



UNIVERSIDADE
FEDERAL DO CEARÁ

Análise de Regressão

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Dez 2018

Conteúdo

- ANÁLISE DE REGRESSÃO LINEAR SIMPLES
- REGRESSÃO MÚLTIPLA

ANÁLISE DE REGRESSÃO LINEAR SIMPLES



1: Vendas 131,00 Visible: 2 of 2 Variables

	Vendas	Gastos_propaganda	var												
1	131,00	12,00													
2	156,00	15,00													
3	192,00	19,00													
4	114,00	9,00													
5	147,00	13,00													
6	173,00	16,00													
7	116,00	9,00													
8	166,00	15,00													
9	145,00	12,00													
10	203,00	19,00													
11	72,00	3,00													
12	73,00	3,00													
13	147,00	12,00													
14	123,00	9,00													
15	91,00	5,00													
16	141,00	11,00													
17	192,00	17,00													
18	151,00	12,00													
19	127,00	9,00													
20	178,00	15,00													
21	179,00	15,00													
22	81,00	3,00													

Linear Regression

Dependent:

Block 1 of 1

Independent(s):

Method:

Selection Variable: Rule...

Case Labels:

WLS Weight:

Buttons: Statistics..., Plots..., Save..., Options..., Bootstrap..., OK, Paste, Reset, Cancel, Help

Linear Regression: Statistics

Regression Coefficients

- Estimates
- Confidence intervals (Level(%):
- Covariance matrix

Model fit

- R squared change
- Descriptives
- Part and partial correlations
- Collinearity diagnostics

Residuals

- Durbin-Watson
- Casewise diagnostics
 - Outliers outside: standard deviations
 - All cases

Buttons: Continue, Cancel, Help



1: Vendas 131,00 Visible: 2 of 2 Variables

	Vendas	Gastos_propaganda	var												
1	131,00	12,00													
2	156,00	15,00													
3	192,00	19,00													
4	114,00	9,00													
5	147,00	13,00													
6	173,00	16,00													
7	116,00	9,00													
8	166,00	15,00													
9	145,00	12,00													
10	203,00	19,00													
11	72,00	3,00													
12	73,00	3,00													
13	147,00	12,00													
14	123,00	9,00													
15	91,00	5,00													
16	141,00	11,00													
17	192,00	17,00													
18	151,00	12,00													
19	127,00	9,00													
20	178,00	15,00													
21	179,00	15,00													
22	81,00	3,00													

Linear Regression

Dependent:

Independent(s):

Method:

Selection Variable:

Case Labels:

WLS Weight:

Linear Regression: Plots

DEPENDNT: *ZPRED, *ZRESID, *DRESID, *ADJPRED, *SRESID, *SDRESID

Scatter 1 of 1: Y: X:

Standardized Residual Plots: Histogram, Normal probability plot

Produce all partial plots

Para análise dos resíduos.



	Músicos	Conhec_musical	Rock	Punk	Pagode	var	var	var
1	Rock	2,65						
2	Punk	,97						
3	Eclético	,84						
4	Punk	3,03						
5	Eclético	,88						
6	Punk	,85						
7	Pagode	1,56						
8	Pagode	3,02						
9	Punk	2,29						
10	Eclético	1,11						
11	Eclético	2,17						
12	Punk	,82						
13	Rock	1,41						
14	Eclético	1,76						
15	Eclético	1,38						
16	Punk	2,79						
17	Punk	1,50						
18	Rock	1,91						
19	Rock	2,32						
20	Eclético	2,05	0	0	0			
21	Punk	2,17	0	1	0			
22	Eclético	2,05	0	0	0			

Linear Regression

Dependent:

Block 1 of 1

Independent(s):

Method:

Selection Variable:

Case Labels:

WLS Weight:

OK Paste Reset Cancel Help

Linear Regression: Save

Predicted Values

- Unstandardized
- Standardized
- Adjusted
- S.E. of mean predictions

Residuals

- Unstandardized
- Standardized
- Studentized
- Deleted
- Studentized deleted

Distances

- Mahalanobis
- Cook's
- Leverage values

Influence Statistics

- DfBeta(s)
- Standardized DfBeta(s)
- DfFit
- Standardized DfFit
- Covariance ratio

Prediction Intervals

- Mean Individual
- Confidence Interval: %

Coefficient statistics

- Create coefficient statistics
- Create a new dataset
 - Dataset name:
- Write a new data file
 - File...

Export model information to XML file

Include the covariance matrix

Continue Cancel Help



1: Vendas 131,00 Visible: 3 of 3 Variables

	Vendas	Gastos_propaganda	ZRE_1	var											
1	131,00	12,00	-2,01019												
2	156,00	15,00	-1,96542												
3	192,00	19,00	-1,59001												
4	114,00	9,00	-1,10779												
5	147,00	13,00	-1,08757												
6	173,00	16,00	-,92440												
7	116,00	9,00	-,87100												
8	166,00	15,00	-,78146												
9	145,00	12,00	-,35265												
10	203,00	19,00	-,28765												
11	72,00	3,00	-,25017												
12	73,00	3,00	-,13177												
13	147,00	12,00	-,11586												
14	123,00	9,00	-,04223												
15	91,00	5,00	,05594												
16	141,00	11,00	,14548												
17	192,00	17,00	,35341												
18	151,00	12,00	,35773												
19	127,00	9,00	,43135												
20	178,00	15,00	,63929												
21	179,00	15,00	,75768												
22	81,00	3,00	,81540												

Explore

Dependent List:
Standardized Resid...

Factor List:

Label Cases by:

Display:
 Both Statistics Plots

OK Paste Reset Cancel Help

Explore: Plots

Boxplots:
 Factor levels together
 Dependents together
 None

Descriptive:
 Stem-and-leaf
 Histogram

Normality plots with tests

Spread vs Level with Levene Test:
 None
 Power estimation
 Transformed Power: Natural log
 Untransformed

