

Your temporary usage period for IBM SPSS Statistics will expire in 5666 days.

GET

FILE='C:\ALL\MA8HMATA\BIOSTATISTICS\Biology\2019\_20\E-Class\Lab\_Extra\Lab\_Extra\_2\_Flower\_Data.sav'.  
 DATASET NAME DataSet1 WINDOW=FRONT.

T-TEST PAIRS=Top WITH Bottom (PAIRED)  
 /CRITERIA=CI(.900)  
 /MISSING=ANALYSIS.

## T-Test

### Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Top	4,6300	10	1,06776	,33766
	Bottom	3,6300	10	,84990	,26876

### Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Top & Bottom	10	-,382	,276

### Paired Samples Test

		Paired Differences						t	df
		Mean	Std. Deviation	Std. Error Mean	90% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Top - Bottom	1,00000	1,59861	,50553	,07332	1,92668	1,978	9	

### Paired Samples Test

		Sig. (2-tailed)
Pair 1	Top - Bottom	,079

EXAMINE VARIABLES=Top Bottom  
 /PLOT BOXPLOT NPLOT  
 /COMPARE GROUPS  
 /STATISTICS NONE  
 /CINTERVAL 95  
 /MISSING LISTWISE  
 /NOTOTAL.

## Explore

## Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Top	10	100,0%	0	0,0%	10	100,0%
Bottom	10	100,0%	0	0,0%	10	100,0%

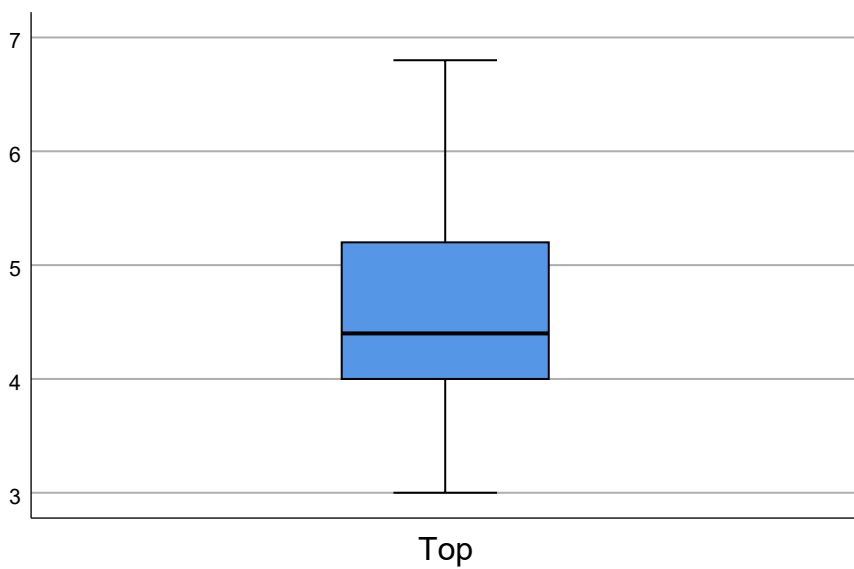
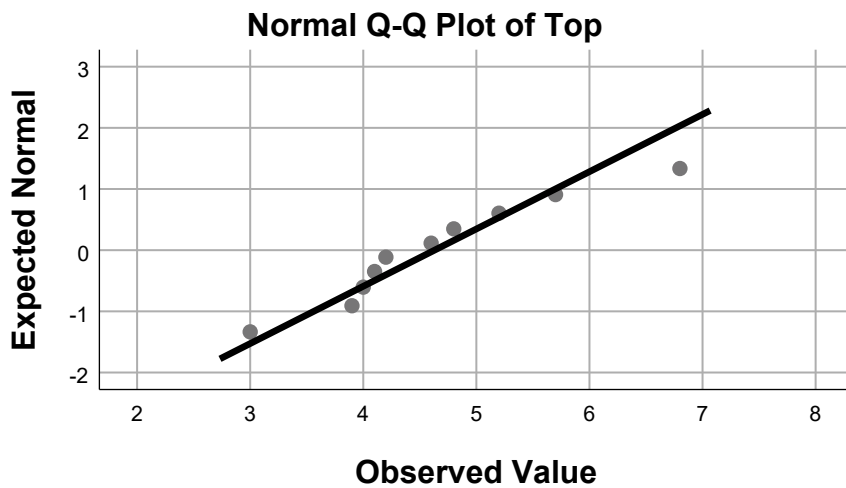
## Tests of Normality

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Top	,156	10	,200 <sup>*</sup>	,956	10	,736
Bottom	,149	10	,200 <sup>*</sup>	,943	10	,586

