

آزمون های مقایسه ایی ناپارامتری

**Nonparametric comparative tests**

# نقش متغیر ها

اصلی  
زمینه ای

مطالعات توصیفی

وابسته  
مستقل  
مداخله گر

مطالعات تحلیلی

# مقیاس ها

پیوسته (مثل سن)

کمی

گسسته (تعداد فرزندان)

ترتیبی (درجه تحصیلات)

کیفی

اسمی (از لحاظ ارزشی تفاوتی وجود ندارد مثل گروه خونی)

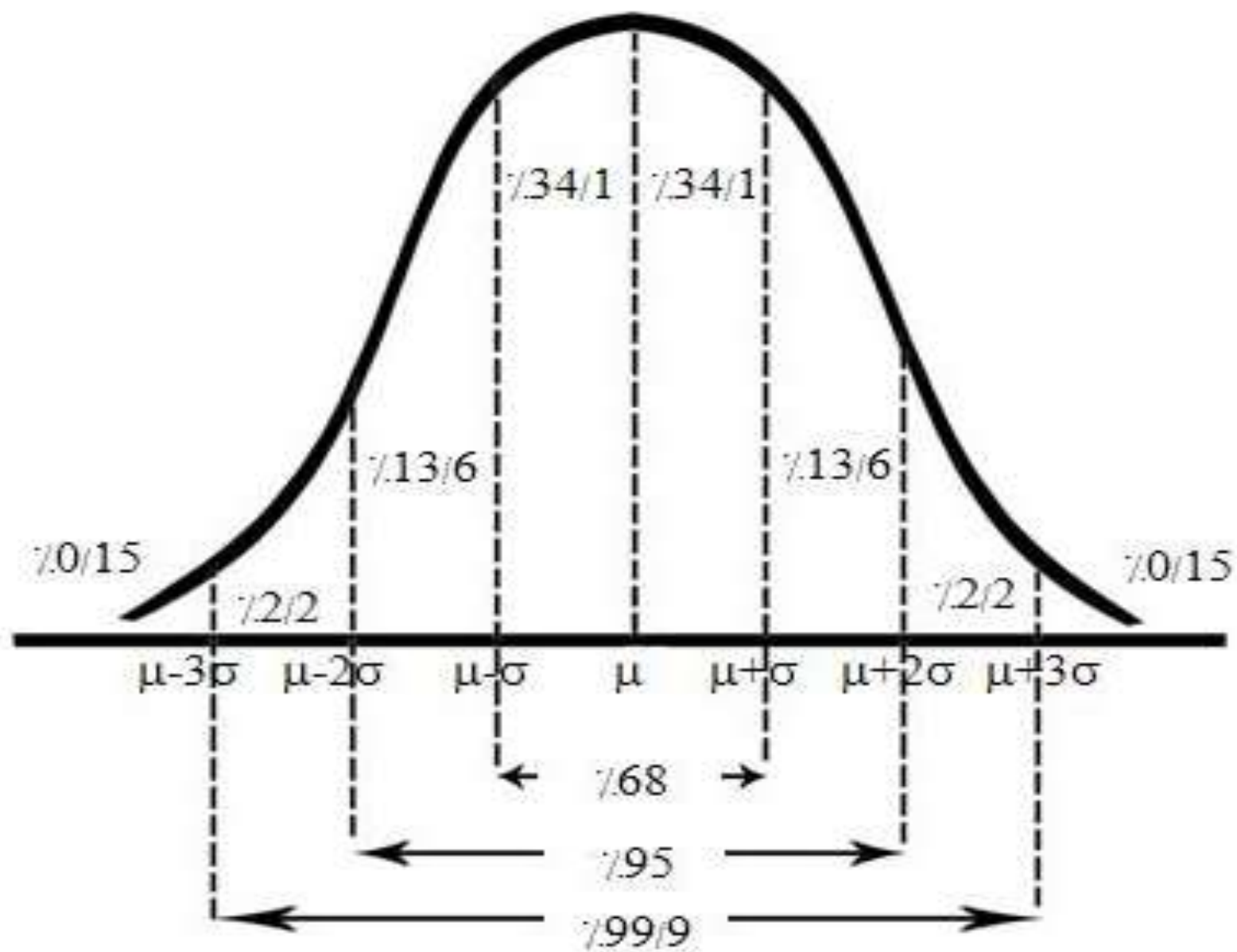
برای متغیرهای کمی  
که دارای توزیع **نرمال**  
باشند استفاده می  
شوند.

