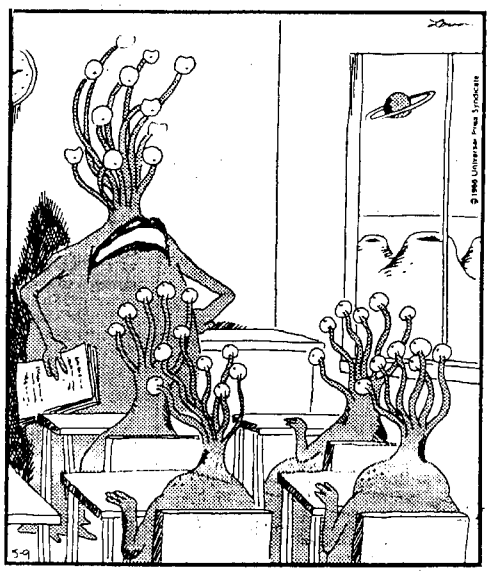


"And one final warning before we begin the exam — any stray eyeballs will be immediately thumped."

ID# _____ Exam 1 PS 306, Fall 2000

The Skidmore Honor Code is in effect for this exam, as always. Please behave accordingly. At the end of the exam you will be asked to sign a sheet attesting to your adherence to the Honor Code.

Read each question carefully and answer each question completely. If some aspect of a question is unclear, please ask for clarification. I think of a point as a minute, so my expectation is that a 10-point question should take you 10 minutes. If you finish a 10-point question in 30 seconds, your answer may not be sufficiently detailed. On the other hand, if you spend 20 minutes answering a 10-point question, you may not finish the exam. Now...take a deep breath…relax a bit…then begin the exam. Good Luck!!

1. Provide a *specific* example of an independent variable for which you would ***not*** want to conduct a manipulation check. Then tell me the sort of variable that *would* lead you to conduct a manipulation check. [5 pts]

For the first part of the question, what I was expecting as a response is something like, "variables that are accessible and can be measured precisely, such as the amount of light in a room, the loudness of a sound, etc." Instead, some people wrote "non-manipulated characteristics of the participant." Which is a correct-enough response, so I accepted it. ☺ The sort of variable that would lead you to conduct a manipulation check is one that is less accessible cannot be measured precisely. One example might be motivation. Another might be anxiety. We can attempt to manipulate motivation (amount of $ paid) or anxiety level (threat of shock), but we can't be certain that our manipulation has been effective. And, thus, we need to conduct a manipulation check.

2a. Dr. Alucard is interested in the auditory discrimination abilities of bats. First, he trains 21 bats to fly from a perch at one end of the experimental chamber to the food box at the other end of the room. He then constructs three different mazes of vertical wires (similar to the maze seen in the movie for the cats, but they go from floor to ceiling with a small opening to allow the bat to move through one wall of wire to the next) between the starting perch and the food box. In one maze the wires are Thick, in one maze the wires are Intermediate, and in the final maze the wires are Thin. Each maze is different (openings are in different locations). The dependent variable he decides to use is the number of times a bat hits the wires of the maze.

Dr. Alucard decides to use a repeated measures design for this experiment. Why might he decide to do so? Give Dr. Alucard specific instructions as to how he should construct his experiment (how many bats he should use, how he should run each bat through the experiment, etc.). [15 pts]

Here's a "sketchy" response:

He would use a repeated measures design to gain the greatest power.

The first "trick" is to recognize the implications of the repeated measures design. That is, with three levels of the IV, we would use complete counterbalancing. Thus, we would need to run 6, 12, or 18 bats. Any of those numbers would work (but not all 21), though power concerns would dictate using 18.

The 6 orders would be:

O1 Thick Intermediate Thin
O2 Thick Thin Intermediate
O3 Intermediate Thick Thin
O4 Intermediate Thin Thick
O5 Thin Intermediate Thick
O6 Thin Thick Intermediate

So, the first bat might go through the mazes in O1, the second bat in O2, etc., then when you get to the 7th bat, you would start using the orders over again. The path through the maze would be changed between the runs through the maze (as the wire widths were changed). [So the bat would need to use a different flight path each time.] You'd need to think of some way to detect the # of times that the bat hits the wires (for the DV).