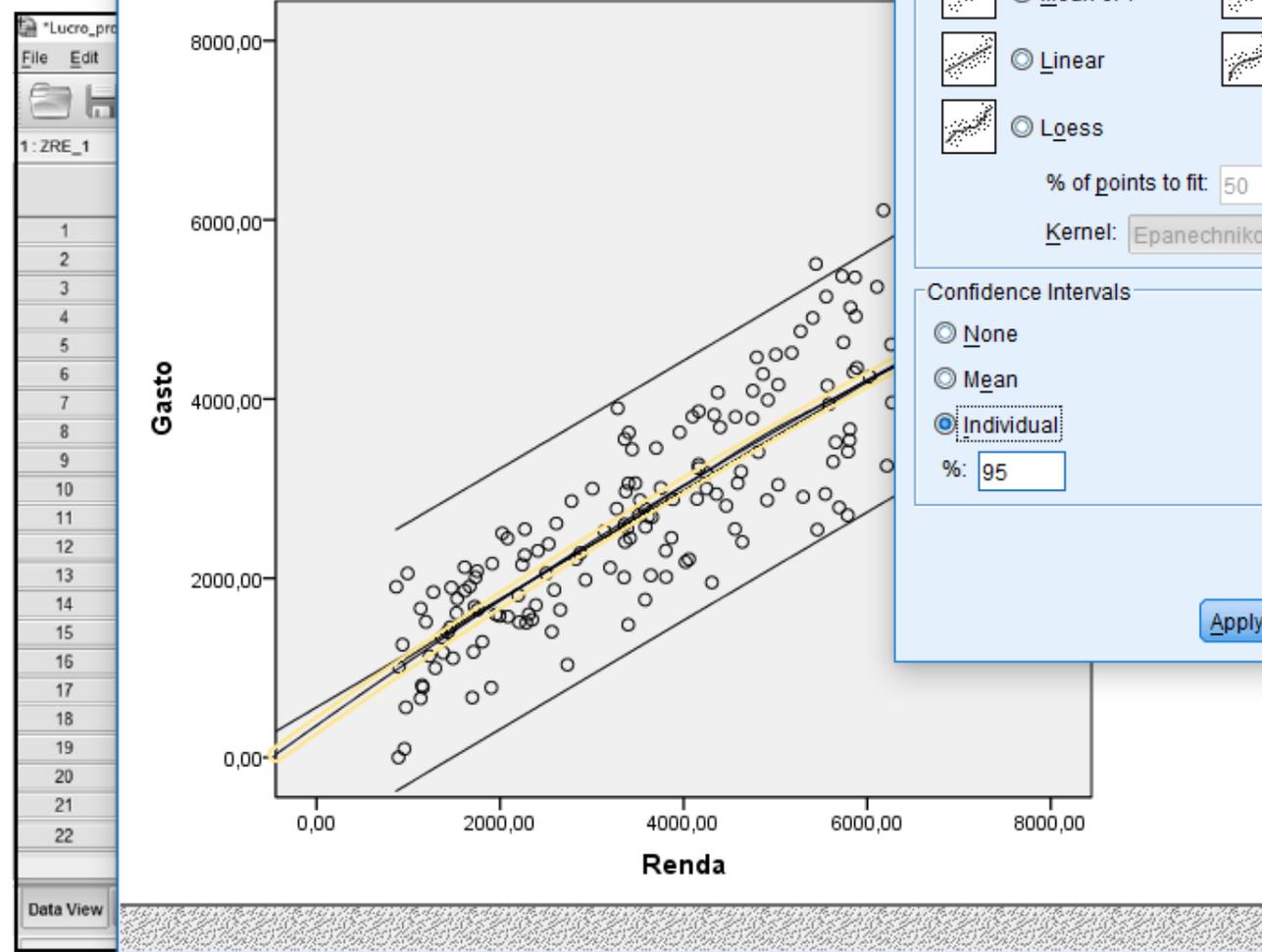
Continue Cancel Help

Para analisar a distribuição dos resíduos

Gráfico final de dispersão

Chart Editor

File Edit View Options Elements Help



Properties

Chart Size Lines **Fit Line** Variables

Display Spikes Suppress intercept

Fit Method

Mean of Y Quadratic

Linear Cubic

L_qess

% of points to fit: 50

Kernel: Epanechnikov

Confidence Intervals

None

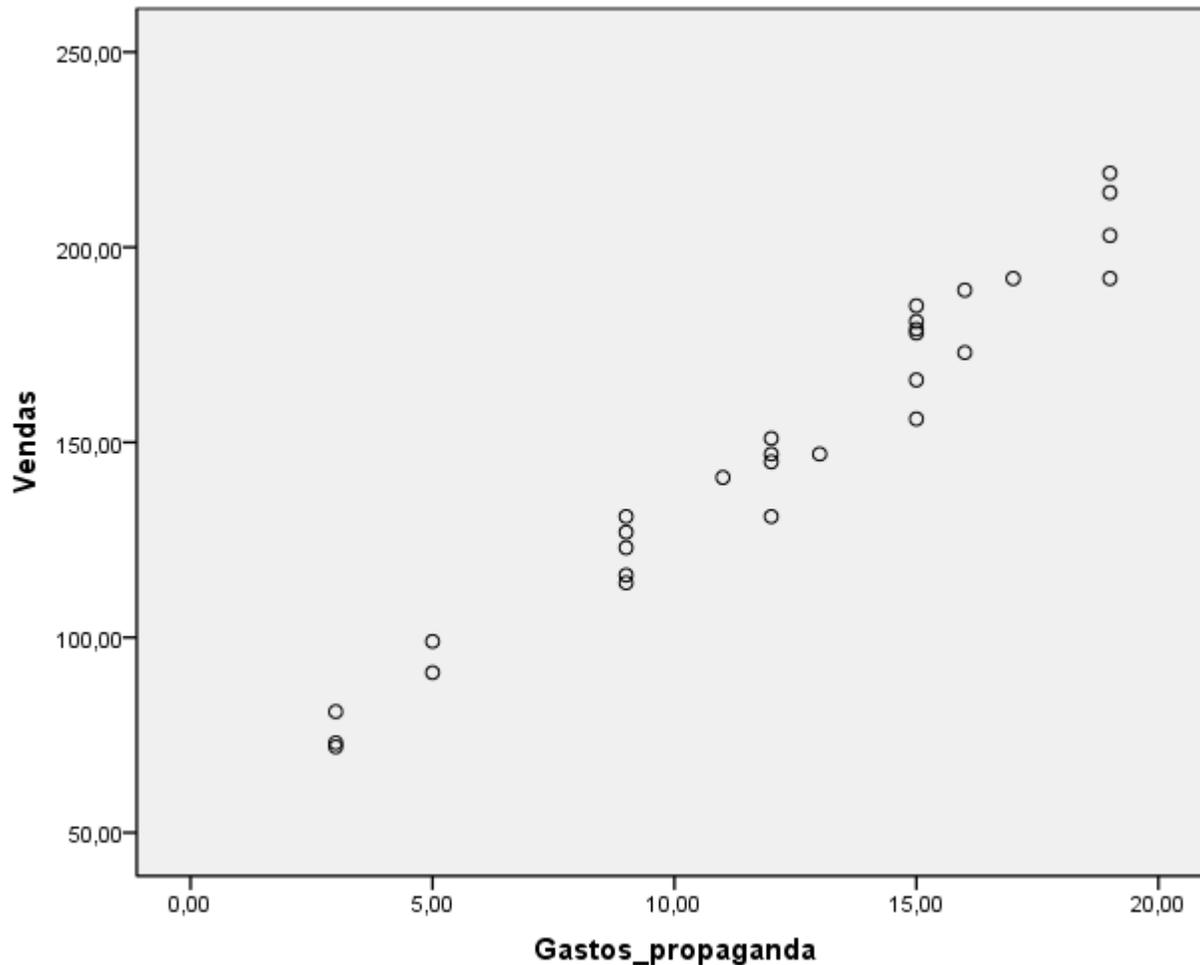
Mean

Individual

#: 95

Apply Cancel Help

Os gastos com propaganda (X) aumentam as vendas (Y)?



- Sim, quanto mais se gasta com propaganda mais se aumenta as vendas.

No gráfico de dispersão, há correlação entre as variáveis resposta (Y) e explicativa (X) quando os pontos estão dispostos ao longo da reta.

- Output
 - Log
 - Graph
 - Title
 - Notes
 - Active Dataset
 - Scatter of Vendas
 - Log
 - Regression
 - Title
 - Notes
 - Active Dataset
 - Variables Entered
 - Model Summary
 - ANOVA
 - Coefficients
 - Residuals Statist

a. All requested variables entered.
 b. Dependent Variable: Vendas

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,980 ^a	,960	,959	8,44624

a. Predictors: (Constant), Gastos_propaganda
 b. Dependent Variable: Vendas

O gasto com propaganda explica 98% das vendas. Independente do gasto com propaganda, se vede R\$49,49 (β_0), e para cada R\$1,00 gasto em propaganda aumenta em R\$8,21 a venda ($R^2=0.98$; $p<0,001$; EPE = 8,44624)

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	46793,987	1	46793,987	655,939	,000 ^a
	Residual	1926,151	27	71,339		
	Total	48720,138	28			

a. Predictors: (Constant), Gastos_propaganda
 b. Dependent Variable: Vendas

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	β_0 (Constant)	49,491	4,184		11,829	,000	40,907	58,075
	β_1 Gastos_propaganda	8,207	,320	,980	25,611	,000	7,550	8,865

a. Dependent Variable: Vendas

Residuals Statistics^a



- Active Dataset
- Variables Entered/Removed
- Model Summary
- ANOVA
- Coefficients
- Residuals Statistics
- Log
- Regression
 - Title
 - Notes
 - Active Dataset
 - Variables Entered/Removed
 - Model Summary
 - ANOVA
 - Coefficients
 - Residuals Statistics
- Charts
 - Title
 - *zresid Histogram
 - *zresid Normal Q-Q Plot
 - *zresid by Category
- Log
- Explore
 - Title
 - Notes
 - Active Dataset
 - Case Processing Summary
 - Tests of Normality
 - Standardized Residual
 - Title
 - Histogram
 - Stem-and-Leaf
 - Normal Q-Q Plot
 - Detrended
 - Boxplot

→ Explore

Tem distribuição normal?

[DataSet1] C:\Users\lucya\Desktop\DINTER\Vendas_propaganda.sav

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Standardized Residual	29	100,0%	0	,0%	29	100,0%

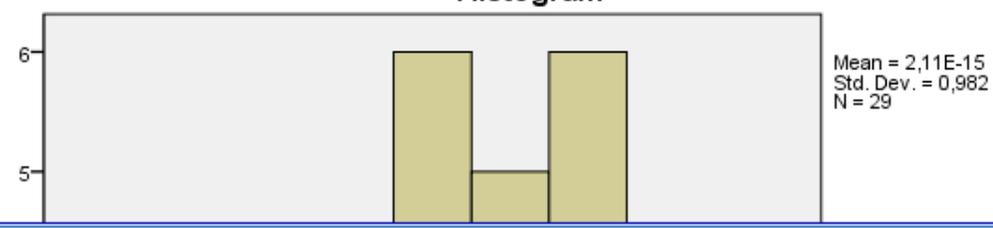
Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Standardized Residual	,090	29	,200*	,960	29	,323

a. Lilliefors Significance Correction
 *. This is a lower bound of the true significance.

