

As always, the Skidmore Honor Code is in effect. At the end of the exam, I have a sheet on which you will attest to your adherence to the Honor Code. Read each question carefully and answer completely, showing all your work. Good Luck!

1. Suppose that you are interested in whether the type of mood reflected by a word (happy, neutral, or sad) affects how well the word is remembered. You construct a list of 10 happy words (e.g., joyful, bright), 10 neutral words (e.g., derive, convey), and 10 sad words (e.g., gloomy, lonely). You present the list repeatedly to 8 participants until they can recite the entire list correctly twice in a row. You repeat this procedure for each word list, for a total of 24 participants. One week later, each participant attempts to recall the entire list. The number of items correctly recalled (the DV) is seen below as a function of the type of word (the IV). Analyze the results of this experiment as completely as possible, including whatever interpretation seems appropriate. [20 pts]

	Happy	Neutral	Sad	
	5	4	3	
	6	3	4	
	4	5	2	
	5	3	1	
	3	1	2	
	6	3	4	
	2	2	3	
	5	3	1	
T (ΣX)	36	24	20	G = 80
Mean	4.5	3.0	2.5	$\Sigma X^2 = 318$
SS	14	10	10	

Source	SS	df	MS	F

2. Suppose that you were interested in computing an ANOVA on 3 sets of data from 30 different people, for which summary statistics are shown below. [5 pts]

	Condition 1	Condition 2	Condition 3
Mean	15	20	40
Variance (s^2)	5	15	70
n	10	10	10

- What parameter is MS_{Within} intended to estimate?
- In the ANOVA computed on the data above, what would MS_{Within} be?
- What F_{Crit} would you use to evaluate the F_{Obt} for the overall ANOVA?
- If the three means had been *identical* (e.g., 15, 15, 15), what would F_{Obt} be?
- If the same study were conducted as a repeated measures design, how many total participants would you need to produce at least as many pieces of data (i.e., at least 30) as seen above?

3. People like Jacob Cohen suggest that we should conduct experiments with power of at least .80. What level of Type II error are they willing to tolerate? [2 pts]

4. Briefly explain why it is essential to develop an error term (MS_{Error}) for the repeated measures design that includes only variability due to random factors? (In other words, what's going on in the MS_{Between} ?) [5 pts]

5. In the repeated measures lab, we never got around to computing the final repeated measures ANOVA. (You may have done so on your own.) Below is a SPSS analysis of the data from the lab. As you may recall, the lab dealt with the notion of bats flying through a maze comprised of wires of varying thickness (Thin, Medium, Thick). We first considered an analysis of an independent groups design, and then the repeated measures design. Analyze and interpret the results below as completely as you can. [13 pts]

Descriptive Statistics

	Mean	Std. Deviation	N
Thin	3.0556	1.21133	18
Medium	1.6111	.97853	18
Thick	.2778	.46089	18

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power ^a
Wire Sphericity Assumed	69.0				.000	.808	143.013	1.000
Error(Wire) Sphericity Assumed	16.5							

a. Computed using alpha = .05

6. Dr. Thomas Tomm is interested in the impact of distraction on driving ability. To that end, he has people drive a car on a closed course. The independent variable is the type of distraction (carrying on a cell-phone conversation, sending a text message, or eating a slice of pizza). Each of the twelve participants first drives the course in the cell-phone condition, then in the text-message condition, and finally in the pizza condition. The dependent variable is the number of times the driver strays from the course. Interpret these data as completely as you can, telling Dr. Tomm what he should do next. [10 pts]

Descriptive Statistics

	Mean	Std. Deviation	N
cellphone	13.3333	1.49747	12
textmsg	13.4167	1.16450	12
pizza	13.0000	1.20605	12

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power ^a
distractor	Sphericity Assumed	1.167	2	.583	.562	.578	.049	1.124	.131
	Greenhouse-Geisser	1.167	1.777	.656	.562	.559	.049	.999	.126
	Huynh-Feldt	1.167	2.000	.583	.562	.578	.049	1.124	.131
	Lower-bound	1.167	1.000	1.167	.562	.469	.049	.562	.105
Error(distractor)	Sphericity Assumed	22.833	22	1.038					
	Greenhouse-Geisser	22.833	19.549	1.168					
	Huynh-Feldt	22.833	22.000	1.038					
	Lower-bound	22.833	11.000	2.076					

a. Computed using alpha = .05