Homework Assignment 3:
Lexical Analysis and Distributional Criteria
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Oct 6, 2004
Due on Oct 13, 2004 by 1pm

1 Exercise 1

A. Apply Harris conditions I and II to show whether the word \textit{unhappy} consists of one single morpheme or it consists of two, namely \textit{un + happy}. The purpose of this exercise it is NOT to find out what the true answer is (I know you know it), but to see how a purely distributional analysis would do at deriving the correct result. Be as explicit as we were in class/recitation. In particular:

(i) For Harris’ condition I, specify:
   a. your environment X\underline{ }Y;
   b. what A, B, C and D are (provide suitable C and D yourself); and
   c. the “crossed” examples that prove condition I

(ii) For Harris’ condition II, specify:
   d. your set $\alpha$ of segments that can replace the segment at issue; and
   e. spell out several environments where you test whether or not your set $\alpha$ --including the segment at issue-- homogeneously behaves as a distributional class.

(iii) Enunciate the conclusion reached through the distributional method.

B. Do the same for \textit{unwind} vs \textit{un + wind}.

C. Do the same for \textit{under} vs \textit{un + der}.

D. If your conclusion from tasks A and B is that each of the two words \textit{unhappy} and \textit{unwind} consists of two morphemes, answer the following question: What insight borrowed from the distributional method would help you decide whether \textit{un-} in \textit{unhappy} and \textit{un-} in \textit{unwind} are tokens of the same morpheme or they are different morphemes? Explain. (I want a distributional answer, not semantic or phonological cues.)

E. The word \textit{unloadable} is ambiguous: it can be used to describe two different properties. Paraphrase the two meanings in your own words and explain the ambiguity in terms of your previous distributional findings in this exercise.
2 Exercise 2

The following sentences belong to an imaginary language L. We want to find out how many morphemes or minimal units there are in the sequence \textit{sunu larakom} in sentence (1), since we suspect that more than one morpheme may be involved per word. Your task is to apply Harris condition I by using the data below. That is, your task is to come up with several hypotheses on how to “cut” the sequence \textit{sunu larakom} into possible morphemic units according to Harris’ condition I, trying different possibilities for the values of A and B in sentence (1) and drawing values for C and D from the sentences below. For each trial, spell out the ingredients (a), (b) and (c) indicated in exercise 1. (You do not have to apply condition II; you are not required to find out which of those potential morphemes are actual morphemes.)

(1) \textit{Fumi kam sunu larakom sonafka}  
\textit{Fumi ate \ldots \, in-market}  
\textit{‘Fumi ate warm pie at the market’}

(2) a. \textit{Fumi kam sunu larakom sonafka}  
\textit{‘Fumi ate warm pie at the market’}  

b. \textit{Fumi kam suni laraken sonafka}  
\textit{‘Fumi ate warm pies at the market’}  

c. * \textit{Fumi kam sunu laraken sonafka}  

d. * \textit{Fumi kam suni larakom sonafka}

(3) a. \textit{Fumi kam zwetu larakom sonafka}  
\textit{‘Fumi ate warm fish at the market’}  

b. \textit{Fumi kam zweti laraken sonafka}  
\textit{‘Fumi ate warm fishes at the market’}  

c. * \textit{Fumi kam zweti laraken sonafka}  

d. * \textit{Fumi kam zweti larakom sonafka}

(4) a. \textit{Fumi kam sunu tabom sonafka}  
\textit{‘Fumi ate cold pie at the market’}  

b. \textit{Fumi kam suni taben sonafka}  
\textit{‘Fumi ate cold pies at the market’}  

c. * \textit{Fumi kam sunu taben sonafka}  

d. * \textit{Fumi kam suni tabom sonafka}

(5) a. \textit{Fumi kam zwetu tabom sonafka}  
\textit{‘Fumi ate cold fish at the market’}  

b. \textit{Fumi kam zweti taben sonafka}  
\textit{‘Fumi ate cold fishes at the market’}  

c. * \textit{Fumi kam zweti taben sonafka}  

d. * \textit{Fumi kam zweti tabom sonafka}
3 Exercise 3

Jon and Maribel are sending encrypted messages to each other and you want to find out what they say. Their enciphering function is not too complicated, but it changes every day. Luckily, you have found out that the very first plaintext sent every day is the one in (6). Then, on day I, you intercept their very first ciphertext message of the day, given in (7). Describe their enciphering function $F_I$ for day I and specify the value of $F_I(j)$, $F_I(q)$, $F_I(x)$ and $F_I(z)$. On day II, the first ciphertext message is the one in (9). Describe the enciphering function $F_{II}$ and give the values for $F_{II}(j)$, $F_{II}(q)$, $F_{II}(x)$ and $F_{II}(z)$. Finally, on day III, you intercept the first message in (11). Describe the enciphering function $F_{III}$ (and rest of the procedure).

(6) Plaintext:
The lecture notes are ready. The copies have been ordered. The webpage has been updated.

(7) Ciphertext I:
Qeb ibzqrob klqbp xoob obxav. Qeb zlmbbp exsb ybbk loaboba. Qeb thymxdb exp ybbk rmaxqba.

(8) a. Enciphering function I, $F_I$:

b. $F_I(j) = $

c. $F_I(q) = $

d. $F_I(x) = $

e. $F_I(z) = $

(9) Ciphertext II:
Ht4 q4yh1k4 n2h4j 5k4 k45xc. Ht4 y2m34j t5g4 z44n 2kx4k4x. Ht4 f4zm5v4 t5j z44n 1mx5h4x.

(10) a. Enciphering function II:

b. $F_{II}(j) = $

c. $F_{II}(q) = $

d. $F_{II}(x) = $

e. $F_{II}(z) = $

(11) Ciphertext III:
hkw luxwflho vlhrq hud bgdhu. hkw vhlrf hydk qhhe gluhr. hkw hjdshez vdk qhhe gluwdsx.

(12) Enciphering function III (and rest of the procedure):