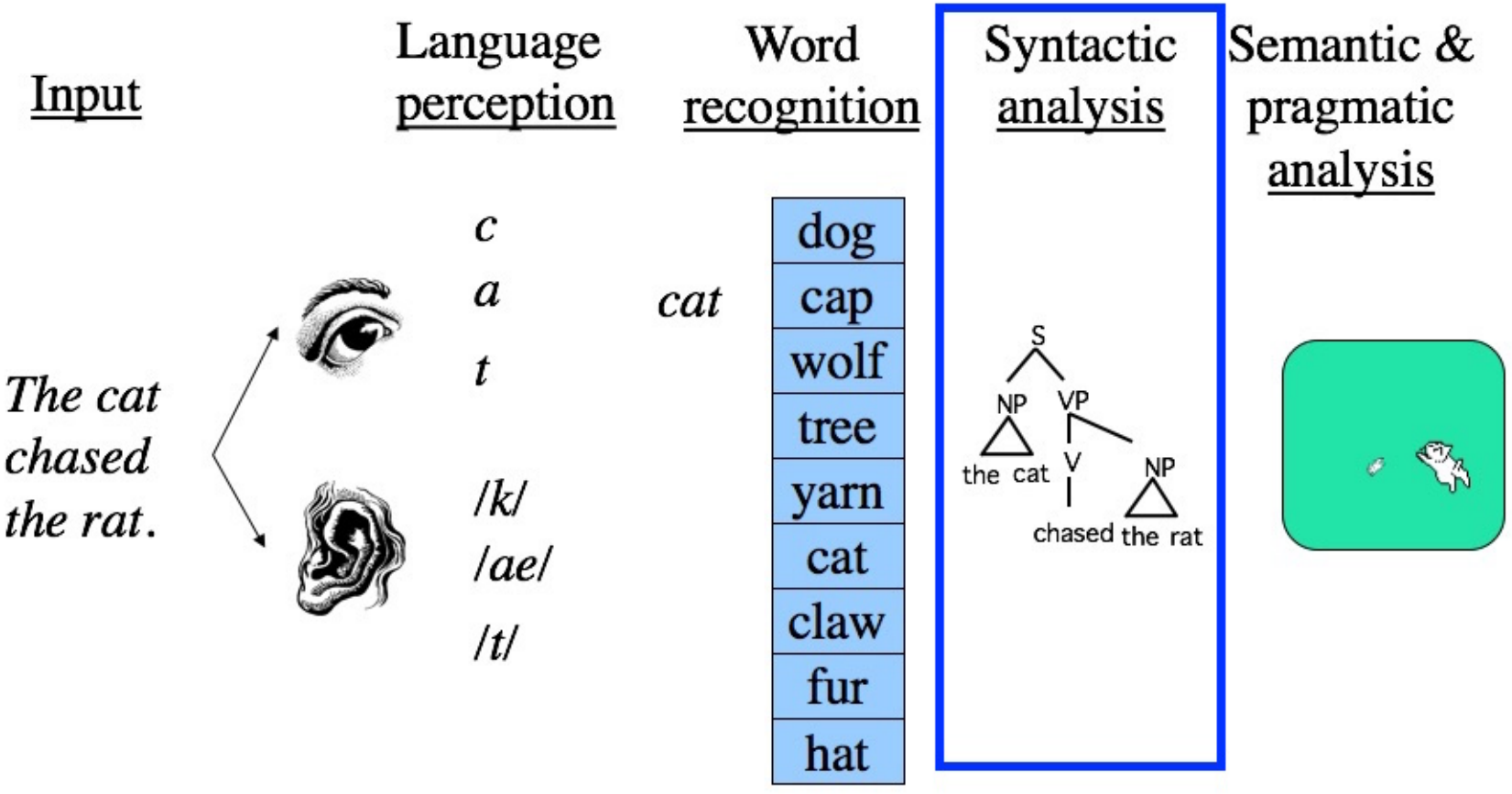
PSYC 3320/5597: Psycholinguistics

Thomas J. Faulkenberry, Ph.D.

Department of Psychological Sciences
Tarleton State University

Unit 6 – Sentence comprehension

Sentence comprehension



How do we parse a sentence?

The man hit the dog with the leash.

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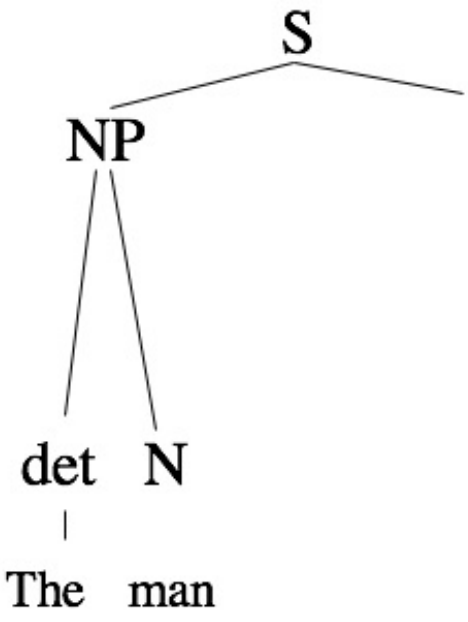

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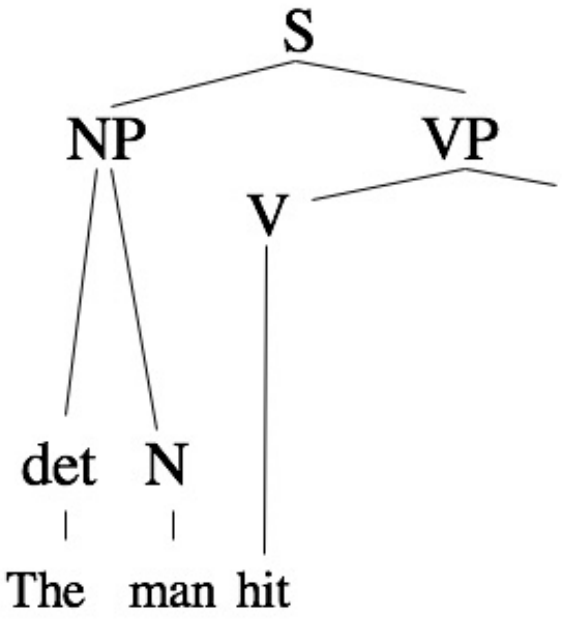

