

XL3B: V0U Excel2013 Model Toolpak Regress2 Binary&Continuous 1

## Regress Linear Two Predictor Binary+Continuous Excel 2013

by  
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Materials at: [www.StatLit.org/pdf/Excel2013-Model-Toolpak-Regress2BC-Slides.pdf](http://www.StatLit.org/pdf/Excel2013-Model-Toolpak-Regress2BC-Slides.pdf)  
[Excel2013-Model-Toolpak-Regress2BC-Output.pdf](http://www.StatLit.org/pdf/Excel2013-Model-Toolpak-Regress2BC-Output.pdf)

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## Weight-Height association before/after control for Gender

Required output: Create and upload your worksheet:

1. Calculate mean height and weight by gender: slide 3
2. Model Weight on Height and Gender: slides 6 & 7.
3. Generate height-weight chart with trendline: slide 8.\*
4. Graph output from multiple regression: slide 12.\*  
Show regress lines for men and women separately.

\* Show equation and R-square on both graphs.

Data: [www.StatLit.org/xls/Excel2013-Model-Toolpak-Regress2BC-Input.xls](http://www.StatLit.org/xls/Excel2013-Model-Toolpak-Regress2BC-Input.xls)  
Subjects are college students. *Male*: 1 for guys; 0 for gals.

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## 1) Analyze Data: Enter Formula into K4:L5

Row	J	K	L	M	N	O	P
2	Generate Summary Statistics by Gender:						V0E
3	Averages	Male=1	Female=0	=AVERAGEIFS() requires Excel 2007 or newer			
4	Height	70.8	65.4	=AVERAGEIFS(\$C2:\$C93,\$D2:\$D93,"=0")			
5	Weight	158.3	123.8	=AVERAGEIFS(\$E2:\$E93,\$D2:\$D93,"=0")			
6				=AVERAGEIFS(\$E2:\$E93,\$D2:\$D93,"=1")			
7				AVERAGEIFS function allows data to be separate from the criteria.			

**Actual male-female differences:**

- Average weight: 158.3 - 123.8 = 34.5 pounds
- Average height: 70.75 - 65.40 = 5.35 inches

Question: How much of the male-female weight difference (34.5#) is due to gender (male vs. female) and how much is due to the difference in heights?  
Analyzing a whole into parts is called "decomposition".

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## 2a) Data Toolbar, select Data Analysis. Select Regression

See slide 17 if no Data Analysis on your toolbar.

	A	B	C	D	E	F	G	H	I	J	K	L
1	Pulse1	Pulse2	Height	Male?	Weight	Activity	Run?	Imokes?				
2	58	56	67	0	125	2	0	0				
3	60	66	62	0	120	2						
4	61	70	65.5	0	120	2						
5	62	100	66	0	120	2						
6	62	98	62.75	0	112	2						
7	62	66	65	0	122	3						
8	64	60	66	0	130	3						
9	66	72	66	0	125	2						
10	66	76	65	0	115	2						
11	68	112	70	0	125	2						
12	68	68	69	0	150	2						

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## 2b) Regress Weight (E1:E93) on Height and Sex (C1:D93)

Input Y Range: \$E\$1:\$E\$93  
Input X Range: \$C\$1:\$D\$93  
Labels:    
Confidence Level: 95%   
Output Range: \$J\$9  
New Worksheet Ply:

Obtain R-sq here

Obtain best-fit coefficients here

Formatting and formula are optional

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## 2c) Results: Regress Weight on Height and Sex (Male?)

	J	K	L	M	N	O	P
9	SUMMARY OUTPUT						
11	Regression Statistics						
12	Multiple R	0.81					
13	R Square	0.66					
14	Adjusted R	0.65					
15	Standard Error	13.98					
16	Observations	92					
18	ANOVA						
19		df	SS	MS	F	Significance F	
20	Regression	2	33886.66	16943.33	86.68	1.28E-21	
21	Residual	89	17397.21	195.47			
22	Total	91	51283.87				
24	Coefficients						
25	Intercept	-117.60	3.69	-3.14	0.00	-192.11	-43.09
26	Height	3.69	0.57	6.45	0.00	2.55	4.83
27	Male?	14.70	4.29	3.43	0.00	6.18	23.22

Weight = -117.6 + (3.69\*Height) + (14.7\*Male).

