WINKS FOR DATA ANALYSIS

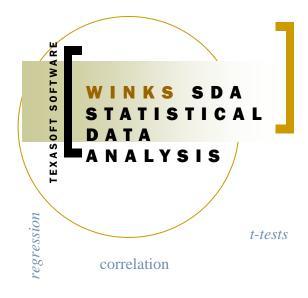
Descriptive Statistics				
	Data Type	Procedure		
Describing one variable	Normal	Descriptives – Mean, SD, Min, Max, etc		
	Not Normal	Descriptives, Median, Histogram, Stem and Leaf		
	Categorical	Frequencies		
	Over Time	Line Plot/Time Series		
	,			
Describing two related	Normal	Pearson's Correlation		
	Not Normal	Spearman's Correlation		
variables	Categorical	Crosstabulations		

Relational Analyses (Correlation and Regression)				
	Data Type	Procedure		
You want to analyze the relationship between two variables.	Normal	Pearson Correla- tion, Simple Linear Regression		
	Not Normal	Spearman Correlation		
	Categorical	Contingency Coefficient		
	Mixed	Spearman Correlation		
Analyze the relationship between three or more variables.	Normal	Multiple Regression		
	Not Normal	Kendall Partial Rank		
	Categorical	Discriminant Analysis (not in SDA)		

Read each table from left to right.

Comparison Tests (t-test/ANOVA)				
Comp	Data Type	Procedure		
Comparing a	Normal	Single Sample t-test		
SINGLE SAMPLE to a norm (gold standard)	Not Normal	Sign Test		
	Categorical	Goodness-of-Fit		
Comparing two	Normal	Paired t-test		
groups - Samples	Not Normal	Wilcoxon		
PAIRED	Categorical	McNemar		
Comparing two	Normal	Ind. Gp. t-test		
groups – Samples	Not Normal	Mann-Whitney		
INDEPENDENT	Categorical	Chi-Square		
More than two groups -	Normal	Rep. Measures ANOVA		
REPEATED	Not Normal	Friedman ANOVA		
MEASURES	Categorical	Cochran's Q		
More than two	Normal	One-Way ANOVA		
groups –	Not Normal	Kruskal-Wallis		
INDEPENDENT	Categorical	Chi-Square		

www.texasoft.com



BASIC EDITION REFERENCE

Logistic

Regression

C O N T I N G E N C Y
T A B L E S

STATISTICAL ANALYSIS

ANOVA

Analysis

write-up



WINKS STATISTICAL DATA ANALYSIS

Opening Data Files

SDA recognizes the following file types:

- ⇒ **SDA** native data set format.
- ⇒ DBF- dBase/KWIKSTAT/WINKS data set format Open using File/Open Dataset and select "Files of Type" as .dbf (Data files from previous WINKS versions.)
- ⇒ XLS Excel spreadsheet format. Open using File/Open Dataset and select "Files of Type" as .xls (Excel 97 or newer.)
- ⇒ CVS (TXT or DAT) ASCII comma delimited data sets. To be opened/imported into SDA, data sets in the XLS or CVS formats should include a first row (record) containing a list of the variable names.

Analysis of Variance

One-Way ANOVA

(Analyze/t-Tests and ANOVA – Independent Group t-test/ANOVA)

A comparison of means where subjects in each group are different (independent):

Ho: The difference in the means of the groups is zero. $(\mu_1 = \mu_2 = ... = \mu_n)$

Ha: The difference in the means of the groups is not zero. (At least one $\mu_i \neq \mu_j$)

Repeated measures ANOVA

(Analyze/t-Tests and ANOVA - Paired Rep. Measures)

Used for three or more repeated measures; a generalization of the paired t-test.

Chi-Square Analysis

(Analyze/Crosstabs, Frequencies, Chi-Square/ Crosstabulations/ Chi-Square)

Ho: The variables are independent of each other. (There is no association between them.)

Ha: The variables are not independent of each other.

Or, an hypothesis of homogeneity can be performed (math is the same.)

t-tests

Independent Group t-test

(Analyze/t-Tests and ANOVA – Independent Group t-test/ANOVA)

Independent group analysis is appropriate when observations are taken from groups in which subjects in one group do not appear in another group. You are testing the hypotheses:

Ho: The difference in the means of the groups is zero. $(u=u_0)$

Ha: The difference in the means of the groups is not zero. $(\mu_1 \neq \mu_2)$

Paired t-test

(Analyze/t-Tests and ANOVA – Paired Rep. Measures (t-test/ANOVA))

A paired t-test is performed when there are two repeated (paired) measures from the same or matched subjects The hypotheses being tested are:

Ho: The mean of the differences is zero. ($\mu_{\text{difference}} = 0$) Ha: The mean difference is not zero. ($\mu_{\text{difference}} \neq 0$)

Single Sample t-test Analysis

(Analyze/t-Tests and ANOVA – Single Sample t-test)

The single sample analysis tests a specified mean differs from an hypothesized mean. The hypotheses are:

Ho: The mean equals the hypothesized value.

Ha: The mean does not equal the hypothesized value.

Nonparametric Procedures

Nonparametric procedures are useful as an alternative to parametric tests when you suspect that the data are not normal or that variances between groups are unequal.

Parametric test	Nonparametric	
Ind. Group t-test	Mann-Whitney	
One-Way ANOVA	Kruskal-Wallis	
Paired t-test	Wilcoxon Signed Rank	
Repeated Measures ANOVA	Friedman's ANOVA	
Pearson's r	Spearman's r	

Correlation

Correlation is used to measure the strength of association between two variables. It is measured using r (Pearson's correlation.) Where r ranges from –1.0 to 1.0. A t-test for significance uses the hypotheses (where *rho* is the population correlation.)

Ho: rho = 0Ha: $rho \neq 0$

Linear Regression

(Analyze/Regression and Correlation/Simple Linear Regression or Multiple Regression Analysis)

Simple linear regression is used for predicting a value of a dependent variable using an independent variable. Hypotheses tested are:

Ho: β = 0 (The slope is zero; no linear relationship.) Ha: $\beta \neq 0$ (The slope is not zero; is a linear relationship.)

Multiple linear regression is used to predict values of a dependent variable using two or more independent variables. The hypothesis are:

Ho: $\beta_1 = \beta_2 = ... \beta_k$ (No relationship between dependent variable and the set of independent variables.)

Performing & Interpreting a Statistical Test

- 1. State a null hypothesis (Ho) (and usually an alternative hypothesis (Ha)).
- 2. **Perform an analysis** to test the hypothesis (the statistical test).
- Interpret the test and make a decision, using a decision criterion (usually the p-value) based on the assumption that the null hypothesis has been satisfied.

Typically, the reported p-value is the most convenient way to decide on statistical significance. For most cases, if the p-value is less than 0.05 (p < 0.05), you reject the null hypothesis in favor of the alternative.