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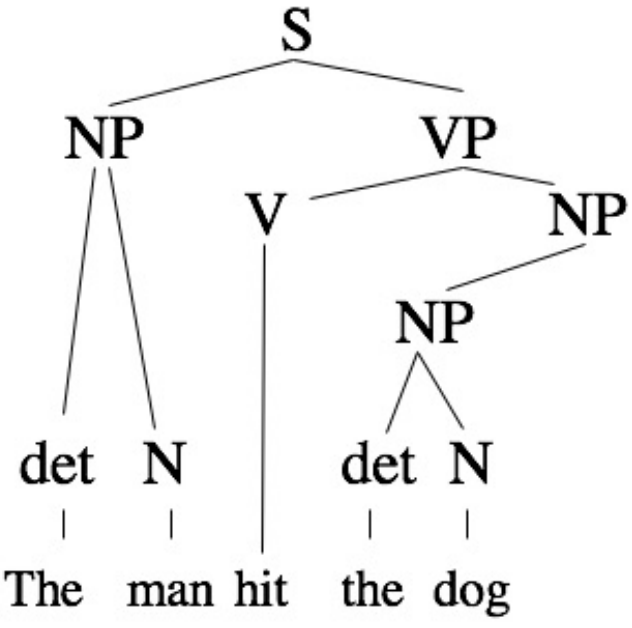

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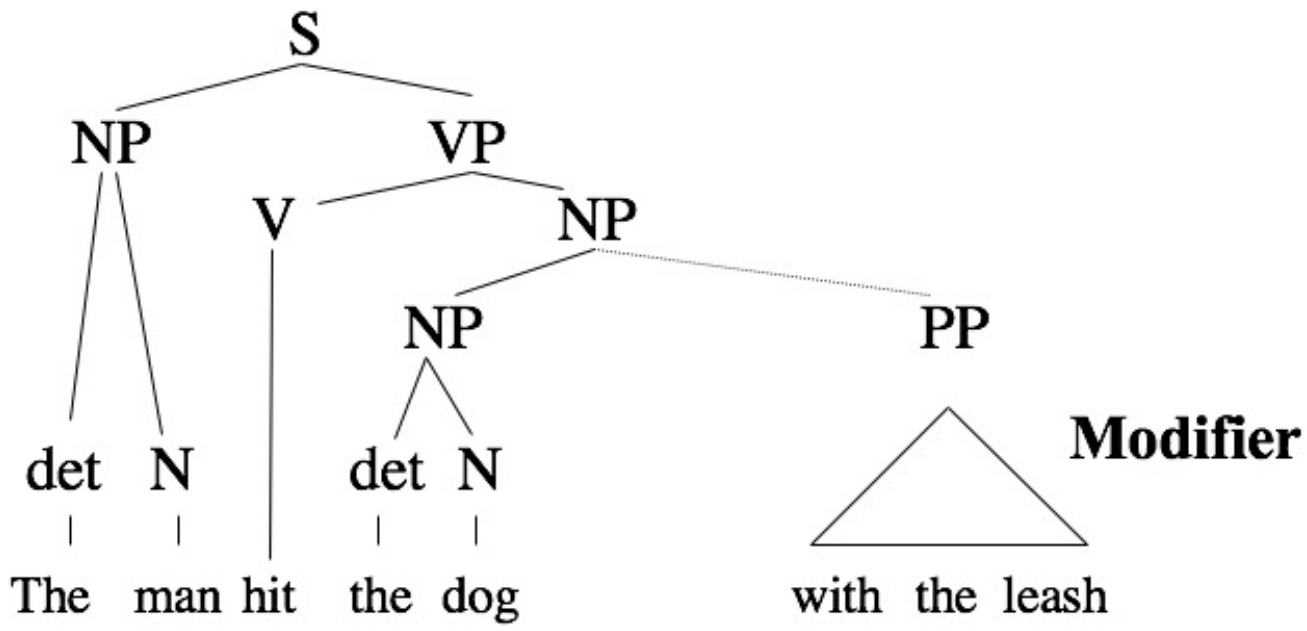

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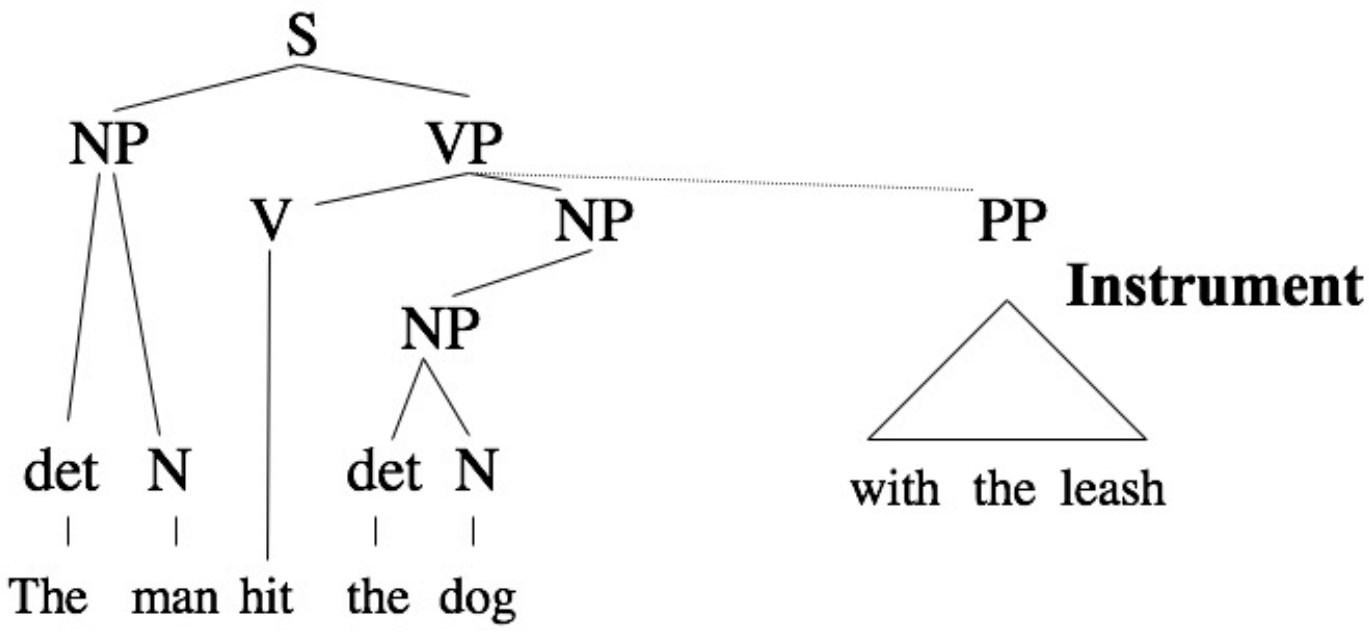
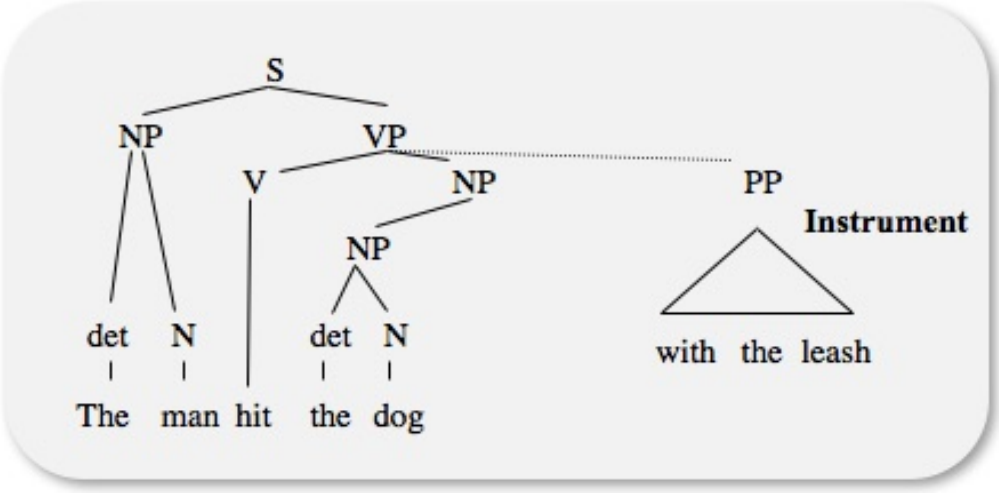
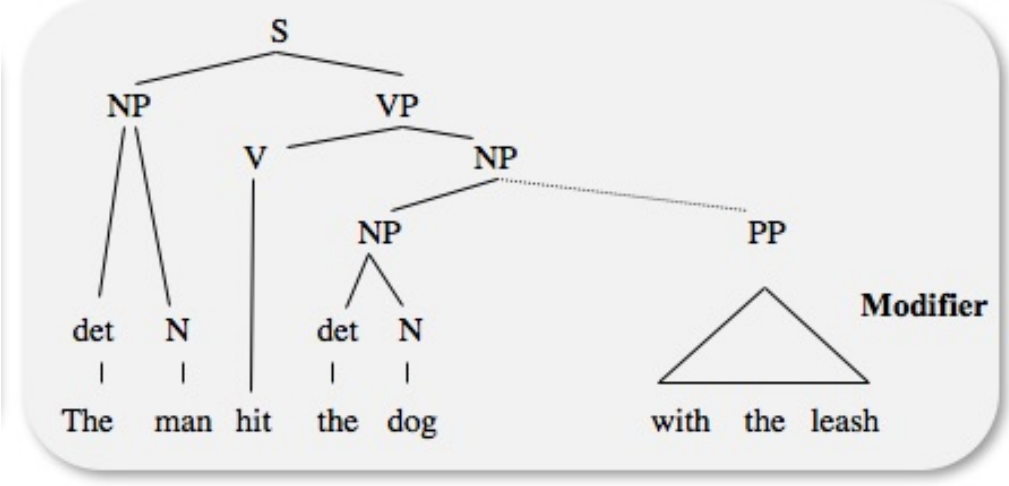


