Getting Started with SPSS

Course: Intro to Statistics

Lecturer: Dr. Courtney Pindling

Overview

SPSS

- Introduction to SPSS
- Installing SPSS for Windows
  - Graduate Pack (= version 13)
- Scales of Measurement and SPSS
- SPSS Menus
- Working with Data
- Documenting Outputs
- Getting Help
- Transformation of Data
- SPSS Analyze Menu
- Graphs and Tables (APA style)

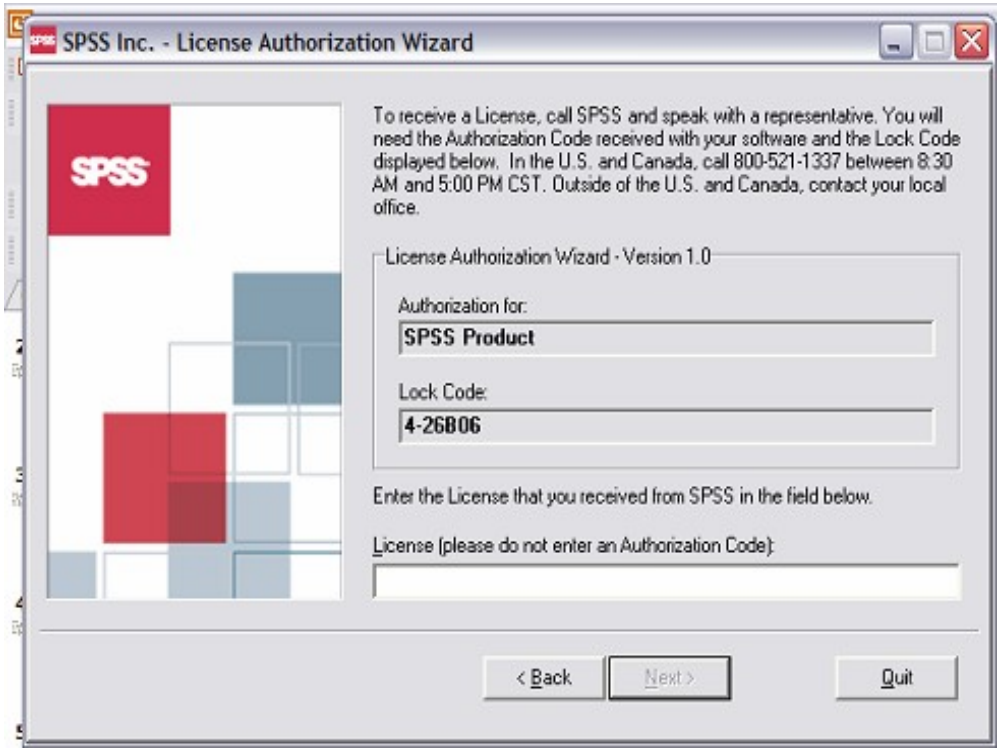
Introduction SPSS

Important Links:

- SPSS Graduate Pack: http://spss.com/gradpack/
  - $200 at http://www.academicsuperstore.com/market/marketdisp.html?PartNo=819983
- SPSS Tutorials: http://www.stat.tamu.edu/spss.php
- Statistics Lectures: http://pindling.org/Math/EDRM611/
  - Username: **EDRM611**, password: ***leadership***
- EDRM611: http://d2l.andrews.edu/
- This Document: http://pindling.org/Math/EDRM611/

Installing SPSS

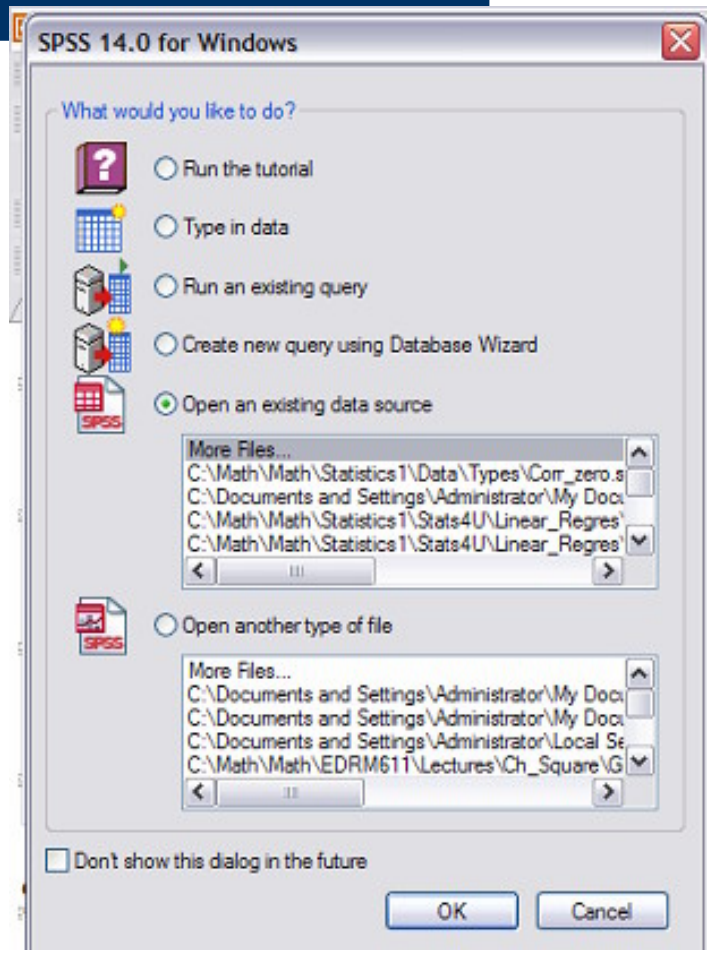
- Installation from CD
  - C:/Program Files/SPSS
- Serial Number Needed
- Authorization Code
  - Provided with software
- Registration
  - Authorization Wizard
  - Use Wizard to Obtained License before Registering
  - Register within two weeks
  - Only 1 installation



Start > Programs > SPSS for Windows > Authorization Wizard

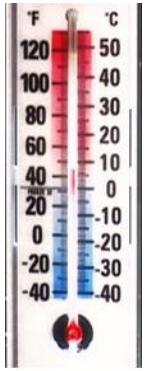
Starting & Running SPSS

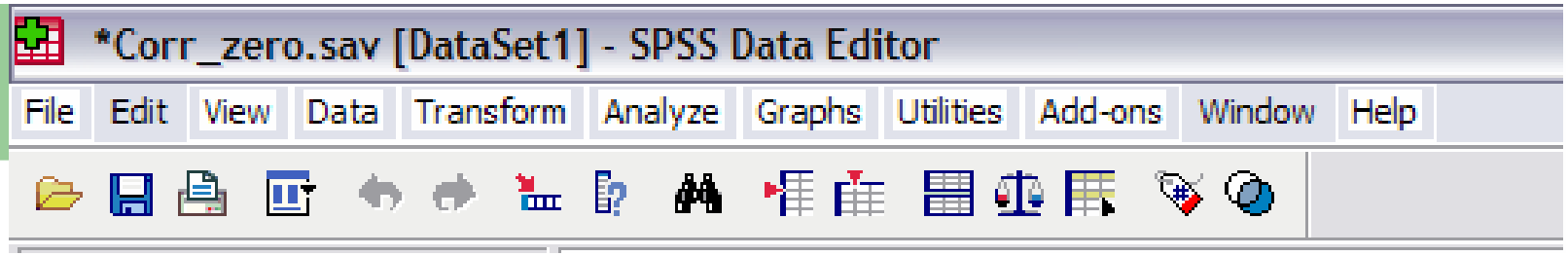
- Create Icon on **Desktop**
- From **Windows Start menu**
  - SPSS for Windows
  - Select *SPSS v14 for* Windows
- **Select Options**
  - Run Tutorial
  - Type in Data
  - Run an Existing Query
  - Create a New Query
  - Open and Existing Data Source



Scales of Measurement

- **Nominal**
  - Label: US 1
- **Ordinal**
  - Rank Order: Survey, 1 or 2
- **Interval** (Scales)
  - Divided Interval: 40 Deg F
- **Ratio** (Scales)
  - Absolute Zero: 66 bps



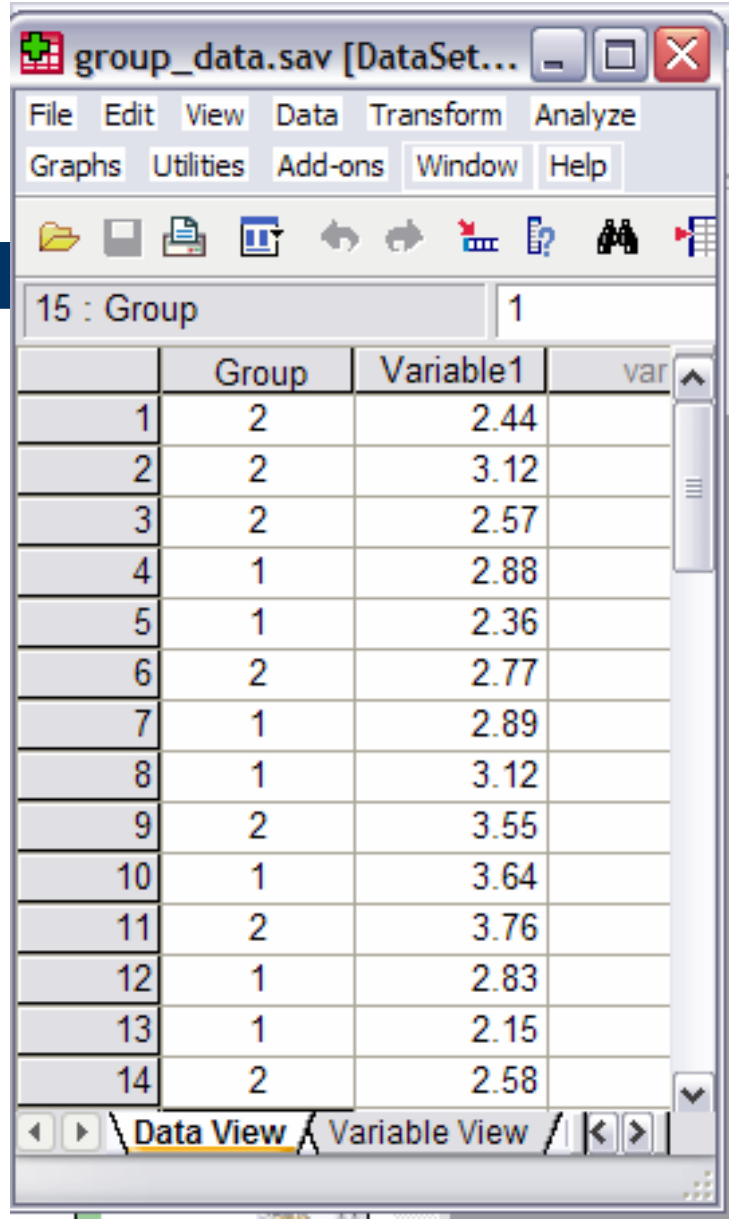


SPSS Menus

- **File:** Open/New (*Data*; *Output*), Save As, Print
- **Edit:** Copy, Paste, Insert Case/Variable
- **View:** Switch between Data & Variable Views
- **Data:** Define Variable/Case, Transpose ?
- **Transform:** Compute, Recode, Rank cases
- **Analyze:** Descriptive Statistics, Compare Means, Correlate, Regression, etc.
- **Graphs:** Chart Builder: Histogram, Pie, Line, etc
- **Help:** Topics, Tutorial, Results Coach, etc

