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## **LDG 660 SPSS Assignment 2**

The following data represent advertising dollars spent and company sales for Nyack Electronics, Inc. for the months of January, 2020 thru August, 2020.

For illustrative purposes, we can tell that in the month of January, Nyack Electronics, Inc. spent \$2,400 in advertising and had corresponding company sales of \$225,000. Therefore, this would be a point on the scatterplot: (2400, 225000).

Conduct the steps below to complete the lab.

There are 5 steps (each worth 15 pts). The lab, in total, is worth 75 pts.

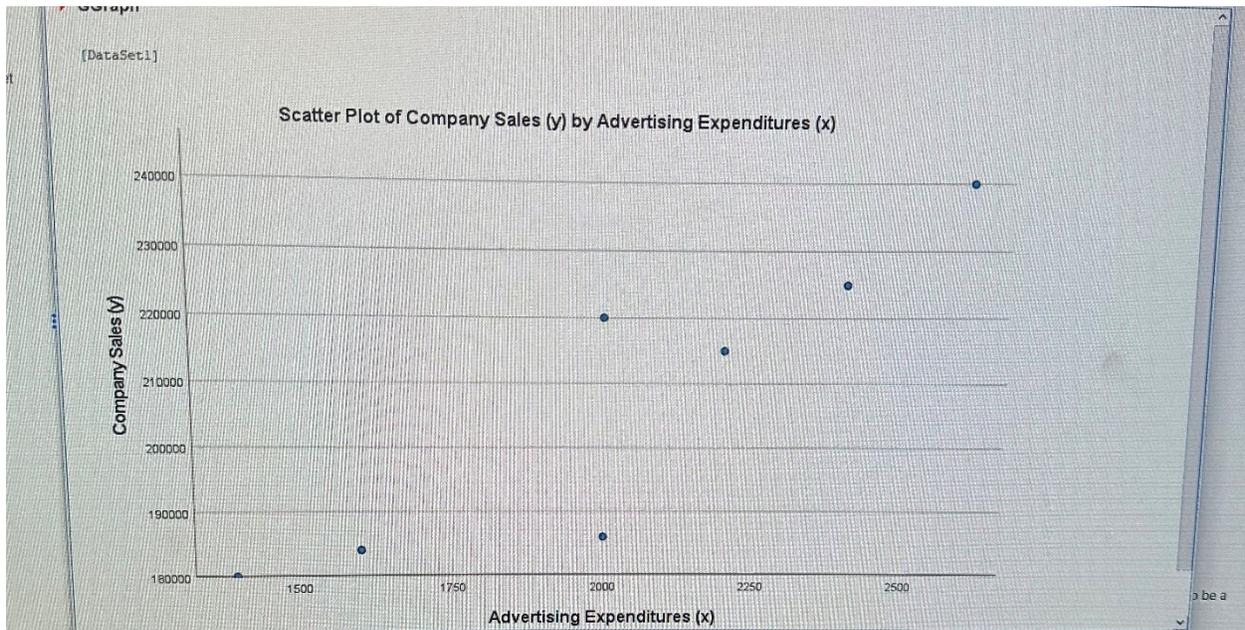
**Step 1 (15 pts):** Import the data into SPSS. Insert an image/screenshot below to confirm this.

Month (of 2020)	Advertising Expenditures (x)	Company Sales (y)
Jan	2,400	225,000
Feb	1,600	184,000
Mar	2,000	220,000
Apr	2,600	240,000
May	1,400	180,000
Jun	1,600	184,000
Jul	2,000	186,000
Aug	2,200	215,000

**Step 2 (15 pts):** Generate a scatterplot

Note: You could do this via:

(1) Graphs → Chart Builder



Comment on what you see/what you can infer from the scatterplot. Does there appear to be a relationship between x and y – Advertising Expenditures and Company Sales?

Yes, there appears to be a positive relationship between x and y. It appears that as the company spends more on advertising sales go up.

**Step 3 (15 pts):** Run a simple linear regression (remember which is 'x' and which is 'y!').

Note: You could do this via:

(1) Analyze → Regression → Linear

Insert an image/screenshot of the output.

The image shows a screenshot of SPSS regression output. It contains three tables: Model Summary, ANOVA, and Coefficients. The Model Summary table shows R = .913, R Square = .833, Adjusted R Square = .806, and Std. Error of the Estimate = 10290.320. The ANOVA table shows Regression Sum of Squares = 3178155870, Residual Sum of Squares = 635344129.6, and Total Sum of Squares = 3813500000. The Coefficients table shows the unstandardized coefficients for the Constant (104060.729) and Advertising Expenditures (50.729), along with their standardized coefficients (.913) and significance values (.001 and .002 respectively).

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.913 <sup>a</sup>	.833	.806	10290.320

a. Predictors: (Constant), Advertising Expenditures (x)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3178155870	1	3178155870	30.014	.002 <sup>b</sup>
	Residual	635344129.6	6	105890688.3		
	Total	3813500000	7			

a. Dependent Variable: Company Sales (y)  
b. Predictors: (Constant), Advertising Expenditures (x)

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	104060.729	18646.221		5.581	.001
	Advertising Expenditures (x)	50.729	9.260	.913	5.478	.002

**Step 4 (15 pts):** What does the output tell you? Comment specifically on the p-value for the overall model (is it significant and how can you tell). Comment on the R-squared value and what it means.

R-value is 0.913 (correlation coefficient)

Ranges from -1 to +1, anything close to +1 indicates a strong positive relationship.

\*Generally at least a r-value 0.6 or higher

Anything close to -1 indicates a strong negative relationship

\*Generally at least a r-value 0.6 or higher

Anything close to 0 indicates no relationship at all

R-squared value of 0.833, indicates that 83.3% of the changes in sales (y) is attributable to its relationship with w/ADV expenditures x. The other 16.7% of changes are due to variables we have not considered (lurking variables).

P-value for the overall model (0.002)-The p-value of 0.002 tells us that the overall model is significant. In other words adv expenditures is a good predictor of Company Sales (we want our p-value to be very small, less than 5% or 0.05)

**Step 5 (15 pts):** What is the equation for the regression line? What is the predicted company sales if advertising expenditures were \$1,800?

$$Y=mx+b$$

$$R\text{-value}=\text{close to } +1 \text{ (0.913)}$$

$$R\text{-squared}=0.833$$

$$P\text{-value for overall model}=\text{less than or equal to } 0.05$$

$$P=0.002$$

$$\text{Company sales}=50.729 (\text{adv exp})+104060.729$$

$$195372.93=50.729(1800)+104060.729$$

$$x-y=195.3$$