

### **Descriptive Statistics**

#### **One Sample Analyses**

Data are Normal

Data Not Normal

Data are Qualitative

Observations Over Time

#### **Two Variables (Related)**

Data are Normal

Data Not Normal

Data are Qualitative

#### **Procedure and Analysis**

Detailed Statistics or  
Summary Statistics  
(Mean, Standard Deviation, etc.)

Detailed Statistics  
Median, Box Plot

Frequencies and  
Crosstabulations

Line/Time Series Plot

#### **Procedure and Analysis**

Correlation, XY Plot  
Pearson's Corr.

Correlation, XY Plot  
Spearman's Corr.

Crosstabulation

### **Comparing Two Samples**

#### **Sample Related/Matched**

Data are Normal

Data Not Normal

Data are Dichotomous

#### **Samples Independent**

Data are Normal

Data Not Normal

Data are Qualitative

#### **Procedure and Analysis**

T-test and ANOVA  
Paired t-test

Non-parametrics  
Friedman's test

Crosstabulations  
McNemar's test

#### **Procedure and Analysis**

T-test and ANOVA  
Ind. Group t-test

Non-Parametrics  
Mann-Whitney test

Crosstabulations  
Chi-Square test

### **Comparing More Than Two Samples**

#### **Sample Related/Matched**

Data are Normal

Data Not Normal

Data are Dichotomous

#### **Samples Independent**

Data are Normal

#### **Procedure and Analysis**

T-test and ANOVA  
Repeated Meas. ANOVA

Non-parametrics  
Friedman's test

Non-parametrics  
Cochran's Q test

#### **Procedure and Analysis**

T-test and ANOVA  
Ind. Group ANOVA

Data Not Normal	Non-Parametrics Kruskal-Wallis
Data are Qualitative	Crosstabulations Chi-Square test

### **Testing For Association**

#### **Two Variables**

Data are Normal	<u>Procedure and Analysis</u> Corr. and Regression Simple Linear Reg. Pearson's Corr.
Data Not Normal	Correlation Spearman's Corr.
Data are Qualitative	Crosstabulations Chi-Square (Independent)
Data are Mixed	Correlation Spearman's Corr.

#### **More than Two Variables**

Data are Normal	Corr. and Regression Multiple Regression
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### **Definitions**

**NORMAL** - refers to data that are well approximated by a normal (Gaussian) distribution.

**NOT NORMAL** - refers to quantitative data that are not normally distributed.

**CATEGORICAL** - refers to nominal data, such as male/female or brown/blue/black.

**QUANTITATIVE** - refers to data that are numeric such as height, batting average, number of people per household, income, etc.

**QUALITATIVE** - refers to data that describe attributes such as hair color, sex, etc.

**ASSOCIATED** - refers to variables where knowledge of one helps predict the other.

**INDEPENDENT** - refers to variables where knowledge of one does not help predict others. Usually, samples from unrelated populations.

**RELATED** - refers to samples where multiple measures are taken on the same or related entities. For example, before after weights for a diet, or heights of twins.

**DICHOTOMOUS** - refers to data that are categorical and can take on only one of two possible states. For example, yes/no or on/off.

**VARIABLE** - refers to the observed measure, such as height, hair color, etc.

### **Statistical Significance, P-Values, and Reporting Data**

1. **Statistical Significance** – Identifies the likelihood that a particular difference (e.g., between groups) or relationship (e.g., between variables) could have occurred by chance or the result of sampling error, rather than from some real difference or relationship. For example, in significance tests the null hypothesis typically postulates “no difference” (e.g., of the means) between groups. The more unlikely the difference between groups that you actually find in your data, the more statistically significant that difference is.
2. **P-Value** – This value measures the probability that the difference or relationship you found could have occurred by chance (i.e., how statistically significant the difference is). Typical recognized significance levels are .05, .01, .005, .001, with each level being progressively more rare (i.e., more statistically significant). However, SPSS calculates the actual probability of your finding occurring by chance.
3. **Reporting Findings** – When you report statistical findings in your discussion you should provide the reader with enough specific technical information to understand them. This will differ by the statistical procedure you use, but as an example, you would report the results of a **t-test** in the following way: Males reported a significantly higher income level than did females,  $t(448) = 4.08, p = .001$ . In this example, 4.08 is the size of the calculated t-statistic, 448 is the number of degrees of freedom associated with this particular test, and .001 is the p-value (i.e., significance level). An example of **ANOVA** findings would be:  $F(2, 177) = 4.37, p = .03$ . Translation: The F-statistic = 4.37; Between-Groups degrees of freedom=2; Within-Groups degrees of freedom=177; Significance level=.03. Then report post hoc test findings for particular pairs of groups.