

Informatics 1 CG – Tutorial 5

Solutions

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Week 6

1 Understanding Sentences: Parsing

You are given the sentence

You made her duck.

and a little grammar of English:

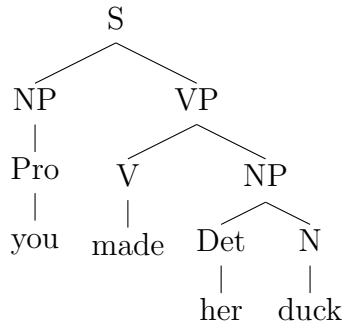
Grammatical rules	Lexical rules
S → NP VP	Det → a the her (determiners)
NP → Det N	N → man park duck telescope (nouns)
NP → Det N PP	Pro → you (pronoun)
NP → Pro	V → saw walked made (verbs)
VP → V NP PP	Prep → in with for (prepositions)
VP → V NP	
VP → V	
PP → Prep NP	

Exercise

1. Produce a syntax tree for the sentence on the basis of the given grammar.
2. There is another, ditransitive, interpretation of the sentence, that interprets *her* and *duck* as two objects of *made*. The given grammar does not account for that, however.
 - (a) Extend the grammar by adding rules that allow for this interpretation. Draw the corresponding syntax tree.
 - (b) For which type of ambiguity is this an example?

Solutions

1. Produce a syntax tree for the sentence on the basis of the given grammar.



2. There is another, ditransitive, interpretation of the sentence, in which *her* and *duck* are interpreted as two objects of *made*. The given grammar does not account for that however.

- (a) Extend the grammar by adding rules that allow for this interpretation. Draw the corresponding syntax tree.

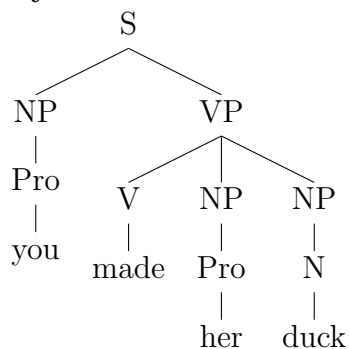
Additional rules:

$VP \rightarrow V NP NP$

$NP \rightarrow N$

$Pro \rightarrow her$

Syntax tree:



- (b) For which type of ambiguity is this an example?
→ Global ambiguity.

2 Understanding Sentences: Garden Path Sentences

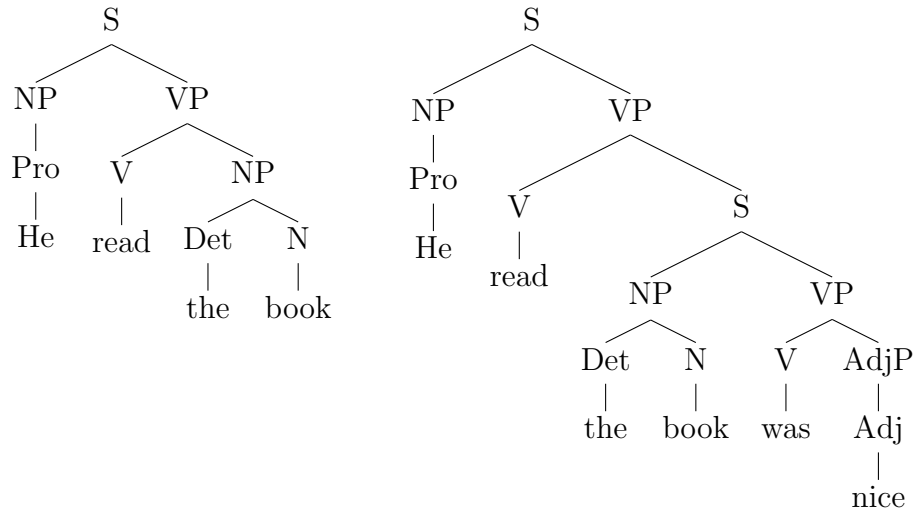
In the lectures we have discussed some unusual constructions called garden-path sentences. These are grammatically correct sentences that are constructed in such a way that the most likely initial parse is incorrect. During the parsing of the sentence, the reader encounters an unexpected word given the parse structure they have constructed so far. At that point, the reader will have to backtrack and reanalyse either part of the parse or the entire parse tree.