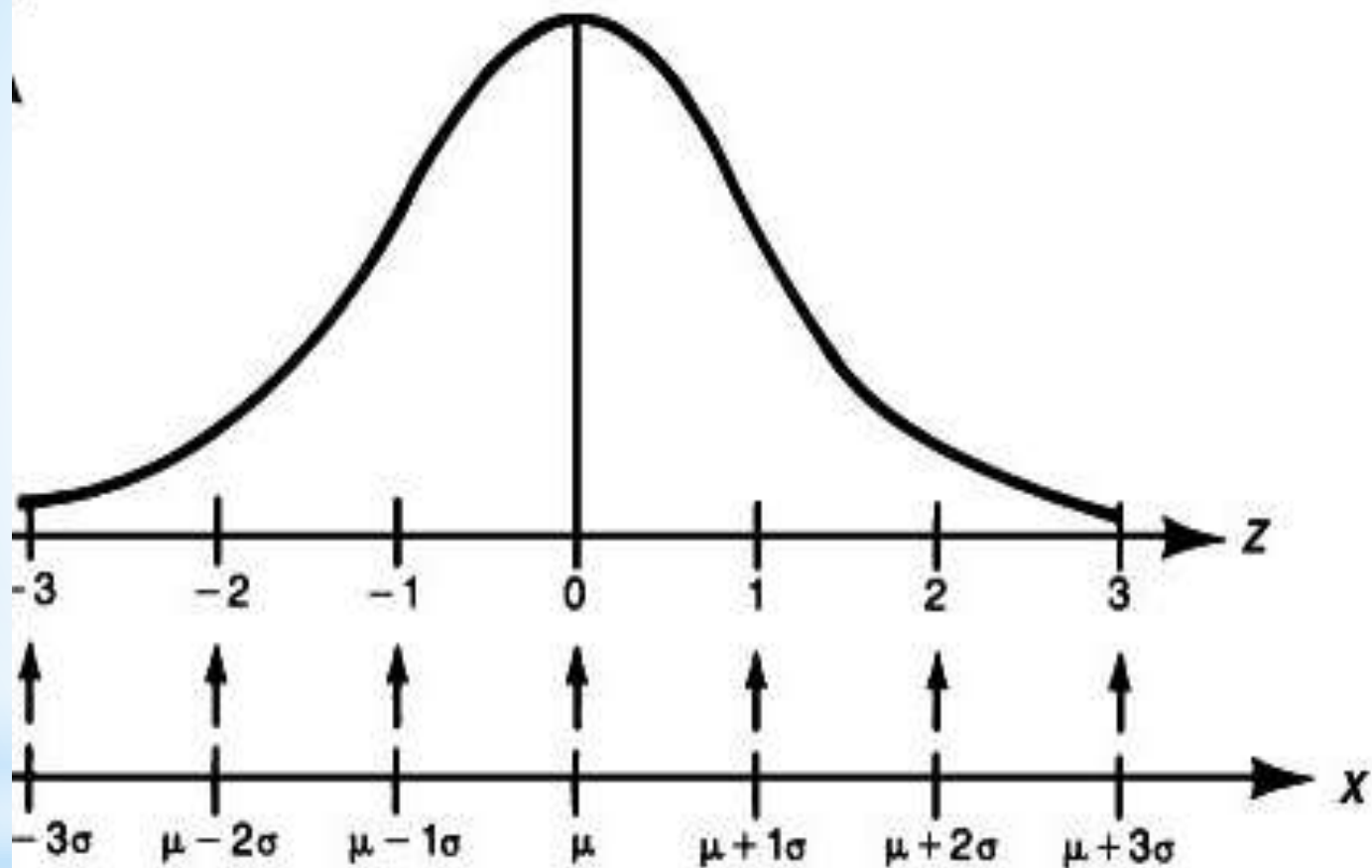
پارامتری

آزمون های  
مقایسه ایی

ناپارامتری

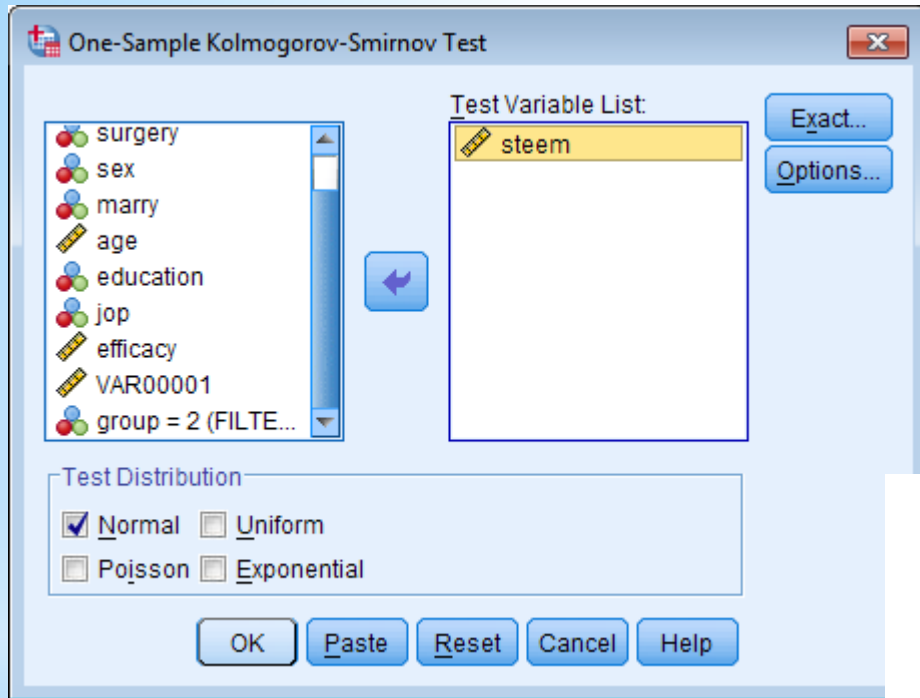
برای متغیرهای کمی که  
دارای توزیع **غیر نرمال**  
باشند، متغیرهای **رتبه**  
**ای** و **اسمی** استفاده می  
شوند.





The Translation of  $X$  to  $Z$  by the Transformation  $Z = (X - \mu) / \sigma$





$H_0 =$  توزیع نرمال است

$H_1 =$  توزیع نرمال نیست

$\text{sig}(p) > 0.05 \rightarrow$  reject  $H_1 =$  accept  $H_0$

**One-Sample Kolmogorov-Smirnov Test**

		steem
N		100
Normal Parameters <sup>a, b</sup>	Mean	35.5300
	Std. Deviation	7.39431
Most Extreme Differences	Absolute	.111
	Positive	.053
	Negative	-.111
Kolmogorov-Smirnov Z		1.108
Asymp. Sig. (2-tailed)		.171

a. Test distribution is Normal.  
b. Calculated from data.



	Number of groups	groups	The studied variable	exam type
1	two groups	Independent	Scale(NORMAL)	T test
2	two groups	Independent	ordinal & Scale Unnormal	Mann-whitney
3	two groups	Independent	nominal	Chi-square
4	two groups	Dependent	Scale(NORMAL)	Paired T-test
5	two groups	Dependent	ordinal & Scale Unnormal	wilcoxon
6	two groups	Dependent	nominal	McNemar
7	More than two groups	Independent	Scale(NORMAL)	ANOVA
8	More than two groups	Independent	ordinal & Scale Unnormal	Kruscal-Wallis
9	More than two groups	Independent	nominal	Chi-square
10	More than two groups	Dependent	Scale(NORMAL)	Repeated measures
11	More than two groups	Dependent	ordinal & Scale Unnormal	friedman
12	More than two groups	Dependent	nominal	cochran



- Reports ▶
- Descriptive Statistics ▶
- Tables ▶
- Compare Means ▶
- General Linear Model ▶
- Generalized Linear Models ▶
- Mixed Models ▶
- Correlate ▶
- Regression ▶
- Loglinear ▶
- Neural Networks ▶
- Classify ▶
- Dimension Reduction ▶
- Scale ▶
- Nonparametric Tests ▶**
- Forecasting ▶
- Survival ▶
- Multiple Response ▶
- Missing Value Analysis...
- Multiple Imputation ▶
- Complex Samples ▶
- Quality Control ▶
- ROC Curve...