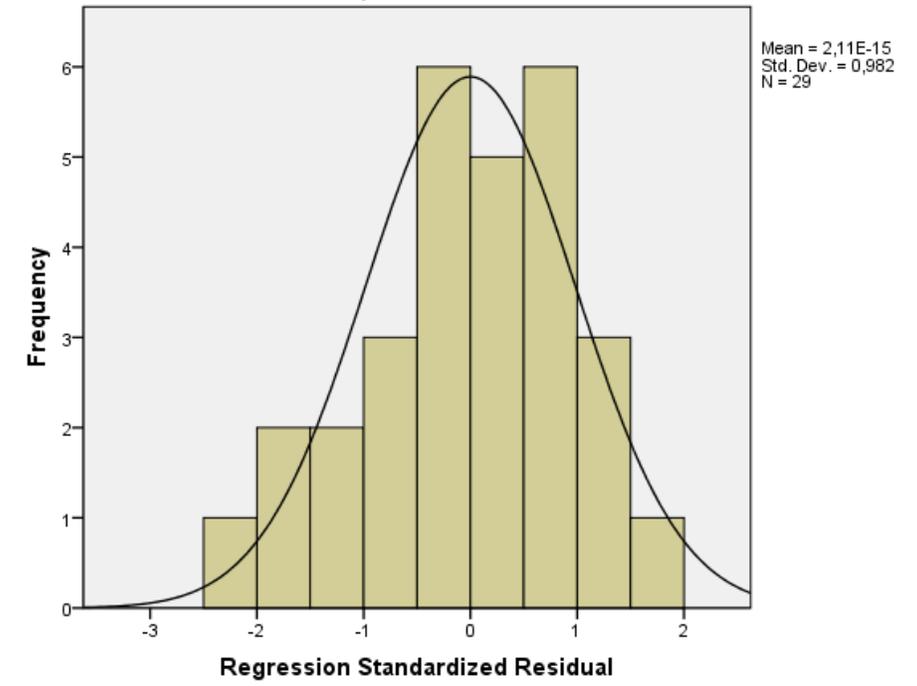
Standardized Residual

Histogram



Histogram

Dependent Variable: Vendas



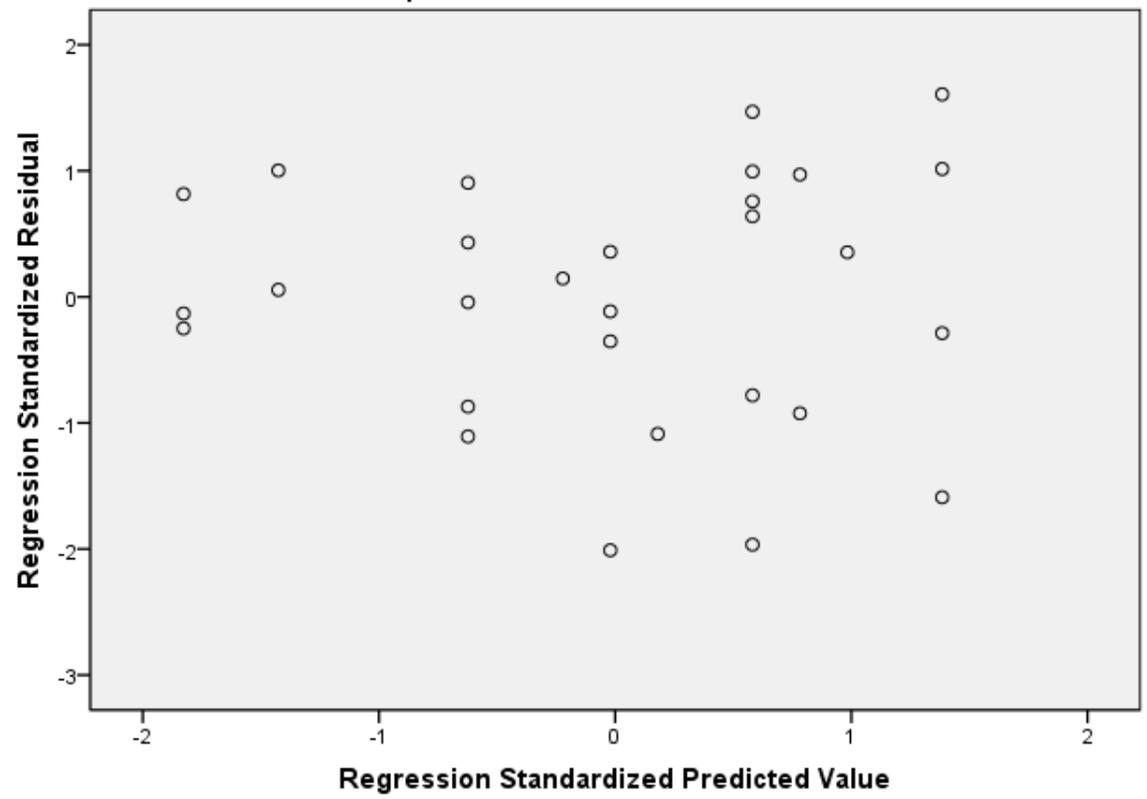


- Variables Entered
- Model Summary
- ANOVA
- Coefficients
- Residuals Statistics
- Log
- Regression
 - Title
 - Notes
 - Active Dataset
 - Variables Entered
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- Explore
 - Title
 - Notes
 - Active Dataset
 - Case Processing Statistics
 - Tests of Normality
- Standardized Residuals
 - Title
 - Histogram
 - Stem-and-Leaf Plot
 - Normal Q-Q Plot
 - Detrended Normal Q-Q Plot
 - Boxplot
- Log

São independentes?

Scatterplot

Dependent Variable: Vendas



```
EXAMINE VARIABLES=zre_1  
/PLOT BOXPLOT STEMLEAF HISTOGRAM NPLOT
```

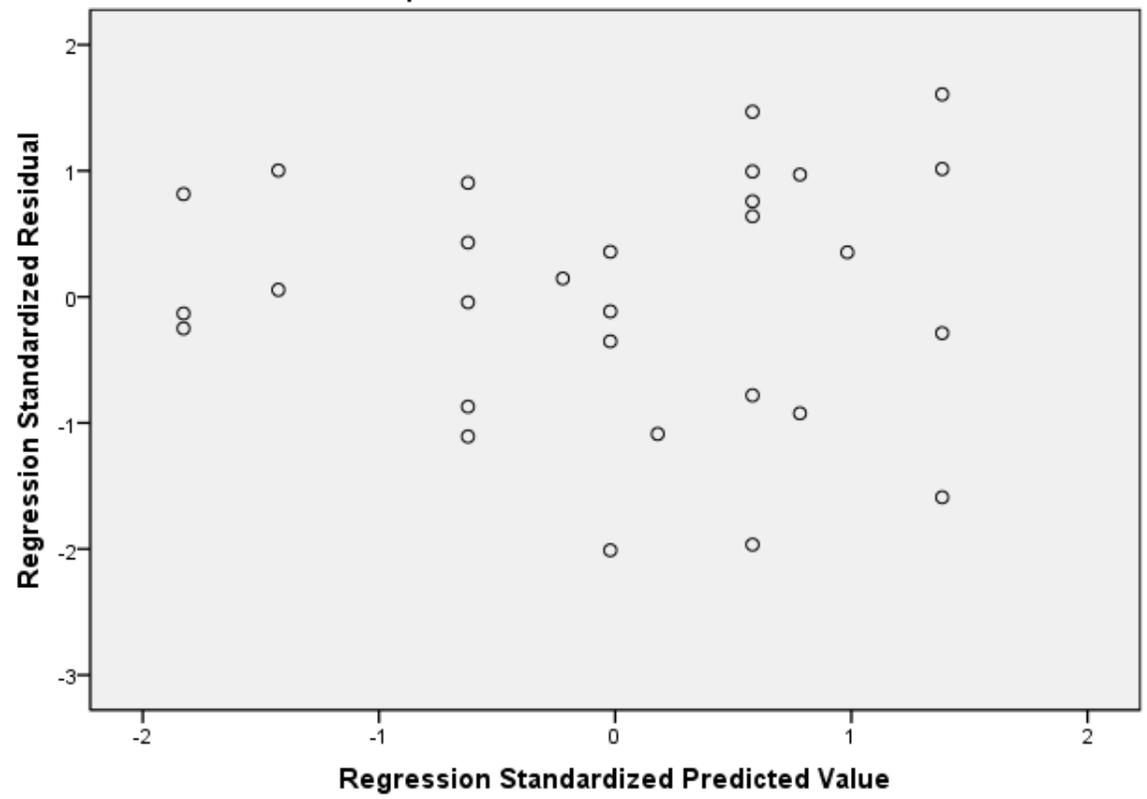


- Variables Entered
- Model Summary
- ANOVA
- Coefficients
- Residuals Statistics
- Log
- Regression
 - Title
 - Notes
 - Active Dataset
 - Variables Entered
 - Model Summary
 - ANOVA
 - Coefficients
 - Residuals Statistics
- Charts
 - Title
 - *zresid Histogram
 - *zresid Normal Q-Q Plot
 - *zresid by Category
- Log
- Explore
 - Title
 - Notes
 - Active Dataset
 - Case Processing Statistics
 - Tests of Normality
- Standardized Residuals
 - Title
 - Histogram
 - Stem-and-Leaf Plot
 - Normal Q-Q Plot
 - Detrended
 - Boxplot
- Log

São independentes?

Scatterplot

Dependent Variable: Vendas



```
EXAMINE VARIABLES=zre_1  
/PLOT BOXPLOT STEMLEAF HISTOGRAM NPLOT
```



- Variables Entered/Removed
- Model Summary
- ANOVA
- Coefficients
- Residuals Statistics
- Log
- Regression
 - Title
 - Notes
 - Active Dataset
 - Variables Entered/Removed
 - Model Summary
 - ANOVA
 - Coefficients
 - Residuals Statistics
- Charts
 - Title
 - *zresid Histogram
 - *zresid Normal Q-Q Plot
 - *zresid by Variable
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- Explore
 - Title
 - Notes
 - Active Dataset
 - Case Processing Summary
 - Tests of Normality
 - Standardized Residuals
 - Title
 - Histogram
 - Stem-and-Leaf
 - Normal Q-Q Plot
 - Detrended
 - Boxplot
- Log

a. Predictors: (Constant), Gastos_propaganda
 b. Dependent Variable: Vendas

É média 0?

