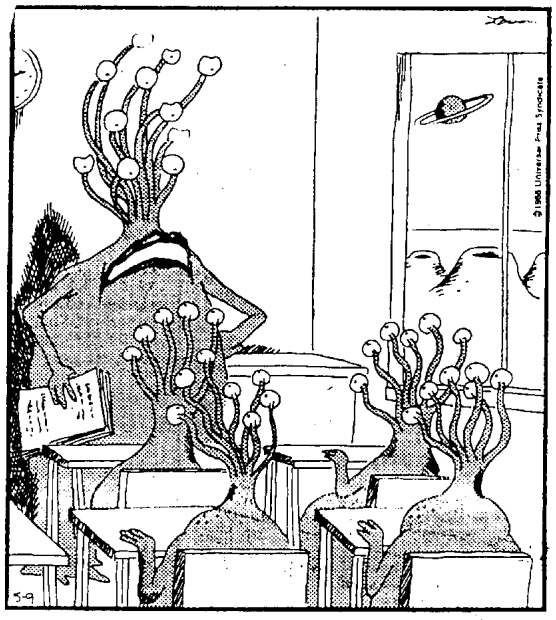
ID# _____ Exam 1 PS306, Spring 1998



"And one final warning before we begin the exam — any stray eyeballs will be immediately thumped."

First of all, as seen above, be sure to keep your eyes focused on your own exam. The Skidmore Honor Code is in effect for this exam (as always). Read each question carefully and answer it completely. The point value of each question is marked, and I tend to think of a point as a minute. Thus, if you spend 30 minutes answering a 10-point question, you've made a tactical error. Good luck!

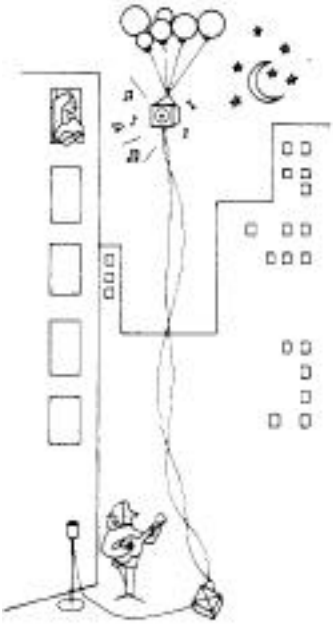
1. Dr. Jones decides to test the effectiveness of two different experimental methodology textbooks. He gets two of his colleagues to agree to use the texts and to give the same exams throughout the term. At the end of the term, he finds that there was no difference in mean performance between the two classes (Mean = 94% and 96% for Class A and Class B, respectively). He concludes that there is no difference between the two texts. Would you agree? [5 pts]

2. In the movie on methodology you saw an example of research on the effects of sensory deprivation on visual development in kittens. Describe the design of the experiment and the independent and dependent variables used in that experiment as completely as possible.

We discussed a more sensitive dependent variable for that experiment. What was it and do you agree that it would make the experiment more powerful? Be sure to define what you mean by power. [5 pts]

3. Using the Mook article, define external validity and then use either the Argyle glasses/intelligence study or the Higgins & Marlatt alcohol/anxiety study to illustrate Mook's points about the relative importance of external validity. [5 pts]

4. Your textbook's author describes the Bransford and Johnson (1972) context/memory study in some detail. As a recall cue, I'm presenting the complete-context picture used in their memory study below. Your author only describes two of the conditions of the experiment (Full Context After and Full Context Before) in Chapter 6. In Chapter 8, you learn about all 5 conditions. Thus, there was also a Partial Context Before condition, in which participants were shown a picture like the one below prior to hearing the passage, but with the speaker on the ground, no balloons inflated, etc. Participants who were shown the less informative picture first did not have the complete context available to the Full Context Before condition participants, but they did have more information than the Full Context After group.



a. Describe $H_0$, the IV and DV in the Bransford & Johnson experiment, as well as the nature of the design as completely as you can. [5 pts.]

b. Bransford and Johnson found a difference among their groups (Partial Context Before, Full Context Before, Full Context After), as shown below, but were interested in testing the extent to which the difference was statistically significant. Obviously, they would use an ANOVA. Assuming an equal number of participants per condition, complete the following ANOVA source table, then interpret the results as completely as you can. [20 pts.]

