

Sentence Comprehension

Semantic vs. Syntactic Approaches

The apple that the boy ate was red.

The boy that the girl kissed had red hair.

Evidence for syntactic parsing

1. Click studies - displace perception of click to phrase boundary

* * *

* * *

The doctor gave the patient a new prescription.

2. Probe latency - faster in same clause (Caplan, 1976)

A. Now that artists work in oil, paintings are rare.

B. Because acrylics are available, oil paintings are rare.

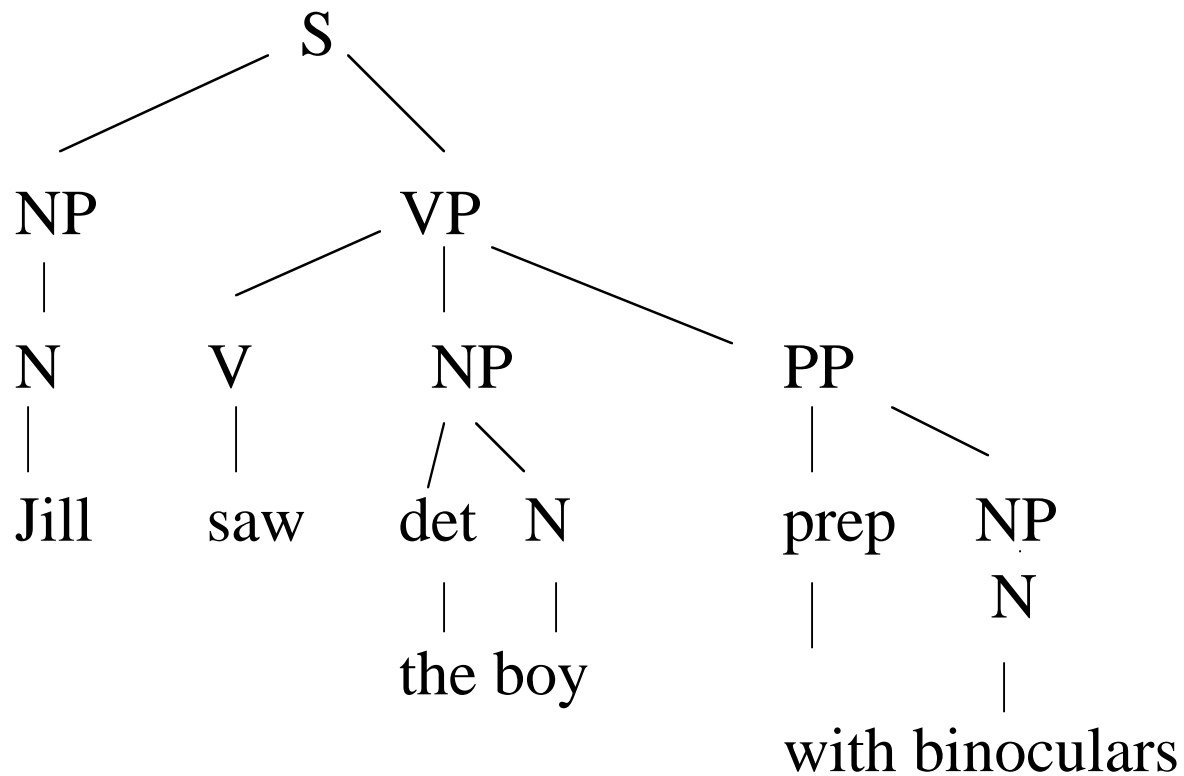
For both, hear sentence, probe with “oil”

Faster RT for B - where oil is in final clause.