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	49,491	4,184		11,829	,000	40,907	58,075
	Gastos_propaganda	8,207	,320	,980	25,611	,000	7,550	8,865

a. Dependent Variable: Vendas

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	74,1130	205,4296	148,8276	40,88048	29
Residual	-16,97856	13,57044	,00000	8,29404	29
Std. Predicted Value	-1,828	1,385	,000	1,000	29
Std. Residual	-2,010	1,607	,000	,982	29

a. Dependent Variable: Vendas

Charts

Histogram

Dependent Variable: Vendas



	Vendas	Gastos_propaganda	ZRE_1	var												
1	219,00	19,00	1,60668													
2	185,00	15,00	1,46806													
3	214,00	19,00	1,01470													
4	99,00	5,00	1,00310													
5	181,00	15,00	,99448													
6	189,00	16,00	,96993													
7	131,00	9,00	,90494													
8	81,00	3,00	,81540													
9	179,00	15,00	,75768													
10	178,00	15,00	,63929													
11	127,00	9,00	,43135													
12	151,00	12,00	,35773													
13	192,00	17,00	,35341													
14	141,00	11,00	,14548													
15	91,00	5,00	,05594													
16	123,00	9,00	-,04223													
17	147,00	12,00	-,11586													
18	73,00	3,00	-,13177													
19	72,00	3,00	-,25017													
20	203,00	19,00	-,28765													
21	145,00	12,00	-,35265													
22	166,00	15,00	-,78146													

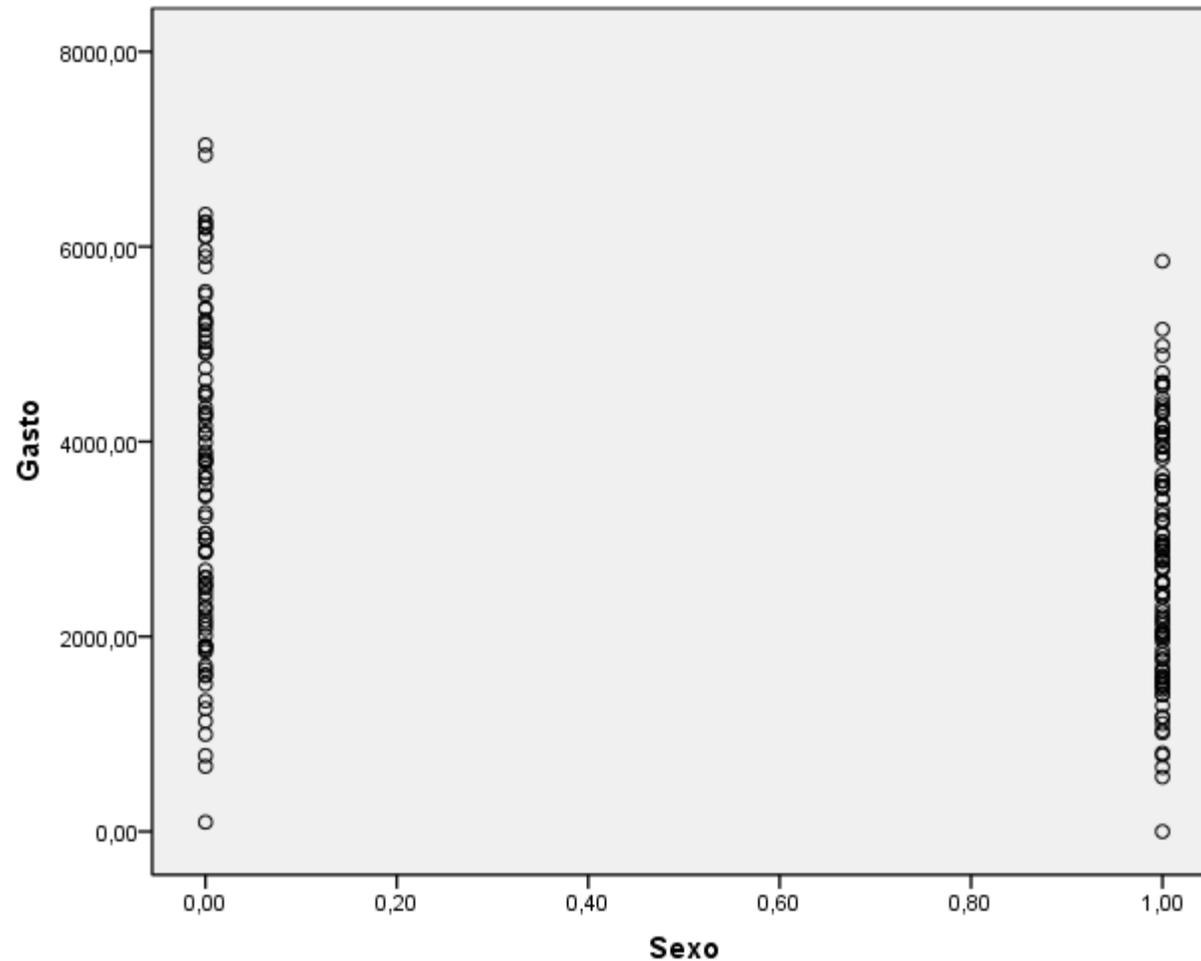
O nível de erro do modelo é aceitável?

Sinais de que o nível de erro do modelo é inaceitável (o modelo não se ajusta bem):

- $ZRE > 3,29$ (IC99,9%)
- $>1\%$ ZRE $> 2,58$ (IC99%)
- $>5\%$ ZRE $> 1,96$ (IC95%)

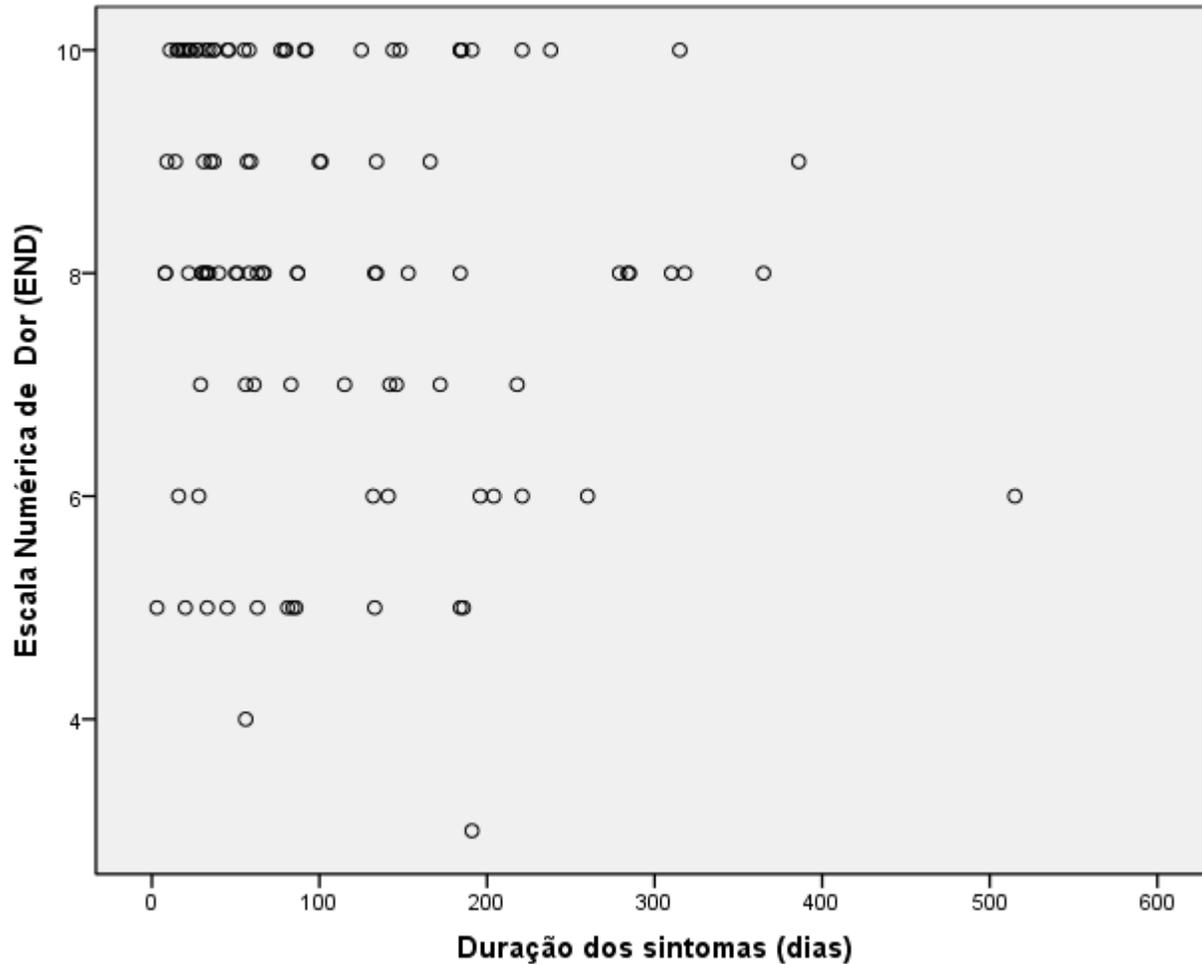
OUTROS EXEMPLOS DE INTERPRETAÇÃO DOS OUTPUTS

Há relação do gasto com o sexo?

