Finish Reading Chapter 11, not including the section on The Bootstrap, if you have not already done so.

Complete Exercises 11.37 through 11.43.

**Hand in Exercises 11.42 and 11.43**

Read Chapter 13, up to the section on Post-Hoc Tests (and not including the discussion on the bootstrap).

Complete Exercises 13.1 (a through i), 13.2 (a through e).

**Hand in Exercise 13.1 (a through i), 13.2 (a through e).**

11.42

ttest Before == After //11.42

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The result of paired sample t-test indicates that there’s no statistically significant difference (t(11)=1.2357, p>0.05) between the score of patients’ mental alertness before and after they reserve the drug.

11.43

ttest score, by(group) //11.43

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The result of independent score t-test demonstrates that there’s a statistically significant difference between the score of one-year old and two-year old group (t(14)=-2.2692, p=0.0396<0.05).

13.1(a)

Because the variable of hsprog has four different groups. One-way ANOVA is suitable for testing the equality among two or more populations means using independent groups while controlling the family-wise Type I error rate at the chosen level alpha regardless of the number of groups in the design.

13.1(b)

graph box achmat08, over (hsprog)



Based on the boxplots, the normality assumption seems tenable since all distributions are approximately symmetric. The homogeneity of variance is also tenable because the interquartile rangers have a similar distribution. The results of one-way ANOVA may have a similar trend with medians of these groups. The median of the rigorous academic group is the highest, followed by the academic group. The Some vocational group and other groups are at the lower end, and their medians are identically the same.

13.1(c)

by hsprog, sort: sum achmat08

The results indicate that not all groups have a population larger than 30, so normality test is required.

summskew achmat08, by (hsprog)

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Figure

Based on the results of Figure 1, the skewness scores of all groups are lower than 1, so we can conclude that the normality assumption is tenable.

13.1(d)

Levene’s test is needed for testing the tenability of the homogeneity of variance assumption because numbers of samples in these four groups are not equal.

robvar achmat08, by (hsprog)

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W0=0.78042667, df(3, 496), Pr > F = 0.50525687 (>0.05), so the homogeneity of variance assumption is robust.

13.1(e)

H0: the population mean of these groups are identical.

H1: at least two of these groups have different population mean.

13.1(f)

oneway achmat08 hsprog, tabulate //13.1(f)

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Figure

From the output of Figure 2, we can know that p<0.01

13.1(g) Since p < 0.01, the null hypothesis should be rejected.

13.1(h) F(3,496) = 8.23, p<0.01. The results of one-way ANOVA suggest that students’ math achievements on their 8th grade have a statistically significant difference caused by different types of high school they were enrolled in.

13.1(i) R^2 = SSb/SSt = 2065/43527 = 0.047. Based on Cohen’s rule, it’s a small effect size, which means 4.7% of Eight grade math achievement can be explained by different types of high school.

13.2(a)

Because the variable of urban has three different groups. One-way ANOVA is suitable for test the equality among two or more population means using independent groups while controlling the family-wise Type I error rate at the chosen level alpha regardless of the number of groups in the design.

13.2(b)

by urban, sort: sum slfcnc08

summskew slfcnc08, by (urban)

All 3 sub-groups have a sample size larger than 30, so the normality assumption seems tenable.



Figure

Based on the boxplots (See Figure 3), the homogeneity of variance is tenable because the interquartile rangers have a similar distribution. The results of one-way ANOVA may have a similar trend with medians of these groups. The Median of the Urban group are the highest, followed by Suburban group and Rural group.

13.2(c) The Urban group has 123 samples, the Suburban group has 215 samples, the Rural group has 162 samples, all of these sub-groups have large sample sizes, so the tenability of the normality of variance assumption is robust. The result of Levene’s test (W0=0.45166995, df(2, 497), Pr > F = 0.63682526) indicates that the homogeneity of variance assumption is tenable.

robvar slfcnc08, over(urban)

13.2(d)

oneway slfcnc08 urban, tabulate

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Figure

Based on the results in Figure 4, F(2,497) = 3.79, p < 0.05, so students’ scores on 8th-grade self-concept have statistically significant differences between different areas they live.

13.2(e) R^2 = 267.06/17791 = 0.015, according to Cohen’s rule, the variable of urbanicity has a small effect size on students’ 8th grade self-concept. Only 1.5% of the score of 8th grade self-concept can be explained by where students originally come from.