Homework Assignment 3:
Lexical Analysis and Distributional Criteria
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Due on Oct 8, 2003 by 1pm

1 Exercise 1

Take the word tactfully. Apply Harris’ conditions I and II to show: (A) that this word can be split into tactful and -ly; (B) that the part tactful can be split into the smaller units tact and -ful and (C) that the remnant tact cannot be split into two units t and act. Be as explicit as we were in class. In particular:

(i) For Harris’ condition I, specify:
   a. your environment X____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 α of segments that can replace the segment at issue;
   e. your set β of segments that cannot replace the segment at issue; and
   f. spell out several environments where you test whether or not your set α—including the 
   segment at issue—homogeneously behaves as a distributional class.

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

2 Exercise 2

A. Apply Harris conditions I and II to show whether the word unhappy consists of one single morpheme or it consists or two, namely 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 (see guidelines above).

B. Do the same for undo vs un + do.

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

D. The word unlockable 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.
3 Exercise 3

The following sentences belong to an imaginary language K. We want to find out how many morphemes or minimal units there are in the sequence karts yayuba 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 karts yayuba 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) Tarik kartis yayuba konalea
    Tarik . . in-forest
    ’Tarik ate apples in the forest’

1. Tarik kartis yayuba  ‘Tarik ate apples’
2. Tarik kartima yayire  ‘Tarik was eating apples’
(2)
3. * Tarik kartis yayire
4. * Tarik kartima yayuba

1. Tarik kartis olpuba  ‘Tarik sought apples’
2. Tarik kartima olpire  ‘Tarik was seeking apples’
(3)
3. * Tarik kartis olpire
4. * Tarik kartima olpuba

1. Tarik nakus yayuba  ‘Tarik ate berries’
2. Tarik nakuma yayire  ‘Tarik was eating berries’
(4)
3. * Tarik nakus yayire
4. * Tarik nakuma yayuba

1. Tarik nakus olpuba  ‘Tarik sought berries’
2. Tarik nakuma olpire  ‘Tarik was seeking berries’
(5)
3. * Tarik nakus olpire
4. * Tarik nakuma olpuba

4 Exercise 4

Sophia 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 $E_I$ for day I and specify the value of $E_I(g)$ and $E_I(x)$. On day II, the first ciphertext message is the one in (9). Describe the enciphering function $E_{II}$ and give the values for $E_{II}(q)$ and $E_{II}(w)$. Finally, on day III, you intercept the first message in (11). Describe the enciphering function $E_{III}$. 

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(6) Plaintext:

(7) Ciphertext I:
Zmgxsv Gexepe. Twiyhsmq hi Gexivmre Epfiux m Tevehmw. Jmppe h yre jeqpmhe hi tystmixevmw vyvepw.

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

b. $E_I (g) =$
c. $E_I (z) =$

(9) Ciphertext II:
G3yh4k Y1h1q1. Mj25x4n3p x2 Y1h2k3n1 1qz2kh 3 M1k1x3j. W3q1l x 5n1 w1p3q31 x2 mk4m32h1k3j k5k1qj.

(10) a. Enciphering function II:

b. $E_{II} (q) =$
c. $E_{II} (w) =$

(11) Ciphertext III:
pmragt yjjrya. kglmbseqn cb ylgpery a rpezjy g qgbypyn. yjjgd b yls ygjgkyd cb qgpyrgmnpn qjyqsp.

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