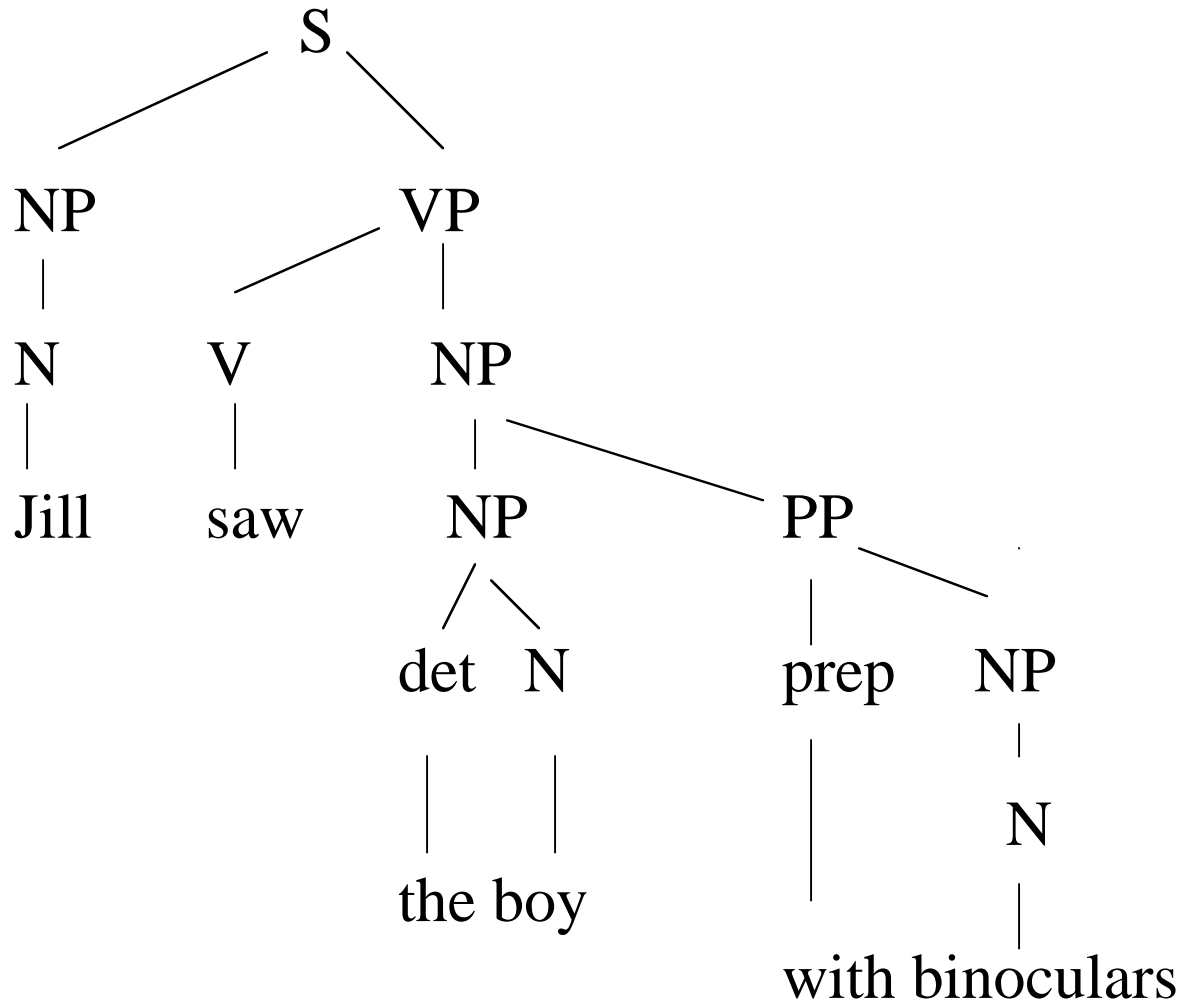
Syntactic Parsing:

Assign syntactic structure -

Jill saw the boy with binoculars.



Ambiguity



Frazier, Rayner, & Clifton

“Garden Path Theory”

Syntax first - followed by semantic evaluation

Syntactic strategies applied without taking semantics into account

Two strategies:

Minimal attachment - assign simplest structure

Late closure - attach to current phrase

Minimal attachment -

Reduced relative clauses -

The man given the check was happy.
(The man who was given the check was happy.)

