HSCC 470
Research Methods and Data Analysis in Health Sciences

Using SPSS: The Unpaired *t* Test

Unit Objectives

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

- List the assumptions of the unpaired ***t*** test.
- Describe when an unpaired ***t*** test is appropriate for testing a hypothesis.
- List some of the common errors in using the unpaired ***t*** test.
- Use SPSS to conduct an unpaired ***t*** 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 Unpaired *t* Test

- **Continuous data**
- **Data measured on an interval or ratio level**
- **Only 2 groups are being compared**
- **The groups are independent**
- **Data drawn from a normally distributed population**
- **Comparing means**

Misuse of the Unpaired *t* Test

- **More than two groups**
- **Groups are not independent**
- **Repeated measures**
- **Data are not normally distributed**
- **Data are not measured on an interval scale**

Conducting an Unpaired *t* 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, 2 independent samples
  - Sample size
    - Control N = 200
    - Experimental N = 200

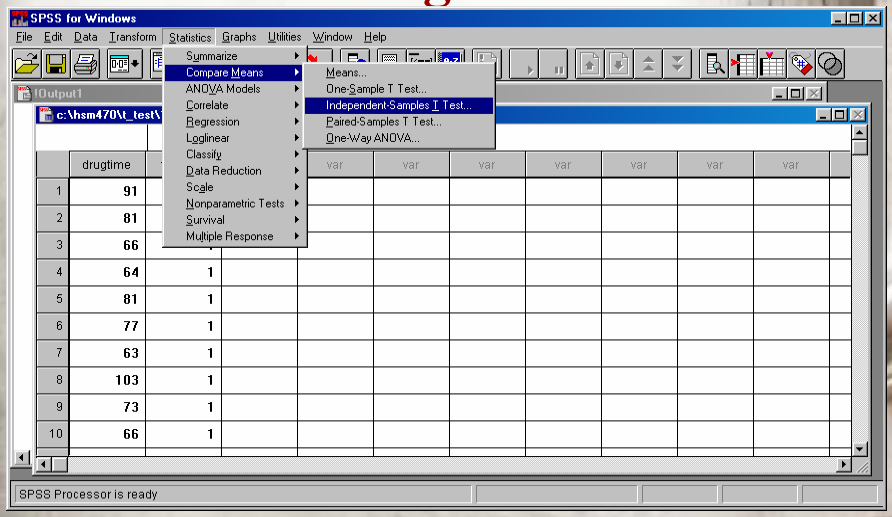
Conducting an Unpaired *t* Test Using SPSS continued

- **Hypotheses**
  - Null
    - There is no difference in the door-to-drug time of patients receiving 12 lead EKGs in the field, when compared with patients who do not receive field 12 leads.
  - Alternative
    - There is a difference in the door-to-drug time of patients receiving 12 lead EKGs in the field, when compared with patients who do not receive field 12 leads.
- **Select Alpha Level**
  - Alpha = 0.05
- **Test statistic**
  - Unpaired ***t*** Test

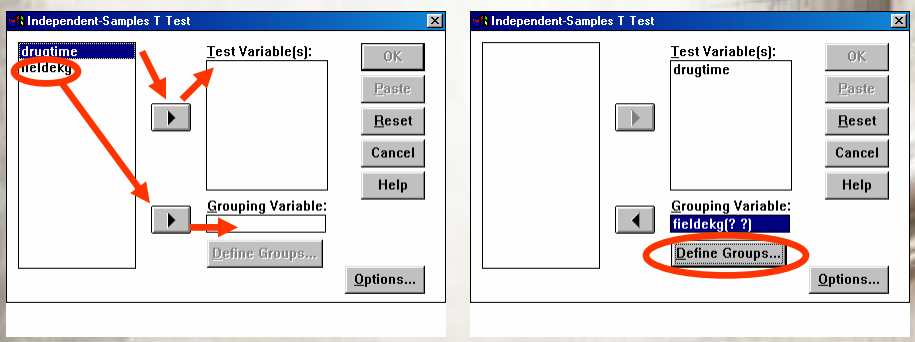
Conducting an Unpaired *t* Test Using SPSS continued

- ***P*-value**
- **Conclusion**

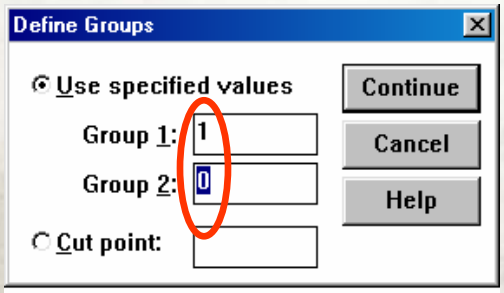
Conducting an Unpaired *t* Test Using SPSS



Conducting an Unpaired *t* Test Using SPSS continued



Conducting an Unpaired *t* Test Using SPSS continued



Conducting an Unpaired *t* Test Using SPSS continued

SPSS for Windows

File Edit Data Transform Statistics Graphs Utilities Window Help

!Output1

t-tests for Independent Samples of FIELDEKG

Variable	Number of Cases	Mean	SD	SE of Mean
DRUGTIME				
FIELDEKG 1	200	81.2500	26.960	1.906
FIELDEKG 0	200	122.7850	43.192	3.054

Mean Difference = -41.5350

Levene's Test for Equality of Variances: F= 68.221 P= .000

t-test for Equality of Means						95%
Variances	t-value	df	2-Tail Sig	SE	ff	CI for Diff
Equal	-11.54	398	.000		3.600	(-48.613, -34.457)
Unequal	-11.54	333.63	.000		3.600	(-48.617, -34.453)

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Conducting an Unpaired *t* 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 door-to-drug times between patients receiving prehospital 12 leads when compared to those who do not.