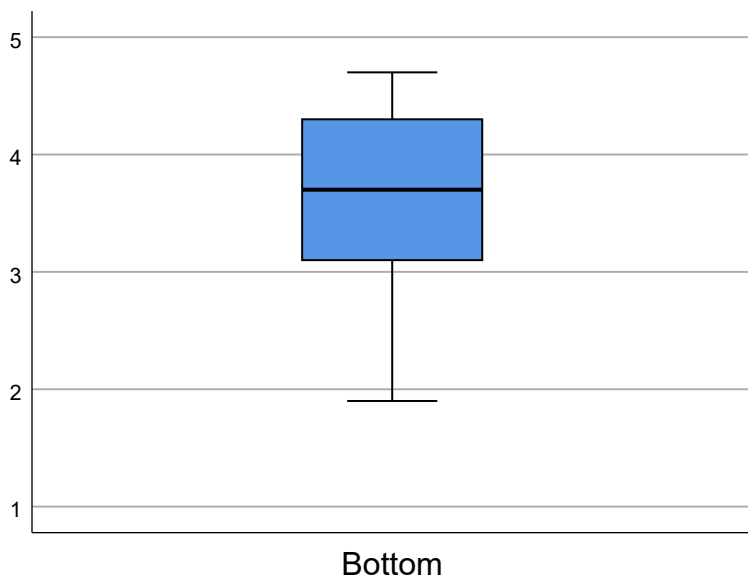
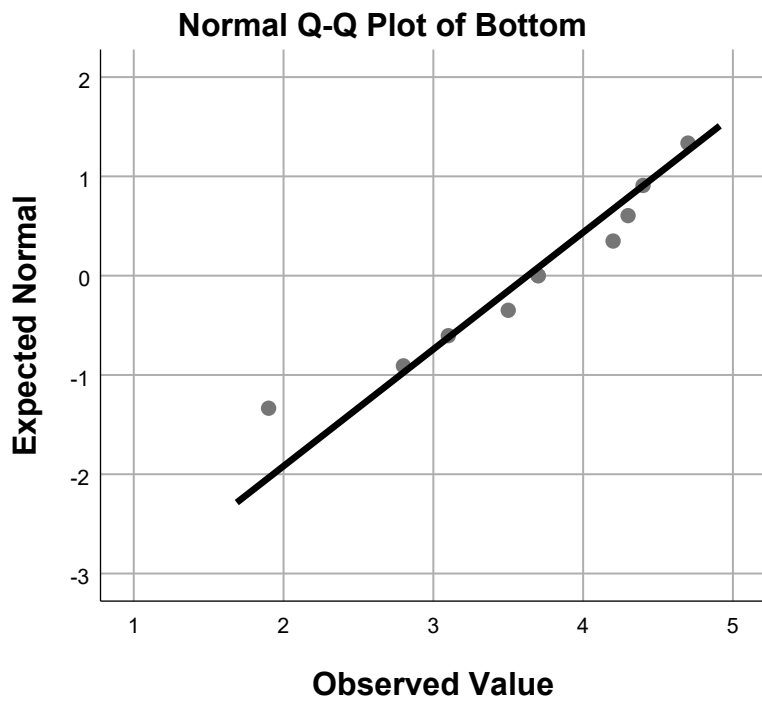
\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Top



Bottom



```

GET
  FILE='C:\ALL\MA8HMATA\BIOSTATISTICS\Biology\2019_20\E-Class\Lab_Extra\Lab_Extra_2_Seeds_Data
.sav'.
DATASET NAME DataSet2 WINDOW=FRONT.
NPAR TESTS
  /CHISQUARE=Type_Seeds
  /EXPECTED=9 3 3 1
  /MISSING ANALYSIS.

```

## NPar Tests

[DataSet2] C:\ALL\MA8HMATA\BIOSTATISTICS\Biology\2019\_20\E-Class\Lab\_Extra\Lab\_Extra\_2\_Seeds\_Data.sav

## Chi-Square Test

## Frequencies

## Type\_Seeds

	Observed N	Expected N	Residual
Yellow smooth	152	140,6	11,4
Yeloww wrinkled	39	46,9	-7,9
Green smooth	53	46,9	6,1
Green wrinkled	6	15,6	-9,6
Total	250		

## Test Statistics

Type_Seeds	
Chi-Square	8,972 <sup>a</sup>
df	3
Asymp. Sig.	,030

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 15,6.

GET

FILE='C:\ALL\MA8HMATA\BIOSTATISTICS\Biology\2019\_20\E-Class\Lab\_Extra\Lab\_Extra\_2\_Euro\_Cities\_Data.sav'.

DATASET NAME DataSet3 WINDOW=FRONT.

