ID# _____ The Final Exam PS306, Spring 1998

Good luck on this exam! Once again, you should think of a point as a minute. Don't spend too much or too little time on any one question. It's been a genuine pleasure for me to come to know you. Please have a wonderful summer and return in the fall rejuvenated and ready for another year of education.

Peace,

1. Suppose that you incorrectly computed a repeated-measures ANOVA on data that emerged from an independent groups design. In the space below the StatView source table, show how the source table would change as a result of re-computing the appropriate analysis. What is your best estimate of population variance? [10 pts.]

ANOVA Table for Drug

	DF	Sum of Squares	Mean Square	F-Value	P-Value	Lambda	Power
Subject	9	27.600	3.067				
Category for Drug	3	92.900	30.967	15.895	<.0001	47.686	1.000
Category for Drug * Subject	27	52.600	1.948				

Means Table for Drug
Effect: Category for Drug

	Count	Mean	Std. Dev.	Std. Err.
Drug 1 Drug	10	4.800	2.251	.712
Drug 2 Drug	10	7.300	1.160	.367
Drug 3 Drug	10	3.200	1.033	.327
Drug 4 Drug	10	6.100	1.197	.379

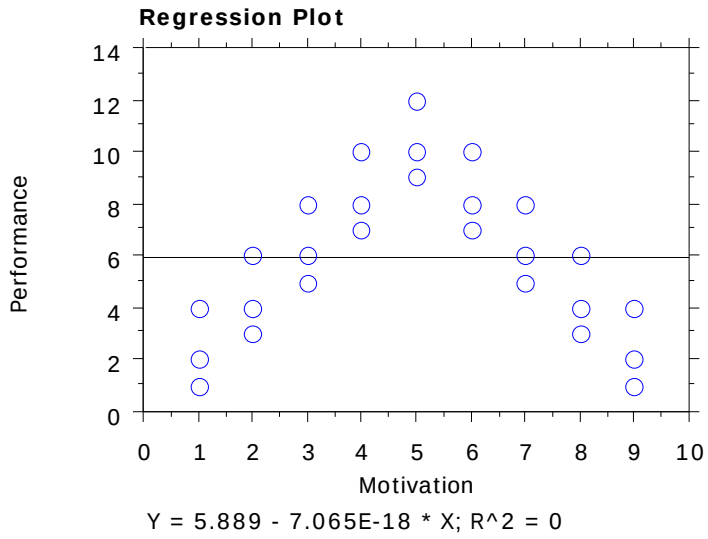
SOURCE	SS	df	MS	F
Treatment	**92.9**	**3**	**30.97**	**13.89**
Error	**80.2**	**36**	**2.23**	
Total				

Your best estimate of σ^2 would be MS_{Error}, which is 2.23.

2. Dr. Upton Reginald Toaste conducted a study to determine the relationship between motivation and performance. He obtained the data seen below (with the accompanying StatView analyses). What kind of relationship should he claim between motivation and performance, based on the analyses? How would *you* approach interpreting this set of data? If someone had motivation of 4, what would you predict for a level of performance? [10 pts]

Regression Summary
Performance vs. Motivation

Count	27
Num. Missing	0
R	0.000
R Squared	0.000
Adjusted R Squared	•
RMS Residual	3.024



ANOVA Table
Performance vs. Motivation

	DF	Sum of Squares	Mean Square	F-Value	P-Value
Regression	1	0.000	0.000	0.000	•
Residual	25	228.667	9.147		
Total	26	228.667			

Regression Coefficients
Performance vs. Motivation

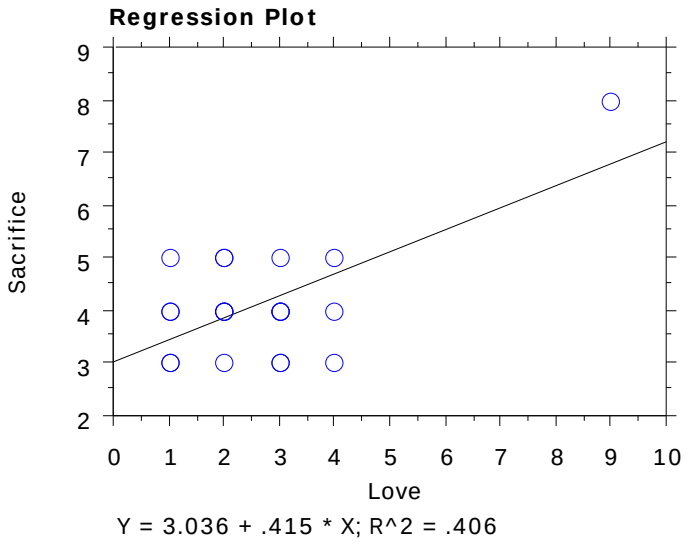
	Coefficient	Std. Error	Std. Coeff.	t-Value	P-Value
Intercept	5.889	1.269	5.889	4.642	<.0001
Motivation	-7.065E-18	.225	-6.268E-18	-3.134E-17	>.9999

With an r = 0 (and p > .05), it should be clear to you that you would have to retain H_0: ρ = 0. At the same time, it should be clear to you that there is a fairly strong relationship exhibited in the data. However, it's a non-linear relationship. Thus, one strategy for analysis might be to split that data and compute two separate analyses: one for Motivation levels below 5 and one for Motivation levels above 5. With a Motivation level of 4, I would use the regression equation for the analysis of Motivation levels below 5 to predict the Performance level. It should be somewhere around 8 (from eyeballing the data).