2b. Below are the means and a partially completed ANOVA source table for Dr. Alucard's experiment. State the null and alternative hypotheses explicitly. Analyze the data completely, then tell Dr. Alucard exactly what he could conclude. (You can treat any F value greater than 3.3 as significant.) [15 pts]

	Thin Wire	Intermediate Wire	Thick Wire
Mean # of touches	5	1	0

Source	SS	df	MS	F
Treatment (Wire Width)	126	**2**	**63**	**31.5**
Subjects	**1**	**17**		
Error	68	**34**	**2**	
Total	195	**53**		

H_0: $\mu_{Thin} = \mu_{Intermediate} = \mu_{Thick}$
H_1: Not H_0

The results are significant, so Dr. A knows that there is some effect of wire width. However, to determine which of the wires differ from the others, he would need to compute a post hoc test. Using the Tukey HSD approach, (q = 3.47) HSD = 1.16, so any two group means that differ by 1.16 or more would be considered significant. As it turns out, the bats hit the Thin wire significantly more often than either the Intermediate or the Thick wires (which don't differ). Thus, it appears that the bats can detect the Thick and Intermediate wires, but cannot detect the Thin wires as easily.

2c. Does it appear that Dr. Alucard realized any advantage from using a repeated measures design in this experiment? Why or why not? [5 pts]

You should note that the SS_{Subj} is quite small (1), so Dr. A will not have removed much in the way of individual differences. As a result, you will likely not have realized much of an advantage from the use of a repeated measures design.

2d. Suppose that Dr. Alucard had decided from the outset to do an independent groups design, rather than a repeated measures design. What would he have done with his 21 bats and what would the degrees of freedom look like in the source table for the ANOVA resulting from such an experiment? [5 pts]

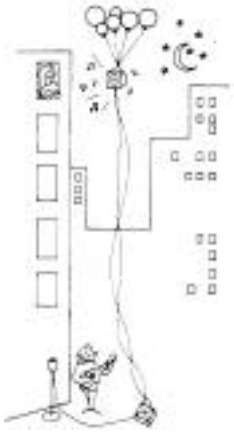
First of all, he would have been able to use all 21 bats. Each of the three conditions would have 7 different bats in it. As a result, the df in the Source Table would look like this:

SOURCE	SS	df
Treatment		**2**
Error		**18**
Total		**20**

3. In the Mook article, he makes a number of claims about the circumstances under which a researcher may not be particularly concerned about external validity. Use *either* the Higgins & Marlatt study (shock and drinking) *or* the Brown & Hanlon (grammar acquisition in children) to illustrate a situation in which a researcher would not necessarily be concerned about external validity. Then, using the Milgram study, illustrate why one might well be concerned about external validity of some studies. [10 pts]

These points should be clear to you, so I won't bother to state them here.

4. In Chapter 8 of your textbook, Ray describes the five conditions found in the Bransford & Johnson (1972) memory study (first mentioned in Chapter 6). These conditions are: Complete-context picture before passage; Complete-context picture after passage; Partial-context picture before passage; Hearing passage once without picture; and Hearing passage twice without picture. Below is the Complete-context picture (as a recall cue for you).



Suppose that the results for this study had turned out as seen below. Complete the source table and then analyze the study as completely as you can. [15 pts]

ANOVA Table for Recall

	DF	Sum of Squares	Mean Square	F-Value	P-Value	Lambda	Power
Condition	4	301.387	75.347	113.344	<.0001	453.375	1.000
Residual	70	46.533	.665				

Means Table for Recall
Effect: Condition

	Count	Mean	Std. Dev.	Std. Err.
Complete-after	15	2.933	.704	.182
Complete-before	15	7.667	1.113	.287
No pic - Hear twice	15	2.400	.737	.190
No pic-Hear once	15	2.267	.704	.182
Partial-before	15	4.133	.743	.192

You'd next need to compute HSD (q = 3.95), so HSD = .83. Thus, any means that differed by .83 or more would be considered significantly different. For this experiment, people in the Complete-Before condition were significantly better than people in the Partial-Before condition, and both were better than those in the Complete-After, No Picture – Once, and No Picture – Twice groups (none of which differed).