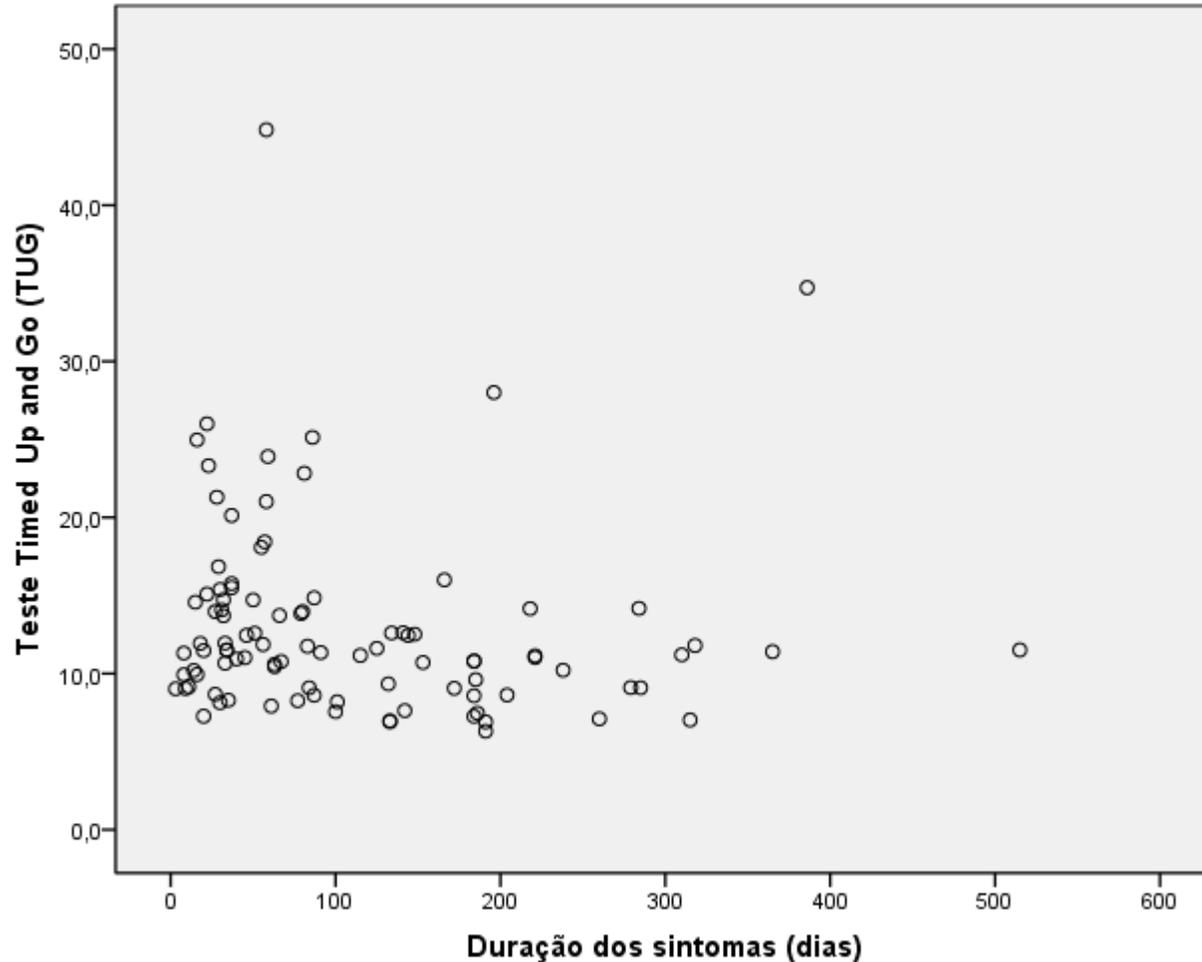


Sim, o gráfico mostra que o sexo gasta mais que o outro.

Há relação da intensidade da dor com o tempo da doença?



Há relação da limitação da mobilidade com o tempo da doença?



DUMMIES



1: Músicos

2

Visible: 2 of 2 Variables

	Músicos	Conhec_musical	var												
1	Rock	2,65													
2	Punk	,97													
3	Eclético	,84													
4	Punk	3,03													
5	Eclético	,88													
6	Punk	,85													
7	Pagode	1,56													
8	Pagode	3,02													
9	Punk	2,29													
10	Eclético	1,11													
11	Eclético	2,17													
12	Punk	,82													
13	Rock	1,41													
14	Eclético	1,76													
15	Eclético	1,38													
16	Punk	2,79													
17	Punk	1,50													
18	Rock	1,91													
19	Rock	2,32													
20	Eclético	2,05													
21	Punk	2,17													
22	Eclético	2,05													

Recode into Different Variables

Numeric Variable -> Output Variable:

Conhec_musical

Músicos --> Rock

Output Variable

Name: Rock

Label:

Change

Old and New Values...

If... (optional case selection condition)

OK Paste Reset Cancel Help

Data View Variable View



1: Músicos 2 Visible: 2 of 2 Variables

	Músicos	Conhec_musical	var														
1	Rock	2,65															
2	Punk	,97															
3	Eclético	,84															
4	Punk	3,03															
5	Eclético	,88															
6	Punk	,85															
7	Pagode	1,56															
8	Pagode	3,02															
9	Punk	2,29															
10	Eclético	1,11															
11	Eclético	2,17															
12	Punk	,82															
13	Rock	1,41															
14	Eclético	1,76															
15	Eclético	1,38															
16	Punk	2,79															
17	Punk	1,50															
18	Rock	1,91															
19	Rock	2,32															
20	Eclético	2,05															
21	Punk	2,17															
22	Eclético	2,05															

Recode into Different Variables: Old and New Values

Old Value

- Value:
- System-missing
- System- or user-missing
- Range: through
- Range, LOWEST through value:
- Range, value through HIGHEST:
- All other values

New Value

- Value:
- System-missing
- Copy old value(s)

Old --> New:

```
2 --> 1
ELSE --> 0
```

Output variables are strings Width:

Convert numeric strings to numbers ('5'->5)

Data View Variable View



Output
Log

```
GET  
  FILE='C:\Users\lucya\Desktop\DINTER\Dummies.sav'.  
DATASET NAME DataSet1 WINDOW=FRONT.  
RECODE Músicos (2=1) (ELSE=0) INTO Rock.  
EXECUTE.  
RECODE Músicos (3=1) (ELSE=0) INTO Punk.  
EXECUTE.  
RECODE Músicos (1=1) (ELSE=0) INTO Pagode.  
EXECUTE.
```



1: Músicos 2 Visible: 5 of 5 Variables

	Músicos	Conhec_musical	Rock	Punk	Pagode	var								
1	Rock	2,65	1											
2	Punk	,97	0											
3	Eclético	,84	0											
4	Punk	3,03	0											
5	Eclético	,88	0											
6	Punk	,85	0											
7	Pagode	1,56	0											
8	Pagode	3,02	0											
9	Punk	2,29	0											
10	Eclético	1,11	0											
11	Eclético	2,17	0											
12	Punk	,82	0											
13	Rock	1,41	1											
14	Eclético	1,76	0											
15	Eclético	1,38	0											
16	Punk	2,79	0											
17	Punk	1,50	0											
18	Rock	1,91	1											
19	Rock	2,32	1											
20	Eclético	2,05	0		0	0								
21	Punk	2,17	0		1	0								
22	Eclético	2,05	0		0	0								

Linear Regression

Dependent: Conhec_musical

Block 1 of 1

Independent(s): Rock, Punk, Pagode

Method: Enter

Selection Variable: [] Rule...

Case Labels: []

WLS Weight: []

Buttons: Statistics, Plots..., Save..., Options..., Bootstrap..., OK, Paste, Reset, Cancel, Help

Data View Variable View



- Output
 - Log
 - Regression
 - Title
 - Notes
 - Active Dataset
 - Variables Entered
 - Model Summary
 - ANOVA
 - Coefficients
 - Casewise Diagnostics
 - Residuals Statistics
 - Charts
 - Title
 - *zresid Histogram
 - *zresid Normal
 - *zresid by *zpred

b. Dependent Variable: Conhec_musical

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,203 ^a	,041	,038	,68031

a. Predictors: (Constant), Pagode, Rock, Punk

b. Dependent Variable: Conhec_musical

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16,106	3	5,369	11,600	,000 ^a
	Residual	373,037	806	,463		
	Total	389,143	809			

a. Predictors: (Constant), Pagode, Rock, Punk

b. Dependent Variable: Conhec_musical

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1,613	,037		43,521	,000	1,540	1,686
	Rock	,219	,063	,131	3,471	,001	,095	,343
	Punk	,263	,061	,162	4,282	,000	,142	,383
	Pagode	,377	,077	,181	4,909	,000	,227	,528

a. Dependent Variable: Conhec_musical



- Output
 - Log
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 - *zresid Normal
 - *zresid by *zp

