Lesson 10: Statistical Inferences About Two Populations

References

- Black, Chapter 10 Statistical Inferences About Two Populations (pp. 316-358)
- Kabakoff, Chapter 7 Basic Statistics (pp. 158-160)
- Davies, Chapter 18 Hypothesis Testing (pp. 384-433)
- Stowell, Chapter 6 Tabular Data (pp. 73-86), Chapter 10 Hypothesis Testing (pp. 144-146, 158)

Exercises:

1) A double-blind clinical trial of a new drug for back pain was designed using control and treatment groups. Volunteers were fully informed and assigned at random to each group. Neither the volunteers nor the doctor knew when the new drug or a placebo was being administered. When 100 volunteers in each group had been treated and evaluated, the results revealed an 85% success rate for the new drug and a 65% success rate for the control group. At the 95% confidence level, is there a statistically significant difference between the two reported rates? Use a one-sided test. Also, report a confidence interval for the difference.

2) Two baseball players had their career records compared. In 267 times at bat, one player hit 85 home runs. In 248 times at bat, the other player hit 89 home runs. Assume the number of home runs follows a binomial distribution, is there a statistically significant difference with 95% confidence between the home run averages for these two baseball players?

3) Using the home_prices.csv data (described in Lesson 1), compare mean selling prices between homes located in the northeast sector of the city versus the remaining homes. Also, compare the mean selling prices between homes with a corner lot and those located elsewhere. Use two-sample t-tests for the hypothesis tests at the 95% confidence level. Report confidence intervals for each.

4) The nsalary.csv data are derived from data collected by the Department of Social Services of the State of New Mexico. The data have been adapted for this problem. Using these data compare mean salary levels between RURAL and non-RURAL locations. Use a two-sample t-test at the 95% confidence level. Report your results.

5) tires.csv contains data published by R.D. Stichler, G.G. Richey, and J. Mandel, "Measurement of Treadware of Commercial Tires, Rubber Age, 73:2 (May 1953). Treadwear measures of tires each tire was subject to measurement by two methods, the first based on weight loss and the second based on groove wear. Use a paired t-test at the 95% confidence level to test for a difference between the two methods. Report your results using a confidence interval.