CROSSTABS

/TABLES=Answer BY Cities

/FORMAT=AVALUE TABLES

/STATISTICS=CHISQ

/CELLS=COUNT EXPECTED

/COUNT ROUND CELL.

## Crosstabs

[DataSet3] C:\ALL\MA8HMATA\BIOSTATISTICS\Biology\2019\_20\E-Class\Lab\_Extra\Lab\_Extra\_2\_Euro\_Cities\_Data.sav

## Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Answer * Cities	800	100,0%	0	0,0%	800	100,0%

## Answer \* Cities Crosstabulation

		Cities					
		A	B	Г	Δ	Total	
Answer	No	Count	124	147	141	152	564
		Expected Count	141,0	141,0	141,0	141,0	564,0
	Yes	Count	76	53	59	48	236
		Expected Count	59,0	59,0	59,0	59,0	236,0
Total		Count	200	200	200	200	800
		Expected Count	200,0	200,0	200,0	200,0	800,0

## Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	10,722 <sup>a</sup>	3	,013
Likelihood Ratio	10,535	3	,015
Linear-by-Linear Association	7,304	1	,007
N of Valid Cases	800		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 59,00.

## NPAR TESTS

```
/BINOMIAL (0.50)=Answer (0)
/MISSING ANALYSIS.
```

## NPar Tests

### Binomial Test

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Answer	Group 1	<= 0	564	,71	,50	,000
	Group 2	> 0	236	,30		
Total			800	1,00		

## T-TEST

```
/TESTVAL=0.5
/MISSING=ANALYSIS
/VARIABLES=Answer
/CRITERIA=CI (.90).
```

## T-Test

### One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Answer	800	,2950	,45633	,01613

## One-Sample Test

	t	df	Sig. (2-tailed)	Mean Difference	90% Confidence Interval of the Difference	
					Lower	Upper
Answer	-12,706	799	,000	-,20500	-,2316	-,1784

GRAPH

/PIE=PCT BY Answer

/PANEL COLVAR=Cities COLOP=CROSS.

## Graph

Cities

Answer

A

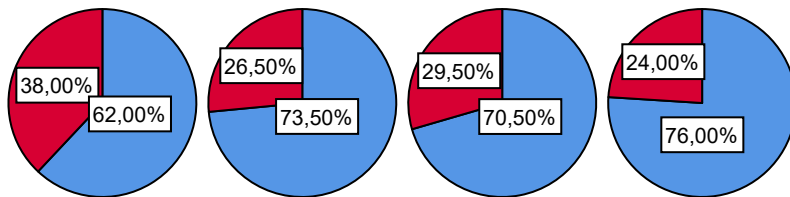
B

Γ

Δ

■ No

■ Yes



Cases weighted by Frequency

GET

FILE='C:\ALL\MA8HMATA\BIOSTATISTICS\Biology\2019\_20\E-Class\Lab\_Extra\Lab\_Extra\_2\_Birds.sav'

DATASET NAME DataSet4 WINDOW=FRONT.

FREQUENCIES VARIABLES=Y

/FORMAT=NOTABLE

/STATISTICS=VARIANCE MEAN

/ORDER=ANALYSIS.

## Frequencies

[DataSet4] C:\ALL\MA8HMATA\BIOSTATISTICS\Biology\2019\_20\E-Class\Lab\_Extra\Lab\_Extra\_2\_Birds.sav

## Statistics

Wings Length

N	Valid	13
	Missing	1
Mean		3,4154
Variance		1,638

```
DATASET ACTIVATE DataSet1.
```

```
DATASET CLOSE DataSet5.
```

```
DATASET ACTIVATE DataSet4.
```