Casewise Diagnostics^a

Case Number	Std. Residual	Conhec_musical	Predicted Value	Residual
574	3,053	3,69	1,6128	2,07715

a. Dependent Variable: Conhec_musical

Residuals Statistics^a

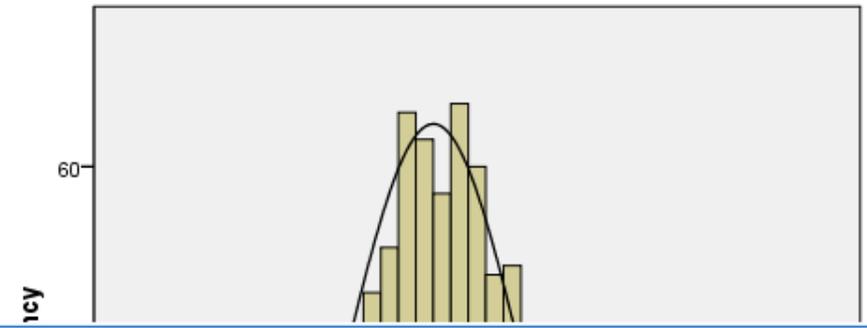
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1,6128	1,9903	1,7711	,14110	810
Residual	-1,82536	2,07715	,00000	,67905	810
Std. Predicted Value	-1,122	1,553	,000	1,000	810
Std. Residual	-2,683	3,053	,000	,998	810

a. Dependent Variable: Conhec_musical

Charts

Histogram

Dependent Variable: Conhec_musical



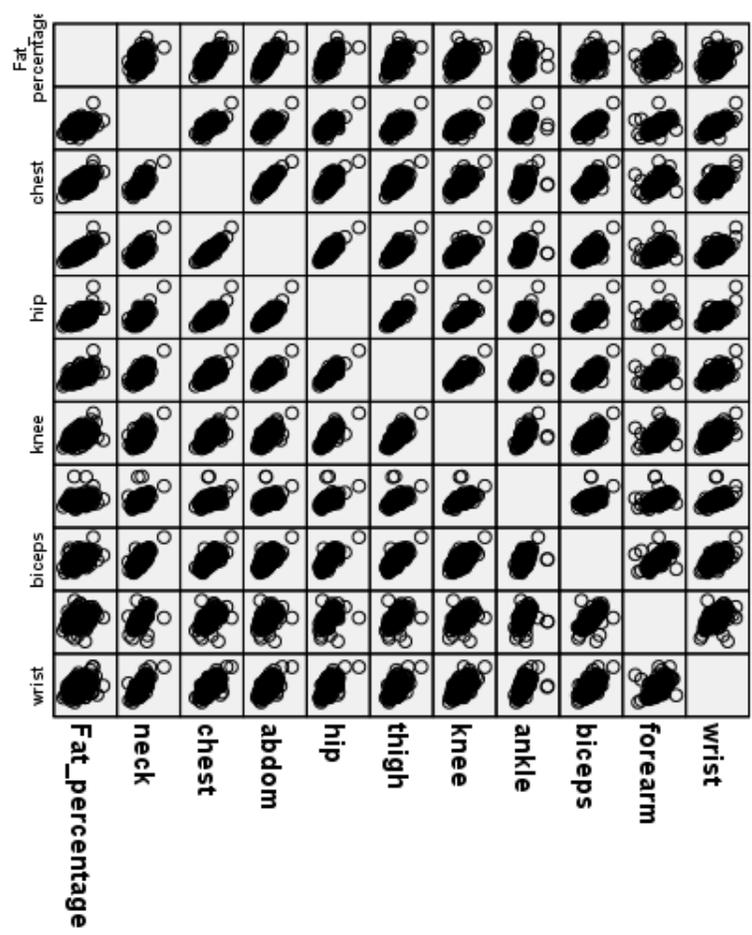
Mean = -2,54E-15
Std. Dev. = 0,998
N = 810

REGRESSÃO MÚLTIPLA



- Output
 - Log
 - Graph
 - Title
 - Notes
 - Active Dataset
 - Matrix of Fat_percentage

[DataSet1] C:\Users\lucya\Desktop\DINTER\RegMult_Fat.sav



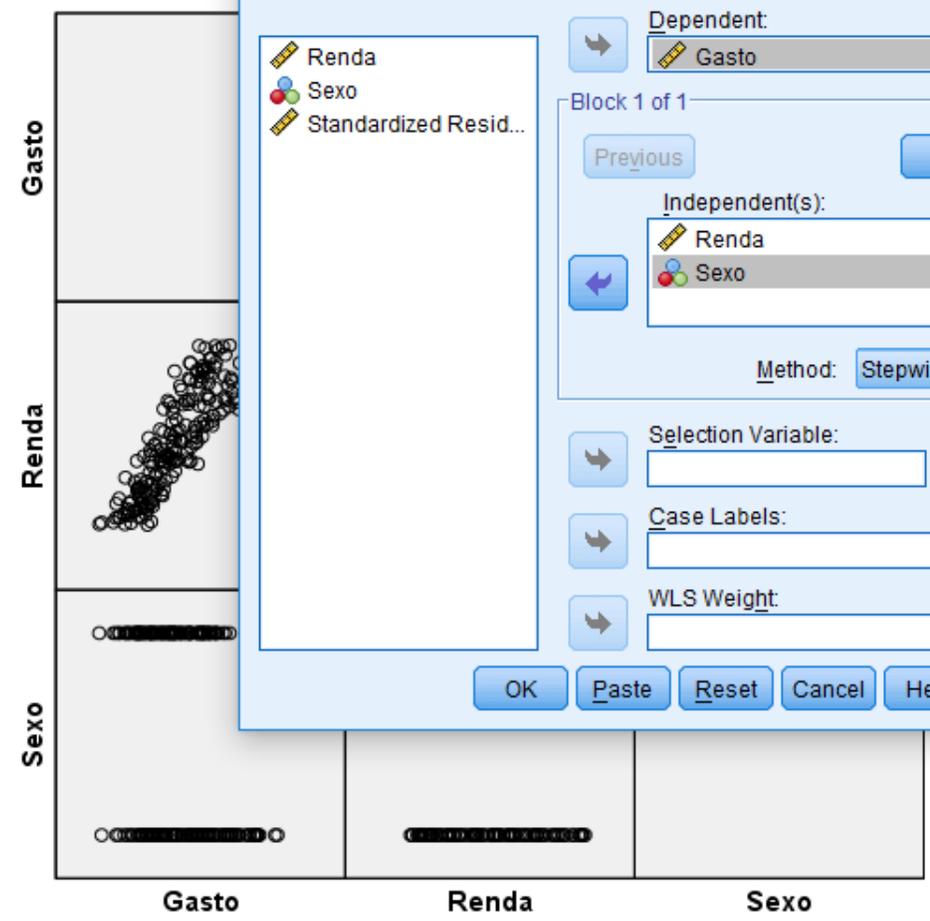


Output

- Log
- Graph
 - Title
 - Notes
 - Active Dataset
 - Matrix of Gasto Re

Graph

[DataSet1] C:\Users\luc



Linear Regression

Dependent: Gasto

Block 1 of 1

Independent(s): Renda, Sexo

Method: Stepwise

Selection Variable: [] Rule...

Case Labels: []

WLS Weight: []

Buttons: Statistics..., Plots..., Save..., Options..., Bootstrap..., OK, Paste, Reset, Cancel, Help



Output

- Log
- Graph
 - Title
 - Notes
 - Active Dataset
 - Matrix of Gasto Re

Graph

[DataSet1] C:\Users\luc

Linear Regression

Dependent: Gasto

Block 1 of 1

Independent(s): Renda, Sexo

Method: Stepwise

Selection Variable: [] Rule...

Case Labels: []

WLS Weight: []

OK Paste Reset Cancel Help

Linear Regression: Statistics

Regression Coefficients

- Estimates
- Confidence intervals
- Level(%): 95
- Covariance matrix
- Model fit
- R squared change
- Descriptives
- Part and partial correlations
- Collinearity diagnostics

Residuals

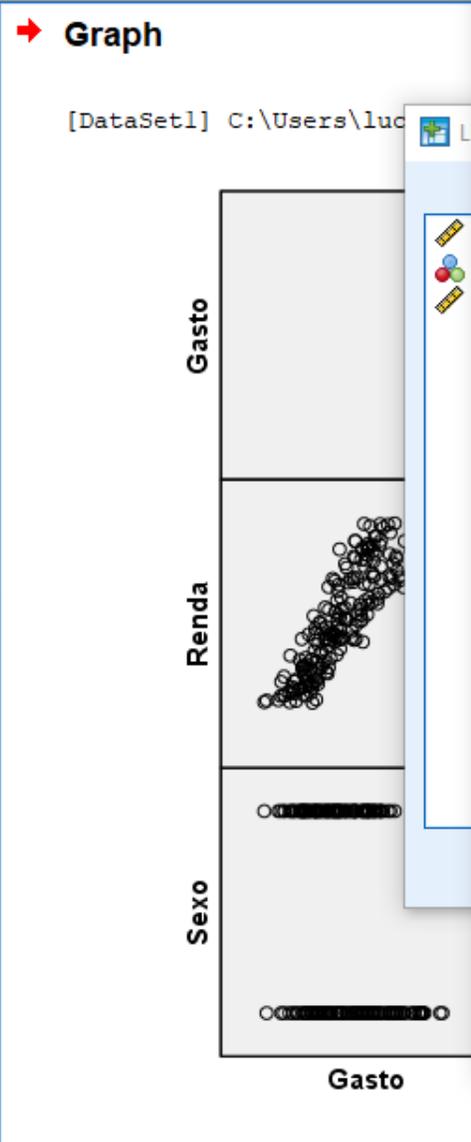
- Durbin-Watson
- Casewise diagnostics
 - Outliers outside: 3 standard deviations
 - All cases

