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Exam 2

PS 217, Spring 2004

As always, the Skidmore Honor Code is in effect, so keep your eyes glued to your own exam. Read each question carefully and answer it completely, showing all your work. The point value of each question is intended as a guide to the time you should spend on your answer, so think of each point as indicating one minute of answer (a 10-pt question should take you 10 minutes to answer). Good Luck!

1a. In each of the chapters we've covered for this exam, there has been some discussion of effect size. First of all, tell me how you would measure effect size (i.e., tell me the statistic you would use). Then, tell me how effect size and power are related. [3 pts]

1b. If researchers work to achieve a level of power of .80, what does that say about their tolerance for Type II Error relative to Type I Error, given the usual  $\alpha$ -level used in research? [2 pts]

2. Pelton (1983) reported that Olympic-level marksmen shoot much better if they fire between heartbeats rather than squeezing the trigger during a heartbeat. The small vibration caused by a heartbeat seems to affect the marksmen's aim. Suppose that Pelton had obtained the following hypothetical data from a sample of  $n = 6$  Olympic marksmen. The dependent variable is an accuracy score (larger scores are better). Do these data indicate a significant difference? [15 pts]

	During Heartbeats	Between Heartbeats	
	93	98	
	90	94	
	95	96	
	92	91	
	95	97	
	91	97	
( $\Sigma X$ ) or T	556	573	1129
$\Sigma X^2$	51544	54755	106299
SS	21.33	33.5	

3. A scientist tests two drugs for their effects on insomnia. A sample of insomniacs is pre-tested 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 (Drug A) before bedtime, and the time that lapses between drug administration and sleep onset is measured again. Finally, a week later the second drug (Drug B) is tested in the same fashion. The latency to sleep onset in minutes is measured for each participant on every test. Complete the StatView output for this study and then interpret the results as completely as you can. [15 pts]

**ANOVA Table for Drug**

	DF	Sum of Squares	Mean Square	F-Value	P-Value	Lambda	Power
Subject			2458.8				
Category for Drug				49.00	<.0001	98.001	1.000
Category for Drug * Subject			412.4				

**Means Table for Drug**

Effect: Category for Drug

	Count	Mean	Std. Dev.	Std. Err.
Placebo	11	219.091	39.104	11.790
Drug A	11	164.545	31.738	9.569
Drug B	11	134.545	27.336	8.242

4. A psychologist would like to examine the relative effectiveness of three therapy techniques for treating mild phobias. A group of 15 individuals who display a moderate fear of spiders is obtained. These individuals are randomly assigned to each of the three therapies with  $n = 5$ . The dependent variable is a measure of the reported fear of spiders, with higher numbers indicating greater fear. Analyze these data as completely as you can. [20 pts]

	Therapy A	Therapy B	Therapy C	
	8	3	1	
	5	3	0	
	5	0	1	
	7	2	2	
	5	2	1	
( $\Sigma X$ ) or T	30	10	5	45
$\Sigma X^2$	188	26	7	221
SS	8	6	2	