How do we parse a sentence?

Problem – the sentence is ambiguous. How do we know which syntactic structure to build?





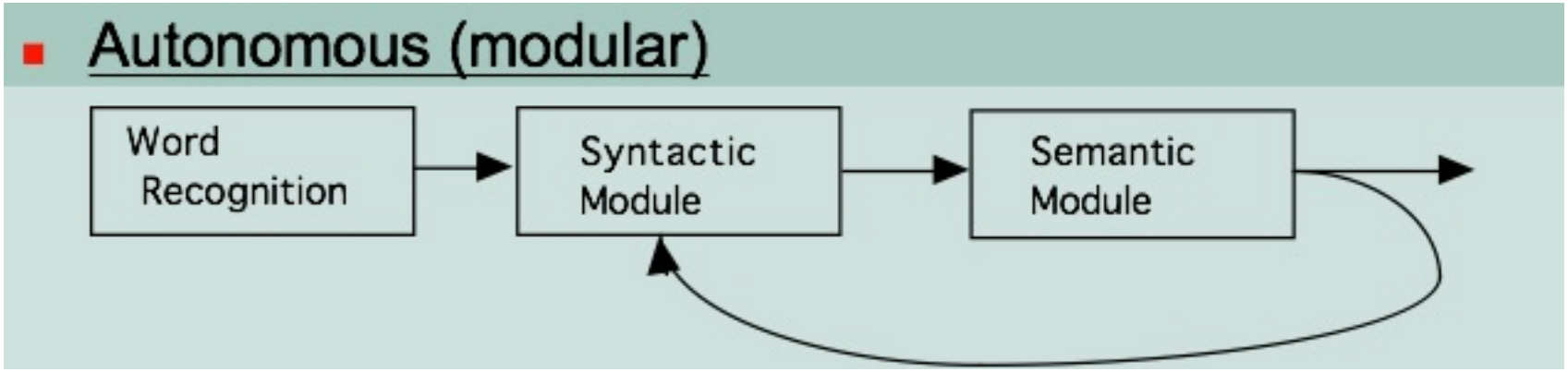
Parsing

Today, we will talk about the sentence parsing mechanism ("parser")

- Main task – to construct a syntactic structure from the words of the sentence as they arrive
- Main research question – how does the parser "decide" which structure to build?

Models of sentence comprehension

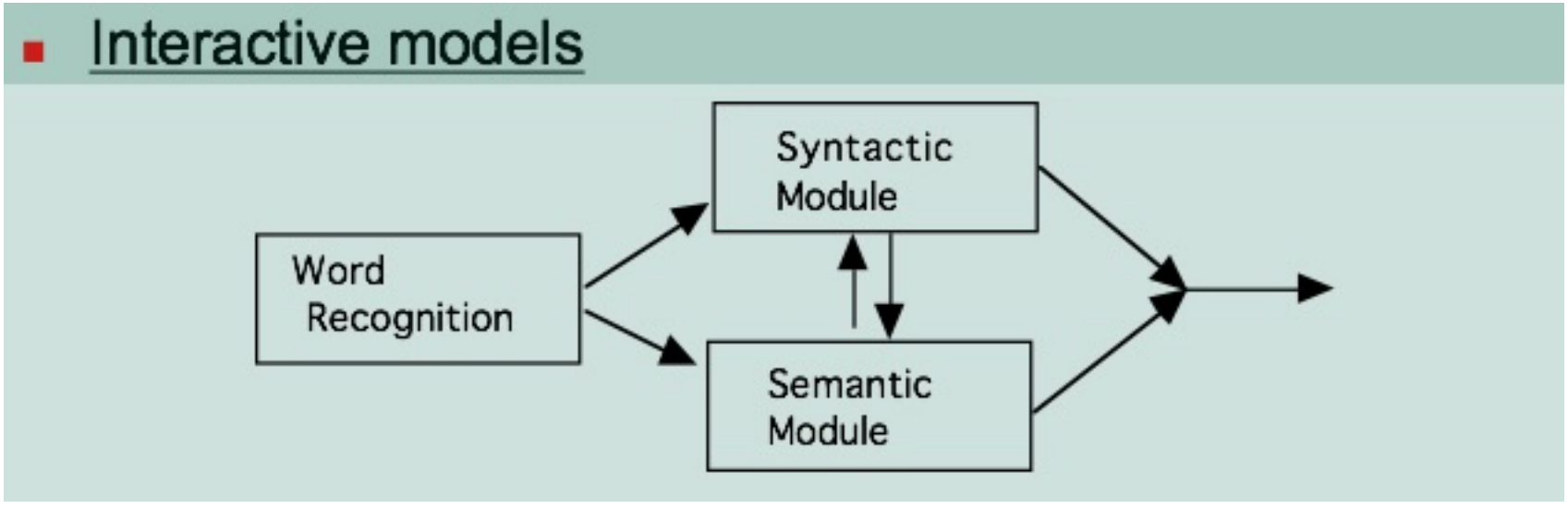
Two types of models: autonomous, and interactive



