

Psych156A/ Ling150

Spring 2010

Homework 3: Phrases, Poverty of the Stimulus & Learning Biases

Or “The Language Adventures of Sigmund von Hacklestein, part 3”

Remember to write your full name and University ID number on your assignment. If you collaborate with other students in the class, please make sure to indicate who you worked with.

(31 points total)

(1) Sigmund has been studying yet more details of the Guin language. This time, he’s trying to figure out what words make up the phrases of Guin. Here are some data that he’s gathered:

Known categories: A, B, C, D

The transitional probability of the category sequence AB is 0.20.

The transitional probability of category sequence BC is 0.90.

The transitional probability of category sequence CD is 0.90.

The transitional probability of category sequence AD is 0.40.

Assume that the transitional probability learner that Thompson & Newport (2007) believe in will only posit a phrase boundary if the transitional probability between grammatical categories is less than 0.50.

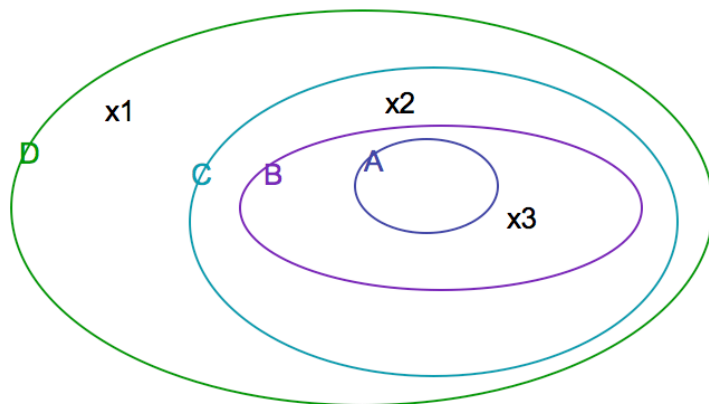
(a) Would this transitional probability learner be likely to think that BCD is a phrase?

Why or why not? [3 pts]

(b) Would this transitional probability learner be likely to think that ABCD is a phrase?

Why or why not? [3 pts]

(2) Below is a schematized picture representing four different generalizations children might make: A, B, C, and D. Sample data points children might encounter are represented by x_1 , x_2 , and x_3 .



(a) Using the figure above, give a specific example where one generalization is a subset of another, and briefly explain how you know that this is true given the figure above. Your answer should take the following form: “Generalization X is a subset of generalization Y because...” [2 pts]

(b) Would initially choosing generalization B when generalization C is actually correct for the language be an example of the Subset problem? Indicate yes or no, and then briefly explain how you know. (Hint: Your answer should make reference to data points x2 and x3. Think about which data this initial choice would predict are in the language, and if this would be an insurmountable problem given the data children would actually encounter. Also, note that the Subset Problem is *not* the same as the Subset Principle.) [4 pts]

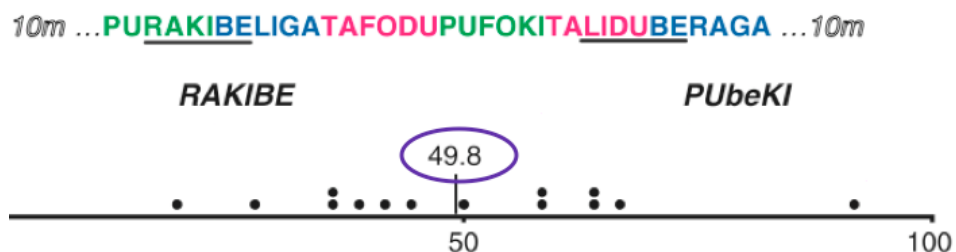
(c) Would initially choosing generalization D when generalization C is actually correct for the language be an example of the Subset problem? Indicate yes or no, and then briefly explain how you know. (Hint: Your answer should make reference to data points x1, x2, and x3. Think about which data this initial choice would predict are in the language, and if this would be an insurmountable problem given the data children would actually encounter. Also, note that the Subset Problem is *not* the same as the Subset Principle.) [4 pts]

(d) Briefly explain what the Subset Principle is, and give an explicit example of a subset problem this principle would solve. Your answer should use the generalizations in the figure above (A, B, C, and/or D). (Hint: Think about what you answered to (b) and (c) and if either of those is an example of a subset problem.) [3 pts]

(e) Would a Bayesian learner that uses the Size Principle eventually be able to learn that generalization B was correct for a language even if that learner began by thinking that generalization C was correct? Indicate yes or no, and then briefly explain your answer. (Hint: Your answer should make reference to data points x2 and x3. Think about how likely each is to be encountered by the child over time if the language really uses generalization B and not generalization C.) [4 pts]

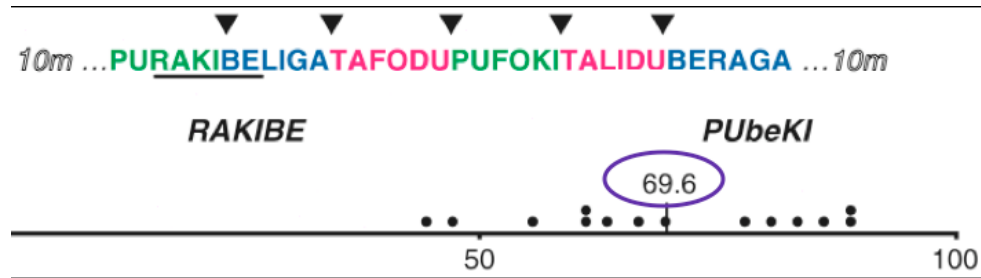
(3) Playing with Peña et al. (2002)

(a) Consider the result from the second experiment in the Peña et al. (2002) study, which is schematized below.



Does this indicate that adults noticed the structural generalization that was present in the words in their training data? Briefly explain how you know. [2 pts]

(b) Consider the result from the third experiment in that study, which is schematized below.



Does this indicate that adults noticed the structural generalization that was present in the words in their training data? Briefly explain how you know. [2 pts]

(c) What was the crucial change in experimental design between experiments 2 and 3 that caused the different in results? [1 pt]

(d) What was the motivation for making this change? That is, why did the experimenters think that this particular change would lead to different results than they had gotten before? [3 pts]