3. Dr. Lance Alotte was interested in the relationship between depth of love and willingness to make sacrifices for the significant other. (You can safely assume that Dr. Alotte will use reasonable operational definitions of depth of love and willingness to make sacrifices.) He randomly surveys a number of people and obtains the data seen below. Interpret the data as best you can. If a person has a "love" score of 3, what would be your best prediction of that person's willingness to sacrifice? [10 pts.]

Regression Summary
Sacrifice vs. Love

Count	21
Num. Missing	0
R	.637
R Squared	.406
Adjusted R Squared	.375
RMS Residual	.911



ANOVA Table
Sacrifice vs. Love

	DF	Sum of Squares	Mean Square	F-Value	P-Value
Regression	1	10.787	10.787	12.985	.0019
Residual	19	15.784	.831		
Total	20	26.571			

Regression Coefficients
Sacrifice vs. Love

	Coefficient	Std. Error	Std. Coeff.	t-Value	P-Value
Intercept	3.036	.366	3.036	8.300	<.0001
Love	.415	.115	.637	3.603	.0019

The first observation you should make is that one of the data points appears to be an outlier. If the person with the Love score of 9 were to be excluded from the analysis, then there would be no linear relationship between Love and Sacrifice. At the very least, you would need to acknowledge that the outlier is having an influence on the relationship you observe.

If you proceeded with the analysis, you would claim that there is a significant positive linear relationship between Love and Sacrifice ($p < .05$). If a person were to achieve a Love score of 3, you would predict a Sacrifice score of 4.3. If you excluded the outlier and analyzed the data, you would get $r = 0$, so you would not use a regression equation to make predictions. Instead, you would simply guess mean Sacrifice, which is 4.

4. Dr. Luke N. Goode was interested in the extent to which physical attractiveness can influence judgment of other personal characteristics such as intelligence or ability. He selected three groups of participants who were to play the role of a company personnel manager. Each participant was given a stack of job applications, each of which included a photograph of the applicant. One of the applications was selected as the test stimulus. For one group of 15 participants, this application contained a photograph of a very attractive person. For the second group, the photograph was of an average-looking person. For the third group, a photograph of a very unattractive person was attached to the application. The participants were instructed to rate the quality of each job applicant (0 = "very poor" to 10 = "excellent"). Complete the source table seen below and then analyze the data as completely as you can. To complete the source table, you will need to remember that the standard deviation is the square root of the variance. [15 pts.]

ANOVA Table for Rating

	DF	Sum of Squares	Mean Square	F-Value	P-Value	Lambda	Power
Attractiveness	2	204.400	102.200	80.082	<.0001	160.164	1.000
Residual	42	53.600	1.276				

Means Table for Rating
Effect: Attractiveness

	Count	Mean	Std. Dev.	Std. Err.
Average	15	6.733	1.486	.384
Unattractive	15	1.733	.704	.182
Very Attractive	15	5.533	1.060	.274

For this single-factor independent groups ANOVA, the F (80.1) is so large and the P-Value so small ($p < .05$) that you would reject H_0. Thus, you would conclude that the three groups were not all drawn from populations with identical means. However, you don't know which means actually differ without computing the appropriate post-hoc analysis. In this case, HSD = 1.0 (q = 3.43). Thus, Average is rated higher than Very Attractive and Very Unattractive. Very Attractive is rated higher than Very Unattractive.

5. Dr. Julie Ard was interested in the effects of music on studying, using an encoding specificity paradigm. That is, she was interested in the extent to which the similarity of the study and test situations affected performance. To test her hypotheses, she used five acquisition conditions (heavy metal, rock, classical, jazz, and blues). People in these groups studied material while listening to a particular type of music. After a brief delay, half of the people in each condition were tested under identical music (Same) and half of the people were tested with no music (Different). The dependent variable was the percentage score on the test (100 = perfect performance). Complete the analysis and interpret the results below as completely as possible. [20 pts.]

ANOVA Table for Score on Test

	DF	Sum of Squares	Mean Square	F-Value	P-Value	Lambda	Power
Music	4	1872.260	468.065	21.072	<.0001	84.290	1.000
Test Situation	1	823.690	823.690	37.083	<.0001	37.083	1.000
Music * Test Situation	4	150.660	37.665	1.696	.1579	6.783	.493
Residual	90	1999.100	22.212				

Means Table for Score on Test
Effect: Music * Test Situation

	Count	Mean	Std. Dev.	Std. Err.
Blues, Diff	10	76.100	2.470	.781
Blues, Same	10	84.000	9.428	2.981
Classical, Diff	10	79.700	3.466	1.096
Classical, Same	10	84.600	3.893	1.231
Heavy Metal, Diff	10	68.800	6.070	1.919
Heavy Metal, Same	10	75.800	4.940	1.562
Jazz, Diff	10	84.700	2.584	.817
Jazz, Same	10	86.000	2.625	.830
Rock, Diff	10	75.000	2.261	.715
Rock, Same	10	82.600	4.477	1.416

With no significant interaction, I would focus my attention on the main effects, both of which were significant. Because Test Situation has only two levels, no HSD would be necessary. I could readily conclude that Same (M = 82.6) led to better performance than Different (M = 76.9). However, you might notice the confound: In every case, Different was also No Music. Thus, it's not clear if the effect is due to a difference between Encoding and Test, or it's the case that people simply perform worse in Silence.