In autonomous models, initial stages of parsing only use syntactic information

Models of sentence comprehension

Two types of models: autonomous, and interactive



In interactive models, early parsing can be influenced by BOTH syntactic and semantic information

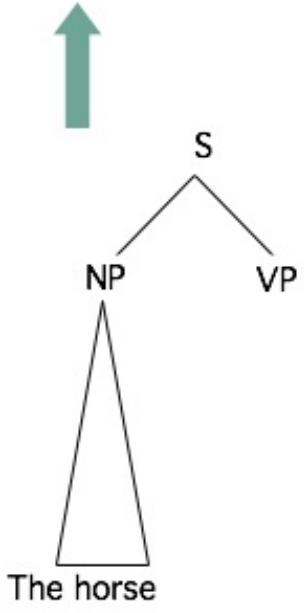
Garden path model

In the garden path model (Frazier, 1987), early parsing draws only on syntactic information (autonomous model)

- one structure is initially built
- if structure is incompatible with context, another pass is necessary

Garden path model

- Garden path sentences
  - The horse raced past the barn fell.



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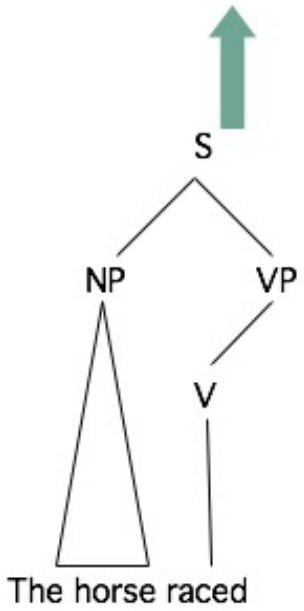

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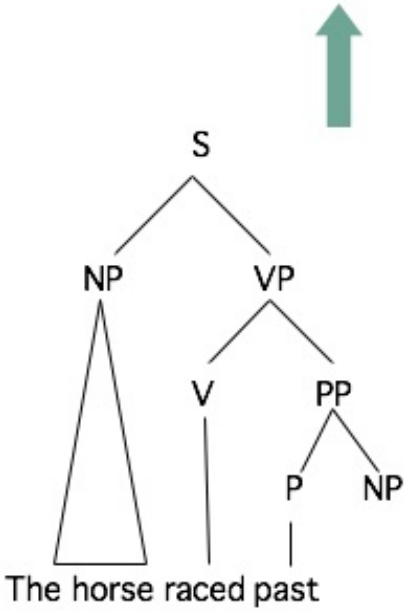

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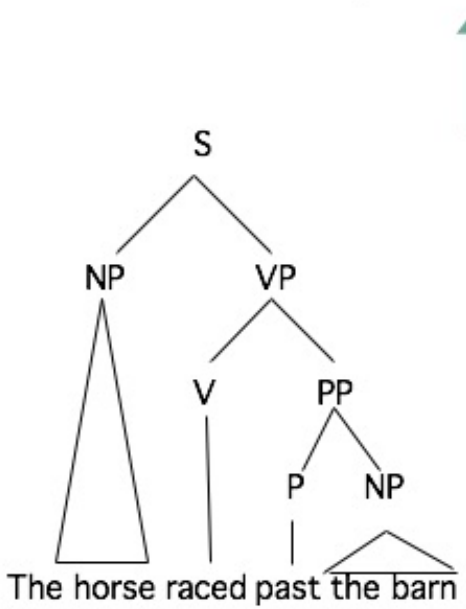

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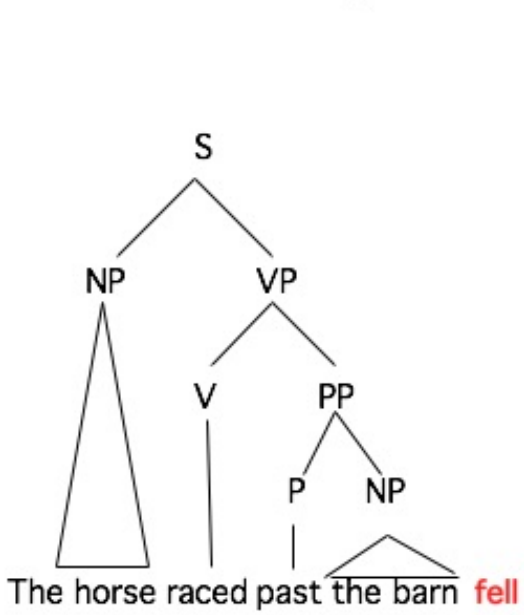
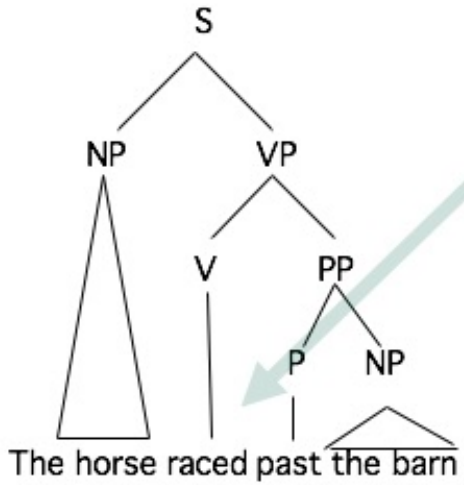


Garden path model

- Garden path sentences
  - The horse raced past the barn fell.

- *raced* is initially treated as a past tense verb



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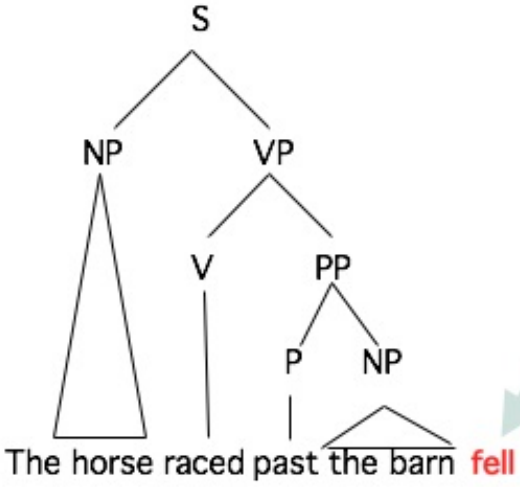

- *raced* is initially treated as a past tense verb
- This analysis fails when the verb *fell* is encountered

