AMBIGUITY

Exercise #1: The following sentences are semantically and syntactically ambiguous. Describe the two interpretations and try to determine which words form meaning units in the different interpretations.

a. *Leo watched a man with binoculars.*
b. *Mary scared the child with the stuffed lion.*
c. *The administration wants more detailed plans.*
d. *I will answer the question precisely at noon.*

PS-RULES

Exercise #2	
a. S ➟ N V b. V ➟ swim c. V ➟ sleep d. N ➟ frogs e. N ➟ fish	**A.** How many possible tree diagrams are there for this set of PS-rules? **B.** Provide tree diagrams for two of the possible sentences.

Exercise #3	
a. S ➟ I V b. V ➟ V O c. V ➟ 2 d. V ➟ 3 e. I ➟ 5 f. I ➟ 6 g. O ➟ n h. O ➟ q	**A.** The set of PS-rules on the left allows us to create the terminal string “6—3—n—n—n—n”. Give one derivation that will yield this string. **B.** How many possible outputs (i.e., strings containing only terminal nodes) can this set of PS-rules create? **C.** Why would such a rule system (once supplemented with appropriate categories and nodes) be useful for language?

Exercise #4	
a. S ➟ N V b. S ➟ N V N c. S ➟ N V PP d. PP ➟ P N e. N ➟ Sue f. N ➟ Max g. N ➟ bananas h. V ➟ ate i. V ➟ talked j. V ➟ thought k. P ➟ about l. P ➟ to	**A.** Give three English sentences generated by the rules on the left. Make sure each of the rules in a, b, c is used once. **B.** The sentence *Max talked to Sue about Vienna* cannot be generated by these rules. What rule(s) would have to be added to generate this sentence? **C.** What tree diagram do your new rules give for the sentence *Max talked to Sue about Vienna*? **D.** A sentence that can be generated by the rules on the left is *Sue ate bananas*. Now consider the sentence *Max thought Sue ate bananas*. One way to derive the pattern of this sentence would be to add the rule S ➟ N V N V N. But there’s a better way. What is it?

REVIEW—TRUE OR FALSE?

(1) A single PS-rule can only apply once. _______________
(2) PS-rules can have the same symbol on both sides of the arrow. _______________
(3) There is an infinite number of PS-rules. _______________
(4) In the sentence *Tuluba finished eating root vegetables*:
root is a root node _______________
finished is a terminal node. _______________

GRAMMARS AS THEORIES

Exercise #5

Which of the following grammars would be the best scientific theory of a speaker's syntactic knowledge of the data given? Why?

Data set

Max smiled.	Max called.	*Called Max.	*Max likes.
Sue smiled.	Sue called.	*Smiled Sue.	*Sue likes.
Max likes Sue.	Max called Sue.	*Called Max Sue.	*Max smiled Sue.
Sue likes Max.	Sue called Max.	*Max Sue called.	*Sue smiled Max.

Grammar I	Grammar II	Grammar III
a. S ➠ N V	a. S ➠ N Vi	a. S ➠ N Vi
b. S ➠ N V N	b. S ➠ N V N	b. S ➠ N V N
c. N ➠ Max	c. N ➠ Max	c. N ➠ Max
d. N ➠ Sue	d. N ➠ Sue	d. N ➠ Sue
e. V ➠ likes	e. V ➠ likes	e. V ➠ likes
f. V ➠ smiled	f. Vi ➠ smiled	f. Vi ➠ smiled
g. V ➠ called	g. V ➠ called	g. V ➠ called
		h. Vi ➠ called

Exercise #6 [a. - h. same as in Grammar III]

a.	S	➟	N Vi
b.	S	➟	N V N
c.	N	➟	Max
d.	N	➟	Sue
e.	V	➟	likes
f.	Vi	➟	smiled
g.	V	➟	called
h.	Vi	➟	called
i.	V	➟	saw
j.	Vi	➟	left
k.	V	➟	shaved

A. State for each of the following grammaticality judgments whether the revised Grammar III correctly or incorrectly predicts that judgment.

B. Give 2 additional sentences that the revised Grammar correctly predicts to be grammatical, and 2 additional sentences that the revised Grammar correctly predicts to be ungrammatical.

Data set

i. Max saw Sue.
ii. Sue left Max.
iii. Sue shaved Max.
iv. *Sue Max saw.
v. *Max saw.
vi. Max left.
vii. Max shaved.
viii. *Left Max.