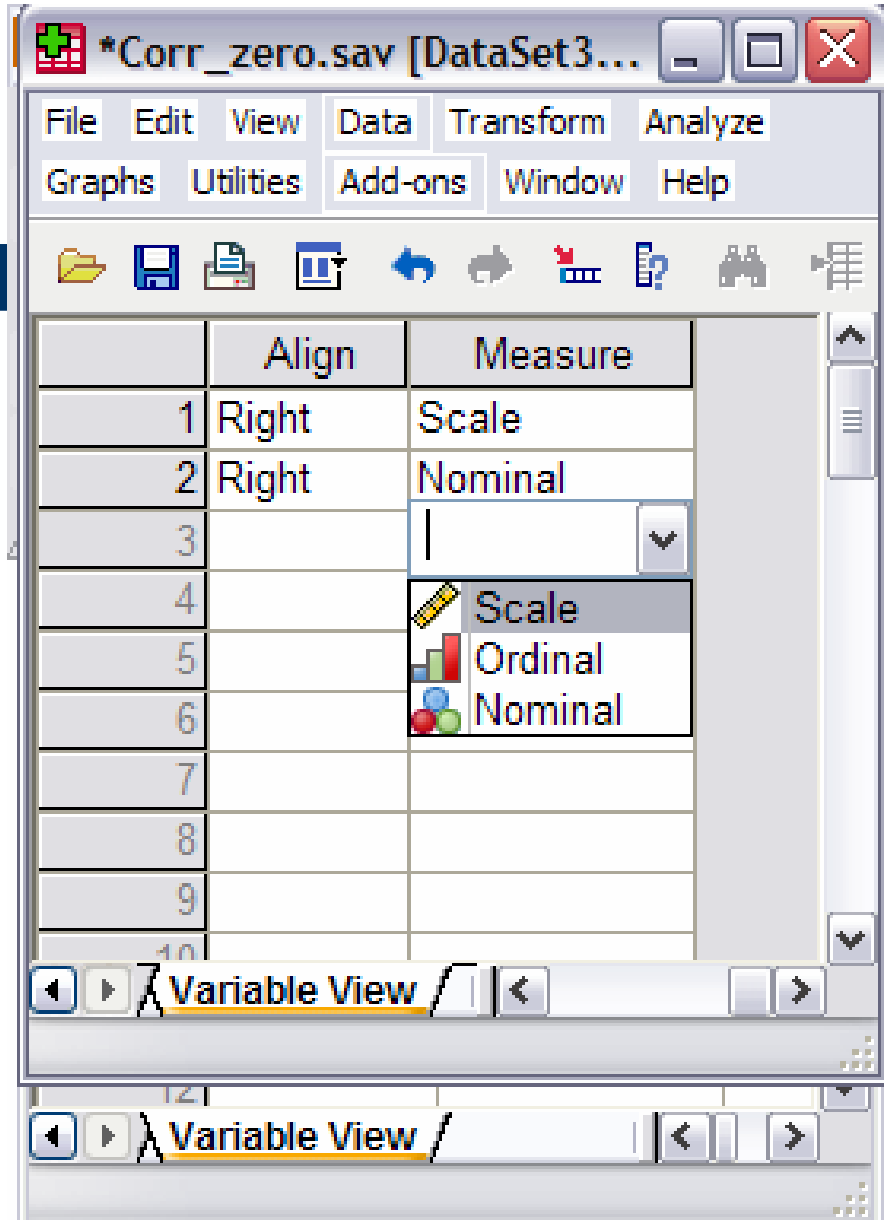
Working with Data: Data View

- **Data Entry**
  - Type in
  - Obtain from file
  - Data or Output
- **Manual Inputs**
  - Determine Measurement Scale
  - Variable View Measure
- **Data File Types**
  - SPSS (.sav)
  - Excel (.xls)
  - Lotus 123 (.wk)
  - Text (.txt)
  - Data (.dat)
  - Csv (.ccs) select (*.*)



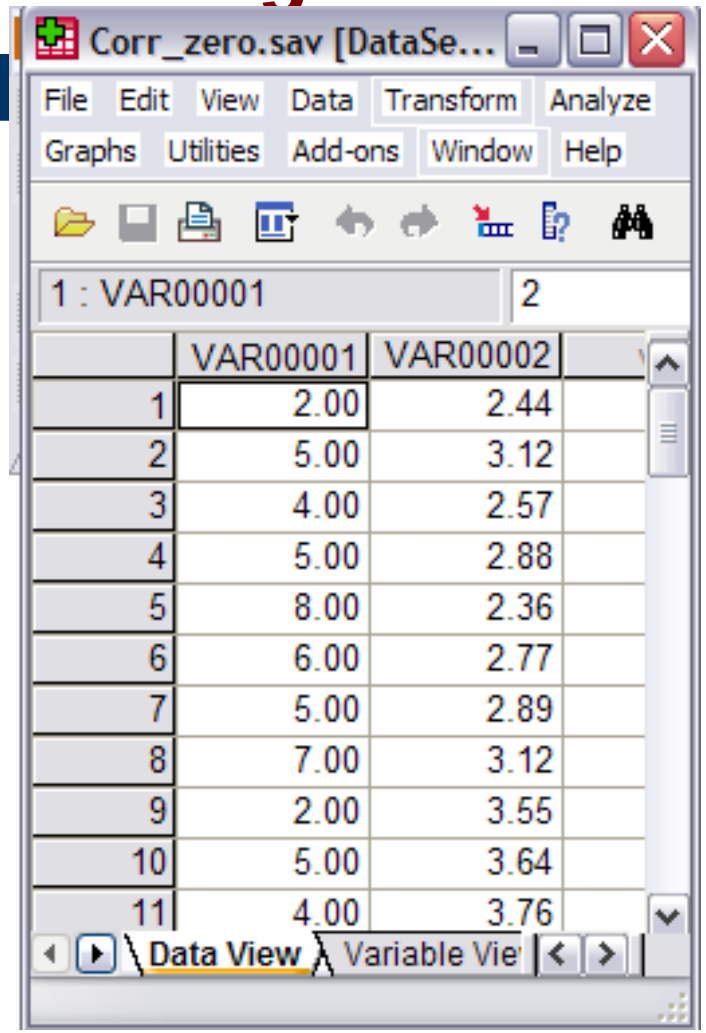
Working with Data: Variable View

- **SPSS Data Types**
  - **Scales** - Ratio
  - **Ordinal** - Rank
  - **Nominal** - Label
- **Structure**
  - **Cases** (rows): Observations
  - **Variables** (columns): Characteristics
- **Options**
  - Name: Variable Name
  - Type: Numeric, String, Date, etc
  - Width: Default 8
  - Decimals: Default 2
  - Label: Variable Report Name
  - Value: Recode Option
  - Missing: Define Omitted Values
  - Columns: Display Width
  - Align: Left, Right, Center
  - Measure: Scales, Nominal, Ordinal



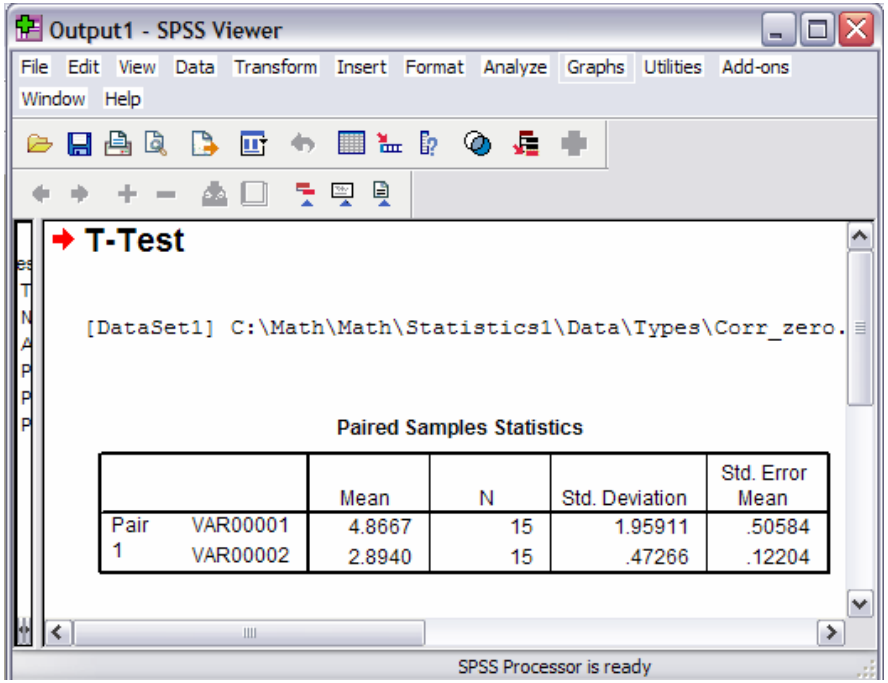
Working with Data: Data Management

- **Data Layout**
  - **Paired Data (equal rows)**
  - Unrelated Data
  - Data with Grouping Variable
  - Homogeneous and Mixed Data Types: Nominal and/or Ordinal
- **File Menu**
  - **Open or New**: Data or Output
  - **Save As**
  - **Recently Used**:
    - Data
    - Files (data and outputs)



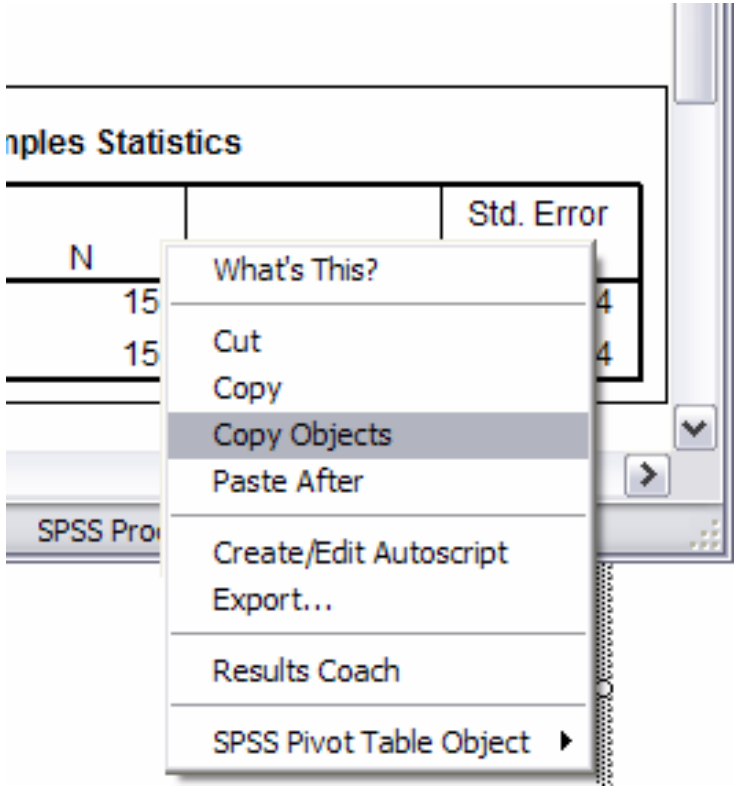
Working with Data: Data Outputs

- **Output Title Bar**
  - Name of Output File
  - File Type (**.spo**): *Output1.spo*
  - Right Mouse Menu
- **Content of Output Window**
  - **Results Tables**
  - **Graphs**
  - **Analyzes Outputs**