Continue Cancel Help



Output

- Log
- Graph
 - Title
 - Notes
 - Active Dataset
 - Matrix of Gasto Re



Linear Regression: Save

Predicted Values

- Unstandardized
- Standardized
- Adjusted
- S.E. of mean predictions

Residuals

- Unstandardized
- Standardized
- Studentized
- Deleted
- Studentized deleted

Distances

- Mahalanobis
- Cook's
- Leverage values

Prediction Intervals

- Mean Individual
- Confidence Interval: %

Influence Statistics

- DfBeta(s)
- Standardized DfBeta(s)
- DfFit
- Standardized DfFit
- Covariance ratio

Coefficient statistics

- Create coefficient statistics
- Create a new dataset
 - Dataset name:
- Write a new data file
 -

Export model information to XML file

-
-
- Include the covariance matrix



Output

- Log
- Graph
 - Title
 - Notes
 - Active Dataset
 - Matrix of Gasto Re
- Log
- Regression
 - Title
 - Notes
 - Active Dataset
 - Variables Entered
 - Model Summary
 - ANOVA
 - Coefficients
 - Excluded Variable
 - Residuals Statisti
 - Charts
 - Title
 - *zresid Histo
 - *zresid Norm
 - *zresid by *zp

			Probability-of-F-to-remove >= ,100).
--	--	--	--------------------------------------

a. Dependent Variable: Gasto

Model Summary^c

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,867 ^a	,752	,751	733,25557	
2	,936 ^b	,875	,874	521,03456	1,870

a. Predictors: (Constant), Renda

b. Predictors: (Constant), Renda, Sexo

c. Dependent Variable: Gasto

ANOVA^c

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3,230E8	1	3,230E8	600,761	,000 ^a
	Residual	1,065E8	198	537663,735		
	Total	4,295E8	199			
2	Regression	3,760E8	2	1,880E8	692,478	,000 ^b
	Residual	5,348E7	197	271477,013		
	Total	4,295E8	199			

a. Predictors: (Constant), Renda

b. Predictors: (Constant), Renda, Sexo

c. Dependent Variable: Gasto

Coefficients^a

Model	Unstandardized Coefficients	Standardized Coefficients			95.0% Confidence Interval for B
-------	-----------------------------	---------------------------	--	--	---------------------------------



- Active Dataset
- Matrix of Gasto
- Log
- Regression
 - Title
 - Notes
 - Active Dataset
 - Variables Entered
 - Model Summary
 - ANOVA
 - Coefficients
 - Excluded Variables
 - Residuals Statistics
- Charts
 - Title
 - *zresid Histogram
 - *zresid Normal
 - *zresid by
- Log
- Regression
 - Title
 - Notes
 - Active Dataset
 - Variables Entered
 - Model Summary
 - ANOVA
 - Coefficients
 - Excluded Variables
 - Collinearity Diagnostics
 - Residuals Statistics
- Charts
 - Title
 - *zresid Histogram
 - *zresid Normal
 - *zresid by

ANOVA^c

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3,230E8	1	3,230E8	600,761	,000 ^a
	Residual	1,065E8	198	537663,735		
	Total	4,295E8	199			
2	Regression	3,760E8	2	1,880E8	692,478	,000 ^b
	Residual	5,348E7	197	271477,013		
	Total	4,295E8	199			

- a. Predictors: (Constant), Renda
- b. Predictors: (Constant), Renda, Sexo
- c. Dependent Variable: Gasto

VIF não pode ser > 5

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	559,858	118,987		4,705	,000	325,214	794,502		
	Renda	,605	,025	,867	24,510	,000	,556	,654	1,000	1,000
2	(Constant)	1024,309	90,852		11,275	,000	845,142	1203,475		
	Renda	,627	,018	,899	35,604	,000	,592	,662	,992	1,008
	Sexo	-1036,795	74,220	-,353	-13,969	,000	-1183,162	-890,429	,992	1,008

a. Dependent Variable: Gasto

Excluded Variables^b

Model	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		
					Tolerance	VIF	Minimum Tolerance

MODELAGEM MANUAL - BACKWARD



- Title
- Notes
- Active Dataset
- Descriptive Sta
- Correlations
- Log
- Regression
 - Title
 - Notes
 - Active Dataset
 - Variables Enter
 - Model Summar
 - ANOVA
 - Coefficients
 - Residuals Stati
- Charts
 - Title
 - *zresid His
 - *zresid No
 - *zresid by
- Log
- Regression
 - Title
 - Notes
 - Active Dataset
 - Variables Enter
 - Model Summar
 - ANOVA
 - Coefficients
 - Residuals Stati
 - Charts
 - Title
 - *zresid His
 - *zresid No
 - *zresid by

Correlations

		Fat_percentage	neck	chest	abdom	hip	thigh	knee	ankle	biceps	forearm	wrist
Fat_percentage	Pearson Correlation	1	,491**	,703**	,814**	,626**	,561**	,508**	,267**	,493**	,363**	,348**
	Sig. (2-tailed)		,000	,000	,000	,000	,000	,000	,000	,000	,000	,000
	Sum of Squares and Cross-products	15079,017	2324,377	11528,155	17070,007	8720,644	5732,732	2382,572	879,677	2897,928	1428,110	631,281
	Covariance	60,076	9,260	45,929	68,008	34,744	22,840	9,492	3,505	11,546	5,690	2,515
	N	252	252	252	252	252	252	252	252	252	252	252
neck	Pearson Correlation	,491**	1	,703**	,754**	,736**	,696**	,672**	,478**	,731**	,624**	,745**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000
	Sum of Squares and Cross-products	2324,377	11528,155	17070,007	8720,644	5732,732	2382,572	879,677	2897,928	1428,110	631,281	631,281
	Covariance	9,260	45,929	68,008	34,744	22,840	9,492	3,505	11,546	5,690	2,515	2,515
	N	252	252	252	252	252	252	252	252	252	252	252
chest	Pearson Correlation	,703**	,754**	1	,896**	,823**	,558**	,739**	,545**	,630**	,630**	,630**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000
	Sum of Squares and Cross-products	11528,155	17070,007	8720,644	5732,732	2382,572	879,677	2897,928	1428,110	631,281	631,281	631,281
	Covariance	45,929	68,008	34,744	22,840	9,492	3,505	11,546	5,690	2,515	2,515	2,515
	N	252	252	252	252	252	252	252	252	252	252	252
abdom	Pearson Correlation	,814**	,754**	,896**	1	,874**	,874**	,874**	,874**	,874**	,874**	,874**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000
	Sum of Squares and Cross-products	17070,007	8720,644	5732,732	2382,572	879,677	2897,928	1428,110	631,281	631,281	631,281	631,281
	Covariance	68,008	34,744	22,840	9,492	3,505	11,546	5,690	2,515	2,515	2,515	2,515
	N	252	252	252	252	252	252	252	252	252	252	252
hip	Pearson Correlation	,626**	,736**	,823**	,874**	1	,896**	,896**	,896**	,896**	,896**	,896**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000
	Sum of Squares and Cross-products	8720,644	5732,732	2382,572	879,677	2897,928	1428,110	631,281	631,281	631,281	631,281	631,281
	Covariance	34,744	22,840	9,492	3,505	11,546	5,690	2,515	2,515	2,515	2,515	2,515
	N	252	252	252	252	252	252	252	252	252	252	252
thigh	Pearson Correlation	,561**	,696**	,558**	,874**	,896**	1	,896**	,896**	,896**	,896**	,896**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000
	Sum of Squares and Cross-products	5732,732	2382,572	879,677	2897,928	1428,110	631,281	631,281	631,281	631,281	631,281	631,281
	Covariance	22,840	9,492	3,505	11,546	5,690	2,515	2,515	2,515	2,515	2,515	2,515
	N	252	252	252	252	252	252	252	252	252	252	252
knee	Pearson Correlation	,508**	,672**	,478**	,874**	,896**	,896**	1	,896**	,896**	,896**	,896**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000
	Sum of Squares and Cross-products	2382,572	879,677	2897,928	1428,110	631,281	631,281	631,281	631,281	631,281	631,281	631,281
	Covariance	9,492	3,505	11,546	5,690	2,515	2,515	2,515	2,515	2,515	2,515	2,515
	N	252	252	252	252	252	252	252	252	252	252	252
ankle	Pearson Correlation	,267**	,478**	,630**	,874**	,896**	,896**	,896**	1	,896**	,896**	,896**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000
	Sum of Squares and Cross-products	879,677	2897,928	1428,110	631,281	631,281	631,281	631,281	631,281	631,281	631,281	631,281
	Covariance	3,505	11,546	5,690	2,515	2,515	2,515	2,515	2,515	2,515	2,515	2,515
	N	252	252	252	252	252	252	252	252	252	252	252
biceps	Pearson Correlation	,493**	,731**	,624**	,874**	,896**	,896**	,896**	,896**	1	,896**	,896**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000
	Sum of Squares and Cross-products	2897,928	1428,110	631,281	631,281	631,281	631,281	631,281	631,281	631,281	631,281	631,281
	Covariance	11,546	5,690	2,515	2,515	2,515	2,515	2,515	2,515	2,515	2,515	2,515
	N	252	252	252	252	252	252	252	252	252	252	252
forearm	Pearson Correlation	,363**	,624**	,745**	,874**	,896**	,896**	,896**	,896**	,896**	1	,896**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000
	Sum of Squares and Cross-products	631,281	631,281	631,281	631,281	631,281	631,281	631,281	631,281	631,281	631,281	631,281
	Covariance	2,515	2,515	2,515	2,515	2,515	2,515	2,515	2,515	2,515	2,515	2,515
	N	252	252	252	252	252	252	252	252	252	252	252
wrist	Pearson Correlation	,348**	,745**	,630**	,874**	,896**	,896**	,896**	,896**	,896**	,896**	1
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000
	Sum of Squares and Cross-products	631,281	631,281	631,281	631,281	631,281	631,281	631,281	631,281	631,281	631,281	631,281
	Covariance	2,515	2,515	2,515	2,515	2,515	2,515	2,515	2,515	2,515	2,515	2,515
	N	252	252	252	252	252	252	252	252	252	252	252

Linear Regression

Dependent: Fat_percentage

Block 1 of 1

Independent(s): neck, chest, abdom

Method: Enter

Selection Variable: [] Rule...