Predictions

ix.
x.
xi. *
xii. *

Revisions

Exercise #7 (based on an exercise in Larson 2010)

a.	S	➟	NP V NP	h.	Det	➟	the
b.	S	➟	NP V PP	i.	CN	➟	answer
c.	S	➟	NP V NP P	j.	CN	➟	boat
d.	NP	➟	Det CN	k.	N	➟	Max
e.	NP	➟	N	l.	N	➟	Sue
f.	V	➟	V P	m.	V	➟	decided
g.	PP	➟	P NP	n.	V	➟	looked
				o.	P	➟	up
				p.	P	➟	on

A. This grammar generates the sentence *Max looked the answer up*. Give the tree.

B. This grammar assigns two different trees to the sentence *Sue decided on the boat* (that is, the sentence is syntactically ambiguous under these rules). Give the two trees.

C. Would a theory that avoids this syntactic ambiguity be simpler or can you think of a reason for keeping the rules as they are?

Exercise #8

A. Although Grammar I and Grammar II are very similar regarding the sentences they generate, they are *not* equivalent in their generative power. Try to think of a well-formed sentence that Grammar II can generate, but Grammar I cannot generate.

B. What rule would have to be added to Grammar I to generate that sentence? Why is that solution unattractive? What is the strength of Grammar II?

Lexical rules for both grammars	**Grammar I**	**Grammar II**
i. N ➟ Greg	a. S ➟ N Vi	a. S ➟ N Vi
ii. N ➟ Lisa	b. S ➟ N Vt N	b. S ➟ N Vt N
iii. N ➟ bananas	c. S ➟ N Vd N N	c. S ➟ N Vd N N
iv. N ➟ flowers	d. S ➟ N Vi Conj N Vi	d. S ➟ S Conj S
v. Vi ➟ worked	e. S ➟ N Vi Conj N Vt N	
vi. Vi ➟ slept	f. S ➟ N Vi Conj N Vd N N	
vii. Vi ➟ ate	h. S ➟ N Vt N Conj N Vi	
viii. Vt ➟ ate	i. S ➟ N Vt N Conj N Vt N	
ix. Vt ➟ likes	j. S ➟ N Vt N Conj N Vd N N	
x. Vd ➟ gave	k. S ➟ N Vd N N Conj N Vi	
xi. Vd ➟ sent	l. S ➟ N Vd N N Conj N Vt N	
xii. Conj ➟ and	m. S ➟ N Vd N N Conj N Vd N N	

Exercise #9

Data set

The doctor and the nurse left.	The nurse and Lisa left.	Greg and Lisa and the nurse left.
Greg and the nurse left.	Lisa and Greg left.	The doctor and Lisa and the nurse left.

Grammar	
a. S ➟ NP Vi b. NP ➟ Det CN c. NP ➟ N d. N ➟ Lisa e. N ➟ Greg f. CN ➟ nurse g. CN ➟ doctor h. Det ➟ the i. Vi ➟ left j. Conj ➟ and	Which single rule could be added to the grammar on the left to generate all the sentences above?

Exercise #10

Grammar I				**Grammar II**			
a.	S	➠	N Vi	a.	S	➠	N VP
b.	S	➠	N Vt N	b.	VP	➠	Vi
c.	S	➠	N Vd N N	c.	VP	➠	Vt N
d.	N	➠	Greg	d.	VP	➠	Vd N N
e.	N	➠	Lisa	e.	N	➠	Greg
f.	N	➠	bananas	f.	N	➠	Lisa
g.	Vi	➠	worked	g.	N	➠	bananas
h.	Vi	➠	slept	h.	Vi	➠	worked
i.	Vt	➠	ate	i.	Vi	➠	slept
j.	Vt	➠	likes	j.	Vt	➠	ate
k.	Vd	➠	gave	k.	Vt	➠	likes
				l.	Vd	➠	gave

A. Both grammars generate the sentence *Greg gave Lisa bananas*. Give the two trees.
B. Grammar I and Grammar II are equivalent. Why?
C. Given that the two grammars are equivalent so far, which grammar appears to be simpler?

New data

Greg worked and slept.	Lisa likes bananas and gave Greg bananas.
Lisa worked and ate bananas.	Greg ate bananas and slept.
Greg gave Lisa bananas and slept.	Lisa worked and gave Greg bananas.

D. For both grammars, add the rules necessary to generate the new data.

E. Can you think of sentences that one of the grammars correctly predicts to be possible, but that the other grammar cannot generate without adding new rules? What rules would have to be added to the grammar that undergenerates?

