

WEB PAGE FOR CHAPTER 11

QUESTIONS AND PROBLEMS

- 1 Briefly explain why protecting against one type of error increases the chance of making the other.
- 2 What is the effect of each of the following on the power of a study?
 - (a) a larger predicted difference between the means of the populations
 - (b) a larger population standard deviation
 - (c) a larger sample size
 - (d) using a more stringent significance level
 - (e) using a two-tailed instead of a one-tailed test.
- 3 You read a study in which the result is just barely significant at the .05 level. You then look at the size of the sample. If the sample is very large (rather than very small), how should this affect your interpretation of (a) the probability that the null hypothesis is actually true, and (b) the practical importance of the result?
- 4 As the power of a test increases, what happens to the probability of a Type II error?
- 5 If an investigator uses $\alpha = 1\%$ rather than 5%, will power increase?
- 6 An investigator normally uses an alpha level of .01 but this time uses .05. What does this change in alpha level do to the amount of power and to the risk of a Type I error?
- 7 An investigator wants a statistical test to be powerful yet would also like to avoid a Type I error. Which of the following approaches would best achieve his goals?
 - (a) increase the alpha level say from .05 to .10
 - (b) increase the sample size but keep alpha small
 - (c) use a one-tailed test
 - (d) use a two-tailed test

ANSWERS TO QUESTION IN TEXT

Qu. 11.3 (a) $d = .87$ is a strong effect; $d = .18$ is a small effect

(b) $d = 1.5$ is a very strong effect

ANSWERS TO WEB PAGE QUESTIONS

- 1 By decreasing the significance level from $p = .05$ to $p = .01$ we decrease the chance of a Type I error, i.e. rejecting the null when it is true but increase the possibility of making a Type II error, i.e. retaining the null when it should be rejected.
- 2 (a) Increases power; (b) decreases power; (c) increases power;
(d) decreases power; (e) decreases power
- 3 (a) Not affected. (That is what the significance level tests.)
(b) Probably of small importance (due to small effect size).
- 4 Probability of Type II error decreases.

- 5 No.
- 6 Moving from .01 to .05 increases power but also an increased risk of a Type I error.
- 7 (a) = increase risk of Type I error; (b) = reduces risk of Type I error and small alpha retains power;
(c) = will increase power using a one-tailed test but increases Type I error risk.