Garden path model

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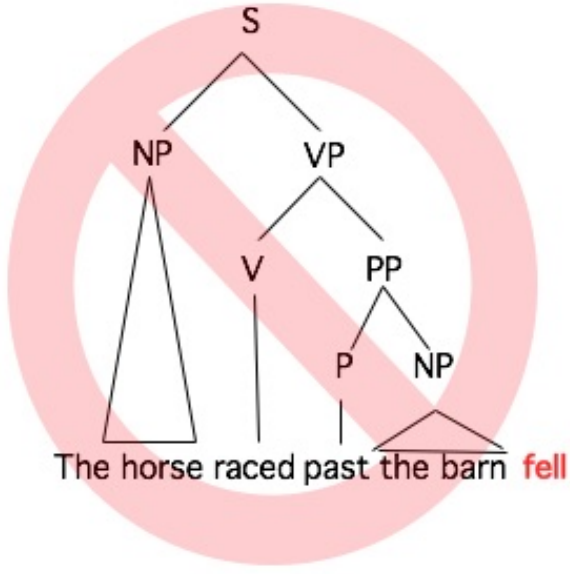
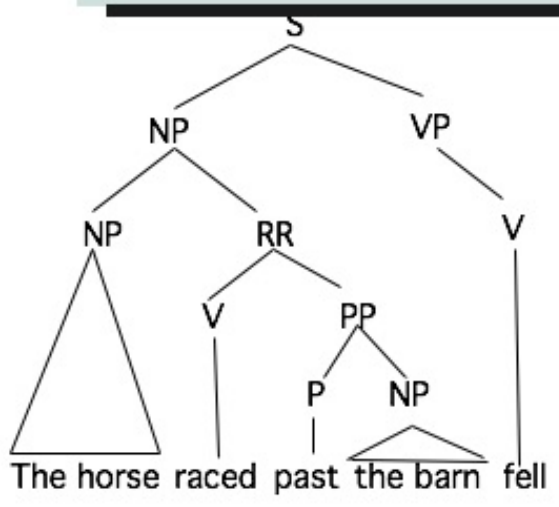


- *raced* is initially treated as a past tense verb
- This analysis fails when the verb *fell* is encountered
- *raced* can be re-analyzed as a past participle.



Garden path model

The garden path model was built on earlier work by Kimball (1973), who argued that we build parse trees using some basic principles:

- top-down parsing
- right association – sentences organize into right-branching structures
- new nodes – a new node is signaled by a function word
- two sentences max
- closure – a phrase is closed as soon as possible
- fixed structure – it is costly to reorganize the constituents after a phrase has been closed
- processing – after closure, phrase exits STM and enters deeper processing

Garden path model

Garden path model = Kimball (1973) + two additional principles

- minimal attachment
- late closure

Garden path model

Minimal attachment – prefer the interpretation that is accompanied by the simplest structure

- simplest = fewest number of branchings/nodes

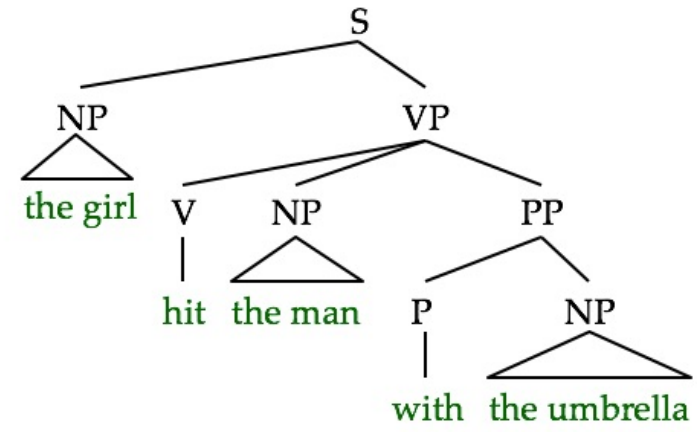
Garden path model

Minimal attachment – prefer the interpretation that is accompanied by the simplest structure

The girl hit the man with the umbrella.

Garden path model

Minimal attachment – prefer the interpretation that is accompanied by the simplest structure



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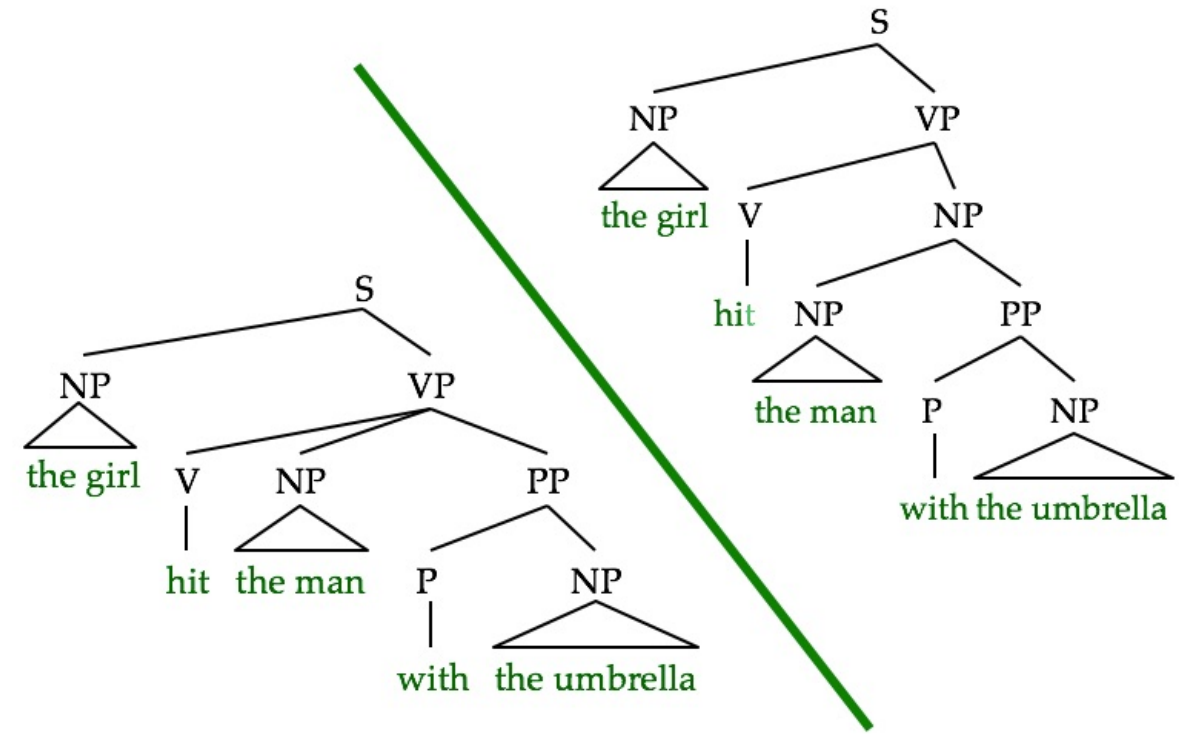

