1. Explain each of the following:

95% confidence intervals—

Power--

Significance level—

Effect size—

2. For each of the following, give conventional levels in psychology and their relation to sample size (e.g., as sample size increases, what happens to power?):

|  |  |  |
| --- | --- | --- |
|  | Conventions | Relation to n |
| Power |  |  |
| Significance level |  |  |
| Effect size |  |  |

3. Compute the sample size you would need for a correlational study when your estimated effect size is .30 by Cohen’s tables and by G\*Power with alpha = .05 (2-tailed) and power of .95. What if you only had power of .80?

|  |  |  |
| --- | --- | --- |
|  | Cohen’s tables | G\*Power |
| Power = .80 |  |  |
| Power =.95 |  |  |

b) Which option did you use on G\*Power?

c) What sample size would you need to estimate the correlation with +/- .25 confidence intervals?

4. Compute the total sample size for a study comparing gender (m/f) differences in analytical ability for a small effect, with alpha = .05 (2-tailed) and power of .90 using Cohen’s tables and G\*Power.

|  |  |
| --- | --- |
| Cohen’s table |  |
| G\*Power |  |

b) Which option did you use on G\*Power?

5. Calculate the total sample size needed (per G\*Power) for a 2 x 2 x 2 anova where you are most interested in the 3-way interaction effect. Alpha - .05 (2-tailed), power = .90, small effect.

b) Which option did you use on G\*Power?

6. Compute the total sample size needed (per G\*Power and per Cohen’s tables) if you’re interested in whether you’re able to significantly predict depression scores using the predictors of social support from family, social support from friends, cortisol levels, gender (M/F), and stress scores. Small effect size, power of .80, alpha = .05 (2-tailed)

|  |  |
| --- | --- |
| Cohen’s table |  |
| G\*Power |  |

b) Which option did you use on G\*Power?

7. Compute the total sample size needed (per G\*Power) to test the hypothesis that people will report fewer symptoms of depression after one week of individual CBT than after one week of group psychotherapy or one week of being on a wait list (between participants design). You’ve determined that you need an effect size of at least 2=.10. Use alpha of .05 (2-tailed) and report for .80 .90, and .95 power.

|  |  |
| --- | --- |
| .80 |  |
| .90 |  |
| .95 |  |

 b) Which option did you use on G\*Power?

8. How does doing more than 1 statistical test affect power? Which should you use for your power analysis and what should you report?

9. Pick one of the estimates above and show how you would report about it in a manuscript.

10. List the types of designs you can do power analyses for using each of the following R packages:

a) pwr

b) pwr2ppl

c) ANOVApower

11. Write a **testable** hypothesis you might use in your thesis or research paper (for this exercise, choose a t-test, anova, correlational, or regression hypothesis—not a mediational one).

12. What type of statistical analysis would you do to test this hypothesis?

13. Explain how (specifically for your study) you could estimate the effect size you’d expect based on previous research along with potential issues with that estimate.

14. Describe how you’d estimate the smallest practical effect size you’d expect.

15. List at least 3 specific ways you could increase power in your test of this hypothesis (not including increasing sample size)