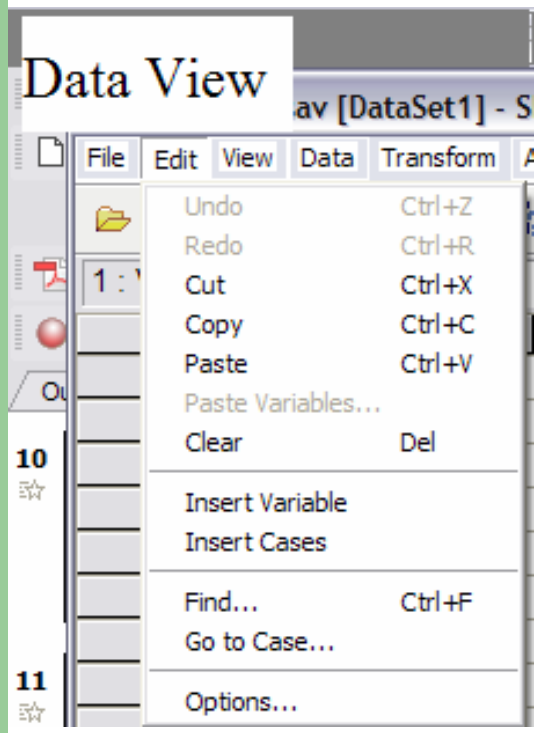


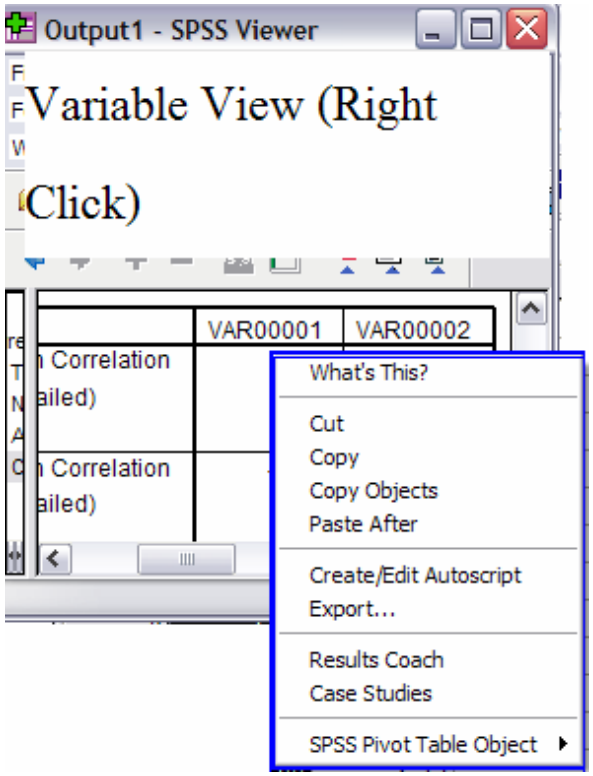
Document Outputs: Right Click Menu

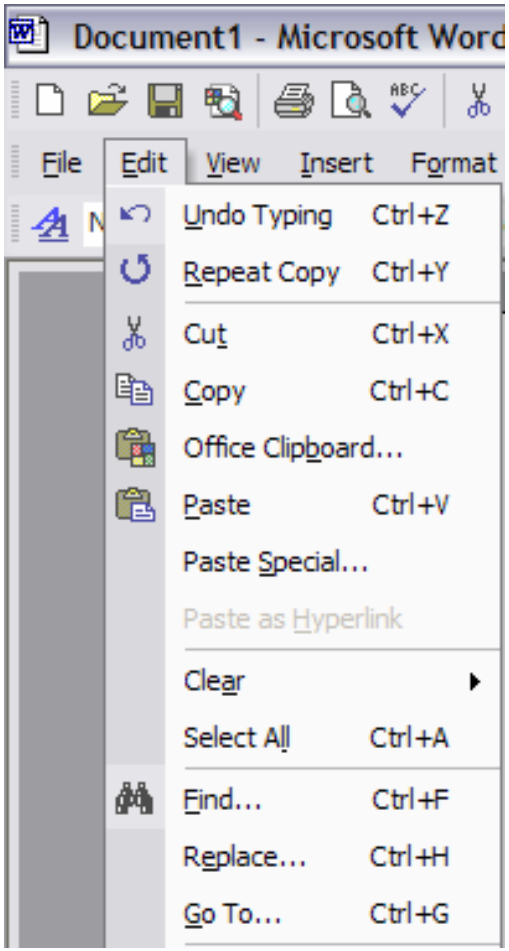
- **Copy Output Item**
  - Select (Left Click)
  - Right Mouse Click
    - Copy Object
    - or **Ctrl C**
  - Paste in Document or **Ctrl V**
- **Edit Outputs**
  - Suggestion: Edit after Pasting in Document



Document Outputs: Copy and Paste



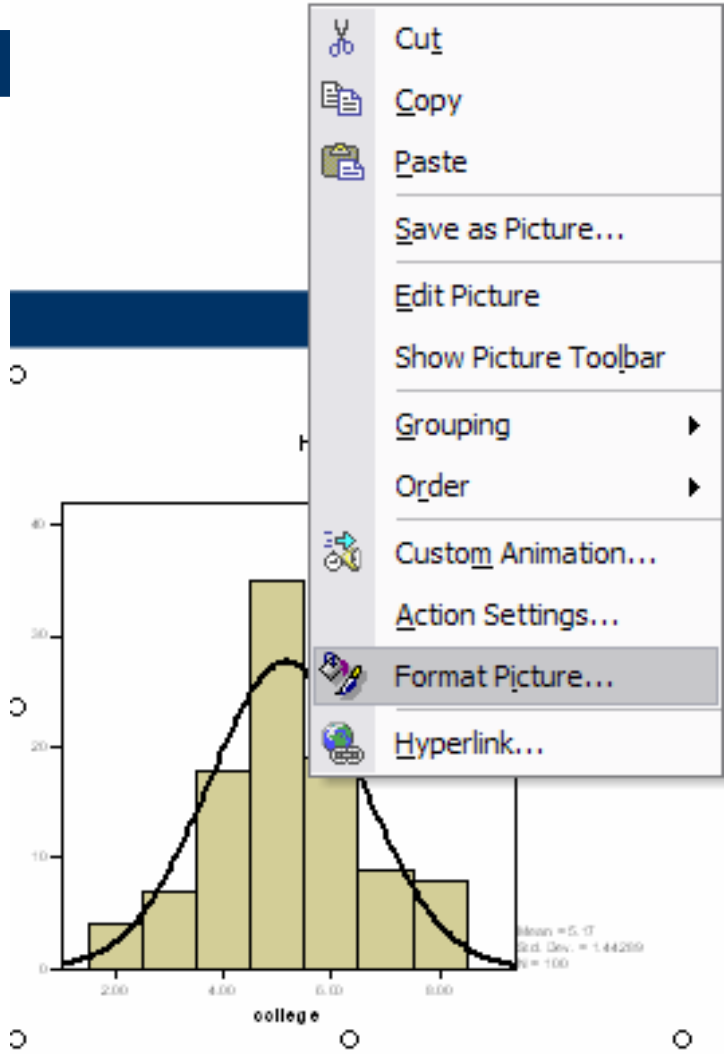




Select All: *Crtl A* **Copy**: *Crtl C* **Paste**: *Crtl V*

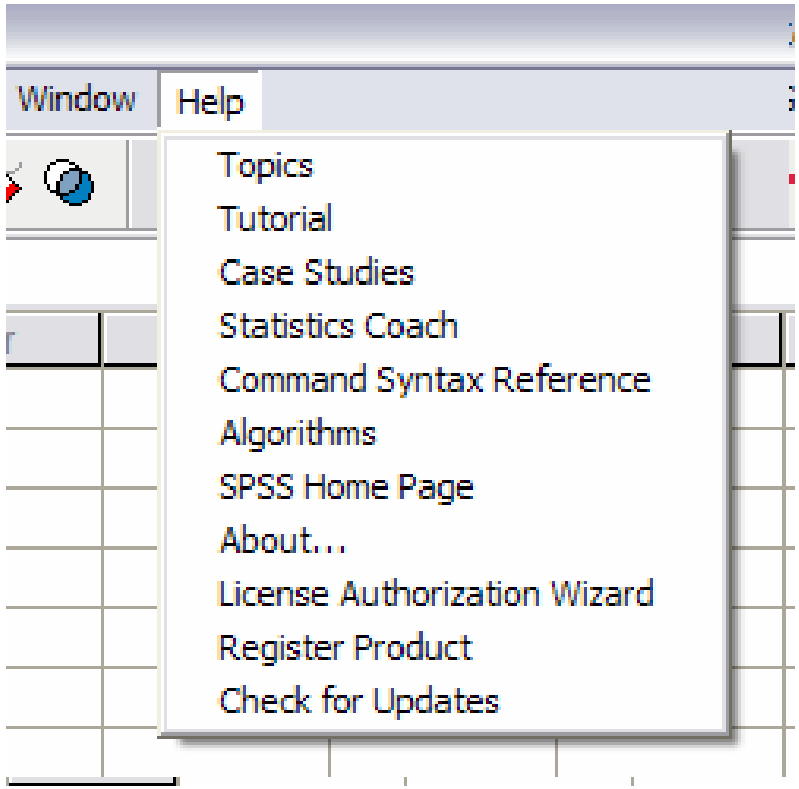
Document Outputs: Format Output

- **Format Output**
  - Locate Graphic Output in Word
  - Select (Left Click)
  - Right Mouse Click
    - Format Picture
- **Format Options**
  - Automatic
  - **Grayscale**
  - Black & White
  - Washout