	A1	A2	A5	A6	A7	A8	A9	A
1	11.00	1.0	.	3.00	1.00	2.00	162.00	
2	139.00	2.0	.	8.00	1.00	1.00	174.00	
3	73.00	1.0	.	2.00	3.00	2.00	190.00	
4	209.00	1.0	.	2.00	3.00	2.00	190.00	
5	197.00	1.0	.	6.00	1.00	2.00	183.00	
6	195.00	1.0	.	5.00	1.00	2.00	172.00	
7	44.00	1.0	.	7.00	1.00	2.00	172.00	
8	46.00	1.0	.	8.00	1.00	2.00	183.00	
9	198.00	1.0	.	3.00	1.00	2.00	180.00	
10	47.00	1.0	.	1.00	1.00	2.00	180.00	
11	12.00	1.0	.	2.00	1.00	1.00	170.00	
12	192.00	1.0	.	3.00	1.00	1.00	169.00	
13	41.00	1.0	.	3.00	1.00	1.00	170.00	
14	199.00	1.0	.	3.00	1.00	2.00	187.00	
15	48.00	2.0	.	3.00	2.00	2.00	187.00	
16	102.00	1.0	.	2.00	1.00	1.00	170.00	
17	193.00	1.0	1.00	12.00	3.00	1.00	170.00	
18	18.00	1.0	.	18.00	1.00	1.00	170.00	
19	42.00	1.0	1.00	2.00	1.00	1.00	170.00	
20	205.00	1.0	1.00	3.00	1.00	1.00	170.00	
21	69.00	1.00	1.00	2.00	1.00	3.00	170.00	
22	77.00	1.00	1.00	1.00	1.00	4.00	170.00	
23	213.00	1.00	1.00	1.00	1.00	3.00	170.00	

- One Sample...
- Independent Samples...
- Related Samples...
- Legacy Dialogs ▶**

- Chi-square...
- Binomial...
- Runs...
- 1-Sample K-S...
- 2 Independent Samples...
- K Independent Samples...
- 2 Related Samples...
- K Related Samples...

Analyze Direct Marketing Graphs Utilities Add-ons

- Reports
- Descriptive Statistics**
  - 123 Frequencies...
  - 4 Descriptives...
  - Explore...
  - Crosstabs...**
  - Ratio...
  - P-P Plots...
  - Q-Q Plots...
- Tables
- Compare Means
- General Linear Model
- Generalized Linear Models
- Mixed Models
- Correlate
- Regression

- Chi-square...
- 0/1 Binomial...
- Runs...
- 1-Sample K-S...
- 2 Independent Samples...
- K Independent Samples...
- 2 Related Samples...
- K Related Samples...

	Number of groups	groups	The studied variable	exam type
1	two groups	Independent	Scale(NORMAL)	T test
2	two groups	Independent	ordinal & Scale Unnormal	Mann-whitney
3	two groups	Independent	nominal	Chi-square
4	two groups	Dependent	Scale(NORMAL)	Paired T-test
5	two groups	Dependent	ordinal & Scale Unnormal	wilcoxon
6	two groups	Dependent	nominal	McNemar
7	More than two groups	Independent	Scale(NORMAL)	ANOVA
8	More than two groups	Independent	ordinal & Scale Unnormal	Kruscal-Wallis
9	More than two groups	Independent	nominal	Chi-square
10	More than two groups	Dependent	Scale(NORMAL)	Repeated measures
11	More than two groups	Dependent	ordinal & Scale Unnormal	friedman
12	More than two groups	Dependent	nominal	cochran



View Data Transform **Analyze** Direct Marketing Graphs Utilities Add-ons Window

Reports  
**Descriptive Statistics**  
 Tables  
 Compare Means  
 General Linear Model  
 Generalized Linear Models  
 Mixed Models  
 Correlate  
 Regression  
 Loglinear  
 Neural Networks  
 Classify  
 Dimension Reduction  
 Scale  
 Nonparametric Tests  
 Forecasting  
 Survival  
 Multiple Response  
 Missing Value Analysis...  
 Multiple Imputation  
 Complex Samples  
 Quality Control  
 ROC Curve...