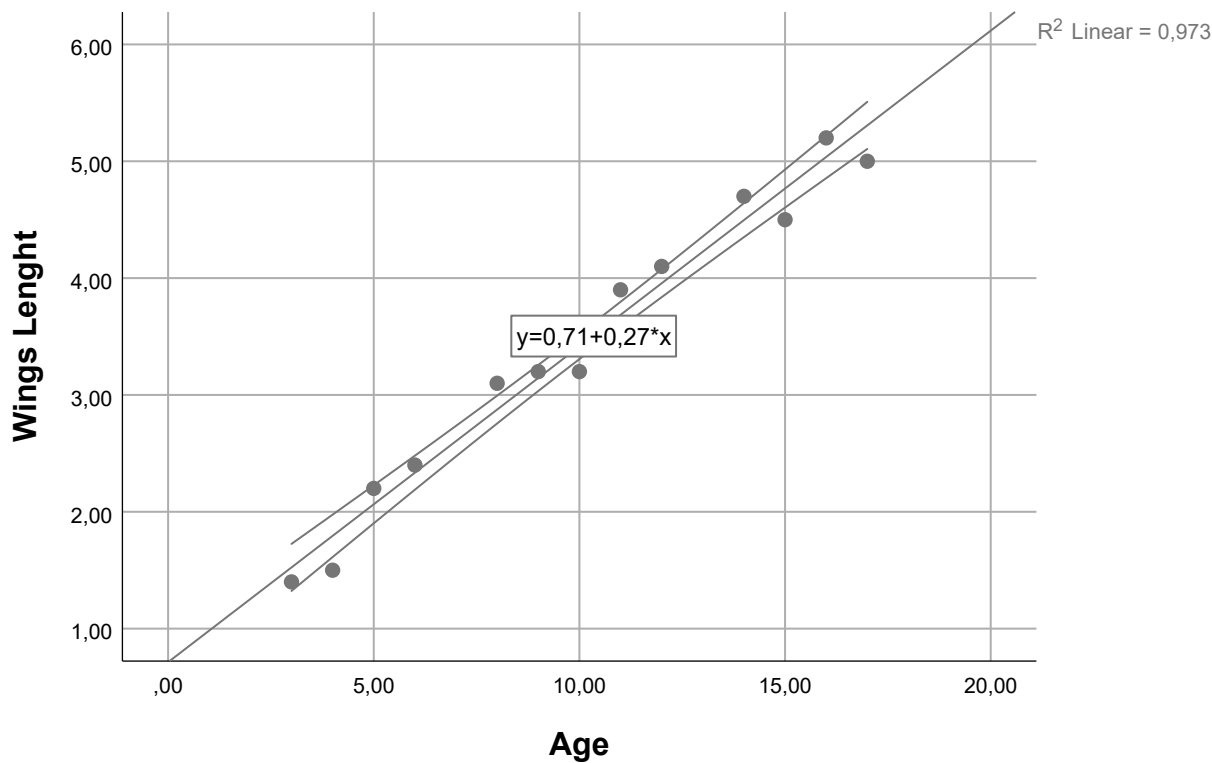
```
GRAPH
```

```
/SCATTERPLOT(BIVAR)=X WITH Y
```

```
/MISSING=LISTWISE.
```

## Graph

```
[DataSet4] C:\ALL\MA8HMATA\BIOSTATISTICS\Biology\2019_20\E-Class\Lab_Extra\Lab_Extra_2_Birds  
av
```



```
REGRESSION
```

```
/MISSING LISTWISE
```

```
/STATISTICS COEFF OUTS CI(90) R ANOVA
```

```
/CRITERIA=PIN(.05) POUT(.10) CIN(90)
```

```
/NOORIGIN
```

```
/DEPENDENT Y
```

```
/METHOD=ENTER X
```

```
/SCATTERPLOT=(*ZRESID , *ZPRED)
```

```
/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID)
```

```
/SAVE PRED MCIN RESID ZRESID.
```

# Regression

## Variables Entered/Removed<sup>a</sup>

Model	Variables Entered	Variables Removed	Method
1	Age <sup>b</sup>	.	Enter

a. Dependent Variable: Wings Lenght

b. All requested variables entered.

## Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,987 <sup>a</sup>	,973	,971	,21841

a. Predictors: (Constant), Age

b. Dependent Variable: Wings Lenght

## ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19,132	1	19,132	401,087	,000 <sup>b</sup>
	Residual	,525	11	,048		
	Total	19,657	12			

a. Dependent Variable: Wings Lenght

b. Predictors: (Constant), Age

## Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	90,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	,713	,148		4,821	,001	,447	,979
	Age	,270	,013	,987	20,027	,000	,246	,294