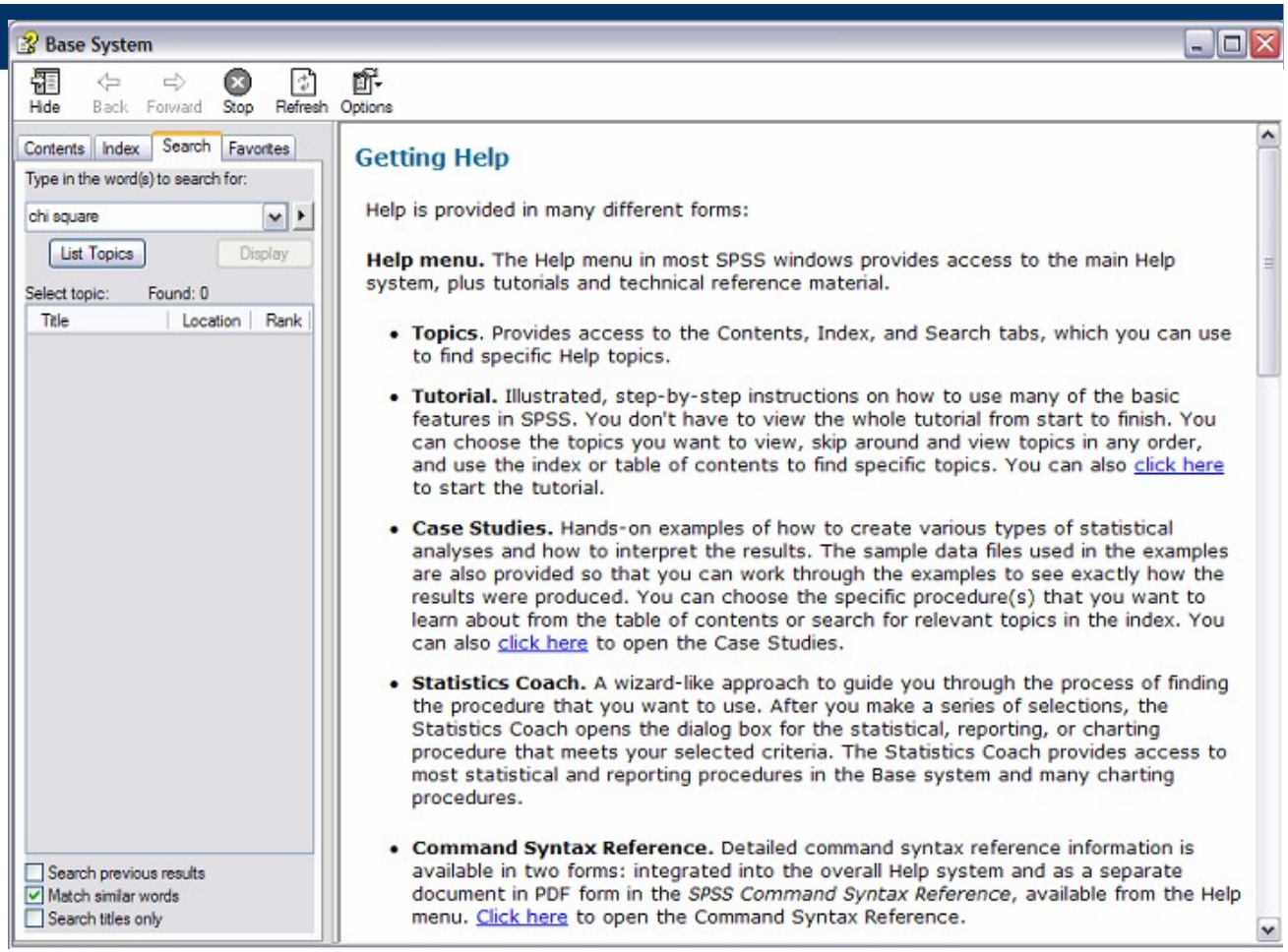
Getting Help: Help System

- Help Topics
- Help Sub-menus
- Help Tutorial
- Dialog Box Help Button
- Pivot Table Content Menu Help
- Statistics Results Coach
- Case Studies



SPSS: Help (Left Click)

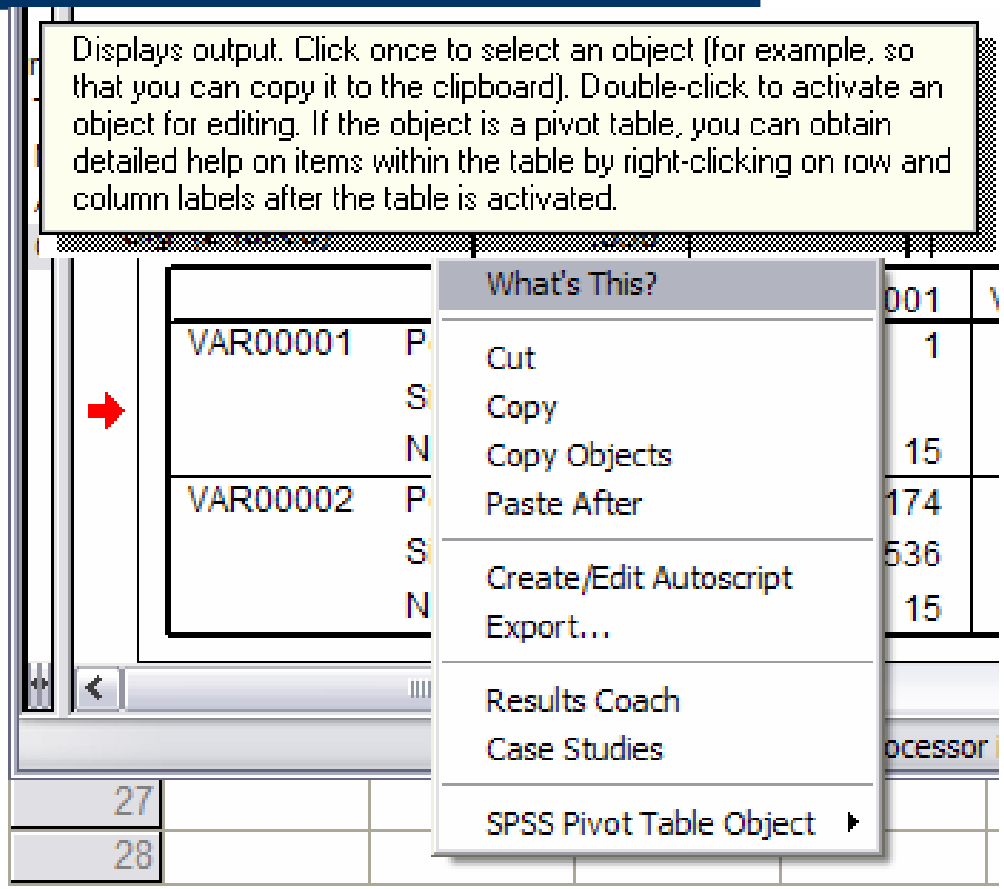
Getting Help: Help Topics



SPSS: Help (Left Click) > Select “Topics”

Getting Help: Help Sub-menus

- Help is every where
- Right Click and Left Click on
  - What's This?
- Window pops up with Explanations



SPSS: Any Output (Right Click)

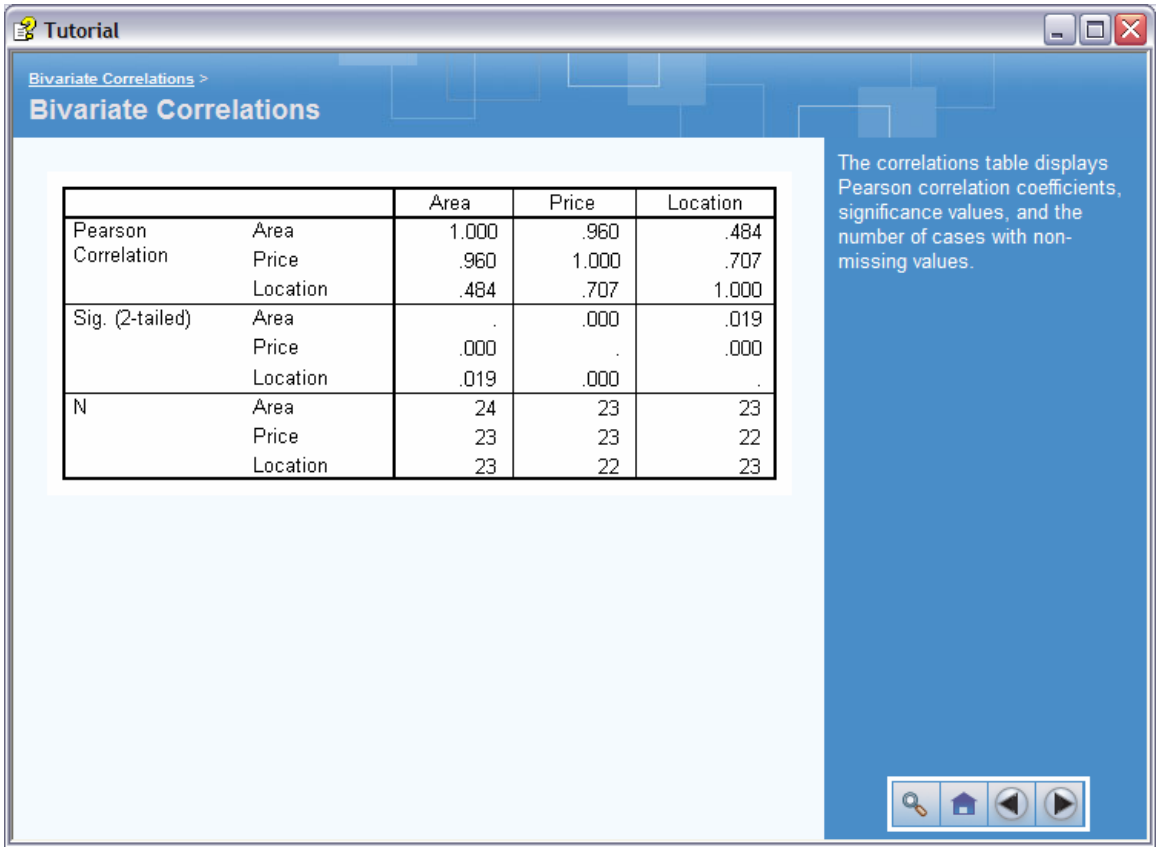
Getting Help: Help Tutorials

1. **Slide Shows by Topics**
2. **Watch Using the Help System**
3. **Help menu**
   Tutorial

SPSS: Help (Left Click) > Select “Tutorial”

