Exam 2, Spring 1995
NOTE: This was a take-home exam!

Question 1

Data are collected from 200 subjects who are randomly assigned to one of two education interventions: the standard curriculum or an enhanced curriculum. At the end of the course, their performance on a final exam serves as the primary dependent variable to assess whether or not the enhanced curriculum made a difference over and above the standard curriculum. Additionally, student's ability, as measured by past performances in similar classes was also assessed at the start of the course, to see if the curriculum differences depended on student's level of ability. Finally, a measure was taken of how much each student reported working during a typical week of the semester, to see if the differences between the two curricula in performance on the final exam could be due to differences in how hard the subjects worked during the semester.

The relevant data are in the SAS dataset stat.curr, with variables defined as follows:

curr	+1 if enhanced curriculum; -1 if standard.
fin	final exam performance (0 - 60 points)
able	ability measure of past performances in similar courses (0 - 100 rating, with higher numbers indicating more ability)
work	self-rated estimate of amount of time spent on course during typical week (1 - 7 rating)

Using these data, conduct analyses to answer the following questions:

1. Is there a performance difference on the final exam as a function of curriculum?

2. Does the performance difference depend on prior ability?

3. Do students in the two curricula differ in how much they say they worked?

4. Does the performance difference between the two curricula persist even when we equate students on how much they say they worked?

Write up your analyses in a succinct results section, no more than a couple of pages long. Include tables and graphs of means, adjusted effects, simple effects, etc., as relevant and informative. (A results section will be considered complete if just the above four questions are answered. You needn't explore other issues that might occur to you.)

Question 2

A perceptual psychologist is interested in factors affecting attention and the recognition of letters. In this experiment, the researcher varied the location of the target letter which was either a ***T*** or an ***I***. This factor, called "angle," has three levels. The target letter is either shown at the center of the screen (i.e., 0° off-center, where the subject has been instructed to fixate), 4° off-center, or 8° off-center (in each case, the deviation from the center varies randomly between left and right). Data are obtained from 10 older subjects (55-70 years) and 10 younger subjects (15-30). The dependent variable is the amount of time (in milliseconds) that it takes subjects to recognize the letter.

a. Conduct a complete analysis of these data to answer the researcher's question. Write a journal summary for your analysis using graphs as appropriate to report the results.

b. The researcher is contemplating a similar study using only an intermediate age group (35-50). If the linear effect of angle is about the same for this age group as for the younger age group, about how large a sample is necessary to have about an 80% chance of detecting the linear effect? [We didn't specifically cover this, but finding the answer isn't difficult. It also won't be many points relative to (a).]

The following data are available in the SAS dataset stat.angle with variables defined as:

agecode +1 if old; -1 if young
ang0, ang4, ang8 recognition latencies at each angle.

Subject	Age	0° Angle	4° Angle	8° Angle
1	old	420	570	690
2	old	600	720	810
3	old	450	540	690
4	old	630	660	780
5	old	420	570	780
6	old	600	780	870
7	old	630	690	870
8	old	480	570	720
9	old	690	750	900
10	old	510	690	810
11	young	450	510	630
12	young	390	480	540
13	young	570	630	660
14	young	450	660	720
15	young	510	660	720
16	young	360	450	450
17	young	510	600	720
18	young	510	660	780
19	young	510	660	660
20	young	510	540	660