Exercises

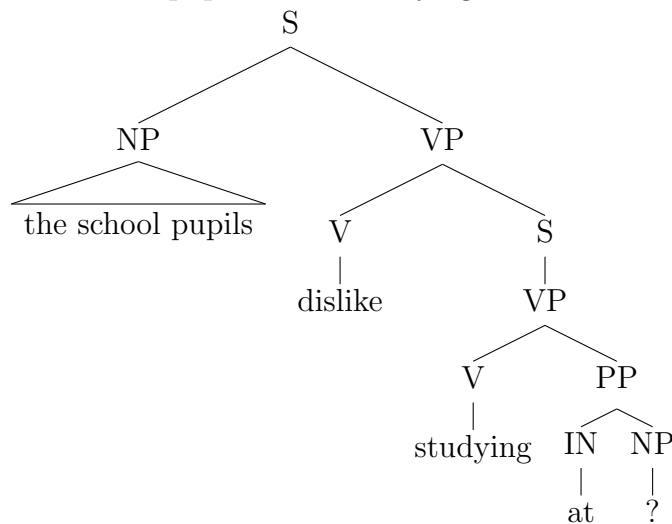
1. Can you create your own garden-path sentences (at least four)? Mark the breaking point and present the initial (most likely) and final (correct) interpretations.

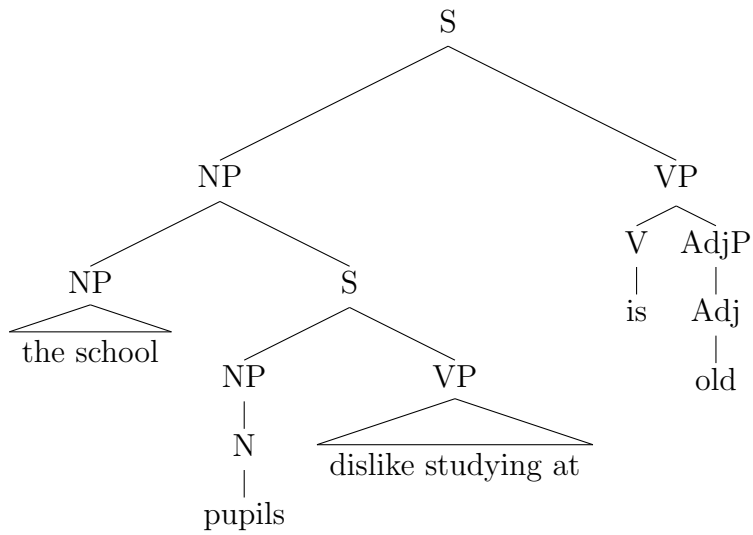
- (a) I read the book *was* nice.
- (b) The school pupils dislike studying at *was* closed.
- (c) If you want to play with your pet dog *it*.
- (d) etc.

(a) He read the book *was* nice.