Getting Help: Results Coach

1. Slide Shows
2. Explain Results Table
3. Can Use Statements to Help with Analysis and Interpretation

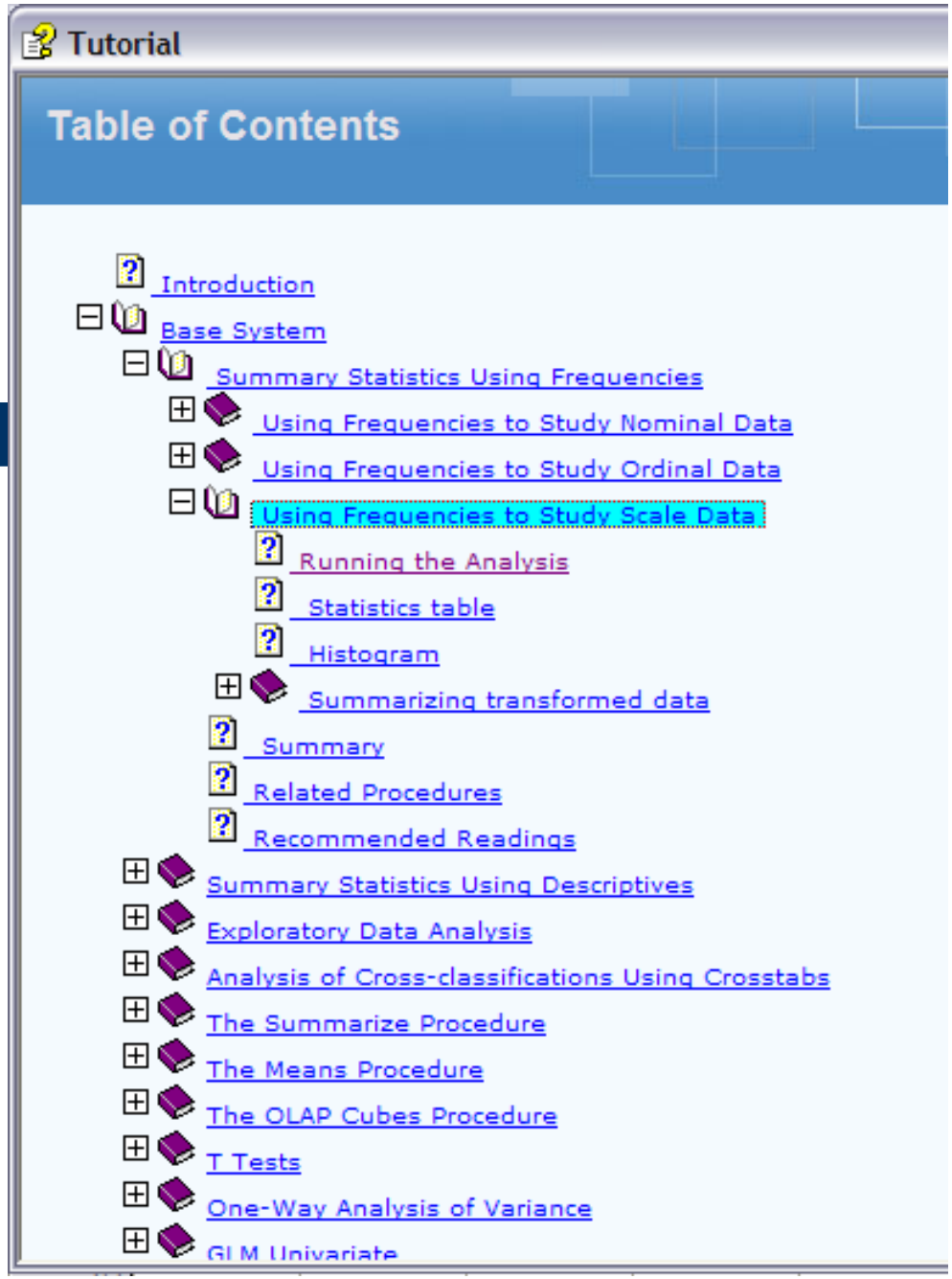


		Area	Price	Location
Pearson Correlation	Area	1.000	.960	.484
	Price	.960	1.000	.707
	Location	.484	.707	1.000
Sig. (2-tailed)	Area	.	.000	.019
	Price	.000	.	.000
	Location	.019	.000	.
N	Area	24	23	23
	Price	23	23	22
	Location	23	22	23

SPSS: Any Output (Right Click) > Select "Results Coach"

Getting Help: Case Studies

1. Slide Shows
2. Explain how to Use SPSS for Types of Statistical Analyses and Interpret the Results
3. Filled with many work through examples



SPSS: Help (Left Click) > Select "Case Study"

Data Transformation: Basics

- **Recode**
  - **Transforms Data Groups**
- **Standard Scores**

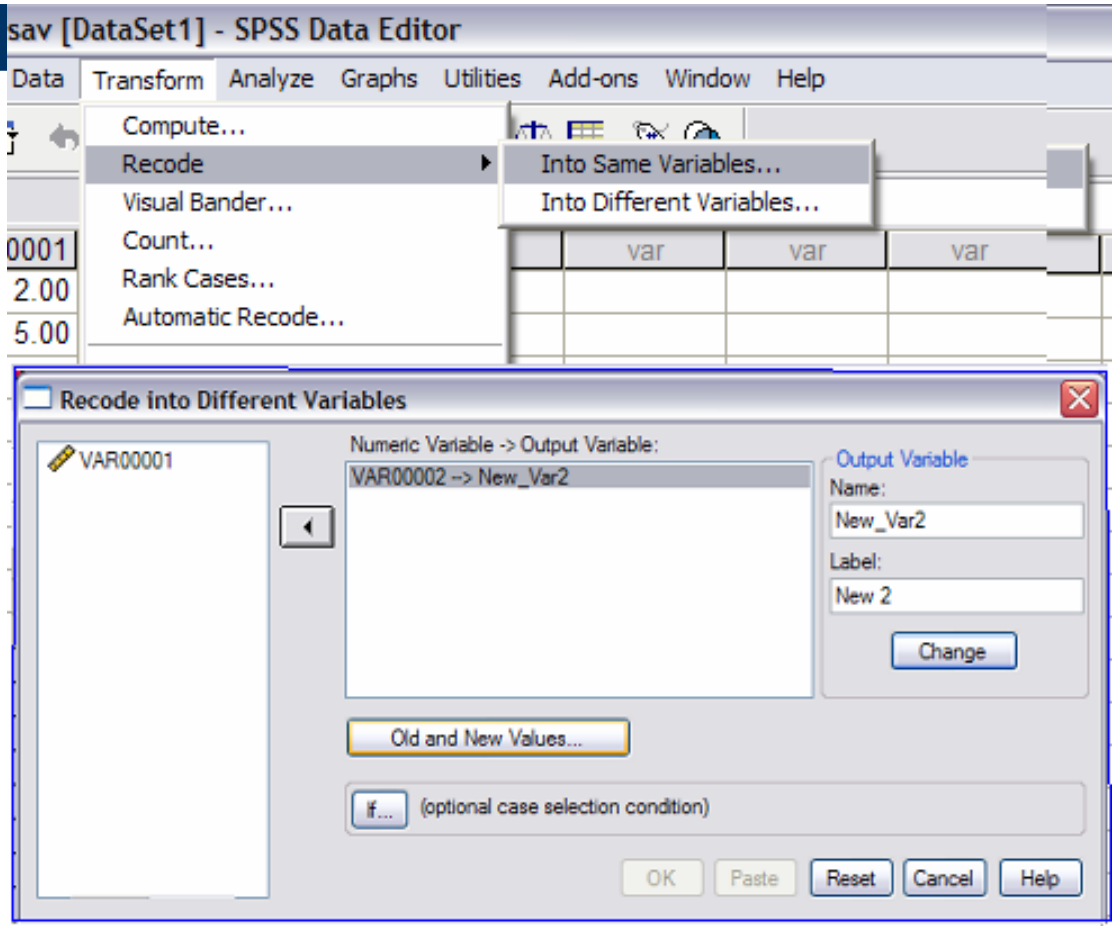
$$z-score:\ z = \frac{\text{Observed Score - Mean}}{\text{Standard Deviation}} = \frac{X - M}{SD}$$

- **Variable Math Conversion**
  - **Var2 = Var1 * 10**

Old	New
72	**75**
83	83
77	**75**
71	**75**
79	**75**

Data Transformation: Recode

- Take Data from a Variable and Recode in Defined Groups
- Example: Data Ranging from **70 to 79** to be transformed to Value **75**
- Same or Different Variable
- **Options**: Name, Label then Change

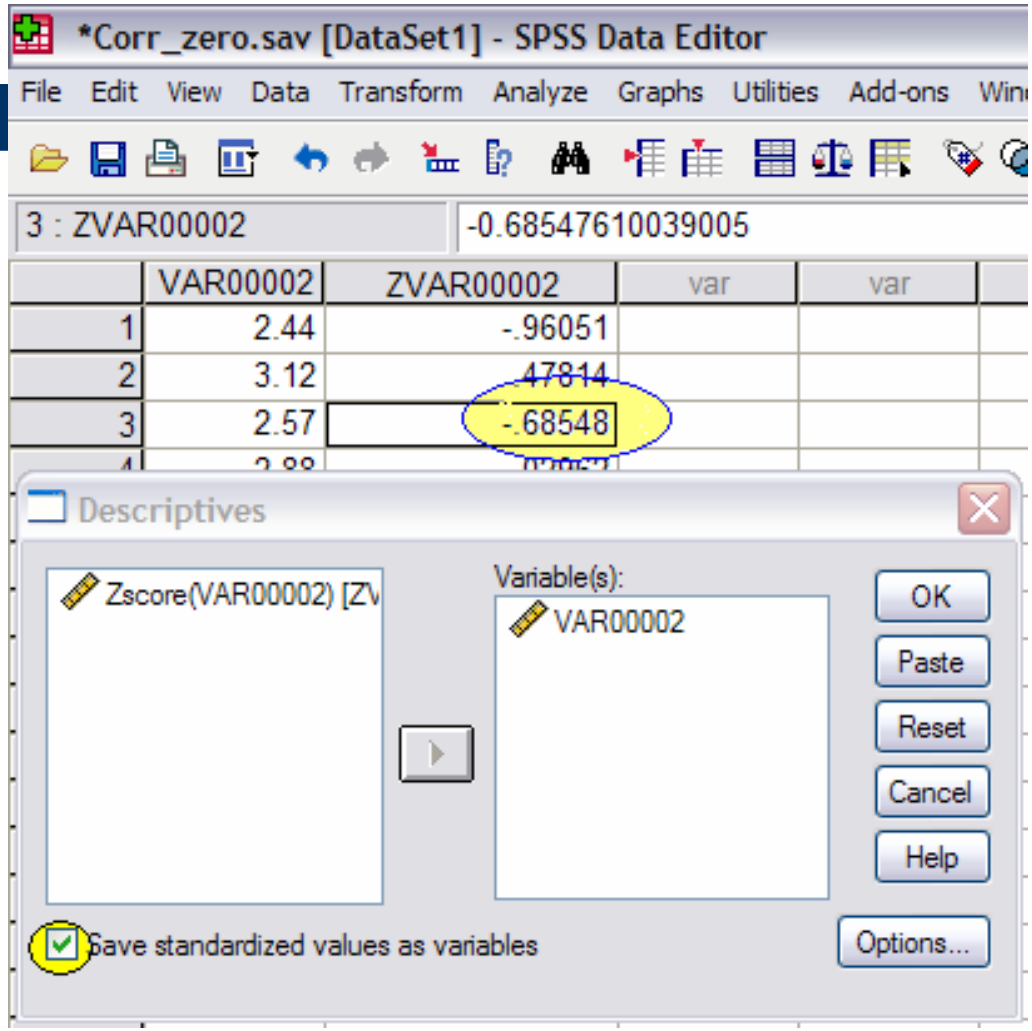


SPSS: Transform > Recode (Into Different Variable)

Data Transformation: Standard Scores

- **Analyze -> …**
  Check Box
- **Compute the z-score for each data score**
- **z-score** is **score (*X*)** *minus* **mean (*M*)** *divided* by **standard deviation (*SD*)**

  Z = [(X – M)/SD]