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**2d) Calculate Expected Weight at High+Low Heights for Guys+Gals**

Create formula in L33 predicting weight:

31	J	K	L	M	N	O
32	Height	Male	Weight			
33	60	0	104	=K\$25+K\$26*J33+K\$27*K33		
34	76	0		Pull down L33 to L36.		
35	60	1				
36	76	1				

Height	Male	Weight
60	0	104
76	0	163
60	1	119
76	1	178

Pull L33 down to L36

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**3) Create Chart #1**

Edit Series

Series name: = Weight

Series X values: = 'S1'!\$C\$2:\$C\$93

Series Y values: = 'S1'!\$E\$2:\$E\$93

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**4a) Copy & Paste Chart 1. Delete Trend, Equation & R<sup>2</sup>**

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**4b) Select Data. Add two series: One for Gals and one for Guys**

31	J	K	L
32	Height	Male	Weight
33	60	0	104
34	76	0	163

Series X values: = 'S1'!\$J\$35:\$J\$36

Series Y values: = 'S1'!\$L\$35:\$L\$36

35	60	1	119
36	76	1	178

Series X values: = 'S1'!\$J\$33:\$J\$34

Series Y values: = 'S1'!\$L\$33:\$L\$34

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**4c) Select top/guys data point. Format data series/Paint/Line/Solid Repeat for bottom/gals data point.**

To select: Point and right mouse

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**4d) Insert text boxes for Male, Female and Equation with R<sup>2</sup>**

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## Appendix


Slide 16: What to do if the plus sign doesn't appear on the upper-right side of the graph

Slides 17 & 18: What to do if the Data Analysis object doesn't appear on the right side of the Data toolbar.

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## If + Sign doesn't appear on upper-right side of graph...

Select the graph. Select the Chart-Tools Design tab.



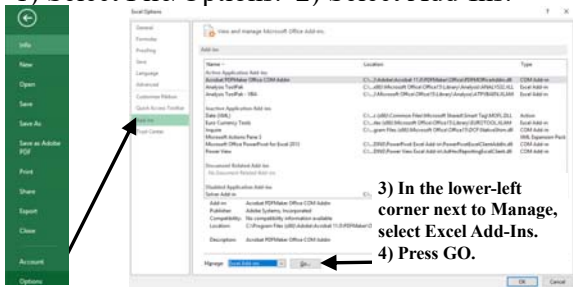
At the far-left, select "Add Chart Element". Select "Axis Titles" and "Chart Title".

To add a Trendline, either select "Trendline" under "Add Chart Element" or right-mouse on a data point and select Trendline from menu.

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## If Data Analysis doesn't appear on Data Toolbar

1) Select File/Options. 2) Select Add-Ins.

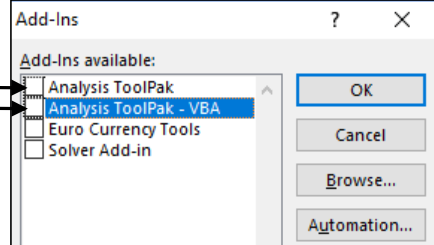


3) In the lower-left corner next to Manage, select Excel Add-Ins. 4) Press GO.

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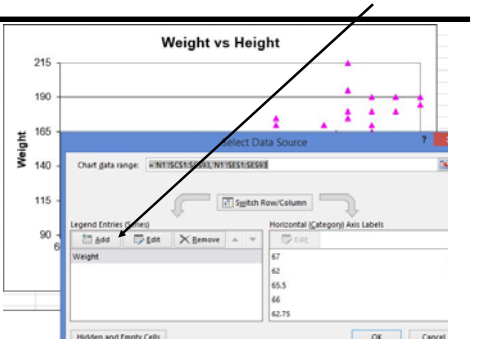
## Add Data Analysis to the Data Toolbar

1) Checks the boxes involving Analysis ToolPak.  
2) Press OK



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## 4b2) Select Data; Select "Add"



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## 4c2) After Adding Two New Series, Press "OK"