| | | | | | |
|---|---|---|---|---|---|
| Partial Context Before | Mean | = 5.0 | Variance | = | 6.0 |
| Full Context Before | Mean | = 8.0 | Variance | = | 3.0 |
| Full Context After | Mean | = 3.6 | Variance | = | 6.0 |

| SOURCE | SS | df | MS | F |
|---|---|---|---|---|
| Treatment | | | 50.5 | |
| Error | | 27 | | |
| Total | | | | |

$F_{crit} = 3.35$

5. A sleep researcher tests two drugs for the effects on insomnia. A sample of $n = 10$ insomniacs is pretested with a placebo before bedtime, and the latency to onset of sleep is measured to serve as a baseline. A week later, the participants receive the first drug before bedtime, and the time that elapses between drug administration and sleep onset is measured again. Finally, a week later the second drug is tested in the same fashion. The latency to sleep onset (in minutes) is measured for each of the participants. A portion of the data look like this:

| Participant | Pretest | Drug 1 | Drug 2 |
|---|---|---|---|
| E.B. | 136 | 24 | 33 |
| K.F. | 92 | 107 | 21 |
| . | . | . | . |

Below is a partially completed StatView source table. Complete the source table and interpret the results of this study as completely as you can. [20 pts]

**ANOVA Table for Test Time**

| | DF | Sum of Squares | Mean Square | F-Value | P-Value | Lambda | Power |
|---|---|---|---|---|---|---|---|
| Subject | | 19678. | | | | | |
| Category for Test Time | | 13930. | | | .0098 | 12.084 | .830 |
| Category for Test Time * Subject | | 20750. | | | | | |

**Means Table for Test Time**
**Effect: Category for Test Time**

| | Count | Mean | Std. Dev. | Std. Err. |
|---|---|---|---|---|
| Pretest | 10 | 109.700 | 34.422 | 10.885 |
| Drug1 | 10 | 72.700 | 38.936 | 12.313 |
| Drug2 | 10 | 58.600 | 42.322 | 13.383 |

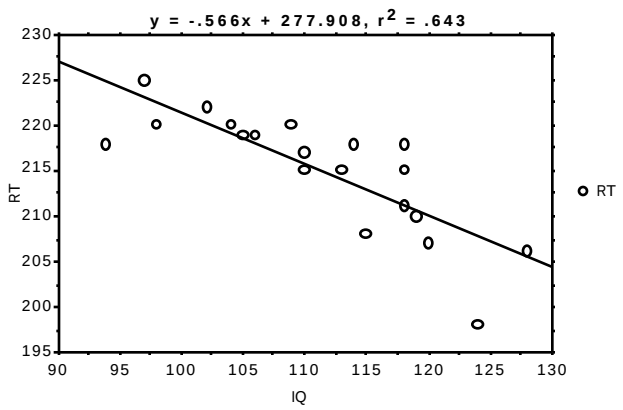
6. Hume and his colleagues (1975) have conducted several studies examining the relationship between intelligence and the speed of basic mental processes. In a typical study, Hunt measured reaction time for a simple mental task (e.g., determining whether two letters are the same or different) and then computed the correlation between the participant's reaction times and their IQ scores. Below is a StatView analysis of these data.

**Simple Regression $X_1$: IQ $Y_1$: RT**

| Count: | R: | R-squared: | Adj. R-squared: | RMS Residual: |
|---|---|---|---|---|
| 20 | .802 | .643 | .624 | 4.009 |

Analysis of Variance Table

| Source | DF: | Sum Squares: | Mean Square: | F-test: |
|---|---|---|---|---|
| REGRESSION | 1 | 521.701 | 521.701 | 32.466 |
| RESIDUAL | 18 | 289.249 | 16.069 | p = .0001 |
| TOTAL | 19 | 810.95 | | |




Interpret the results of this study as completely as possible. If a person has an IQ of 110, what would be your best prediction of that person's reaction time? If a person has an IQ of 135, what would be your best prediction of that person's reaction time? On the basis of these data, does it appear that IQ causes people to be faster in their reaction times? How much of the variability in reaction time data appears to be explanable by knowing a person's IQ? [10 pts]