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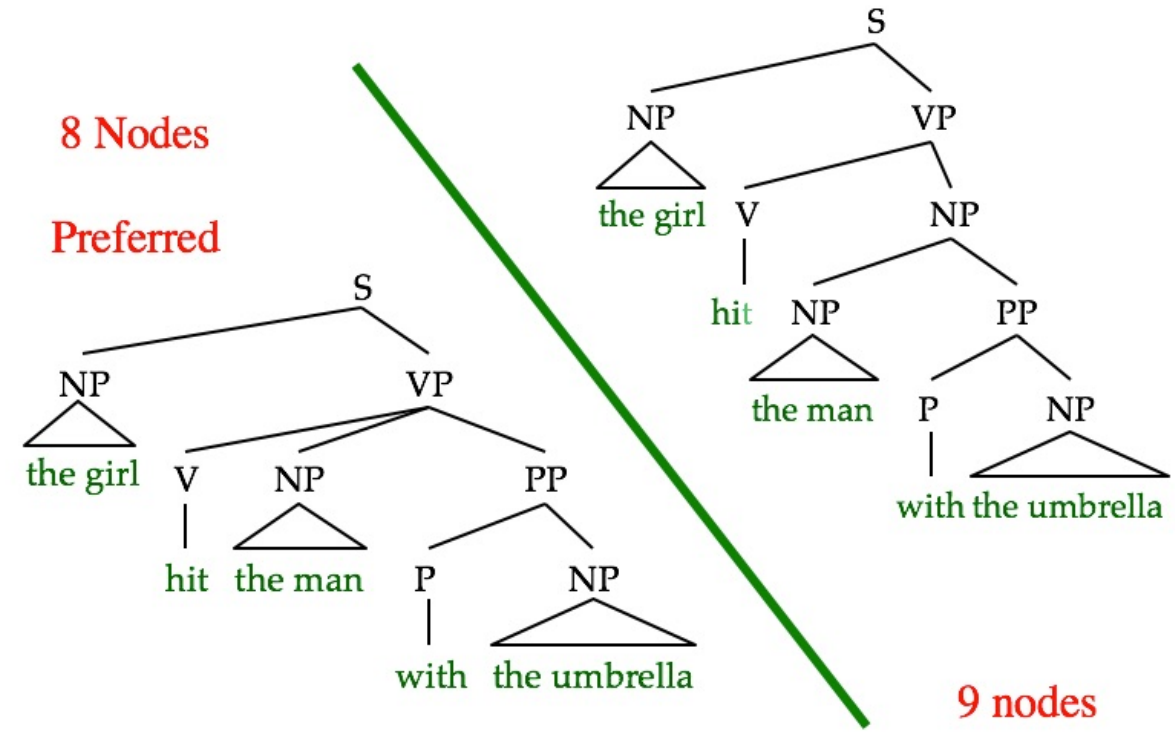

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Garden path model

Late closure – incorporate incoming material into the phrase/clause currently being processed

She said he tickled her yesterday

Garden path model

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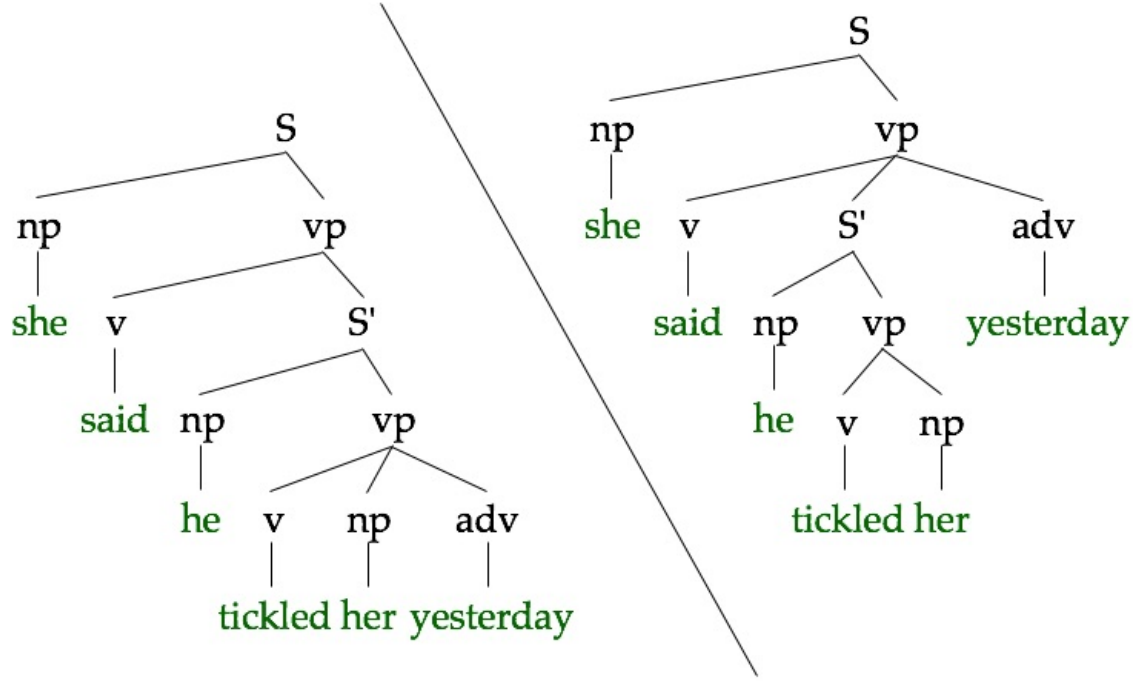

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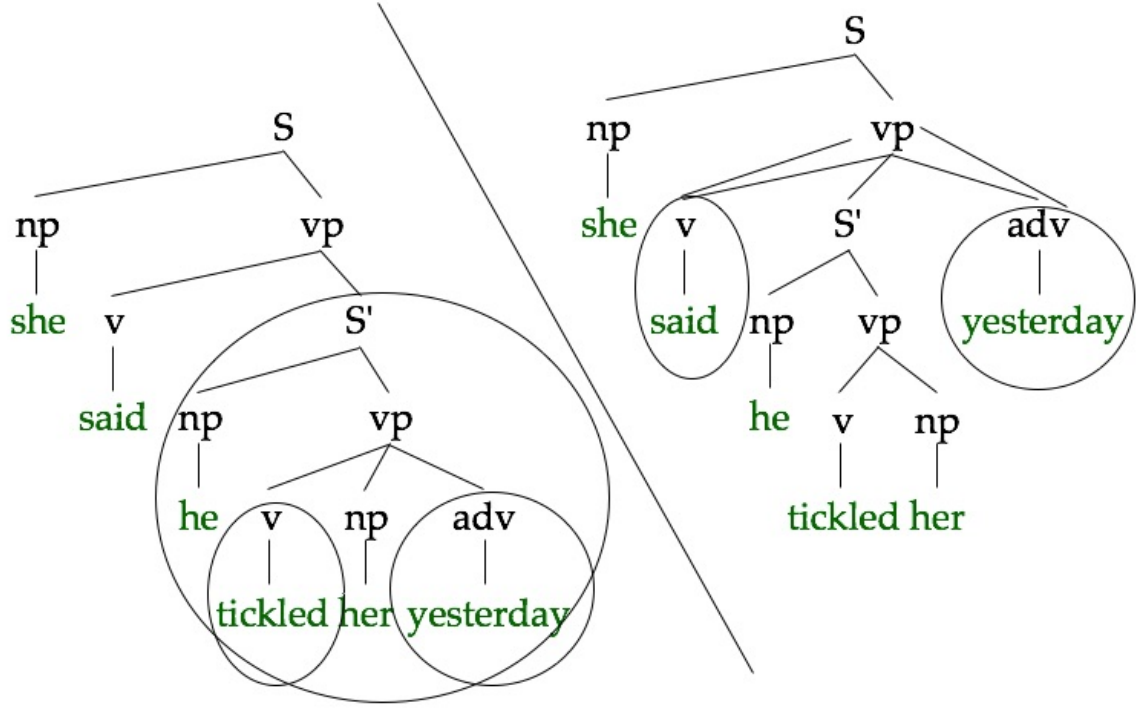

