

ΑΝΑΛΥΣΗ ΔΙΑΚΥΜΑΝΣΗΣ

Αναπλ. Καθ. Στέλιος Ζήμερας

Τμήμα Στατιστικής και Αναλογιστικών –
Χρηματοοικονομικών Μαθηματικών

2020

ΠΑΡΑΔΕΙΓΜΑ

PARADEIGMA SPSS.sav [DataSet1] - PASW Statistics Data Editor @

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

1: TIMES 7,0 Visible: 3 of 3 Variables

	TIMES	OMADA	E_TR	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	7,0	1	1																	
2	14,0	1	2																	
3	8,5	1	3																	
4	16,0	2	1																	
5	15,0	2	2																	
6	16,5	2	3																	
7	10,5	3	1																	
8	15,0	3	2																	
9	9,5	3	3																	
10	13,5	4	1																	
11	21,0	4	2																	
12	13,5	4	3																	
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One-Way ANOVA

Dependent List: OMADA [OMADA]

Factor: E_TR

One-Way ANOVA: Options

Statistics

- Descriptive
- Fixed and random effects
- Homogeneity of variance test
- Brown-Forsythe
- Welch

Means plot

Missing Values

- Exclude cases analysis by analysis
- Exclude cases listwise

PASW Statistics Processor is ready

9:19 μμ 24/11/2020

ΠΑΡΑΔΕΙΓΜΑ

Descriptives

TIMES

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
					1	4			11,750	3,8837	1,9419	5,570	17,930	7,0	16,0
2	4	16,250	3,2016	1,6008	11,156	21,344	14,0	21,0
3	4	12,000	3,6968	1,8484	6,117	17,883	8,5	16,5
Total	12	13,333	3,9100	1,1287	10,849	15,818	7,0	21,0

Test of Homogeneity of Variances

TIMES

Levene Statistic	df1	df2	Sig.
,209	2	9	,815

ΠΑΡΑΔΕΙΓΜΑ

ANOVA

TIMES

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	51,167	2	25,583	1,968	,195
Within Groups	117,000	9	13,000		
Total	168,167	11			

ΠΑΡΑΔΕΙΓΜΑ

Multiple Comparisons

Dependent Variable:TIMES

	(I) E_TR	(J) E_TR	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	1	2	-4,5000	2,5495	,235	-11,618	2,618
		3	---	-2,500	2,5495	,995	-7,368	6,868
	2	1	4,5000	2,5495	,235	-2,618	11,618
		3	---	4,2500	2,5495	,269	-2,868	11,368
	3	1	,2500	2,5495	,995	-6,868	7,368
		2	---	-4,2500	2,5495	,269	-11,368	2,868
Scheffe	1	2	-4,5000	2,5495	,262	-11,939	2,939
		3	---	-2,500	2,5495	,995	-7,689	7,189
	2	1	4,5000	2,5495	,262	-2,939	11,939
		3	---	4,2500	2,5495	,298	-3,189	11,689
	3	1	,2500	2,5495	,995	-7,189	7,689
		2	---	-4,2500	2,5495	,298	-11,689	3,189
LSD	1	2	-4,5000	2,5495	,111	-10,267	1,267
		3	---	-2,500	2,5495	,924	-6,017	5,517
	2	1	4,5000	2,5495	,111	-1,267	10,267
		3	---	4,2500	2,5495	,130	-1,517	10,017
	3	1	,2500	2,5495	,924	-5,517	6,017
		2	---	-4,2500	2,5495	,130	-10,017	1,517

ΠΑΡΑΔΕΙΓΜΑ

The screenshot shows the SPSS Statistics Data Editor interface. The main window displays a data table with the following data:

1: E_TR	TIMES	OMADA
1	7,0	
2	14,0	
3	8,5	
4	16,0	
5	15,0	
6	16,5	
7	10,5	
8	15,0	
9	9,5	
10	13,5	
11	21,0	
12	13,5	
13		
14		
15		
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The 'Analyze' menu is open, showing the following options:

- Reports
- Descriptive Statistics
- Tables
- Compare Means
- General Linear Model** (highlighted)
 - Univariate...
 - Multivariate...
 - Repeated Measures...
 - Variance Components...
- 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...

The Windows taskbar at the bottom shows the system tray with the date 23/11/2020 and time 8:01 μμ. The taskbar also contains icons for various applications including Internet Explorer, Firefox, and the Start menu.

ΠΑΡΑΔΕΙΓΜΑ

PARADEIGMA SPSS.sav [DataSet0] - PASW Statistics Data Editor @

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

1: E_TR 1 Visible: 3 of 3 Variables

	TIMES	OMADA	E_TR	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	7,0	1	1																
2	14,0	1	2																
3	8,5	1	3																
4	16,0	2	1																
5	15,0	2	2																
6	16,5	2	3																
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8	15,0	3	2																
9	9,5	3	3																
10	13,5	4	1																
11	21,0	4	2																
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Univariate

Dependent Variable: TIMES [TIMES]

Fixed Factor(s): E_TR, OMADA [OMADA]

Random Factor(s):

Covariate(s):

WLS Weight:

Model... Contrasts... Plots... Post Hoc... Save... Options... Bootstrap...