Case Labels: []

WLS Weight: []

Buttons: OK, Paste, Reset, Cancel, Help

Linear Regression: Statistics

Regression Coefficients

- Estimates
- Confidence intervals
- Level(%): 95
- Covariance matrix
- Model fit
- R squared change
- Descriptives
- Part and partial correlations
- Collinearity diagnostics

Residuals

- Durbin-Watson
- Casewise diagnostics
 - Outliers outside: 3 standard deviations
 - All cases

Buttons: Continue, Cancel, Help



1: Fat_percentage 6,1

	Fat_percentage
1	6,1
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	4,0
22	18,2

Linear Regression: Save

Predicted Values

- Unstandardized
- Standardized
- Adjusted
- S.E. of mean predictions

Residuals

- Unstandardized
- Standardized
- Studentized
- Deleted
- Studentized deleted

Distances

- Mahalanobis
- Cook's
- Leverage values

Influence Statistics

- DfBeta(s)
- Standardized DfBeta(s)
- DfFit
- Standardized DfFit
- Coyariance ratio

Prediction Intervals

- Mean Individual
- Confidence Interval: %

Coefficient statistics

- Create coefficient statistics
- Create a new dataset
 - Dataset name:
- Write a new data file
 -

Export model information to XML file

-
- Include the covariance matrix

Visible: 14 of 14 Variables

dom	hip	thigh	knee	ankle	biceps	forearm	wrist	var	va
82,8	91,9	54	35,2	22,5	29	26,8	17,0		
	147,7	87	49,1	29,6	45	29,0	21,4		
	98,2	57	37,1	21,8	34	31,1	19,2		
	90,1	53	35,0	21,3	32	27,3	16,9		
	92,8	55	36,2	22,1	30	27,4	17,7		
	102,6	61	39,0	24,0	33	29,2	18,4		
	103,6	61	39,3	23,5	31	28,5	18,1		
	89,2	50	34,8	22,0	25	25,9	16,9		
	102,4	61	39,4	22,9	32	30,1	18,5		
	107,7	67	42,5	24,5	36	29,8	18,7		
	111,8	63	41,1	22,3	35	29,6	18,5		
	101,7	60	37,3	21,5	31	27,2	18,0		
	109,0	66	40,6	24,0	37	30,1	18,2		
	101,4	57	39,6	24,6	30	27,9	17,8		
	109,9	70	43,1	25,8	39	32,5	19,9		
	85,0	47	33,5	20,2	28	24,6	16,5		
	96,2	58	38,1	23,9	31	29,9	18,9		
	89,1	49	33,7	21,4	30	26,0	16,9		
	102,5	61	38,5	25,0	32	28,0	18,6		
	99,9	63	38,3	23,8	36	31,1	18,2		
	96,5	55	36,7	22,5	30	28,2	17,7		
101,6	100,7	56	38,7	23,4	35	29,6	19,1		



- Title
- Notes
- Active Dataset
- Descriptive Sta
- Correlations
- Log
- Regression
 - Title
 - Notes
 - Active Dataset
 - Variables Enter
 - Model Summar
 - ANOVA
 - Coefficients
 - Residuals Stati
- Charts
 - Title
 - *zresid His
 - *zresid No
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- Log
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 - Notes
 - Active Dataset
 - Variables Enter
 - Model Summar
 - ANOVA
 - Coefficients
 - Residuals Stati
- Charts
 - Title
 - *zresid His
 - *zresid No
 - *zresid by

[DataSet1] C:\Users\lucya\Desktop\DINTER\RegMult_Fat.sav

Variables Entered/Removed^b

Model	Variables Entered	Variables Removed	Method
1	wrist, thigh, ankle, forearm, chest, biceps, knee, neck, abdom, hip ^a	.	Enter

- a. All requested variables entered.
- b. Dependent Variable: Fat_percentage

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,857 ^a	,735	,724	4,0713	,028

- a. Predictors: (Constant), wrist, thigh, ankle, forearm, chest, biceps, knee, neck, abdom, hip
- b. Dependent Variable: Fat_percentage

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11084,281	10	1108,428	66,871	,000 ^a
	Residual	3994,736	241	16,576		
	Total	15079,017	251			

- a. Predictors: (Constant), wrist, thigh, ankle, forearm, chest, biceps, knee, neck, abdom, hip



Tree view showing the project structure:

- Title
 - *zresid His
 - *zresid No
 - *zresid by
- Log
- Regression
 - Title
 - Notes
 - Active Dataset
 - Variables Enter
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 - ANOVA
 - Coefficients
 - Residuals Stati
- Charts
 - Title
 - *zresid His
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 - *zresid by
- Log
- Regression
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 - Notes
 - Active Dataset
 - Variables Enter
 - Model Summar
 - ANOVA
 - Coefficients
 - Collinearity Dia
 - Residuals Stati
- Charts
 - Title
 - *zresid His
 - *zresid No
 - *zresid by

Model		Sums of Squares	df	Mean Square	F	Sig.
1	Regression	11084,281	10	1108,428	66,871	,000 ^a
	Residual	3994,736	241	16,576		
	Total	15079,017	251			

a. Predictors: (Constant), wrist, thigh, ankle, forearm, chest, biceps, knee, neck, abdom, hip

b. Dependent Variable: Fat_percentage

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	7,229	6,214		1,163	,246	-5,013	19,470		
	neck	-,582	,209	-,183	-2,790	,006	-,993	-,171	,257	3,893
	chest	-,091	,085	-,099	-1,063	,289	-,259	,077	,127	7,855
	abdom	,960	,072	1,336	13,414	,000	,819	1,101	,111	9,022
	hip	-,391	,113	-,362	-3,473	,001	-,613	-,169	,101	9,869
	thigh	,134	,125	,091	1,070	,286	-,112	,380	,154	6,513
	knee	-,094	,212	-,029	-,443	,658	-,512	,324	,252	3,973
	ankle	,004	,203	,001	,021	,983	-,396	,404	,557	1,796
	biceps	,111	,159	,043	,699	,485	-,202	,425	,286	3,500
	forearm	,345	,186	,090	1,857	,064	-,021	,710	,470	2,128
	wrist	-1,353	,471	-,163	-2,871	,004	-2,282	-,425	,341	2,933

a. Dependent Variable: Fat_percentage

Collinearity Diagnostics^a

Model	Dimension	Condition	Variance Proportions																	
			1	2	3	4	5	6	7	8	9	10								



- Title
- Notes
- Active Dataset
- Descriptive Sta
- Correlations
- Log
- Regression
 - Title
 - Notes
 - Active Dataset
 - Variables Enter
 - Model Summar
 - ANOVA
 - Coefficients
 - Residuals Stati
 - Charts
 - Title
 - *zresid His
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- Log
- Regression
 - Title
 - Notes
 - Active Dataset
 - Variables Enter
 - Model Summar
 - ANOVA
 - Coefficients
 - Residuals Stati
 - Charts
 - Title
 - *zresid His
 - *zresid No
 - *zresid by

ankle	,004	,203	,001	,021	,983	-,396	,404
biceps	,111	,159	,043	,699	,485	-,202	,425
forearm	,345	,186	,090	1,857	,064	-,021	,710
wrist	-1,353	,471	-,163	-2,871	,004	-2,282	-,425

a. Dependent Variable: Fat_percentage

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	5,682	42,677	18,938	6,6453	252
Std. Predicted Value	-1,995	3,572	,000	1,000	252
Standard Error of Predicted Value	,434	2,320	,802	,284	252
Adjusted Predicted Value	5,584	46,946	18,937	6,7067	252
Residual	-9,3159	10,5150	,0000	3,9894	252
Std. Residual	-2,288	2,583	,000	,980	252
Stud. Residual	-2,653	2,620	,000	1,006	252
Deleted Residual	-13,1458	11,5814	,0013	4,2199	252
Stud. Deleted Residual	-2,687	2,653	,000	1,010	252
Mahal. Distance	1,853	80,505	9,960	10,458	252
Cook's Distance	,000	,308	,006	,024	252
Centered Leverage Value	,007	,321	,040	,042	252

a. Dependent Variable: Fat_percentage

Charts

Histogram



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