

# Introduction



Course: Statistics 1

Lecturer: Dr. Courtney Pindling

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# Overview

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- **Descriptive Statistics**
  - Describes Data
- **Inference Statistics**
  - Predicts and Infers

# Descriptive Statistics

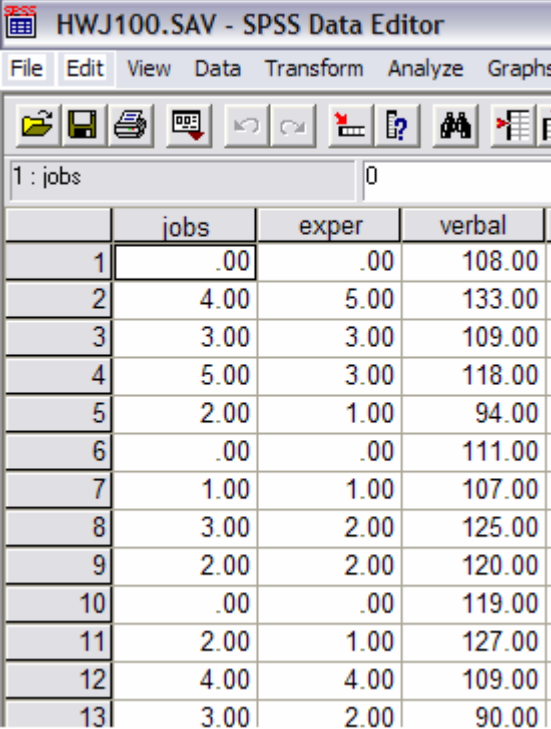
- Frequency (Distribution)
- Central Tendency
- Variability
- Standard Score
- Normal Distribution
- Correlation

# Inference Statistics

- Hypothesis Testing
- Sampling
- Comparing Means: *t*-tests
- Linear Regression
- Chi-square

# Sampling

- Sample
- Population
- Theory



HWJ100.SAV - SPSS Data Editor

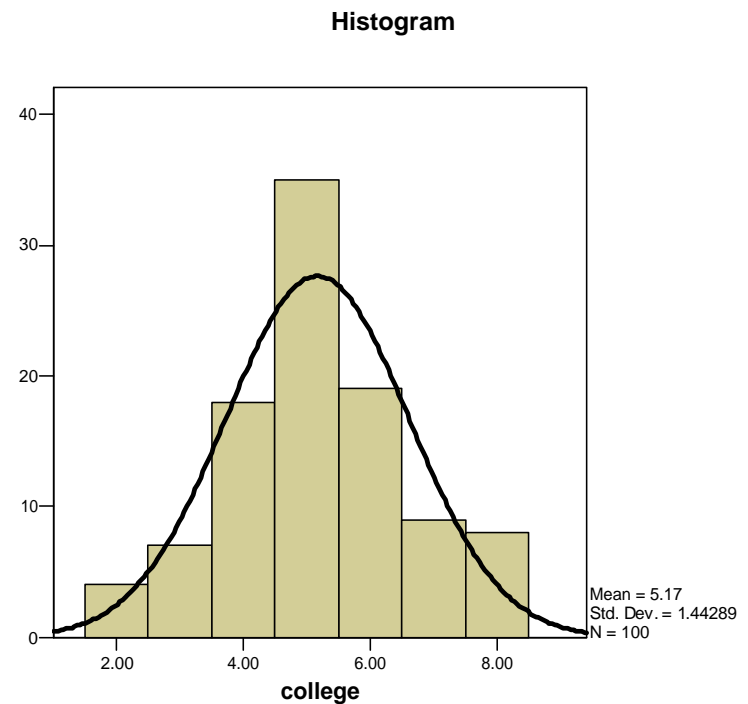
File Edit View Data Transform Analyze Graphs

1 : jobs 0

	jobs	exper	verbal
1	.00	.00	108.00
2	4.00	5.00	133.00
3	3.00	3.00	109.00
4	5.00	3.00	118.00
5	2.00	1.00	94.00
6	.00	.00	111.00
7	1.00	1.00	107.00
8	3.00	2.00	125.00
9	2.00	2.00	120.00
10	.00	.00	119.00
11	2.00	1.00	127.00
12	4.00	4.00	109.00
13	3.00	2.00	90.00

# Frequency

- Tabular or Graphics of Distribution
  - Central Tendency
  - Variability
  - Shape of Data Set



# Central Tendency

- Single value (statistics):  
Represents what's **typical** or **center** of data set
- *Means, Median, and Mode*

