SPSS Examples

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Descriptive Statistics

Lets examine fatal accidents per state in 2005.

1. Open States.sav using File → Open → Data.
2. Then Analyze → Descriptive Statistics → Explore.
3. Select "Number of fatalities in accidents in 2005 (accfat2005)" in put in "Dependent List".
4. Under Plots, include histogram. Continue
5. Click "OK".

One–Sample t–Test and Confidence Intervals

Does 20.5% of the average American male consist of bodyfat? I.e:

$$H_0 : \mu = 20.5 \qquad \text{versus} \qquad H_1 : \mu \neq 20.5.$$

1. File → Open → Data and then open "Bodyfat.sav".
2. Then Analyze → Compare Means → One-Sample T-Test.

3. Select % body fat (fatperc).
4. Enter 20.5 as "Test Value".
5. Enter "OK".

Notice one can get different confidence intervals under options (a 95% confidence interval automatically given).

Two–Sample t–Test and Confidence Intervals

Do males and females have the same heart rates?

$$H_0 : \mu_M = \mu_F \qquad \text{versus} \qquad H_1 : \mu_M \neq \mu_F.$$

1. File → Open → Data and then open "BP.sav".
2. Then Analyze → Compare Means → Independent–Samples T-Test.
3. Select "heartrate cold pressor [hrcp]" and enter it in "Test Variable(s)".
4. Select "subject sex [sex]" and enter it in "Grouping Variable".
5. Select "Define Groups" and enter "0" for "Group 1" and "1" for "Group 2".
6. Enter "continue".
7. Enter "OK".

Notice one can get different confidence intervals under options (a 95% confidence interval automatically given).

If one was testing $H_1 : {}_M > {}_F$, the correct p–value would be $0.02/2 = 0.01$ since the sample mean for females is greater than the sample mean for males. If one was testing $H_1 : {}_M < {}_F$, the correct p–value would be $1 - 0.02/2 = 0.99$.

Matched Pairs and Confidence Intervals

We want to compare to see if difference in times between a swimmer's first and second trails don't diminish or not. In other words

$$H_0 : \mu_D \leq 0 \qquad \text{versus} \qquad H_1 : \mu_D > 0.$$

1. Open file "Swimmer2.sav".
2. Analyze → Compare Means → Paired-Sample Test.
3. Choose "100 Freestyle 1" and "100 Freestyle 2".
4. Click "OK".

Notice one can get different confidence intervals under options (a 95% confidence interval automatically given).

Scatterplots

1. Open "Student.sav".
2. Go to Graphs → Chart Builder.
3. Drag first scatterplot icon to preview area and put "weight" as y and "height" as$x$.
4. Press "OK".
5. Now do over again, but use second scatterplot icon with color.
6. Use the classification "gender".
7. Press "OK".

Regression

1. Open "Student.sav".
2. Do Analyze → Regression → Linear.

3. Enter "weight" as the dependent variable and "height" as the independent variable.

4. Press "OK".

The tests are for $H_0 : \beta_j = 0$ versus $H_1 : \beta_j \neq 0$ for $j = 0, 1$. You can chose Plots before pressing OK and ask for "Normal Probability Plot" to check the normality of the residuals. The actually see a scatterplot with the regression line, create the scatterplot and double click on it. You can now find the regression line icon above (or go to Elements $->$ "Fit Line at Total".

Multiple Regression

1. Open "Student.sav".

2. Analyze $\rightarrow$ Regression $\rightarrow$ Linear

3. Enter "weight" as the dependent variable and "height" and "GPA" as the independent variables.

4. Hit "OK"

. The tests are for $H_0 : \beta_j = 0$ versus $H_1 : \beta_j \neq 0$ for $j = 0, 1, 2$. You can chose Plots before pressing OK and ask for "Normal Probability Plot" to check the normality of the residuals.

Correlation

1. Open "Student.sav".

2. Do Analyze $\rightarrow$ Correlate $\rightarrow$ Bivariate.

3. Enter "height" and "weight".

4. Press "OK".

Notice the hypothesis test is $H_0 : r = 0$ versus $H_1 : r \neq 0$. One can do one sided tests too.

Goodness of Fit Test

1. File → New → Data.
2. Go to variable view.
3. Name first variable "PChar" and make "Measure" Nominal. Enter the following values

Value	Label
1	SYellow
2	SGreen
3	WYellow
4	WGreen

4. Name second variable "Freq".
5. Return to data view.
6. Enter

PChar	Freq
1	315
2	108
3	102
4	31

7. Do Data → Weight Classes and click "Weight cases by" and chose "Freq".
8. Do Analysis → Nonparametric Tests → Legacy Dialogs → Chi–Squared.
9. Chose "PChar" as Test Variable and enter values 0.5625, 0.1875, 0.1875 and 0.0625.
10. Click "OK"

Chi–Squared Test for Independence

1. Open “Student.sav”.
2. Analyze → Descriptive Statistics → Crosstabs.
3. Select “How do you rate your driving” for Row and “Gender” for Column.
4. Click on Statistics and chose Chi–Squared.
5. Click “continue” to leave Statistics.
6. Click “OK”.

Fisher’s Exact Test

1. Open “Student.sav”.
2. Do Analyze → Descriptive Statistics → Crosstabs
3. Select “owncar” for Row and “res: for Column.
4. Click on “Statistics” and choose “Chi–Square” and continue.
5. Click on “Cells” and add “Expected” and continue.
6. Click OK.

One–Way ANOVA and Bonferroni Multiple Comparison Test

1. Open “Student.sav”.
2. Do Graphs → Chart Builder.
3. Choose “Boxplot” and drag first (simple) boxplot to preview area.
4. Drag “GPA” to y–axis and “WorkCat” to x–axis.
5. Click “OK”.
6. Now Analyze → Compare Means → One–Way ANOVA.
7. Add “GPA” to dependent list and the Factor is “WorkCat”.

8. Click on “Options” and select “Descriptive” and Click “Continue”
9. Click on “Post–Hoc” and select “Bonferroni” and continue.
10. Click on “OK”.

Two–Way ANOVA

1. Open “BP.sav”.
2. Now Analyze → General Linear Model → Univariate. Linear Models.
3. Add “systolic bp mental arithmetic [sbpma]” to “Dependent Variable”.
4. Add “sex” and “parental hypertension [PH]” to “Fixed Factors”.
5. Select “Options”, click “Statistics” and “Homogeneity tests”.
6. ”Click “Continue”
7. Click on “OK”.