123 Frequencies...  
 Descriptives...  
 Explore...  
**Crosstabs...**  
 Ratio...  
 P-P Plots...  
 Q-Q Plots...

A1	A2
11.00	1.00
139.00	2.00
73.00	1.00
209.00	1.00
197.00	1.00
195.00	1.00
44.00	1.00
46.00	1.00
198.00	1.00
47.00	1.00
12.00	1.00
192.00	1.00
41.00	1.00
199.00	1.00
48.00	2.00
102.00	1.00
193.00	1.00
18.00	1.00
42.00	1.00
205.00	1.00

Crosstabs

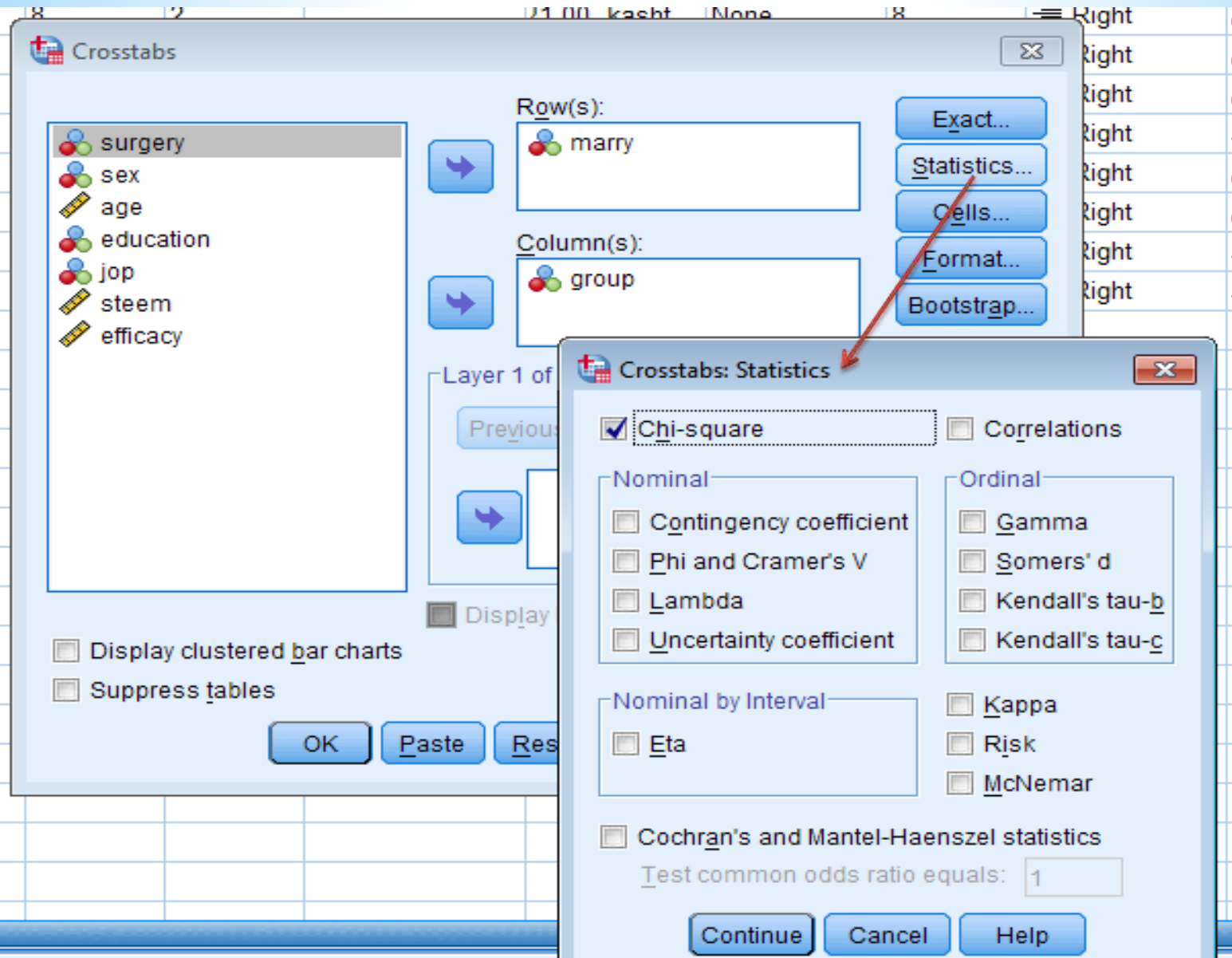
Row(s):  
 Column(s):

Layer 1 of 1  
 Previous Next

Display clustered bar charts  
 Suppress tables

OK Paste Reset Cancel Help

# آزمون Chi-square



### Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
marry * group	198	99.0%	2	1.0%	200	100.0%

### marry \* group Crosstabulation

Count

		group		Total
		do surgery	do not surgery	
marry	mojarad	65	60	125
	motaahel	34	39	73
Total		99	99	198

### Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.542 <sup>a</sup>	1	.461		
Continuity Correction <sup>b</sup>	.347	1	.556		
Likelihood Ratio	.543	1	.461		
Fisher's Exact Test				.556	.278
Linear-by-Linear Association	.540	1	.463		
N of Valid Cases	198				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 36.50.

b. Computed only for a 2x2 table



### Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
education * group	200	100.0%	0	.0%	200	100.0%

### education \* group Crosstabulation

Count

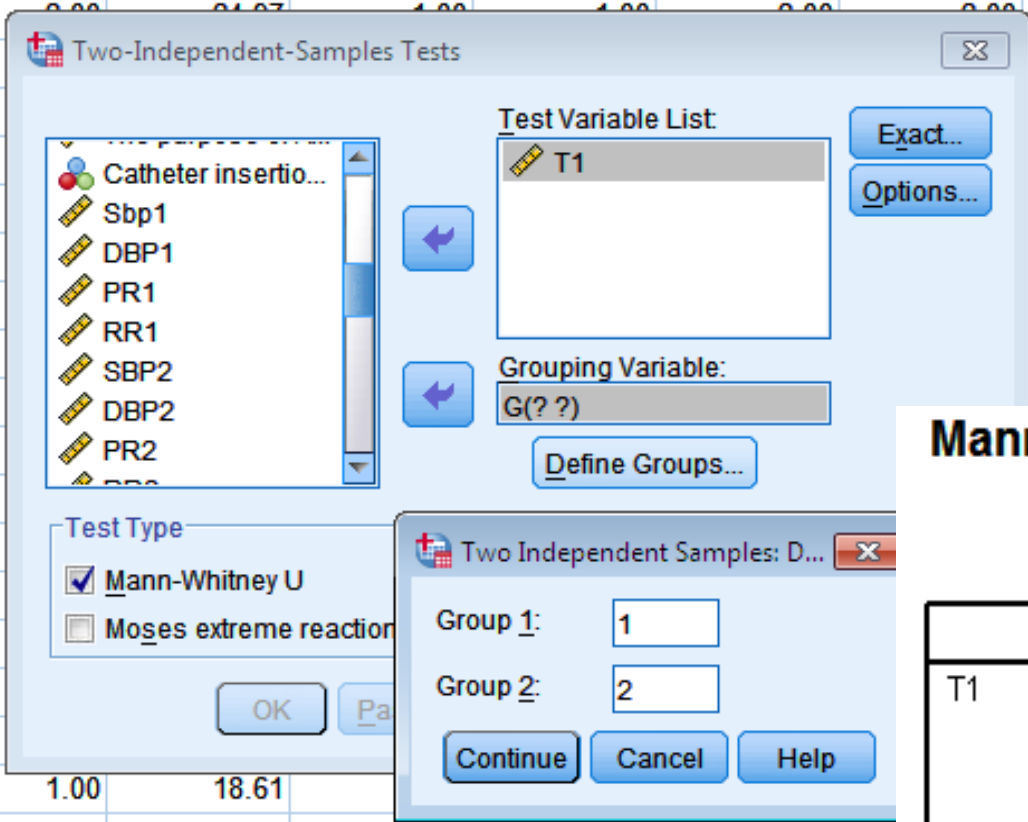
		group		Total
		do surgery	do not surgery	
education	zire diplom	6	2	8
	diplim	32	32	64
	karshenas	48	49	97
	karshenas arshad	14	17	31
Total		100	100	200

### Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.301 <sup>a</sup>	3	.512
Likelihood Ratio	2.394	3	.495
Linear-by-Linear Association	1.047	1	.306
N of Valid Cases	200		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 4.00.





### Mann-Whitney Test

**Ranks**


groups	N	Mean Rank	Sum of Ranks
T1 lavender	40	40.03	1601.00
peppermint	40	40.98	1639.00
Total	80		


$\text{sig}(p) < 0.05 \rightarrow$  تفاوت معنی دار است


**Test Statistics<sup>a</sup>**


	T1
Mann-Whitney U	781.000
Wilcoxon W	1601.000
Z	-.187
Asymp. Sig. (2-tailed)	.852


a. Grouping Variable: groups


 Chi-square...


 Binomial...


 Runs...

 1-Sample K-S...














 2 Independent Samples...

 K Independent Samples...



 2 Related Samples...

 K Related Samples...