a. Dependent Variable: Wings Lenght



## Residuals Statistics<sup>a</sup>

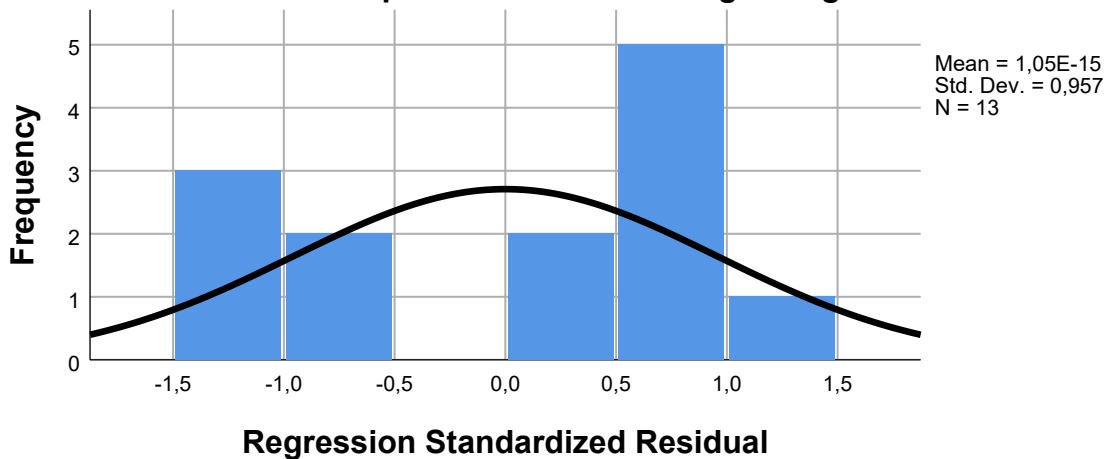
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1,5238	5,3070	3,4154	1,26268	13
Std. Predicted Value	-1,498	1,498	,000	1,000	13
Standard Error of Predicted Value	,061	,112	,084	,019	13
Adjusted Predicted Value	1,5682	5,4171	3,4255	1,26438	13
Residual	-,30699	,22507	,00000	,20911	13
Std. Residual	-1,406	1,031	,000	,957	13
Stud. Residual	-1,638	1,082	-,021	1,054	13
Deleted Residual	-,41707	,24793	-,01008	,25420	13
Stud. Deleted Residual	-1,797	1,091	-,049	1,091	13
Mahal. Distance	,000	2,244	,923	,827	13
Cook's Distance	,003	,481	,113	,139	13
Centered Leverage Value	,000	,187	,077	,069	13