Statistics

quant		
N	Valid	100
	Missing	0
Mean		111.9500
Median		111.0000
Mode		100.00

# Variability

- Spread of Data
- *Range, Variance, and Standard Deviation*

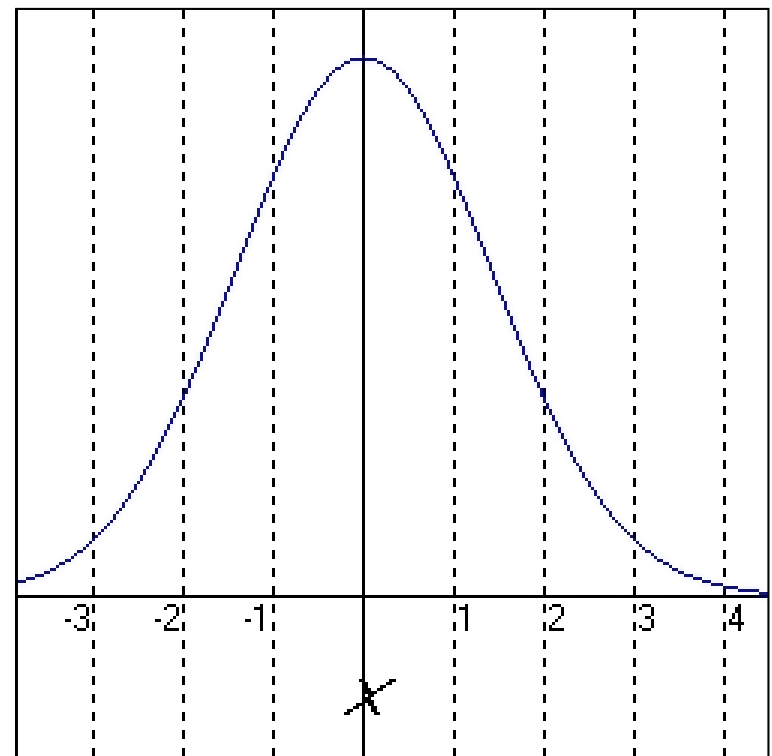
## Statistics

quant		
N	Valid	100
	Missing	0
Std. Deviation		12.61903
Variance		159.240
Range		47.00



# Standard Score and Normal Curve

- Normal Distribution
  - Symmetric Distribution
  - Known Properties
- Standard Score
  - Number of Standard Deviations from the Mean



# 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

# Hypotheses Testing

- Null Hypothesis
  - $H_0: \text{mean}(1) = \text{mean}(2)$
- Significance Level
  - Rules of *Rejection* and *Acceptance* of  $H_0$
- Statistical Tests

# Comparing Means

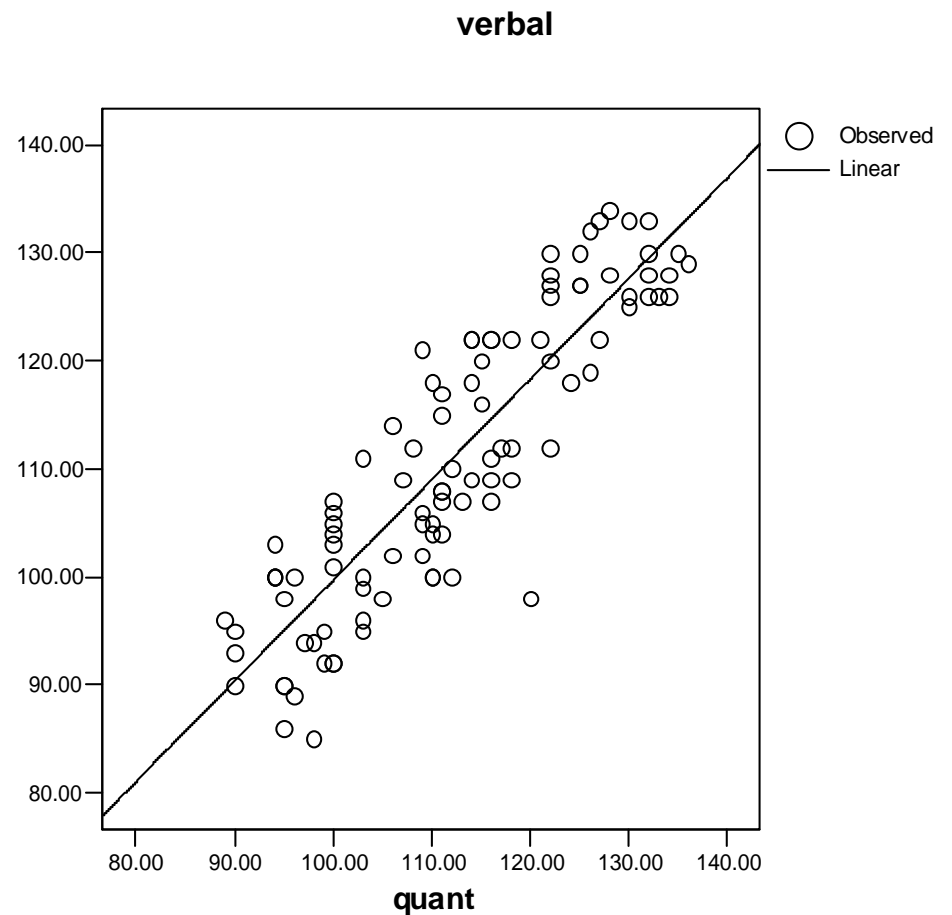
- The *t*-test
  - Mean versus Constant
  - Independent Means
  - Correlated Means

