Due Tuesday 2/14/06 in class
COGS 179/279
Homework Problem Set D
COGS 179: Please complete problems 1-5, and (if you like) do 6 for extra credit
COGS 279: Please complete problems 1-6

1. In task 1, the subject is shown a list of color words and asked to read them. In task 2, the subject is shown circles of various colors and asked to name the colors. In task 3, the subject is shown color words, but each word is printed in a color other than that of the written word (that is RED printed in green ink). The subject is asked to identify the colors of the stimulus items. In task 4, the subject is asked to view the same stimuli as in task 3 but to read the words. The difficulty most people experience with task 3 is known as the Stroop effect. It is consistent with the usual finding that reading words can be done more quickly than producing a word from a pictured stimulus. Using the framework of one of the production models discussed in class or in the readings, develop an explanation of the Stroop effect. (OK to use a combination of models, too.)

2. Have speakers attempt to read the following "twisters" 3 times rapidly and then repeat three times from memory (from Shattuck-Huffnagel, 1991). a) Describe 3 errors that were made. b) Discuss whether or not the errors substantiate the claims made in lecture about the nature of speech errors.

TWISTERS
How polite is the fame of the fib to police.
Your lapel has the fame and the fib of Lapointe.
This locale has a yen for a yacht by LaCoste.
You collect if you yawn, but not yet, said Colleen.
The rebuff was to wan since it's wet to rebuild.
If the ribbon is wan it's too wet for a rebate.
The balloon had no gun and could get the ballet.
From the belly a gun will not get me a ballot.
When the lubber is gone we can get him a lapel.
You defy me the tin and I talk to defend.

3. When subjects are asked to produce responses (such as squeezing a dynamometer) at self-paced intervals, a negative-going response is seen at electrode sites over motor cortex. Early investigators found that when the response is executed with the left hand, the later section of the Readiness Potential is more negative over the right side of the head; when the response is executed with the right hand, the Readiness Potential was more negative over the left side of the head. a) Is this consistent with a neural generator in motor cortex? b) Explain why or why not. c) What other (ERP) experiment would you do to test whether the RP is generated in motor cortex? (Need to know something about motor cortex to answer this question.)

4. a) What 2 arithmetical transformations of the ERPs are needed to isolate the Lateralized Readiness Potential? b) Explain (briefly) what each step does for you. c) What is the functional significance of the LRP?

5. Design an ERP experiment to test a particular bilingual population (e.g. English/Chinese) as to whether they access phonological information faster in one language or the other during an implicit language production task. a) Describe your task. b) What aspects of the ERPs will you measure and why? c) Give one possible outcome of this study and tell what it would mean.

6. The following data is from an experiment almost identical to one we discussed in lecture on the relative timing of semantic and phonological information during picture naming.

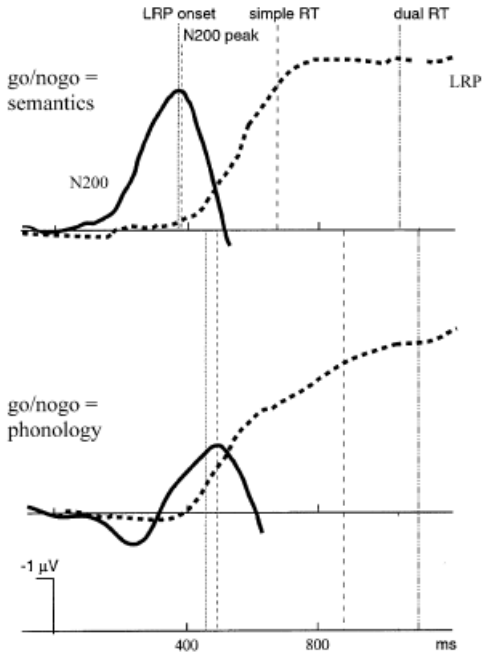

Figure 6. Timeline of N200, lateralized readiness potential (LRP), and reaction times for the hand=phonology condition (top panel) and the hand=semantics condition (bottom panel).

a) Do these data support a serial model, a parallel model, or a cascade model? b) Explain your answer by pointing to particular aspects of the data. Be sure to consider the functional significance of these components. c) Comment briefly on the value of this experimental paradigm for studying language production (can be positive or negative or both).