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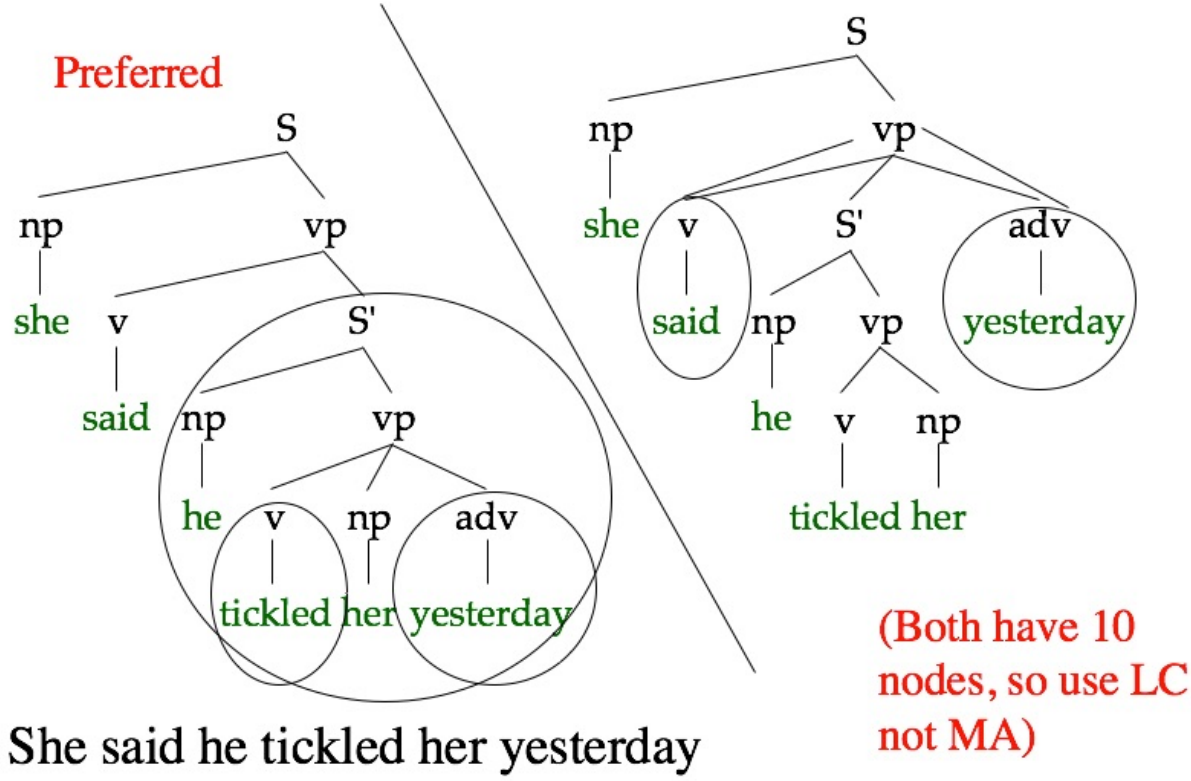
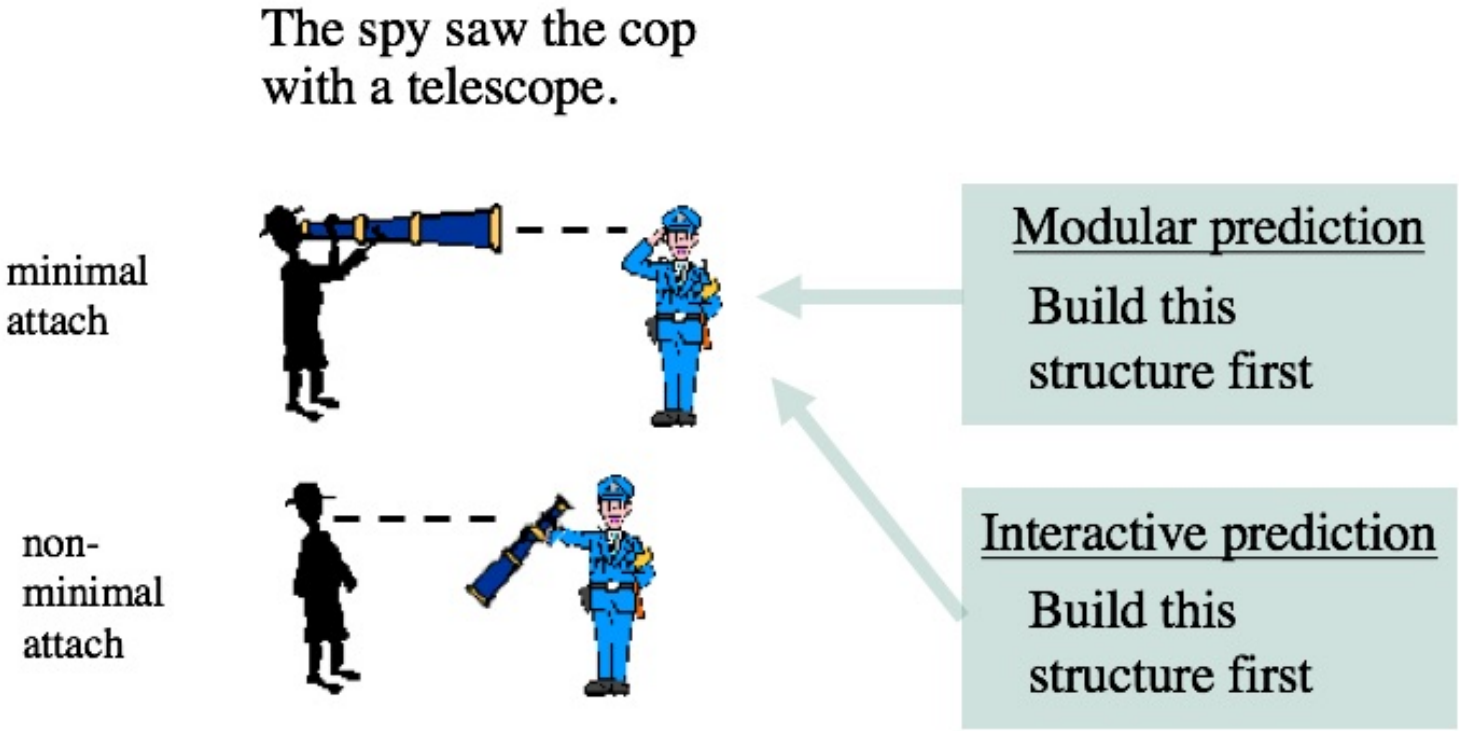