For the main effect of music, you would obtain HSD = 4.16 (q = 3.95). The 5 means would be 72.3 (HM), 78.8 (R), 80.1 (B), 82.2 (C), and 85.4 (J). Thus, Jazz leads to better performance than Blues, Rock, and Heavy Metal, but it's equivalent to Classical. Classical leads to better performance than Heavy Metal, but it's equivalent to Blues and Rock. Blues leads to better performance than Heavy Metal, but it's equivalent to Rock. Finally, Rock leads to better performance than Heavy Metal.

6. Ethical considerations arise in at least three areas of psychological research. First, in the research design, which may involve unethical treatment of human participants. Second, in the wholesale fabrication of data. Third, in the determination of authorship on a publication that arises out of the research. Using all of the information at your disposal (notes on articles, recollection of classroom discussions, information in your textbook), craft an essay that outlines the sorts of concerns that face psychologists and the sorts of safeguards that have been introduced. Make your essay as concrete as possible, using specific examples from the sources at your disposal. [25 pts.]

The better answers to this question incorporated a range of specific examples from classroom discussions, textbook material, and information from the articles that were read that semester (including Ross, et al. and Fine & Kurdek). The use of compelling evidence and careful integration of the material led to better essays.

7. Define a demand characteristic and give a specific example to illustrate your definition. [5 pts.]

According to Ray, "Demand characteristics occur when a participant's response is influenced more by the research setting than by the independent variable." (p. 234) Ray goes on to discuss a couple of studies by Orne, either of which would serve to illustrate the operation of demand characteristics.

8. Briefly describe two studies that illustrate the principle of experimenter expectancy effects. [5 pts.]

To answer this question, any of the Rosenthal studies discussed in class would be appropriate.

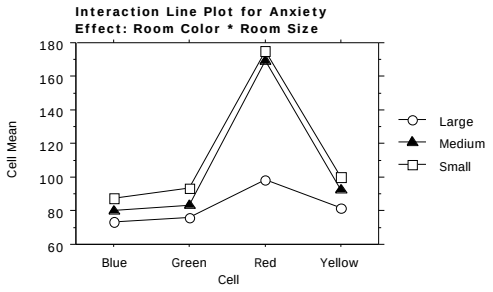
9. In an experiment to assess the impact of room size and room color on anxiety, Dr. Bambi Thumper randomly assigned people to one of 12 rooms that varied in room color (red, yellow, green, blue) and room size (small, medium, large). Everyone was led to believe that after waiting in the room for 15 minutes, they would be participating in an experiment involving shock (but no permanent tissue damage). As a result, everyone had to fill out a number of release forms prior to participating. Analyze the data below as completely as possible. [25 pts.]

ANOVA Table for Anxiety

	DF	Sum of Squares	Mean Square	F-Value	P-Value	Lambda	Power
Room Size	2	6535.056	3267.528	353.246	<.0001	706.492	1.000
Room Color	3	26642.750	8880.917	960.099	<.0001	2880.297	1.000
Room Size * Room Color	6	5623.833	937.306	101.330	<.0001	607.982	1.000
Residual	24	222.000	9.250				

Means Table for Anxiety
Effect: Room Size * Room Color

	Count	Mean	Std. Dev.	Std. Err.
Large, Blue	3	73.333	1.528	.882
Large, Green	3	75.667	2.082	1.202
Large, Red	3	98.333	1.528	.882
Large, Yellow	3	81.667	1.528	.882
Medium, Blue	3	80.333	1.528	.882
Medium, Green	3	83.667	5.033	2.906
Medium, Red	3	169.000	3.606	2.082
Medium, Yellow	3	92.333	2.517	1.453
Small, Blue	3	87.667	2.517	1.453
Small, Green	3	93.000	4.359	2.517
Small, Red	3	175.000	5.000	2.887
Small, Yellow	3	99.667	1.528	.882



Because the interaction is significant, that's where I would focus my attention. I would first draw a graph of the means to see what led to the interaction. It appears that Red led to greater anxiety in Small and Medium rooms than in Large rooms, but the other colors showed similar effects regardless of room size. To see if my interpretation would be upheld by statistical analysis, I would compute HSD = 8.96 (q = 5.1). For Blue and Green, Small led to greater anxiety than Medium or Large rooms, neither of which differed. However, for Yellow and Red, Small and Medium rooms did not differ, but both led to greater anxiety than Large rooms. Thus, the effects of color were not the same at all levels of room size.