

Okay, here's the second installment in the continuing saga of "What have you learned in your statistics course?" You should work quickly and carefully through the questions. Remember to show all your work, otherwise you will not receive partial credit if you make a mathematical error. Try to be as neat as possible. I've indicated the point value of each question, which should give you a clue as to the amount of time I expect that question to take you (1 pt = 1 min).

1. A psychologist is asked by a dog food manufacturer to determine if animals show a preference among three new food mixes recently developed. The psychologist takes a sample of 6 dogs. They are deprived of food overnight and presented simultaneously with three bowls of the mixes on the next morning. After 10 minutes, the bowls are removed, and the amount of food (in ounces) consumed is determined for each type of mix. The data are as follows: [25 points]

	<u>Mix1</u>	<u>Mix2</u>	<u>Mix3</u>	
	3	7	5	
	0	0	1	
	2	2	3	
	1	6	3	
	1	2	1	
	3	5	3	
T =	10	22	16	<u>SUM</u> 48
$X^2 =$	24	118	54	196

What is the independent variable?

What is the dependent variable?

What are the null and alternative hypotheses?

Determine fully and completely what one could conclude from an experiment such as this. In other words, if you were asked to make recommendations about the 3 mixes based on these results, what would you tell the dog food manufacturer?

2. Suppose that in the not-too-distant future you conduct a single factor experiment using a repeated measures design, but you can't remember how to perform a repeated measures ANOVA. All you can remember from your PS217 class is how to conduct an independent groups ANOVA, so you go ahead and analyze the data from the repeated measures design using an independent groups ANOVA. Your analysis is significant (you can reject H_0). Even though you've conducted an inappropriate analysis, would you be inclined to believe the results of your analysis? Why or why not? [5 pts]

3a. Sure, you can tell me the formula for computing the MS_{Between} (i.e., $MS_{\text{Treatment}}$), but what is it *really*? In other words, we know that the MS_{Between} assesses Treatment Effects + Random Effects (+ Individual Differences in an independent groups design). We also know that MS is just another term for a variance. But what is the MS_{Between} estimating? (Be explicit.) [3 pts]

3b. In an independent groups design, what is estimated by MS_{Within} (i.e., MS_{Error})? In other words, we know that the MS_{Within} assesses Random Effects + Individual Differences. We also know that MS is just another term for variance. But what is the MS_{Within} estimating? (Be explicit.) [2 pts]

4. Suppose that you've analyzed an experiment as a repeated measures ANOVA. You've obtained an $F(3,12) = 5$. Your $MS_{\text{Error}} = 1$ and there are 5 scores in each group. Now, however, you find out that you *should have* computed an independent groups ANOVA. Fill in the source table below as it should appear with the appropriate analysis (i.e., assuming that all the scores are the same). [5 pts]

SOURCE	SS	df	MS	F
Between				
Within				
Total	47			

5. In the first problem (dog food mixes), how likely is it that Mix 1 was drawn from a population with $\mu = 2.5$ ounces of food consumed? [10 pts]