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	verbal - quant	-1.16000	6.33209	.63321	-2.41642	.09642	-1.832	99	.070

# Linear Regression

- Correlated Variables
- Linear Formula  
 $y = mx + b$
- Prediction

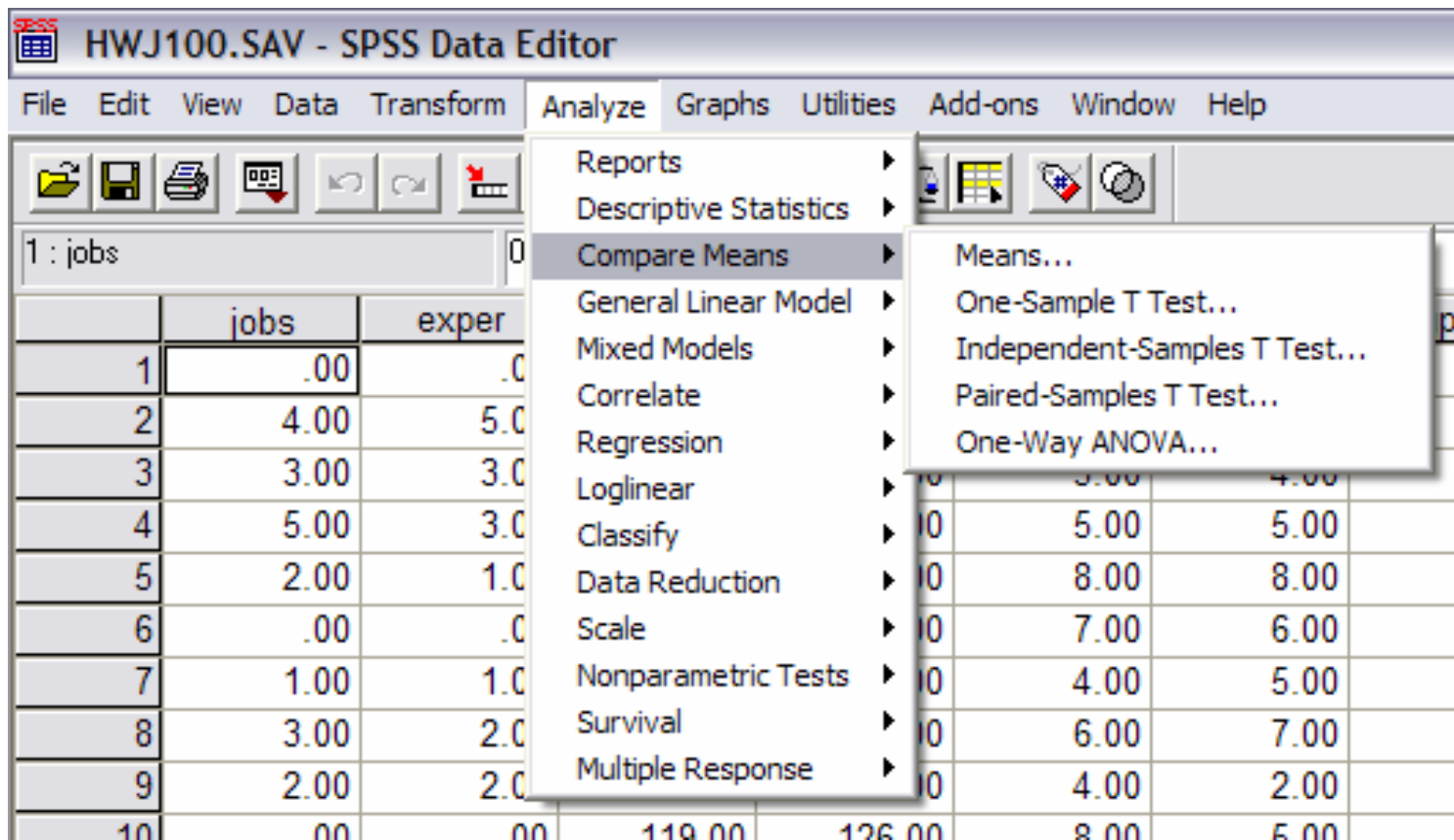


# Chi-Square of Association

- Categorical Variables
- Frequencies of Nominal Values
- Degree of Association

		Grades							Total
		2	3	4	5	6	7	8	
Sex	0	1	12	26	57	69	79	36	280
	1	2	14	40	47	52	42	23	220
Total	1	3	26	66	104	121	121	59	500

# SPSS



The screenshot shows the SPSS Data Editor window for a file named 'HWJ100.SAV'. The 'Analyze' menu is open, and the 'Compare Means' option is selected, which has opened a submenu. The submenu contains the following options: Means..., One-Sample T Test..., Independent-Samples T Test..., Paired-Samples T Test..., and One-Way ANOVA... The background data table is partially visible, showing columns for 'jobs' and 'exper'.

	jobs	exper
1	.00	.0
2	4.00	5.0
3	3.00	3.0
4	5.00	3.0
5	2.00	1.0
6	.00	.0
7	1.00	1.0
8	3.00	2.0
9	2.00	2.0
10	.00	.00