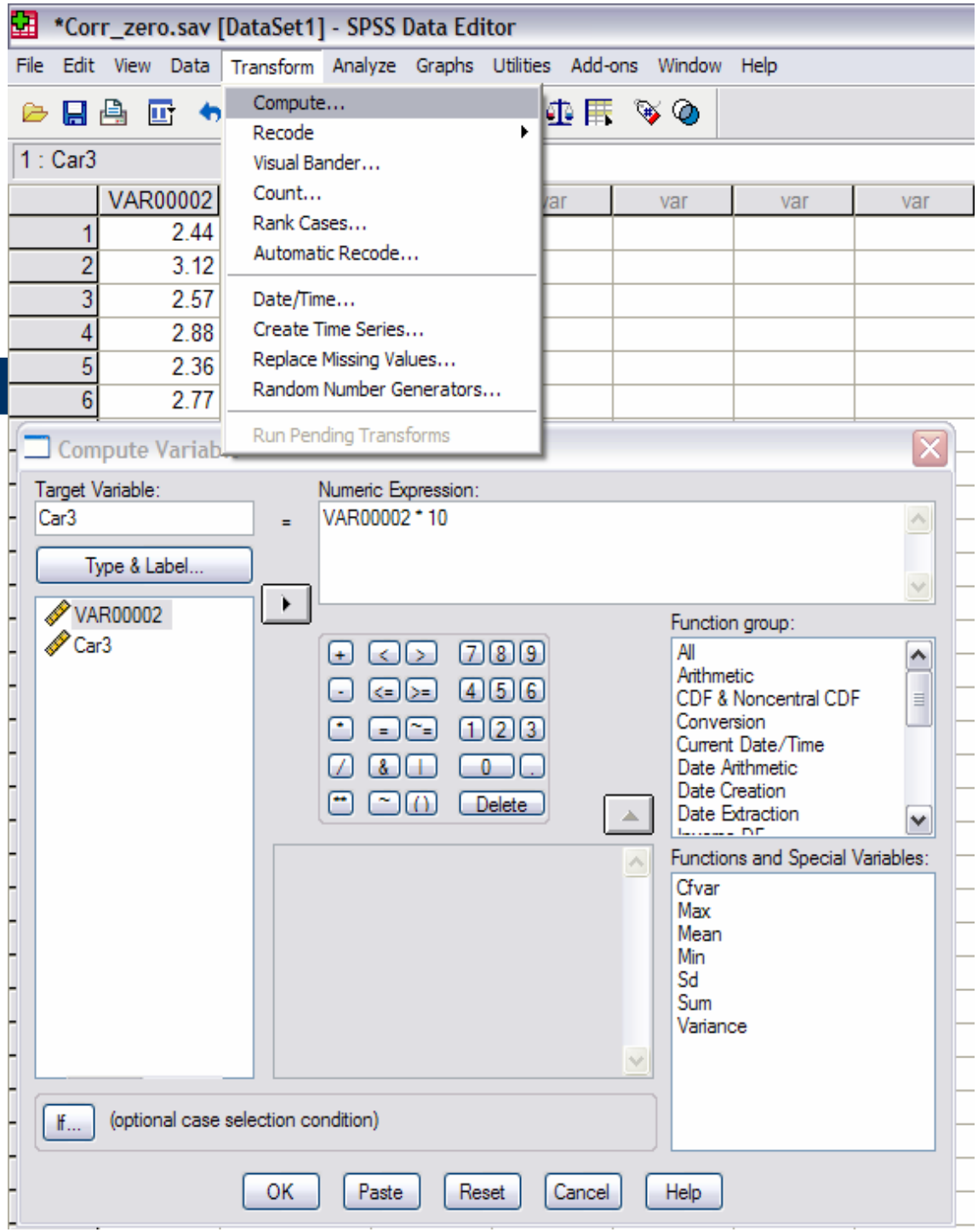


SPSS: Analyze > Descriptive Statistics > Descriptives (Check Box)

Compute: Variable Math Compute

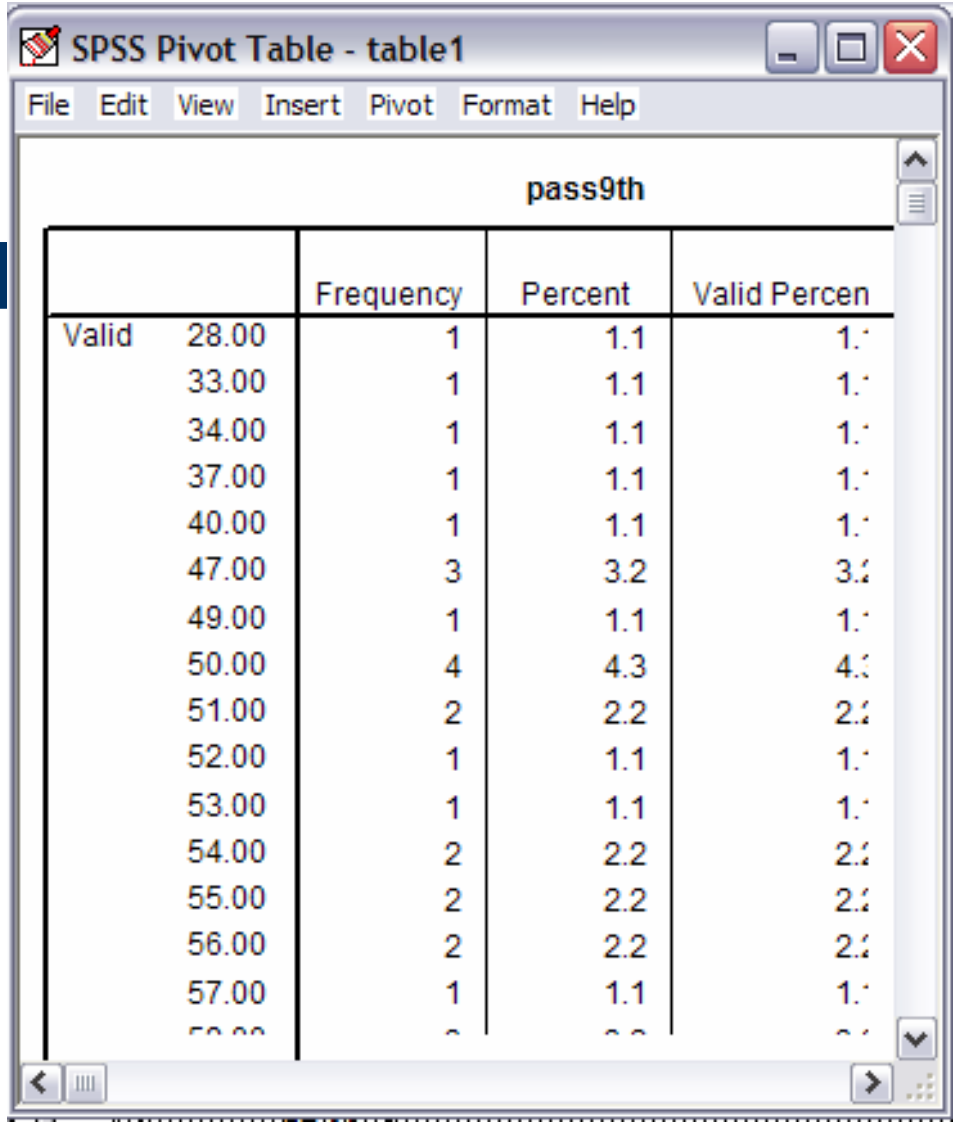
- Transform -> Compute
- Perform Math Computations on Variables
- Same or Different Variable

SPSS: Transform > Compute



Analyze Menu: Frequency Table

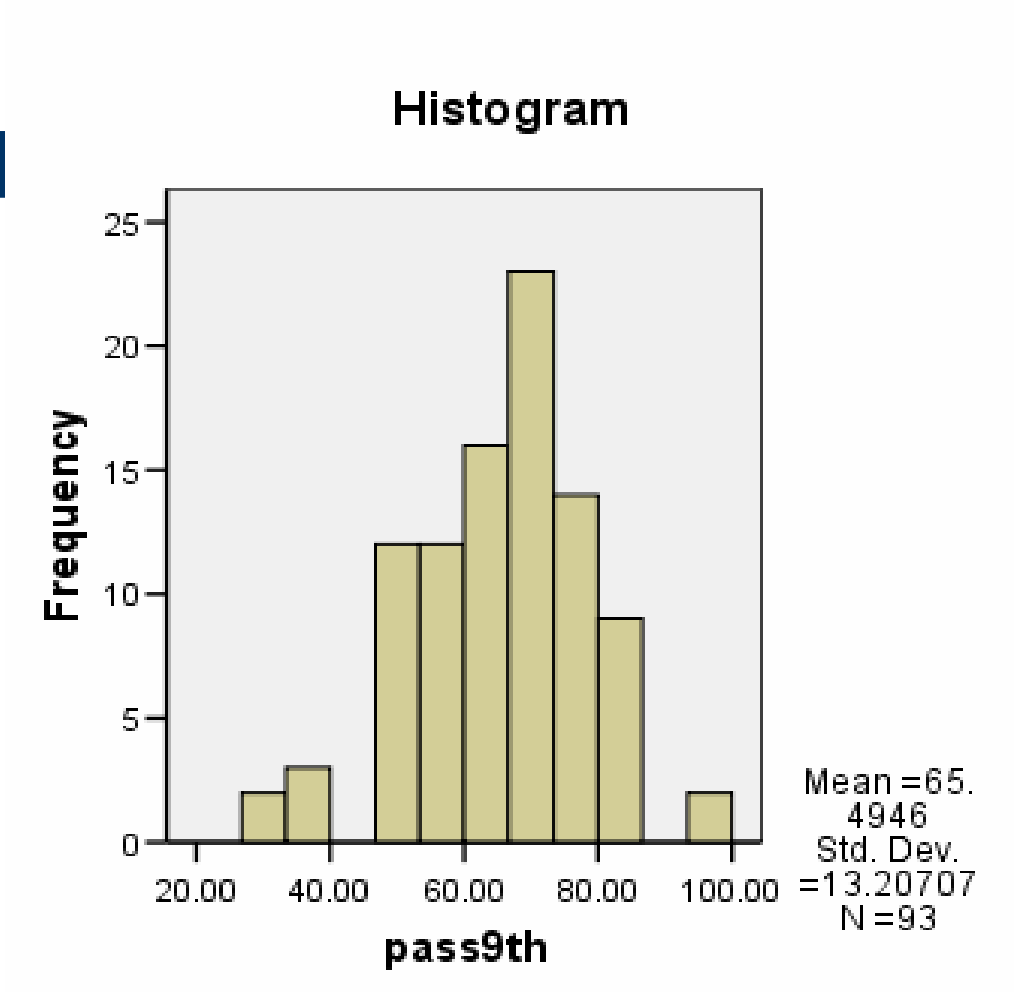
- **Simple Frequency Table**
- **Compute the Frequency for each Score**



Analyze > Descriptive Statistics > Frequency
(Select *Display Frequency Table*)

Analyze Menu: Freq Histogram

- **Simple Frequency Histogram**
- **Compute the Frequency for each Score and display a Histogram**



Analyze > Descriptive Statistics > Frequency > Charts (Select Histogram) (Option: *With normal curve*)

Analyze Menu: Central Tendency

- **Central Tendency Statistics**
- **Compute the mean, median, mode, std error of mean (S.E. mean)**

Statistics

Pass9_Group

N	Valid	93
	Missing	0
Mean		65.97
Std. Error of Mean		1.377
Median		65.00
Mode		65