a. Dependent Variable: Wings Lenght

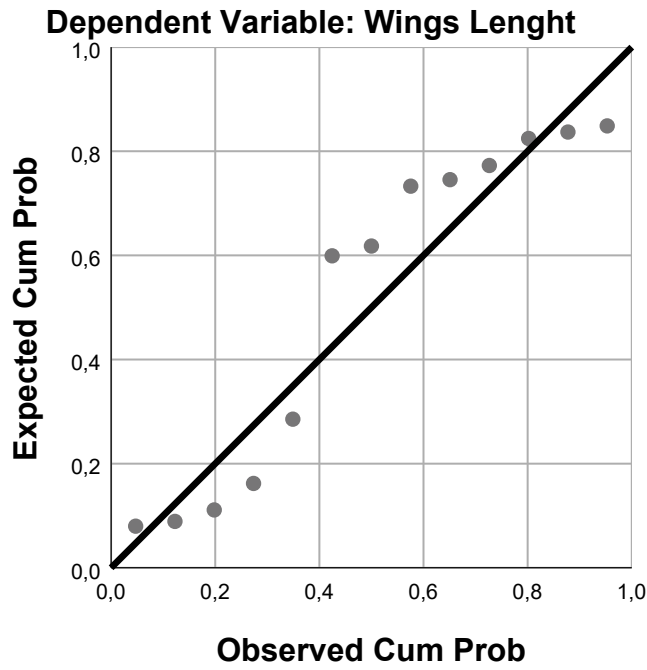
## Charts

### Histogram

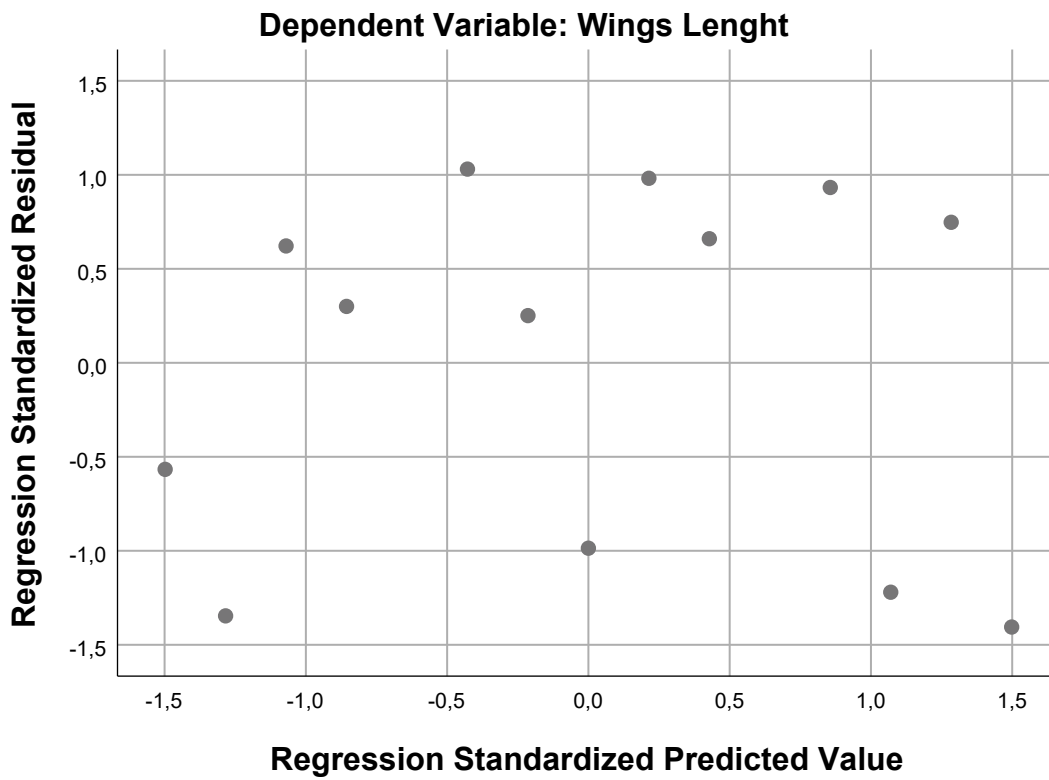
#### Dependent Variable: Wings Lenght



# Normal P-P Plot of Regression Standardized Residual



## Scatterplot



```
EXAMINE VARIABLES=RES_1 ZRE_1  
/PLOT BOXPLOT NPLOT  
/COMPARE GROUPS  
/STATISTICS NONE  
/CINTERVAL 95  
/MISSING LISTWISE  
/NOTOTAL.
```

Explore

## Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
Unstandardized Residual	13	92,9%	1	7,1%	14	100,0%
Standardized Residual	13	92,9%	1	7,1%	14	100,0%

## Tests of Normality

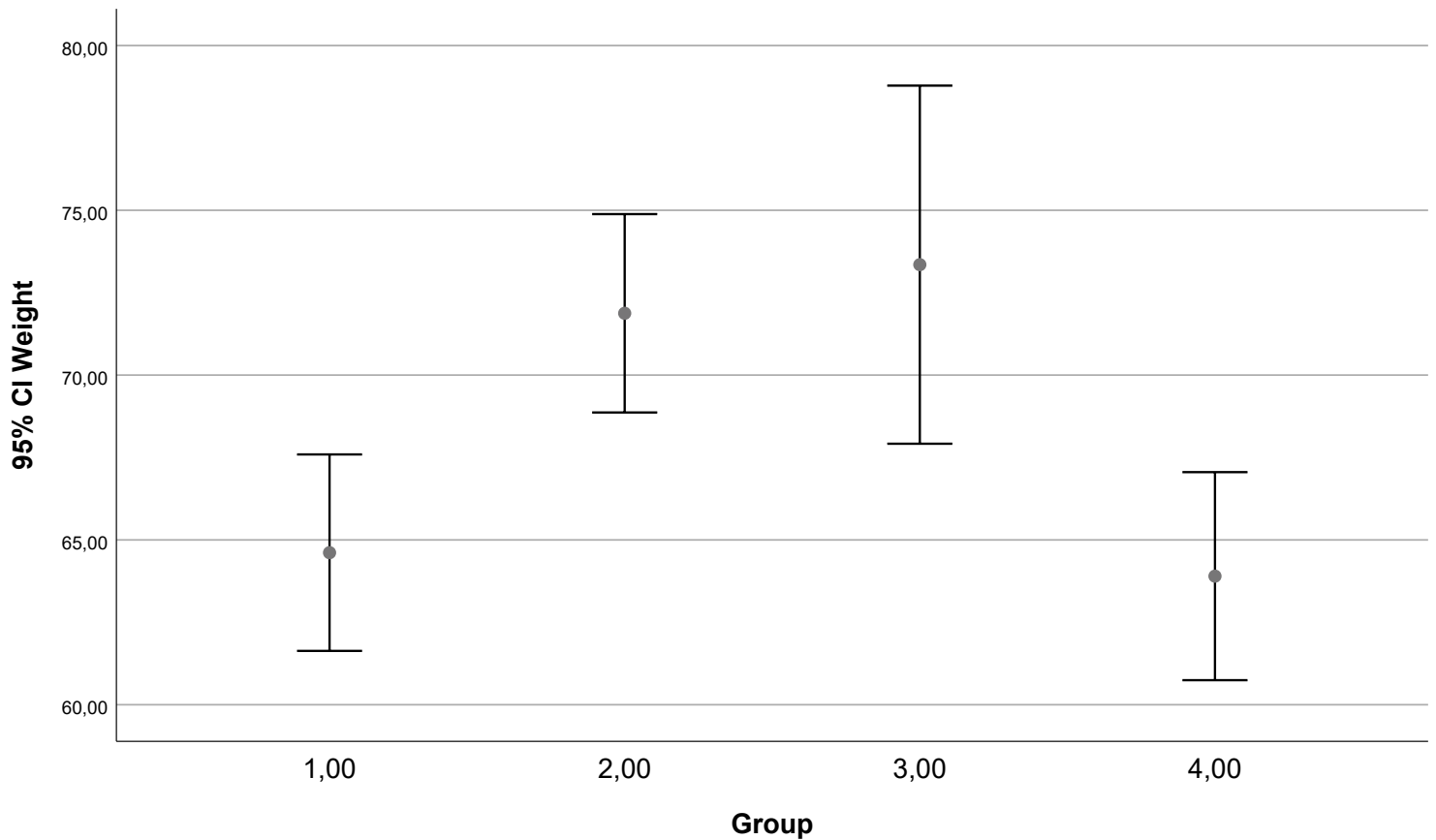
	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Unstandardized Residual	,219	13	,089	,845	13	,025
Standardized Residual	,219	13	,089	,845	13	,025

