

Lab activity for P554 Statistics

Name: _____

Data from Chapter 10, Exercise 7. Method ("method") is a fixed factor, therapist ("therap") is a random factor. Here's output from SPSS:

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```
ratings BY method therap          /* notice this is specified as fixed effects */
/METHOD = SSTYPE(3)
/INTERCEPT = INCLUDE
/CRITERIA = ALPHA(.05)
/TEST method vs method*therap    /* notice extra test with interaction error term */
/DESIGN = method therap method*therap .
```

Dependent Variable: ratings

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	230.000(a)	8	28.750	3.275	.007
Intercept	79380.000	1	79380.000	9043.291	.000
method	120.000	2	60.000	6.835	.003
therap	43.333	2	21.667	2.468	.099
method * therap	66.667	4	16.667	1.899	.132
Error	316.000	36	8.778		
Total	79926.000	45			
Corrected Total	546.000	44			

a R Squared = .421 (Adjusted R Squared = .293)

Dependent Variable: ratings

Source	Sum of Squares	Df	Mean Square	F	Sig.
Contrast	120.000	2	60.000	3.600	.128
Error(a)	66.667	4	16.667		

a method * therap

1. Estimate the power of the test of method. (See top of p. 493 and Eqn. 21 on p. 487; also last slide of lecture.) Show your work and indicate where the values come from.

est ϕ =

df_{num} =

df_{denom} =

approx. power =

2a. How many total subjects are used in the current design?

2b. Suppose that there were 5 therapists and 3 subjects per therapist. How many total subjects would there be in the design?

2c. Using the MS terms from the current design, estimate the power of the test of method if there were 5 therapists and 3 subjects per therapist. Show your work.

$$\text{est } \phi =$$

$$\text{df}_{\text{num}} =$$

$$\text{df}_{\text{denom}} =$$

$$\text{approx. power} =$$

3a. Estimate the power for 3 therapists and 9 subjects per therapist.

$$\text{est } \phi =$$

$$\text{df}_{\text{num}} =$$

$$\text{df}_{\text{denom}} =$$

$$\text{approx. power} =$$

3b. Estimate the power for 9 therapists and 3 subjects per therapist.

$$\text{est } \phi =$$

$$\text{df}_{\text{num}} =$$

$$\text{df}_{\text{denom}} =$$

$$\text{approx. power} =$$

4. Starting with the formula for estimated phi at the top of p. 493, plug in the expressions from Equation 21 on p. 487 and simplify (i.e., cancel out as many terms as possible). Does estimated phi depend on n (number of subjects per cell)? Does estimated phi depend on b (number of levels of the random factor)? So how do n or b have any influence on the estimated power?