F. Does your answer to E. change your conclusion in C.?

Conjunction rule: **X** ➟ **X** Conj **X**

Constituency test schema:
If a string of words can be [Fill in: CONSTITUENCY TEST], then that string is a constituent.

Exercise #11: Do so replacement

(5) a. Tim ate the cake with a spoon in the kitchen yesterday and Emma did so, too.

did so = ____

b. Tim ate the cake with a spoon in the kitchen yesterday and Emma did so today.

did so = ____

c. Tim ate the cake with a spoon in the kitchen yesterday and Emma did so in the living room today.

did so = ____

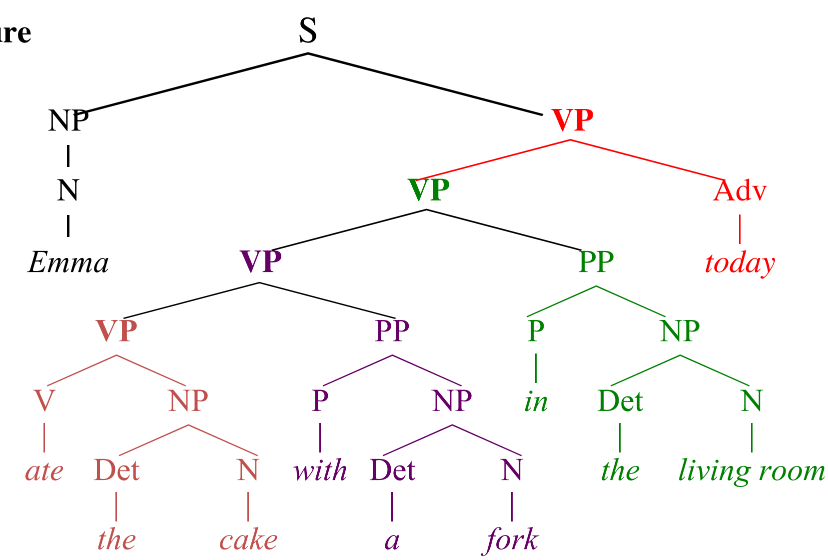
d. Tim ate the cake with a spoon in the kitchen yesterday and Emma did so with a fork in the living room today.

did so = ____

If *did so* <u>always</u> replaces a **VP**, what does this tell us about the strings of words in the different sentences in (1)? ____

How is this possible?____

e. **VP-structure**



If a string of words can be replaced by a **pronoun**, that string is a constituent, namely an **NP**.
If a string of words can be replaced by **do/did so**, that string is a constituent, namely an **VP**.
If a string of words can be dislocated, that string is a constituent.

Exercise #12: *Max watched the man with binoculars.*			
Interpretation I:			
Interpretation II:			
	Constituency tests	**Constituent targeted; result**	**I or II?**
a.	*Max watched him with binoculars.*		
b.	*Max watched him.*		
c.	*Max did so with binoculars.*		
d.	*The man with binoculars, Max watched.*		
e.	*The man, Max watched with binoculars.*		

Provide tree diagrams for the two interpretations:

Interpretation I

Interpretation II

Exercise #13: Constituency

The sentence “*Fido ate the cookies in the box under the table*” is multiply ambiguous.

A. The three different interpretations this sentence can receive are given in I, II, and III. The structures corresponding to these interpretations are given as Trees (a), (b), and (c) at the end of this exercise. Determine which tree matches which interpretation.

		Tree
I)	Fido ate the cookies which were in the box that was under the table.	_______
II)	Fido was sitting under the table when he ate the cookies which were in the box.	_______
III)	Fido was sitting in the box under the table when he ate the cookies.	_______