Analyze > Descriptive Statistics > Frequency > Statistics (Select *Central Tendency*: Mean, Median, Mode) > OK

Analyze Menu: Dispersion

- **Dispersion Statistics**
- **Compute the range, standard deviation, variance**

Statistics

Pass9_Group

N	Valid	93
	Missing	0
Std. Deviation		13.275
Variance		176.227
Range		70

Analyze > Descriptive Statistics > Frequency > Statistics
(Select *Dispersion*: Range, SD, Variance) > OK

Analyze Menu: z-scores

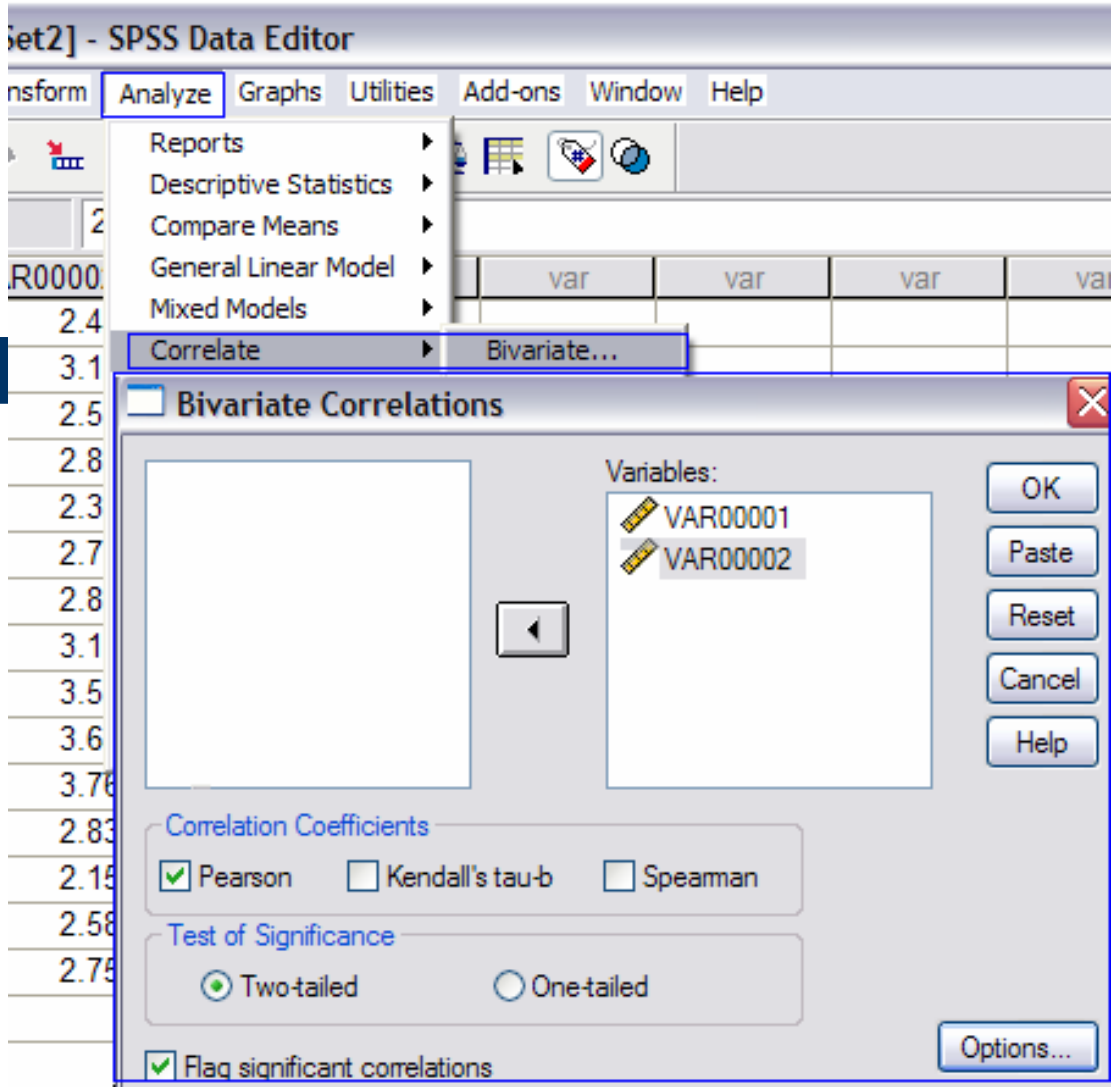
- **z-scores Statistics**
- **Compute the z-score for each score**
- **Compute the range, standard deviation, variance**
- ***z = (X – M)/SD***

pass9th	Zpass9th
85.00	1.47689
73.00	.56828
68.00	.18970
65.00	-.03745
62.00	-.26460
40.00	-1.93038
72.00	.49257
85.00	.18970

Analyze > Descriptive Statistics > Descriptives
(Select: *Saved standardizes scores as variable* **> OK**

Analyze Menu: Correlation

- **Correlation Coefficient, *r***
- **Compute correlation matrix (> 2 Variables)**
- **Indicate if correlation significant**
- **Indicate level of significance**



Analyze > Correlate > Bivarate
(Select: *Pearson or Spearman*, **Option:** *CI 95%* **> OK**

Analyze Menu: Correlation Example

- **Pearson Correlation Coefficient, *r***
- **There is a significant correlation at alpha = 0.01**

Correlations

		pass9th	pass4th
pass9th	Pearson Correlation	1	.382**
	Sig. (2-tailed)		.000
	N	93	93
pass4th	Pearson Correlation	.382**	1
	Sig. (2-tailed)	.000	
	N	93	93

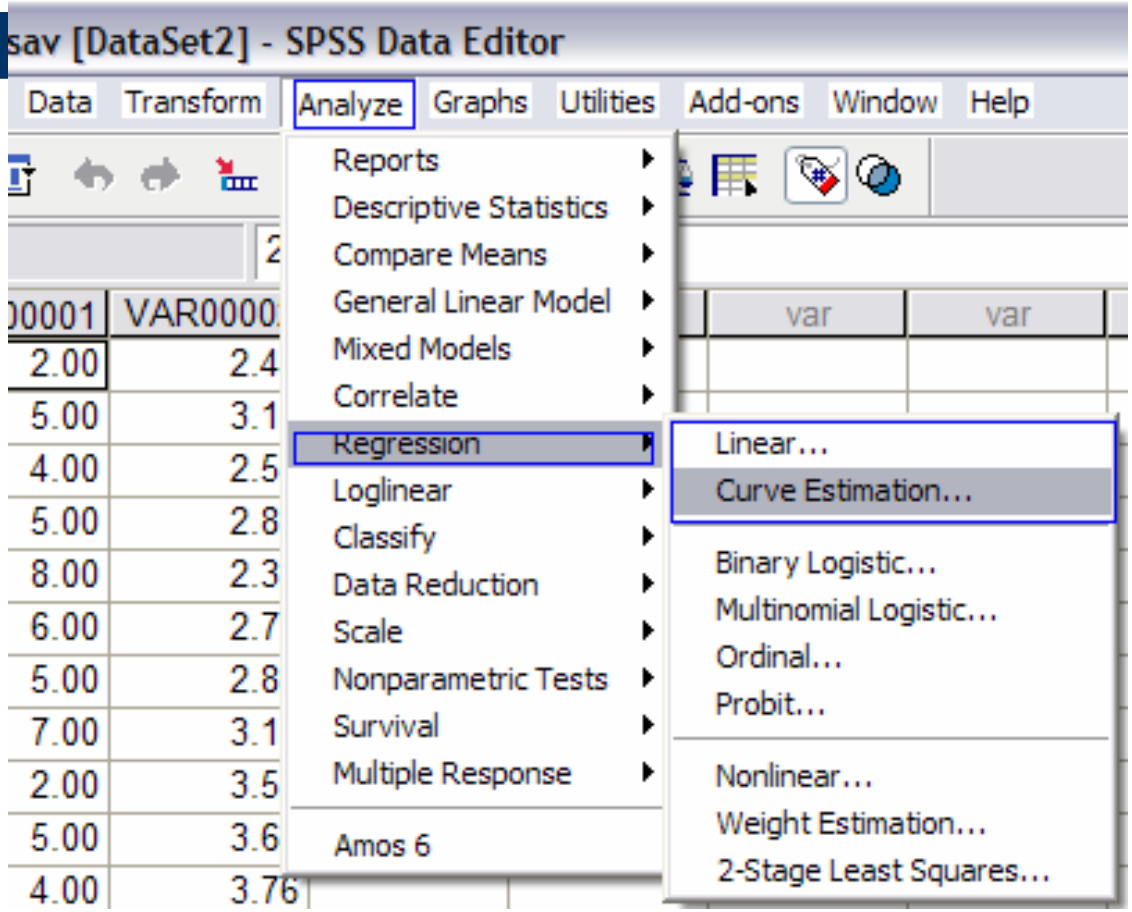
**. Correlation is significant at the 0.01 level

Analyze > Correlate > Bivarate
(Select: *Pearson*) > OK

Analyze Menu: Linear Regression

- Correlated Variables
- Formula

  $y = mx + b$
- Prediction



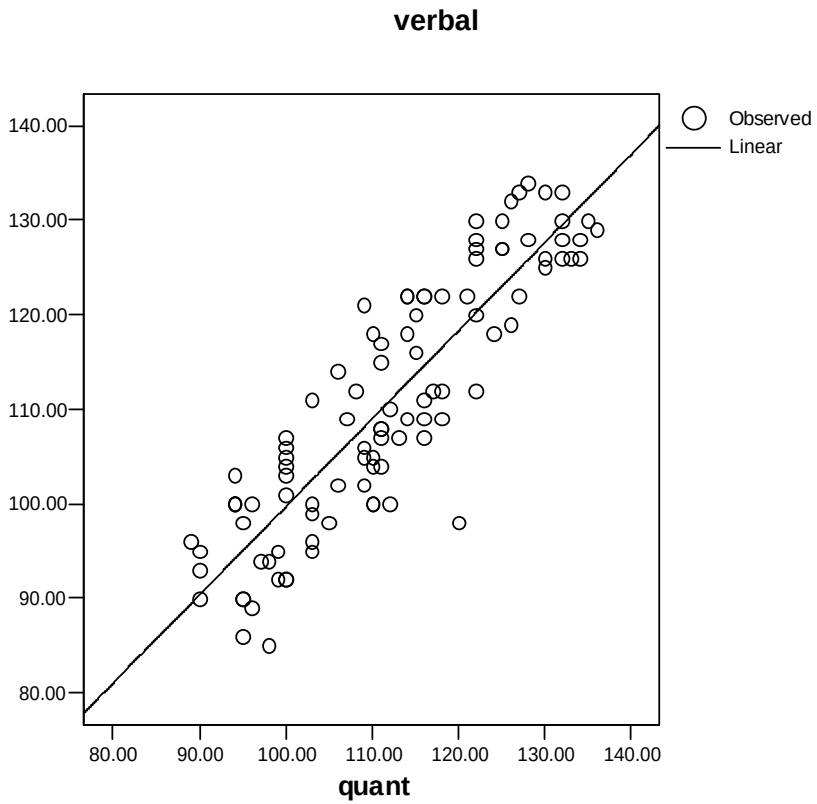
Analyze > Regression > Linear

[Select: *Linear* (for Equation) or *Curve Estimation* (for Plot)**]**

Analyze Menu: Linear Example

- Positive Linear Relationship
- Linear Formula

Verbal = 0.93(Quant) + 6.



