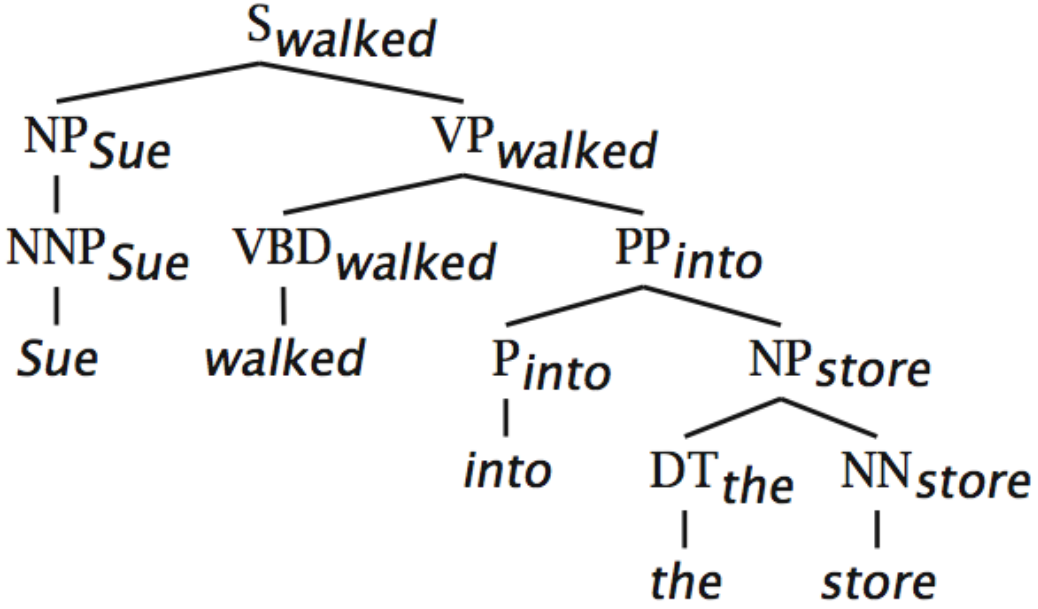

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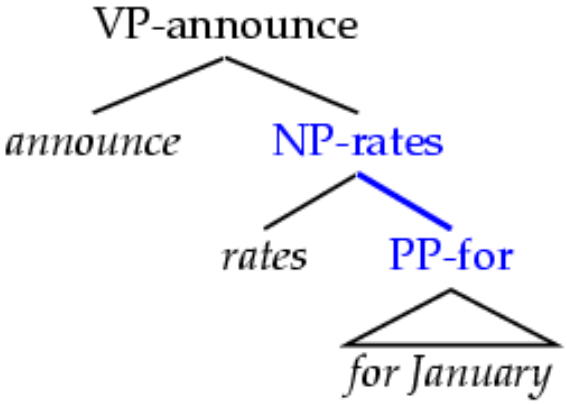
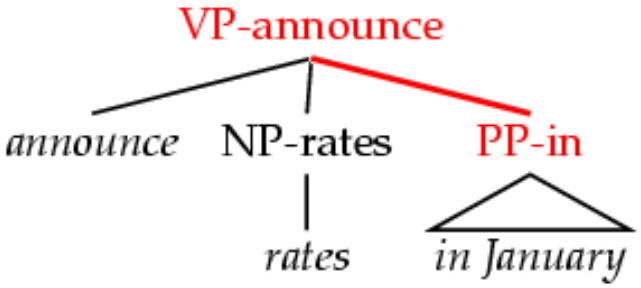
- Word-to-word affinities are useful for certain ambiguities
  - PP attachment is now (partly) captured in a local PCFG rule.
    - Think about: What useful information isn't captured?





  - Also useful for: coordination scope, verb complement patterns

Lexicalized parsing was seen as *the* parsing breakthrough of the late 1990s

- Eugene Charniak, 2000 JHU workshop: "To do better, it is necessary to condition probabilities on the actual words of the sentence. This makes the probabilities much tighter:
  - $p(\text{VP} \rightarrow \text{V NP NP})$ = 0.00151
  - $p(\text{VP} \rightarrow \text{V NP NP} \mid \text{said})$ = 0.00001
  - $p(\text{VP} \rightarrow \text{V NP NP} \mid \text{gave})$ = 0.01980 "
- Michael Collins, 2003 COLT tutorial: "Lexicalized Probabilistic Context-Free Grammars … perform vastly better than PCFGs (88% vs. 73% accuracy)"

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