## Two-Related-Samples Tests

-  RR1
-  T1
-  SBP2
-  DBP2
-  PR2
-  RR2
-  T2
-  ANX1
-  ANX2
-  Pain [PN]
-  PNCODE
-  G = 3 (FILTER) [fil...
-  age

### Test Pairs:

Pair	Variable1	Variable2
1	 [ANX1]	 [ANX2]
2		

Exact...

Options...

### Test Type

- Wilcoxon
- Sign
- McNemar
- Marginal Homogeneity

OK

Paste

Reset

Cancel

Help

## Wilcoxon Signed Ranks Test

### Ranks

		N	Mean Rank	Sum of Ranks
ANX2 - ANX1	Negative Ranks	111 <sup>a</sup>	56.00	6216.00
	Positive Ranks	0 <sup>b</sup>	.00	.00
	Ties	9 <sup>c</sup>		
	Total	120		

a. ANX2 < ANX1

b. ANX2 > ANX1


c. ANX2 = ANX1

### Test Statistics<sup>b</sup>

	ANX2 - ANX1
Z	-9.290 <sup>a</sup>
Asymp. Sig. (2-tailed)	.000


a. Based on positive ranks.


b. Wilcoxon Signed Ranks Test


 Chi-square...

 Binomial...

 Runs...

 1-Sample K-S...

 2 Independent Samples...

 K Independent Samples...



 2 Related Samples...

 K Related Samples...

### Two-Related-Samples Tests

- groups [G]
- Age [A1]
- gender [A2]
- BMI [A3]
- JOB [A4]
- Education [A5]
- marital status [A6]
- residence [A7]
- diagnosis [A8]
- hospital duration ...
- History of hospita...
- History of Cathet...
- History of a partic...

#### Test Pairs:

Pair	Variable1	Variable2
1	 [T1CODE]	 [T2COD...
2		

#### Test Type

- Wilcoxon
- Sign
- McNemar
- Marginal Homogeneity

OK Paste Reset Cancel Help

Exact..

Options...



## T1CODE & T2CODE


T1 CODE	T2CODE	
	1.00	2.00
1.00	6	2
2.00	10	102

## Test Statistics<sup>b</sup>

	T1 CODE & T2CODE
N	120
Exact Sig. (2-tailed)	<b>.039<sup>a</sup></b>


a. Binomial distribution used.

b. McNemar Test


 Chi-square...


 Binomial...

 Runs...

 1-Sample K-S...

 2 Independent Samples...

 **K Independent Samples...**

 2 Related Samples...

 K Related Samples...

Tests for Several Independent Samples

Test Variable List: Pain [PN]

Grouping Variable: G(??)

Test Type:  Kruskal-Wallis H  Median  Jonckheere-Terpstra

Range for Grouping Variable: Minimum: 1, Maximum: 3

OK Paste Re

1.00	18.61	2.00
1.00	23.66	2.00

### Ranks

	groups	N	Mean Rank
Pain	1	40	45.43
	2	40	64.18
	3	40	71.90
	Total	120	

### Test Statistics<sup>a,b</sup>

	Pain
Chi-Square	13.052
df	2
Asymp. Sig.	.001

a. Kruskal Wallis Test  
b. Grouping Variable: groups

$\text{sig}(p) < 0.05$

تفاوت معنی دار است

آزمون تعقیبی کروسکال  
والیس، من ویتنی است.

# آزمون تعقیبی فریدمن، ویلکاکسون است.

Tests for Several Related Samples

Test Variables:

- ANX1
- ANX2
- ANX3

Test Type

Friedman  Kendall's W  Cochran's Q

OK Paste Reset Cancel Help

	Mean Rank
ANX1	2.45
ANX2	1.18
ANX3	2.37

N	120
Chi-Square	136.528
df	2
Asymp. Sig.	.000

a. Friedman Test



# آزمون تعقیبی ککران ، مک نمار است.

- Chi-square...
- Binomial...
- Runs...
- 1-Sample K-S...
- 2 Independent Samples...
- K Independent Samples...
- 2 Related Samples...
- K Related Samples...**

Tests for Several Related Samples

Test Variables:

- T1CODE
- T2CODE
- T3CODE

Test Type

Friedman  Kendall's W  Cochran's Q

OK Paste Reset Cancel Help

**Frequencies**

	Value	
	1	2
T1CODE	8	112
T2CODE	16	104
T3CODE	15	105

**Test Statistics**

N	120
Cochran's Q	3.455 <sup>a</sup>
df	2
Asymp. Sig.	.178

a. 2 is treated as a success.