

9.59, 24.905: Psycholinguistics
Problem Set 1

Handed out: Class #3
Due: Class #8

Answer all questions. Total number of points: 100. You are encouraged to work in groups, but do the write-up independently.

1. (5 points) Provide the argument structures for the verbs in the main predicates of the sentences below. Provide the syntactic category of the complements and the thematic roles for each category, following the notation from class.

- a. Fred passed Lorena the books.
- b. That the test was fair pleased the students.
- c. Alexandra objected to the tone of Barbara's voice.
- d. Donald saw Marvin leave the classroom.
- e. Karen loved to eat at expensive restaurants.

2. (5 points) Each of the verbs in question 1 has other possible argument structures. Provide one additional argument structure (categories plus thematic roles) for each of these verbs, and provide an example sentence which uses this alternative argument structure.

3. (32 points) Draw X-bar phrase structure trees for the following English sentences.

Note: There are constructions in here that we have not discussed. Discuss these among yourselves in order to work out possible analyses.

- a. The big dog with the long shaggy fur chased the ball in the corner of the room.
- b. The woman beside Wanda with the green hat is waving to us.
- c. Percy convinced the shop owner to give him a good price.
- d. Eleanor told Phil that she had done the homework on time.
- e. The beautiful woman was kissed by the handsome man under the mistletoe.
- f. The woman who Albert kissed in the park was Mary.

g. That John was talking loudly outside my room while I was trying to sleep bothered me.

h. The winter bears no resemblance to the summer.

i. The winter bears are similar to the summer bears.

j. Which restaurant did you go to yesterday?

k. Who picked up the invited speaker at the airport?

l. The chipmunk which was chased by the cat escaped up a tree.

m. The chipmunk chased by the cat escaped up a tree.

n. Fresh green beans, I really love.

4. (10 points) Draw the Japanese phrase structure for each of the following English sentences.

a. Eve told Sandra that the Yankees beat the Red Sox again.

b. The woman beside Wanda with the green hat is waving to us.

Note: there are no determiners like “a” and “the” in Japanese. Japanese is a head-final language.

5. (6 points) Consider (5a) with respect to the following set of phrase structure rules:

IP \rightarrow NP VP

NP \rightarrow Det N

Det \rightarrow the

N \rightarrow bartender, fan, Red-Sox, Yankees

VP \rightarrow V NP CP

VP \rightarrow V NP

V \rightarrow told, beat

CP \rightarrow Comp IP

Comp \rightarrow that

a. The bartender told the fan that the Yankees beat the Red-Sox.

Give the order of expansion of the nodes in the parse tree for (5a) with respect to three different parsing strategies: top-down, bottom-up and left-corner. The easiest way to represent this is to draw a tree structure for each algorithm and place an index next to each PS node in the tree.

6. (3 points) Consider the following argument:

Garden-path sentences almost never occur in everyday situations. Therefore, they have little relevance to how the human sentence processor normally operates. If we want to know how the human sentence processor operates in normal situations, then the only types of sentences that we should be concerned with are those that there is a reasonable chance of encountering.

Is this argument valid? If so, give reasons to support it. If not, give reasons why it is fallacious.

7. (8 points) Give unambiguous control sentences for the local ambiguities below.

(An unambiguous control sentence is a sentence which is unambiguous, but which has the same properties as the original sentence, including the same order of the words.)

- a. The warehouse fires caused a lot of damage. (ambiguity involving the word “fires”)
- b. The warehouse fires many employees in the spring. (ambiguity involving the word “fires”)
- c. The report that the witness ridiculed was important in the case.
(ambiguity involving the attachment of the clause initiated by “that”)
- d. The report that the witness ridiculed the defendant was important in the case.
(ambiguity involving the attachment of the clause initiated by “that”)

[non-native speakers who have problems with this task might want to consult native speakers for help]

8. (6 points) Consider (8a):

- a. The evidence examined the lawyer in the courtroom.

This is a syntactically well-formed sentence, even though it describes a very implausible event. Provide a control version of this sentence: an unambiguous main-verb sentence with a very similar meaning.

What does the modularity hypothesis predict for the processing of (8a) during the regions “examined”, “the lawyer” and “in the courtroom” relative to its unambiguous control sentence?

What does the non-modularity hypothesis predict for the same regions relative to its unambiguous control sentence?

9. (5 points) Object-extracted relative clauses are observed to be generally more complex than subject-extracted relative clauses. Consider the subject-extraction in (9a) and the object-extraction in (9b):

- a. The boy who scratched the cat is in the living room.
- b. The boy who the cat scratched is in the living room.

If anything, (9a) seems more difficult to understand than (9b). Why is this? Construct a better comparison pair, and say how you would control for the confounding factor present in (9a) and (9b).

10. (5 points) Show how the principle of Minimal Attachment would derive the garden-path effect in (10a):

- a. The doctor told the patient that he was having trouble with to leave.

Use X-bar phrase structure notation.

11. (5 points) Consider a display consisting of 1) an apple; 2) an apple sitting on a towel, 3) a towel; and 4) a box. Suppose that an experimental participant was told to “put the apple on the towel into the box.”

- a. Describe the eye-movement patterns of a typical participant. What do these eye-movement patterns tell us?
- b. Describe the eye-movement patterns of a typical participant when the first apple is replaced by a banana. What do these eye-movement patterns tell us?

12. (5 points) Briefly work through the DLT integration costs for each word in the following sentence:

- a. The professor who the student who John met at the party liked ate the cheese-ball.

13. (5 points) According to a DLT-based theory of ambiguity resolution, minimizing structural storage costs is one factor that contributes to ambiguity resolution. Show how this hypothesis explains the garden-path effect in (13a), by appeal to details of storage costs:

- a. The alley mice crawl in is dark and dusty.
(compare to: The alley which mice live in is dark and dusty.)