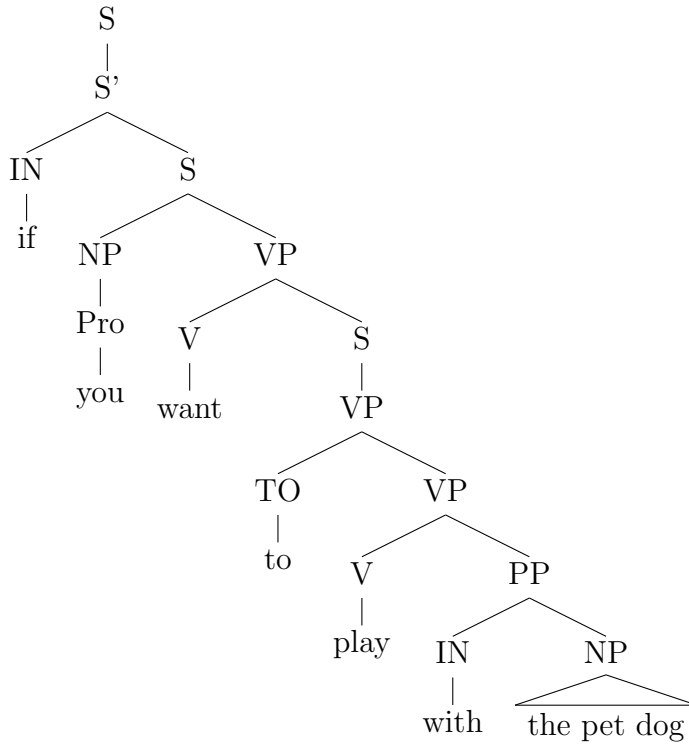


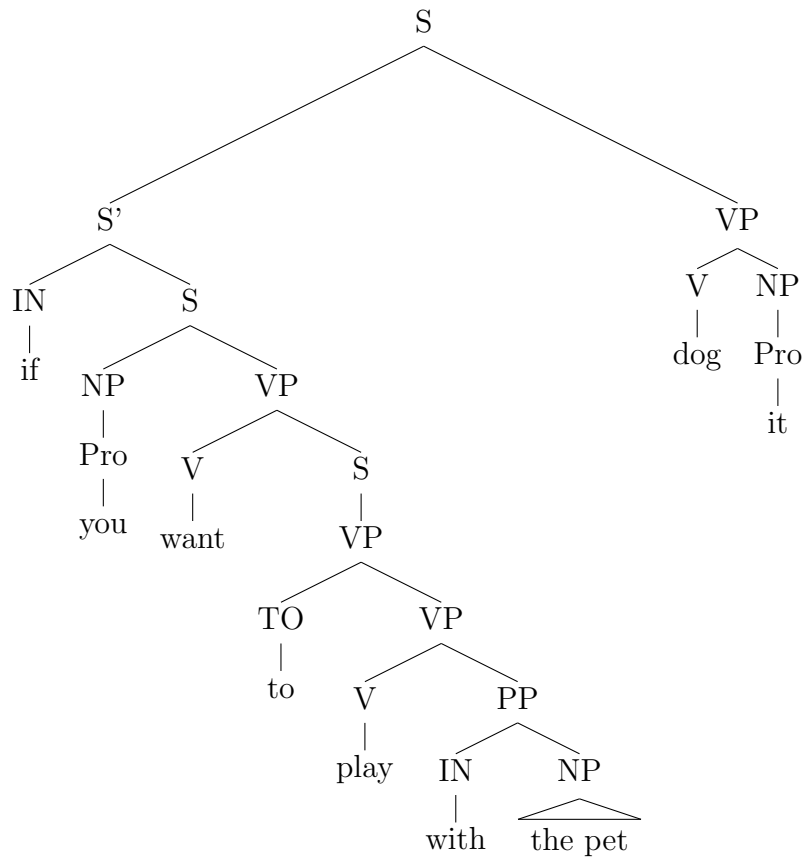
(b) The school pupils dislike studying at *was* closed. (or *at*)





(c) If you want to play with the pet dog *it*.





(d) etc.

2. Can you construct a grammar that will parse your garden path sentences?
 [Note that you will have to include all the part-of-speech tags for the you
 ambiguous word(s).]

Grammatical rules	Lexical rules
S → NP VP	Pro → he you
S → VP	V → read was dislike studying want play
S → S' VP	Det → the
S' → IN S	N → book school pupils pet dog
NP → Pro	Adj → nice old
NP → Det N	IN → at with if (prep. and subordinate conjunctions)
NP → N	TO → to
VP → V NP	
VP → V S	
VP → V AdjP	
VP → V PP	
VP → TO VP	
PP → IN NP	
AdjP → Adj	