a. Lilliefors Significance Correction

$x=7,00$   $\hat{y}=2,60470$  Δ.Ε. σ.ε. 90% για μέση πρόβλεψη 2,47386 2,73554

GRAPH  
/ERRORBAR(CI 95)=Weight BY Group.

## Graph



ONEWAY Weight BY Group  
/STATISTICS DESCRIPTIVES HOMOGENEITY

## Oneway

### Descriptives

Weight

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1,00	8	64,6125	3,56468	1,26031	61,6324	67,5926	59,90	69,30
2,00	8	71,8750	3,59990	1,27276	68,8654	74,8846	67,70	78,20
3,00	4	73,3500	3,41419	1,70709	67,9173	78,7827	69,60	77,10
4,00	9	63,9000	4,10548	1,36849	60,7442	67,0558	59,80	73,40
Total	29	67,6000	5,42000	1,00647	65,5383	69,6617	59,80	78,20

### Test of Homogeneity of Variances

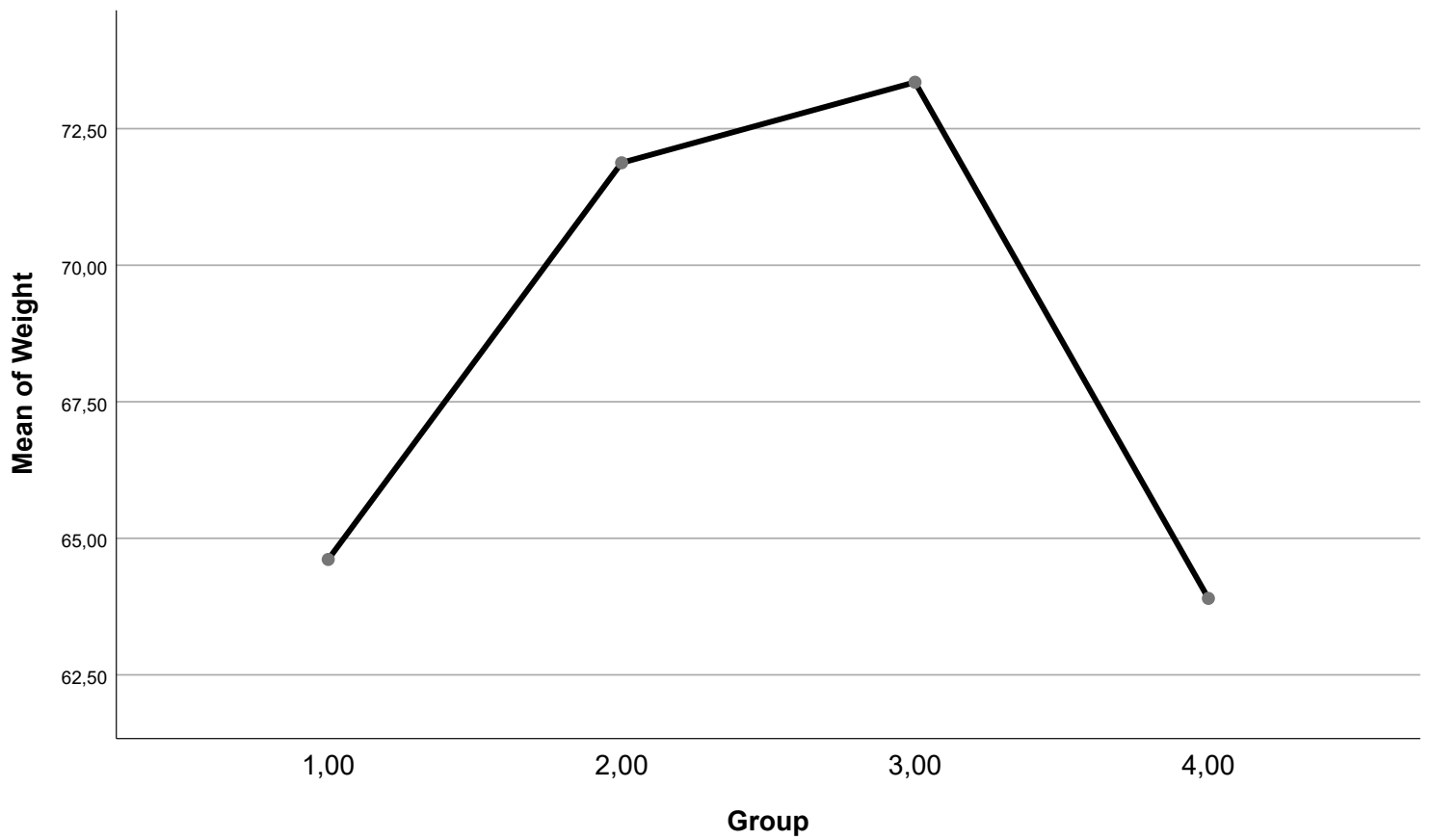
		Levene Statistic	df1	df2	Sig.
Weight	Based on Mean	,006	3	25	,999
	Based on Median	,031	3	25	,993
	Based on Median and with adjusted df	,031	3	18,419	,992
	Based on trimmed mean	,009	3	25	,999

