HSCC 470
Research Methods and Data Analysis in Health Sciences

Using SPSS: ANOVA

Unit Objectives

Upon completion of this unit, the student will be able to:

- List the assumptions of the analysis of variance (ANOVA) test.
- Describe when the ANOVA test is appropriate for testing a hypothesis.
- Use SPSS to conduct an ANOVA test and correctly interpret the output.

Statistical Methods to Test Hypotheses

Scale of Measurement	Two Treatment Groups Consisting of Different Individuals	Three or More Treatment Groups Consisting of Different Individuals	Before and After a Single Treatment in the Same Individuals	Association Between Two Variables
Interval	Unpaired *t* test	ANOVA	Paired *t* test	Linear Regression and Pearson Correlation
Nominal	Chi-square	Chi-square	McNemar's test	Contingency Coefficients
Ordinal	Mann-Whitney rank-sum test	Kruskal-Wallis statistic	Wilcoxon signed-rank test	Spearman Rank Correlation

Assumptions of the ANOVA Test

- **Continuous data**
- **Data measured on an interval or ratio level**
- **3 or more groups are being compared**
- **The groups are independent**
- **Data drawn from a normally distributed population**
- **Comparing means**

Conducting an ANOVA Test Using SPSS

- **Assumptions**
  - Scale of measurement
    - Continuous data measured on an interval scale
  - Population distribution
    - **Kolmogorov-Smirnov Test – $p > 0.05$**
  - Method of sampling
    - Randomized, 3 or more independent samples
  - Sample size
    - Control N = 50
    - Experimental$_1$ N = 50
    - Experimental$_2$ N = 50

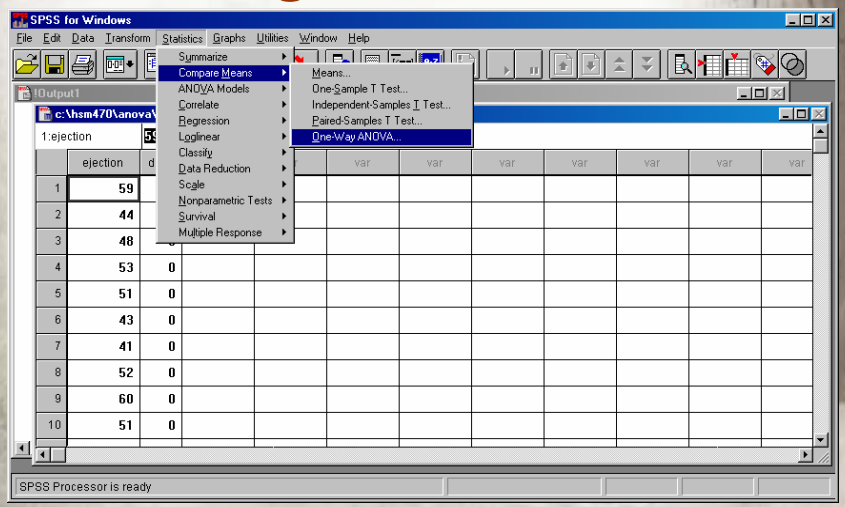
Conducting an ANOVA Test Using SPSS continued

- **Hypotheses**
  - Null
    - There is no difference in the ejection fraction of MI patients 3 weeks post-MI who receive TPA, Streptokinase, or a placebo.
  - Alternative
    - There is a difference in the ejection fraction of MI patients 3 weeks post-MI who receive TPA, Streptokinase, or a placebo.
- **Select Alpha Level**
  - Alpha = 0.05
- **Test statistic**
  - ANOVA

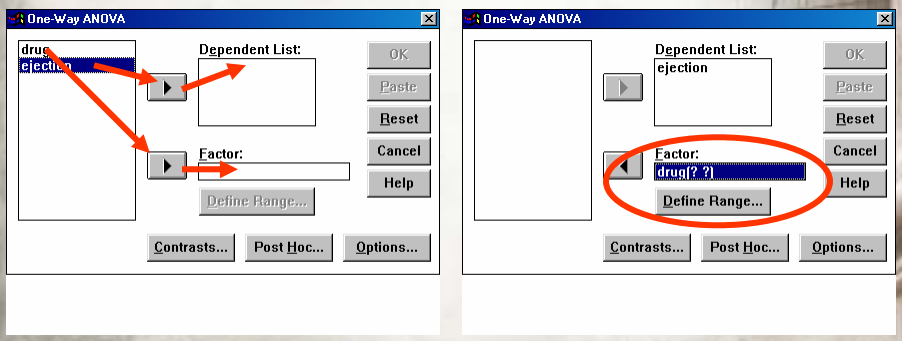
Conducting an ANOVA Test Using SPSS continued