Garden path model

Evidence for serial autonomous model (Rayner & Frazier, 1983)

The spy saw the cop with the revolver, but the cop didn't see him



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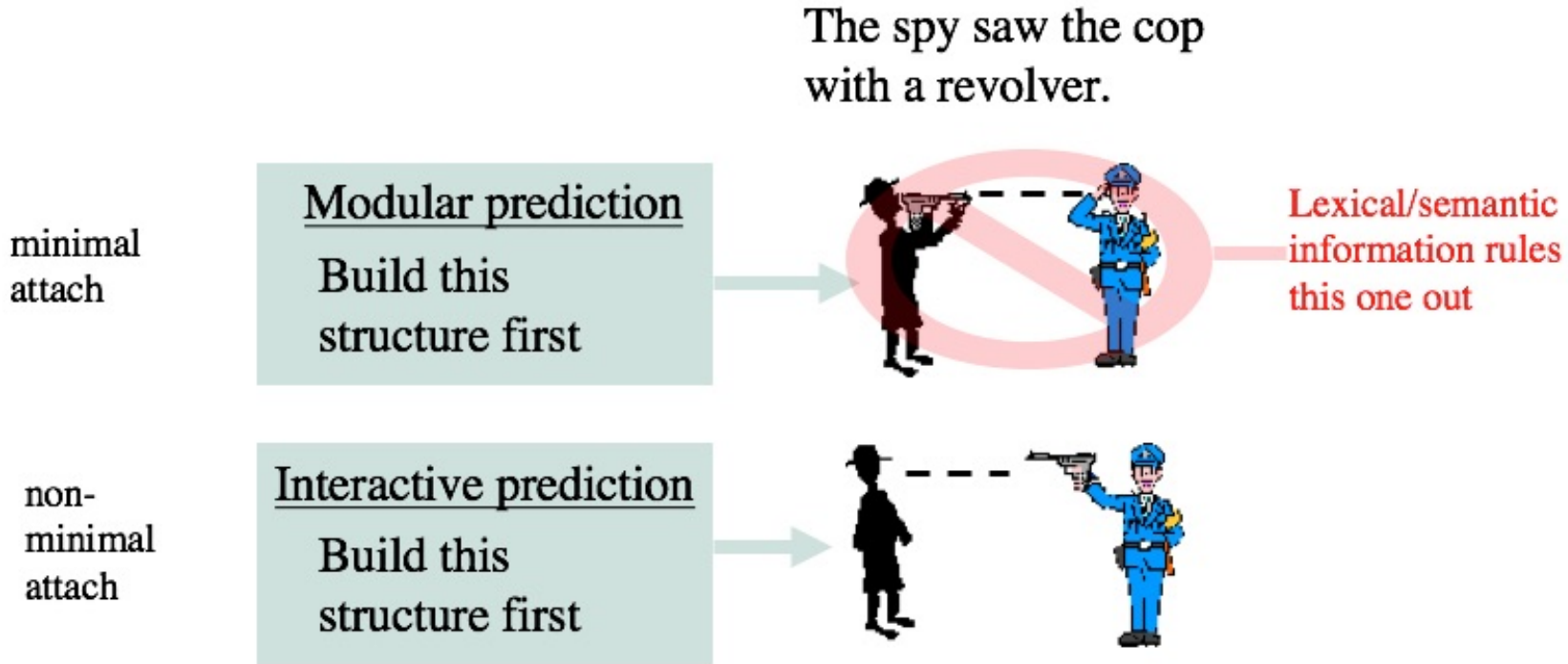
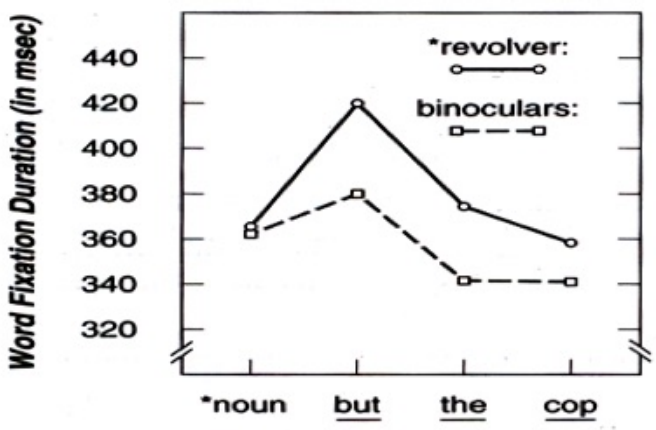


Garden path model

Evidence for serial autonomous model (Rayner & Frazier, 1983)

> *The spy saw the cop with the revolver, but the cop didn't see him*

- "binoculars"
- "revolver" ← takes longer
- participants did NOT use semantic information initially
- instead, built the wrong structure and had to reanalyze
- supports serial model



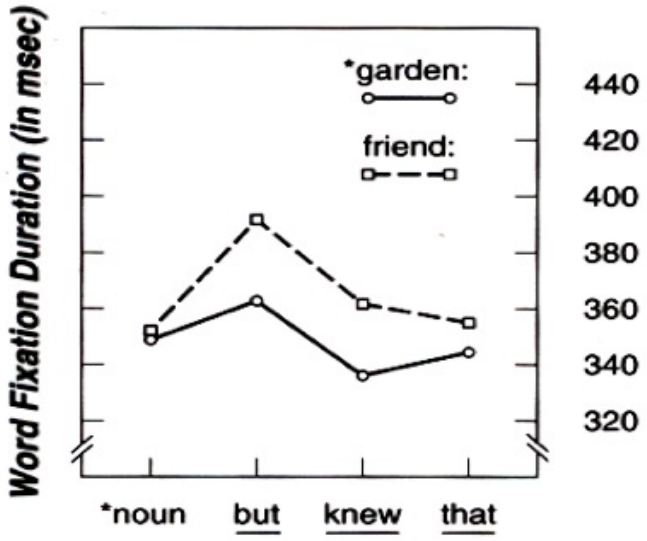
Alternative model

- Previous experiment indicates that only syntactic information is initially processed (serial model)
- Can semantic factors play a role in early processing? (interactive model)

Alternative model

Taraban & McClelland (1988) – compared self-paced reading times on sentences such as the following:

- The couple admired the house with a friend but knew that it was overpriced.
- The couple admired the house with a garden but knew that it was overpriced.



- Even though the "garden" sentence is not minimally attached, it was read faster
- Taraban & McClelland argued that words leading up to "garden" create a semantic bias for the non MA structure
- evidence for interactive parsing