The man sent the check was happy.
(The man who was sent the check was happy.)

The man sent by the CIA was actually a double agent.
(The man who was sent by the CIA was actually a double agent.)

EYE TRACKING

gaze duration

The man given the check was happy.

430

The man who was given the check was happy.

430

The man sent the check was happy.

550

The man who was sent the check was happy.

430

The man sent by the CIA was actually a double agent.

?

The man who was sent by the CIA was actually a double agent.

430

Late Closure

(i.e., add to current phrase, don't close phrase)

Sam teased John and his sister

A) every day.

B) got angry.

John and his sister - taken as one NP initially

Small garden path effect

Sarah said that John left yesterday.

Sarah will say that John left tomorrow.

Modular vs. Interactive Accounts

A. The landscape painted in the sunlight was beautiful.
(The landscape that was painted in the sunlight was beautiful.)

B. The woman painted in the sunlight was beautiful.
(The woman that was painted in the sunlight was beautiful.)

Compare times for “was” in ambiguous vs. unambiguous

Frazier et al.: predict no difference at “was”, total reading time shorter for A

Trueswell, Tanenhaus, & Garnsey (1994) find times on “was” faster for A - supports interactive account.

Support for Interactive Account

1. Plausibility of N as agent vs. theme (landscape vs. woman painted)

2. Story context:

Two men were sent to the small Middle Eastern country. One was from the CIA and the other from Army Intelligence. The man sent by the CIA was actually a double agent.

3. Verb preferences - Direct Object vs. Sentence Complement

The girl forgot the solution was in the back of the book.

The girl believed the solution was in the back of the book.

Sentence Comprehension and Memory

1. Memory for sentences
2. Role of STM in sentence comprehension

What is remembered following comprehension of sentences in context?

Surface form? Meaning?

Bransford and Franks demonstration

How rapidly is surface form lost?

Sachs (1976) - spoken story

An inventor was working on a device for viewing the stars. The inventor sent a letter about it to Galileo, the great Italian scientist. As he was excited about the suggestion in the letter, Galileo immediately went to visit the inventor

Test: as some point past end of critical sentence, test sentences presented.
Subjects say if test is identical to sentence in story.

Test sentence types:

A. Identical -

The inventor sent a letter about it to Galileo, the great Italian scientist.

B. Formal change

The inventor sent Galileo, the great Italian scientist, a letter about it,.