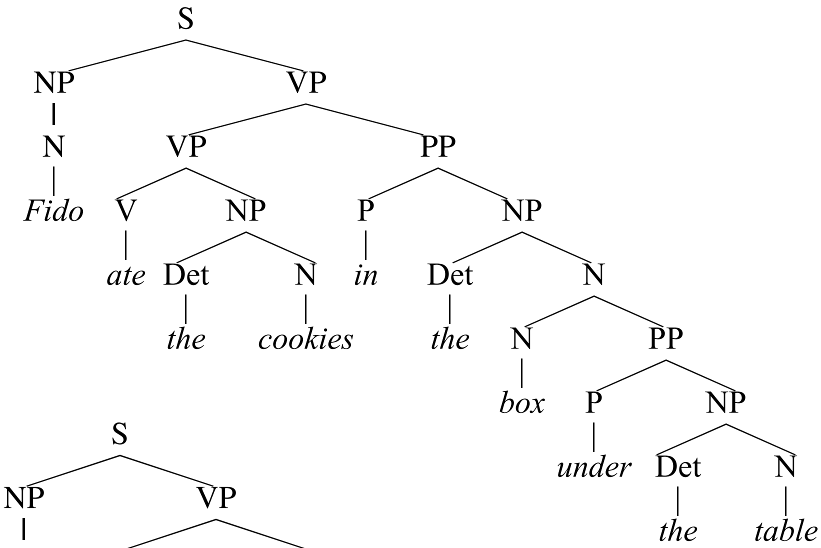
B. The examples in i. to x. involve constituency tests (the sentence set in italics) that target specific constituents of the structures in Trees (a)-(c). State for each of the following test sentences what type of constituency test is involved; whether that test targets a constituent in Trees (a), (b), and/or (c); and what constituent the test picks out (give the exact words of the targeted constituent).

i. *Fido ate them in the box under the table.*
ii. *The cookies, Fido ate in the box under the table.*
iii. [Fiffy ate the cookies in the box under the sink, but…]
Fido did so under the table.
iv. *Fido ate the cookies and slept in the box under the table.*
[Meaning: Fido ate the cookes in the box under the table]
v. *The cookies in the box under table, Fido ate.* […the others he buried in the yard.]
vi. *Fido ate them.*
vii. *The cookies in the box, Fido ate under the table.*
viii. [Fiffy ate the cookies in the basket under the sink, but…]
Fido did so in the box under the table.
ix. *Fido ate them under the table.*
x. *Fido ate the cookies in the box and slept under the table.* [Meaning as in iv.]

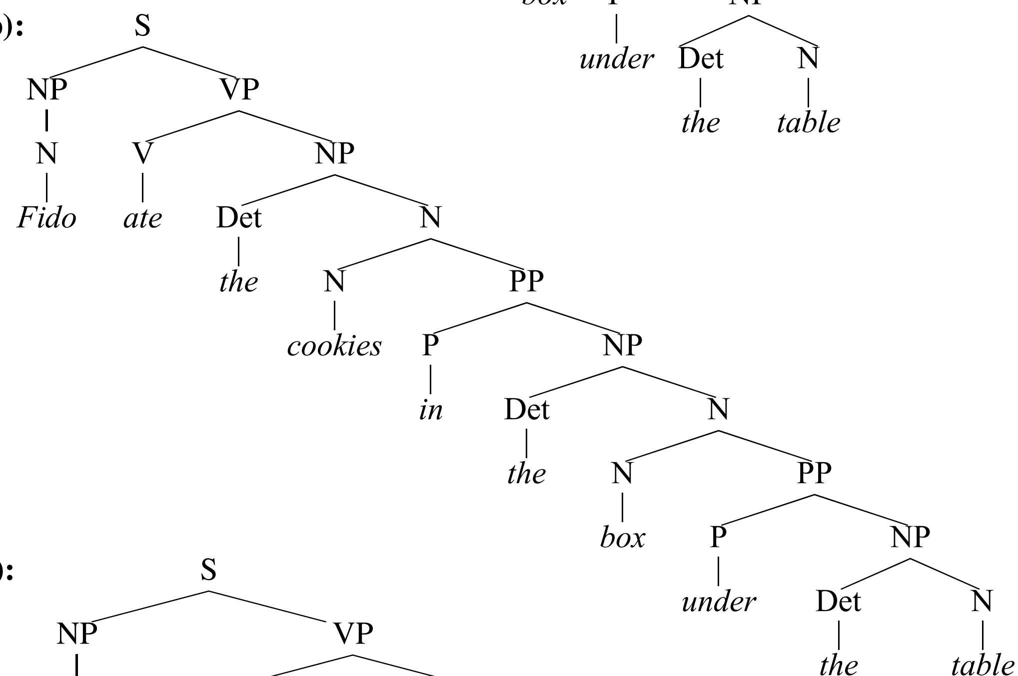
ANSWERS	Type of test	Interpretation/Tree	Constituent picked out
i.			
ii.			
iii.			
iv.			
v.			
vi.			
vii.			
viii.			
ix.			
x.			

C. The sentence *Fiffy ate the cookies in the box under the table…and Fido did so, too* diagnoses a constituent available in all three structures. Which constituent does this test pick out in each of the trees? If a tree has more than one constituent with the same label, specify it as “___, which is the sister of ___”.

Tree (a):



Tree (b):



Tree (c):