Coefficients[a]

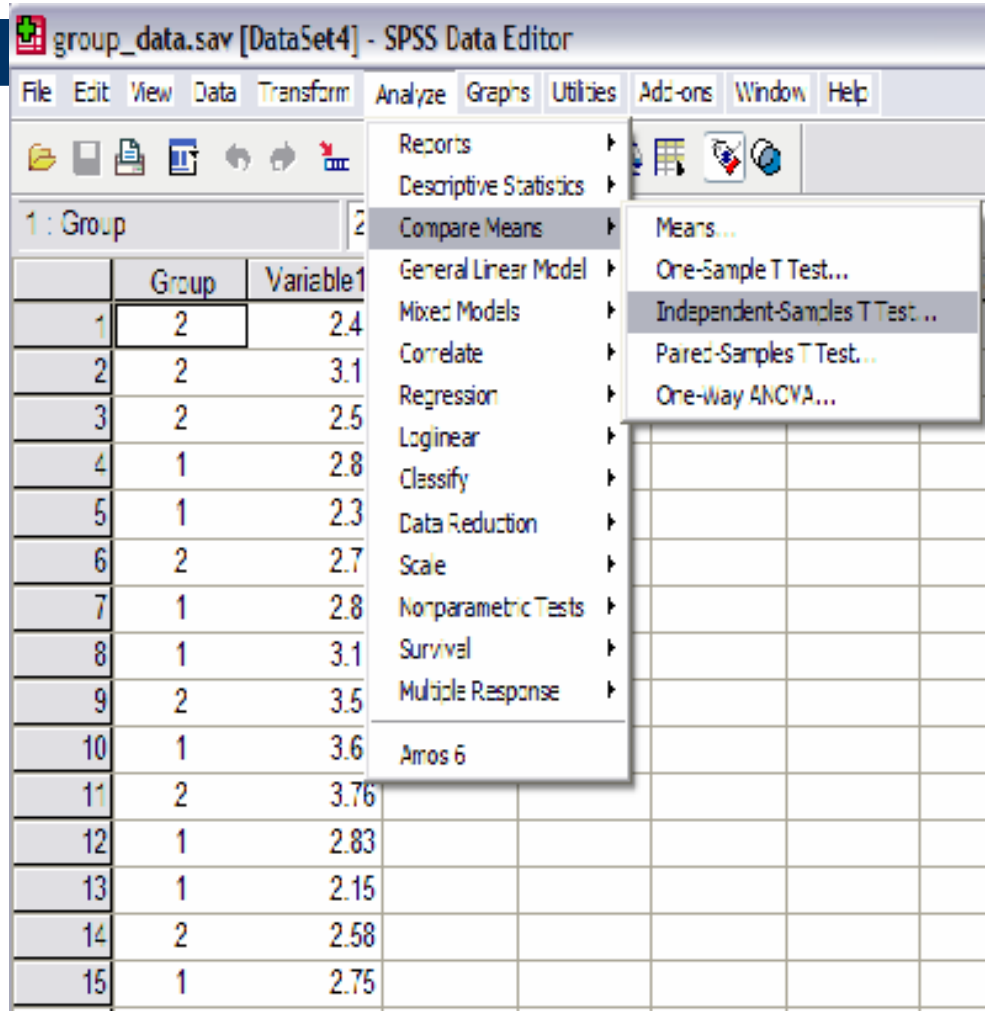
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	6.543	5.656		1.157	.250
	QUANT	.931	.050	.882	18.546	.000

a. Dependent Variable: VERBAL

Analyze Menu: Compare Means

- Statistics: *t* test
- **One-Sample T Test:**
  - *Sample mean against a reference value*
- **Independent Sample T Test**
  - *Done Related Samples*
  - *Homogeneous and Non-Homogeneous Variances*
- **Paired-Sample T Test**
  - *Correlated Samples*

Analyze > Compare Means



Analyze Menu: Compare Means Example

- Statistics: *t* test
- **Independent Sample T Test**
  - *Done Related Samples*
  - *Homogeneous Variances*

Group Statistics

	ACTIV	N	Mean	Std. Deviation	Std. Error Mean
QUANT	4.00	21	112.1429	12.02616	2.62432
	5.00	33	109.1818	13.63235	2.37309

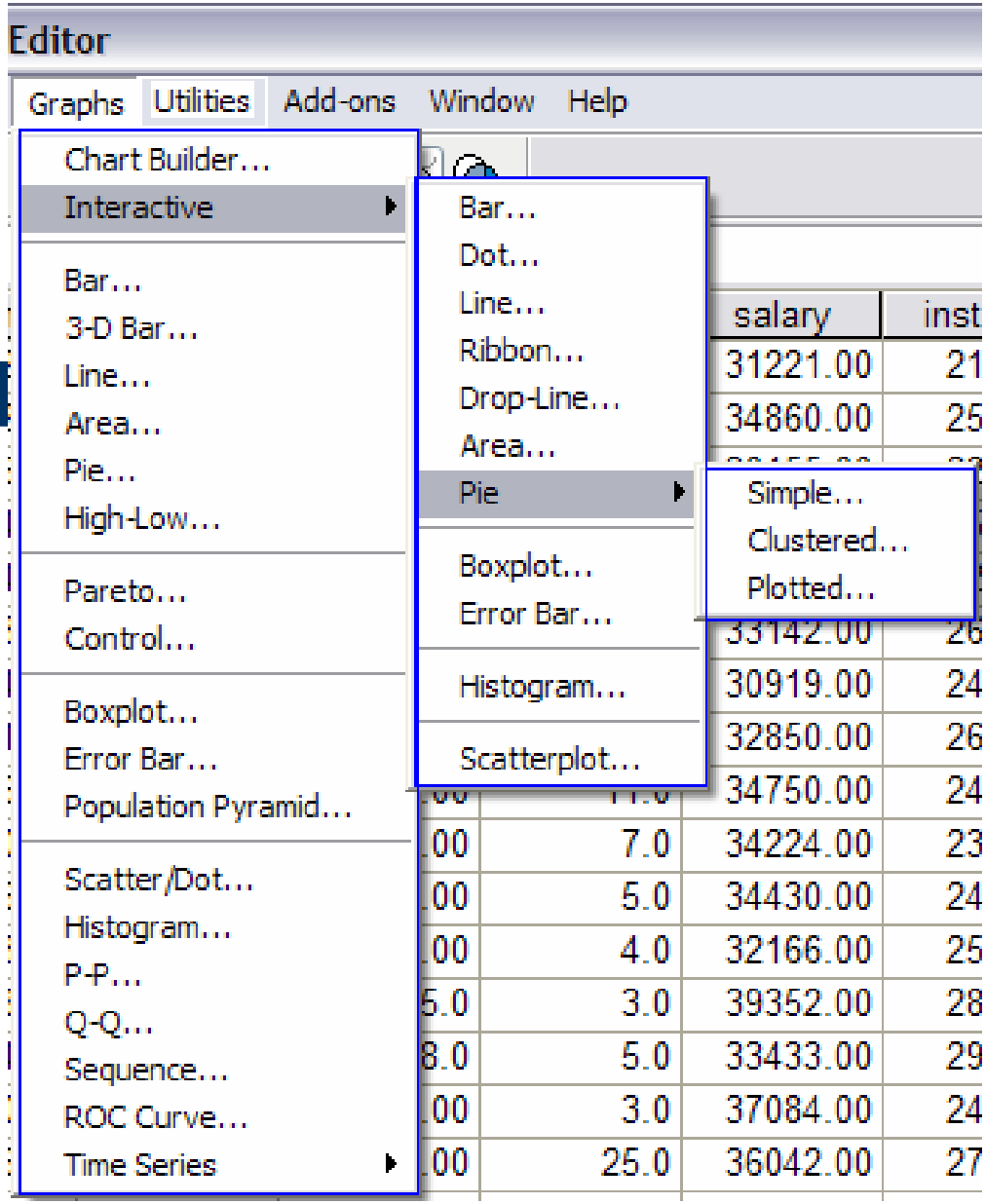
Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
QUANT	Equal variances assumed	1.123	.294	.814	52	.420	2.96104	3.63950	-4.34216	10.26423
	Equal variances not assumed			.837	46.605	.407	2.96104	3.53817	-4.15843	10.08050

Analyze > Compare Means > Independent-Sample T Test

Graph Menu

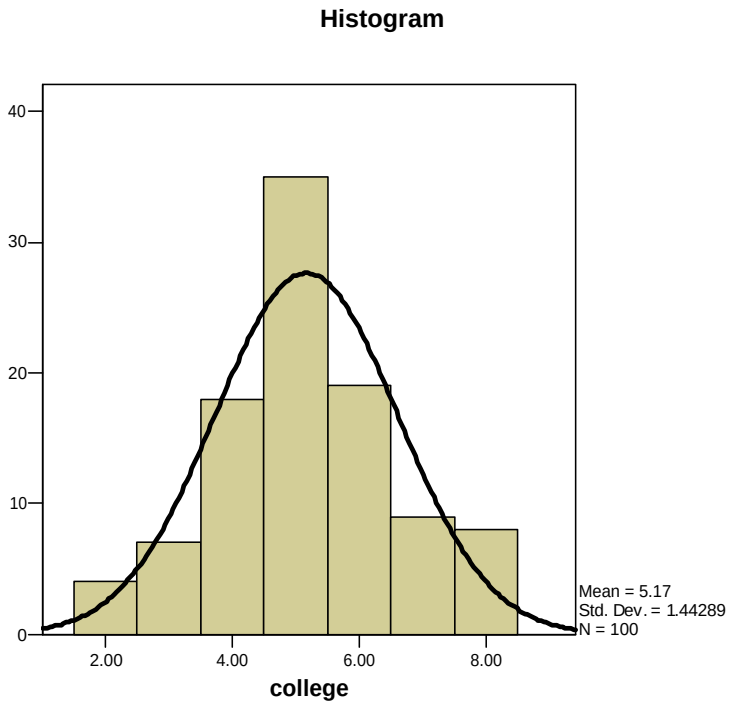
- See Help Tutorial on Graphs
- Popular Graphs
  - Histogram
  - Bar
  - Scatterplot
  - Pie



Graph > Interactive > (*Line, Pie, Histogram, Scatterplot, etc***)**

Graphs

- Outputs from Analyze Menu or Graph Menu
- Example: Frequency
- Tabular or Graphics of Distribution
  - Central Tendency
  - Variability
  - Shape of Data Set



Tables

- Result Summary of Analyze Menu
- Example: Correlation
- Measures Degree of Associations between Variables
- Correlation Coefficient, ***r***
  - *Strength*
  - *Direction of relationship*

Correlations

		verbal	quant
verbal	Pearson Correlation	1	.882**
	Sig. (2-tailed)	.	.000
	N	100	100
quant	Pearson Correlation	.882**	1
	Sig. (2-tailed)	.000	.
	N	100	100

**. Correlation is significant at the 0.01 level