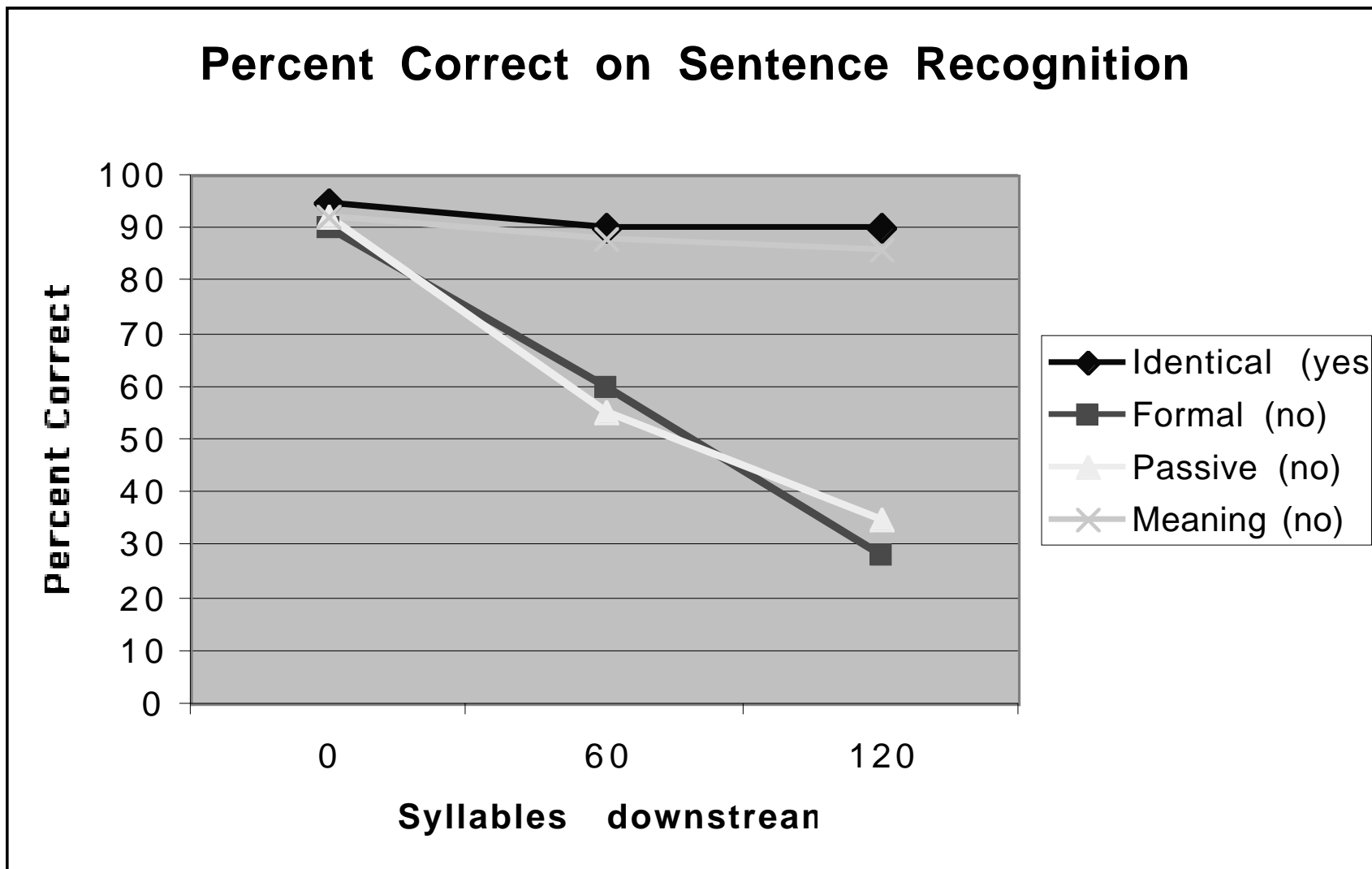
C. Active/Passive

Galileo, the great Italian scientist, was sent a letter about it by the inventor.

D. Meaning change

Galileo, the great Italian scientist, sent a letter about it to the inventor.

Sachs (1976)



Working Memory and Sentence Comprehension

Sentence length not predictive of comprehension difficulty

The little boy in the striped shorts rode his new bicycle down the street toward the new neighbor's house to see if their son could come out and go to the park with him.

The senator that the reporter attacked regretted his error.

Relative clause sentences:

Right-branching:

The horse kicked the dog that chased the cat.

The horse kicked the dog that chased the cat that frightened the chickens.

Center-embedded:

The cat that the dog chased frightened the chickens.

The cat that the dog that the horse kicked chased frightened the chickens.

Center-embedded:

The cat [that the dog chased] frightened the chickens.

Insert clause between main N and V

The cat [that the dog {that the horse kicked} chased] frightened the chickens.

Insert another clause between N and V in embedded clause

Possible?

The gift [that the children bought me] was beautiful.

The gift that [the children {that I teach} bought me] was beautiful.

Center-embedded:

The cat [that the dog chased] frightened the chickens.

Insert clause between main N and V

The cat [that the dog {that the horse kicked} chased] frightened the chickens.

Why is one embedding hard? Two impossible?

Subject vs. Object Relative

The cat that the dog chased ^ frightened the chickens.

The cat that ^ chased the dog frightened the chickens.

Gibson (1997)

Difficulty maintaining words from earlier in sentence that haven't been integrated with other words - e.g., nouns that haven't been connected with a verb

Unintegrated information difficult to maintain
Integrated information becomes part of long-term memory representation of sentence (and text)