- *P*-value
- Conclusion

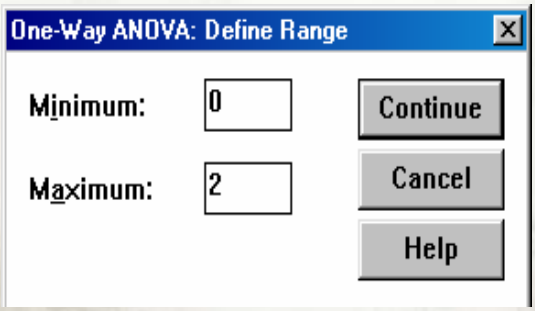
Conducting an ANOVA Test Using SPSS continued



Conducting an ANOVA Test Using SPSS continued

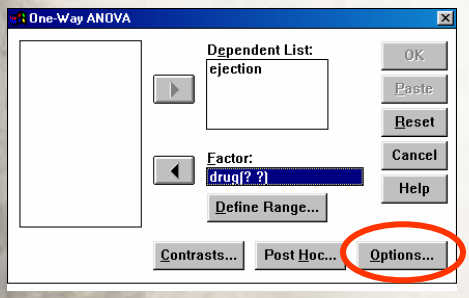


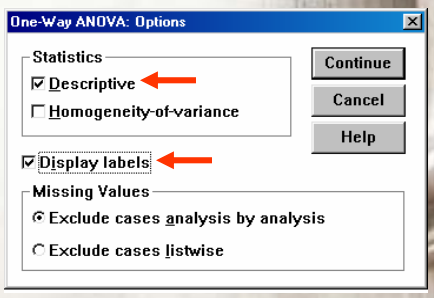
Conducting an ANOVA Test Using SPSS continued



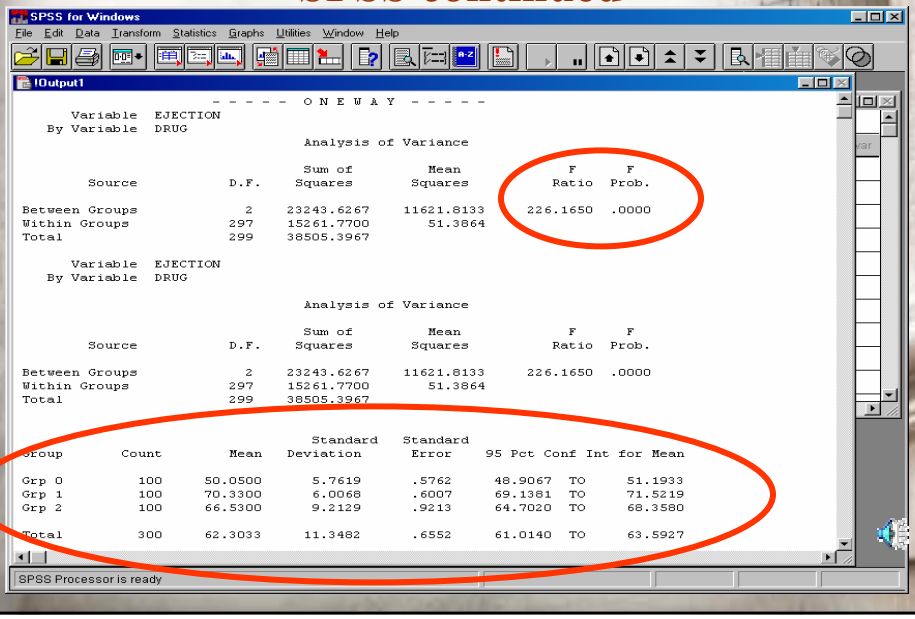
- **Placebo Group = 0**
- **TPA Group = 1**
- **Streptokinase Group = 2**

Conducting an ANOVA Test Using SPSS continued





Conducting an ANOVA Test Using SPSS continued



Conducting an ANOVA Test Using SPSS continued

- ***P*-value**
  - ***P*** = 0.000
- **Conclusion**
  - ***P*** value is less than alpha. Therefore, we reject the null hypothesis and conclude that there is a difference in ejection fraction between the 3 treatment groups.