### ANOVA

Weight

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	473,066	3	157,689	11,280	,000
Within Groups	349,474	25	13,979		
Total	822,540	28			

## Means Plots



```
T-TEST GROUPS=Group(2 3)
/MISSING=ANALYSIS
/VARIABLES=Weight
/CRITERIA=CI(.90).
```

## T-Test

### Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Weight	2,00	8	71,8750	3,59990	1,27276
	3,00	4	73,3500	3,41419	1,70709

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Weight	Equal variances assumed	,005	,945	-,679	10	,512	-1,47500
	Equal variances not assumed			-,693	6,413	,513	-1,47500

## Independent Samples Test

		t-test for Equality of Means		
		Std. Error Difference	90% Confidence Interval of the Difference	
			Lower	Upper
Weight	Equal variances assumed	2,17099	-5,40983	2,45983
	Equal variances not assumed	2,12934	-5,56545	2,61545

```
T-TEST GROUPS=Group(1 2)
/MISSING=ANALYSIS
/VARIABLES=Weight
/CRITERIA=CI(.90).
```

## T-Test

### Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Weight	1,00	8	64,6125	3,56468	1,26031
	2,00	8	71,8750	3,59990	1,27276

## Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Weight	Equal variances assumed						
	Equal variances not assumed			-4,055	13,999	,001	-7,26250

## Independent Samples Test

		t-test for Equality of Means		
		Std. Error Difference	90% Confidence Interval of the Difference	
			Lower	Upper
Weight	Equal variances assumed	1,79117	-10,41730	-4,10770
	Equal variances not assumed	1,79117	-10,41732	-4,10768

```
T-TEST GROUPS=Group(1 4)
/MISSING=ANALYSIS
/VARIABLES=Weight
/CRITERIA=CI(.90).
```

## T-Test

### Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Weight	1,00	8	64,6125	3,56468	1,26031
	4,00	9	63,9000	4,10548	1,36849

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Weight	Equal variances assumed	,003	,958	,380	15	,710	,71250
	Equal variances not assumed			,383	14,996	,707	,71250

### Independent Samples Test

		t-test for Equality of Means		
		Std. Error Difference	90% Confidence Interval of the Difference	
			Lower	Upper
Weight	Equal variances assumed	1,87686	-2,57773	4,00273
	Equal variances not assumed	1,86042	-2,54895	3,97395

EXAMINE VARIABLES=Weight BY Group

/PLOT BOXPLOT NPLOT

/COMPARE GROUPS

/STATISTICS NONE

/CINTERVAL 95

/MISSING LISTWISE

/NOTOTAL.

## Explore

### Group

#### Case Processing Summary

		Cases					
		Valid		Missing		Total	
Group	N	Percent	N	Percent	N	Percent	
Weight	1,00	8	100,0%	0	0,0%	8	100,0%
	2,00	8	100,0%	0	0,0%	8	100,0%
	3,00	4	100,0%	0	0,0%	4	100,0%
	4,00	9	100,0%	0	0,0%	9	100,0%

## Tests of Normality

	Group	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Weight	1,00	,168	8	,200*	,932	8	,535
	2,00	,186	8	,200*	,936	8	,572
	3,00	,206	4	.	,952	4	,729
	4,00	,249	9	,115	,829	9	,044

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