OK Paste Reset Cancel Help

PASW Statistics Processor is ready

8:03 μμ 23/11/2020

ΠΑΡΑΔΕΙΓΜΑ

PARADEIGMA SPSS.sav [DataSet0] - PASW Statistics Data Editor @

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

1: E_TR 1 Visible: 3 of 3 Variables

	TIMES	OMADA	E_TR	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	7,0	1	1																
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10	13,5	4	1																
11	21,0	4	2																
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Univariate

Dependent Variable: TIMES [TIMES]

Fixed Factor(s): E_TR, OMADA [OMADA]

Random Factor(s):

Covariate(s):

WLS Weight:

Univariate: Model

Specify Model: Custom

Factors & Covariates: E_TR, OMADA

Model: E_TR, OMADA

Build Term(s): Type: Interaction

Sum of squares: Type III

Include intercept in model

Data View Variable View

PASW Statistics Processor is ready

8:04 μμ 23/11/2020

ΠΑΡΑΔΕΙΓΜΑ

The screenshot displays the SPSS Statistics Data Editor interface. The main window shows a dataset with 30 rows and 20 columns. The first three columns are labeled 'TIMES', 'OMADA', and 'E_TR'. The data is as follows:

	TIMES	OMADA	E_TR	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	7,0	1	1																
2	14,0	1	2																
3	8,5	1	3																
4	16,0	2	1																
5	15,0	2	2																
6	16,5	2	3																
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9	9,5	3	3																
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11	21,0	4	2																
12	13,5	4	3																
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Two dialog boxes are open over the data editor:

- Univariate**:
 - Dependent Variable: TIMES [TIMES]
 - Fixed Factor(s): E_TR, OMADA [OMADA]
 - Random Factor(s):
 - Covariate(s):
 - WLS Weight:
 - Buttons: Model..., Contrasts..., Plots..., Post Hoc..., Save..., Options..., Bootstrap..., OK, Paste, Reset, Cancel, Help
- Univariate: Options**:
 - Estimated Marginal Means:
 - Factor(s) and Factor Interactions: OVERALL, E_TR, OMADA
 - Display Means for: (OVERALL)
 - Compare main effects:
 - Confidence interval adjustment: LSD(none)
 - Display:
 - Descriptive statistics
 - Estimates of effect size
 - Observed power
 - Parameter estimates
 - Contrast coefficient matrix
 - Homogeneity tests
 - Spread vs. level plot
 - Residual plot
 - Lack of fit
 - General estimable function
 - Significance level: .05 Confidence intervals are 95,0%
 - Buttons: Continue, Cancel, Help

ΠΑΡΑΔΕΙΓΜΑ

Tests of Between-Subjects Effects

Dependent Variable: TIMES

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	136,333 ^a	5	27,267	5,139	,035
Intercept	2133,333	1	2133,333	402,094	,000
E_TR	51,167	2	25,583	4,822	,056
OMADA	85,167	3	28,389	5,351	,039
Error	31,833	6	5,306		
Total	2301,500	12			
Corrected Total	168,167	11			

a. R Squared = ,811 (Adjusted R Squared = ,653)

ΠΑΡΑΔΕΙΓΜΑ

Multiple Comparisons

Dependent Variable:TIMES

	(I) E_TR	(J) E_TR	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	1	2	-4,5000	2,5495	,235	-11,618	2,618
		3	---	-.2500	2,5495	,995	-7,368
	2	1	4,5000	2,5495	,235	-2,618	11,618
		3	---	4,2500	2,5495	,269	-2,868
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		3	---	4,2500	2,5495	,130	-1,517
	3	1	,2500	2,5495	,924	-5,517	6,017
		2	---	-4,2500	2,5495	,130	-10,017

ΠΑΡΑΔΕΙΓΜΑ

Parameter Estimates

Dependent Variable:TIMES

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Intercept	14,667	1,629	9,005	,000	10,681	18,652
[OMADA=1]	-6,167	1,881	-3,279	,017	-10,769	-1,565
[OMADA=2]	-,167	1,881	-,089	,932	-4,769	4,435
[OMADA=3]	-4,333	1,881	-2,304	,061	-8,935	,269
[OMADA=4]	0 ^a	.	.	.	.	.
[E_TR=1]	-,250	1,629	-,153	,883	-4,235	3,735
[E_TR=2]	4,250	1,629	2,609	,040	,265	8,235
[E_TR=3]	0 ^a	.	.	.	.	.

a. This parameter is set to zero because it is redundant.